INTRUSIVE GEO-ENVIRONMENTAL FACTUAL REPORT

FINAL

Cardiff and Vale College – Barry Waterfront Campus (BWC)

February 2024

HSP2023-C3297-G-GFPII-1948

REV B





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Cardiff and Vale College - Barry Waterfront Campus (BWC)

Ground Investigation Factual Report

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Issue & Revision History

Revision	Status	Originated	Checked	Approved	Date
-	INTERIM	L.Jones B.Sc (Hons) FGS, MIEnvSci	K. Murray BSc (Hons), MSc FGS, MIMMM	H.Pratt B.Eng (Hons), C.Eng, F.Cons.E, M.I.C.E, MI Mgt.	05.12.2023
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Executive Summary

HSP Consulting Engineers Ltd has been commissioned by WEPCo on behalf of Cardiff and Vale College to undertake an intrusive ground investigation at the site to investigate the existing ground conditions, identify any buried obstructions or fuel tanks and provide information on likely constraints to the development.

The site is located off Ffordd Y Mileniwm, approximately 0.30 km south east of Barry town centre. The approximate National Grid Reference for the centre of the site is (NGR) 311115, 167399.

The physical methods of investigation employed were 8No mechanically excavated trial pits to a maximum depth of 4.10m begl, 5No. cable percussion boreholes with rotary core follow on to depths in the range of 25.15m begl and 34.50m begl and 10No. static cone penetration tests to a maximum depth of 10.00m begl. In-situ plate load testing and infiltration testing was conducted within the trial pits. The scope of works has been prepared by Ove Arup & Partners Limited ref: VG0201-ARP-ZZ-ZZ-SP-G-00001, 23rd June 2023.

The ground conditions encountered on site generally comprised grass or hardstanding over Made Ground deposits which were encountered to a maximum depth of 4.00m begl. Underlying the Made Ground, Tidal Flat Deposits consisting of very soft to stiff grey blue brown SILT and bands of medium dense grey brown gravelly COBBLES of Limestone to a maximum depth of 20.00m begl. Weathered deposits of the Penarth Group were encountered from a minimum depth of 8.00m begl and comprised very weak weathered LIMESTONE. Competent strong LIMESTONE was encountered from a minimum depth of 15.00m begl. Rapid groundwater ingress was encountered within BH01 at 16.00m begl and BH06 at 21.00m begl during the advancement of the core drilling.

Thirty seven soil samples were scheduled for chemical analysis. In addition, disturbed, bulk and undisturbed samples were scheduled for geotechnical testing from the development area. Testing schedules were prepared by the design engineers Ove Arup and Partners. Three rounds of ground gas and water monitoring has been completed at the site. Ground water samples were collected during each monitoring visit and submitted for chemical analysis.

The executive summary contains an overview of key findings. However, no reliance should be placed on the executive summary until the whole of the report has been read. Other sections of the report may contain information which puts into context the findings noted within the executive summary.





1. Introduction

1.1 Background

WEPCo on behalf of Cardiff and Vale College propose to construct a new college campus including multi-storey buildings, car park, access roads and areas of landscaping and attenuation.

This investigation forms a supplementary ground investigation and the scope of works has been prepared by Arup Ref: VG0201-ARP-ZZ-ZZ-SP-G-00001, 23rd June 2023. (Ref 9).

1.2 Client Brief & Scope

HSP Consulting Engineers Ltd has been commissioned by WEPCo on behalf of the Vale of Glamorgan Council to undertake an intrusive ground investigation at the site to investigate the existing ground conditions and geoenvironmental setting. The scope of the investigation was provided by Arup, the clients engineer.

The ground investigation scope included the following:

- 8No. Machine excavated trial pits to a maximum of 4m begl. This is to confirm the ground conditions and groundwater level, and collect soil samples for laboratory analysis;
- 5No. exploratory holes to a depth of between 25m and 35m using a combination of cable percussion and rotary drilling methods, to confirm ground conditions and groundwater level, and collect soil samples for laboratory analysis;
- 7No. cone penetration tests with piezocone to confirm ground conditions and groundwater level;
- In situ strength and stiffness testing such as Standard Penetration tests and Plate Load tests:
- In situ infiltration testing in 3No. trial pits;
- Geotechnical laboratory testing to inform the design process, including unconfined compression strength test;
- BRE SD1 classification of all strata encountered;
- Sampling and geochemical testing of Made Ground and suspected contaminated materials where encountered;
- Monitoring of groundwater if encountered;
- Sampling and contamination testing of groundwater if encountered;
- Ground gas monitoring;
- Dry weight and waste acceptance criteria (WAC) of soil samples to inform disposal options;

The report presents the following information:

- details of the ground investigation undertaken and the ground conditions encountered,
- details and results of the environmental analysis and geotechnical testing.



· results of ground gas and groundwater monitoring.

Where applicable, the fieldwork was undertaken in accordance with BS5930:2015+A1:2020 Code of Practice for Site Investigations and BS10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.

1.3 Limitations

The recommendations made in this report are based on the findings of the intrusive ground investigation undertaken by HSP Consulting Engineers Ltd from the 18th September to the 20th October 2023.

1.4 Previous Reports

HSP Consulting Engineers Ltd has produced the following reports for the site:

- HSP Consulting Engineers Limited Cardiff and Vale College Site BWF Phase I Geo-Environmental Desk Study Report, July 2020, Ref: C3297/PI. (Ref 1).
- HSP Consulting Engineers Limited Cardiff and Vale College Site BWF Phase II Geo-Environmental Assessment Report, November 2020, Ref C3297/PII. (Ref 2).

The following third party reports are also available for the site:

- Barry Waterfront Campus Proposed Site Plan [VG0210-SRA-ZZ-ZZ-DR-A-00101-P02-Sheppard Robson 05/2022]. (Ref 3).
- Barry Waterfront Campus Desk Study Addendum [VG0201-ARP-ZZ-ZZ-RP-G-00001, Arup]. (Ref 4).



2. Review of Existing Information & Geoenvironmental Setting

2.1 The Site

2.1.1 Location

The site is located off Ffordd Y Mileniwm, approximately 0.30 km south east of Barry town centre. The approximate National Grid Reference for the centre of the site is (NGR) 311115, 167399. A Site Location Plan is included in Appendix I.

2.1.2 **2020 Description**

The site is irregular in shape and is approximately 1.15Ha in area. The site is accessed via a gated road off Ffordd Y Mileniwm to the south of the site.

The majority of the site is a mixture of concrete hardstanding and weathered tarmacadam surface. Directly south of the fenced temporary compound is an area of undulating scrubland which has been used for stockpiling topsoil like materials and construction debris.

The site is bounded by a mixture of Heras and Palisade fencing with the temporary site compound in the east of the site bounded by further Heras Fencing. The sites topography is generally level in the west, centre and north east of the site. With the eastern scrubland at a higher elevation, approximately 1.5m compared to the rest of the site.

2.1.3 Surrounding Land Use

The main features of interest identified are:

North: Mixed use, heritage rail line and station, commercial, retail and leisure use with

residential properties beyond.

East: Barry Docks.

South: Supermarket and residential properties.

West: Railway Lines and residential properties beyond.

2.1.4 Site Access

The site was accessed via a turning head off Ffordd Y Mileniwm along the southern boundary of the site or via a gated entrance from Hood Road on the eastern boundary.

2.1.5 Proposed End Use

WEPCo on behalf of Cardiff and Vale College propose to construct a new college campus including multi-storey buildings, car park, access roads and areas of landscaping and attenuation. A site development plan is presented in Appendix II.

2.2 Geology

2.2.1 Made Ground

The BGS mapping indicates that Made Ground (Undivided) is present across the site, this is described as an area where the land surface (natural or artificial) has been extensively



remodelled, but where it is impractical or impossible to delineate separate zones of made ground, worked ground or disturbed ground of variable composition.

2.2.2 Superficial Deposits

The BGS mapping indicates the site is underlain by superficial deposits of Tidal Flats in the centre and east of the site, which comprise sands, gravels, silts and clays. Described by the BGS as 'Tidal flat deposits, including mud flat and sand flat deposits, are deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. They may form the top surface of a deltaic deposit. Normally a consolidated soft silty clay, with layers of sand, gravel and peat. Characteristically low relief.' Superficial deposits are not expected in the west of the site.

2.2.3 Bedrock Geology

BGS bedrock mapping indicates the majority of the site is underlain by mudstone and interbedded limestones of the Penarth Group Mudstone and Limestone, Interbedded of the Triassic Period, described by the BGS as 'Grey to black mudstones with subordinate limestones and sandstones; predominantly marine in origin.'

With the St Mary's Well Bay Member – Limestone and Mudstone, Interbedded of the Triassic and Jurassic Periods indicated in the extreme west of the site. A detailed description of this unit is not available from the BGS.

2.3 Pertinent Site Sensitivity Information

Based on the information collated for the desk study, the geo-environmental setting of the site is summarised as follows:

- The site is shown from earliest mapping (1878) to be part of tidal flats of the *Cadoxton River*. The site and surrounding area is shown as reclaimed from the 1898 mapping forming part of the Barry Docks, a large industrial area with associated railways, tracks, tanks and coal yards until the late 1990's where the site is disused.
- The surrounding land use is recorded as predominantly, industrial and residential. The
 town of Barry is located to the east of the site. Rapid industrial development in the early
 1900s reaching its peak towards the 1970s, with a steady decline to present day.
 Recent developments include residential and commercial development to the north
 and south of the site.
- Superficial deposits comprising Tidal Flats with bedrock geology of the Penarth Group and St Mary's Well Bay Member are expected on site.
- Made Ground materials are expected across the site area as the site and surrounding area are recorded on the BGS mapping as Infilled Land
- The superficial geology of the Tidal Flats is designated as Secondary Undifferentiated with bedrock geologies of the Penarth Group and St Mary's Well Bay Member are designated as a Secondary (B) Aquifer and Secondary (A) Aquifer respectively.



Based on the above, the environmental sensitivity of the site can be considered to be Moderate at this stage.

2.4 HSP 2020 Intrusive Site Investigation Summary

The ground investigation comprised 12No window sample boreholes to a maximum depth of 4.00m begl. The ground conditions encountered generally comprised hardstanding or topsoil, overlying made ground deposits to a maximum depth of 3.50m begl. Natural Tidal Flats deposits were encountered within four locations across the site.

Due to variable and deep made ground (greater than 3.00m depth) and low strength Tidal Flat deposits, a traditional solution is unlikely to be feasible. Therefore, an alternate foundation solution in the form of piling is recommended. This should be designed and warranted by a specialist contractor. It is recommended that deeper rotary boreholes are advanced within the proposed building footprint on site to determine the depth of competent strata and provide information for initial pile design.

The screening process for on-site human health receptors show that the relevant GACs, were exceeded for lead and asbestos. Mitigation measures in the form of a clean cover system within all soft landscaping areas will be required. Alternatively, the area of the lead exceedance and asbestos detection could be subject to delineation and removal off site to a suitable waste disposal facility.

At this stage, it is considered appropriate to adopt a basic Design Sulphate Class of DS-1 together with and Aggressive Chemical Environment for Concrete (ACEC) of AC-1 within the made ground across the site and a basic Design Sulphate Class of DS-2 together with and Aggressive Chemical Environment for Concrete (ACEC) of AC-1s within the natural soils. An atypical result was encountered within WS02 at 2.80m which would be classified as DS-4 with ACEC of AC - 4, further testing is recommended to confirm the above concrete classification.

Ground gas concentrations have been monitored on four occasions. Comparison of the results with Table 8.5 of the CIRIA document indicates the site falls in a Characteristic Situation 2 and therefore gas protection measures will be required for the proposed development.



3. Fieldwork & Factual Information

Site work was carried out between the 18th September and 20th October 2023. Where applicable, the fieldwork was undertaken in accordance with BS5930:2015+A1:2020 Code of Practice for Site Investigations (Ref. 7) and BS10175:2011+A2:2017 Investigation of Potentially Contaminated Sites (Ref. 8).

3.1 Exploratory Methods

The physical methods of investigation employed were:

- 8No mechanically excavated trial pits to a maximum depth of 4.10m begl,
- 3No. of the trial pits were utilised for soakaway infiltration testing,
- 4No. plate load tests were also undertaken within 4No. trial pit locations,
- 5No. cable percussion boreholes were conducted to a maximum depth of 20.15m begl with rotary core follow on to 34.50m begl and
- 10No. Static Cone Penetration Tests were conducted to a maximum depth of 20m begl with dissipation testing.

The exploratory holes were logged and sampled by an engineer from HSP Consulting Engineers Ltd. The exploratory hole logs are presented in Appendix III. The exploratory hole locations are shown on the Ground Investigation Layout Plan presented in Appendix IV. Photographs of the site and rotary cores are presented within Appendix X.

Fragmentary bulk and disturbed samples were recovered from materials revealed within all of the exploratory holes. Rock cores were extruded in plastic liners and placed in suitable core boxes for geotechnical testing. Geo-environmental samples, placed in plastic tubs and glass jars supplied by the laboratory, were also obtained specifically for chemical analysis. The samples were taken to UKAS accredited laboratories for further examination and testing.

3.2 In-situ Testing

3.2.1 Standard Penetration Tests

Standard Penetration Tests (SPTs) were carried out within the cable percussion and rotary cored boreholes to 22.50m depth. The SPTs were undertaken in accordance with EN ISO 22476-2 2005: A1 2011 and the results are included on the appended borehole logs (Appendix III).

3.2.2 Soil Infiltration Tests

Soil Infiltration Tests were conducted within TP05, TP06 and TP9. The tests were undertaken in accordance with BRE Digest 365 Soakaway Design. The results are included within Appendix VII.



3.2.3 In-situ Plate Load Tests

In-situ plate load tests were conducted within TP07, TP08, TP09 and TP10 in accordance with BS 1377-9 Section 4.1 using a 300mm diameter plate. The results are presented in Appendix VIII.

3.2.4 Dissipation Tests

Dissipation Tests were conducted within four of the static cone penetration test locations. The dissipation test was carried out where there was excess porewater pressure. The results are included in the CPT report presented within Appendix XI.

3.3 Laboratory Testing

The laboratory testing schedules were prepared by Arup, the Clients Engineer.

3.3.1 Geotechnical Testing

Geotechnical testing has been undertaken by a UKAS accredited laboratory as part of the works at the site:

- 35 No. Particle Size Distributions (Wet Sieving)
- 5 No. Compaction using 2.5kg rammer
- 21 No. Natural Moisture Contents
- 25 No. Atterberg Limits
- 21 No. Sedimentation by Pipette
- 9 No. Organic Matter
- 8 No. Recompacted CBR Testing
- 6 No. Shear Strength 60mm x 60mm
- 9 No. Uniaxial Compressive Strength (rock)
- 5 No. Point Load Strength Index (rock)

The laboratory testing has been carried out by Apex Testing Solutions (ATS) (UKAS accredited, laboratory No. 7771), Professional Soils Laboratories (PSL) (UKAS accredited, laboratory No. 4043) and KIWA CMT (UKAS accredited, laboratory No. 0529) in accordance with BS1377:1990 using calibrated equipment specifically for the British Standard and in accordance with the methodology within the ISRM suggested methods for Rock Testing for UCS and Point Load (ref. 10). The results are presented in Appendix VI.

3.3.2 Chemical Analysis

The geo-environmental samples retained specifically for chemical analysis were stored in cooled containers until delivery to the laboratory by courier.

Thirty-seven samples were analysed by the laboratory for the presence of a selected suite of potential contaminants as outlined in the table below. Please refer to the Arup specification (presented in Appendix V) for further details regarding the specifics of each suite:



Table 1 - Chemical Analysis

Table 1 – Chemical Ana	aiysis			
Exploratory Hole Location & Depth	Sample Description		Exploratory Hole Location & Depth	Sample Description
TP03, 1.20 – 1.40m	Made Ground ^{1,2,3,4,8,9,10}		TP08, 2.10 – 2.30m	Made Ground ^{1,2,3,4,11,12}
TP03, 2.20 – 2.40m	Made Ground ¹³		TP09, 1.10 – 1.30m	Made Ground ^{1,2,3,4,6,9,10,11,12}
TP03, 3.00 – 3.20m	Made Ground ^{1,2,3,5,7}		TP09, 2.00 – 2.20m	Made Ground ¹³
TP04, 1.00 – 1.20m	Made Ground ¹³		TP09, 2.10 – 2.30m	Made Ground ^{1,3,4,7}
TP04, 1.00 – 1.40m	Made Ground ^{1,2,3,4}		TP10, 0.25 – 0.45m	Made Ground ^{1,2,3,4,6,11,12}
TP05, 0.15 – 0.20m	Made Ground ^{1,2,3,4,6,7,8,9,10}		TP10, 1.15 – 1.35m	Made Ground ¹³
TP05, 0.90 – 1.00m	Made Ground ¹³		TP10, 2.20 – 2.40m	Made Ground ^{1,2,3,4,6,7,8}
TP05, 1.10 – 1.20m	Made Ground ^{1,2,3,4,6,11,12}		TP10, 2.90 – 3.00m	CLAY ^{1,3,4}
TP05, 2.20 – 2.30m	CLAY ^{1,3,4}		BH01, 0.80 – 1.00m	Made Ground ^{1,2,3,4}
TP05, 3.10 – 3.20m	CLAY ¹³		BH01, 3.00 – 3.10m	Made Ground ^{1,3,4}
TP06, 0.25 – 0.35m	Made Ground ^{1,2,3,4,6}		BH02, 0.10 – 0.30m	Made Ground ^{1,2,3,4,6}
TP06, 1.00 – 1.20m	Made Ground ^{1,2,3,4,7,8,9,10}		BH02, 1.00 – 1.20m	Made Ground ^{1,2,3,4}
TP06, 1.10 – 1.30m	Made Ground ¹³		BH03, 0.10 – 0.30m	Made Ground ^{1,2,3,4,6,7,8,9,10}
TP06, 2.00 – 2.20m	Made Ground ^{1,2,3,4,6,11,12}		BH03, 1.80 – 2.00m	Made Ground ^{1,2,3,4}
TP07, 1.00 – 1.20m	Made Ground ¹³		BH04, 1.00 – 1.20m	Made Ground ^{1,2,3,4,6}
TP07, 1.20 – 1.40m	Made Ground ^{1,2,3,4,7,8,9,10}		BH04, 1.80 – 2.00m	Made Ground ^{1,2,3,4,6*}
TP07, 2.00 – 1.40m	CLAY ^{1,3,4}		BH06, 0.10 – 0.30m	Made Ground ^{1,2,3,4,6}
TP07, 2.90 – 3.00m	CLAY ¹³		BH06, 1.80 – 2.00m	Made Ground ^{1,2,3,4}
TP08, 1.00 – 1.20m	Made Ground ¹³			
		TD116		

¹ Suite E1 – Soil, ² Suite E2 – Asbestos, ³ Suite E3 - TPHCWG + BTEX, ⁴ Suite E4 – PAH, ⁵ Suite E5 – VOC and SVOC, ⁶ Suite E6 – PCB, ⁷ Suite E9 – Hexavalent Chromium, ⁸ Suite E16 - Other (Loss on Ignition), ⁹ Suite H - WAC soils, ¹⁰ Suite I – WAC leachability, ¹¹ Suite J1 – Leachability General, ¹² Suite J2 Leachability PAH / BTEX ¹³ Suite D BRE (Greenfield site – pyrite present)

The contamination analysis was carried out by Chemtest Environmental Ltd (UKAS accredited, laboratory No. 2183) during the period 21st September to 3rd November 2023. The results are presented in Appendix V.

3.3.3 Chemical Analysis – Groundwaters

The groundwater samples were extracted using low-flow techniques and retained specifically for chemical analysis. The samples were stored in cooled containers until delivery to the laboratory by courier. The samples were delivered to the laboratory with 24 hours of abstraction.

Three rounds of ground water monitoring were undertaken between the 15th December 2023 and the 23rd January 2024.

Prior to extraction each borehole was purged for three times the well volume and given ample time to recharge prior to extraction via low flow.

The groundwater samples were analysed by the laboratory for the presence of a selected suite of potential contaminants. Please refer to the Arup specification (presented in Appendix XII) for further details regarding the specifics of each suite.

^{*}This samples were misplaced by the courier / testing laboratory and therefore the requested testing has not been completed.



The contamination analysis was carried out by Chemtest Environmental Ltd (UKAS accredited, laboratory No. 2183) during the period 15th December 2023 to 31st January 2024. The results along with low flow data are presented in Appendix XII.

3.4 Ground Conditions

3.4.1 Published Geology

The published geology indicates the site is expected to be underlain by Made Ground up to 3.00m in depth and superficial Tidal Flat deposits as described in section 2.2.1 and 2.2.2 The site is underlain by the bedrock geology of the Penarth Group— Limestone and Mudstone, described in section 2.2.3 above.

3.4.2 Ground Conditions on site or General Geology & Revealed Strata

The exploratory hole data does conform with the published information, the strata across the site generally comprises:

Table 2 – Encountered Ground Conditions

	Strata	Depth (m begl)	Thickness (m)	Description
0		G.L. – 3.00	3.00	MADE GROUND comprising black, brown slightly gravelly clay fill with cobbles of brick and concrete.
ogenic		2.00 – 2.80	0.80	MADE GROUND comprising black, clayey sand and gravel fill. Gravels are of coal, clinker and concrete.
Anthropogenic	MADE GROUND	2.80 – 4.00	1.20	MADE GROUND comprising grey, brown very gravelly clay fill. Gravels are of brick, concrete, ceramics and occasional fabric.
		3.00 – 4.00	1.00	POSSIBLE MADE GROUND comprising reworked blue grey sandy CLAY. (BH04 only).
		4.00 – 12.00	8.00	Medium dense light brown sandy clayey gravelly COBBLES. (BH01 only).
		12.00 – 15.00	3.00	Dense red brown clayey SAND and GRAVEL. (BH01 only).
ja j		2.80 – 6.50	3.70	Soft to firm blue grey brown SILT.
Superficial	TIDAL FLAT DEPOSITS	6.50 – 9.70	3.20	Medium dense grey brown gravelly COBBLES of Limestone.
ัง		9.70 – 16.40	6.70	Soft blue grey SILT.
		11.00 – 15.00	2.00	Dense slightly clayey sandy GRAVELS of Mudstone and Limestone.
		16.40 – 20.00	3.60	Soft to stiff blue grey SILT with cobbles of Limestone.
		8.00 – 9.00	1.00	Very weak weathered LIMESTONE. (BH04 only).
ᅩ		9.00 – 15.00	3.00	Very strong grey LIMESTONE with yellowish brown staining. (BH04 only).
Bedrock	PENARTH GROUP – MUDSTONE AND LIMESTONE	15.00 – 21.00	6.00	Very weak to strong greenish grey LIMESTONE.
		21.00 – 21.10	0.10	Very strong white CALCITE.
		21.10 – 34.50	13.40	Very strong reddish brown and bluish grey banded LIMESTONE.



3.5 Ground Gas and Groundwater Monitoring

Dual use gas and groundwater monitoring installations were constructed within four of the boreholes at the site during ground investigation (BH01, BH02, BH03 and BH04). Each well has been constructed using 50mm diameter HDPE pipe. All of the borehole installations have a 6mm pea gravel surround to the slotted pipe with a bentonite seal above and a gas tap. The covers are raised round lockable stopcock covers.

HSP Consulting uses a GFM 436 Gas Analyser. Prior to its use a calibration check can be performed against gas readings in air. It is recommended that this check is undertaken once on each day the analyser is used. Annual calibration is undertaken on the unit and a copy of this certificate has been included within Appendix IX.

Three rounds of ground gas and ground water monitoring have been completed on the site. The results are presented within IX.

3.6 Groundwater Levels

Groundwater was encountered during the advancement of the exploratory holes. Table 3 below provides further information:

Table 3 – Groundwater during Drilling

Exploratory Hole Location	Depth of Groundwater (m begl)	Depth of Groundwater (m AOD)	Notes
TP03	3.60	4.74	Seepage.
TP04	3.90	4.61	Seepage.
BH01	3.00	3.91	Seepage.
BH01	16.00	-7.09	Extremely rapid flow.
BH02	3.50	5.55	Steady flow.
BH03	3.90	4.97	Steady flow.
BH04	6.90	1.72	Steady flow.
BH06	5.00	4.18	Steady flow.
BH06	21.00	-11.82	Extremely rapid flow.

Groundwater levels were recorded on three occasions. The results are presented in Table 4 below.

Table 4 – Groundwater Levels

Table 4 – Groundwater Le	eveis						
	Rour (06.11.			nd 2 .2023)	Round 3 (12.12.2024)		
Exploratory Location	Depth (m begl)	Depth (m AOD)	Depth (m begl)	Depth (m AOD)	Depth (m begl)	Depth (m AOD)	
BH02	3.12	5.93	3.48	5.57	3.91	5.14	
BH03 (A)	2.21	6.66	2.43	6.44	2.55	6.32	
BH03 (B)	-		1.95	6.92	2.05	6.82	
BH04	1.80	6.82	1.97	6.65	1.93	6.69	



4. References

- 1. HSP Consulting Engineers Limited Cardiff and Vale College Site BWF Phase I Geo-Environmental Desk Study Report, July 2020, Ref: C3297/PI.
- HSP Consulting Engineers Limited Cardiff and Vale College Site BWF Phase II Geo-Environmental Assessment Report, November 2020, Ref C3297/PII.
- 3. Barry Waterfront Campus Proposed Site Plan [VG0210-SRA-ZZ-ZZ-DR-A-00101-P02-Sheppard Robson 05/2022].
- 4. Barry Waterfront Campus Desk Study Addendum [VG0201-ARP-ZZ-ZZ-RP-G-00001, Arup].
- 5. BRITISH GEOLOGICAL SURVEY. 1996. Cardiff. England and Wales Sheet 263. Solid and Drift. 1:50 000 (Keyworth, Nottingham: British geological Survey).
- 6. British Geological Survey Lexicon Search http://www.bgs.ac.uk/lexicon/
- 7. BS5930:2015+A1:2020 Code of Practice for Site Investigations
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- 9. Ove Arup & Partners Limited ref: VG0201-ARP-ZZ-ZZ-SP-G-00001, 23rd June 2023.
- 10. ISRM (1985)., Suggested method for determining point load strength, International Journal of Rock Mechanics and Mining Sciences and Geomechanics Abstract., Vol 22, Issue 2



Appendix I



DO NOT SCALE NOTES:





Lawrence House, Meadowbank Way, Eastwood, Nottingham, NG16 3SB Tel: 01773 535 555 Fax: 0870 600 6091

CLIENT

WEPCo

PROJECT:

Barry Waterfront Campus

TITLE:

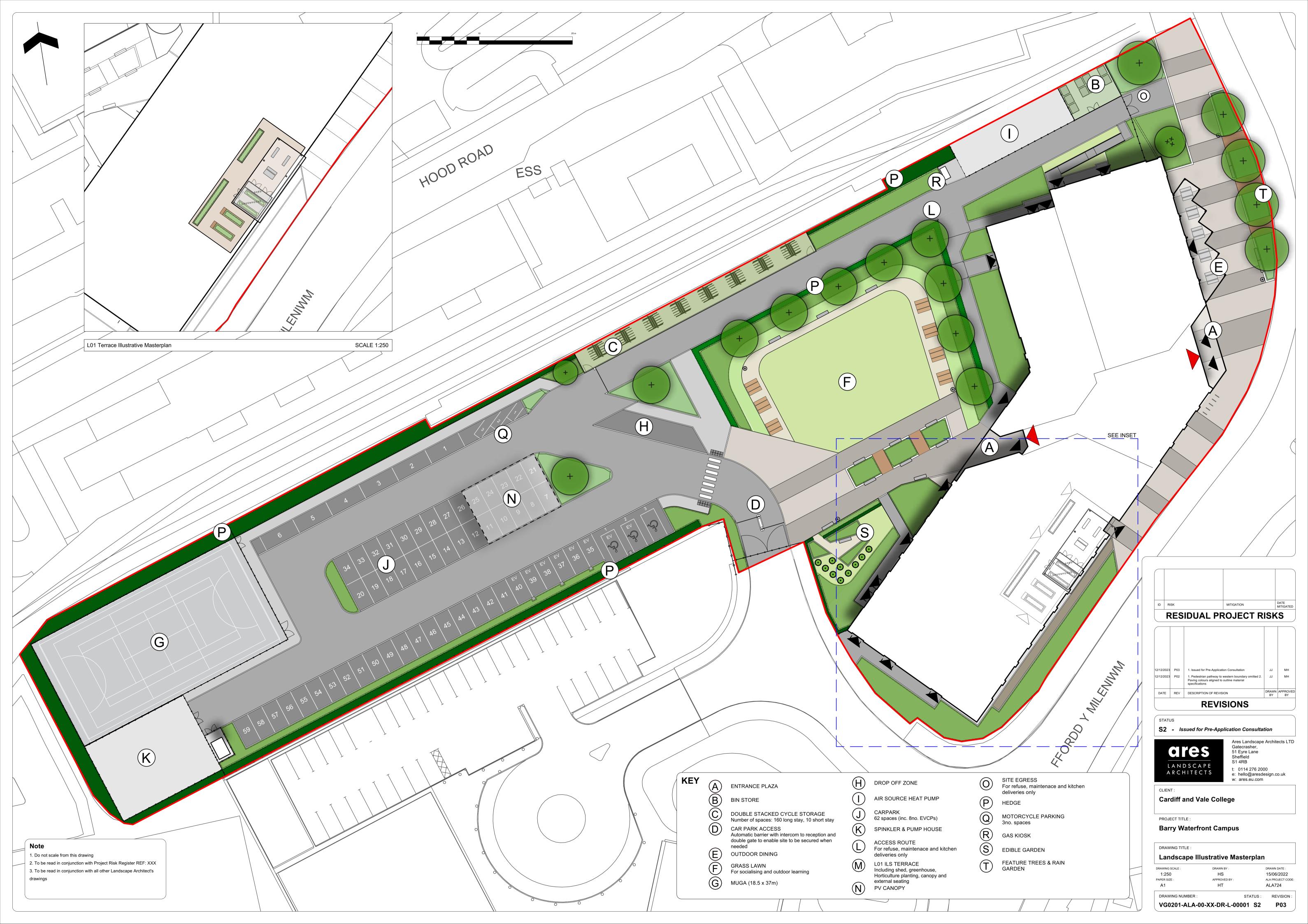
Site Location Plan

ì	SCALE@SIZE:	ISSUE:
ı	NTS	FINAL
i	DESIGN/DRAWN: LEJ	Dec 2023
	PROJECT No: C3297	DRAWING No: 502

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Appendix II





Appendix III

									Borehole N	0.
h	S	D				Во	reho	ole Log	BH01	
con	sult	ıng		_			T		Sheet 1 of	
Projec	t Name:	Barry Wate	erfront		Project No. 23297		Co-ords:	311148.00 - 167363.00	Hole Type CP	9
Locati	on:	Ffordd Y N	/lileniw	m, Barry			Level:	8.91	Scale 1:50	
Client:		WEPCO					Dates:	ates: 04/10/2023 - 10/10/2023		y
\\/all	Water	Samples	sPandFl	nrSiturTesting	Depth	Level	Lamand	Ctuati un Dan avintian		
Well	Strikes	Depth (m)	Туре	Results	(m)	(m)	Legend	Stratum Description		
		1.20 1.20 - 1.65 2.00 2.00 - 2.45 3.00 3.00 - 3.45 4.00 4.00 - 4.45	ВВВВВ	N=21 (4,4/4,5,6,6) N=20 (3,2/2,6,6,6) N=31 (5,5/7,8,8,8) N=33 (4,6/8,9,8,8) N=35 (5,7/7,10,9,9)	2.80	6.11 4.91		MADE GROUND comprising black gravelly clayey fill with cobbles of broncrete. Sand is fine to coarse, gracoarse subangular brick and concrete subangular brick and concrete subangular brick and concrete subangular brick, concrete and occasional fabric pieces. Wet medium dense light brown clay COBBLES. Gravels are fine to coar subrounded mudstone, limestone and concrete subrounded mudstone.	rown very coarse te, ceramics ey gravelly se, angular to	2 3 1 5 1 5 1 1 1 1 1 1
		5.00 - 5.45 6.00 6.00 - 6.45 7.00 7.00 - 7.45 8.00 8.00 - 8.45 9.00 9.00 - 9.45	B B B	N=34 (7,7/10,8,7,9) N=38 (6,6/11,9,9,9) N=35 (10,7/6,9,10,10) N=38 (7,7/8,10,9,11)	8.00	0.91		Wet medium dense light brown sangravelly COBBLES. Sand is fine to Gravels are fine to coarse, angular subrounded mudstone, limestone at	coarse. to	6
		10.00		N=39 (4,8/10,9,9,11)			Continued on next sheet		10 —

Remarks

1. Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



1	C	n							Borehole N	lo.
Ш	5	Ρ				Bo	reho	ole Log	BH01	
con	sult	ing						3	Sheet 2 of	4
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311148.00 - 167363.00	Hole Type CP	Э
<u></u>					C3291				Scale	
Locati	on:	Ffordd Y M	lileniw	m, Barry			Level:	8.91	1:50	
Client:		WEPCO					Dates:	04/10/2023 - 10/10/2023	Logged B	У
	Water	Samples	s Pand F	nrSiturTesting	Depth	Level				
Well	Strikes	Depth (m)	Туре	Results	(m)	(m)	Legend	Stratum Description		
		10.00 - 10.45	В				9,000			-
		11.00 11.00 - 11.45	В	N=34 (6,6/6,7,10,1		-3.09				11 —
		12.00 12.00 - 12.45	В	N=38 (10,11/11,9,9	,9) 12.00	-3.09		Dense wet red brown clayey SAND GRAVEL. Sand is fine to coarse, grato coarse, angular to subangular mulimestone.	avels are fine	12 —
		13.00 13.00 - 13.45	В	N=42 (8,8/12,11,9,10)						13 —
		14.00 14.00 - 14.45	В	N=49 (10,11/10,11,14,14	1)					14 -
		15.00		50 (10,12/50 for 295mm)	15.00	-6.09		Very weak weathered grey LIMEST	ONE.	15
		15.00 - 15.45	В	29311111)				Recovered as gravels and cobbles. cobbles are fine to coarse angular to		- - - - -
		16.00 - 16.50	С							16 -
		16.50		50 (25 for 120mm/s for 295mm)	50					=
		16.50 - 17.25	С] =
		17.25 - 18.00	С							17 —
		18.00		50 (8 for 110mm/5	50 18.00	-9.09				18 —
		18.00 - 19.50	С	for 249mm)		0.00		Strong greenish grey LIMESTONE in non-intact	recovered as	- - - - - -
		19.50 - 21.00	С		19.40	-10.49 -10.89		Strong grey LIMESTONE with orang Very strong greenish grey and grey LIMESTONE with orange staining a	banded	19 -
					10.00	10.03		occasional 5mm bands of calcite. Continued on next sheet		20 —
Rema	rks			1		1	1	2223 511 115/115/115/115/115/115/115/115/115		

^{1.} Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



	l n							Borehole N	lo.
11 2	P				Boi	reho	ole Log	BH01	
consu	lting						9	Sheet 3 of	4
Project Nan	ne: Barry Wate	erfront		Project No. C3297		Co-ords:	311148.00 - 167363.00	Hole Type CP	
Location:	Ffordd Y M	1ileniw	m, Barry			Level:	8.91	Scale 1:50	
Client:	WEPCO					Dates:	04/10/2023 - 10/10/2023 Log		у
Well Wate	OI .	s Pand P	n ß itu F esting	Depth	Level	Legend	Stratum Description	I	
Strik	es Depth (m)	Туре	Results	(m)	(m)			'	
	21.00 - 22.50	С		21.00 21.10	-12.09 -12.19		Very strong white CALCITE Very strong reddish brown and bluis banded LIMESTONE with regular 5 bands of non-intact LIMESTONE ar brown staining. Fractures very close spaced 0-30° rough planar and 70-5	-15mm nd orangish ely to widely	21 —
	22.50 - 24.00	С					vertical.	o rough	22 —
	24.00 - 25.50	С		23.55	-14.64 -15.09		Very strong reddish brown and bluis LIMESTONE with orange brown sta Fractures closely spaced 0-20° roug Very strong dark grey with orange s very frequent bands of non-intact lir Fractures closely spaced 0-20° roug 80-90° rough closed undulating.	ining. gh planar. taining and nestone.	24 -
	25.50 - 27.00	С		25.90	-16.99		Very strong and bluish grey mottled with dark orange staining and frequencies of calcite from 27.95m bgl. Fra	ent 5mm	25 —
	27.00 - 28.50	С					very closely so closely spaced roug planar and very widely spaced 50-6 undulating.	h closed	27 —
	28.50 - 30.00	С					Band of white calcite		28 —
Remarks	30.00 - 31.50	С		29.55	-20.64		Very strong brown and bluish grey be LIMESTONE. Fractures are closely spaced 0-25° smooth to rough plans widely spaced 50-70° rough undulated Continued on next sheet	to widely ar and very	30 —

^{1.} Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



	C	n							Borehole N	No.
Ω	5	Р				Bo	reho	ole Log	BH01	
con	sult	ing						J	Sheet 4 of	f 4
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311148.00 - 167363.00	Hole Typ CP	е
Locati	on:	Ffordd Y M	1ileniw	m, Barry			Level:	8.91	Scale 1:50	
Client:		WEPCO					Dates:	04/10/2023 - 10/10/2023	Logged E LH+LJ	Ву
Well	Water	Samples	s Pand P	nrSiturTesting	Depth	Level	Legend	Stratum Description		
	Strikes	Depth (m)	Туре	Results	(m)	(m)	9			
		31.50 - 33.00	C C		33.15	-24.24 -25.59		Very strong reddish brown and bluis banded LIMESTONE with occasion of calcite and orange staining. Fract closely to widely spaced 0-20° smo closed planar and very widely space rough undulating. End of borehole at 34.50 m	al 5mm veins tures very oth to rough ed 40-60°	31 32 33 34 35 36 37 38 39 39 39 39 39 39 39
Rema	rko									40 —

Remarks
1. Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



	10									Borehole No	D .
N S consult	<u>D</u>					R	ota	ry C	Core Log	BH01	-
					Pro	oject No.		T		Sheet 1 of 4 Hole Type	
Project Name:	Barry Wat	erfront				3297		Co-ords:	311148.00 - 167363.00	RC	
Location:	Ffordd Y N	/lileniw	m, Bar	ry				Level:	8.91	Scale 1:50	
Client:	WEPCO							Dates:	04/10/2023 - 10/10/2023	Logged By LH+LJ	У
Well Water	Depth	Туре		Coring	3	Depth	Level	Lagand	Stratum Dogarintion		
Strikes	(m)	/FI	TCR	SCR	RQD	(m)	(m)	Legend	Stratum Description		
	1.20 - 1.65 2.00 - 2.45 3.00 - 3.45	ВВВ				2.80	6.11		MADE GROUND comprising black I gravelly clayey fill with cobbles of br concrete. Sand is fine to coarse, gracoarse subangular brick and concrete subangular brick and concrete gravelly clay fill. Gravels are fine to angular to subangular brick, concrete and occasional fabric pieces.	rrown very	1
	4.00 - 4.45 5.00 - 5.45	В				4.00	4.91		Wet medium dense light brown clay COBBLES. Gravels are fine to coarsubrounded mudstone, limestone at	se, angular to	4
	6.00 - 6.45	В									6
	7.00 - 7.45	В									7
	8.00 - 8.45 9.00 - 9.45	В				8.00	0.91		Wet medium dense light brown sand gravelly COBBLES. Sand is fine to Gravels are fine to coarse, angular to subrounded mudstone, limestone and subrounded mudstone.	coarse. to	8
	10.00 - 10.45	В							Continued on next sheet		9
Domorko		1									

Remarks

1. Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



	C	1									Borehole N	О.
П	5	Р					Rotary Core Log				BH01	
con	sult	ing							<u>, </u>		Sheet 2 of	4
Project	t Name:	: Barry Wate	erfront				Project No. Co-ords: 311148.00 -		311148.00 - 167363.00	Hole Type RC	е	
Locatio	on:	Ffordd Y M	lileniw	m, Bar	ry				Level:	8.91	Scale 1:50	
Client:		WEPCO							Dates:	04/10/2023 - 10/10/2023	Logged B	у
Well	Water	Depth	Туре		Coring	l	Depth	Level	Logond	Stratum Description	LH+LJ	
vveii	Strikes	(m)	/FI	TCR	SCR	RQD	(m)	(m)	Legend	Stratum Description		
		11.00 - 11.45	В									11 -
		12.00 - 12.45	В				12.00	-3.09		Dense wet red brown clayey SAND GRAVEL. Sand is fine to coarse, gr. to coarse, angular to subangular mulimestone.	avels are fine	12 -
		13.00 - 13.45	В									13 —
		14.00 - 14.45	В									14 —
		15.00 - 15.45	В				15.00	-6.09		Very weak weathered grey LIMEST Recovered as gravels and cobbles. cobbles are fine to coarse angular to	Gravels and	15 — - - - - - -
		16.00 - 16.50	С									16 —
		16.50 - 17.25	С									-
		17.25 - 18.00	С									17 —
		18.00 - 19.50	С				18.00	-9.09		Strong greenish grey LIMESTONE non-intact	recovered as	18 —
		18.00 - 19.50		53	9	0						19 —
		19.50 - 21.00	С				19.40 19.80	-10.49 -10.89		Strong grey LIMESTONE with orang Very strong greenish grey and grey LIMESTONE with orange staining a	banded	-
Remar	des									occasional 5mm bands of calcite. Continued on next sheet		20 -

^{1.} Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



h c n										Borehole N	0.
11 2						R	Core Log	BH01			
consu	lting							• •	3 3 3 3	Sheet 3 of	4
Project Nan	ne: Barry Wate	erfront				oject No. 297		Co-ords:	311148.00 - 167363.00	Hole Type RC	Э
Location:	Ffordd Y N	/lileniw	m, Bar	ту				Level:	8.91	Scale 1:50	
Client:	WEPCO							Dates:	04/10/2023 - 10/10/2023	Logged B LH+LJ	y
Wate	er Depth	Туре		Coring	9	Depth	Level	Laward	Ctuatura Daganintian		
Well Strike		/FI	TCR	SCR	RQD	(m)	(m)	Legend	Stratum Description		
	19.50 - 21.00		53	34	24				_ Band of non-intact mudstone.		-
	21.00 - 22.50	C				21.00 21.10	-12.09 -12.19		Very strong white CALCITE Very strong reddish brown and bluis banded LIMESTONE with regular 5 bands of non-intact LIMESTONE ar	-15mm nd orangish	21 -
	21.00 - 22.50		94	52	15				brown staining. Fractures very close spaced 0-30° rough planar and 70-9 vertical.		22 —
	22.50 - 24.00	С									23 —
	22.50 - 24.00		87	81	36	23.55	-14.64		Very strong reddish brown and bluis LIMESTONE with orange brown sta Fractures closely spaced 0-20° roug	ining.	- - - - - - -
	24.00 - 25.50	С				24.00	-15.09		Very strong dark grey with orange s very frequent bands of non-intact lir Fractures closely spaced 0-20° rough 80-90° rough closed undulating.	taining and nestone.	24 -
	24.00 - 25.50		97	28	10				Band of white calcite		25 —
	25.50 - 27.00	C				25.90	-16.99		Very strong and bluish grey mottled with dark orange staining and frequ	ent 5mm	26 —
	25.50 - 27.00		97	91	30				veins of calcite from 27.95m bgl. Fravery closely so closely spaced roug planar and very widely spaced 50-6 undulating.	h closed	- - - -
	27.00 - 28.50	С									27 —
	27.00 - 28.50		100	95	57						28 —
	28.50 - 30.00	С							Band of white calcite		=
	28.50 - 30.00		89	81	41	29.55	-20.64		√ Very strong brown and bluish grey b	oanded \	29 -
Remarks	30.00 - 31.50	С				23.00	-20.04		LIMESTONE. Fractures are closely spaced 0-25° smooth to rough plans widely spaced 50-70° rough undula Continued on next sheet	to widely ar and very	30 —

^{1.} Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



h	C	n					_		_	_	Borehole N	lo.
<u> </u>	5	P					R	ota	rv (Core Log	BH01	
con	sult	ing							,	5	Sheet 4 of	4
Projec	t Name:	: Barry Wate	erfront				oject No. 3297		Co-ords:	311148.00 - 167363.00	Hole Type RC	е
ocati	on:	Ffordd Y M	/lileniw	m, Bar	ry				Level:	8.91	Scale 1:50	
Client:		WEPCO							Dates:	04/10/2023 - 10/10/2023	Logged B LH+LJ	Ву
	Water	Depth	Туре		Coring	3	Depth	Level				
Well	Strikes		/FI	TCR	_	RQD	(m)	(m)	Legend	Stratum Description	I	
												-
												_
		30.00 - 31.50		88	87	87						-
												31 _
												_
		31.50 - 33.00	С									-
												32 —
		31.50 - 33.00		100	100	89						-
												-
												-
		33.00 - 34.50	С				33.15	-24.24		Very strong reddish brown and bluis	ch grey	33 —
										banded LIMESTONE with occasions of calcite and orange staining. Fract	al 5mm veins	-
		33.00 - 34.50		100	100	65				closely to widely spaced 0-20° smoo	oth to rough	-
										closed planar and very widely space rough undulating.	30 40-60	34 _
												-
			1				34.50	-25.59		End of borehole at 34.50 m		-
												35 —
												55 -
												-
												-
												36 —
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Remarks
1. Cable Percussion to 16m with Rotary Core to 34.50m begl. 2.Extremely rapid groundwater encountered whilst coring from 16m begl.



	C	n							Borehole No).
	5	Ρ				ole Log	BH02			
con	sult	ing						J	Sheet 1 of 3	3
Project	t Name:	Barry Wate	erfront		Project No.		Co-ords:	311145.00 - 167423.00	Hole Type	
					C3297				CP Scale	
Location	on:	Ffordd Y M	lileniw	m, Barry			Level:	9.05	1:50	
Client:		WEPCO					Dates:	16/10/2023 - 18/10/2023	Logged By LH+LEJ	
	Water	Samples	s Pand Fl	nrSiturTesting	Depth	Level			LUTLE	_
Well	Strikes		Туре	Results	(m)	(m)	Legend	Stratum Description	1	
		,	, , , , , , , , , , , , , , , , , , ,					MADE GROUND comprising black gravelly clay fill. Sand is fine to coar fine to coarse angular to sub angula	rse, gravel is ar brick,	
								concrete, mudstone and limestone.		
		1.20 1.20 - 1.65	В	N=31 (3,4/6,6,9,10))					1 -
		2.00	_	N=16 (3,4/4,4,4,4) 2.00	7.05		MADE GROUND comprising black	clavey sand	2 —
		2.00 - 2.45	В					and gravel fill. Sand is fine to coarse to coarse angular to subangular coaconcrete.	e, gravel is fie	-
		3.00 3.00 - 3.45	В	N=22 (4,4/6,6,6,4)	2.80	6.25	× × × × × ×	Stiff blue grey SILT.		3 -
	•	3.00 - 3.43	Ь				× × × × × × × × × × × × × × × × × × ×	Wet from 3.60m.		-
		4.00 4.00 - 4.45	В	N=22 (3,4/6,5,5,6)		×××× ×××× ×××× ××××			4 —
		5.00 5.00 - 5.45	В	N=21 (4,3/3,5,6,7))		XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX			5 —
		6.00 6.00 - 6.45	В	N=22 (4,5/5,6,5,6			×××× ×××× ×××× ×××× ××××			6 —
		7.00 7.00 - 7.45	В	N=29 (6,5/4,7,9,9	6.50	2.55	0.0.0.0.0	Wet medium dense grey brown CC Limestone. Cobbles are fine to coal subangular.	rse angular to	7 —
		8.00 8.00 - 8.45	В	N=37 (4,6/9,9,10,9	7.60	1.45		Wet medium dense grey brown san COBBLES of Limestone. Sand is fi cobbles are fine to coarse angular to Wet medium dense grey brown cla	ine to coarse, o subangular. ayey	8 —
		9.00 9.00 - 9.45	В	N=33 (7,7/7,8,9,9	8.80	0.25		GRAVELS and COBBLES oF Limes Gravels and cobbles are fine to coat to subangular.	rse angular	9 —
		10.00		N=3 (0,0/0,1,1,1)	9.70	-0.65	× × × × × × × × × × × × × × × × × × ×	Very soft wet blue grey SILT. Continued on next sheet	1	- - - 10 —
Remar	ke									

1. Cable Percussion to 18m with Rotary Core to 25.5m begl.



									Borehole N	lo.
n	S	D				Bo	reho	ole Log	BH02	<u> </u>
con	sult	ing					. •).o _	Sheet 2 of	3
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311145.00 - 167423.00	Hole Typ CP	е
Locati	on:	Ffordd Y M	1ileniw	m, Barry			Level:	9.05	Scale 1:50	
Client:		WEPCO					Dates:	16/10/2023 - 18/10/2023	Logged B LH+LEJ	
Well	Water			nrSiturTesting	Depth	Level	Legend	Stratum Description		
	Strikes	Depth (m)	Туре	Results	(m)	(m)		<u>'</u>		
		10.00 - 10.45	В				×××××			_
		11.00 11.00 - 11.45	В	N=3 (0,0/0,1,1,1)			X X X X X X X X X X X X X X X X X X X			11 —
		12.00 12.00 - 12.45	В	N=2 (1,0/0,1,0,1)			***** ***** ***** ***** *****			12 -
		13.00 13.00 - 13.45	В	N=3 (1,0/0,1,1,1)						13 —
		14.00 14.00 - 14.45	В	N=4 (1,0/1,1,1,1)			X X X X X X X X X X X X X X X X X X X			14 —
		15.00 15.00 - 15.45	В	N=4 (0,0/0,1,1,2)			(15 -
		16.00 16.00 - 16.45	В	N=36 (5,6/5,10,9,12	16.40	-7.35	×××× ×××× ××××× ×××××	Stiff wet blue grey SILT with cobbles		16
		17.00 17.00 - 17.45	В	N=50 (8,9/10,11,14,15)				Limestone. Cobbles are fine to coars subangular.	e angular to	17 —
		18.00 18.00 - 19.50	С	50 (25 for 145mm/5 for 265mm)	18.00	-8.95	×××•× x	Very strong bluish grey LIMESTONE Recovered as non-intact	-	18 -
Rema		19.50 19.50 - 21.00	С	50 (25 for 95mm/5 for 245mm)	0 19.50	-10.45		Very strong bluish grey and yellowist mottled LIMESTONE with orangish be staining and occasional 15mm nodul Fractures closely spaced 10-30° rougand 60-70° very widely spaced smooth planar. Continued on next sheet	orown ar of calcite. gh planar	19 -



^{1.} Cable Percussion to 18m with Rotary Core to 25.5m begl.

hcn									Borehole N	lo.
	5	Ρ				Bor	eho	ole Log	BH02	
con	sult	ing							Sheet 3 of	3
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311145.00 - 167423.00	Hole Type CP	9
Locati	on:	Ffordd Y M	lileniw	m, Barry	00201		Level:	9.05	Scale 1:50	
Client:		WEPCO					Dates:	16/10/2023 - 18/10/2023	Logged B	-
	Water		:FandF	nÆituFfesting	Depth	Level			LH+LEJ	
Well	Strikes		Туре	Results	(m)	(m)	Legend	Stratum Description		
		21.00 - 22.50	С		21.20	-12.15		Band of reddish brown mudstone - recovered Very strong reddish brown and grey LIMESTONE with occasional orange	banded	21 —
		22.50 - 24.00	С					Fractures 0-20° very closely to widel rough open to closed planar and 80-smooth undulating.	y spaced 90° vertical	22 —
		24.00 - 25.50	С		24.00	-14.95		Very strong grey mottled reddish bro LIMESTONE with very frequent band yellowish brown moderately strong n and dark orange staining. Fractures extremely closely to closely spaced and 70-80° vertical smooth planar. Band of pinkish white calcite.	ds of nudstone 0-20° rough planar	24 —
					25.30	-16.25		End of borehole at 25.50 m		-
										26 —
										27 —
										28 —
										29 —
Rema	rks									30 —

Remarks
1. Cable Percussion to 18m with Rotary Core to 25.5m begl.



Project Name: Barry Waterfront Project No. C3297 Co-ords: 311145.00 - 167423.00 Hole Type RC	1	C	n									Borehole No.	
Project Name: Barry Waterfront		5	P					R	BH02				
Cocation: Flored Y Milenium, Barry Level: 9.05 Scale 1.50	con	sult	ing									Sheet 1 of 3	3
Coalest Florad Y Milenium, Barry Level 9.05 1.50	Projec	t Name:	Barry Wate	erfront						Co-ords:	311145.00 - 167423.00		
Client Well PCO							C	5291					
Well Water Strikes (m) Type Coring F TCR SCR ROD Cm) Legend Stratum Description Legend L	Locati	on:	Ffordd Y M	lileniw	m, Bar	ry				Level:	9.05	1:50	
Water Natice N	Client:	:	WEPCO							Dates:	16/10/2023 - 18/10/2023		′
Strikes	Woll		Depth	Туре		Coring		Depth	Level	Legend	Stratum Description		
	VVCII	Strikes	(m)	/FI	TCR	SCR	RQD	(m)	(m)	Legend	*		
### August 1 August			1.20 - 1.65	В							gravelly clay fill. Sand is fine to coar fine to coarse angular to sub angular	se, gravel is	1 —
3.00 - 3.45 B 4.00 - 4.45 B 6.00 - 6.45 B 6.00 - 6.45 B 7.00 - 7.45 B 7.60 1.45 Wet medium dense grey brown COBBLES of Limestone. Cobbles are fine to coarse angular to subangular. 7.60 1.45 Wet medium dense grey brown COBBLES of Limestone. Sand is fine to coarse cobbles are fine to coarse angular to subangular. 8.00 - 8.45 B 9.70 - 0.65 Very soft wet blue grey SiLT.			2.00 - 2.45	В				2.00	7.05		and gravel fill. Sand is fine to coarse to coarse angular to subangular coa	e, gravel is fie	2 -
4.00 - 4.45 B 5.00 - 5.45 B 6.00 - 6.45 B 6.50 2.55 Wet medium dense grey brown COBBLES of Limestone. Cobbles are fine to coarse angular to subangular. 7.00 - 7.45 B 7.60 1.45 Wet medium dense grey brown sandy CobBLES of Limestone. Sand is fine to coarse, cobbles are fine to coarse angular to subangular. 8.00 - 8.45 B 9.00 - 9.45 B 9.70 - 0.65 Very soft wet blue grey SiLT.			3.00 - 3.45	В				2.80	6.25	×××× ××××× ×××××	Stiff blue grey SILT.		3 -
6.00 - 6.45 B 6.50 2.55 Wet medium dense grey brown COBBLES oF Limestone. Cobbles are fine to coarse angular to subangular. 7.00 - 7.45 B 7.60 1.45 Wet medium dense grey brown sandy COBBLES oF Limestone. Sand is fine to coarse, and is fine to coarse, and is fine to coarse angular to subangular. Wet medium dense grey brown sandy COBBLES oF Limestone. Sand is fine to coarse, and is fine to coarse angular to subangular. Wet medium dense grey brown clayey GRAVELS and Cobbles are fine to coarse angular to subangular. 9.00 - 9.45 B 9.70 -0.65 Very soft wet blue grey SiLT.			4.00 - 4.45	В						× × × × × × × × × × × × × × × × × × ×	Wet from 3.60m.		4 —
6.50 2.55 Wet medium dense grey brown COBBLES oF Limestone. Cobbles are fine to coarse angular to subangular. 7.00 - 7.45 B 7.60 1.45 Wet medium dense grey brown sandy COBBLES oF Limestone. Sand is fine to coarse, cobbles are fine to coarse angular to subangular. Wet medium dense grey brown sandy COBBLES oF Limestone. Sand is fine to coarse, cobbles are fine to coarse angular to subangular. Wet medium dense grey brown sandy COBBLES oF Limestone. Gravels and cobbles are fine to coarse angular to subangular. 9.00 - 9.45 B 9.70 -0.65 Very soft wet blue grey SILT.			5.00 - 5.45	В						× × × × × × × × × × × × × × × × × × ×			5 —
7.00 - 7.45 B 8.00 - 8.45 B 9.00 - 9.45 B 9.00 - 9.45 B 9.00 - 9.45 B 9.00 - 9.45 B			6.00 - 6.45	В						× × × × × × × × × × × × × × × × × × ×			6 —
8.00 - 8.45 B 8.00 - 9.45 B 9.00 - 9.45 B 9.70 - 0.65 Wet medium dense grey brown sandy COBBLES of Limestone. Sand is fine to coarse, cobbles are fine to coarse angular. Wet medium dense grey brown clayey GRAVELS and COBBLES of Limestone. Gravels and cobbles are fine to coarse angular to subangular. 9.00 - 9.45 B 9.70 - 0.65 Very soft wet blue grey SILT.			7.00 - 7.45	В				6.50	2.55		Limestone. Cobbles are fine to coar	BBLES oF se angular to	7 —
9.00 - 9.45 B 9.70 -0.65 to subangular. 9.00 - 10.45 B			8.00 - 8.45	В				7.60	1.45		COBBLES oF Limestone. Sand is fi cobbles are fine to coarse angular to Wet medium dense grey brown cla GRAVELS and COBBLES oF Limes	ne to coarse, o subangular. ayey stone.	8 —
Very soft wet blue grey SIL1.			9.00 - 9.45	В				8.80	0.25			se angular	9 —
I I I Continued of the Atlanta			10.00 - 10.45	В				9.70	-0.65		Very soft wet blue grey SILT. Continued on next sheet		10 —

1. Cable Percussion to 18m with Rotary Core to 25.5m begl.



aca											Borehole No).
	5	P					R	Core Log	BH02			
cons	ulti	ng					. `		. , –	20.0 209	Sheet 2 of 3	3
Project N	Name:	Barry Wate	erfront				roject No. 3297		Co-ords:	311145.00 - 167423.00	Hole Type RC	;
Location	:	Ffordd Y M	lileniw	m, Bar	ry		0201		Level:	9.05	Scale 1:50	
Client:		WEPCO							Dates:	16/10/2023 - 18/10/2023	Logged By	/
	Vater trikes	Depth (m)	Type / FI	TCR	Coring		Depth (m)	Level (m)	Legend	Stratum Description		
		11.00 - 11.45	В						XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX			11 —
		12.00 - 12.45	В						X X X X X X X X X X X X X X X X X X X			12 -
		13.00 - 13.45	В						<pre></pre>			13 —
		14.00 - 14.45	В						<pre></pre>			14 —
		15.00 - 15.45	В						X X X X X X X X X X X X X X X X X X X			15 —
		16.00 - 16.45	В				16.40	-7.35	×××× ×××× ×××× ××××	Chiff weak blue areas CII T with each blue		16 —
		17.00 - 17.45	В							Stiff wet blue grey SILT with cobbles Limestone. Cobbles are fine to coars subangular.	se angular to	17 —
		18.00 - 19.50	С				18.00	-8.95	× × × × × × × × × × × × × × × × × × ×	Very strong bluish grey LIMESTONE Recovered as non-intact	<u>:</u> -	18 —
		18.00 - 19.50		50	50	7						19
Remarks		19.50 - 21.00	С				- 19.50	-10.45		Very strong bluish grey and yellowis mottled LIMESTONE with orangish I staining and occasional 15mm nodu Fractures closely spaced 10-30° rou and 60-70° very widely spaced smooth planar. Continued on next sheet	orown lar of calcite. gh planar oth open	20 —



^{1.} Cable Percussion to 18m with Rotary Core to 25.5m begl.

		1 0									Borehole N	0.
N	5	P					R	ota	rv (Core Log	BH02	2
con	sult	ing					. `		. ,	J 3. 3	Sheet 3 of	3
Projec	t Name	: Barry Wate	erfront				oject No. 297		Co-ords:	311145.00 - 167423.00	Hole Type RC	е
Location	on:	Ffordd Y M	1ileniw	m Rar	rv	00	201		Level:	9.05	Scale	
Locativ	OII.	1 lorda 1 lv	IIICIIIW	iii, bai	' y				LCVCI.	5.00	1:50 Logged B	W
Client:		WEPCO						Ī	Dates:	16/10/2023 - 18/10/2023	LH+LEJ	
Well	Water Strikes	Depth (m)	Type / FI	TCR	Coring SCR		Depth (m)	Level (m)	Legend	Stratum Description		
		19.50 - 21.00		97	73	8				Band of reddish brown mudstone - recovered	d as non-intact.	-
		21.00 - 22.50 21.00 - 22.50	5.3	100	100	63	21.20	-12.15		Very strong reddish brown and grey LIMESTONE with occasional orange Fractures 0-20° very closely to widel rough open to closed planar and 80-smooth undulating.	staining. y spaced	21
		22.50 - 24.00 22.50 - 24.00	6.7	87	87	49						23 —
		24.00 - 25.50 24.00 - 25.50	9.3	99	93	20	24.00 25.30	-14.95 -16.25		Very strong grey mottled reddish bro LIMESTONE with very frequent band yellowish brown moderately strong n and dark orange staining. Fractures extremely closely to closely spaced n and 70-80° vertical smooth planar. Band of pinkish white calcite.	ds of nudstone 0-20°	24
										End of borehole at 25.50 m		26 —
												27 —
												28 -
												29 -
Remai	rks											30 —

Remarks
1. Cable Percussion to 18m with Rotary Core to 25.5m begl.



	C	n							Borehole No.	
	5	D				Bo	reho	ole Log	BH03	
con	sult	ing							Sheet 1 of 3	
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311196.00 - 167435.00	Hole Type CP	
1 4:		Ff	4 :1 i		03291		11	0.07	Scale	
Locati	on:	Ffordd Y M	/lileniw	m, Barry			Level:	8.87	1:50	
Client		WEPCO					Dates:	12/10/2023 - 17/10/2023	Logged By LEJ+LH	
	Water	Samples	s Pand Fl	nrSiturTesting	Depth	Level				
Well	Strikes	Depth (m)	Туре	Results	(m)	(m)	Legend	Stratum Description	1	
	•	1.20 1.20 - 1.65 2.00 2.00 - 2.45 3.00 3.00 - 3.45 4.00 4.00 - 4.45	ВВВВ	N=13 (3,3/4,3,3,3 N=20 (4,4/6,4,5,5 N=9 (1,1/2,3,2,2) N=4 (1,1/1,1,1,1) N=8 (2,2/2,2,2,2)	3.00	5.87		MADE GROUND comprising black gravelly clayey fill. Sand is fine to coarse angular to subrouconcrete, flint, mudstone and limest Very soft wet grey brown SILT.	parse, gravels inded brick,	2
		6.00 6.00 - 6.45	В	N=4 (1,1/1,1,1,1)	6.00	2.87	**************************************	Very soft wet grey brown SILT with cobbles and gravels of LIMESTONE and cobbles are fine to coarse, ang subangular.	E. Gravels	6 - 1 - 1 - 1
		7.00 7.00 - 7.45	В	N=3 (1,0/1,0,1,1)	7.00	1.87		Very soft wet grey brown SILT.	7	7 — - - - - - - -
		8.00 8.00 - 8.45	В	N=6 (2,1/2,2,1,1)			X X X X X X X X X X X X X X X X X X X		8	8 -
		9.00 9.00 - 9.45	В	N=4 (1,1/1,1,1,1)			X X X X X X X X X X X X X X X X X X X		ę	9
		10.00		N=7 (2,2/1,2,2,2)	,		×××××	Continued on most starts	10	0 -
Domo	<u>. </u>							Continued on next sheet		[

1. Cable Percussion to 15.5m with Rotary Core to 25.30m begl.



1	C	n							Borehole N	l o.
	5	Ρ				Bo	reho	ole Log	BH03	3
con	sult	ing						9	Sheet 2 of	3
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311196.00 - 167435.00	Hole Type CP	е
Location	on:	Ffordd Y M	lileniw	m, Barry			Level:	8.87	Scale 1:50	
Client:		WEPCO					Dates:	12/10/2023 - 17/10/2023	Logged B LEJ+LH	-
Well	Water	Samples	RandF	nrSiturTesting	Depth	Level	Legend	Stratum Description		
VVOII	Strikes	Depth (m)	Туре	Results	(m)	(m)	Logoria	Guatam Boscipion		
		11.00 11.00 - 11.45 12.00 12.00 - 12.45 13.00 13.00 - 13.45	ВВВВ	N=37 (8,9/9,9,9,10 N=37 (9,10/9,10,9,9,10) N=34 (9,8/9,8,8,9)	9)	-2.13 -4.13	×××× ×××× ×××× ×××× ×××× ×××× ×××× ××××	Dense wet slightly clayey sandy GF Sand is fine to coarse, gravels are fangular to subrounded flint, mudsto limestone. Very weak weathered grey LIMEST Recovered as gravels and cobbles Gravels and cobbles are fine to coato subangular.	ONE.	12 —
		14.00 14.00 - 14.45 15.00 15.00 - 15.45 15.50 - 16.50	B B C	N=39 (7,10/9,9,10,11) N=50 (7,10/10,10,15,15)	15.50	-6.63		Very strong dark grey LIMESTONE yellowish brown staining. Fractures		14 —
		16.50 - 18.00	С		16.50 17.20	-7.63 -8.33		Band of white calcite. Very strong greenish grey LIMESTO recovered as non-intact Very strong greenish grey mottled g LIMESTONE with dark orange stair frequent bands of non-intact limesto Fractures are closely spaced 20-30	rey ning and one. ° rough	16
		18.00 18.00 - 19.50 19.50 - 21.00	С	50 (25 for 115mm/5 for 245mm)	50			undulating and 70-80 smooth plana		18 —
Remar	rko							Continued on next sheet		20 —



Remarks
1. Cable Percussion to 15.5m with Rotary Core to 25.30m begl.

	C	<u> </u>							Borehole N	۱o.
Π	5	Р				Boi	eho	ole Log	BH03	3
con	sult	ing						. .	Sheet 3 of	f 3
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311196.00 - 167435.00	Hole Typ	е
Location	on:	Ffordd Y M	lileniw	m, Barry			Level:	8.87	Scale 1:50	
Client:		WEPCO					Dates:	12/10/2023 - 17/10/2023	Logged B LEJ+LH	
Well	Water Strikes			nrSiturTesting	Depth (m)	Level (m)	Legend	Stratum Description		
	Slikes	Depth (m)	Туре	Results	(111)	(111)		■ Band of yellowish brown limestone.		
		21.00 - 22.50	С		20.20	-11.33		Band of pinkish white calcite. Very strong grey and reddish brown dark orange staining and occasiona veins. Fractures very closely to clos spaced smooth open planar and 70 planar.	l 5mm calcite ely 0-20°	21 —
		22.50 - 24.00	С							22 -
		24.00 - 25.30	С		23.60	-14.73 -15.43		Very strong yellowish brown and gre LIMESTONE. Fractures extremely of closely spaced 0-20° smooth to roug and very widely spaced 50-60° roug Band of white calcite. Band of pinkish white calcite. Dark grey and dark bluish grey mott LIMESTONE with dark orange and brown staining. Fractures closely 0-	closely to gh planar gh planar. gled yellowish	24 —
					25.30	-16.43		undulating and 70-90° vertical smoot	oth undulating	25 -
										26 —
										27 —
										28 —
										29 —
Remai										30 —



	1 0									Borehole N	0.
n S	<u>D</u>					R	ota	ry C	Core Log	BH03	ı
consult	ing				Dw					Sheet 1 of	
Project Name:	Barry Wat	erfront				oject No. 297		Co-ords:	311196.00 - 167435.00	Hole Type RC	3
Location:	Ffordd Y N	/lileniw	m, Bar	ry	•			Level:	8.87	Scale 1:50	
Client:	WEPCO							Dates:	12/10/2023 - 17/10/2023	Logged B	у
Well Water Strikes	Depth (m)	Type / FI		Coring		Depth (m)	Level (m)	Legend	Stratum Description		
	1.20 - 1.65 2.00 - 2.45 3.00 - 3.45 4.00 - 4.45	ВВВВ	TCR	SCR	RQD	3.00	5.87		MADE GROUND comprising black gravelly clayey fill. Sand is fine to co are fine to coarse angular to subrou concrete, flint, mudstone and limest	oarse, gravels Inded brick,	2
	6.00 - 6.45	В				6.00	2.87	×××× •××××× •××××× •××××× •×××××	Very soft wet grey brown SILT with cobbles and gravels of LIMESTONE and cobbles are fine to coarse, ang subangular.	E. Gravels	6 -
	7.00 - 7.45 8.00 - 8.45	В				7.00	1.87	6%*X;X;X; X;X;X;X;X;X;X;X;X;X;X;X;X;X;X;X;	Very soft wet grey brown SILT.		8 —
	9.00 - 9.45	В						X X X X X X X X X X X X X X X X X X X			9 —
Remarks	10.00 - 10.45	В						XXXX	Continued on next sheet		10 —

Remarks
1. Cable Percussion to 15.5m with Rotary Core to 25.30m begl.



h	C	n									Borehole N	0.
Ω	5	Р					R	ota	rv C	Core Log	BH03	
con	sult	ing							,	9	Sheet 2 of	3
Projec	t Name:	Barry Wate	erfront				roject No. 3297		Co-ords:	311196.00 - 167435.00	Hole Type RC	Э
Location	on:	Ffordd Y M	lileniw	m, Bar	ry				Level:	8.87	Scale 1:50	
Client:		WEPCO							Dates:	12/10/2023 - 17/10/2023	Logged B	у
					Corine		Τ				LEJ+LH	
Well	Water Strikes	Depth (m)	Type /FI	TCR	Coring SCR		Depth (m)	Level (m)	Legend	Stratum Description		
		11.00 - 11.45	В				11.00	-2.13	×××× ×××× ×××× ×××× ××××	Dense wet slightly clayey sandy GR Sand is fine to coarse, gravels are fi angular to subrounded flint, mudstor limestone.	ne to coarse	11 -
		12.00 - 12.45 13.00 - 13.45	В				13.00	-4.13		Very weak weathered grey LIMESTOR Recovered as gravels and cobbles of Gravels and cobbles are fine to coal to subangular.	of Limestone.	12 -
		14.00 - 14.45	В									14 —
		15.00 - 15.45	В									15 =
		15.50 - 16.50	С				15.50	-6.63		Venue share a shark arrow LIMECTONE		=
		15.50 - 16.50	4	60	55	11				Very strong dark grey LIMESTONE yellowish brown staining. Fractures spaced 0-20° rough planar.		16 —
		16.50 - 18.00	С				16.50	-7.63		Band of white calcite. Very strong greenish grey LIMESTC recovered as non-intact	NE,	17 —
		16.50 - 18.00		67	49	11	17.20	-8.33		Very strong greenish grey mottled greenish grey mottled greenish grey mottled greenish grequent bands of non-intact limesto fractures are closely spaced 20-30 undulating and 70-80 smooth planary	ing and ne. rough	-
		18.00 - 19.50	С				†			G		18 —
		18.00 - 19.50 19.50 - 21.00	8 C	73	34	10						19 -
										Continued on next sheet		20 —
Remai	rks											



on	Sult	<u>p</u>					R	ota	ry C	Core Log	Borehole N BH03 Sheet 3 of	3
	t Name		erfront				oject No.		Co-ords:	311196.00 - 167435.00	Hole Typ	
ocati	on:	Ffordd Y M	/lileniw	m, Bar	ry	C3	297		Level:	8.87	RC Scale	
ient:		WEPCO							Dates:	12/10/2023 - 17/10/2023	1:50 Logged B	-
	Water	Depth	Туре		Coring	9	Depth	Level			LEJ+LH	! T
/ell	Strikes		/FI	TCR		RQD	(m)	(m)	Legend	Stratum Description Band of yellowish brown limestone.		
		19.50 - 21.00	10	73	53	0	20.20	-11.33		Band of pinkish white calcite. Very strong grey and reddish brown dark orange staining and occasiona veins. Fractures very closely to clos spaced smooth open planar and 70 planar.	l 5mm calcite ely 0-20°	
		21.00 - 22.50		00	00	04				pianar.		2
		21.00 - 22.50 - 22.50 - 24.00	5 C	93	92	61						2
		22.50 - 24.00	9	100	85	53						2
		-24.00 - 25.30	С				23.60	-14.73		Very strong yellowish brown and gre LIMESTONE. Fractures extremely of closely spaced 0-20° smooth to rou very widely spaced 50-60° rough pla	losely to gh planar and	2
		24.00 - 25.30		100	85	8	24.30	-15.43		Band of white calcite. Band of pinkish white calcite. Dark grey and dark bluish grey mott LIMESTONE with dark orange and brown staining. Fractures closely 0- undulating and 70-90° vertical smoc	led yellowish 20° rough	2
							25.30	-16.43		End of borehole at 25.30 m		-
												2
												2
												2
												2
												3

		1 0							Borehole N	No.
n	5	P				Bo	reho	ole Log	BH04	.
con	sult	ing					. •	3.0 – 09	Sheet 1 of	f3
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311099.00 - 167403.00	Hole Typ	е
Location	on:	Ffordd Y M	/lileniw		70291		Level:	8.62	Scale	
				, ,					1:50 Logged B	Ву
Client:		WEPCO					Dates:	18/10/2023 - 20/10/2023	LH+LEJ	•
Well	Water Strikes			nrSituresting	Depth (m)	Level (m)	Legend	Stratum Description		
	Strikes	1.20 1.20 - 1.65 2.00 2.00 - 2.45 3.00 3.00 - 3.45 4.00 4.00 - 4.45 5.00 5.00 - 5.45 6.00 6.00 - 6.45	Type B B B B	Results N=16 (2,4/4,4,4,4) N=26 (2,4/6,6,7,7) N=18 (4,3/3,4,6,5) N=4 (1,1/1,1,1,1) N=2 (1,0/1,0,0,1) N=2 (1,0/1,1,0,0) N=42 (6,9/9,9,10,14) N=50 (10,12/25,25,0,0)	3.00 4.00	1.82 0.62	Legeliu	MADE GROUND comprising black I gravelly clayey fill. Sand is fine to co is fine to coarse subangular of brick limestone, flint and mudstone. Possible MADE GROUND comprisiblue grey sandy CLAY. Sand is fine blue grey sandy CLAY. Sand is fine Very soft blue grey SILT with occasing partings. Stiff wet blue grey SILT with occasion of Limestone. Gravels are fine to co to subangular. Very weak weathered LIMESTONE as gravels and cobbles which are fine angular to subangular.	orown sandy parse, gravel parse, gravel property of the second or second organic onal organic onal organic onal second organic Recovered	1 1 1 2 1 1 1 1 1 1
		9.00 9.00 - 10.50	С	N=50 (25,0/50,0,0,0	9.00	-0.38		Very strong grey LIMESTONE with brown staining and frequent bands limestone. Fractures 0-20° very clos spaced rough open planar.	of non-intact	9 -
										10 —
Rema	rke							Continued on next sheet		1.



		10							Borehole N	No.
	S	D				Boi	reho	ole Log	BH04	
con	sult	ing					. •	3.3 = 3	Sheet 2 of	f 3
Projec	t Name:	Barry Wate	erfront		Project No. 23297		Co-ords:	311099.00 - 167403.00	Hole Typ	е
Location	on:	Ffordd Y M	lileniw	m, Barry			Level:	8.62	Scale 1:50	
Client:	1	WEPCO					Dates:	18/10/2023 - 20/10/2023	Logged B LH+LEJ	
Well	Water Strikes			n Situ Festing	Depth (m)	Level (m)	Legend	Stratum Description		
	Otrikos	Depth (m)	Туре	Results	(111)	(111)				
		10.50 10.50 - 12.00	С	50 (25 for 105mm/5 for 275mm)	0					11 —
		12.00 - 13.50	С		12.00	-3.38		Very strong yellowish brown and da mottled with dark orange staining ar 5-15m veins of calcite. Fractures cle widely spaced 10-30° rough open p Band of pinkish white calcite.	nd occasional osely to	12 —
		13.50 - 15.00	С		13.50	-4.88		Very strong yellowish brown mottled LIMESTONE. Fractures 0-20° very closely spaced rough open undulati and 50-60° very widely spaced roughlanar. Band of white calcite. Band of yellowish brown mudstone.	closely to ng/planar	14 —
		15.00 15.00 - 16.50	С	50 (25 for 85mm/50 for 245mm)				Band of white calcite.		15 —
		16.50 - 18.00	С		15.70	-7.08		Band of pinkish white calcite. Very strong dark grey LIMESTONE yellowish brown staining and occas veins of calcite. Fractures closely smooth planar and 80-90° vertical of Band of dark grey mudstone.	ional 5-10mm paced 0-20°	16 -
		18.00 - 19.50	С		17.10	-8.48		Very strong bluish grey LIMESTONI orange staining and very frequent 5 calcite, becoming less frequent with Fractures extremely closely to close 0-20° rough planar and widely 30-4 undulating.	mm veins of depth.	18 —
Remai		19.50 - 21.00	С					Continued on next sheet		19 -



1	C	n					Borehole No.			
	5	Ρ				Boı	reho	ole Log	BH04	
con	sult	ing						9	Sheet 3 of	3
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311099.00 - 167403.00	Hole Type CP	€
Locati	on:	Ffordd Y M	lileniw	m, Barry			Level:	8.62	Scale 1:50	
Client:		WEPCO					Dates:	18/10/2023 - 20/10/2023	Logged B	
Well	Water		Randf	nRSituPTesting	Depth	Level	Legend	Stratum Description		
vveii	Strikes	Depth (m)	Туре	Results	(m)	(m)	Legend	Stratum Description		
								Band of reddish brown mudstone.		=
								Band of pinkish white calcite.		_
		21.00 - 22.50	С							
		21.00 - 22.50			21.20	-12.58		Band of yellowish brown mudstone with calc Very strong reddish brown and grey		21 —
								LIMESTONE with occasional 5mm vicalcite and orange staining. Fracture	eins of	=
								very widely spaced 10-20° rough op planar and very widely spaced 30-4	en to closed	-
								open planar.		22 —
		22.50 - 24.00	С							_
										_ _ _
										23 —
										_ _ _
								band of dark grey mudstone.		=
		24.00 - 25.50	С							24 -
					24.20	-15.58		Very strong grey LIMESTONE with of staining and occasional bands of pir	orange	- - -
								calcite and dark grey mudstone. Fra closely spaced smooth open planar	ctures 0-20°	_
										25 —
										=
					25.50	-16.88		End of borehole at 25.50 m		
										26 —
										_
										_ _
										27 —
										- - -
										=
										28 —
										29 =
										30 —
Rema	rks									

n	S	р					R	ota	rv (Core Log	Borehole N	
ons	sulti	ing						Ota		7010 L0g	Sheet 1 of	12
roject	Name:	Barry Wat	erfront				oject No. 3297		Co-ords:	311099.00 - 167403.00	Hole Typ RC	ре
ocatio	n:	Ffordd Y N	/lileniw	m, Bar	ry				Level:	8.62	Scale 1:50	
lient:		WEPCO							Dates:	18/10/2023 - 20/10/2023	Logged E	-
	Water Strikes	Depth (m)	Type / FI	TCR	Coring	RQD	Depth (m)	Level (m)	Legend	Stratum Description		
		1.20 - 1.65 2.00 - 2.45	ВВ				3.00	5.62		MADE GROUND comprising black I gravelly clayey fill. Sand is fine to co is fine to coarse subangular of brick limestone, flint and mudstone.	arse, gravel , concrete,	
		4.00 - 4.45	В				4.00	4.62		Possible MADE GROUND comprisi blue grey sandy CLAY. Sand is fine	to coarse.	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
		5.00 - 5.45	В						X X X X X X X X X X X X X X X X X X X	Very soft blue grey SILT with occasi partings.	onal organic	
		6.00 - 6.45	В						(
	•	7.00 - 7.45	В				6.80	1.82	×××× ××××× ××××× ××××× ××××× ××××××	Stiff wet blue grey SILT with occasion of Limestone. Gravels are fine to co to subangular.		
		8.00 - 8.45	В				8.00	0.62	X X X X X X X X X X X X X X X X X X X	Very weak weathered LIMESTONE as gravels and cobbles which are fit angular to subangular.		
		9.00 - 10.50 9.00 - 10.50	C	50	21	9	9.00	-0.38		Very strong grey LIMESTONE with brown staining and frequent bands limestone. Fractures 0-20° very clos spaced rough open planar.	of non-intact	
			1	1	1	i	1	I .	1 1 1			



	C	5									Borehole N	0.
	5	Р					R	ota	rv (Core Log	BH04	Ļ
con	sult	ing							,	3	Sheet 2 of	12
Projec	t Name	: Barry Wate	erfront				oject No. 297		Co-ords:	311099.00 - 167403.00	Hole Type RC	е
Locatio	on:	Ffordd Y M	1ileniw	m, Bar	ry				Level:	8.62	Scale 1:50	
Client:		WEPCO							Dates:	18/10/2023 - 20/10/2023	Logged B	-
	Water	Depth	Туре		Coring	 J	Depth	Level		_	LH+LEJ	
Well	Strikes	(m)	/ FI	TCR	SCR	RQD	(m)	(m)	Legend	Stratum Description		
												=
		10.50 - 12.00	С									
												11 —
		10.50 - 12.00		80	61	17						-
		-12.00 - 13.50	С				12.00	-3.38		V	-d	12 —
										Very strong yellowish brown and da mottled with dark orange staining and 5-15m veins of calcite. Fractures clo	nd occasional	-
		10.00 10.50		00	07	00				widely spaced 10-30° rough open p Band of pinkish white calcite.		
		12.00 - 13.50		88	87	28						13 —
												-
		13.50 - 15.00	С				13.50	-4.88		Very strong yellowish brown mottled LIMESTONE. Fractures 0-20° very	d dark grey	-
										closely spaced rough open undulati and 50-60° very widely spaced rough	ng/planar	14 —
		13.50 - 15.00		80	73	10				planar. Band of white calcite.	, ,	
										Band of yellowish brown mudstone.		-
		15.00 - 16.50	С									15 —
										Band of white calcite.		
		15.00 - 16.50		90	83	11	15.70	-7.08		Band of pinkish white calcite.	***	-
		15.00 - 16.50		90	03	"				Very strong dark grey LIMESTONE yellowish brown staining and occas veins of calcite. Fractures closely specific process.	ional 5-10mm	16 —
										smooth planar and 80-90° vertical c		
		16.50 - 18.00	С									-
							17.10	-8.48				17 —
		16.50 - 18.00		90	67	33	17.10	-0.40		Very strong bluish grey LIMESTONI orange staining and very frequent 5	mm veins of	
										calcite, becoming less frequent with Fractures extremely closely to close 0-20° rough planar and widely 30-4	ely spaced	-
		18.00 - 19.50	С							undulating.	o smooth	18 —
		18.00 - 19.50		97	93	15						-
		10.00 - 19.00		"	33	13						19 -
		19.50 - 21.00	С									=
										Continued on next sheet		20 —
Remar	-ke				1	<u> </u>				Continued on next sheet		1



h	C	n				D (0)				_	Borehole No	Э.
	5	P					R	ota	rv (Core Log	BH04	
con	sult	ing							,	3	Sheet 3 of 1	
Projec	t Name	: Barry Wate	erfront				oject No. 3297		Co-ords:	311099.00 - 167403.00	Hole Type RC)
Location	on.	Ffordd Y M	lileniw	m Bar	rv				Level:	8.62	Scale	
Loodin		- Torus		, Dai	.,				20701.		1:50 Logged By	,
Client:		WEPCO							Dates:	18/10/2023 - 20/10/2023	LH+LEJ	y
Well	Water Strikes	Depth (m)	Type / FI	TCR	Coring SCR	RQD	Depth (m)	Level (m)	Legend	Stratum Description		
		19.50 - 21.00		94	80	36				Band of reddish brown mudstone. Band of pinkish white calcite.		-
		21.00 - 22.50	С				-			Band of yellowish brown mudstone with calcite	e nodules.	21 -
		21.00 - 22.50		94	94	61	21.20	-12.58		Very strong reddish brown and grey b LIMESTONE with occasional 5mm ve calcite and orange staining. Fractures very widely spaced 10-20° rough open planar and very widely spaced 30-40° open planar.	anded ins of closely to n to closed	22 —
		22.50 - 24.00 22.50 - 24.00	С	100	100	73				band of dark grey mudstone.		23 —
		24.00 - 25.50	С									
		24.00 - 25.50		97	65	37	24.20	-15.58		Very strong grey LIMESTONE with or staining and occasional bands of pink calcite and dark grey mudstone. Fract closely spaced smooth open planar	ish white	25 —
							25.50	-16.88		End of borehole at 25.50 m		=
										End of boreriole at 25:30 fil		26 —
												27 —
												28 -
												29 -
Remai	rke									Continued on next sheet		30 —



h	Sult	D				Во	reho	ole Log	Borehole N BH06 Sheet 1 of	
Projec	t Name:	Barry Wat	erfront		Project No. C3297		Co-ords:	311177.00 - 167395.00	Hole Type CP	Э
Locati	on:	Ffordd Y N	/lileniw				Level:	9.18	Scale 1:50	
Client:		WEPCO					Dates:	06/10/2023 - 13/10/2023	Logged B LH+LEJ	-
Well	Water Strikes		т т	nrBiturFesting	Depth (m)	Level	Legend	Stratum Description	1	
vveil	Strikes	1.20 1.20 - 1.65 2.00 2.00 - 2.45 3.00 3.00 - 3.45 4.00 4.00 - 4.45 5.00 5.00 - 5.45 6.00 6.00 - 6.45	B B B B B B B	Results N=26 (3,4/6,6,7,7) N=26 (4,4/7,6,6,6) N=6 (1,1/2,2,1,1) N=3 (1,1/1,0,1,1) N=5 (2,2/2,1,1,1) N=8 (2,3/2,2,2,2) N=4 (1,1/1,1,1,1) N=10 (1,1/2,3,3,2)	(m) 3.00	(m) 6.18	Legend	MADE GROUND comprising black gravelly clayey fill. Sand is fine to co is fine to coarse angular to subangu concrete, mudstone and limestone, Wet very soft grey brown SILT with organic partings.	brown sandy parse, gravel ılar brick,	1 1 1 1 1 1 1 1 1 1
							× × × × × × × × × × × × × × × × × × ×			
		10.00		N=15 (3,2/4,4,3,4))		XXXX	Continued on next sheet		10 —



Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl. whilst coring from 21m to 34.5m

h con	S	<mark>D</mark>				Во	reho	ole Log	Borehole N BH06 Sheet 2 or	5 f 4
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311177.00 - 167395.00	Hole Typ CP	е
Locati	on:	Ffordd Y N	/lileniw	m, Barry			Level:	9.18	Scale 1:50	
Client:		WEPCO					Dates:	06/10/2023 - 13/10/2023	Logged E LH+LEJ	-
Well	Water Strikes	Samples Depth (m)		n RSituPresting Results	Depth (m)	Level (m)	Legend	Stratum Description	1	
		11.00 11.00 - 11.45 12.00 12.00 - 12.45 13.00 13.00 - 13.45	B B B	N=14 (3,3/3,4,3,4) N=8 (1,2/2,2,2,2) N=16 (3,4/4,4,4,4)	11.50	-2.32	XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXX	Medium dense yellow brown SANE GRAVELS. Sand is fine to coarse, to coarse angular to subangular flir and mudstone.	gravel is fine	11 —
		14.00 14.00 - 14.45	В	N=17 (4,6/5,4,4,4) N=4 (1,1/1,1,1,1)	15.00	-5.82	××××	Soft blue grey SILT.		14 —
		16.00 16.00 16.00 - 16.45	В	N=4 (2,2/1,1,1,1)			***** ***** ***** ***** ***** ***** *****			16 —
	17	17.00 17.00 - 17.45	В	N=11 (1,2/2,3,3,3)			X X X X X X X X X X X X X X X X X X X			17 —
		18.00 18.00 - 18.45	В	N=10 (2,2/3,2,3,2)			XXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX			18 —
	1	19.00 19.00 - 19.45	В	N=13 (2,2/3,3,4,3)			XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX			19 —
		20.00		50 (10,12/24,26,,)	20.00	-10.82	XXXX	Continued on next sheet		20 -



Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl. whilst coring from 21m to 34.5m

									Borehole N	lo.
n	S	р				Bo	reho	ole Log	ВН06	;
con	sult	ing							Sheet 3 of	4
Projec	t Name:	Barry Wate	erfront		Project No. C3297		Co-ords:	311177.00 - 167395.00	Hole Type CP	е
Locati	on:	Ffordd Y N	/lileniw				Level:	9.18	Scale 1:50	
Client		WEPCO					Dates:	06/10/2023 - 13/10/2023	Logged B LH+LEJ	-
Well	Water		sPandFl	n r Situ r Testing	Depth	Level	Legend	Stratum Descriptior	1	
	Strikes	Depth (m)	Туре	Results	(m)	(m)				
	•	20.00 - 20.30	С					Very weak weathered LIMESTONE as gravels and cobbles of Limestor and Cobbles are fine to coarse, and subrounded.	e. Gravels	21 —
		22.50		50 (25 for 80mm/50	0 22.50	-13.32				_
				for 275mm)	22.50	-13.32		Very strong reddish brown mottled LIMESTONE with alternating bands	grey s of intact and	_
		22.50 - 24.00 24.00 - 25.50	С					non-intact limestone.		23 -
		25.50 - 27.00	С		24.50	-15.32		Very strong grey and reddish brown LIMESTONE with orange staining. very closely to widely spaced 0-20° planar and 70-80° rough open plan Band of white calcite.	Fractures rough open	25 —
					26.10	-16.92		Very strong dark blue and dark grey LIMESTONE with orange staining. widely spaced 0-20° smooth planar smooth planar and widely to very w 50-60° rough open undulating.	Fractures , 70-90°	26 -
		27.00 - 28.50	С					30-00 Tough open undulating.		27 -
		27.75 28.50 - 30.00	C							28 —
								Pand of sinkish white salati-		29 -
Domo		30.00 - 31.50	С		30.00	-20.82		Band of pinkish white calcite. Continued on next sheet		30 -



Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl. whilst coring from 21m to 34.5m

Break Barry Waterfront Project No. C3297 Co-ords: 311177.00 - 167395.00 Hole of the Project No. C3297 Co-ords: 311177.00 - 167395.00 Hole Type CP			<u></u>							Borehole I	No.
Project Name: Barry Waterfront C3297 Co-ords: 311177.00 - 167395.00 Hole Type CP Location: Ffordd Y Millenhwn. Barry Location: Well Water Samples Bndfhrishtuffesting Shrikes Depth (m) Type Results Sinkes Depth (m) Type Results 32.40 -23.22 33.00 - 33.50 C 34.50 - 26.32 34.50 - 26.32 Seried 4 of 4 Hole Type CP Level: 9.18 Scrience 15.50 Dates: 06/10/2023 - 13/10/2023 Logged By LH+LEJ Well Water Samples Bndfhrishtuffesting (m) Level (m) Legend Stratum Description Very strong grey and reddish brown motted groy with visidely spaced rough open to closed planar. 31 - 14 - 15 - 15 - 15 - 15 - 15 - 15 - 1	n	5	р				Bo	reho	ole Log	ВН06	3
Column C	con	sult	ing						<u> </u>		
Client WEPCO Well Wilder Samples Results Depth (m) Type Results Re	Projec	t Name:	Barry Wate	erfront				Co-ords:	311177.00 - 167395.00		е
West Water Sample=Rhotim=Riture Depth (m) Type Results Statum Description Depth (m) Strakes Depth (m) Type Results Statum Description Depth (m) Strakes Depth (m) Depth	Locati	on:	Ffordd Y M	/lileniwn	n, Barry			Level:	9.18		
Strikes Depth (m) Type Results (m) Legend Stratum Description	Client:	ŀ	WEPCO					Dates:	06/10/2023 - 13/10/2023		
Strikes Depth (m) Type Results (m) (m) Legent	\A/- II	Water	Samples	s Pand Pr	n r Situ r Testing	Depth	Level	1	Otratana Daganiatian		
31.50 - 33.00 C 31.50 - 33.00 C 32.40 -23.22 Very strong reddish brown motited grey with occasional 5-16mm calcile veins. Fractures are very closely to widely spaced are 0-10° and very widely spaced 30-40° smooth undulating 33 - 25.32 34.50 -25.32 End of boothols at 34.50 m 35 - 36 - 37 - 38 - 38 - 38 - 38 - 38 - 38 - 38	vveii	Strikes	Depth (m)	Туре	Results		(m)	Legend			
34.50 25.32 End of barehole at 34.50 m 33 - 35 - 36 - 36 - 36 - 36 - 36 - 36 -			31.50 - 33.00	С		32.40	-23 22		LIMESTONE. Fractures 0-20° very widely spaced rough open to closed	closely to d planar.	-
36 - 37 - 38 - 38 - 38 - 38 - 38 - 38 - 38			33.00 - 33.50	С		32.40	-23.22		occasional 5-15mm calcite veins. F very closely to widely spaced are 0-	ractures are -10° and very	- - - - - - - -
36 - 37 - 38 - 39 - 39 - 39 - 39 - 39 - 39 - 39						34.50	-25.32		End of borehole at 34.50 m		-
38 -											35 -
38 -											36 -
38 —											- -
39											37 —
39											-
											38 —
											-
											39 -
											40 —

Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl. whilst coring from 21m to 34.5m

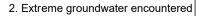


	C	n								_	Borehole N	О.
	5	D					R	ota	ry C	Core Log	BH06	;
con	sult	ing									Sheet 1 of	
Projec	t Name:	Barry Wate	erfront				oject No. 297		Co-ords:	311177.00 - 167395.00	Hole Type RC	е
Locati	on:	Ffordd Y N	/lileniw	m, Bar	ry	·			Level:	9.18	Scale 1:50	
Client		WEPCO							Dates:	06/10/2023 - 13/10/2023	Logged B	
Ollorit					Coring	•			Buttoo.	00/10/2020 10/10/2020	LH+LEJ	
Well	Water Strikes	Depth (m)	Type / FI				Depth (m)	Level (m)	Legend	Stratum Description		
	Strikes	(m) 1.20 - 1.65 2.00 - 2.45 3.00 - 3.45 4.00 - 4.45 5.00 - 5.45 7.00 - 7.45	B B B B B B	TCR	SCR	RQD	3.00	6.18		MADE GROUND comprising black gravelly clayey fill. Sand is fine to co is fine to coarse angular to subangu concrete, mudstone and limestone, Wet very soft grey brown SILT with organic partings.	brown sandy parse, gravel lar brick,	1 — 2 — 3 — 4 — 5 — 6 — 7 — 8 — 8 — 8 — 8 — 8 — 8 — 8 — 8 — 8
		9.00 - 9.45	В						(9 -
		10.00 - 10.45	В						XXXX	Continued on next sheet		10 -



Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl.
whilst coring from 21m to 34.5m

h	S	р					R	ota	rv (Core Log	Borehole N	
con	sult	ing					1 /	Ota	ı y C	Joie Log	Sheet 2 of	
Projec	t Name	: Barry Wate	erfront				oject No. 297		Co-ords:	311177.00 - 167395.00	Hole Typ RC	е
Locati	on:	Ffordd Y N	/lileniw	m, Bar	ry	03	291		Level:	9.18	Scale 1:50	
Client:		WEPCO							Dates:	06/10/2023 - 13/10/2023	Logged E	
	Water	Depth	Туре		Coring	l	Depth	Level			LH+LE.)
Well	Strikes		/ FI	TCR	_		(m)	(m)	Legend	Stratum Description	1	
		11.00 - 11.45 12.00 - 12.45 13.00 - 13.45	ВВВ				11.50	-2.32	XXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX	Medium dense yellow brown SAND GRAVELS. Sand is fine to coarse, of to coarse angular to subangular flin and mudstone.	gravel is fine	11 —
		14.00 - 14.45 15.00 - 15.45	В				15.00	-5.82	×××× ××××	Soft blue grey SILT.		14 —
		16.00 - 16.45	В						XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX XXXXX			16 —
		17.00 - 17.45	В						X X X X X X X X X X X X X X X X X X X			17 —
		18.00 - 18.45	В						X X X X X X X X X X X X X X X X X X X			18 —
		19.00 - 19.45	В						X X X X X X X X X X X X X X X X X X X			19 -
		20.00 - 20.30	В				20.00	-10.82	×××× ××××			20 —
Rema	rke									Continued on next sheet		





Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl. whilst coring from 21m to 34.5m

											Borehole N	0.
n	S	р					R	ota	ry C	Core Log	BH06	;
con	sult	ıng							<u>, </u>		Sheet 3 of	
Projec	t Name	: Barry Wate	erfront				oject No. 3297		Co-ords:	311177.00 - 167395.00	Hole Type RC	Э
Locati	on:	Ffordd Y M	1ileniw	m, Bar	ry	1			Level:	9.18	Scale 1:50	
Client:	1	WEPCO							Dates:	06/10/2023 - 13/10/2023	Logged B LH+LEJ	-
Well	Water Strikes	Depth (m)	Type / FI		Coring		Depth (m)	Level (m)	Legend	Stratum Description		
	•	21.00 - 21.75	С	TCR	JOIN	RQD				Very weak weathered LIMESTONE. as gravels and cobbles of Limeston and Cobbles are fine to coarse, ang subrounded.	e. Gravels	21 –
		22.50 - 24.00	С				22.50	-13.32		Very strong reddish brown mottled g LIMESTONE with alternating bands non-intact limestone.	rey of intact and	23 —
		22.50 - 24.00 -24.00 - 25.50	С	100	28	15						24 —
		24.00 - 25.50		60	55	8	24.50	-15.32		Very strong grey and reddish brown LIMESTONE with orange staining. For very closely to widely spaced 0-20° planar and 70-80° rough open planated by the calcite.	ractures rough open	25 —
		25.50 - 27.00	С				26.10	-16.92		Very strong dark blue and dark grey	mattled	26 —
		25.50 - 27.00 - 27.00 - 28.50	6	60	57	7				LIMESTONE with orange staining. It widely spaced 0-20° smooth planar, smooth planar and widely to very wi 50-60° rough open undulating.	ractures 70-90°	- - - - - - - -
		27.0 207-728 .50	6	97	90	42						28 —
		28.50 - 30.00 28.50 - 30.00 -30.00 - 31.50	7 C	98	75	25	30.00	-20.82		Band of pinkish white calcite.		29 —
Domo					1		<u> </u>	<u> </u>		Continued on next sheet		1

Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl. whilst coring from 21m to 34.5m



		1 0									Borehole N	0.
Π	5	P					R	ota	rv (Core Log	BH06	,
con	sult	ing							·	-0.0 -09	Sheet 4 of	4
Projec	t Name	: Barry Wate	erfront				oject No. 3297		Co-ords:	311177.00 - 167395.00	Hole Type RC	Э
Locati	on:	Ffordd Y M	fileniw	m, Bar	ry				Level:	9.18	Scale 1:50	
Client:		WEPCO							Dates:	06/10/2023 - 13/10/2023	Logged B LH+LEJ	
Well	Water Strikes	Depth (m)	Type / FI	TCR	Coring SCR	RQD	Depth (m)	Level (m)	Legend	Stratum Description		
		30.00 - 31.50	4	71	69	59				Very strong grey and reddish brown LIMESTONE. Fractures 0-20° very of widely spaced rough open to closed	closely to	31 —
		31.50 - 33.00 31.50 - 33.00	2.6	100	100	85	32.40	-23.22		Very strong reddish brown mottled goccasional 5-15mm calcite veins. Fr	actures are	32 —
		33.00 - 33.50	С							very closely to widely spaced are 0- widely spaced 30-40° smooth undul	ating	33 —
		33.00 - 34.50	5	98	97	43						-
							34.50	-25.32		End of borehole at 34.50 m		34 -
										End of borefiole at 54.50 m		-
												35 -
												36 -
												37 -
												38 -
												39 —
												40 —

Remarks
1. Cable Percussion to 21.15m with Rotary Core to 34.5m begl. whilst coring from 21m to 34.5m



h	cn							Trialpit N	No
	sulting					Ir	ial Pit Log	TP0	3
							la	Sheet 1 d	
Projec Name:		aterfront	:	Project C3297			Co-ords: 311035.00 - 167374.00 Level: 8.34	Date 20/09/20	
				03291			Dimensions	Scale	
Location	on: Ffordd Y	Mileniw	m, Barry				(m):	1:25	
Client:	WEPCO)					Depth 4.00	Logged LAB	d
<u>-</u> 0	Sample	es Pand P	n r SituPTesting	Donth	Lovol			_ LAD	
Water Strike	Depth	Туре	Results	Depth (m)	Level (m)	Legend	Stratum Description		
> 0)	200	.,,,,					MADE GROUND - Asphalt concrete.		-
	0.15 - 0.30	TJ		0.15	8.19		MADE GROUND - Sub base material (Type 1)	l.	-
	0.15 - 0.30	TJV		0.30	8.04		MADE GROUND - Dark brown sandy gravelly		:
							occasional cobbles. Sand is fine to coarse. Gra	avel is fine	-
	0.50 - 0.60 0.60 - 0.80	B B					to medium angular to sub angular of bricks, co Cobbles are angular of concrete and brick.	ncrete.	-
	0.70 - 1.00	В		0.70	7.64		MADE COOLING Province and Consulty CLAY	/ Candia	
							MADE GROUND - Brown sandy gravelly CLA' fine to medium. Gravel is fine to medium angu	lar to sub	-
	4.00 4.00	.					angular of mudstone, siltstone and limestone (Reworked).		-
	1.00 - 1.20	TJ					,		1 -
	1.20 - 1.40	TJV							-
									-
	1.50 - 1.70	В]
	1.50 - 1.70	Ь							-
	1.70 - 1.90	В							=
	1.80 - 2.10	В							-
	2.00 - 2.20	TJ							2 -
	2.00 2.20	"							-
	2.20 - 2.40	TJV							-
									=
	2.50 - 2.70	В							-
									-
	2.70 - 2.90	В							-
	2.90 - 3.10	В							-
	3.00 - 3.10	TJ							3 -
	3.20	TJV					slight hydrocarbon odour and staining between 3.20m	to 3.60m	-
							depth.		-
	3.50 - 3.70	В							
									-
	2.00 4.00								-
	3.80 - 4.00	В							
	4.00 - 4.10	TJ		4.00	4.34		End of pit at 4.00 m		4 -
	4.00 - 4.10	TJV							-
									-
									-

1. Slight groundwater was encountered at 3.60m depth during the excavation process. 2. Trial pit was terminated at 4.00m depth and backfilled with arisings.

Stability: Sides unstable within made ground.



								Trialpit N	No
n	SD					Tri	al Pit Log	TP04	4
COII	sulting							Sheet 1 c	of 1
Projec		aterfron	!	Projec			Co-ords: 311021.00 - 167370.00	Date	
Name	: Barry VV			C3297	•		Level: 8.51	20/09/20	23
Locati	on: Ffordd Y	Mileniv	m. Barrv				Dimensions	Scale	
			· •				(m):	1:25	
Client	: WEPCO						Depth 4.00	Logged LAB	a
er (e	Sample	es Rand R	nrSiturTesting	Depth	Level	Legeno	Stratum Description		
Water Strike	Depth	Туре	Results	(m)	(m)	Legend			
							MADE GROUND - Sub base material (Type 1).		-
	0.15 - 0.30 0.15 - 0.30	TJV		0.20	8.31		MADE GROUND - Brown sandy gravelly clay.	Sand is	-
							fine to coarse. Gravel is fine to coarse angular	to sub	
							angular of mudstone, siltstone and limestone.		-
	0.50 - 0.60	В							-
	0.60 - 0.80	В							
	0.70 - 1.00	В							-
									-
									-
	1.00 - 1.20	TJ							1 -
	1.00 1.10	T 1) /							-
	1.20 - 1.40	TJV							-
									-
	1.50 - 1.70	В							-
	1.30 - 1.70								-
	1.70 - 1.90	В							-
	1.80 - 2.10	В							-
				1.90	6.61		0.64.6	l :- .f	-
	2.00 - 2.20	TJ					Soft to firm brown grey sandy gravelly CLAY. So to medium. Gravel is fine to medium angular to		2 -
							angular of limestone, mudstone and siltstone.		-
	2.20 - 2.40	TJV					<u>-</u>		-
							<u>.</u>		
									-
	2.50 - 2.70	В							-
									-
	2.70 - 2.90	В							-
	0.00 0.40	_							-
	2.90 - 3.10	В					-		-
	3.00 - 3.10	TJ							3 –
	3.20	TJV					4 		
	3.20	130					<u>.</u>		-
				3.40	5.11				-
	3.50 - 3.70	В		0.40	0.11		Medium dense black brown slightly clayey SAN GRAVEL. Sand is fine to coarse. Gravel if fine to	ID and	_
	0.00 0.70						medium angular to sub angular mudstone and	shale.	-
									-
	3.80 - 4.00	В							-
							1		-
	4.00 - 4.10	TJ		4.00	4.51		End of pit at 4.00 m		4 -
	4.00 - 4.10	TJV							-
									-
									-
									-
									-

1. Slight groundwater was encountered at 3.90m depth during the excavation process. 2. Trial pit was terminated at 4.00m depth and backfilled with arisings.

Stability: Sides unstable within made ground.



				T				Trialpit N	Jo.
h	s p					Tri	al Pit Log	TP05	
CON	sulting							Sheet 1 o	of 1
Projec		aterfront	<u> </u>	Projec			Co-ords: 311139.00 - 167361.00	Date	
Name	: =====			C3297	7		Level: 9.01	18/09/20	
Locati	on: Ffordd Y	Mileniw	/m, Barry				Dimensions (m):	Scale 1:25	
<u> </u>	=====						Depth	Logged	
Client	: WEPCO				,	_	3.10	DRS	
ke fe	Sample	sPandP	n r Situ r Testing	Depth	Level	Legeno	Stratum Description		
Water Strike	Depth	Type	Results	(m)	(m)	Logono	· ·		
	0.15 0.25	TJV		0.35	8.66		MADE GROUND - scrub overlying brown sandy gravelly clayey topsoil. Sand is fine to coarse. Gine to coarse sub angular to sub rounded of bri fragments, concrete, asphalt concrete, sandstormudstone.	Gravel is ck ne and	- - - -
	0.50	В					MADE GROUND - dark brown sandy very grave with occasional cobble content. Sand is fine to compare the content of the content o		_
	0.50	В					Gravel is fine to coarse sub angular to sub roun	ded of	-
	0.70	В					bricks, brick fragments, concrete, asphalt concressandstone and mudstone. Cobbles are sub and		
							concrete.	,	-
	4.00	.		4.00	0.04				
	1.00 1.10	TJV TJ		1.00 1.01	8.01 8.00		MADE GROUND - black plastic membrane. MAADE GROUND - dark brown sandy gravelly occasional cobble content. Sand is fine to coars is fine to coarse angular to sub angular of bricks fragments, concrete, plastic, timber, asphalt cor	se. Gravel s, brick	1 -
	1.50	В					Cobbles are sub angular of concrete.		_
	1.60	В							-
	1.70	В							-
				4.00	7 44				
	2.00	TJV		1.90	7.11		Soft brown mottled grey orange sandy gravelly Sand is fine to coarse. Gravel is sub angular to rounded of mudstone and sandstone.		2 -
	2.20 - 2.30	TJ							-
	2.50	В							-
	2.60	В							-
	2.70	В							
	0.00	T.D./							-
	3.00 3.10	TJV		3.10	5.91		End of pit at 3.10 m		3 -
									4 —
									- - - - - - - - - -

No groundwater was encountered during the excavation process.
 Trial pit was terminated at 3.10m depth and backfilled with arisings.

Stability: Sides unstable within made ground.



								Trialpit No	
h	s p					Tr	ial Pit Log	TP06	
con	sulting							Sheet 1 of	1
Projec		aterfron	t	Projec			Co-ords: 311126.00 - 167387.00	Date	
Name	:,		-	C3297	7		Level: 9.39	18/09/202	23
Locati	on: Ffordd Y	/ Mileniw	vm, Barry				Dimensions (m):	Scale 1:25	
01: 1	WEDOG						Depth	Logged	
Client:	WEPCC)			1		3.00	DRS	
ke fe	Sampl	esPandF	nrSiturTesting	Depth	Level	Legend	d Stratum Description		
Water Strike	Depth	Туре	Results	(m)	(m)	3			
							MADE GROUND - scrub overlying brown sandy gravelly clayey topsoil. Sand is fine to coarse. G	slightly gravel is	
	0.15 0.25	TJV TJ					fine to coarse sub angular to sub rounded of brid	ck	-
	0.25	13		0.30	9.09		fragments, concrete, asphalt concrete, sandston mudstone.	ne and	-
	0.50	_					MADE GROUND - dark brown sandy gravelly cloccasional cobble content. Sand is fine to coars	ay with	-
	0.50 0.60	B B					is fine to coarse sub angular to sub rounded of b	oricks,	-
	0.70	В					brick fragments, concrete, asphalt concrete, clin Cobbles are angular of bricks and concrete.	ker.	-
							Cobbles are angular of bricks and concrete.		-
									-
	1.00	TJV							1 -
	1.10	TJ							-
									-
									-
	1.50	В							-
	1.60	В							-
	1.70	В							-
									-
	2.00	TJV							2 -
	2.10	TJ							-
									-
	2.50	В		2.50	6.89				-
	2.60	В					Soft brown mottled yellowish grey brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is	very fine to	-
	2.70	В					coarse sub angular to sub rounded of sandstone		-
	2.80	В					mudstone and occasional limestone.		-
				2.00	6.00				_
				3.00	6.39		End of pit at 3.00 m		3 -
									-
									-
									-
									-
									-
									-
									4 -
									-
									-
									-
		1			1	1			-

No groundwater was encountered during the excavation process.
 Trial pit was terminated at 3.00m depth and backfilled with arisings.

Stability: Sides unstable within made ground.



									NI-
h	s p					Tri	al Pit Log	Trialpit	
con	sulting					111	iai i il Lug		
Projec	·+			Projec	t No.		Co-ords: 311153.00 - 167410.00	Sheet 1	
Name		aterfront		C3297			Level: 9.13	20/09/2	
Locati	on: Ffordd Y	' Mileniwm	n, Barry	•			Dimensions	Scal	_
		6 - 0.30 TJV 0 - 0.30 TJ 0 - 0.70 B 0 - 0.80 B 0 - 1.00 B					(m): Depth	1:25 Logg	
Client				1			3.00	LAE	
Water Strike		1		Depth	Level	Legeno	Stratum Description		
Wa	Depth	Туре	Results	(m)	(m)	××××××			
	0.15 - 0.30 0.20 - 0.30			0.20	8.93		MADE GROUND - scrub overlying brow gravelly clayey topsoil. Sand is fine to come fine to coarse sub angular to sub round fragments, concrete, asphalt concrete, smudstone. MADE GROUND - dark brown sandy gr	parse. Gravel is ed of brick sandstone and	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	0.50 - 0.70	В					occasional cobbles. Sand is fine to coar to medium angular to sub angular of bri	se. Gravel is fine	-
	0.60 - 0.80						Cobbles are angular of concrete and bri		-
	0.70 - 1.00								=
									-
	1.00 - 1.20	TJ							1 -
	1.20 - 1.40	TJV							- - -
	1.50 - 1.70	В							-
	1.70 - 1.90	В							
	1.80 - 2.10	В							
	2.00 - 2.20	TJ							2 -
	2.20 - 2.40	TJV		2.20	6.93		Firm brown yellow slightly sandy gravell fine to coarse. Gravel is fine to medium rounded of sandstone and mudstone.		-
	2.50 - 2.70	В							=
	2.70 - 2.90	В							
	2.90 - 3.10	В							-
	3.00 - 3.10 3.00 - 3.20	TJV		3.00	6.13		End of pit at 3.00 m		3 -
									4 —

No groundwater was encountered during the excavation process.
 Trial pit was terminated at 3.00m depth and backfilled with arisings.

Stability: Sides unstable within made ground.



h	cn							Trialpit N	No
	S D					Tr	ial Pit Log	TP08	8
CON	sulting							Sheet 1 c	of 1
Projec		aterfront		Projec			Co-ords: 311062.00 - 167385.00	Date	
Name	:,			C3297	7		Level: 8.25	20/09/20	
Locati	on: Ffordd Y	Mileniw	m, Barry				Dimensions (m):	Scale	
_							Depth	1:25 Logged	d
Client	WEPCO						3.00	DRS	
ë.	Sample	es Pand Pr	n r Situ r Testing	Depth	Level	Legend	Stratum Description		
Water Strike	Depth	Туре	Results	(m)	(m)	Legend			
	0.50 0.60 0.70 1.00 1.20	B B TJ TJV		0.30	7.95		MADE GROUND - compacted layer of stone. F as a gravel. Gravel is sub angular of limestone. MADE GROUND - reddish brown sandy gravel with occasional cobble content. Sand is fine to Gravel is sub angular to sub rounded of bricks, fragments, concrete, sandstone and mudstone occasional limestone. Cobbles are angular of b concrete. MADE GROUND - yellowish grey brown sandy clay with occasional cobble content. Sand is fin coarse. Gravel is fine to coarse sub angular to rounded of bricks, brick fragments, concrete, tif fragments, metal sheeting, sandstone and muc with occasional limestone. Cobbles are angular concrete.	lly clay coarse. brick with brick and gravelly te to sub mber	1-
	2.10 2.20 2.50 2.60 2.70 2.90 3.00	TJ TJV B B B TJ		3.00	5.25				2
	3.00	137		3.00	3.20		End of pit at 3.00 m		4-

No groundwater was encountered during the excavation process.
 Trial pit was terminated at 3.00m depth and backfilled with arisings.

Stability: Sides unstable within made ground.



	C 10								Trialpit	No
h S p consulting					Trial Pit Log				TP09	
						• • •		og	Sheet 1	of 1
Project Name: Barry Waterfront Location: Ffordd Y Mileniwm, Barry				Projec			Co-ords: 311028.00 - 167400.00 Level: 8.89 Dimensions (m):		Date	
				C3297	7				19/09/2023	
									Scale 1:25	
Client:	WEPC	0				Depth 3.00		Logge	d	
er (e	Samples Rand Pn Situ Festing			Depth	Level				•	
Water Strike	Depth Type Results			(m)	(m)	Legend				
				0.10			MADE GRROUND - asphalt concrete. MADE GROUND - reddish sub base material.			=
	0.15 0.20	TJV					Recovered as an gravel. Gravel is fir		se sub	-
				0.40			angular limestone.		-	
	0.50	В		0.40	8.49		MADE GROUND - lig	ht yellowish grey sandy g	lowish grey sandy gravelly e content. Sand is fine to parse sub angular to sub esandstone with occasional	
	0.50 0.60	C B					coarse. Gravel is fine	e to coarse sub angular to		
	0.70	В					limestone. Cobbles a	re sub rounded of mudsto		-
							sandstone (Possible	Reworked).		-
	1.00	TJ								1 -
	1.10	TJV								-
										-
										-
	1.50 1.60	B B								-
	1.00									-
										-
	2.00	TJ		1.90	6.99			ellowish grey sandy grave		2 -
	2.10	TJV					sandstone, mudstone	e. Gravel is fine to coarse e, shale and flint.	OI	-
										-
										_
	2.50	В		2.50	6.39		Firm dark grev slightl	y sandy gravelly CLAY. Sa	and is fine	-
	2.60	В					to coarse. Gravel is fi	ine to coarse sub angular	of shale	=
							and IIInt.			-
	2.90	TJ								-
	3.00	TJV		3.00	5.89		-	End of pit at 3.00 m		3 -
										=
										-
										-
										_
										=
										=
										4 -
										=
										-

No groundwater was encountered during the excavation process.
 Trial pit was terminated at 3.00m depth and backfilled with arisings.

Stability: Sides unstable within the made ground.



h s p									No	
					Trial Pit Log					
con	sulting			1116111123				Sheet 1 of 1		
Project Barry Waterfront				Projec	t No.		Co-ords: 311119.00 - 167411.00	Date	Date 19/09/2023	
Name: Barry Waterfront				C3297	,		Level: 8.61	19/09/20		
Locatio	n: Ffordd	, Barry				Dimensions (m):	Scale	Scale 1:25		
Client: WEPCO							Depth	Logge		
	Samples@and@nrisituFresting			- I - II	l	Т	3.00	DRS		
Water Strike	Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description			
> 0	Борит	Туро	rtoduito				MADE GROUND - scrub overlying brown s		-	
	0.15	TJ		0.10	8.51		gravelly clayey topsoil. Sand is fine to coars fine to coarse sub angular to sub rounded of	se. Gravel is of brick	-	
	0.25	TJV					fragments, concrete, asphalt concrete, san		-	
							│ mudstone. MADE GROUND - dark brown sandy grave		-	
	0.50	В					occasional cobbles. Sand is fine to coarse. to coarse sub angular to sub rounded of bri		-	
	0.60 0.70	B B					fragments, concrete, asphalt concrete, plas	tic, fabric	-	
	0.70						sandstone and mudstone. Cobbles are ang and concrete.	ular of brick	-	
									-	
	1.00	TJV							1 -	
	1.15	TJ		1.10	7.51		MADE GROUND - yellowish grey brown sa		-	
							clay with occasional cobble content. Sand i coarse. Gravel is fine to coarse sub angula	to sub	-	
							rounded of bricks, brick fragments, concrete timber, sandstone and mudstone with occa		-	
							limestone.	Sioriai	-	
	1.60	В							-	
	1.70 1.80	B B							-	
	1.00								-	
									2 -	
	2.10	TJ							-	
	2.20	TJV							-	
									-	
	2.50	В		2.50	6.11		Soft brown mottled yellowish grey brown sa	ndv verv		
	2.60	В					gravelly CLAY. Sand is fine to coarse. Grav	el is fine to	-	
	2.70	В					mudstone and occasional limestone.	sione,	-	
	2.90	TJ							-	
	3.00	TJV		3.00	5.61		End of pit at 3.00 m		3 -	
									-	
									-	
									-	
									-	
									-	
									=	
									-	
									4 -	
									-	

No groundwater was encountered during the excavation process.
 Trial pit was terminated at 3.00m depth and backfilled with arisings.

Stability: Sides unstable within made ground.





Appendix IV