e3p

Validation Report
Pacific Park, Wrexham

Reference: 14-255-R5-1
Date: August 2023

REMEDIATION AND ENABLING WORKS VALIDATION

Land to the south of Bridge Road North
Pacific Park
Wrexham
LL13 9PN

Prepared for:

Multimag Limited

Report Ref: 14-255-R5-1
Date Issued: August 2023

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1. INTRODUCTION

1.1. BACKGROUND

This report details the remediation and enabling works operations that were undertaken by Portal Construction NW Ltd under the part-time supervision of E3P to facilitate the preparation of the commercial and industrial development on a parcel of land to the south of Bridge Road North, Wrexham; herein referred to as the site.

E3P were appointed by Multimag Limited as independent Geo-Environmental Consultant for the site remediation, preparation / enabling and validation works and the subsequent production of a suitably detailed report to ensure the satisfaction of the relevant planning conditions and geotechnical engineering requirements for Building Control, warranty providers and the future adoption of infrastructure by the Highways Authority and statutory service providers.

1.2. PROPOSED DEVELOPMENT

E3P understands that the proposed development will comprise of two industrial units with associated adopted estate roads and utility infrastructure.

Drawing 14-255-002 (Appendix III) and Figure 1.1 identifies the proposed development layout.

FIGURE 1.1 SNAPSHOT OF PROPOSED DEVELOPMENT



1.3. SUMMARY OF PARTIES INVOLVED

Function/interest	Name of Party
Local Planning Authority	Wrexham County Borough Council
Developer	Multimag Limited
Geoenvironmental Consultant	E3P
Main Contractor	Portal Construction NW Ltd
Remediation/Enabling Works Contractor	Portal Construction NW Ltd
Human Health Regulator	Wrexham County Borough Council
Controlled Waters and Waste Regulator	Environment Agency
Highways Adoption Authority	Wrexham County Borough Council

1.4. PREVIOUS WORKS

The following previous phases of site investigation and assessment have been completed at the subject site:

- E3P – Phase I Geoenvironmental Site Assessment - Pacific Park, Wrexham. (Ref: 14-255-R1-1; June 2020).
- Phase II Geoenvironmental Site Assessment - Pacific Park, Wrexham. (Ref: 14-255-R2-1; May 2021).

These documents were utilised to development the following Remediation and Enabling Works Strategy:

- E3P – Remediation and Enabling Works Strategy - Pacific Park, Wrexham. (Ref: 14-255-R4-REVA; July 2021).

The above documents should be read in conjunction with this Validation Report.

1.5. REGULATORY CORRESPONDENCE

Multimaq Limited have received planning permission from the local planning authority for the proposed redevelopment of the site for a commercial / industrial development with associated adopted estate roads and infrastructure.

2. SUMMARY OF REMEDIATION AND ENABLING WORKS OBJECTIVES

The proposed remediation activities were detailed within the E3P Remediation and Enabling Works Strategy (14-255-R4-1; dated July 2021) and supplementary supporting documents provided by E3P.

This report has been prepared to document the completion of all necessary land remediation and enabling works and to record the presence of any variation in ground conditions or previously unidentified sources of potential contamination, environmental impact or potential nuisance to the wider environ.

The Remediation and Enabling Works elements are summarised below:

- RE-1 – Pre-commencement Supplementary Site Investigation
- RE-2 – Pre-commencement Regulatory Compliance
- RE-3 – Service Infrastructure
- RE-4 – Unexploded Ordnance
- RE-5 – Environment and Nuisance Control
- RE-6 – Risk to Infrastructure
- RE-7 – Identification, Isolation and Treatment of Invasive Plants
- RE-8 – Site Clearance Operations
- RE-9 – Delineation, Excavation and Treatment of Identified Asbestos Impact
- RE-10 – Excavation, Breaking and Processing of All Above- and Below-Ground Structures
- RE-11 – Delineation, Excavation, Treatment of Infilled Historical Ponds
- RE-12 – Removal of Deleterious Material
- RE-13 – Cut-And-Filling of MADE GROUND to Development Levels
- RE-14 – Replacement of Materials, Geotechnical Engineering Requirements
- RE-15 – Importation of Bulk Fill
- RE-16 – Independent Validation: Watching Brief
- RE-17 – Waste Soils Surplus to Requirements
- RE-18 – Validation of Materials for Potable Water Supply Infrastructure
- RE-19 – Remedial Verification Report

3. SECOND PHASE MITIGATION AND MANAGEMENT – BUILD PHASE

A second post demolition phase of works will be required to ensure the proposed development is constructed in a manner that incorporates the required mitigation measures to ensure the development is compliant with UK Building Regulations and the Local Authority Planning requirements.

These obligations are specified in more detail within Section 5.

4. DETAILED REMEDIATION AND ENABLING WORKS ACTIVITIES

The focus of the remediation and enabling works are to address the contaminant issues previously identified within the site investigations that presented an unacceptable risk to human health following the redevelopment of the site.

For completeness, each of these activities has been discussed below within the context of the actual remediation works that were undertaken on site.

The Remediation & Site Enabling works commenced in September 2021 and were completed by July 2023.

RE-1 – PRE-COMMENCEMENT SUPPLEMENTARY SITE INVESTIGATION

DATE OF WORKS UNDERTAKEN
Sepotember 2021

PHOTOGRAPHS
Plate 1 – 2

CHEMICAL ANALYSIS
I2 Analytical Report – 21-10521; September 2021.

OVERVIEW OF WORKS
The area of the concrete slab in the south of the subject site was not previously investigated due to its use as car parking for the adjacent industrial property. Additionally, investigation of the former infilled pond was restricted due to the presence of gas infrastructure and underlying services. Further investigation was undertaken in September 2021 to determine ground conditions and confirm no unidentified contamination was present. The results of the supplementary site investigation were submitted to the planning department in a letter report (Ref: 14-255-L2; dated December 2021). Additional PCB testing was also undertaken within the area of supplementary investigation and the excess materials chemical analysis. The materials left in-situ indicated that PCBs were not detected above the screening values for the site. Within the excess Made Ground materials (discussed in RE-17), elevated levels of PCBs were detected above the screening value for a commercial end use.

RE-2 – PRE-COMMENCEMENT REGULATORY COMPLIANCE

OVERVIEW OF WORKS
Prior to the commencement of works on-site, all reports relating to the assessment of risk to contaminated land were submitted to the regulatory authorities. A U1 and T5 Standard Rules Permit were registered by Portal Construction NW Ltd with the EA. The documentation and permits referred to above are available on request from Portal Construction NW Ltd.

RE-3 – SERVICE INFRASTRUCTURE

OVERVIEW OF WORKS
During remediation, the electricity infrastructure and the sewage treatment system tank and pipe works were diverted as part of the proposed development. All records regarding the diversion are available on request from Portal Construction NW Ltd.

RE-4 – UNEXPLODED ORDNANCE

OVERVIEW OF WORKS
The subject site was in the wider area of works associated with ROF Wrexham, but no historical buildings have been identified on the subject site which may be associated with the manufacture of explosives. The responsibility for UXO clearance during the remediation and construction works was of that of the contractor and therefore all records are available from Portal Construction NW Ltd upon request.

RE-5 – ENVIRONMENT AND NUISANCE CONTROL

DATE OF WORKS UNDERTAKEN
Throughout works

OVERVIEW OF WORKS
Dust monitoring was completed during the start of the remediation and enabling works. A power washer and bowser were present to dampen down materials throughout the works and during the excavation and delineation of asbestos hotspots. All records are available on request from Portal Construction NW Ltd.

RE-6 – RISK TO INFRASTRUCTURE

DATE OF WORKS UNDERTAKEN
Throughout works

OVERVIEW OF WORKS
During remediation, works were restricted to between 8.00am and 5.30pm. A road sweeper was present to keep the access and Bridge Road North clean and clear of debris during the importation of materials to site. A 15m easement was adhered to along the western boundary of the site as a medium pressure and intermediate pressure gas main were present along Bridge Road North.

RE-7 – IDENTIFICATION, ISOLATION AND TREATMENT OF INVASIVE PLANTS

OVERVIEW OF WORKS
No invasive plant species were identified during the remediation phase, therefore no further work was required.

RE-8 – SITE CLEARANCE OPERATIONS

DATE OF WORKS UNDERTAKEN
Throughout works.

OVERVIEW OF WORKS
No buildings were present on-site prior to the remediation works, however concrete slabs and asphalt hardstanding were present beneath a layer of shallow Made Ground. Trees were removed by a specialist contractor, shredded and subsequently removed off-site. A vegetation strip was completed across the whole site. Throughout the enabling works scrap metal and general waste was separated from demolition materials, and placed into allocated skips for subsequent disposal off-site.

RE-9 – DELINEATION, EXCAVATION AND TREATMENT OF IDENTIFIED ASBESTOS IMPACT

DATE OF WORKS UNDERTAKEN
Throughout works.

OVERVIEW OF WORKS
Detectable asbestos fibres were identified in discreet locations; however, due to the nature and age of the filled material, it must be assumed that trace fibres are present throughout the Made Ground. However, the supplementary ground investigation did not identify any further areas of asbestos impact within the Made Ground. The E3P Developed Conceptual Site Model demonstrates a suitable method for management of soils to negate any future risk. It was determined that no further hotspot delineation was required as the materials containing the elevated asbestos levels was placed at c. 1.00m below the proposed final development levels and therefore was placed in an area of low sensitivity, as per the E3P Asbestos CSM in Figure 2.2 within the agreed E3P Remediation Strategy (Ref: 14-255-R4-REVA; July 2021).

RE-10 – EXCAVATION, BREAKING AND PROCESSING OF ALL ABOVE- AND BELOW-GROUND STRUCTURES

DATE OF WORKS UNDERTAKEN
Throughout works.

OVERVIEW OF WORKS
Obstructions, relict foundations and infrastructure, including live services were diverted or removed from the areas of proposed development, adopted highway and utilities infrastructure (road box) in their entirety.

RE-11 – DELINEATION, EXCAVATION, TREATMENT OF INFILLED HISTORICAL PONDS

DATE OF WORKS UNDERTAKEN
September 2021

PHOTOGRAPHS
Plate 3

OVERVIEW OF WORKS
Pad foundation excavations had been advanced in the vicinity of the former pond prior to E3P's attendance to site, however the excavations were still open which allowed a visual inspection to be completed to confirm no organic or deleterious materials were present. Shallow Made Ground was identified to overlie natural CLAY drift deposits. No further works were deemed necessary.

RE-12 – REMOVAL OF DELETERIOUS MATERIAL

DATE OF WORKS UNDERTAKEN
Throughout works.

OVERVIEW OF WORKS
No deleterious materials were encountered during the remediation and enabling works. Further works were therefore not required.

RE-13 – CUT-AND-FILLING OF MADE GROUND TO DEVELOPMENT LEVELS

DATE OF WORKS UNDERTAKEN
Throughout works.

PHOTOGRAPHS
Plate 4 – 5

OVERVIEW OF WORKS
Portal Construction NW Ltd has undertaken limited cut and filling of the Made Ground to development levels at the site, given the original ground level is similar to the proosioed formation levels. A pad foundation was then utilised for the development.

RE-14 – REPLACEMENT OF MATERIALS, GEOTECHNICAL ENGINEERING REQUIREMENTS

DATE OF WORKS UNDERTAKEN
Throughout works.

OVERVIEW OF WORKS
To achieve the proposed Enabling Works Levels (EWLs), Portal Construction NW Ltd undertook a process of minor cut/fill works including the careful selection of materials from within areas of reduced level excavation (cut) prior to placement in a manner that accords with the geotechnical engineering specification & contamination compliance criteria. Arisings from the foundations were re-used on site to build up levels. Portal Construction NW Ltd has had full supervision with E3P providing part time supervision of the following: - General cut/fill of natural and anthropogenic soils in accordance with the E3P geotechnical & contamination performance criteria; - Management of all materials to maximise the retention of soils on site to ensure suitable development.

RE-15 – IMPORTATION OF BULK FILL

OVERVIEW OF WORKS
Due to the limited nature of any cut/fill earthworks there was an excess in bulkfill materials on site and therefore there was no requirement to import bulkfill materials to the site.

RE-16 – INDEPENDENT VALIDATION: WATCHING BRIEF

OVERVIEW OF WORKS
E3P implemented a part-time watching brief from September 2021, however by this point the majority of the works were undertaken. The overall aim was to investigate any potential sources of previously unidentified contamination. The Portal Construction NW Ltd site manager confirmed that prior to E3P's site attendance, no previously unidentified contamination was identified.

RE-17 – WASTE SOILS SURPLUS TO REQUIREMENTS

DATE OF WORKS UNDERTAKEN
Throughout works.

PHOTOGRAPHS
Plate 6 – 7

CHEMICAL TESTING
I2 Analytical Report 21-10252-2A (EXS101 to 103). RJT Classification Report 7U6H8-EKLQ4-0ZT6Q.

OVERVIEW OF WORKS
Excess Made Ground deposits stockpiled across the site, were removed from site by DNT Group Ltd (Permit no. EPR/HB3031AZ, Reg no. CBDU82444). WAC analysis undertaken on three samples of the excess Made Ground from across the site determined that these soils were inert non-hazardous waste. With the exception of mixed general waste and timber/vegetation chippings which were removed to a licensed waste facility, no other materials were deemed unsuitable for retention on site. Waste Transfer Notes are available in Appendix IV of this report.

RE-18 – VALIDATION OF MATERIALS FOR POTABLE WATER SUPPLY INFRASTRUCTURE

OVERVIEW OF WORKS
The site has been identified as suitable for barrier pipework. The materials imported to the site for the purpose of potable pipework installation meet the criteria of barrier pipework as presented within UKWIR guidelines.

5. POST REMEDIATION BUILD PHASE REQUIREMENTS

This document details the construction works that are required to ensure full compliance with the remediation Strategy, Regulatory Authorities, Building Control & Warranty Providers.

The following should be implemented during the build phase of the development:

- Installation and validation of ground gas protection measures.

The validation protocols are presented within the E3P Remediation and Enabling Works Strategy and are presented below.

5.1. GROUND GAS PROTECTION MEASURES

Ground gas monitoring to date suggests that the site will fall into the bracket for Characteristic Situation 2 / Amber which will require specialist mitigation measures to be constructed in accordance with BS8485 (2015)+A1(2019).

The validation inspection was completed by MEC Environmental Ltd on 19th May 2022. The validation certificate report is available in Appendix VII of this report.

6. CONCLUSION

The remediation elements identified within the approved Remediation and Enabling Works Strategy have been completed with validation testing confirming that the works have been completed to the required standard.

END OF REPORT

APPENDIX I
LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the Client as indicated in Section 1.2.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.

10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II
GLOSSARY

TERMS

ACM	Asbestos-containing material	**MMP**	Materials management plan
ADS	Acoustic design statement	**ND**	Not detected
AST	Above-ground storage tank	**NDP**	Nuclear density probe
BGS	British Geological Survey	**NMP**	Noise management plan
BSI	British Standards Institute	**NPSE**	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	**NR**	Not recorded
CA	Coal Authority	**PAH**	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	**PCB**	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	**PI**	Plasticity index
CIRIA	Construction Industry Research Association	**PID**	Photo ionisation detector
CLEA	Contaminated land exposure assessment	**POS**	Public open space
CML	Council of Mortgage Lenders	**PPE**	Personnel protective equipment
CoC	Contaminants of concern	**ProPG**	Professional practice guidance
CSM	Conceptual site model	**QA**	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	**SGV**	Soil guideline value
DWS	Drinking water standard	**SPH**	Separate-phase hydrocarbon
EA	Environment Agency	**SPT**	Standard penetration test
EQS	Environmental quality standard	**SVOC**	Semi-volatile organic compound
FFL	Finished floor level	**TPH**	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	**TPH CWG**	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	**UKWIR**	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	**UST**	Underground storage tank
HCV	Health criteria value	**VCC**	Vibro-concrete column
ICSM	Initial conceptual site model	**VOC**	Volatile organic compound
LEL	Lower explosive limit	**VRSC**	Vibro-replacement stone columns
LMRL	Lower method reporting limit	**VSC**	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	**WHO**	World Health Organisation
MCV	Moisture condition value	**WRAP**	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	**WTE**	Water table elevation
m	Metres	**ppm**	Parts per million

km	Kilometres	**mg/m^3**	Milligram per metre cubed
% v/v	Percent volume in air	**m bgl bgl**	Metres below ground level
mb	Millibars (atmospheric pressure)	**m bcl**	Metre below cover level
l/hr	Litres per hour	**mAOD**	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	**kN/m^2**	Kilonewtons per metre squared
ppb	Parts per billion	**µm**	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	**SSRT**	Site Specific Remediation Target
PSD	Particle Size Distribution	**DD**	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	**Mc**	Moisture Content
ρ	Bulk Density	**GPR**	Ground Penetrating Radar
NDP	Nuclear Density Probe	**FFL**	Finished Floor Level
LEL	Lower Explosive Limit	**UKWIR**	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	**LOD**	Limit of Detection

APPENDIX III
DRAWINGS



Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Trial Pit Location
- Approximate Cable Percussive Borehole Location

Notes:

Client:

Portal Construction

Job No:	*Date:*
14-255	08.12.2021
Drawing No:	*Scale:*
005	NTS@ A3

e3p

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Phase	Issue	Date	Drawn	Checked
P1	REVB	08.12.2021	LM	RH
P1	REVA	26.02.2021	EB	MJ

Job Title:

Pacific Park, Wrexham

Drawing Title:

Exploratory Hole Location Plan

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APPENDIX IV
CHEMICAL TESTING RESULTS

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Analytical Report Number : 21-10251

Project / Site name:	Pacific Park Wrexham	**Samples received on:**	15/09/2021
Your job number:	14 255	**Samples instructed on/ Analysis started on:**	15/09/2021
Your order number:	14255 BH N	**Analysis completed by:**	23/09/2021
Report Issue Number:	1	**Report issued on:**	23/09/2021
Samples Analysed:	2 leachate samples - 10 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham
Your Order No: 14255 BH N

Lab Sample Number				2012757	2012758	2012759	2012760	2012761
Sample Reference				TP201	TP201	TP202	TP202	TP202
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.30	0.10	0.40	0.85
Date Sampled				15/09/2021	15/09/2021	15/09/2021	15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	17	6.4	20	10
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.7	8.9	9.3	8.2	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	770	320	960	1000	2100
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.041	0.019	0.065	0.11	0.062
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	82	37	130	220	120
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	41.0	18.6	65.1	110	62.0
Sulphide	mg/kg	1	MCERTS	20	4.0	50	40	6.2
Total Sulphur	mg/kg	50	MCERTS	690	200	4100	1200	1400
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8	0.4	0.6	2.4	1.1
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.86	< 0.05	< 0.05	1.8	0.53
Anthracene	mg/kg	0.05	MCERTS	0.21	< 0.05	< 0.05	0.54	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.4	< 0.05	< 0.05	4.2	0.54
Pyrene	mg/kg	0.05	MCERTS	1.2	< 0.05	< 0.05	3.7	0.47
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.81	< 0.05	< 0.05	2.5	0.32
Chrysene	mg/kg	0.05	MCERTS	0.65	< 0.05	< 0.05	2.1	0.30
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.76	< 0.05	< 0.05	2.7	0.34
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.38	< 0.05	< 0.05	0.93	0.22
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.72	< 0.05	< 0.05	2.3	0.33
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.30	< 0.05	< 0.05	0.81	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.23	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.39	< 0.05	< 0.05	0.92	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	7.74	< 0.80	< 0.80	22.6	3.05
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	13	5.6	12	19
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	0.2	0.4	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	35	7.3	31	27
Copper (aqua regia extractable)	mg/kg	1	MCERTS	30	22	7.7	25	32
Lead (aqua regia extractable)	mg/kg	1	MCERTS	47	17	15	41	51
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	39	37	15	30	30
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	92	65	20	130	63

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Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham
Your Order No: 14255 BH N

Lab Sample Number				2012757	2012758	2012759	2012760	2012761
Sample Reference				TP201	TP201	TP202	TP202	TP202
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00	1.30	0.10	0.40	0.85
Date Sampled				15/09/2021	15/09/2021	15/09/2021	15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	4.6	6.0
TPH (C16 - C21)	mg/kg	1	MCERTS	21	< 1.0	< 1.0	24	32
TPH (C21 - C35)	mg/kg	1	MCERTS	43	< 1.0	< 1.0	51	54
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10	17	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	65	< 10	< 10	96	92
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	0.004	< 0.001	< 0.001	< 0.001	< 0.001
PCB Congener 52	mg/kg	0.001	MCERTS	0.013	< 0.001	0.006	0.022	0.005
PCB Congener 101	mg/kg	0.001	MCERTS	0.031	< 0.001	0.014	0.061	0.015
PCB Congener 118	mg/kg	0.001	MCERTS	0.023	< 0.001	0.012	0.057	0.009
PCB Congener 138	mg/kg	0.001	MCERTS	0.024	< 0.001	0.014	0.068	0.019
PCB Congener 153	mg/kg	0.001	MCERTS	0.023	< 0.001	0.011	0.052	0.018
PCB Congener 180	mg/kg	0.001	MCERTS	0.005	< 0.001	< 0.001	0.011	0.016
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	0.12	< 0.007	0.057	0.27	0.082

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

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Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham
Your Order No: 14255 BH N

Lab Sample Number				2012762	2012763	2012764	2012765	2012766
Sample Reference				TP203	TP203	EXS101	EXS102	EXS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.35	0.90	None Supplied	None Supplied	None Supplied
Date Sampled				15/09/2021	15/09/2021	15/09/2021	15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	17	12	12	9.5
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	8.2	8.3	8.5	8.9	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	7500	1500	6000	1500	670
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.11	0.69	0.078	0.30	0.060
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	230	1400	160	590	120
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	113	687	78.1	295	60.4
Sulphide	mg/kg	1	MCERTS	3.9	< 1.0	5.1	28	2.9
Total Sulphur	mg/kg	50	MCERTS	4900	550	2500	1100	380
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8	0.5	1.4	1.2	1.0
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.58	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.54	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	3.7	< 0.05	6.5	0.80	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	2.7	0.25	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.62	< 0.05	19	2.1	0.35
Pyrene	mg/kg	0.05	MCERTS	0.38	< 0.05	18	2.3	0.33
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	11	2.0	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	8.1	1.2	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	8.3	2.5	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	5.8	1.2	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	9.0	2.2	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	4.4	1.3	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.3	0.40	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	4.8	1.5	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	4.67	< 0.80	100	17.7	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	29	14	18	5.5	8.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.5	0.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	30	51	23	17	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	42	25	27	19	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	52	21	54	42	36
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	0.4	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	49	23	14	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	84	75	67	80

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Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham
Your Order No: 14255 BH N

Lab Sample Number				2012762	2012763	2012764	2012765	2012766
Sample Reference				TP203	TP203	EXS101	EXS102	EXS103
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.35	0.90	None Supplied	None Supplied	None Supplied
Date Sampled				15/09/2021	15/09/2021	15/09/2021	15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	11	19	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	81	70	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0	250	370	< 1.0
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	61	130	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	< 10	400	580	< 10
PCBs by GC-MS								
PCB Congener 28	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.47	< 0.001	0.007
PCB Congener 52	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.24	0.020	0.10
PCB Congener 101	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.098	0.043	0.21
PCB Congener 118	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.11	0.034	0.15
PCB Congener 138	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.081	0.036	0.14
PCB Congener 153	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.073	0.031	0.12
PCB Congener 180	mg/kg	0.001	MCERTS	< 0.001	< 0.001	0.097	< 0.001	0.025
Total PCBs by GC-MS								
Total PCBs	mg/kg	0.007	MCERTS	< 0.007	< 0.007	1.2	0.17	0.76

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Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham

Your Order No: 14255 BH N

Lab Sample Number				2012767	2012768
Sample Reference				TP202	TP203
Sample Number				None Supplied	None Supplied
Depth (m)				0.85	0.35
Date Sampled				15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
General Inorganics					
pH	pH Units	N/A	ISO 17025	7.9	7.4
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0
Total Phenols					
Total Phenols (monohydric)	µg/l	1	ISO 17025	1.6	1.9
Speciated PAHs					
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01
Total PAH					
Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2
Heavy Metals / Metalloids					
Arsenic (dissolved)	µg/l	1	ISO 17025	3.2	< 1.0
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.1	1.3
Copper (dissolved)	µg/l	0.7	ISO 17025	14	12
Lead (dissolved)	µg/l	1	ISO 17025	1.8	3.3
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.6	3.7
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	8.3	7.2
Monoaromatics & Oxygenates					
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10

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Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham

Your Order No: 14255 BH N

Lab Sample Number				2012767	2012768
Sample Reference				TP202	TP203
Sample Number				None Supplied	None Supplied
Depth (m)				0.85	0.35
Date Sampled				15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Petroleum Hydrocarbons					
TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10

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Analytical Report Number : 21-10251
Project / Site name: Pacific Park Wrexham

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2012757	TP201	None Supplied	1	Brown clay and sand with rubble.
2012758	TP201	None Supplied	1.3	Brown clay with gravel.
2012759	TP202	None Supplied	0.1	Brown clay and sand with gravel.
2012760	TP202	None Supplied	0.4	Brown clay and sand with gravel.
2012761	TP202	None Supplied	0.85	Brown clay and sand with rubble.
2012762	TP203	None Supplied	0.35	Brown clay and sand with rubble.
2012763	TP203	None Supplied	0.9	Brown clay with gravel.
2012764	EXS101	None Supplied	None Supplied	Brown clay and sand with gravel.
2012765	EXS102	None Supplied	None Supplied	Brown clay and sand with gravel.
2012766	EXS103	None Supplied	None Supplied	Brown clay and sand with gravel and brick.

Analytical Report Number : 21-10251
Project / Site name: Pacific Park Wrexham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In house method.	L005-PL	W	ISO 17025
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

Analytical Report Number : 21-10251
Project / Site name: Pacific Park Wrexham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

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Analytical Report Number : 21-10251-2A

Replaces Analytical Report Number: 21-10251, issue no. 1
Report format change.

Project / Site name:	Pacific Park Wrexham	**Samples received on:**	15/09/2021
Your job number:	14 255	**Samples instructed on/ Analysis started on:**	15/09/2021
Your order number:	14255 BH N	**Analysis completed by:**	23/09/2021
Report Issue Number:	2A	**Report issued on:**	24/09/2021
Samples Analysed:	3 soil samples		

Signed: Karolina Marek

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham
Your Order No: 14255 BH N

Lab Sample Number				2012764	2012765	2012766
Sample Reference				EXS101	EXS102	EXS103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				15/09/2021	15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	12	9.5
Total mass of sample received	kg	0.001	NONE	0.50	0.50	0.50
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
General Inorganics						
pH - Automated	pH Units	N/A	MCERTS	8.5	8.9	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Total Sulphate as SO4	mg/kg	50	MCERTS	6000	1500	670
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.078	0.30	0.060
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	160	590	120
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	78.1	295	60.4
Sulphide	mg/kg	1	MCERTS	5.1	28	2.9
Total Sulphur	mg/kg	50	MCERTS	2500	1100	380
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.4	1.2	1.0
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.58	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.54	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	6.5	0.80	< 0.05
Anthracene	mg/kg	0.05	MCERTS	2.7	0.25	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	19	2.1	0.35
Pyrene	mg/kg	0.05	MCERTS	18	2.3	0.33
Benzo(a)anthracene	mg/kg	0.05	MCERTS	11	2.0	< 0.05
Chrysene	mg/kg	0.05	MCERTS	8.1	1.2	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	8.3	2.5	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	5.8	1.2	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	9.0	2.2	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	4.4	1.3	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	1.3	0.40	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	4.8	1.5	< 0.05
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	100	17.7	< 0.80
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	5.5	8.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.5	0.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	17	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	27	19	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	54	42	36
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	23	14	26
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	75	67	80

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 21-10251
Project / Site name: Pacific Park Wrexham
Your Order No: 14255 BH N

Lab Sample Number				2012764	2012765	2012766
Sample Reference				EXS101	EXS102	EXS103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				15/09/2021	15/09/2021	15/09/2021
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Petroleum Hydrocarbons						
TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	11	19	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	81	70	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	250	370	< 1.0
TPH (C35 - C40)	mg/kg	10	MCERTS	61	130	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	400	580	< 10
PCBs by GC-MS						
PCB Congener 28	mg/kg	0.001	MCERTS	0.47	< 0.001	0.007
PCB Congener 52	mg/kg	0.001	MCERTS	0.24	0.020	0.10
PCB Congener 101	mg/kg	0.001	MCERTS	0.098	0.043	0.21
PCB Congener 118	mg/kg	0.001	MCERTS	0.11	0.034	0.15
PCB Congener 138	mg/kg	0.001	MCERTS	0.081	0.036	0.14
PCB Congener 153	mg/kg	0.001	MCERTS	0.073	0.031	0.12
PCB Congener 180	mg/kg	0.001	MCERTS	0.097	< 0.001	0.025
Total PCBs by GC-MS						
Total PCBs	mg/kg	0.007	MCERTS	1.2	0.17	0.76

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

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Analytical Report Number : 21-10251
Project / Site name: Pacific Park Wrexham

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2012764	EXS101	None Supplied	None Supplied	Brown clay and sand with gravel.
2012765	EXS102	None Supplied	None Supplied	Brown clay and sand with gravel.
2012766	EXS103	None Supplied	None Supplied	Brown clay and sand with gravel and brick.

Analytical Report Number : 21-10251
Project / Site name: Pacific Park Wrexham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

Analytical Report Number : 21-10251
Project / Site name: Pacific Park Wrexham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

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Analytical Report Number : 21-10253

Project / Site name:	Pacific Park Wrexham	**Samples received on:**	15/09/2021
Your job number:	14 255	**Samples instructed on/ Analysis started on:**	15/09/2021
Your order number:	14255 BH N	**Analysis completed by:**	22/09/2021
Report Issue Number:	1	**Report issued on:**	22/09/2021
Samples Analysed:	3 wac multi samples		

Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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Waste Acceptance Criteria Analytical Results

Report No:	**21-10253**						
					Client:	**E3P**	
Location	**Pacific Park Wrexham**						
Lab Reference (Sample Number)	2012772				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	15/09/2021				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	EXS101						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	1.0				3%	5%	6%
Loss on Ignition (%) **	3.2				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	0.71				1	--	--
Mineral Oil (mg/kg) #	240				500	--	--
Total PAH (WAC-17) (mg/kg)	93.2				100	--	--
pH (units)**	8.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	4.0				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.022	0.017		0.17	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0016	< 0.0010		0.010	0.5	10	70
Copper *	0.0049	< 0.0030		0.028	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0032	0.0032		0.032	0.4	10	40
Lead *	< 0.0050	< 0.0050		0.028	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		0.065	0.1	0.5	7
Zinc *	0.0085	0.0044		0.050	4	50	200
Chloride *	< 4.0	< 4.0		23	800	15000	25000
Fluoride	0.81	0.38		4.4	10	150	500
Sulphate *	11	4.4		53	1000	20000	50000
TDS*	74	50		530	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	6.2	8.8		84	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.50						
Dry Matter (%)	88						
Moisture (%)	12						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.25						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation ** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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

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Waste Acceptance Criteria Analytical Results

Report No:	**21-10253**						
					Client: E3P		
Location	**Pacific Park Wrexham**						
Lab Reference (Sample Number)	2012773				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	15/09/2021				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	EXS102						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	1.0				3%	5%	6%
Loss on Ignition (%) **	2.1				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	0.34				1	--	--
Mineral Oil (mg/kg) #	190				500	--	--
Total PAH (WAC-17) (mg/kg)	15.9				100	--	--
pH (units)**	8.5				--	>6	--
Acid Neutralisation Capacity (mol / kg)	12				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.021	0.019		0.19	20	100	300
Cadmium *	< 0.0005	< 0.0005		0.0025	0.04	1	5
Chromium *	0.013	0.0044		0.056	0.5	10	70
Copper *	0.040	0.013		0.17	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.021	< 0.0030		0.042	0.5	10	30
Nickel *	0.0099	0.0043		0.051	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.0036	0.0028		0.029	4	50	200
Chloride *	< 4.0	< 4.0		17	800	15000	25000
Fluoride	1.1	0.35		4.5	10	150	500
Sulphate *	31	8.5		120	1000	20000	50000
TDS*	190	120		1300	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	14	9.0		97	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.50						
Dry Matter (%)	91						
Moisture (%)	9.5						
Stage 1							
Volume Eluate L2 (litres)	0.33						
Filtered Eluate VE1 (litres)	0.24						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation ** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

i2 Analytical
7 Woodshots Meadow
Croxley Green Business Park
Watford, WD18 8YS

Telephone: 01923 225404
Fax: 01923 237404
email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	**21-10253**						
					Client: E3P		
Location	**Pacific Park Wrexham**						
Lab Reference (Sample Number)	2012774				**Landfill Waste Acceptance Criteria Limits**		
Sampling Date	15/09/2021				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	EXS103						
Depth (m)							
Solid Waste Analysis							
TOC (%)**	0.8				3%	5%	6%
Loss on Ignition (%) **	2.7				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	0.93				1	--	--
Mineral Oil (mg/kg) #	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	3.45				100	--	--
pH (units)**	8.4				--	>6	--
Acid Neutralisation Capacity (mol / kg)	7.4				--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.017	0.014		0.14	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0068	0.0014		0.021	0.5	10	70
Copper *	0.024	< 0.0030		0.048	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.0088	< 0.0030		< 0.020	0.5	10	30
Nickel *	0.0055	0.0023		0.027	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	< 0.0050	< 0.0050		0.033	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.0049	0.0030		0.033	4	50	200
Chloride *	< 4.0	< 4.0		23	800	15000	25000
Fluoride	1.1	0.23		3.6	10	150	500
Sulphate *	19	5.0		69	1000	20000	50000
TDS*	99	71		750	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	16	8.6		97	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.50						
Dry Matter (%)	89						
Moisture (%)	11						
Stage 1							
Volume Eluate L2 (litres)	0.32						
Filtered Eluate VE1 (litres)	0.24						

Results are expressed on a dry weight basis, after correction for moisture content where applicable. *= UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepencies with current legislation ** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 21-10253
Project / Site name: Pacific Park Wrexham

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2012772	EXS101	None Supplied	None Supplied	Brown clay and sand with gravel.
2012773	EXS102	None Supplied	None Supplied	Brown clay and sand with gravel and brick.
2012774	EXS103	None Supplied	None Supplied	Brown clay and loam with gravel and vegetation.

Analytical Report Number : 21-10253
Project / Site name: Pacific Park Wrexham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Preparation WAC leachate		In-house method	L043-PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	ISO 17025
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L031-PL	W	NONE
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil in Soil C10 - C40	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L076-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS

Analytical Report Number : 21-10253
Project / Site name: Pacific Park Wrexham

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

APPENDIX V
PHOTOGRAPHS

PLATE 1 SUPPLEMENTARY GROUND INVESTIGATION - TP201

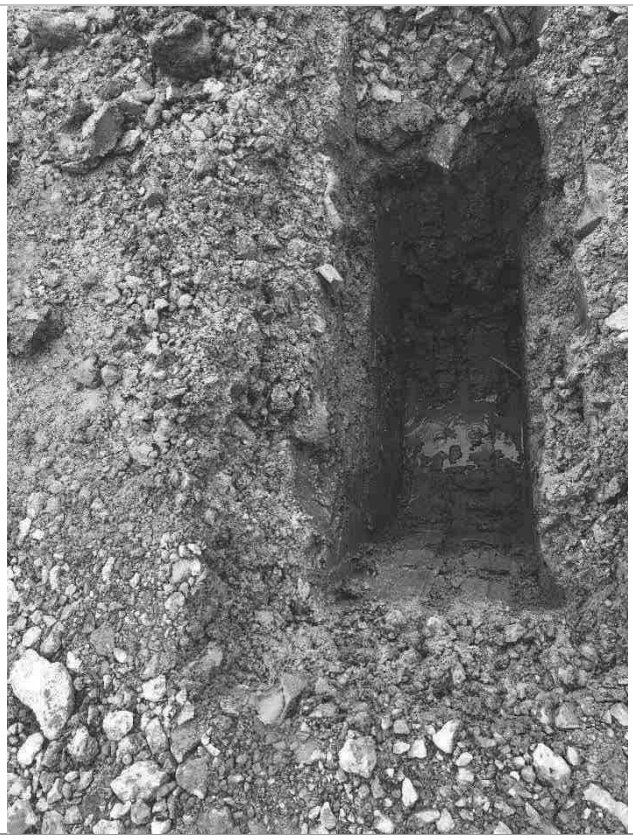


PLATE 2 SUPPLEMENTARY GROUND INVESTIGATION - TP203



PLATE 3 PAD FOUNDATIONS INSTALLED ACROSS AREA OF HISTORIC POND



PLATE 4 DEVELOPMENT LEVEL ACROSS SITE



PLATE 5 PAD FOUNDATION EXCAVATION

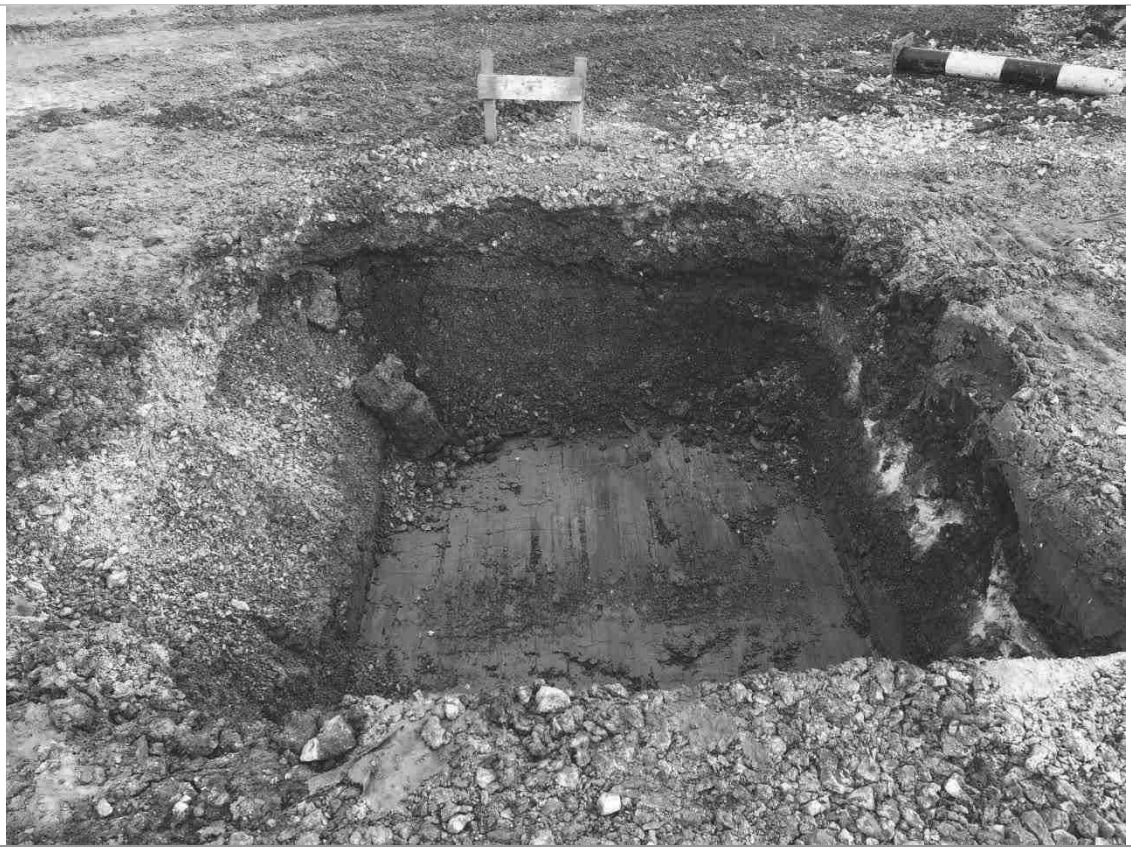


PLATE 6 STOCKPILE OF EXCESS MADE GROUND MATERIALS



PLATE 7 STOCKPILE OF EXCESS MADE GROUND MATERIALS



APPENDIX VI
WASTE TRANSFER NOTES

Duty of care: waste transfer note

Keep this page and copy it for future use. Please write as clearly as possible.

Section A – Description of waste

A1 Description of the waste being transferred
INERT SOIL

List of Waste Regulations code(s)
17-05-04

A2 How is the waste contained?
Loose ☑ Sacks ☐ Skip ☐ Drum ☐
Other ☐

A3 How much waste? For example, number of sacks, weight
80 LOADS

Section B – Current holder of the waste – Transferor

By signing in Section D below I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011 Yes ☐

B1 Full name
PORTAL CONSTRUCTION LTD

Company name and address
PORTAL CONSTRUCTION LTD
CALVELEY MILL
NANTWICH ROAD
TARPORLEY
Postcode CW6 9GT SIC code (2007)

B2 Name of your unitary authority or council

B3 Are you:
The producer of the waste? ☑
The importer of the waste? ☐
The local authority? ☐
The holder of an environmental permit? ☐
Permit number
Issued by
Registered waste exemption? ☐
Details, including registration number
A registered waste carrier, broker or dealer? ☐
Registration number
Details (are you a carrier, broker or dealer?)

Section C – Person collecting the waste – Transferee

C1 Full name
DNT GROUP LTD

Company name and address
G DAVIES T/A DAVIES NATIONAL TRANSPORT
THE OAKS
BABBINSWOOD
OSWESTRY
Postcode SY11 4LW

C2 Are you:
The local authority? ☐

C3 Are you:
The holder of an environmental permit? ☑
Permit number EPR/HB3031AZ
Issued by ENVIRONMENT AGENCY
Registered waste exemption? ☐
Details, including registration number
A registered waste carrier, broker or dealer? ☑
Registration number CBDU82444
Details (are you a carrier, broker or dealer?)
UPPER TIER WASTE CARRIER AND DEALER

Section D – The transfer

D1 Address of transfer or collection point
UNIMAQ, WREXHAM INDUSTRIAL ESTATE
WREXHAM
Postcode LL13 9PN

Date of transfer (DD/MM/YYYY) 18/08/2021 - 20/09/2021

D2 Broker or dealer who arranged this transfer (if applicable)
Postcode
Registration number
Time(s)

Transferor's signature
Name
Representing

Transferee's signature G. Davies
Name GWYNFOR DAVIES
Representing DNT GROUP LTD

Copies.

Environment Agency

Permit

The Environmental Permitting (England & Wales) Regulations 2010

Mr Gwynfor Davies

Gwynfor Davies T/A National Transport
Ifton Colliery
St. Martins
Oswestry
Shropshire
SY11 3DA

Permit number

EPR/HB3031AZ

Permit

Permit number
EPR/HB3031AZ

The Environment Agency hereby authorises, under regulation 13 of the Environmental Permitting (England and Wales) Regulations 2010

Mr Gwynfor Davies ("the operator"),

whose registered office is

The Oaks
Babbinswood
Whittington
Oswestry
Shropshire
SY11 4LW

to operate waste operations described in standard rules **SR2010No12** at
Gwynfor Davies T/A Davies National Trasnport
Ifton Colliery
St. Martins
Oswestry
Shropshire
SY11 3DA

to the extent authorised by and subject to the conditions of this permit.

Under regulation 27(2) of the Regulations, standard rules **SR2010No12** are conditions of this permit.

Name	Date
Tracey Pollard	**23/05/2012**

Authorised on behalf of the Environment Agency

APPENDIX VII
GAS MEMBRANE VALIDATION CERTIFICATE

MEC Environmental Ltd – Blackburn Technology Management Centre -
Challenge Way - Greenbank Technology Park – Blackburn – BB1 5QB

MEC ENVIRONMENTAL LTD

Gas Membrane Installation
Validation Report
Portal Construction
Pacific Park
Bridge Road
North Wrexham
LL13 9PN

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1. INTRODUCTION

1.1 Purpose

ACS Linings are installing a gas protection membrane to the aforementioned site. MEC Environmental Ltd (MEC) has been appointed by ACS Linings to carry out independent validation of the installation of the membrane on the site as per our terms of engagement. The frequency of independent inspections has been determined by the client, comprehensive CQA should be forwarded by the installer to cover any data gaps for areas that have not been subjected to independent inspections.

The **SOLE** purpose of the works undertaken by MEC Environmental is to provide independent inspections and a factual report as and when requested to assist the client in gaining regulatory approval with regards to the gas membrane installation. This is as per the scope of work section within our term's engagement.

1.2 Limitations

This report is limited to providing lines of evidence to the regulatory authority for the areas components inspected by MEC only in support of the discharging of the relevant planning conditions only and cannot be used or relied upon for any other purpose. No professional liability shall be extended to any other parties by MEC, the report should explicitly not be relied on by any future vendor or tenant as proof that the gas protection measures are sufficient for the site and functioning at the time of purchase or start of any tenancy. Gas protection systems are not solely reliant on the gas membrane as points are scored under BS8485 for the floor slab, membrane and venting, these components work collaboratively to provide a gas protection system. This is as per the conditions within our term's engagement.

The report has been provided on the assumption that no damage or works that may have compromised the components and integrity of the gas membrane have been made after our inspections, failure to report any such occurrences will invalidate any liability and render the report and contents invalid. This is as per the conditions within our term's engagement.

This report has been prepared in accordance with the best available practice and the relevant guidance documents listed below of which the author of the report was a contributor and member of the steering committees:

Mallett H, Wilson S, Corban M (2014) "Good practice on the testing and verification of protection systems for buildings against hazardous ground gases". CIRIA Report C735

1.3 Compliance with Regulation 7 of Building Regulations

Regulation 7 of the building regulations requires that building work shall be carried out in a workmanlike manner. Approved document 7 suggests installation can comply with the regulation if workmanship is such that, where relevant, materials are adequately mixed or prepared and applied, used or fixed so as to perform adequately the functions for which they are intended.

A reasonable standard may be demonstrated by:

Compliance with a standard and independent certification - The relevant standard for gas protection measures is BS8485:2015 +A1:2019, Table 7 of the standard requires that gas membranes are verified as per CIRIA C735.

Past experience – The installers qualifications are checked by MEC Environmental to ensure that the installation supervisor holds the NVQ Level 2 in gas membrane installations.

Integrity Testing methods. – are carried out as prescribed in CIRIA C735, unless stated elsewhere Frequency of Visits – MEC have not been employed to prepare a validation plan for this project, the frequency of visits is as per the instructions of the client, in essence MEC inspected the available membrane that could be inspected each time an inspection visit was requested. The area inspected on each visit is noted on the survey sheets in appendix 1. This report should be read in conjunction with the installers CQA report.

1.4 Method of Inspection (Per Visit)

All seams and non-seam areas of the available gas membrane were inspected/tested by the Validation Surveyor for identification of defects, protruding and penetrating objects, lack of subgrade support, overheating, holes, blisters, undispersed raw materials, scratches and gouges, and any sign of contamination by foreign matter.

Any portion of the gas membrane exhibiting a flaw or failing a visual inspection/testing was repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure was agreed upon between the Validation Consultant and the Installer at the time of the repair and is noted in the survey sheets.

Major repairs are visually inspected/tested, repairs passing the inspection/testing were considered acceptable. In some cases minor repairs maybe carried out under contractor CQA and photographic evidence supplied to the verifier for inclusion in the report.

1.5 MEC Staff Competency

All site inspections have been carried out by suitably qualified staff as defined in CIRIA C735, the qualification held by all MEC inspection surveyors is either the NVQ Level 4 in gas protection verification or the NVQ Level 2 in gas membrane installation

The author of this report is also a CL:AIRE accredited Specialist in Gas Protection Verification (SGPV) and holds both the NVQ Level 2 in gas membrane installation and the NVQ Level 4 in gas protection verification.

1.6 Conclusion

During our inspections to the areas denoted in Appendix 1 (Site Surveys Sheets) we witnessed the installer carrying out the installation in a workmanlike manner, the materials were adequately prepared and applied, used and fixed so as to perform adequately the functions for which they are intended as per Regulation 7 of the building regulations. In instances were 100% of the installation has not been independently inspected/tested then this report should be read in conjunction with the gas membrane installers CQA records.

The installers all hold the NVQ Level 2 “Gas membrane Installations” qualification and as such are classed as a qualified and experienced installer. MEC Environmental have checked the CSCS Trade Cards of the installers, which confirms the holder has attained the qualification.

Signed  Date: 10/06/2022

Michael Corban S.G.P.V.
Director
MEC Environmental Ltd

Appendix 1 – Site Survey Sheets

Site name: Portal Construction. Pacific Park. Bridge Road North. Wrexham **Postcode: LL13 9PN**			**Units/ plots checked: Unit 2 full line out laser screed installation**	
Installers Name: ACS				
Date: 19/05/2022				
Inspection by: Dan Squire			**Weather: 17ºC Dry**	
Item	**Comments**			
Sub-floor void	N/A			
Ventilation Inlets and Outlets	N/A			
Number Of Vents	N/A			
Materials used:	Membrane – ACS Gas Membrane			
	Self-Adhesive Membrane ☒ Yes	Preformed Top hats ☐ Yes		
	Double Sided Butyl Tape ☒ Yes	Preformed Corners ☐ Yes		
	Others Please List: N/A			
Installation Notes	**(brief description of area/plots and list of defects/repairs identified to the main membrane sheet, excluding detailing and joints)** MEC Environmental carried out a thorough visual inspection of the membrane that was laid on a just in time basis in front of a laser pour, during our inspection we witnessed the installer carrying out their own CQA repairs as the pour progressed. The membrane is lined across the main floor and sealed to the perimeter steel using Double sided butyl tape. All pipe penetrations, stanchions and patches sealed using SAGM.			
Type of Joint	Tape Joint ☒	Auto Weld ☐	Hand Weld ☐	Extrusion Weld ☐
Jointing/Detailing Testing	☐ Air Lance (ASTM D4437)		☒ Probe Test (ASTM D4437)	
Laps, welds and detailing Ventilation Inlets & Outlets	Have all joints passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
	Have all pipes passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
	Have all stanchions/wind braces/columns passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
	Have all piles and pile caps passed testing prior to surveyor leaving site?	☐ Yes	☐ No	☒ N/A
	Has all other detailing work passed inspection	☐ Yes	☐ No	☒ N/A

	(List any defects to detailing work and joints): During our inspection the following defects and repairs were carried out: 22no patch repairs made using SAGM. During the inspection we witnessed that the sub grade was not sufficient to lay membrane on. We then saw steel mesh and tools being dropped on the membrane creating holes which were patched up using SAGM. We also witnessed not only concrete wagons but the laser screed itself driving / turning wheels and sitting on the steel mesh which sits above the membrane. Due to this MEC are unable to confirm the integrity of the membrane underneath concrete which was poured in these areas. Site was informed and a corrective action sheet sent to the customer. marked up drawing key: Area in yellow = full pour area Area in red = membrane inspected Area in green is how far the pour had progressed during our inspection. The area in green is also the areas of concern with the vehicles on the membrane. Have any defects identified above been satisfactorily rectified ☒ Yes ☐ No ☐ N/A The Area has passed inspection ☐ The Area has failed inspection and a corrective action sheet has been left with the contractor ☒ The Area is incomplete as detailed above ☐ Signed: **Dan Squire** Date: **19/05/2022**

Area Inspected

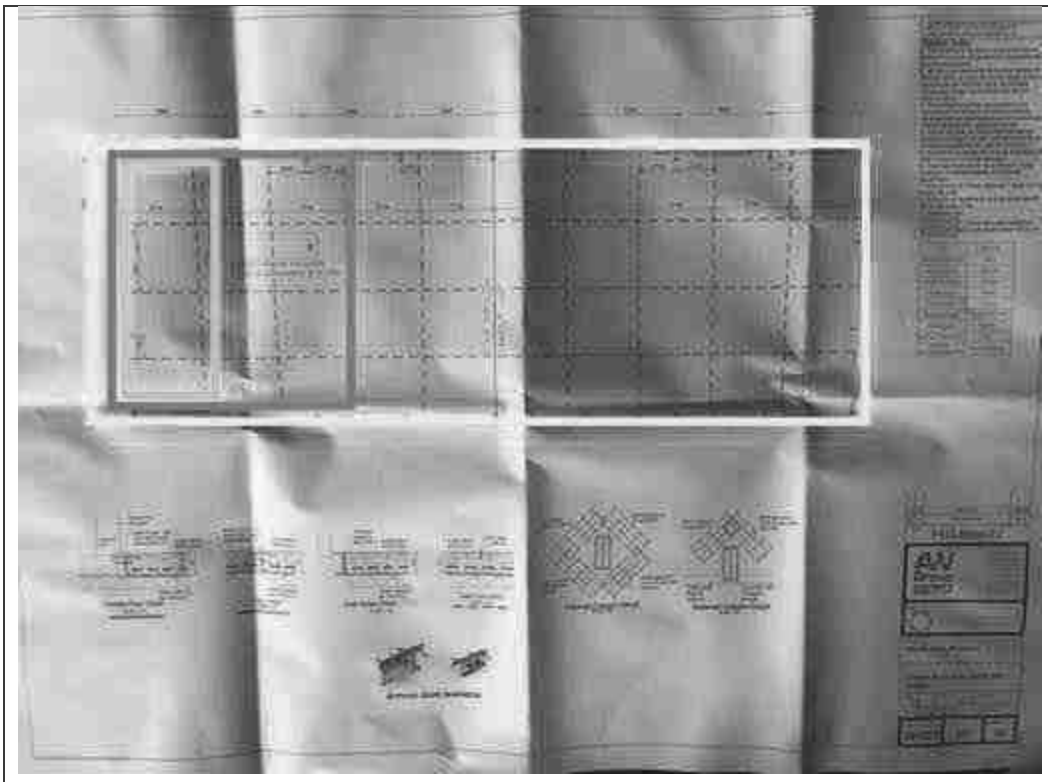
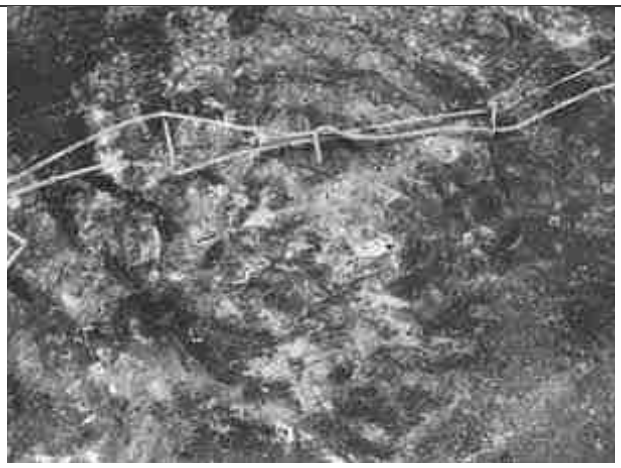


Photo **19/05/2022**



Unit 2 concrete pour



Damages caused by driving on the membrane



Laser screed on top of mesh / membrane



Lorry reversing on the membrane



Patch repairs made following damage by steel mesh



Sub grade prior to membrane installation



Sub grade prior to membrane installation



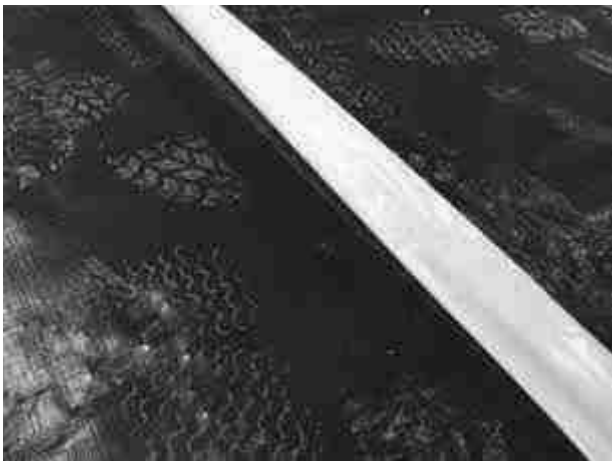
Unit 2 membrane installation



Sealed stanchion detail



Sealed pipe penetration



Sealed tape joint



Tool thrown and damaged membrane



Tool dropped and damaged membrane

Site name: Portal Cons Pacific Park Bridge Rd, North Wrexham **Postcode: LL13 9PN**			**Units/ plots checked: Full footprint (excluding office) Unit 1**	
Installers Name: ACS Linings				
Date: 10/06/2022				
Inspection by: Michael Corban			**Weather: 15ºC Fine**	
Item	**Comments**			
Sub-floor void	N/a			
Ventilation Inlets and Outlets				
Number Of Vents	N/a			
Materials used:	Membrane – ACS Standard gas barrier			
	Self-Adhesive Membrane ☒ Yes	Preformed Top hats ☐ Yes		
	Double Sided Butyl Tape ☒ Yes	Preformed Corners ☐ Yes		
	Others Please List: N/a			
Installation Notes	**(brief description of area/plots and list of defects/repairs identified to the main membrane sheet, excluding detailing and joints)** MEC Environmental carried out a thorough visual inspection of the membrane, the membrane had been installed to a good standard to the full footprint of the building , all stanchions have been sealed with self adhesive gas membrane and all joints have been made with double sided butyl tape.			
Type of Joint	Tape Joint ☒	Auto Weld ☐	Hand Weld ☐	Extrusion Weld ☐
Jointing/Detailing Testing	☐ Air Lance (ASTM D4437)		☒ Probe Test (ASTM D4437)	
Laps, welds and detailing Ventilation Inlets & Outlets	Have all joints passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
	Have all pipes passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
	Have all stanchions/wind braces/columns passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
	Have all piles and pile caps passed testing prior to surveyor leaving site?	☐ Yes	☐ No	☒ N/A
	Has all other detailing work passed inspection	☒ Yes	☐ No	☐ N/A

	(List any defects to detailing work and joints): During our inspection the following defects were recorded Have any defects identified above been satisfactorily rectified ☐ Yes ☒ No ☐ N/A The Area has passed inspection ☐ The Area has failed inspection and a corrective action sheet has been left with the contractor ☐ The Area is incomplete as detailed above ☒ Signed: **Michael Corban** Date: **10/06/2022**

Photo **10/06/2022**



General overview



Double sided tape seal



Overview of location of steel reinforcement that requires sealing



General overview



General overview



Stanchion seal



Manhole seal

Site name: Portal Cons Pacific Park Bridge Rd, North Wrexham **Postcode: LL13 9PN**	**Units/ plots checked: Full footprint Unit 2**
Installers Name: ACS Linings	
Date: 10/06/2022	
Inspection by: Michael Corban	**Weather: 15ºC Fine**

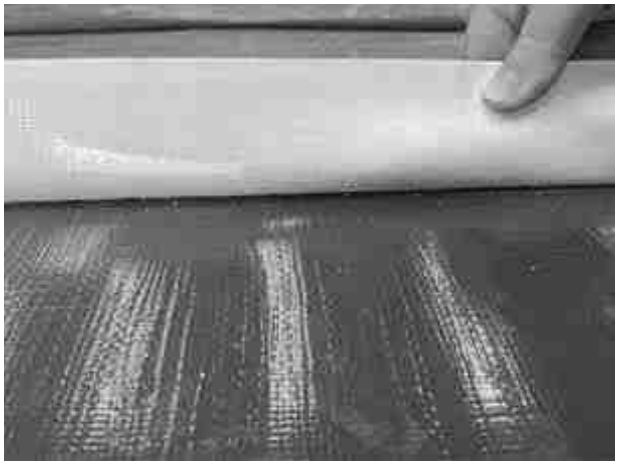
	Item	**Comments**			
Sub-floor void		N/a			
Ventilation Inlets and Outlets					
Number Of Vents		N/a			
Materials used:		Membrane – ACS Standard gas barrier			
		Self-Adhesive Membrane ☒ Yes	Preformed Top hats ☐ Yes		
		Double Sided Butyl Tape ☒ Yes	Preformed Corners ☐ Yes		
		Others Please List: N/a			
Installation Notes		**(brief description of area/plots and list of defects/repairs identified to the main membrane sheet, excluding detailing and joints)** MEC Environmental carried out a thorough visual inspection of the membrane, the membrane had been installed to a good standard to the full footprint of the building, all stanchions have been sealed with self adhesive gas membrane and all joints have been made with double sided butyl tape.			
Type of Joint		Tape Joint ☒	Auto Weld ☐	Hand Weld ☐	Extrusion Weld ☐
Jointing/Detailing Testing		☐ Air Lance (ASTM D4437)		☒ Probe Test (ASTM D4437)	
Laps, welds and detailing Ventilation Inlets & Outlets		Have all joints passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
		Have all pipes passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
		Have all stanchions/wind braces/columns passed testing prior to surveyor leaving site?	☒ Yes	☐ No	☐ N/A
		Have all piles and pile caps passed testing prior to surveyor leaving site?	☐ Yes	☐ No	☒ N/A
		Has all other detailing work passed inspection	☒ Yes	☐ No	☐ N/A

	(List any defects to detailing work and joints): During our inspection the following defects were recorded 1) install membrane to 4m x 2m area where steel reinforcement has been stored and provide photographic evidence that this has been done Have any defects identified above been satisfactorily rectified ☐ Yes ☒ No ☐ N/A The Area has passed inspection ☐ The Area has failed inspection and a corrective action sheet has been left with the contractor ☐ The Area is incomplete as detailed above ☒ Signed: **Michael Corban** Date: **10/06/2022**

Photo **10/06/2022**



General overview



Double sided tape to joint



General overview opposite direction



Sealed stanchion