

Final Factual Environmental Report for

National Grid Property Holdings Ltd.

Report on Bluelined area on the following plan at:

Maelor, Wrexham

Volume 1 of 1

NGP Site Location Code: 138

Prepared by:

Advisian, in October 2017

From an original letter report entitled:

Areas A and C Stage 1 Risk Mitigation Works Factual Report

Maelor, Wrexham

Site Code (138)

Authored By: IKM Consulting, dated July 2014 Project Reference 13627-REP-002

Insofar as practicable the factual information contained in the original report named and dated above that is relevant to the bluelined area has been presented in this report. No new information has been included.

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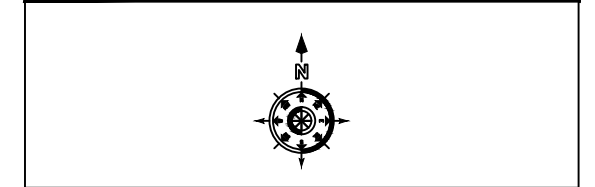
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WREXHAM - MAELOR WORKS

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BOUNDARY PROPERTY ACCESS EASEMENT	
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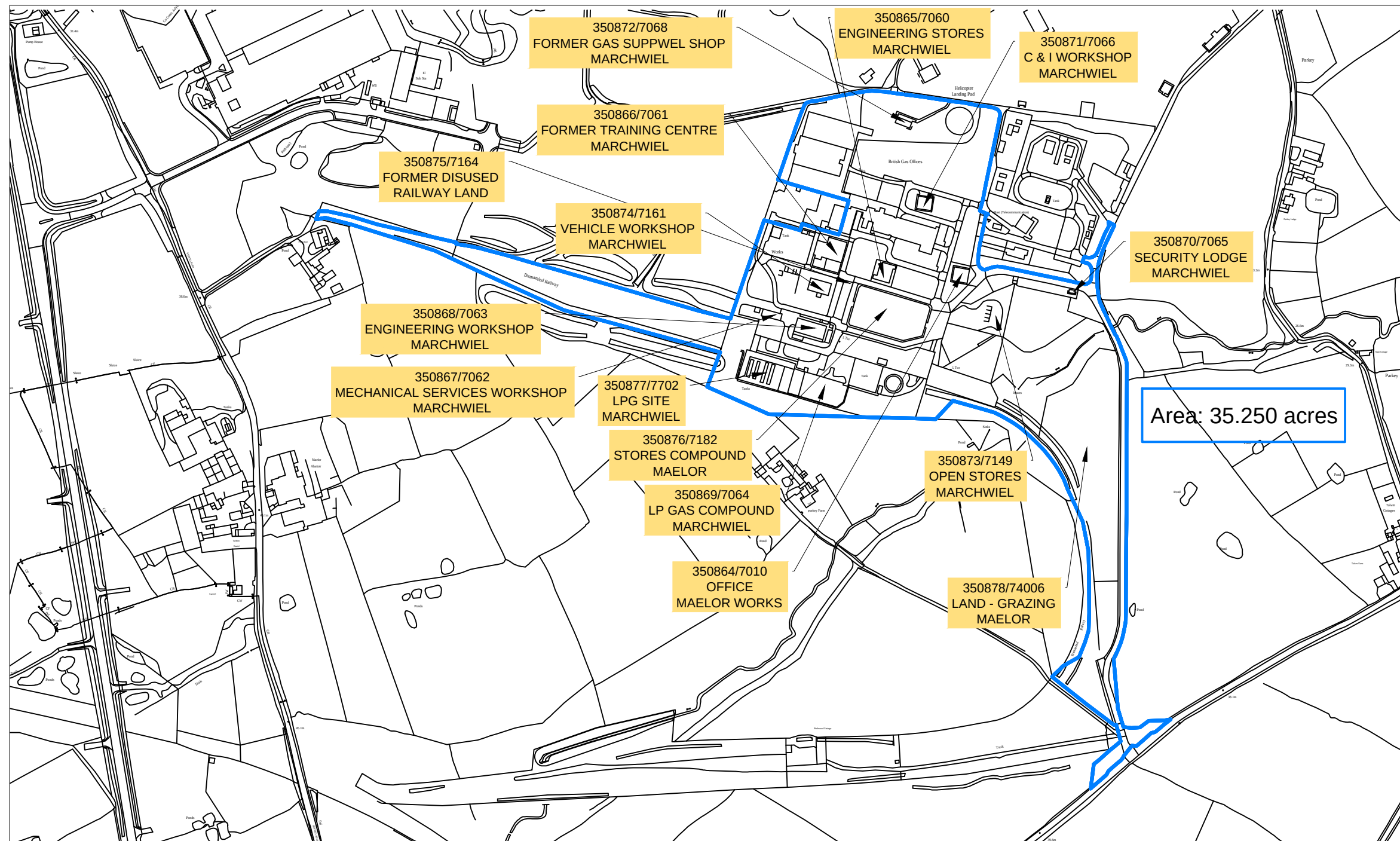
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	B9990	138	V2





Sales Plan Explanatory Notes

The site that is the subject of this report is the blue line area plan shown on the previous page. The site may form just a part of the area considered in the original report. If a former gasworks, the site may form just a part of a former gasworks site.

- The blue line plan on the previous page shows the most probable extent of NGPH land ownership, as provided by NGPH.
 - Original file reference: *Sale Plan_2017.pdf*
- Any bluelined plans within the redacted report indicate current or former National Grid Property land ownership.
- Any redlined plans within the redacted report indicate current Wales and West Utilities Ltd. Land ownership.



Ref:13627

I & H BROWN

MAELOR WORKS, WREXHAM (SITE CODE 138S)

AREAS A AND C STAGE 1 RISK MITIGATION WORKS FACTUAL REPORT

13627-REP-002

July 2014

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Revision History

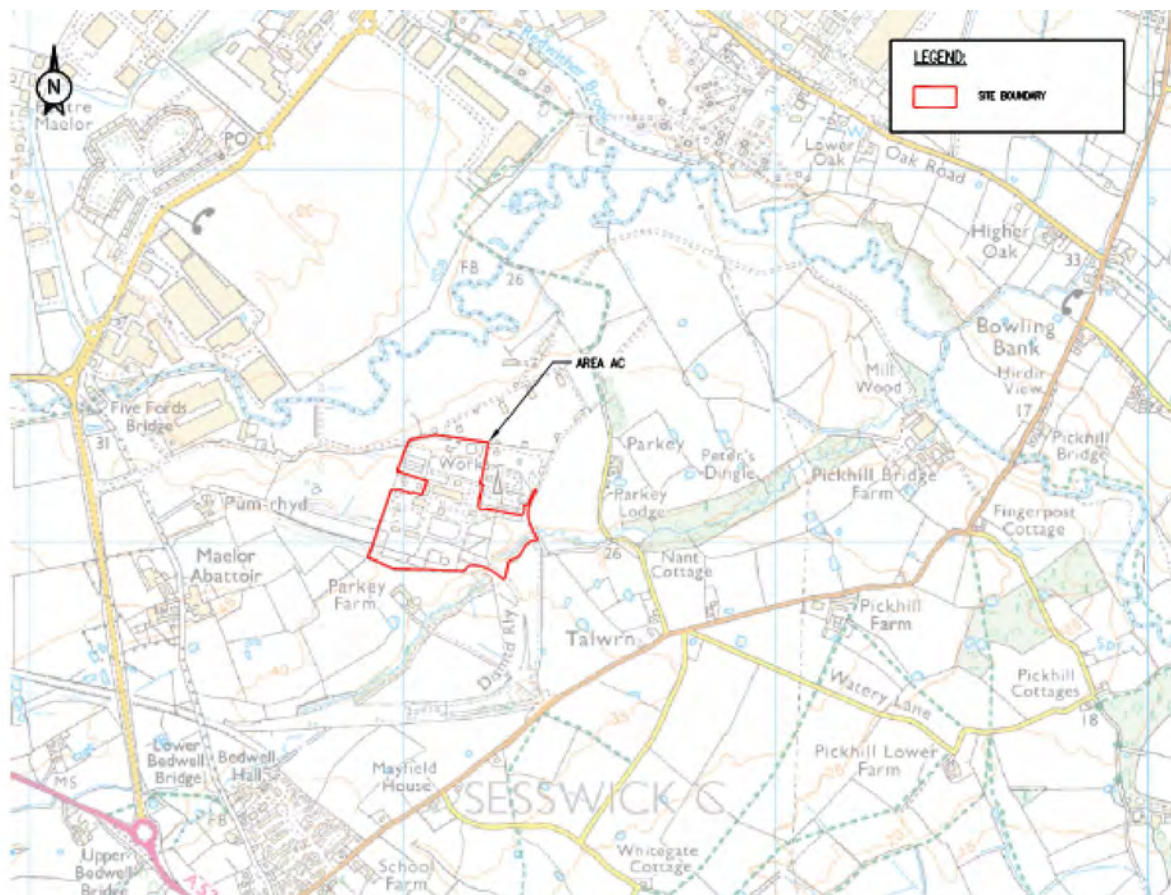
Revision History

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National Grid Property Holdings Ltd, Maelor Works, Wrexham
Areas A and C Stage 1 Risk Mitigation Works Factual Report

13627-REP-002
Reporting Insert

Main Site Area A and C, Maelor Works, Wrexham, Clywd



Site Address:	Maelor Works, Marchwiell, Wrexham	NGP Document Tracking Code	
Report Title:	AREAS A AND C STAGE 1 RISK MITIGATION WORKS FACTUAL REPORT MAELOR WORKS, WREXHAM		
Report Type:	Contamination	Retention Period	Indefinitely
Site Code:	138S (part)	Author (Company)	IKM Consulting Ltd
Report Date:	26 June 2014	Factual/Interpretative	Factual
Draft/Final	Final	H&S File	Yes
Work Stage:*	Site Investigation		
Brief Description of Contents	Preliminary Site investigation Factual Report		
Access Permitted:	NGPH Land Regeneration Team	NGPH Contact	Matt Pearce

I & H BROWN

MAELOR WORKS, WREXHAM (SITE CODE 138S)

AREAS A AND C STAGE 1 RISK MITIGATION WORKS FACTUAL REPORT

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Appendix A Ecological Survey Report

Appendix B Trial Pit Photographs and Logs

Appendix C Borehole Logs

Appendix D Radiological Survey Report

Appendix E Utility Survey

Appendix F Laboratory Analysis Certificates

Appendix G Compiled Analytical Data

Appendix H Refurbishment & Demolition Survey (Asbestos)

Appendix I Photographic Records

Appendix J Historical Maps

Appendix K QA/QC Laboratory Data

Appendix L Site Diaries

Appendix M Controlled Waste Certificates

Appendix N Wrexham Service Plans

Appendix O CD Format: DETS Laboratory QA/QC Information

Appendix P CD Format: Data Tables

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Version: v3

Prepared By:	Mark Sweeney	Date:	07 July 2014	Initials:	
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EXECUTIVE SUMMARY

Site Information

The site is an area of mixed commercial use (open storage and offices) and unused open land, known as Areas A and C of the Maelor Works, Marchweil, Wrexham. LL13 0UW. National Grid reference: SJ38087 48086. The site forms the majority of a large NGPH landholding with Site Code Ref: 138S. The site is accessed by a dedicated private roadway leading into the site from the B5130 public highway to the south. There are also various boundary fence access points into the site from surrounding privately owned farmland.

Site History

The site was originally open farmland that was developed into a small part of the extensive former Royal Ordnance Factory (ROF) Wrexham, the majority of which lay to the north of the site. Following closure of the ROF, the site was redeveloped as a large coal and ultimately oil fuelled town gas manufacturing works. Following closure of the gasworks in the 1970s, the site has been used for a variety of gas distribution related activities, with some new office buildings constructed over the footprint of the former gasworks. Other parts of the site have been used for the storage of containerised gas (Flogas) and portions of the site have been sold to a separate gas utility company (Wales and West Utilities). Large parts of the northern and southeastern sectors of the site have essentially been disused since the closure of the gasworks operations.

Geology

The site is underlain by [REDACTED] glacial drift, including laterally impersistent sands and gravels that have been deposited on extensive cohesive Boulder Clay strata, [REDACTED] to depths in excess of 10 metres below ground level.

Due to the extensive earthworks and levelling associated with the site development and the subsequent demolition of major gasworks structures, Made Ground is present across the entire surface of the site, with a wide variety of composition and thicknesses proven.

The depth to bedrock, indicated on maps as being Triassic Sherwood Sandstone or Carboniferous Coal Measures, is unknown.

Hydrology and Hydrogeology

Due to its artificial landform, the majority of the site does not contain any natural watercourses, or receive runoff from surrounding land. Artificial surface water drainage systems are provided for the whole of the developed area of the site, with discharges from these drains known to be directed either to agricultural ditches to the north, or to the Bedwell Brook surface watercourse that actually flows through the south easternmost corner of the site.

The next nearest surface water course is the River Clywedog, approximately 120m northwest of the site, known to be connected to the site area via agricultural ditches and field drains.

Granular drift deposits on the site are water bearing at shallow depth, [REDACTED]

[REDACTED]

Site Works

Recent site investigations were conducted as part of Stage 1 Risk Mitigation investigations for the Maelor Works site as a whole. The works included a preliminary ecological appraisal report; a programme of trial pitting and drilling for sub-surface visual inspection and sampling; a radiological survey to confirm the absence of significant radiation issues arising from identified historical oil gas manufacturing activities; monitoring and sampling of groundwater beneath the site area and surface water courses around the site boundaries; and utility and building (pre-demolition asbestos) surveys within the main site area.

Previous Investigation and Remediation

The site has been subject to extensive previous site investigations, dating back at least to 1999. A number of small scale remediation projects have also been undertaken, within the site area [REDACTED]. These have involved the emptying of tar tanks in the west of the site; the removal of spent oxide deposits in the northern sector; and the removal of hydrocarbon contaminated soil in the southern sector [REDACTED]. The remainder of the former gasworks operational area has been levelled, but remains unremediated below the ground surface.

1. INTRODUCTION

1.1 Background

Land nominated (by National Grid Property Holdings – NGPH) as Areas A and C is part of a large landholding that covers the majority of the Maelor Works site, which in turn was previously a large coal and oil town gas manufacturing site.

1.2 Scope

IKM Consulting Limited has been commissioned by I&H Brown Limited (IHB) to act as their designers for the Maelor Works Gasworks Remediation Project. As part of their project brief, IKM has undertaken an initial site assessment and outline remediation design (of the whole Maelor Works site) as part of the original project tender submission, followed by additional site investigations to supplement existing site information, as a precursor to detailed risk assessment and remediation design work.

This report presents the results of the additional site investigation works carried out on selected parts of the site in November/December 2013, and relates only to the main site area (Area AC). Separate Factual Reports are available for the adjacent NGPH land (Area B).

1.3 Disclaimer

This report is based upon the information available to IKM Consulting Ltd at the time of preparing the report. The information provided to IKM Consulting Ltd by other consultants in connection with the preparation of this report is believed to be accurate to the best of IKM's knowledge. IKM shall not be held responsible for the negligence, error or omissions of other consultants. IKM Consulting Ltd does not accept any responsibility for the use of this report by any third party other than those third parties identified in the term deed.

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		Mobile No	
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Contractors (cont.)	<u>Sample Analysis (Soils and Groundwater)</u> Derwentside Environmental Testing Services Unit 2 Park Road Industrial Estate Consett Co Durham DH8 5PY	Contact Tel No	Adam Fenwick 01207 582333
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2. SITE INFORMATION

2.1 General

The site is known as Maelor Works, Marchwiel, Wrexham LL13 0UW. The centre of the site has a National Grid Reference SJ38087 48086. The site area forms the majority of the wider NGPH landholding at Maelor Works, with the site reference number 138S.

The site is situated in a largely rural setting, albeit that the surrounding area was formerly part of the Royal Ordnance Factory (ROF) Wrexham facility, which consisted of widely scattered manufacturing and small storage facilities in the predominantly open land to the north. The main manufacturing area for the ROF is now occupied by Wrexham Industrial Estate, approximately one kilometre to the northwest. A few remnant brick built buildings from the ROF lie in the fields immediately to the north of the site.

The shallow River Clwedog river valley lies immediately to the north of the site, with the river some 120m away at its closest point. The river flows west to east past the site. A second smaller watercourse, Bedwell Brook, flows towards the site from the west and passes through a culvert under the former railway line embankment, on the southern boundary of the site, before entering and flowing in a steep sided valley through the south easternmost corner of the site area.

A number of long established farms are located around the site boundary to the west, south and northeast.

The site is accessed via a private access road that leads north from the B5130 public road to the south of the site. The site area is completely surrounded by a boundary fence, with a number of secured access points from the surrounding third party agricultural land, including a long established un-surfaced track way that passes the northwest corner of the site and continues along the northern boundary and away to the northeast.

The following text has been taken from Ref 4 (Worley Parsons, 2012). Worley Parsons – *Environmental Assessment Site Investigation Report, Maelor Works, Wrexham*. Report No. 50065-29, January 2012.

“The site is generally flat and lies at an average elevation of approximately 35 metres above ordnance datum (mAOD). The site is believed to have been built up during its development as the site is higher than the surrounding land. The site boundaries generally consist of steep slopes leading to the lower land beyond the site boundary.

Groundcover at the site is a mixture of hardcover, gravel and made ground with areas vegetated with grass, trees and shrubs. The following summarises the approximate percentage of each type of cover:

Buildings/structures – 25 %

Hardstanding – 20 %

Exposed soil – not present

Vegetation/scrub/landscaped areas – 35 %

Gravel/loose fill – 20 %

The north of the site is predominantly vegetated with grass, trees and shrubs, particularly on the northern boundary which borders with an access lane, beyond which is agricultural land. The centre of the site is covered with buildings and hard standing comprising concrete and tarmac. The north-west corner of the site is covered in concrete hard standing, the footprint of the former purifiers. Trees are growing through cracked portions of the concrete. In the south-west of the site to the north of the workshops buildings tenanted by W&WU, the ground comprises compacted gravel often with loose limestone chippings above. In addition, occasional landscaped embankments exist along the roadways. In the far south of the site within the FloGas compound, the LPG bottle storage area is formed of compacted gravels. The far south east of the site comprises grass fields leading to Bedwell Brook.”

2.2 Site Occupation

The site can be split into two main areas (nominated by NGPH as Area A and Area C), with the following land uses:

- Area A – the central part of the site, including most of the former gas works manufacturing and processing areas; now occupied by administrative and workshop buildings, large areas of open storage compounds and car parking, as well as a large derelict office building. Occupied offices are a mixture of modern buildings built since the cessation of gas manufacture and reused gasworks buildings.
- Area C – a large area of un-occupied, vacant land across the whole northern sector of the site area. This part of the site has some hardstanding and foundation slabs from previous development, but is largely covered by exposed Made Ground materials. A single brick built former ROF building (known as the Paint Store) sits in the centre of the area, with a small ephemeral pond in the open ground just to the west.
- Land immediately to the east of Area C and a small compound between Area A and Area C on the western boundary of the site are both owned by Wales and West Utilities Limited (WWU) and are excluded from the NGPH site area and from investigations recorded in this report.
- Small parts of the NGPH landholding outwith the current perimeter fence have been nominated as Areas B East and West and are also excluded from consideration in this report. Separate Factual Reports are available for these areas.

Current land ownership boundaries and site area designations are shown in Drawing A1-13627-3017.

2.3 Utilities

The site area is heavily constrained by a wide variety of underground service constraints, associated with both historical activities and current utility provision and surface water drainage.

Previous site investigation reports have attempted to compile underground and over ground service records for the site, most recently as Figure 3 in the Worley Parsons 2012 Factual Report (Ref. 4).

In addition, L and M Survey Services Limited (L&M) were present on site for two days from 18/11/13, for a service survey of the main site in advance of the Stage 1 intrusive investigations being reported here. Vacuum extraction was also performed at the start of the works under supervision of IHB to expose the location of several of the major gas services across site prior to excavation works commencing.

All identified services are shown on Drawing A1-13627-3048, based on Figure 3 from the Worley Parsons 2012 report.

The original plans from the L&M surveys can be found in Appendix E.

A high pressure gas mains runs west to east across the south of the site area, before diverting northeast, towards an Above Ground Installation (AGI) compound owned by WWU to the east of Area C. A high pressure gas main also runs east to west across the site, to the north of the workshops and former North East Wales district offices.

A medium pressure gas main enters the site in the southwest (at the boundary with Area B West), and runs to the east, passing through the access gate to the FloGas butane storage area and leads in a south easterly direction out of the site.

Underground low pressure gas mains; electricity and telephone cables; and water and foul drainage pipes transverse across the majority of the site area in dense service corridors or individually, between on-site buildings.

A dense network of largely historical surface drainage is also present across the majority of the site area. Area C surface water drains [REDACTED] while the majority of Area A, including the extensive car park and open storage yards, [REDACTED]

Water mains enter the site from the north [REDACTED]
[REDACTED]

[REDACTED] It is known that there are a number of long standing leaks within the site area (exact location not determined) and due to concerns over the quality of the water supply, it is no longer used for potable supply.

2.4 Site History

The land use history for the site and surrounding area has been summarised using the series of Ordnance Survey (OS) maps included in an Envirocheck report (Landmark, 2006) from Ref 4 (WP 2011 Factual Report). Copies of the OS maps are contained in Appendix J. Photographs of the construction of the gasworks and an article on the works provided by W&WU (also taken for Ref. 4) have been used to supplement this discussion (copies also contained in Appendix J).

The OS plans provide a broad indication of site details only. In most cases, the names of buildings are not provided on the OS maps hence these titles have been inferred from gas board plans available to previous assessors.

Relevant extracts from Ref. 4 are provided below:

“Prior to 1940 the site was open farmland. In 1940 the area was incorporated into the Royal Ordnance Factory (ROF) Marchwiel. ROF Marchwiel consisted of a number of production units, widely separated to minimise the damage done should there be an explosion. The site of the Maelor Works occupies what was an extension area to ROF Marchwiel. It is believed that this area was only used for dry storage and that no manufacturing or bulk storage of liquids took place in this particular location. ROF Marchwiel was closed down shortly after the end of World War II.

The Maelor gasworks was opened in 1953 after three years of construction. Construction scenes are depicted in many of the historical photos (see Appendix J). An article written by the Wales Gas Board in 1953 described the construction of the works (see Appendix J), Buildings and infrastructure present on the NGPH land included:

- vertical retort house comprising 25 chambers each of 3.65 tons capacity;
- coal handling plant;

- coke quenching and handling equipment;
- coke grading and storage plant;
- Carburetted Water Gas (CWG) house containing two solid fuel boilers;
- compressor and power house;
- laboratory and office block;
- two vertical water cooled condensers;
- detarrer, ammonia washer and naphthalene washer;
- five reinforced concrete above ground purifiers;
- gasholder 1, above ground with a capacity of 500,000 cu ft.;
- relief gasholder for CWG plant, above ground with a capacity of 250,000 cu ft.;
and
- underground tar and liquor storage with a total capacity of 280,000 gallons.

Maelor works supplied gas to the Wrexham, Rhos, Cefn Maew and Llangollen areas. It is estimated that the works carbonised 36,000 tonnes of coal per annum producing 2,900,000 therms of gas, 18,000 tons of coke and 435,000 gallons of tar. The plant continued to operate, without further expansion until 1968 when a new oil-gas plant, built to the north of the retort house, took over gas production.

The oil gas plant was completed in August 1968 and used a distillate of oil as a feedstock. On site storage existed for 168,000 gallons of feedstock although the exact location of this storage is unknown, it is believed that the old LDF storage tanks were used”.

2.5 Adjoining Areas

Table 1 and the text in sections 2.5 to 2.8 has been taken from Ref 4 (Worley Parsons, 2012). Worley Parsons – *Environmental Assessment Site Investigation Report, Maelor Works, Wrexham*. Report No. 50065-29, January 2012.

Land use near the site is summarised in Table 1

Table 1: Adjacent and Proximal Land Use

Boundary	Adjacent Land Use	Proximal Land Use (within 100m of site boundary)
North	Agricultural pasture and W&WU AGI compound and access lane.	Agricultural pasture and TetraPak (Wrexham) factory to the north-west.
East	W&WU AGI compound and access land beyond which is agricultural pasture.	Agricultural pasture.
South	Agricultural pasture.	Agricultural pasture and Parkey Farm to the south. Bedwell Brook, a tributary of the River Clywedog lies to the southeast. Rum Rhyd Farm lies to the south-west.
West	Agricultural pasture.	Agricultural pasture.

2.6 Potentially Contaminative Land Uses

An Envirocheck report was obtained from Landmark Information Group. This provides details of hydrological information, waste, hazardous substances, and industrial land uses within 1km of the site. A summary of pertinent information from locations within 1km of the site is summarised below and in appropriate sections throughout the report as referenced:

- There are no discharge consents held by the site although 24 discharge consents are held, within 1km of the site, many of which are expired. The closest discharge consent that is current is at 430m northwest of the site and relates to discharge of sewage from a domestic property to soakaway.
- There are two Integrated Pollution Control (IPC) licences within 1km of the site. The closest is 875m southeast of the site held by 'The First Milk Cheese Company'. The licence permits the treating of animal raw materials.
- There are two Local Authority Integrated Pollution Control (LAIPC) licences within 1km of the site. The closest is 362m to the west of the site held by 'Animal Waste Services Ltd' for an incinerator.

- One Local Authority Pollution Prevention Control (LAPPC) licence exists at the site for the process of odorising natural and liquefied petroleum gas. The licence is held by Wales & West Utilities. The nearest offsite LAPPC is at 169m northwest of the site held by TetraPak (Wrexham) Ltd for printing of flexible packaging.
- There are 33 pollution incidents to controlled waters within the vicinity of the site. The closest was at 147m northeast, occurred in 1996 and involved algae as a pollutant. No further information was given. It was categorised as a minor incident by the Environment Agency.
- There are two permits of registered radioactive substances held at the site by National Grid Transco. The permits are for disposal of radioactive waste under S13 RSA. One of the licences has been revoked and the other is suspended.
- One historical landfill site is recorded at 486m southeast of the site at School Farm, Cross Lanes. The licence is held by Mr Bryan Griffiths. Waste deposited included inert waste and the last deposition occurred in October 1981. A registered landfill site (at 350m south of the site) at the same location as the historical landfill site. Authorised waste included; hardcore, concrete, builder's rubble, soil and clay.
- There is one registered waste treatment or disposal site 291m to the northwest of the site and relates to Maelor Abattoir.
- There are two Control of Major Hazard Sites (COMAH) registrations at the site. One is registered to British Gas, which has ceased and the other belongs to FloGas UK Ltd, which is active.
- There is one Notification of Installations Handling Hazardous Substances (NIHHS) which relates to the site "belonging to British Gas Plc", this has ceased.

- There is one planning Hazardous Substance Consents for the site belonging to British Gas Plc for the storage of liquefied petroleum gas (LPG), the consent is active.
- There are six groundwater abstractions within 1km of the site. All relate to Calypso Soft Drinks Ltd and abstract groundwater for food and drink process water. The closest water abstraction is 660m east of the site.

2.7 Nearby Sensitive Land Uses

There is limited sensitive land use near to the site. Those particularly worthy of note include:

- Agricultural land which surround the site.
- The land lies within a Source Protection Zone II (outer protection) and Zone III (total protection). The source protection zones relate to groundwater abstraction by Calypso Drinks Ltd.
- Residential areas including farm houses are within 100m of the site.

2.8 Surrounding Area

Agricultural land surrounds the site. Parkey Farm lies 70m south of the site, with Rum Rhyd Farm to the south-west and a TetraPak factory to the north-west.

The River Clywedog runs west to east, approximately 130m north-west of the site at its closest point.

The surrounding fields have sporadic buildings (from additional information it is known that these were associated with an ammunitions factory (Royal Ordnance Factory (ROF) Marchwiel). The factory extends beyond 1km north from the site).

Mineral railway passes the south of the site from the northwest and heads in a south-westerly direction. Maelor Abattoir is located 750m to the south-west of the site.

The mineral railway is shown as dismantled.

Some of the buildings associated with the former ammunitions factory are no longer shown. Wrexham Industrial Estate is shown at 360m west of the site at its closest point.”

3. ENVIRONMENTAL SETTING

3.1 Geology

According to published mapping, the site is underlain by substantial thicknesses of glacial drift, with bedrock at depths in excess of fifty metres below ground. Bedrock is indicated as sandstone from the Triassic Sherwood Sandstone formation, although the boundary between this rock formation and Carboniferous Coal Measures is postulated as being close by.

Previous site investigations have revealed the site area to be underlain by a variable range of clayey, silty, sandy and gravelly alluvium and ultimately by stiff, cohesive, silty clay of glacial origin (Boulder Clay). The bedrock surface is anticipated to be covered by many metres of low permeability glacial boulder clay laid down under a former ice sheet, with the boulder clay in turn draped with variable thicknesses of clays, silts and sands and gravels laid down by flowing water following the retreat of the ice sheet.

Due to the artificial nature of the site foundations, there are no natural soils or strata exposed at the site surface. Made Ground deposits have either been laid directly over the alluvial strata, or laid on top of re-graded alluvial deposits.

Ground conditions across the site area are described in more detail in Section 5.5 of this report.

[REDACTED]

3.2 Mining

The site is considered to be unaffected by historical underground mining or surface quarrying activity [REDACTED]

[REDACTED]

3.3 Hydrogeology

No natural soils are exposed at the site surface and a shallow groundwater table has been developed, [REDACTED].

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

The sand stratum does extend across the majority of the south and eastern site area, but along the north bank of the Bedwell Brook valley feature, tipped Made Ground deposits have been placed directly on the Boulder Clay surface. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

The bedrock strata at depth beneath the site are known to form designated aquifers (classified by National Resources Wales as a Principal Aquifer), [REDACTED]

[REDACTED]

The site area lies within the outer zone (Zone 2) source protection zone of a bedrock water abstraction borehole in Wrexham Industrial Estate approximately 2km to the north of the site. Up to date details are available on the Environment Agency website.

3.4 Hydrology

The site sits on a watershed between the River Clywedog to the north and Bedwell Brook to the southeast (although Bedwell Brook itself flows into the River Clywedog approximately one kilometre to the east of the site). The Clywedog sits in a broad, shallow valley that is drained by a network of mostly artificial agricultural drainage ditches and field drains, some of which are associated with the former ROF facility. Bedwell Brook is similarly fed by ditches and drains in land to the south of the site, but is a much smaller watercourse than the Clywedog. Bedwell Brook enters the site area beneath the former railway embankment in the southeastern corner of the site and flows in a valley through this part of the site. The northern flank of the valley has been steepened and constrained by tipping activities within the site, but the brook appears to continue to flow in its original bed up to the culvert beneath the access road on the eastern boundary of the site.

The majority of the site area is largely flat and level and does not contain any open, flowing water courses. An extensive surface water drainage system has been installed at the site, [REDACTED]

[REDACTED] The majority of the site area [REDACTED], excluding all of Area C and a small part of Area A in the northwest of the site, drains into three main branches, all of which ultimately discharge to the Bedwell Brook in the southeast of the site. The integrity and status of this drainage system has not been confirmed and many of the manhole entry points are not accessible without powered mechanical aids (not available to the current investigation).

[REDACTED]
[REDACTED] A French Drain interceptor installed along the western boundary of this part of the site is also connected into this drainage network at the northwestern corner of the site.

Previous site reporting (Ref.1 2 and 4) states that the collection efficiency of the drainage has not been tested, but groundwater levels are known to react quickly to rainfall events, [REDACTED]
[REDACTED]

Subsequent seepage of groundwater onto low lying agricultural land to the north of the site is documented as having generated complaints from third party land owners in the past.

All known drainage services are included on Drawing A1-13627-3048.

3.5 Discharge Consents

There are no reported discharge consents held by the site occupiers.

Previous reporting including reference to commercially available consent listings, with 24 discharge consents listed, within 1km of the site, many of which are expired. The closest discharge consent reported as current (2011) is some 430m northwest of the site and relates to discharge of sewage from a domestic property to soak away (Ref 4).

3.6 Landfill Sites

There are no licensed landfill deposits within the site area or in the immediate vicinity. Tipped material in the southeast corner of the site is not part of a licensed disposal facility.

Commercial listings of licensed sites report one historical landfill site 486m southeast of the site at School Farm, Cross Lanes. The licence is held by Mr Bryan Griffiths. Waste deposited included inert waste and the last deposition occurred in October 1981. A further registered landfill site lies 350m south of the site, at the same location as a separate, historical landfill site. Authorised waste included: hardcore, concrete, builders rubble, soil and clay (Ref 4).

3.7 Waste Management Licenses

There are two Integrated Pollution Control (IPC) licences within 1km of the site. The closest is 875m south east of the site held by the "The First Milk Cheese Company". The licence permits the treating of animal raw materials.

There are two Local Authority Integrated Pollution Control (LAIPC) licences within 1km of the site. The closest is 362m to the west of the site held by “Animal Waste Services Ltd” for an incinerator, assumed to be associated with the Maelor Abattoir site.

One Local Authority Pollution Prevention Control (LAPPC) licence exists at the site for the process of odorising natural and liquefied petroleum gas. The license is held by WWU. The nearest off-site LAPPC is at 169m northwest of the site held by Tetra Pak (Wrexham) Limited for printing of flexible packaging.

There are two permits of registered radioactive substances held at the site by the National Grid Transco. The permits are for disposal of radioactive waste under S13 RSA. One of the licenses has been revoked and the other is superseded.

3.8 COMAH Reports

There are two Control of Major Hazards Sites (COMAH) registrations at the site. One is registered to British Gas, which has ceased and the other belongs to FloGas UK Ltd, which is active.

3.9 Conservation Areas

No part of the site or immediate surroundings has any registered statutory protection for reasons of scientific or archaeological interest or ecological sensitivity.

4. HISTORICAL DEVELOPMENT

The site was initially developed as part of the Marchwiel Royal Ordnance Factory, when it is understood the site was used for the bulk dry storage of cordite in small scattered buildings across the northern sector of the site (and beyond). It is understood that no munitions were produced within the vicinity of the Area AC site, with the main production site being further to the northwest, where the Wrexham Industrial Estate is now sited.

The development of the large gasworks site in the 1950s required the formation of a roughly square area of up-filled and levelled land to the immediate northwest of the existing Bedwell Brook valley. Historical plans show that the former land surface was gently undulating in character, such that the creation of a level surface means that the thickness of Made Ground beneath the site varies significantly over quite short distances (being deeper in former “valley” features and very thin, almost absent on former “ridges”).

The gasworks site contained all of the typical features of coal gas production, including retorts; tar processing, gas purifying and by-product handling areas which remained in use until the late 1960s when gas manufacture from oil feedstock took over, with gas production finally ceasing in the 1970s.

Details of the decommissioning and demolition of the main production areas are not available, but the majority of plant was removed down to ground level only, with many below ground tanks and foundations etc left in-situ.

Subsequent use of the site has been for gas distribution and ancillary gas supply business and a separate LPG storage and distribution business. Previous remediation works have focused on the former above ground gas holders and localised areas around the former effluent tar tank, oil gas feedstock storage area and a spent oxide deposit in the north-eastern part of the site area.

4.1 Previous Investigation and Remediation

The site has been the subject of an extensive series of investigations since 1996, aimed at both general characterisation of the contamination status of the site and the detailed examination of a number of individual issues arising. Key data, in the form of trial pit and borehole logs, field measurements and chemical data from the analytical testing of solid and liquid samples, is available in a number of Factual Reports that were used as the basis for the additional site works presented in this report.

Of particular significance are records of:

- visible “blue billy” spent oxide waste within site Made Ground deposits;
- visible free phase tar contamination in Made Ground deposits and underlying soils;
- [REDACTED] concentrations of iron, ammonia and cyanide in the shallow groundwater underlying parts of the site area and in surface water receiving site drainage from the northwest sector of the site;
- the restricted area and thickness of the shallow, water bearing alluvial sand and gravel beneath the site [REDACTED]
[REDACTED]; and
- [REDACTED]
[REDACTED]

Documented historical remediation work at the site is restricted to the local removal of spent oxide and hydrocarbon contamination from isolated, separate hotspots in the north and south of the site, and the removal of the contents of a former tar tank in the western central part of the site, adjacent to the current Training Centre building. Records of the removal of accumulated spent oxide, tars and other by-products of gas manufacture following closure of the gas manufacturing processes have not been previously made available or reported. [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]

5. SITE INVESTIGATION AND METHODOLOGIES

5.1 Scope of Work

A programme of additional site investigations was completed in November / December 2013 / January 2014, which consisted of:

- an ecological survey walkover and update report;
- an updated utilities survey;
- an instrumental radiological survey of the accessible site surface area and monitoring of radiation levels in materials exposed by the sub-surface site investigation work;
- the drilling of boreholes to reveal typical sub-surface ground conditions and permit the collection of soil samples;
- the excavation of trial pits to reveal typical sub-surface ground conditions and permit the collection of soil samples for chemical testing and treatment trials;
- the installation of groundwater monitoring wells in selected borehole locations;
- two rounds of monitoring of rest water levels and three rounds groundwater samples from selected existing and newly installed wells;
- visual inspection and collection of water samples from an interceptor and specific drainage locations sampled in previous site investigations;
- surface water sampling of outfalls and surface waters surrounding and across the site;
- sediment sampling of surface waters in the vicinity of the site;
- a topographical survey of site investigation locations; and
- the production of a Factual Report presenting site data produced by the works.

5.2 Fieldwork

Site diaries by the IKM engineers on site can be found in Appendix L

5.2.1 Ecological Survey

A walkover inspection of the site was conducted by Evolution Ecology Limited (EEL), in November 2013, in advance of the site works. The scope of the survey was to assess the possible presence of protected species and provide an update on the current ecological status of the site (from that which had previously been reported by others). The EEL report from this survey is included in Appendix A.

The main features noted of relevance to the site were:

- Mammals: No mammals were actually seen on site during the survey; however, in excess of 100 rabbit warren entrances and droppings were recorded along the north and northwestern boundary of Area C, mostly within the Made Ground embankment.
- No signs of water vole, otter or bat species were recorded, even within the Bedwell Brook valley. The derelict buildings on-site have limited potential to act as refuge / roosting sites for bats.
- Birds: The survey was carried outside of nesting season, but potential nest sites were identified, primarily within the tree cover in the northwestern and southeastern site sectors and within one of the derelict buildings in Area C, to the east of the pond.
- Insects: No insect species were noted on-site during the survey, but this is not surprising given the time of year the survey was carried out. Vegetated open land and areas of hardstanding across the site could provide good foraging / basking opportunities for insects in the spring and summer months.

- Reptiles/Amphibians: No clear signs of usage were identified; however, the site is thought to have a high potential for housing reptiles or amphibians, within the unused burrows situated in the woodland to the northwest of Area C. This includes possible use by hibernating Great Crested Newts (GCN). Hard standing areas nearby were also considered to provide suitable basking areas for GCN and other reptiles and amphibians, such as the Grass Snake.

It is noted that GCNs are a protected species and cannot be allowed to be intentionally / foreseeably disturbed or injured / killed by site activities or development.

5.2.2 Radiological Survey

In response to the former use of radioactive catalyst (nickel/depleted uranium) material during the operation of the gasworks site, a site wide radiological survey was carried out by specialist radiological risk assessment contractors, Aurora Health Physics Services Limited (Aurora).

The survey included the instrumental measurement of radiation levels across the whole of the open site surface (where this was accessible to the manually carried instrumentation), within occupied and unoccupied buildings and in accessible underground services (drains). In addition, Aurora carried out monitoring of radiation levels in materials exposed by all of the trial pitting and borehole drilling conducted across the site during the site works.

The Aurora Limited survey report for the area is included as Appendix D with other areas results which are not relevant crossed out.

5.2.3 Trial Pits and Boreholes

Site investigations consisted of:

- the excavation of forty-three trial pits;
- sinking of six window sampler boreholes; and
- drilling of eight cable percussive boreholes.

Twenty-two trial pits, one window sampler and eight cable percussive boreholes were excavated in the northern and northwestern area of the site (Area C and the northernmost sector of Area A – Area AC1) in the vicinity of previously reported spent oxide process structures and near surface, visible spent oxide deposits.

Eleven trial pits and five window sampler boreholes were excavated in the former gasworks process area, in the western sector of Area A (Area AC2).

Ten trial pits were excavated in the southeastern corner of the site (Area AC4), within the tipped material on the northern flank of the Bedwell Brook valley.

Each sample location was included in the site wide topographical survey following completion of the works and that information has been used in the production of the location plans provided in this report (Drawing Nos. A1-13627-3018, 3019 and 3021).

Trial pitting was conducted using a backhoe excavator under the supervision of the I&H Brown site manager and IKM field staff. Spoil was temporarily placed on plastic sheeting during trial pitting, before being backfilled in approximate reverse order of excavation and the location being levelled and tidied on completion.

Window sampling and cable percussive drilling was carried out by Rotary Test Drilling Limited, under the supervision of the I&H Brown site manager and IKM field staff. All spoil and debris was removed from the area on completion and returned to the Maelor Works compound for off-site disposal. Controlled waste certificates are located in Appendix M.

On the instruction of the IKM field supervisor, selected boreholes were installed as monitoring wells for future groundwater monitoring and sampling.

Drawing No. A1-13627-3011 shows the location of each completed trial pit and borehole in relation to historical investigation locations for Area AC as a whole.

5.3 Ground Conditions

The four different areas subject to investigation during the IKM 2013 site investigation have been defined as follows:

- Area AC1 – the northern site sector, largely open land to the north of the occupied site buildings.
- Area AC2 – the western site sector, previously occupied by gasworks process structures.
- Area AC3 – the southernmost sector of the site, previously occupied by the oil feedstock tanks associated with oil gas manufacture.
- Area AC4 – the Bedwell Brook valley area.

Drawing A1-13627-3017 shows the location and extent of each of these areas. Identified site constraints are shown for each area in Drawing Nos. A1-13627-3007, 3008, 3009 and 3010. Ground conditions are described in the following sections.

5.3.1 Area AC1

Twenty-two trial pits and nine boreholes were excavated in this area during the works. The north-eastern area to the south of the former gas holder and paint store consists of an area of soft standing which is grazed by rabbits and has sections of fencing dividing parts of the area. Trial pitting in this area found Made Ground overlying firm brown sandy clay. Made Ground deposits were observed from ground level to between 0.3m and 2.1m below ground level (bgl). The Made Ground consisted of re-worked clay with some demolition waste including bricks and wood.

The trial pits in the vicinity of the old bullet storage vessel were found to consist of gravel on to a concrete base 0.3m thick with re-bar and clay underneath. Some Made Ground consisting of coal was found in IKM 2013 trial pit TP21 at 1.2-2.1m bgl. The area to the south of the old bullet storage vessel was previously used for spent oxide re-vivification. This area is covered in hard standing consisting of concrete with re-bar 0.3m thick. Beneath the hard standing is Made Ground up to 3.2m in depth which included reworked

clay and sand and gravels. Beneath the Made Ground was sandy clay with bands of gravel observed in IKM 2013 boreholes BH 5, 6, and 7. The depth to the underlying Boulder Clay was proven at 4.50m, 5.10m and 4.55m bgl respectively.

In the area housing the old purifier's (below ground concrete bunker type structures), two IKM 2013 boreholes (BH4 and BH4A) and 4 trial pits were excavated. BH4 and 4A drilled through Made Ground to a concrete base at 2.1mbgl. The Made Ground consisted of road and pavement excavation arisings including mixed cobbles of brick and concrete and tarmac. Similar strata of Made Ground with waste such as plastic pipes, tar macadam was observed in IKM 2013 trial pits TP 23-26. A chamber like structure was seen in TP25.

IKM 2013 trial pits TP10-13 were excavated in the area to the south of the purifiers which was also covered by a concrete slab used for the re-vivification of spent oxide. Made Ground was observed from ground level to 2.5mbgl with sandy silty clay beneath.

5.3.2 Area AC2

Eleven trial pits and five boreholes were excavated in this area during the works.

The northern section consists of the existing training centre building, with a gravel covered lay down area to the west and the southern area contains the existing garage building also with a lay down area to the west. These lay down areas are currently used for pipe, trailer and small excavator storage. These areas are covered in Type 1 gravel, with some areas of hard standing for storage of tarmac and trailers. During excavation works 0-0.8m of Made Ground was observed over brown clay 0.5-2.7m thick and sand 1.3-2.8m. The thickness of the gravels was not proven. A concrete tank was observed in IKM 2013 trial pit TP7 which was full of tar impacted demolition waste.

IKM 2013 trial pits TP8 and 9 consisted of Made Ground to 0.6mbgl over clay 2.2m thick with sand beneath. TP8A had a band of gravel from 1.6-2.4m bgl. The total thicknesses of granular alluvium were not proven.

One borehole was drilled inside the training centre and one borehole was drilled just outside to the south. IKM 2013 borehole BH1, inside the training centre, required coring through a 0.27m thick concrete slab into gravel sub-base to 1m, with silt and sand extending to Boulder Clay at 3m bgl. IKM 2013 borehole BH2 saw Made Ground of gravel and clay to 0.7m bgl, with sand, silt and a thick layer of sandy gravel to 3.85m bgl with Boulder Clay beneath.

Within IKM 2013 trial pits TP4, TP5, TP6 to the west of the garage the ground conditions were observed to be of Made Ground (of gravel and clay) from ground level to a maximum of 0.6m bgl. This was underlain by sand (with a thin band of clay observed in TP4 from 1-1.4mbgl) varying in thickness up to 0.8m with water saturated gravel underneath (not observed in TP6). The thickness of the gravels was not proven due to the instability of the trial pits due to water ingress.

IKM 2013 trial pits TP1, 2 and 3 were underlain by Made Ground comprising of demolition waste including bricks and concrete which was [REDACTED] with tar and oil. Brick foundations were observed in TP1 at 0.1mbgl, which may have been left from the old CWG plant. The sand and gravels in all the trial pits in the southern area of AC2 were [REDACTED] with tar impacted groundwater.

5.3.3 Area AC3

No intrusive investigation went on in this area but water and sediment samples were taken at the outfall and the pond in the east of the area (see drawing A1-13626-3020). A sediment sample was also taken in the centre of the pond which was of a clay based Made Ground. Drain covers were lifted at MH1 and MH2 (see drawing A1-13627-3011) and no visual or olfactory contamination was observed.

5.3.4 Area AC4

Ten trial pits were excavated in area AC4 during the site works.

This area was previously used for tipping of waste materials from the site and consists of an area of flat open space, with short grass, with a steep densely vegetated slope down to Bedwell Brook to the south. The southern bank of Bedwell Brook is less steep and tree covered to the site boundary beyond. Ten trial pits were excavated, all in the tip area to the north of the brook. The majority of the pits consisted of reworked clay including some waste concrete with re-bar and bricks. A concrete structure was observed at 0.2mbgl in IKM 2013 trial pit TP33 [REDACTED]. TP32 was contaminated with waste including bricks and tiles mixed in with clay and coal tar from 1.8mbgl.

5.4 Field Records and Contamination Observations

Logs and photographs of all the trial pit and hand pit locations are contained in Appendix B.

Measurements of the headspace above soil samples, taken from the site investigation locations and placed in sealed containers, were carried out using a photo-ionisation detector to provide an indication of the presence of volatile organic compounds (VOCs). Table 2 provides a compilation of these measurements for each sampling location. This data is also recorded on the trial pit logs in Appendix B.

Table 2: PID Measurements from Soil Sample Headspace

Exploratory Hole IKM 2013	Total Volatile Organic Compound (TVOC) Concentration (ppm)	Comments
TP07	0.66	TVOC reading taken from soil samples at 0.8m bgl.
TP10	3.3	TVOC reading taken from soil samples at 1.8m bgl.
TP10	4.4	TVOC reading taken from soil samples at 2m bgl.
TP8A	10	TVOC reading taken from soil samples at 1.7m bgl.
TP8A	10.7	TVOC reading taken from soil samples at 2.4m bgl.

Exploratory Hole IKM 2013	Total Volatile Organic Compound (TVOC) Concentration (ppm)	Comments
TP6	0.3	Background ambient reading besides trial pit.
TP32	14.6	TVOC reading taken from soil samples at 2m bgl.
BH23	4.8	TVOC reading taken from soil samples at 2.6m bgl.
BH23	0.5	TVOC reading taken from soil samples at 2m bgl.

In addition to the PID measurements, visible or olfactory signs of contamination were noted within each of the site investigation areas as follows:

Area AC1

IKM 2013 boreholes BH3, 3A, 5, 6 and 7 were noted to emit an oil/chemical odour from the top 3m of strata, whilst drilling.

Area AC2

In IKM 2013 trial pit TP7, free phase tar, mixed with waste within a concrete tank like structure was observed. Tar and oil contamination was observed in the groundwater and in the sand and gravel in IKM 2013 trial pits TP4 to 6. A pocket of blue ceramic spacers (associated with the uranium/nickel radioactive catalyst previously used on site) were observed within the Made Ground in trial pit TP3, at 0.25mbgl. A redundant pipe observed at 0.2mbgl in trial pit IKM 2013 trial pit TP2 and relic foundations and the Made Ground in TP1 were tar impacted. No visual or olfactory contamination was observed in IKM 2013 boreholes BH23 and BH24, but hydrocarbon impacted gravels and sands were observed in BH23, BH1 and BH2.

A manhole lid was lifted and a water sample taken at SS11-09-1 (see drawing A1-13627-3019). There was a hydrocarbon sheen on the water sample and free phase tar was observed on the outside of the bucket used to take the sample. A strong gas works odour was observed in the road drain gullies, along the road south of the old retort house. A sample of the drain sediment was taken at location GP1. The manhole lids in this area were not able to be lifted for further inspection / sampling.

Area AC3

At location SD3, a sediment sample taken from the outfall to the pond was hydrocarbon impacted and had a strong odour and sheen visible, as did the water taken at the same location SS11-03-1 (see photo 14-16). A sediment sample taken from the centre of the pond did not show visual or olfactory signs of contamination. Drain covers were lifted at MH1 and MH2 (see drawing A1-13627-3011) and no visual or olfactory contamination was observed.

Area AC4

Orange stained groundwater was observed in IKM 2013 trial pit TP30. No groundwater was observed in any of the other trial pits in this area, apart from TP38, which had some groundwater ingress but did not appear contaminated. The soil in TP32 contained visible waste material, including bricks and tiles, mixed with clay and coal tar from 1.8mbgl. A leachate outbreak was noted around the outfall flowing into Bedwell Brook (see photos 20 and 21). The leachate appeared around the outfall head works and was orange / brown in colour and had a hydrocarbon sheen. The leachate outbreak combines with flows from the outfall before entering the brook. A further orange / brown patch of leachate outbreak was also observed at Location RB1, in the brook bank (see drawing A1-13627-3021 and photo 22). Globules of free phase tar were observed in sediment samples SD2 and SD4 (see photos 23-26), these were black and mobile and separated to form a hydrocarbon sheen on the water surface when disturbed. Empty oil drums were observed on the surface on the north bank of the tip (see photo 28) and on the opposite south bank, along with other waste, including a car engine and bonnet and a wheel barrow. No visual or olfactory contamination was observed in the water or sediment sampled upstream or downstream, from locations CULV UP and SDCULV or SS11-08-1 and SD1 (see drawing A1-13627-3021).

[REDACTED]

[REDACTED]

The locations of visible tar or spent oxide [REDACTED] in areas AC1-4 are shown in drawings A1-13627-3038 to A1-13627-3041. Table 3 provides a compiled listing of the locations where visible contamination was observed during the 2013/4 investigations and recorded on logs from previous investigations.

Table 3: Compiled Visible or Odorous Contamination Records

Location	Contamination Description
Komex Clarke Bond Investigation 1995	
MW1	Black staining
████	████████
	████████
MW3	HC on groundwater, Visible tar
MW4	HC odour, spent oxide, Visible tar
MW5	No visible contamination
MW6	Black Staining, HC odour
TP1	HC odour
TP2	HC odour and HC on groundwater
TP3	HC odour
TP4	No visible contamination
TP5	HC odour, Spent oxide
TP6	No visible contamination
TP7	Spent oxide
TP8	Spent oxide
TP9	HC odour
TP10	No visible contamination
TP11	No visible contamination
TP12	HC odour
TP13	No visible contamination
TP14	No visible contamination
TP15	HC odour
TP16	No visible contamination
TP17	No visible contamination
TP18	HC odour, spent oxide
TP19	No visible contamination
TP20	HC odour, Visible tar, HC sheen
TP21	HC odour
TP22	No visible contamination

Location	Contamination Description
TP23	HC odour, HC on groundwater, visible tar
TP24	HC odour
████	████████████████
TP26	No visible contamination
TP27	HC odour, spent oxide
TP28	No visible contamination
TP29	Spent oxide, visible tar
Komex Clarke Bond Investigation 1999	
TP99-101	No visible contamination
TP99-102	No visible contamination
████	████████████████
TP99-104	No visible contamination
████	████████████████
████	████████████████
TP99-107	Visible tar
TP99-108	No visible contamination
TP99-109	HC odour
TP99-110	No visible contamination
TP99-111	No visible contamination
TP99-112	No visible contamination
TP99-113	No visible contamination
TP99-113A	HC odour
TP99-115	No visible contamination
TP99-116	No visible contamination
TP99-117	HC odour
████	████████████████
TP99-119	No visible contamination
TP99-120	No visible contamination
TP99-121	No visible contamination
TP99-122	No visible contamination
TP99-123	Spent oxide
MW99-101	Spent oxide, Black staining

Location	Contamination Description
MW99 - 102	Spent oxide
MW99-103	No visible contamination
MW99-104	Black staining, HC odour
MW99-105	Spent oxide
MW99 - 106	HC odour
██████████	████████████████████
MW99-108	No visible contamination
MW99 -109	HC odour, visible tar
MW99-110	No visible contamination
MW99-201	No visible contamination
MW99-202	No visible contamination
MW99-203	No visible contamination
██████████	██████████
MW99 - 205	Visible tar
Worley Parsons Investigation 2011	
MW11-01	No visible contamination
MW11-02	No visible contamination
MW11-03	No visible contamination
██████████	████████████████████
MW11-05	HC odour
MW11-06	No visible contamination
MW11-07	Black staining, HC odour
MW11-08A	HC odour
MW11- 08B	Black staining, HC odour, HC on groundwater
MW11-10	No visible contamination
MW11-12	No visible contamination
MW11-13	No visible contamination
MW11-14	No visible contamination
██████████	████████████████████
MW11-16	No visible contamination
TP11-01	No visible contamination
██████████	████████████████████

Location	Contamination Description
TP11-03	No visible contamination
TP11-04	No visible contamination
TP11-05	No visible contamination
TP11-06A	No visible contamination
TP11-06B	No visible contamination
TP11-07	HC Odour
TP11-08	HC Odour
IKM Investigation 2013	
HP13-48	No visible contamination
13-01	Visible tar, HC odour, HC sheen on water
13-02	HC sheen on water, HC odour
13-03	Blue spacers, HC sheen on water, HC odour
13-04	HC sheen on water
13-05	HC odour
13-06	HC sheen on water
13-07	Visible tar, HC odour, HC sheen on water
13-08	HC odour
13-08A	HC odour
13-09	HC odour
13-10	HC odour, HC sheen on water
13-11	No visible contamination
13-12	No visible contamination
13-13	No visible contamination
13-15	No visible contamination
13-16	No visible contamination
13-17	No visible contamination
13-18	No visible contamination
13-19	No visible contamination
13-20	No visible contamination
13-21	No visible contamination
13-22	No visible contamination
13-23	No visible contamination
13-24	No visible contamination

Location	Contamination Description
13-25	No visible contamination
13-26	No visible contamination
13-27	No visible contamination
13-28	No visible contamination
13-29	No visible contamination
13-30	Ground water red in colour
13-31	No visible contamination
13-32	Visible tar, HC odour
13-33	No visible contamination
13-34	No visible contamination
13-35	No visible contamination
13-36	No visible contamination
13-37	No visible contamination
13-38	No visible contamination
13-39	No visible contamination
13-40	No visible contamination
13-41	No visible contamination
13-49	No visible contamination
13-50	No visible contamination
13-51	No visible contamination
BH1	HC odour, HC sheen on groundwater
BH2	HC odour, HC sheen on groundwater
BH3	HC odour
BH3A	HC odour
BH4	No visible contamination
BH4A	No visible contamination
BH4B	No visible contamination
BH5	HC odour
BH6	HC odour
BH7	HC odour
BH8A	HC odour
BH22	No visible contamination
BH23	HC odour, HC sheen on groundwater

Location	Contamination Description
SD1	No visible contamination
SD2	Visible tar
SD3	HC sheen on groundwater
SD3A	No visible contamination
SD4	Visible tar
SS11-01-1	No visible contamination
SS11-08-1	No visible contamination
SS11-02-1	No visible contamination
SS11-02-2	No visible contamination
SS11-02-3	No visible contamination
SS11-03-1	HC sheen on groundwater
SS11-05-1	Red sediment
SS11-06-1	No visible contamination
SS11-07-1	No visible contamination
RB1	Red staining

<i>Visible Tar</i>	<i>Visible free tar in matrix or coating spoil surfaces</i>
<i>Spent oxide</i>	<i>Visible spent oxide materials</i>
<i>Black staining</i>	<i>Black hydrocarbon or tarry staining observed in excavation</i>
<i>HC odour</i>	<i>Hydrocarbon Odour noted during excavation</i>
<i>HC sheen</i>	<i>Hydrocarbon sheen observed on water during sampling</i>
<i>HC on groundwater</i>	<i>Free phase hydrocarbon layer floating on groundwater</i>
<i>Red sediment</i>	<i>Ferruginous orange / red sediment observed in groundwater</i>
<i>Red staining</i>	<i>Ferruginous orange / red staining observed in soil</i>
<i>Groundwater red in colour</i>	<i>Ferruginous colouration to trial pit groundwater ingress</i>

5.5 Groundwater and Surface Water Monitoring

Selected new borehole locations were installed as groundwater monitoring locations. The installed wells were monitored on two occasions for rest water level and groundwater samples were obtained from where volumes permitted. Groundwater monitoring details are provided in Table 4. Well installation details are provided on the borehole logs in Appendix C.

In area AC1, all the wells were screened across the Made Ground and underlying granular and cohesive drift. This is to maximise the capture of groundwater from all horizons.

In area AC2, all the wells were screened in the shallow granular drift beneath the Made Ground, so as to target the most visibly impacted horizon.

Surface water samples were taken upstream and downstream of the site from the River Clywedog, and from the ox-bow lake (which was flooded and part of the main river in January 2014 - see photo 1). Sediment and water samples were also taken from drainage on and around the site (see drawing A1-13627-3011) where possible and drains visually inspected during sampling. Samples were taken from a pond located in Area AC3 and the outfall into this pond. Further samples were taken along Bedwell Brook (both on and off site) and outfalls flowing into Bedwell Brook. These locations are shown in drawing A1-13627-3021.

Samples of groundwater were obtained from newly installed and established monitoring wells within boreholes across the site area.

Two rounds of sampling were undertaken in December 2013 and January 2014.

Measurements of rest water levels and total borehole depths were made on each occasion. Table 4 provides a compilation of all available water level measurements for boreholes across the site.

Table 4: Groundwater Monitoring Records

Borehole	Response Zone	Elevation (mAOD)	A - March/ April 1999	B - March/ April 1999	C - April 1999	D - June 2011	E - July 2011	F - August 2011	G - December 2013	H - January 2014
			Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)
MW99-101	SAND	35.96	34.22	34.22	34.22	-	-	-	-	-
MW99-102	CLAY/SAND	36.38	34.90	34.90	34.86	34.30	34.25	34.16	-	-
MW99-103	SAND	36.48	34.94	34.94	34.96	34.31	34.27	34.17	-	-
MW99-104	SAND	36.52	33.95	33.95	-	33.46	33.51	33.18	33.84	34.15
MW99-105	SAND/ GRAVEL	36.37	34.86	34.86	-	-	-	-	-	-
MW99-106	GRAVEL	36.81	35.13	35.12	35.13	34.60	33.49	34.33	35.25	35.7
MW99-108	SAND	36.9	36.51	36.54	36.6	-	-	-	-	-
MW99-109	MADE GROUND	37	-	36.43	36.48	-	-	-	-	-
MW99-110	GRAVEL	36.68	-	35.29	35.28	34.88	35.00	34.81	-	-
MW99-201	GRAVEL	36.34	34.75	34.77	34.77	-	-	-	-	-
MW99-202	MADE GROUND	34.00	-	31.26	31.25	30.77	30.70	30.69	31.10	31.84
MW99-203	MADE GROUND	36.85	-	DRY	DRY	-	-	-	-	-
MW99-205	CLAY/SAND	36.71	-	36.10	36.10	-	-	-	-	-

Borehole	Response Zone	Elevation (mAOD)	A - March/ April 1999	B - March/ April 1999	C - April 1999	D - June 2011	E - July 2011	F - August 2011	G - December 2013	H - January 2014
			Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)
MW3	SAND/ GRAVEL/ CLAY	37.19	35.80	35.80	-	35.86	35.78	35.64	-	-
MW4	MADE GROUND	36.04	33.50	33.47	-	-	-	-	-	-
MW5	SAND	37.52	35.90	35.89	35.87	35.84	35.81	35.72	-	-
MW6	SAND/CLAY	36.62	36.47	36.46	-	-	-	-	-	-
MW11-01	CLAY	33.29	-	-	-	33.01	32.90	32.68	-	-
MW11-02	MADE GROUND/ CLAY	37.05	-	-	-	34.93	34.46	34.33	35.68	36.04
MW11-05	MADE GROUND	36.73	-	-	-	36.33	36.24	36.01	36.27	36.53
MW11-06	GRAVEL/ SAND	36.50	-	-	-	36.18	35.96	35.75		
MW11-07	MADE GROUND/ GRAVEL/ CLAY	36.75	-	-	-	36.03	35.96	35.8	36.04	36.75
MW11-08B	MADE GROUND/ GRAVEL/ CLAY	36.7	-	-	-	36.60	35.72	35.46	35.61	35.83

Borehole	Response Zone	Elevation (mAOD)	A - March/ April 1999	B - March/ April 1999	C - April 1999	D - June 2011	E - July 2011	F - August 2011	G - December 2013	H - January 2014
			Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)
MW11-10	MADE GROUND/ GRAVEL	35.38	-	-	-	-	35.30	35.18	-	-
MW11-11	MADE GROUND/ SAND/ CLAY	36.79	-	-	-	36.33	35.96	35.9	-	-
MW11-12	SAND/ GRAVEL/ CLAY	36.65	-	-	-	34.79	34.84	34.66	-	-
MW11-13	CLAY	36.31	-	-	-	34.94	35.00	34.82	-	-
MW11-16	CLAY/SAND	36.49	-	-	-	33.44	32.97	32.915	34.11	34.13
BH1	SAND	-	-	-	-	-	-	-	-	-
BH2	SILT/GRAVEL	36.73	-	-	-	-	-	-	35.83	36.07
BH3	CLAY/ GRAVEL	36.55	-	-	-	-	-	-	34.79	35.00
BH4	CLAY/ GRAVEL	36.91	-	-	-	-	-	-	35.15	35.36
BH5	MADE GROUND/ CLAY/ GRAVEL	36.43	-	-	-	-	-	-	33.58	34.26
BH9	MADE GROUND/ SILT/ CLAY	34.16	-	-	-	-	-	-	33.16	33.26

Borehole	Response Zone	Elevation (mAOD)	A - March/ April 1999	B - March/ April 1999	C - April 1999	D - June 2011	E - July 2011	F - August 2011	G - December 2013	H - January 2014
			Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)	Rest Water Level (mAOD)
BH12	SILT	34.30	-	-	-	-	-	-	33.94	34.30
BH17	SAND	36.98	-	-	-	-	-	-	36.58	36.78
BH21	CLAY	36.65	-	-	-	-	-	-	32.136	36.46
BH23	GRAVEL/ SAND	36.93	-	-	-	-	-	-	35.81	34.64
BH24	SAND	37.86	-	-	-	-	-	-	36.23	35.80

Groundwater occurrences were also recorded in trial pit excavations, although reduced rest water level measurements were not possible for these observations. Details are provided on the trial pit logs in Appendix B.

Area AC1

Monitoring wells monitored in this area recorded rest water levels between 33-36m above Ordnance Datum (AOD). No groundwater was observed in trial pits in the area south of old paint house and gas holder. Perched groundwater in trial pits excavated in the old purifier area was observed at 1.5 – 1.6m bgl.

On the northern site boundary there is water flowing out of location SS11-05-1 (see drawing A1-13627-3018 and photos 5-7), apparently from a surface drain onto surrounding land. The outflow is accompanied by orange sediment and the drain cover was lifted to reveal the drain line was also full of similar orange sediment. The outfall from the site, at SS11-06-1 to river was not found. Further orange / brown leachate breakout was observed in the same location as previously reported along the northwestern site boundary fence line.

Area AC2

Monitoring wells in this area recorded rest water levels of between 34-36 mAOD. In the trial pits, groundwater was observed between 1-2.7mbgl to the west of the training centre. Groundwater strikes were recorded at 1.1mbgl in IKM 2013 borehole BH1 and 1.6mbgl in BH2 beneath the building itself. The water sampled from BH1 and BH2 had a strong hydrocarbon odour and sheen on the surface. During monitoring of historical borehole MW11-08B, adjacent to the garage building, free product was observed on the dip meter and the water sampled from MW11-08B [REDACTED] [REDACTED] had a very strong hydrocarbon odour (see photo 13).

Area AC3

Water sampled from the outfall SS11-03-1 had a hydrocarbon sheen on the surface (see photos 14-16).

Area AC4

All the culverts in this area were observed to be partially blocked with wood and other waste and in need of clearance/maintenance work (see photos 17-19). One of the culverts below the old railway line was blocked completely and there was no visible flow (see photo 18).

During trial pitting, groundwater was observed in two of the trial pits, at 2.1mbgl in IKM 2013 trial pit TP30 and 2.5mbgl in TP38.

The second round of monitoring in January 2014 took place after a period of heavy rainfall and localised flooding was noted around the site. Bedwell Brook had burst its banks, leaving a strong odour and slight sheen over the surrounding area. Water levels prevented sampling at exactly the same location as in December.

Historical borehole MW99-202 was monitored and sampled, with a rest water level of 31m AOD.

5.6 Incidents

All works were conducted in accordance with prior agreed method statements and risk assessments developed for the main site investigation. Full records were maintained by the I&H Brown site manager.

Nevertheless, an unrecorded water main was struck on 26th November 2013, during trial pitting in the eastern sector of Area AC1, close to where TP40 was excavated (see drawing A1-13627-3018). Works were stopped and the incident dealt with by the IHB site manager, who organised for the main to be repaired before the site investigation works were completed.

No further incidents or near misses were reported during the works.

5.7 Laboratory Analysis

Water, sediment and soil samples during the investigation works were placed in appropriate laboratory supplied containers and dispatched to the laboratory by overnight courier.

All sample analysis was conducted by Derwentside Environmental Testing Services Ltd (DETS) in accordance with their standard laboratory methods, the majority of which are UKAS accredited. Soil

A total of 68 soil samples (including sediment samples) were collected from trial pit, borehole and sediment sampling locations during the site works. 20 soil/sediment samples were collected from area AC1, 33 soil/sediment samples were collected from area AC2 and 15 soil/sediment samples were collected from area AC4.

Samples were collected from Made Ground and underlying natural strata, both visibly contaminated and apparently uncontaminated.

All soil samples were subject to analysis for the standard National Grid suite of typical inorganic and organic contaminants, including screening for asbestos fibres. Compiled results tables for this analysis are provided in Appendix G.

Drawing No. A1-13627-3014 shows the location of samples tested for asbestos fibres and indicates the level of fibres found in each case (not detected, detected at less than 0.001% by mass, or detected at greater than 0.001% by mass).

5.7.1 Water

All water samples were subject to the same standard National Grid suite as the soil samples, with the exception of asbestos screening. Compiled results tables for water analysis are also presented in Appendix G.

5.7.2 Leachate

Leachate testing was performed on one soil sample taken at 2mbgl from TP32. Leachate was tested for the same suite of contaminants as the water samples. Results are included in the Tables in Appendix G.

5.8 Quality Assurance & Control

All DETS testing is subject to rigorous internal QA/QC, developed as an integral part of the testing methodology, and with records available on request. A total of two duplicate soil samples and five duplicate waters were obtained from site and submitted to identical testing regime as the standard samples. A field blank and trip blank were also submitted to an identical testing regime as the standard samples. No significant discrepancies were noted. DETS QA and QC data is located in Appendix K.

6. REFERENCES

References contained in the current report are:

Ref 1 (KCB, 1996). Komex Clarke Bond – *Final Environmental Assessment Factual Report, Maelor Works, Wrexham*. Report No. 50065, February 1996.

Ref 2 (KCB, 1999). Komex Clarke Bond – *Factual Additional Site Investigation, Maelor Works, Wrexham*. Report No. 50065-6, November 1999.

Ref 3 (Worley Parsons, 2006). Worley Parsons Komex– *Factual Site Report, Area A, Maelor Works, Wrexham*. Report No. 50065-25, August 2006.

Ref 4 (Worley Parsons, 2012). Worley Parsons – *Environmental Assessment Site Investigation Report, Maelor Works, Wrexham*. Report No. 50065-29, January 2012.

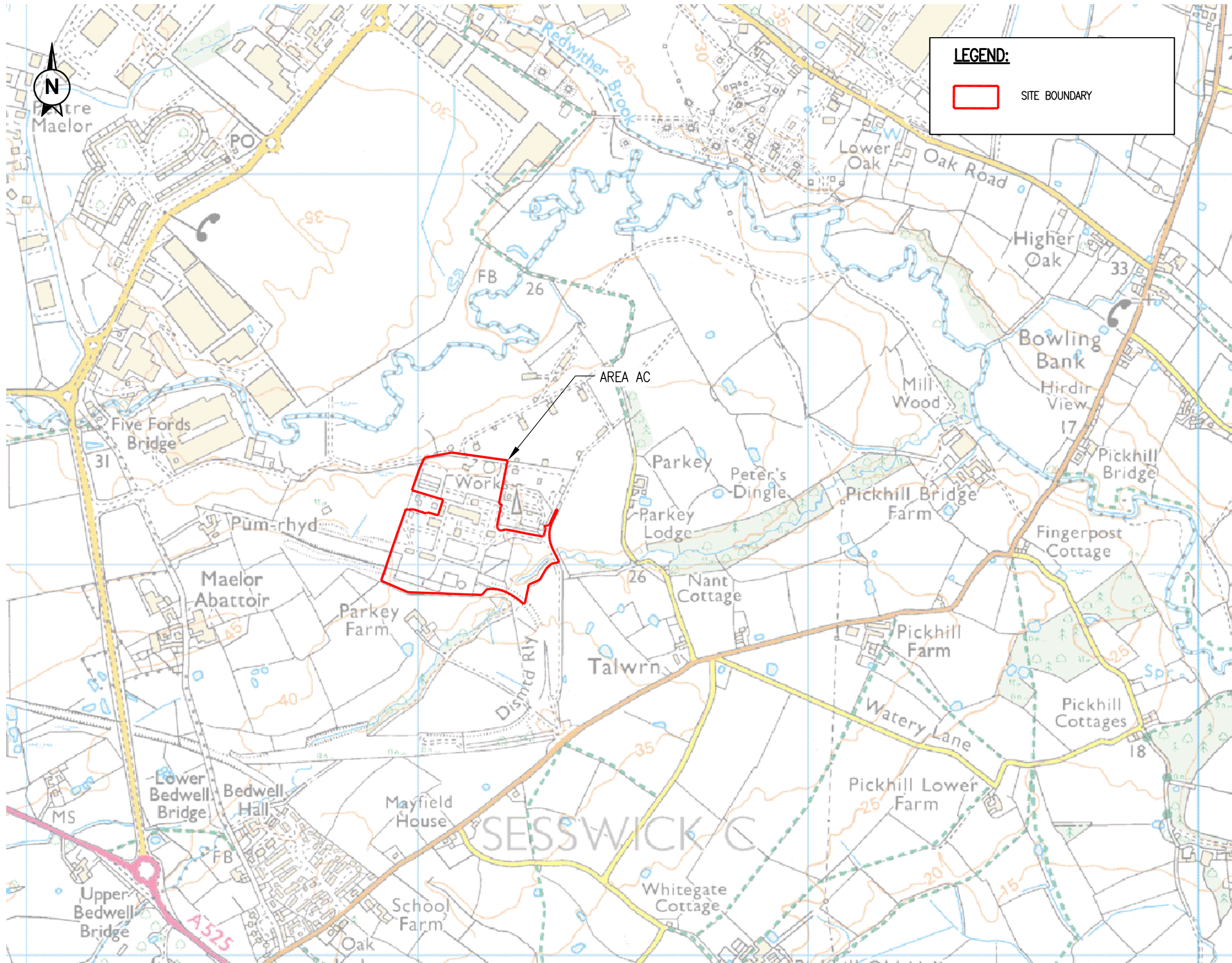
Ref 5 (Worley Parsons, 2012) Worley Parsons – Site Information, Maelor Works, Wrexham Report No. 50065-30, November 2012.

DRAWINGS

A3-13627-3057

Areas A and C Site Location Plan

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LEGEND:

SITE BOUNDARY



SITE LOCATION PLAN

NTS

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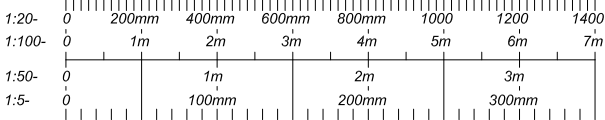
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PROJECT **NATIONAL GRID WREXHAM GASWORKS**

DRAWING **SITE LOCATION PLAN - AREA AC**

DRAWING No. **A3-13627-3057** REV **0**

SITE LOCATION PLAN – AREA AC
SCALE 1:10000



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A1-13627-3017
Tile Layout Plan

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WORLEY PARSONS

SITE INVESTIGATION LOCATIONS 2011:

- TP11-01 TRIAL PITS
- MW11-01 MONITORING WELL LOCATION
- MW11-03 SHALLOW SAMPLE FROM VACUUM EXCAVATION (MONITORING WELL NOT INSTALLED)
- SW11-01 DRAINAGE SAMPLE LOCATION (APPROX.)

FORMER SITE INVESTIGATION LOCATIONS:

- TP99-106 KOMEX TRIAL PIT (1999)
- MW99-204 KOMEX MONITORING WELL (1999)
- MW2 KOMEX MONITORING WELL (1995)
- TP2 KOMEX TRIAL PIT (1995)

IKM SITE INVESTIGATION LOCATIONS 2013:

- GROUND WATER SAMPLING EXISTING WELL
- NORTHERN DISCHARGE SURFACE WATER SAMPLING
- SEDIMENT SAMPLING
- SPENT OXIDE "LOOK-SEE" TRIAL PITS
- TRIAL PITS
- BOREHOLES
- SURFACE WATER / STREAM OUTFALL SAMPLING
- DRAINAGE WATER SAMPLING / INSPECTION

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PROJECT MAELOR WORKS WREXHAM

DRAWING TILE LAYOUT PLAN - AREA AC

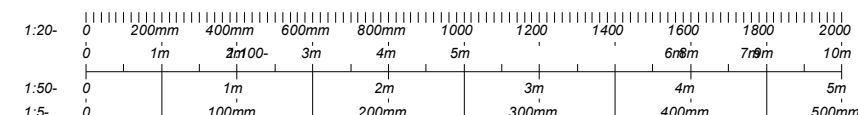
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TILE LAYOUT PLAN - AREA AC
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A1-13627-3048
Service Drawings

A1-13627-3018

Exploratory Holes Layout Plan - AC1

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EXPLORATORY HOLES LAYOUT PLAN – AC1

SCALE 1:500



UPSTREAM

DOWNSTREAM

OXBOW

OX-BSO

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WORLEY PARSONS
SITE INVESTIGATION LOCATIONS 2011:

- TP11-01 TRIAL PITS
- MW11-01 MONITORING WELL LOCATION
- MW11-03 SHALLOW SAMPLE FROM VACCUM EXCAVATION (MONITORING WELL NOT INSTALLED)

FORMER SITE INVESTIGATION LOCATIONS:

- TP99-106 KOMEX TRIAL PIT (1999)
- MW99-204 KOMEX MONITORING WELL (1999)
- MW2 KOMEX MONITORING WELL (1995)
- TP2 KOMEX TRIAL PIT (1995)

IKM SITE INVESTIGATION LOCATIONS 2013:

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- NORTHERN DISCHARGE SURFACE WATER SAMPLING
- SEDIMENT SAMPLING
- SPENT OXIDE "LOOK-SEE" TRIAL PITS
- TRIAL PITS
- BOREHOLES
- SURFACE WATER SAMPLING
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PROJECT	MAELOR WORKS WREXHAM
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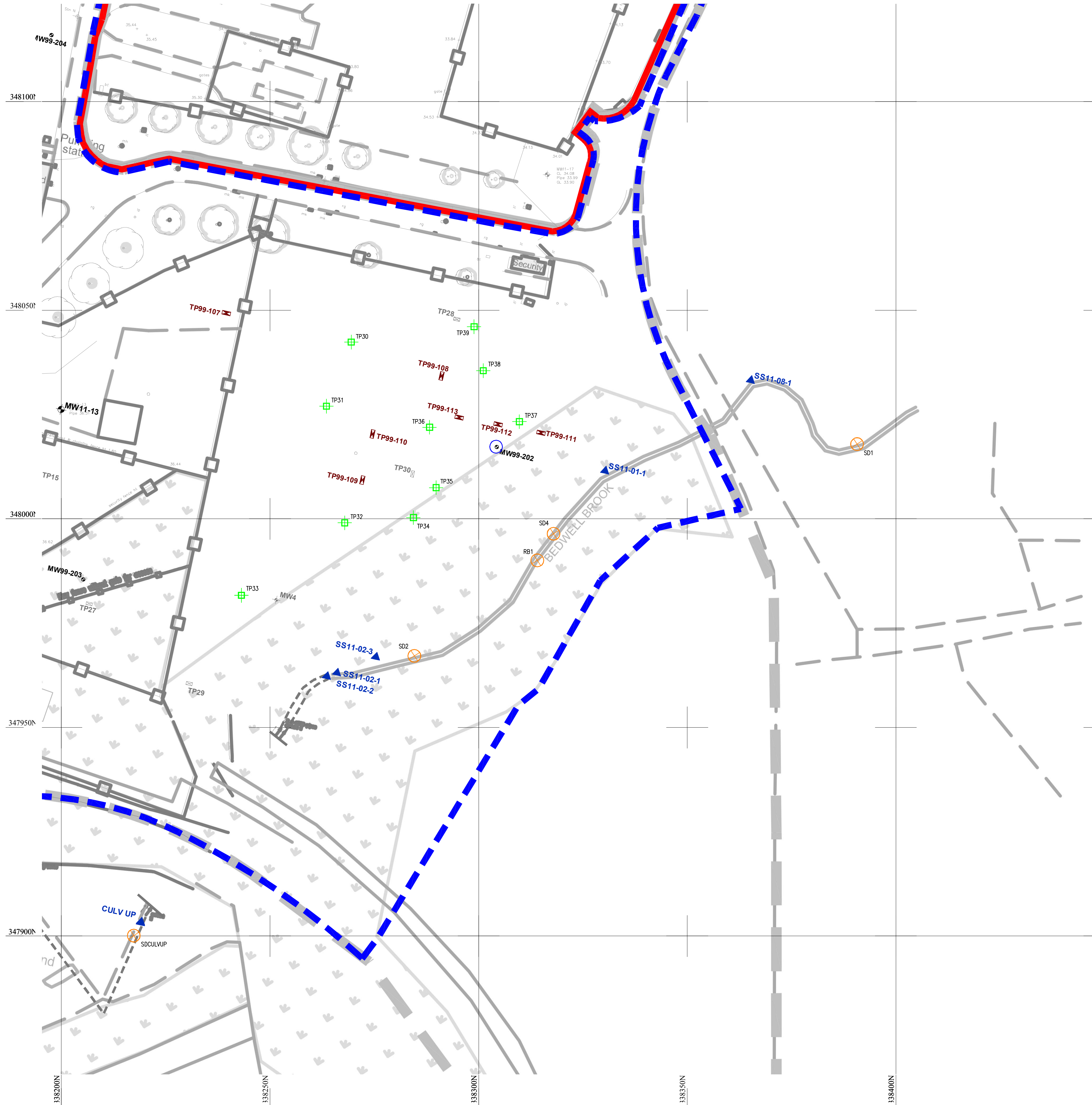
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Exploratory Holes Layout Plan - AC2

A1-13627-3021

Exploratory Holes Layout Plan - AC4

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EXPLORATORY HOLES LAYOUT PLAN – AC4
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SITE INVESTIGATION LOCATIONS 2011:

- TP11-01 TRIAL PITS
- MW11-01 MONITORING WELL LOCATION
- MW11-03 SHALLOW SAMPLE FROM VACUUM EXCAVATION (MONITORING WELL NOT INSTALLED)
- SW11-01 DRAINAGE SAMPLE LOCATION (APPROX.)

FORMER SITE INVESTIGATION LOCATIONS:

- TP99-106 KOMEX TRIAL PIT (1999)
- MW99-204 KOMEX MONITORING WELL (1999)
- MW2 KOMEX MONITORING WELL (1995)
- TP2 KOMEX TRIAL PIT (1995)

IKM SITE INVESTIGATION LOCATIONS 2013:

- GROUND WATER SAMPLING EXISTING WELL
- NORTHERN DISCHARGE SURFACE WATER SAMPLING
- SEDIMENT SAMPLING
- SPENT OXIDE "LOOK-SEE" TRIAL PITS
- TRIAL PITS
- BOREHOLES
- SURFACE WATER / STREAM OUTFALL SAMPLING
- DRAINAGE WATER SAMPLING

RESIDUAL RISK REGISTER

IN ADDITION TO THE HAZARDS, NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING :

IDENTIFIED RISK / HAZARD	DESCRIPTION
-	-
IDENTIFIED RISK / HAZARD	DESCRIPTION
-	-

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT PERSON WORKING TO AN APPROVED SAFE SYSTEM OF WORK

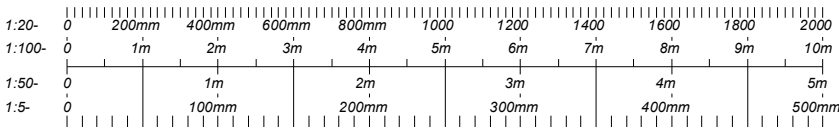
STATUS				
FOR COMMENT				
0	30.01.13	CUB	MS	ISSUED FOR COMMENT
REV	DATE	BY	CHKD	DESCRIPTION



CLIENT	I & H BROWN
PROJECT	MAELOR WORKS WREXHAM
DRAWING	EXPLORATORY HOLES LAYOUT PLAN - AC4

DRAWING No.	REV
A1-13627-3021	0

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A1-13627-3011

Exploratory Holes Layout Plan - Area A

EXTERNAL REFERENCES: BELOW IS A LIST OF EXTERNALLY REFERENCED DRAWINGS REQUIRED TO VIEW AND PLOT THIS DRAWING.
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GENERAL NOTES:

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5. ALL DIMENSIONS ARE IN MILLIMETERS

LEGEND:

- NATIONAL GRID PROPERTY HOLDINGS LTD BOUNDARY
- WALES & WEST UTILITIES BOUNDARIES
- CURRENT STRUCTURES
- FENCELINE

WORLEY PARSONS

SITE INVESTIGATION LOCATIONS 2011:

- TP11-01 TRIAL PITS
- MW11-01 MONITORING WELL LOCATION
- MW11-03 SHALLOW SAMPLE FROM VACUUM EXCAVATION (MONITORING WELL NOT INSTALLED)
- SW11-01 DRAINAGE SAMPLE LOCATION (APPROX.)

FORMER SITE INVESTIGATION LOCATIONS:

- TP99-106 KOMEX TRIAL PIT (1999)
- MW99-204 KOMEX MONITORING WELL (1999)
- MW2 KOMEX MONITORING WELL (1995)
- TP2 KOMEX TRIAL PIT (1995)

IKM SITE INVESTIGATION LOCATIONS 2013:

- GROUND WATER SAMPLING EXISTING WELL
- NORTHERN DISCHARGE SURFACE WATER SAMPLING
- SEDIMENT SAMPLING
- SPENT OXIDE "LOOK-SEE" TRIAL PITS
- TRIAL PITS
- BOREHOLES
- SURFACE WATER / STREAM OUTFALL SAMPLING
- DRAINAGE WATER SAMPLING / INSPECTION

RESIDUAL RISK REGISTER

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-	-
IDENTIFIED RISK / HAZARD	DESCRIPTION
-	-

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STATUS

FOR INFORMATION

0	30.01.14	CUB	MS	ISSUED FOR INFORMATION
REV	DATE	BY	CHKD	DESCRIPTION



CLIENT I & H BROWN

PROJECT MAELOR WORKS WREXHAM

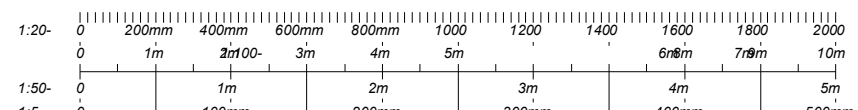
DRAWING EXPLORATORY HOLES LAYOUT PLAN - AREA AC

DRAWING No. A1-13627-3011

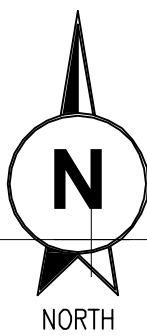
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EXPLORATORY HOLES LAYOUT PLAN – AREA AC
SCALE 1:1000



3483001

3482501

3482001

3481501

3481001

3480501

3480001

3479501

3479001

178500N

179000N

179500N

180000N

180500N

181000N

181500N

182000N

182500N

183000N

183500N

184000N

184500N

185000N

A1-13627-3020

Exploratory Holes Layout Plan - AC3

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EXPLORATORY HOLES LAYOUT PLAN – AC3
SCALE 1:500

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LEGEND:

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- WALES & WEST UTILITIES BOUNDARIES
- CURRENT STRUCTURES
- FENCELINE

WORLEY PARSONS
SITE INVESTIGATION LOCATIONS 2011:

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- MW11-01 MONITORING WELL LOCATION
- MW11-03 SHALLOW SAMPLE FROM VACCUM EXCAVATION (MONITORING WELL NOT INSTALLED)
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- TP2 KOMEX TRIAL PIT (1995)

IKM SITE INVESTIGATION LOCATIONS 2013:

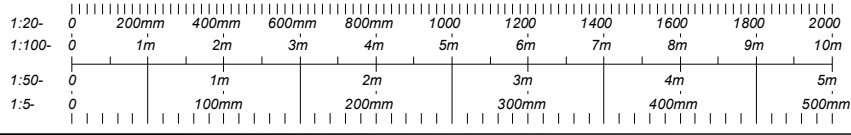
- SEDIMENT SAMPLING
- SURFACE WATER / STREAM OUTFALL SAMPLING
- DRAINAGE WATER SAMPLING / INSPECTION

RESIDUAL RISK REGISTER	
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-	-
IDENTIFIED RISK / HAZARD	DESCRIPTION
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STATUS	
FOR INFORMATION	
0	30.01.13 CJB MS ISSUED FOR INFORMATION
REV	DATE BY CHKD DESCRIPTION

 	
CLIENT	I & H BROWN
PROJECT	MAELOR WORKS WREXHAM
DRAWING	EXPLORATORY HOLES LAYOUT PLAN - AC3
DRAWING No.	REV
A1-13627-3020	0



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- FENCELINE

WORLEY PARSONS

SITE INVESTIGATION LOCATIONS 2011:

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IKM SITE INVESTIGATION LOCATIONS 2013:

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- ⊗ SEDIMENT SAMPLING
- ⊗ SPENT OXIDE "LOOK-SEE" TRIAL PITS
- ⊗ TRIAL PITS
- ⊗ BOREHOLES
- ▲ SURFACE WATER / STREAM OUTFALL SAMPLING
- ▲ DRAINAGE WATER SAMPLING
- STAINING
- HYDROCARBON ODOUR
- SPENT OXIDE
- HYDROCARBON SHEEN
- RED SEDIMENT

RESIDUAL RISK REGISTER

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IDENTIFIED RISK / HAZARD	DESCRIPTION
-	-

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FOR INFORMATION

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REV	DATE	BY	CHKD	DESCRIPTION



CLIENT I & H BROWN

PROJECT MAELOR WORKS WREXHAM

DRAWING VISUAL CONTAMINATION - AC1

DRAWING No. A1-13627-3038

REV 0

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37900N

37950N

38000N

38050N

38100N

38150N

348300

348250

348200

348150

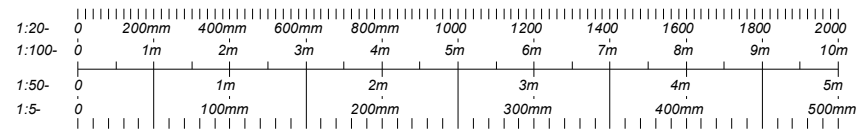
VISUAL CONTAMINATION - AC1
SCALE 1:500

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VISUAL CONTAMINATION – AC3
SCALE 1:500



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LEGEND:

- NATIONAL GRID PROPERTY HOLDINGS LTD BOUNDARY
- WALES & WEST UTILITIES BOUNDARIES
- CURRENT STRUCTURES
- FENCELINE

WORLEY PARSONS
SITE INVESTIGATION LOCATIONS 2011:

- TP11-01 TRIAL PITS
- MW11-01 MONITORING WELL LOCATION
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IKM SITE INVESTIGATION LOCATIONS 2013:

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- SEDIMENT SAMPLING
- SPENT OXIDE "LOOK-SEE" TRIAL PITS
- TRIAL PITS
- BOREHOLES
- SURFACE WATER / STREAM OUTFALL SAMPLING
- DRAINAGE WATER SAMPLING
- HYDROCARBON ODOUR
- OILY GROUNDWATER
- HYDROCARBON SHEEN
- TAR

RESIDUAL RISK REGISTER

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STATUS

FOR INFORMATION

REV	DATE	BY	CHKD	DESCRIPTION
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CLIENT
I & H BROWN

PROJECT
MAELOR WORKS
WREXHAM

DRAWING
VISUAL CONTAMINATION - AC3

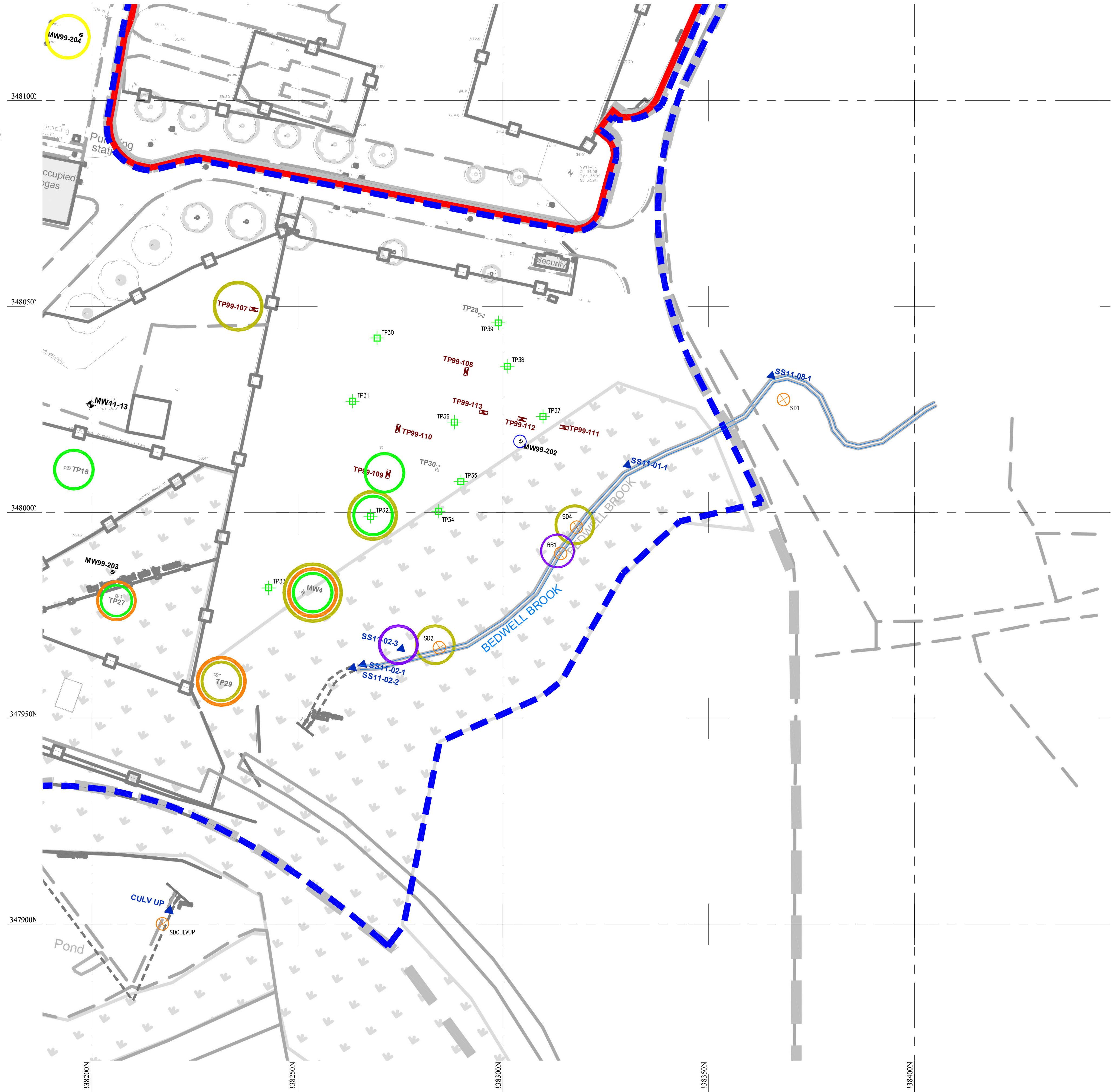
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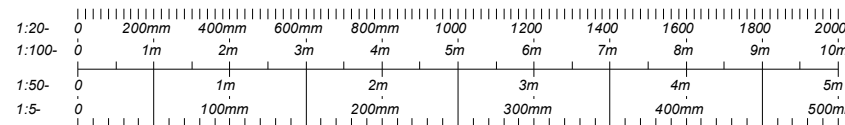
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VISUAL CONTAMINATION – AC4
SCALE 1:500



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LEGEND:

- NATIONAL GRID PROPERTY HOLDINGS LTD BOUNDARY
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- CURRENT STRUCTURES
- FENCELINE

WORLEY PARSONS
SITE INVESTIGATION LOCATIONS 2011:

- TP11-01 TRIAL PITS
- MW11-01 MONITORING WELL LOCATION
- MW11-03 SHALLOW SAMPLE FROM VACCUM EXCAVATION (MONITORING WELL NOT INSTALLED)
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IKM SITE INVESTIGATION LOCATIONS 2013:

- GROUND WATER SAMPLING EXISTING WELL
- ⊗ SEDIMENT SAMPLING
- ⊕ TRIAL PITS
- ▲ SURFACE WATER / STREAM OUTFALL SAMPLING
- HYDROCARBON ODOUR
- SPENT OXIDE
- TAR
- RED SEDIMENT
- STAINING

RESIDUAL RISK REGISTER

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STATUS

FOR INFORMATION

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REV	DATE	BY	CHKD	DESCRIPTION



CLIENT	I & H BROWN
PROJECT	MAELOR WORKS WREXHAM
DRAWING	VISUAL CONTAMINATION - AC4

DRAWING No.	REV
A1-13627-3041	0

A1-13627-3014

Asbestos Testing Location Plan - Area A

THIS IS A CAD PRODUCED DRAWING AND SHOULD NOT BE MANUALLY UPDATED



EXPOSITORY HOLES	QUANTIFICATION (%)
TP15	<0.001
TP17	<0.001
TP21	<0.001
TP7	0.002
TP5	0.109
TP6 - 0.4m	0.047
TP6 - 0.9m	<0.001
TP1	<0.001
TP2 - 0.5m	<0.001
TP2 - 1.0m	<0.001
TP3	<0.001
BH4	<0.001
TP51 - 0.9m	<0.001

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LEGEND:

- NATIONAL GRID PROPERTY HOLDINGS LTD BOUNDARY
- WALES & WEST UTILITIES BOUNDARIES
- CURRENT STRUCTURES
- FENCELINE

WORLEY PARSONS SITE INVESTIGATION LOCATIONS 2011:

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- MW2 KOMEX MONITORING WELL (1995)
- TP2 KOMEX TRIAL PIT (1995)

IKM SITE INVESTIGATION LOCATIONS 2013:

- GROUND WATER SAMPLING EXISTING WELL
- NORTHERN DISCHARGE SURFACE WATER SAMPLING
- SEDIMENT SAMPLING
- TRIAL PITS
- BOREHOLES
- SURFACE WATER / STREAM OUTFALL SAMPLING
- DRAINAGE WATER SAMPLING
- ASBESTOS NOT DETECTED
- ASBESTOS DETECTED <0.001
- ASBESTOS DETECTED >0.001

RESIDUAL RISK REGISTER

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IDENTIFIED RISK / HAZARD	DESCRIPTION
-	-

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STATUS

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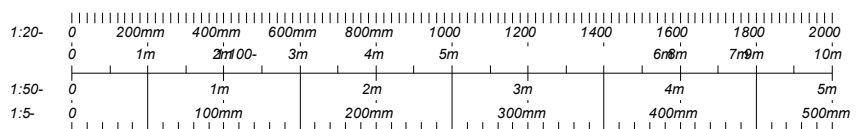
CLIENT I & H BROWN

PROJECT MAELOR WORKS WREXHAM

DRAWING ASBESTOS TESTING LOCATION PLAN - AREA AC

DRAWING No. A1-13627-3014 REV 0

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ASBESTOS TESTING LOCATION PLAN – AREA AC
SCALE 1:1000

A1-13627-3007
Area AC1 Constraints Plan

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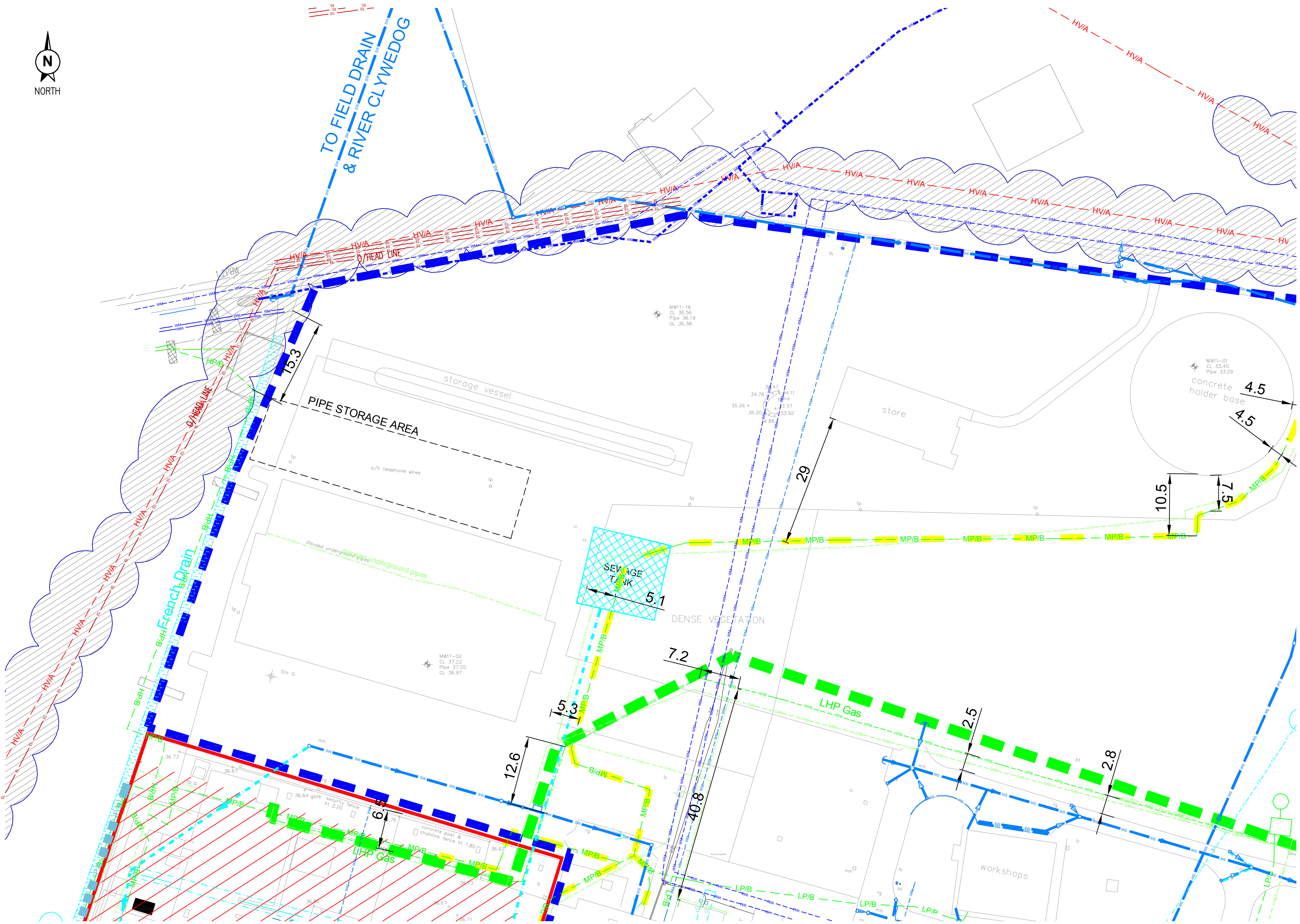
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LEGEND:

- NATIONAL GRID PROPERTY HOLDINGS LTD BOUNDARY
- WALES & WEST UTILITIES BOUNDARIES
- HP GAS MAINS
- MP GAS MAINS
- IP GAS MAINS
- HIGH VOLTAGE OVERHEAD POWER LINES
- OPERATIONAL WWU SITE



AREA AC1 CONSTRAINTS PLAN
SCALE 1:500

RESIDUAL RISK REGISTER

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STATUS	
FOR INFORMATION	
0	24.02.14 CJB MS ISSUED FOR INFORMATION
REV	DATE BY CHKD DESCRIPTION



CLIENT	I & H BROWN
PROJECT	MAELOR WORKS WREXHAM
DRAWING	AREA AC1 CONSTRAINTS PLAN

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A1-13627-3007	0

A1-13627-3008
Area AC2 Constraints Plan

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AREA AC2 CONSTRAINTS PLAN
SCALE 1:500

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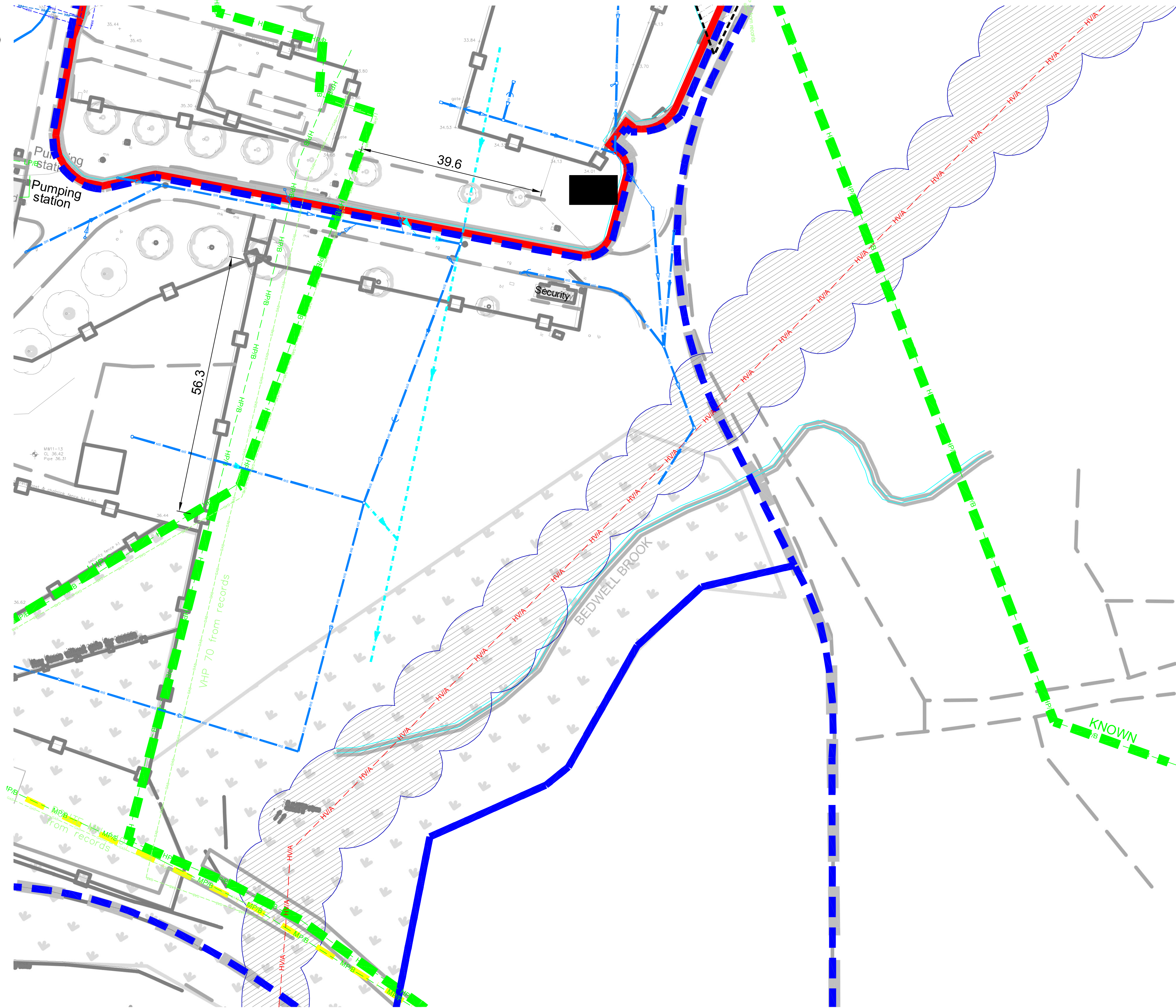
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AREA AC4 CONSTRAINTS PLAN
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APPENDICES

Appendix A
Ecological Survey Report



Evolution Ecology Ltd, Park Hall Farm, Brookhouse Road, Cheadle, Staffordshire,
ST10 2NJ, 07838 377 612, paul@evolutionecology.co.uk www.evolutionecology.co.uk

National Grid - Maelor Works, Wrexham

Preliminary Ecological Appraisal Report

(Extended Phase 1 Habitat Survey Report)

18th November 2013



Preliminary Ecological Appraisal

Preliminary Ecological Appraisal Report

(Extended Phase 1 Habitat Survey)

At

National Grid
Maelor Works
Marchwiel
Wrexham
LL13 0UW

for

James Wood
I & H Brown Ltd

On behalf of

National Grid Gas Property Holdings Limited

Preliminary Ecological Appraisal

Executive Summary

This section [REDACTED] the desktop study and the site survey [REDACTED]

[REDACTED] wildlife species, with particular reference to mammals, amphibians, birds and reptiles.

“Planning authorities have a duty to consider biodiversity when assessing planning applications. Where there is a reasonable likelihood that a planning proposal might affect important protected species or habitats, the council will require information on the species and habitat likely to be affected, and an assessment of the impacts of the proposals. This information will need to be provided before a planning decision is made and if this information is not provided, the council may refuse to register the application.

This Duty was introduced by the Natural Environment and Rural Communities Act (The NERC Act) and came into force on 1 October 2006. This act clarified existing commitments with regard to biodiversity, raised the profile of biodiversity. It aimed to make the consideration of biodiversity a natural and integral part of policy and decision making.

In addition to the NERC Act there is also national and international biodiversity legislation. This includes legislation in relation to protected species and sites which operates outside of the planning system. Local Authorities and developers have a duty to comply with this legislation. Planning Policy Statement 9 - Biodiversity and Geological Conservation Local Policy in relation to biodiversity can be found in the Local Development Framework, retained Local Plan policies and in the emerging Core Strategy.”

For further information please go to
http://www.enfield.gov.uk/info/200052/advice_for_developers/1083/ecological_assessments_for_planning_applications

[REDACTED]

Preliminary Ecological Appraisal

As mentioned previously, Badger (*Meles meles*) setts were identified on the northern and southern boundaries of the western extension.

[REDACTED]

With regards to reptiles and amphibians, there is a possibility that the site could be utilized by both of these groups.

[REDACTED]

There is a possibility that hibernating reptiles (inc GCN) may occupy some of the disused rabbit warrens within the woodland on the north-western boundary.

[REDACTED]

Finally, birds are protected (Wildlife and Countryside Act 1981) during the nesting season (March – August)

[REDACTED]

Preliminary Ecological Appraisal

Phase 1 habitat surveys can be conducted all year round and the site survey was carried out in November 2013. However, the optimal time for undertaking these surveys would be between the months of April and September. If surveys are undertaken outside this period, it is quite likely that a follow-up botanical survey will be required.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Preliminary Ecological Appraisal

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- 1.1 Background
- 1.2 Site Description

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4 CONCLUSIONS/ RECOMMENDATIONS

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Preliminary Ecological Appraisal

1 INTRODUCTION

1.1 Background

This report has been prepared at the request of James Wood (I & H Brown Ltd) on behalf of National Grid Property Holdings Ltd, to provide an overview of the landscape and habitat types, any ecological features of interest and the potential to provide habitats for legally protected species at the former gaswork site located at Maelor Works, Marchwiel, Wrexham, LL13 0UW (OS Grid Reference: SJ 38108 48134). A site survey was undertaken on the 18th November 2013, by Evolution Ecology Ltd.

Aim

The aim of this survey was to identify [REDACTED] habitats and flora species [REDACTED]
[REDACTED]
[REDACTED]

Surveyor Details

The site was surveyed by Mr Paul Keeling BSc (Hons) MCIEEM – Senior Ecologist and Miss Charlotte Richardson BSc (Hons) – Ecologist.

1.2 Site Description

The former gasworks site located at Maelor Works is situated approximately 5km to the south-east of the town of Wrexham, with residential areas to the south-west and a large industrial estate expanding from the north-west to the north-east of the site. Open countryside occupies the vast majority of the surrounding area (to all sides) which comprises of; agricultural grasslands, scattered trees and hedgerows. Additionally, running water courses are present in the surrounding area, (one of which - a small brook which diverts from the River Clywedog - runs through the site itself), as are a number of standing water bodies.

The site is made up of predominantly buildings and hard standing towards the centre, but some areas (of varying size) to the west, north, east, south and south-east of the site are occupied by more ecologically beneficial habitats. These include; semi-natural broad-leaved woodland, dense and continuous scrub, semi-improved grassland and standing water. The surveyed site measures approximately 13.92ha, but the approximate total area of the sites to undergo the proposed works measure only approximately 6.26ha. Proposals have been made to conduct trial pits and

Preliminary Ecological Appraisal

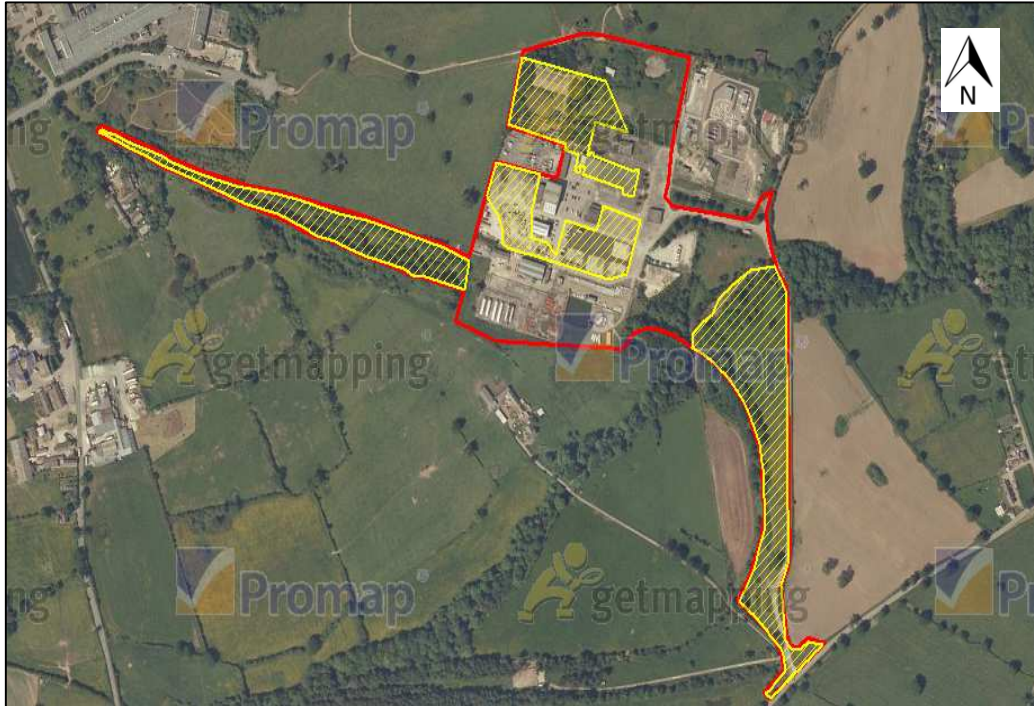
boreholes in order to allow ground investigation works/contamination testing to take place. Each of the habitat types at this site has varying ecological value and these will be assessed individually in turn.

Figure 1: A map showing the location of the site in relation to the surrounding landscape (indicated by the red boundary).



Preliminary Ecological Appraisal

Figure 2: This map illustrates the approximate locations where the proposed works are to take place (hatched in yellow) in relation to the National Grid Property Holdings Ltd boundary (red line).



Preliminary Ecological Appraisal

2 METHODOLOGY

2.1 Desktop Study (Ecological Data Search)

North Wales Environmental Information Service (COFNOD) was commissioned to carry out an ecological data search of all protected species and sites recorded within 2km radius of the site.

2.2 Preliminary Ecological Appraisal (Extended Phase 1 Habitat Site Survey)

To fulfil the brief, a Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) was conducted according to the methodology of the JNCC (2010). Preliminary Ecological Appraisal is a standard technique for classifying British habitats. The aim is to provide records of habitats that are of significant ecological value.

Additional Target Notes

Additional target notes were made where applicable to record:

- Key habitat features.
- Urban ecological features not covered in sufficient detail in the Phase 1 Methodology.
- Important habitats too small to be mapped and to identify dominant species.
- Other features of ecological interest.

2.3 Protected Fauna and Flora Species

Potential signs and suitable habitats for the presence of European and Domestically protected species (amphibians, reptiles, mammals and birds) were recorded according to the Biodiversity Action Plan (BAP) and Birds of Conservation Concern (RSPB, 2009).

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3 FIELD SURVEY RESULTS

3.1 Desktop Survey (Ecological Data Search)

North Wales Environmental Information Service (COFNOD) was commissioned to carry out an ecological data search of all protected species and sites recorded within 2km radius of the site. The search uncovered records of numerous protected species, but none of which have been recorded directly on the site. This being said, a few records were identified immediately adjacent to the site.

With regards to bats, two distinct species were recorded; the Common Pipistrelle (*Pipistrellus pipistrellus*) and the Whiskered bat (*Myotis mystacinus*). The closest of these records was of a Common Pipistrelle (*Pipistrellus pipistrellus*) and it was located approximately 500m to the east of the gasworks site.

Figure 3: A map illustrating the approximate locations of some of the bat species recorded in the surrounding area of the gasworks site.



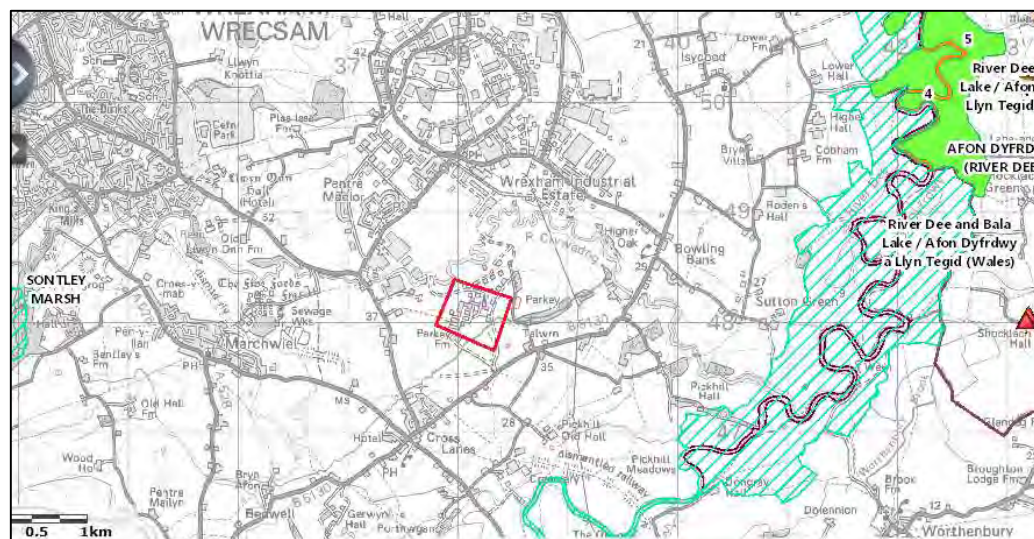
Preliminary Ecological Appraisal

A number of declining bird species have also been recorded within the 2km search radius. These included: Kingfisher (*Alcedo atthis*), Kestrel (*Falco tinnunculus*), Red Kite (*Milvus milvus*) and Fieldfare (*Turdus pilaris*). All of these species have been noted as having either amber (unfavourable conservation status) or red population status (globally threatened) however, they were not recorded within the boundary of the proposed trial pits/boreholes and building demolition. Other records of protected species in the surrounding area include: Badger (*Meles meles*), Otter (*Lutra lutra*) and Grass Snake (*Natrix natrix* – within a nearby pond) but again, none of these records were obtained from anywhere within the gaswork site boundary.

Finally, a number of Great Crested Newt (*Triturus cristatus*) records were identified within the immediately surrounding area. The closest of these records was identified as being approximately 320m to the north-east of the site, but again, no records were identified within the gasworks site boundary itself.

The ecological data search and MAGIC have also revealed that the site itself contains no sites with statutory or non-statutory designations. The nearest statutory site designation is of a Site of Special Scientific Interest (SSSI – River Dee and Bala Lake) and is located roughly 3.6km to the east of the site. Similarly, Sontley Marsh is another nearby SSSI, but this is located even further away to the west at a distance of approximately 4.1km. Bearing this information in mind, there are no records of any such designations on the site itself (or within the immediately surrounding area), meaning that the proposed works are unlikely to have a substantial impact upon the wider surrounding landscape.

Figure 4: A MAGIC map which shows the statutory and non-statutory sites within the surrounding area of the site (the approximate site boundary is illustrated by the red square).



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3.2 Preliminary Ecological Appraisal (Extended Phase 1 Habitat Site Survey) and Limitations

The site is dominated by a number of habitat types, predominantly buildings and hard standing, but with some areas dominated by woodland, tall ruderal, scrub and semi-improved grassland and in one area, a small standing water body. All of these habitat types have varying ecological value and will be addressed individually. The dominant species, if any, will be noted and their ecological value will be assessed to conclude what affects the proposed works will have on the habitats that are situated on-site. Each habitat is colour coded and can be found in Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map. This Phase 1 has been conducted using JNCC (Joint Nature Conservation Committee, 2010) Handbook for Phase 1 habitat survey.

Limitations/constraints: As the site consists predominantly of buildings and hard standing, there was generally little in the way of accessibility issues. This being said, it was difficult to access some areas (particularly to the north of the site) due to the density of the vegetation. However, this was not much of an issue, as the habitats present were fairly standard, as were the floral species. Additionally, access to another area of the site (the woodland area towards the east of the site) was not available, as this part of the site was sectioned off by a chain link fence. This being said, a visual inspection was made through the fence, which concluded that this area was of similar habitat composition to some of those already recorded (i.e. woodland/scrub). Other than these issues, no other constraints were noted during the survey.

Phase 1 habitat surveys can be conducted all year round and the site survey was carried out in November 2013. However, the optimal time for undertaking these surveys would be between the months of April and September.



A1.1 – Semi-natural Broad-leaved Woodland

There are a number of areas within the site boundary which are dominated by semi-natural broad-leaved woodland, the most extensive of these being on the southern boundary of the western extension and also to the east of the site, surrounding the running water course. The woodland within the western extension consisted of a number of species, including; Silver Birch (*Betula pendula*), Hawthorn (*Crataegus monogyna*), Dog-rose (*Rosa canina*) and Elderberry (*Sambucus nigra*). This area had a varying age

Preliminary Ecological Appraisal

structure (some trees older than others) which often provides a greater variety of habitats for invertebrate species, and in turn, birds. Although this stretch of land is fenced off from the adjacent embankment along the southern boundary and the fields to the north, two badger setts were identified within these areas. The first had two entrances (at least one of which is thought to be active) and was located in the south-eastern corner, adjacent to the main gasworks site. The second was also located outside the proposed works boundary, but this time on the northern side (within the adjacent fields). As both of these setts are within very close proximity to the proposed development works, it will be necessary to ensure that the works are conducted at least 10m away from each sett. This distance to maintain is less than the usual (20m when using machinery) when a badger sett is discovered, but as the setts are situated within lands which raise above ground level (therefore leading away from the site), it is unlikely that any badgers will be disturbed as the tunnels should lead away from the site to the north and south. As well as the badger setts located offsite, there is also a rabbit warren within the northern field to the north-east of this section. But, as rabbit are not protected under UK or European legislation, this will not be an issue. The locations of all of the setts/warrens within this area can be found on the Phase 1 Habitat Map within the appendix.

Figure 5: The woodland and semi-improved grassland within the western extension. Silver Birch (*Betula pendula*) trees are once again abundant throughout the wooded areas.



Preliminary Ecological Appraisal

In addition to the first area of woodland, a further three patches were discovered to the north-west of the site. One of these areas ran adjacently to the site boundary on the north-western corner and was situated on a steep embankment. This woodland consisted predominantly of semi-mature Silver Birch (*Betula pendula*) trees and in addition to this, in excess of 100 rabbit warren entrances (which were of missed use) and droppings were discovered. As mentioned previously, two further patches of woodland were located in the northern portion of the site. These were adjacent to one another and both consisted of young Silver Birch (*Betula pendula*) trees with stands of Bramble (*Rubus fruticosus*), Nettle (*Urtica dioica*), Creeping Thistle (*Cirsium arvense*) and Rosebay Willowherb (*Chamerion angustifolium*) also being abundant. The final area of woodland is quite possibly the densest and most mature (although still not classed as 'mature'), and it is located to the east of the site. As access to this area was restricted (as mentioned previously) it is difficult to ascertain the precise species present. However, from a distance, Silver Birch (*Betula pendula*) was observed. Due to the fact that this woodland is located upon a steep embankment which leads to a running water course, it is unlikely that any of the proposed works will be able to take place within this area. This is correlated with the information received by I & H Brown Ltd regarding the areas to be impacted, this woodland of which, is not one.

Figure 6: This image illustrates the area of Silver Birch (*Betula pendula*) woodland along the north-western boundary of the site. A number of the rabbit warren entrances can also be seen.



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With regards to birds, all of the woodland areas hold some potential in terms of foraging. [REDACTED]

In addition to birds, as there are a number of rabbit warrens on the embankment of the north-western woodland, there is a possibility that this area may be used by reptiles. [REDACTED]

Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the location of the semi-natural broad-leaved woodland (A1.1).

A2.1 – Dense and Continuous Scrub

Dense and continuous scrub was present within three main areas of the site. These were; within the central portion of the northern semi-improved rough grassland, along the northern boundary of the western extension and along the western edge of the south-eastern semi-improved grassland. These stands consisted of species including; Bramble (*Rubus fruticosus*), Blackthorn (*Prunus spinosa*) and Gorse (*Ulex europaeus*). Dense scrub can often be of interest to foraging small mammals, which may in turn attract predatory reptiles and birds. Not only is this habitat useful for foraging purposes, but the density of the vegetation works well as a protective barrier and thus provides shelter. The patches of scrub onsite are ultimately of potential interest to small mammals, reptiles and birds [REDACTED]

Preliminary Ecological Appraisal

Figure 7: The dense scrub which separates the northern semi-improved grassland from B2 can be observed to the left of the photograph.



Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the location of the Dense and Continuous Scrub (A2.1).

A3.1 – Broad-leaved Scattered Trees

A number of scattered trees were identified onsite, predominantly to the north of the central hard standing area and within the field to the south-east of the site. With regards to those located to the north of the site, they were all young Silver Birch (*Betula pendula*) specimens which were scattered along the boundaries of the semi-improved rough grassland and dense and continuous scrub habitats. Generally, these trees were of relatively low ecological value due to their immature status. Further scattered semi-mature trees were identified along the western boundary of the south-eastern field, but due to their distance away and access issues, it was not possible to identify them. In addition to these semi-mature trees within the south-eastern field, one large mature Oak (*Quercus robur*) tree was identified within the centre of the southern portion of the field. Mature trees such as this can often be utilized by roosting bats or nesting birds which means that they are of ecological importance. Finally, in addition to the areas already mentioned, a number of scattered Ash (*Fraxinus excelsior*) trees were identified [along with Hawthorn (*Crataegus*

Preliminary Ecological Appraisal

monogyna) and Dog-rose (*Rosa canina*)] across the far southern boundary of the western extension. Within these scattered trees in this area, one further rabbit warren was discovered.



Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the location of the Broad-leaved Scattered Trees (A3.1).

B6 – Poor Semi-improved Rough Grassland

Poor semi-improved rough grassland was one of the most extensive habitats onsite (after the hard standing). It occupied the vast majority of the remaining western extension (after scrub and woodland), the areas to the north and south of the central hard standing and the field which extends from the east to the south-east of the site. The species discovered within these stands are typical of the habitat type and include; Nettle (*Urtica dioica*), Creeping Buttercup (*Ranunculus repens*), Creeping Thistle (*Cirsium arvense*), Spear Thistle (*Cirsium vulgare*), Bramble (*Rubus fruticosus*), White Dead Nettle (*Lamium album*) and Broad-leaved Dock (*Rumex obtusifolius*). In addition to these species, some stands of scattered Hawthorn (*Crataegus monogyna*) were present within the south-eastern field and it was also recognized that this area was being grazed by horses (which contribute greatly to keeping the vegetation relatively low and thus preventing succession). Semi-improved rough grassland is often used by mammals for foraging purposes so it can sometimes attract reptiles (who prey after small mammals) and amphibians. This is indeed the case with regards to the semi-improved grassland to the north of the hard standing, as multiple skulls and droppings were found which were identified as those of European Rabbits (*Oryctolagus cuniculus*). Finally, due to the lack of suitable shelter, this habitat is thought to be of foraging use only.

Preliminary Ecological Appraisal

Figure 8: The poor semi-improved grassland to the north of the site can be seen in the foreground, followed by the patch of scrub and scattered trees to the rear.



Preliminary Ecological Appraisal

G1 – Standing Water

There is one small standing water body located on site, but it is outside of all of the proposed work zones (refer to figure 2). It is located directly to the west of the most northerly building and is approximately 10m² in size. A number of floral species which are typical colonizers of pond margins have established within/on the edge of the pond. These include; Common Reed (*Phragmites australis*), Bulrush (*Typha latifolia*) and Rush species (*Juncus spp.*).

Figure 9: The pond located towards the north of the site. This image illustrates some of the species present (Rushes are abundant), the small size of the pond and its shaded nature (by the overhanging tree).



Preliminary Ecological Appraisal

A Habitat Suitability Index (HSI) was conducted on this pond by Ecosulis in 2010 to establish its potential for housing the Great Crested Newt (*Triturus cristatus*) which is a European Protected Species (EPS). The results from this HSI can be found in table 1.

Table 1: The results from the HSI assessment conducted by Ecosulis in 2010.

HSI Criteria	Score for pond at Maelor Works
Location	1.0
Pond area	0.02
Pond drying	0.1
Water quality	0.67
Shade	0.8
Water fowl	1.0
Fish	1.0
Ponds	1.0
Terrestrial habitat	1.0
Macrophytes	0.3
Calculation	$(1.0 \times 0.02 \times 0.1 \times 0.67 \times 0.8 \times 1.0 \times 1.0 \times 1.0 \times 1.0 \times 0.3)^{0.1}$
HSI score	0.45
Pond suitability	<u>Poor</u>

After comparing these results with the current condition of the pond, it can be concluded that no change has occurred in the pond's suitability since this HSI was conducted.

there are at least four other ponds within 500m radius of the site (one of them is known to have GCN), which along with the pond on site, m

Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the location of the Standing Water (G1).

Preliminary Ecological Appraisal

G2 – Running Water

One running water course passes through the site. It passes under the road which leads to the site and through the eastern woodland area. This water course is situated well below ground level at the bottom of the wooded embankment so the proposed works are unlikely to affect it.

Figure 10: A view of the running water course that cuts through the site. The steep embankments can be observed to either side, particularly to the left in this image.



Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the location of the Running Water (G2).

Preliminary Ecological Appraisal

J1.2 – Amenity Grassland

One area which contained amenity grassland was discovered onsite and this was found towards the east of the site. Amenity grassland is of very low ecological value as it is often regularly maintained (i.e. via mowing etc.) meaning that it is not a stable habitat. Some of the species which were present within this grassland include; Creeping Buttercup (*Ranunculus repens*) Broad-leaf Plantain (*Plantago major*) and Creeping Thistle (*Cirsium arvense*).

Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the location of the Amenity Grassland (J1.2).

J3.6 – Buildings

Although there are a number of buildings onsite, only one of them is within the boundaries of the proposed works. The vast majority of the buildings within the central hard standing area have not been individually classified, as they will be unaffected by the trial pits/boreholes and are all of low ecological value for protected species (the offices are regularly used, have internal lighting installed, are flat roofed and show little potential ingress points). Due to this, the only buildings which have been classified are the disused ones which may exhibit some potential for housing protected species. These are; the one which is likely to be affected by the proposed works within the central hard standing area and the building to the east of the northern pond (as it is within close proximity to the proposed work zone).

The building within the hard standing area (B1) is proposed to be demolished as a part of the trial pit/borehole works. An external inspection of the building was conducted which revealed that it was a single-storey, flat roofed structure with no fascia/soffit boards. All of the windows and doors appeared to be in tact which again reduces the likelihood of bats/birds utilizing the building, as it lowers the number of potential access points into the structure.

[REDACTED]

[REDACTED]

Preliminary Ecological Appraisal

Figure 11: Building 1 (B1) and some of the hard standing from a south-eastern viewpoint.



The second building inspected (B2) located to the east of the pond, was of similar construction to B1, but on a much smaller scale. It was a flat roofed building with no fascia/soffit boards, but it had one noticeably broken window, which would be large enough to allow entry for birds up to the size of a Barn Owl (*Tyto alba*). [REDACTED]

[REDACTED] With regards to bats, although they would be able to gain access through the broken window, there would be no suitable areas inside to roost within (due to the lack of a roof void, roofing felt and roof tiles). [REDACTED]

Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the precise location of the Buildings (J3.6).

Preliminary Ecological Appraisal

Table 2: Features of buildings and built structure classification, which may indicate the potential for bats. The full guidance can be found in the Bat Conservation Trust Good Practice Survey Guidelines (P53).

Likelihood of bats being present	Feature of the building or built structure and its location
Higher	Pre-20th century or early 20th century construction². Agricultural buildings of traditional brick, stone or timber construction. Large and complicated roof void with unobstructed flying spaces. Large (>20 cm) roof timbers with mortice joints, cracks and holes. Entrances for bats to fly through. Poorly maintained fabric providing ready access points for bats into roofs, walls, bridges, but at the same time not too draughty and cool. Roof warmed by the sun, in particular south facing roofs. Weatherboarding and/or hanging tiles with gaps. Low level of disturbance by humans. Bridge structures, follies, aqueducts and viaducts over water and/or wet ground. For rarer species, buildings or built structures in the core area of their distribution. Buildings and built structures in proximity to each other providing a variety of roosting opportunities throughout the year. Buildings or built structures close to good foraging habitat, in particular mature trees, parkland, woodland or wetland, especially in a rural setting.
Lower	Modern, well-maintained buildings³ or built structures that provide few opportunities for access by bats. Small, cluttered roof space. Buildings and built structures comprised primarily of prefabricated steel and sheet materials. Cool, shaded, light or draughty roof voids. Roof voids with a dense cover of cobwebs and no sections of clean ridge board. High level of regular disturbance. Highly urbanised location with few or no mature trees, parkland, woodland or wetland. High levels of external lighting.

Notes

¹ The features listed here may not be indicative of use of the site by bats during winter or spring. This table should be read in conjunction with Box 2.1 – Chapter 2, which provides triggers for bat surveys.

² Pre-1914 buildings may present the greatest likelihood of providing roost space for bats due to their design, materials used and age. Pre-1990 buildings, especially when close to good foraging habitat, and with favoured features such as cavity walls and soffits, also have a high likelihood of providing roost sites for some bat species.

³ Post-1990 buildings are generally less likely than older buildings to house roosts; however, some modern designs provide access to suitable roosting spaces for bats. Pipistrelles in particular occupy modern buildings and built structures providing that there are suitable access gaps (> 8mm) and provided the structure has appropriate characteristics for roosting.

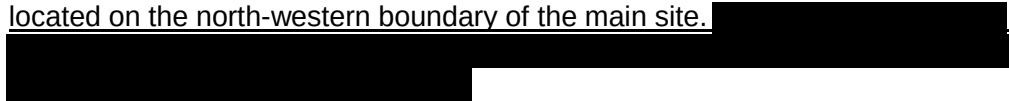
Preliminary Ecological Appraisal

J5 – Other Habitat: Hard Standing

The Hard standing area is situated throughout most of the site in the form of concrete paving, but it is most prominent towards the centre. Hard standing is considered to be of low ecological value as it possesses no suitable ecological features which could be utilized by protected species. However, reptiles have been known to use this man-made habitat to their advantage by basking upon it when the sun heats the ground.



Figure 12: The area of hard standing which is situated next to the woodland located on the north-western boundary of the main site.



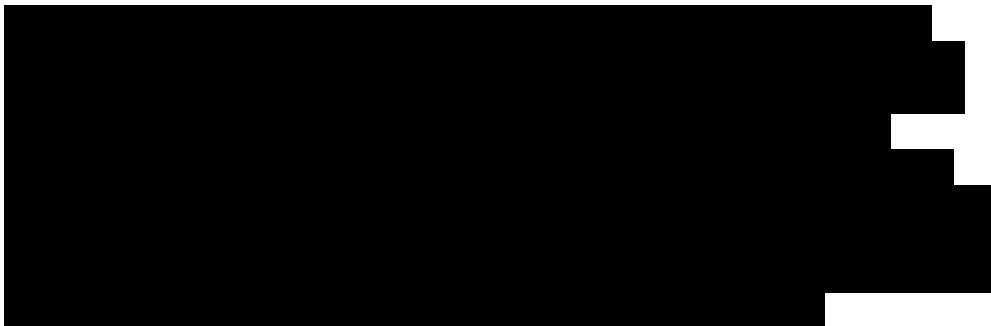
Please see Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Survey) Map, for the precise location of the Hard Standing (J5).

Preliminary Ecological Appraisal

3.3 Protected Fauna Species

Bird species recorded during the field survey

As the survey was conducted outside of the bird nesting season, truly representative results of the birds which utilize the site could not be gained. This being said, a number of potential nesting areas were uncovered including; the building to the east of the pond, the mature Oak (*Quercus robur*) tree within the south-eastern grassland, the dense areas of scrub and the woodland areas. In relation to the lone Oak, birds generally make their nests within mature trees as they tend to house more opportunities for invertebrate colonization (cracks in the trunk etc.). The hard standing areas are only likely to be used by passerine (perching) birds, as they provide very little in the way of potential nesting or foraging habitat.



Mammals

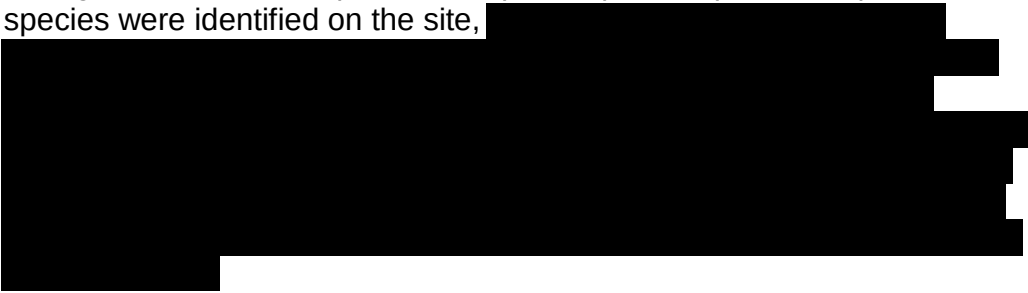
Although no mammals were directly discovered on site, multiple signs were identified from different species which suggest that mammals have been occupying the area. A number of Rabbit (*Oryctolagus cuniculus*) skulls and droppings were identified within the semi-improved grassland towards the north of the site, which suggests that this species have in the past and possibly still do occupy the site. This is in correlation with the evidence found within the woodland embankment to the north-west (and in other areas) of active and disused rabbit warrens with more than 100 entrances. With evidence of high rabbit usage being present, although not protected by law, it is recommended that the works proposed within the woodland be moved to the woodland boundary (within the lard standing) or as close to it as possible. This will not only protect the rabbits occupying the area, but it will also protect any herpetiles present from harm (as discussed in the 'Reptiles/Amphibians' section).

Preliminary Ecological Appraisal

Signs of Badger (*Meles meles*) activity were uncovered along the boundaries of the western extension. A sett with 2 entrances was discovered along the southern boundary just off site, but due to its proximity to the proposed development area, this should be taken into account. The same can be said for another sett located off site to the north within the adjacent grassland.



No signs of Water Vole (*Arvicola amphibius*), Otter (*Lutra lutra*) or Bat species were identified on the site,



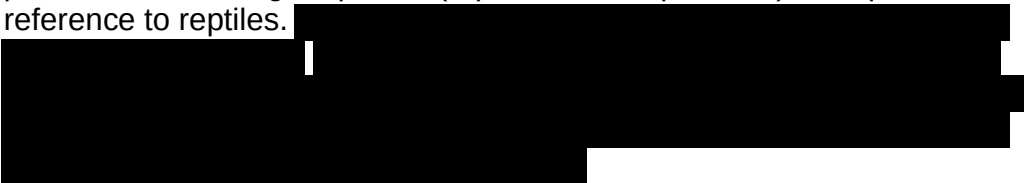
Insects

No insect species were noted during the preliminary ecological appraisal, which is likely to be down to the time of the year at which the survey was conducted (November 2013).

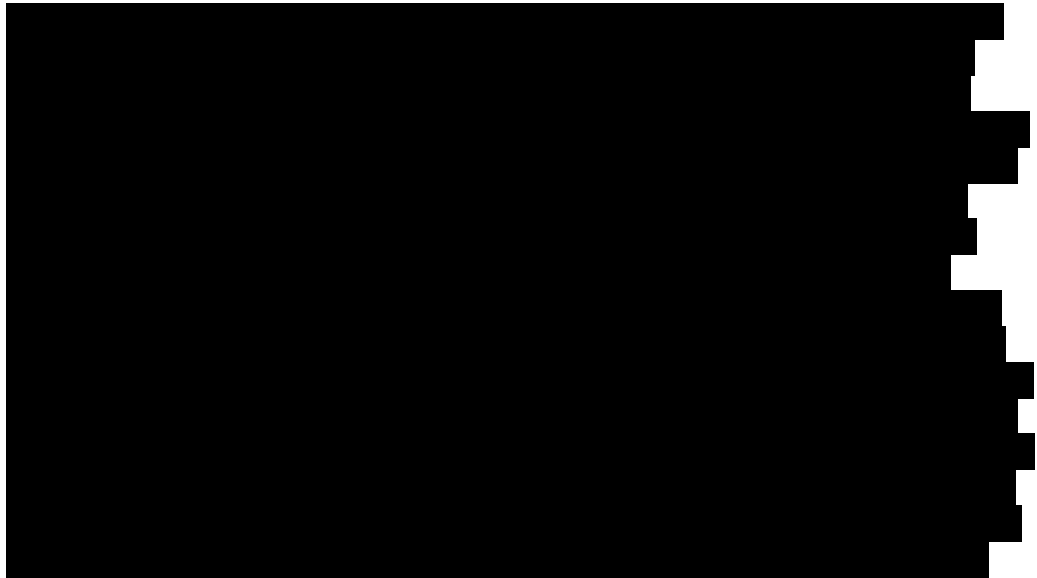


Reptiles/Amphibians

Although no clear signs of usage were identified, the site is thought to hold potential for housing herpetiles (reptiles and amphibians), with particular reference to reptiles.



Preliminary Ecological Appraisal



Preliminary Ecological Appraisal

4 CONCLUSIONS AND RECOMMENDATIONS



“Planning authorities have a duty to consider biodiversity when assessing planning applications. Where there is a reasonable likelihood that a planning proposal might affect important protected species or habitats, the council will require information on the species and habitat likely to be affected, and an assessment of the impacts of the proposals. This information will need to be provided before a planning decision is made and if this information is not provided, the council may refuse to register the application.

This Duty was introduced by the Natural Environment and Rural Communities Act (The NERC Act) and came into force on 1 October 2006. This act clarified existing commitments with regard to biodiversity, raised the profile of biodiversity. It aimed to make the consideration of biodiversity a natural and integral part of policy and decision making.

In addition to the NERC Act there is also national and international biodiversity legislation. This includes legislation in relation to protected species and sites which operates outside of the planning system. Local Authorities and developers have a duty to comply with this legislation. Planning Policy Statement 9 - Biodiversity and Geological Conservation Local Policy in relation to biodiversity can be found in the Local Development Framework, retained Local Plan policies and in the emerging Core Strategy.”

For further information please go to
http://www.enfield.gov.uk/info/200052/advice_for_developers/1083/ecological_assessments_for_planning_applications



Preliminary Ecological Appraisal

As mentioned previously, Badger (*Meles meles*) setts were identified on the northern and southern boundaries of the western extension.

[REDACTED]

With regards to reptiles and amphibians, there is a possibility that the site could be utilized by both of these groups.

[REDACTED]

There is a possibility that hibernating reptiles (inc GCN) may occupy some of the disused rabbit warrens within the woodland on the north-western boundary.

[REDACTED]

Preliminary Ecological Appraisal

Finally, birds are protected (Wildlife and Countryside Act 1981) during the nesting season (March – August) [REDACTED]

Phase 1 habitat surveys can be conducted all year round and the site survey was carried out in November 2013. However, the optimal time for undertaking these surveys would be between the months of April and September. If [REDACTED]

Preliminary Ecological Appraisal

5 REFERENCES

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Preliminary Ecological Appraisal

6 APPENDICES

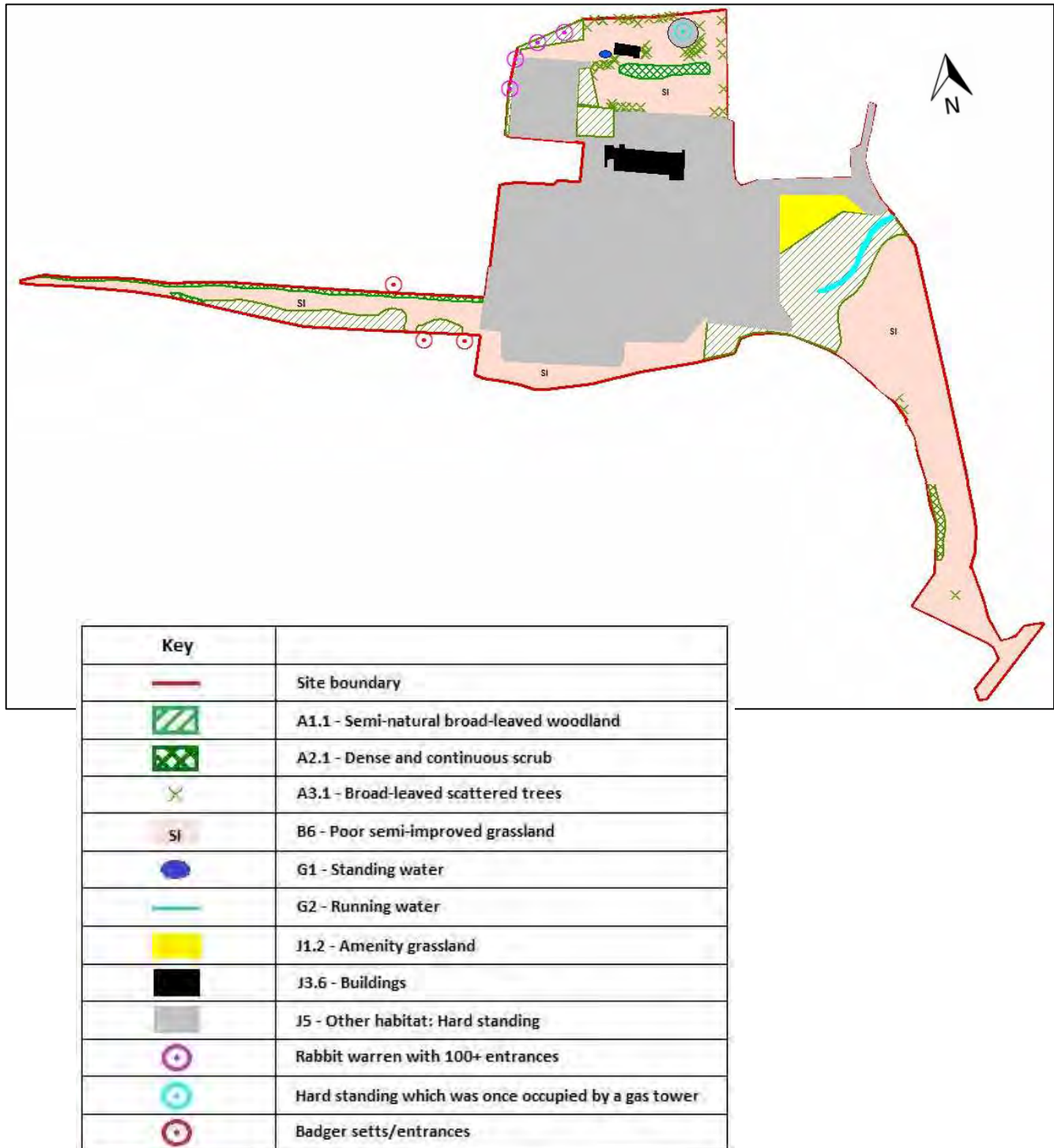
Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Map)

Appendix B: Site Plans

Appendix C: Photographic Records

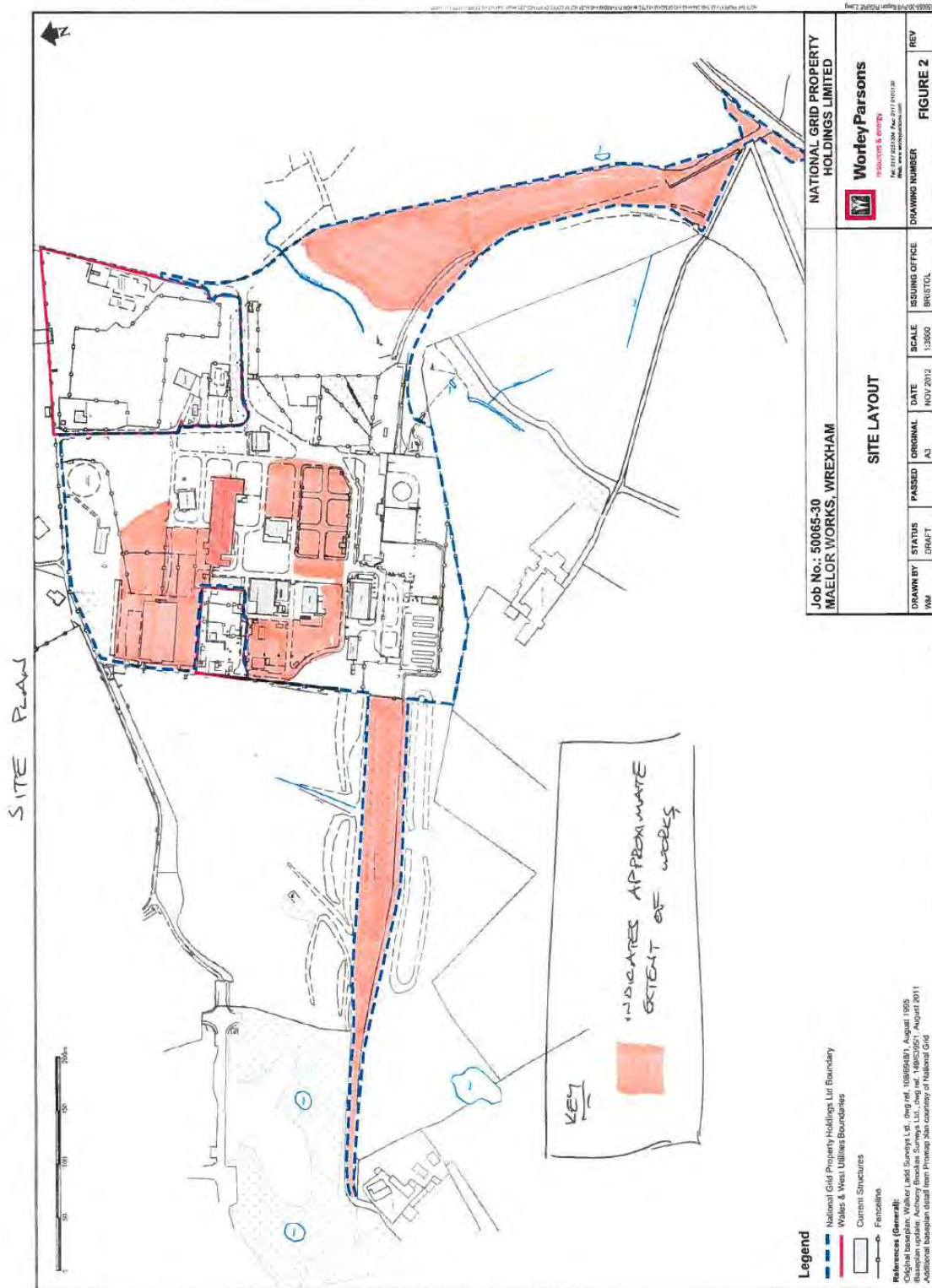
Preliminary Ecological Appraisal

Appendix A: Preliminary Ecological Appraisal (Extended Phase 1 Habitat Map).



Preliminary Ecological Appraisal

Appendix B: A site plan which shows the approximate extent of the proposed works (trial pits and boreholes). These are indicated in pink.



Preliminary Ecological Appraisal

Appendix C: Photographic Records

Another view of building 1 (B1) which is proposed to be demolished as a part of the proposed works.



A view of the east side of B1 from a north-eastern viewpoint.



Preliminary Ecological Appraisal

A view of the northern side of B1 from a north-eastern viewpoint.



A close up of the pond,



Preliminary Ecological Appraisal

The pond located outside the development zone, with the adjacent building in the background. [REDACTED]
[REDACTED]



One of the main areas of hard standing located on site. This particular area is located within the 'proposed works' zone, but the building to the right however, is not.



Preliminary Ecological Appraisal

This photograph was taken from the entrance point to the western extension. For access reasons, entry to this area was only available via a farm which was located off site to the west.



The semi-improved rough grassland located to the south-east of the site.



Preliminary Ecological Appraisal

The chain link fence and gate which limited access to the eastern woodland/scrub area.



Preliminary Ecological Appraisal

7 LIMITING CONDITIONS/DISCLAIMERS (Unless stated otherwise)**1. The Service**

- 1.1 Evolution Ecology Ltd agrees to supply Ecological consulting services of a preliminary nature or a more thorough service as advised or as commissioned.

2. Fees

- 2.1 The client(s) will settle the agreed fee in full, within 30 days of receiving the invoice. Reports will remain the property of Evolution Ecology Ltd until full payment has been received. No liability is accepted for the contents of a report that is not paid in full. Any queries should be notified to Evolution Ecology Ltd within 7 days of the invoice date.
- 2.2 If the client(s) fails to pay within the time specified in 2.1 then Evolution Ecology Ltd shall charge the client(s) interest on the outstanding fee, both before and after any judgment, at the rate of 4% per annum above the HSBC Bank base rate, until payment is made in full (A part of a month being treated as a full month for the purposes of calculating interest).
- 2.3 In the event that it is necessary to recover any outstanding fees from the client(s), the client(s) will fully reimburse any costs and expenses incurred during the recovery period, including court costs. Evolution Ecology Ltd reserves the right to make a charge for every letter sent and telephone/fax call made, in connection with the recovery.

3. The Report

- 3.1 If any part of the report is lost, or altered without the written consent of Evolution Ecology Ltd, then the entire report becomes invalid.
- 3.2 The general format of reports is a certified product and cannot be shown, copied or distributed to third parties without the permission of Evolution Ecology Ltd. No liability is accepted for the contents of the report, other than to that of the client(s).
- 3.3 The report will purport not to express any opinion or comment as to the condition or structural integrity of any building and no reliance should be made on any such comments.

Preliminary Ecological Appraisal

4. Insurance Cover

- 4.1 All work carried out by Evolution Ecology Ltd is covered by a £1,000,000 professional indemnity insurance.

5. Quality of Craftsmanship

- 5.1 When appointing an Ecologist, please use only suitably qualified and experienced companies (The Local Authority and the Institute of Ecology and Environmental Management may be able to provide a select list of such companies).
- 5.2 Evolution Ecology Ltd will not accept liability for any works undertaken by any other companies, or contractors.

Appendix B
Trial Pit Photographs and Logs



Trial Pit TP13-01



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-01 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338031E - 348045N Level: 36.65 m AOD	
Location: Marchwiel		Dimensions: Depth 1.60m		Date 29/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			0.10	36.55		MADE GROUND: Gravel of Limestone (Type 1).
0.17			0.17	36.48		MADE GROUND: Concrete foundation.
0.40						MADE GROUND: Demolition waste consisting of bricks and coarse grained sand. Bricks and sand have blue/black staining and a hydrocarbon odour.
0.90			0.90	35.75		Wet, loose, black, slightly sandy GRAVEL of mixed lithology including sandstone and mudstone. Gravel is subrounded to rounded and fine to coarse. Strong hydrocarbon odour and black tarry staining on sand and on gravels. Black oily sheen on groundwater.
1.50						
1.60			1.60	35.05		Tripod Complete at 1.60 m.

Remarks: Concrete slab observed at 0.1mbgl in North of pit. Brick foundations observed in North and west of pit from 0.1mbgl. Trial pit abandoned due to collapse.

Groundwater: At 0.9m, groundwater ingress of fast flow with strong hydrocarbon odour and black oily sheen.

AGS



Trial Pit TP13-02



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-02 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338022E - 348046N Level: 36.79 m AOD	
Location: Marchwiel		Dimensions: - Depth 1.50m		Date 29/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Stratum Description
Depth (m)	Type	Results			
0.10			36.69		MADE GROUND: Gravel of Limestone (Type 1)
0.50					MADE GROUND: Demolition waste consisting of bricks and coarse grained sand. Bricks and sand have blue/black staining and hydrocarbon odour.
1.00			35.79		Wet, loose, black, slightly sandy GRAVEL of mixed lithology including sandstone and mudstone. Gravel is subrounded to rounded and fine to coarse. Strong hydrocarbon odour and black tarry staining on sand and on gravels. Black oily sheen on groundwater.
1.50			35.29		Thiobar Complete at 1.60 m
Remarks: Brick foundations observed in East face of pit from 0.2mbgl. Redundant metal pipe observed at 0.2bgl. Trial pit abandoned due to collapse.					
Groundwater: At 1m, groundwater ingress of fast flow with strong hydrocarbon odour and black oily sheen.					





Trial Pit TP13-03



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-03 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338006E - 348048N Level: 36.84 m AOD	
Location: Marchwiel		Dimensions: Depth 2.10m		Date 29/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.50			0.10	36.74		MADE GROUND: Gravel of Limestone (Type 1).
			0.20	36.84		MADE GROUND: Concrete foundation with re-bar.
			0.40	36.44		MADE GROUND: Demolition waste consisting of bricks and brown coarse grained sand. Pocket of blue circular pellets (spacers), observed in east face, at 0.25mbgl.
						MADE GROUND: Demolition waste consisting of bricks and coarse grained sand. Bricks and sand have blue/black staining and a hydrocarbon odour.
2.00			1.20	35.64		Firm orange/brown slightly sandy CLAY. No visual or olfactory signs of contamination.
			2.10	34.74		Triptic Complete at 2.10 m

Remarks:	Brick foundations observed in East face of pit from 0.1mbgl. Pocket containing large number of blue circular pellets (spacers) observed at 0.25mbgl in eastern face of pit within made ground.
Groundwater:	At 1m, groundwater ingress of fast flow with a hydrocarbon odour and brown/black oily sheen.



Trial Pit TP13-04



		IKM Consulting Ltd Tel: 01324 575822 Fax: 01324 575523 email: info@ikmconsulting.co.uk		Trialpit No TP13-04 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 337994E - 348077N Level: 36.88 m AOD	
Location: Marchwiel		Dimensions: Depth 1.40m		Date 28/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.20			36.68			MADE GROUND: Gravel of Limestone (Type 1)
0.40			36.28			MADE GROUND: Medium dense, reddish black slightly clayey, ashy sand with gravel sized fragments of brick.
0.60			35.88			Firm orange/brown slightly sandy CLAY. No visual or olfactory signs of contamination.
1.00			35.48			Wet, loose, black, slightly sandy GRAVEL of mixed lithology including sandstone and mudstone. Gravel is subrounded to rounded and fine to coarse. Strong hydrocarbon odour and black tarry staining on sand and on gravels. Black Oily sheen on groundwater.
1.40			35.48			Trialpit Complete at 1.40 m

Remarks: No surface or subsurface structures observed.

Groundwater: At 1.4m, groundwater ingress of fast flow with strong hydrocarbon odour and black oily sheen.





Trial Pit TP13-05



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-05 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 337989E - 348090N Level: 36.89 m AOD	
Location: Marchwiel		Dimensions: -		Date 28/11/2013	
Client: NGPH		Depth 1.70m		Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30			0.30	36.59		MADE GROUND: Gravel of Limestone (Type 1)
						MADE GROUND: Medium dense, black slightly clayey, ashy sand with gravel sized fragments of brick.
			0.90	35.99		Loose orange-brown silty SAND.
1.70			1.70	35.19		Trialpit Complete at 1.70 m

Remarks: Trial pit terminated due to collapse.

Groundwater: At 1.7m, groundwater ingress of fast flow with strong hydrocarbon odour and black oily sheen.





Trial Pit TP13-06



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-06 Sheet 1 of 1		
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 337998E - 348070N Level: 36.91 m AOD		
Location: Marchwiel		Dimensions: Depth 0.90m		Date 28/11/2013 Scale 1:15 Logged By M Sweeney		
Client: NGPH						
Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.40			0.20	36.71		MADE GROUND: Gravel of Limestone (Type 1).
			0.70	36.21		MADE GROUND: Medium dense, reddish black slightly clayey, ashy sand with gravel sized fragments of brick.
0.90			0.90	36.01		Loose grey silty SAND.
						Trialpit Complete at 0.90 m
Remarks: Trial pit terminated due to collapse. Ambient PID reading of 0.3ppm observed.						
Groundwater: At 0.9m, groundwater ingress of fast flow with scum on the surface and a strong hydrocarbon odour and black oily sheen.						



Trial Pit TP13-07



		iKM Consulting Ltd Tel: 01324 875822 Fax: 01324 875823 email: info@ikmconsulting.co.uk		Trialpit No TP13-07 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338008E - 348099N Level: 36.70 m AOD	
Location: Marchwiel		Dimensions: -		Date 27/11/2013	
Client: NGPH		Depth 1.30m		Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	36.50		MADE GROUND: Gravel of Limestone (Type 1).
			0.40	36.30		MADE GROUND: Red sand of crushed brick.
			0.50	36.20		MADE GROUND: Cobbles of brick with coal tar visible.
0.80						MADE GROUND: Demolition waste consisting of wood, slate, bricks, cobbles of concrete and rebar which are all stained with tar and have a hydrocarbon odour. Redundant borehole installation visible in northern corner of pit (MW99-109).
			1.30	35.40		MADE GROUND: Concrete base Trialpit Complete at 1.30 m

Remarks: Trial pit terminated on concrete base. PID reading of 0.8ppm from soil sample at 0.8m bgl. Concrete structure resembling a tank visible in the west of the trial pit.	
Groundwater: At 1.2m groundwater visible in east of trial pit. Groundwater has a strong hydrocarbon odour and black oil.	



Trial Pit TP13-08



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-08 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 337980E - 348104N Level: 36.88 m AOD	
Location: Marchwiel		Dimensions: Depth 2.40m		Date 28/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.80			0.10	36.78	 MADE GROUND: Gravel of Limestone (Type 1). MADE GROUND: Stiff blackish brown silty clay with rare gravel of brick.	
			0.60	36.28		
			1.30	35.58	 Stiff light grey CLAY with frequent bands of fine sand.	
2.40			2.40	34.48	 Loose brown SAND with rare gravel. Slight hydrocarbon odour.	Trialpit Complete at 2.40 m.

Remarks: Trial pit terminated due to collapse.

Groundwater: At 1.5m, groundwater ingress of fast flow with slight hydrocarbon odour.



Trial Pit TP13-08A



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-08A Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 337993E - 348102N Level: 36.78 m AOD	
Location: Marchwiell		Dimensions: -		Date 27/11/2013	
Client: NGPH		Depth 2.40m		Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
			0.10	36.88		MADE GROUND: Gravel of Limestone (Type 1).
						MADE GROUND: Gravel of crushed red brick.
			0.40	36.38		MADE GROUND: Gravel of crushed yellow brick.
			0.80	35.98		Firm to stiff, grey, very sandy CLAY.
1.70			1.60	35.18		Grey SAND with strong hydrocarbon odour.
2.40			2.40	34.38		Trialpit Complete at 2.40 m

Remarks: Trial pit terminated due to collapse. PID reading of 10ppm from soil sample at 2.4mbgl.

Groundwater: At 1.6m, groundwater ingress of fast flow with a strong hydrocarbon odour.

		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-09 Sheet 1 of 1		
Project Name Maelor Works, Wrexham			Project No. 13627	Co-ords: 337994E - 348123N Level: 36.53 m AOD	Date 27/11/2013	
Location: Marchwiell			Dimensions: Depth 2.80m		Scale 1:15	
Client: NGPH					Logged By M Sweeney	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	
Depth (m)	Type	Results			Stratum Description	
1.00			0.30	36.23		MADE GROUND: Gravel of Limestone (Type 1).
			0.50	36.03		MADE GROUND: Firm blackish brown ashy clay.
						Firm orange/brown very sandy CLAY:
2.70			2.70	33.63		Medium dense orange/brown coarse grained SAND
Trialpit Complete at 2.80 m						
Remarks: Concrete slab observed at 0.1mbgl at front of trial pit.						
Groundwater: At 2.7m, groundwater ingress of fast flow with a hydrocarbon sheen and a hydrocarbon odour.						



Trial Pit TP13-10



		iKM Consulting Ltd Tel: 01324 878622 Fax: 01324 878623 email: info@ikmconsulting.co.uk		Trialpit No TP13-10 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338009E - 348120N Level: 36.85 m AOD	
Location: Marchwiel		Dimensions: - Depth 1.90m		Date 27/11/2013	
Client: NGPH				Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.30	36.55		MADE GROUND: Gravel of Limestone (Type 1).
			0.60	36.25		MADE GROUND: Firm blackish brown silty clay.
			1.10	35.75		Firm to stiff brown very sandy CLAY.
			1.80	35.25		Firm to stiff, brownish grey very sandy CLAY.
1.80			1.80	35.05		Loose coarse grained SAND
2.00			1.00	34.95		Wet, slightly sandy, sub-rounded, fine to coarse GRAVEL of mixed lithology including sandstone and mudstone.
						Tripic Complete at 1.80 m

Remarks:	No surface or subsurface structures observed. PID reading of 4.4ppm for a soil sample taken at 1.8mbgl and 4.4ppm for soil sample taken at 2mbgl.
Groundwater:	At 1.9m, groundwater ingress of fast flow with a dark brown sheen on groundwater and a strong hydrocarbon odour.



Trial Pit TP13-11



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-11 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338001E - 348182N Level: 36.60 m AOD	
Location: Marchwiel		Dimensions: Depth 2.60m		Date 26/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Sample & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30			0.22	36.38		MADE GROUND: Concrete foundation with re-bar.
			0.50	36.10		MADE GROUND: Firm blackish grey silty clay.
						MADE GROUND: Firm blackish grey gravelly sandy clay, with frequent bands of orange, fine to coarse sand.
			2.50	34.10		Brown sandy gravelly CLAY. Gravel is fine to medium, of mixed lithology.
			2.60	34.00		Trialpit Completes at 2.60 m

Remarks: Concrete slab with re-bar observed at ground level.

Groundwater: At 2.6m, groundwater ingress of moderate flow with a slight hydrocarbon/phenolic odour.





Trial Pit TP13-12



		ikm Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-12 Sheet 1 of 1		
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338011E - 348178N Level: 36.60 m AOD		
Location: Marchwiel		Dimensions: Depth 2.30m		Date 26/11/2013		
Client: NGPH				Scale 1:15 Logged By M Sweeney		
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	36.30		MADE GROUND: Concrete foundation with re-bar
			0.50	36.00		MADE GROUND: Brown to black sand with rare ash.
			1.70	34.80		MADE GROUND: Firm, dark brownish grey, very sandy clay with frequent bands of orange, fine to coarse sand.
			2.20	34.30		Firm, brownish grey silty sandy CLAY.
			2.30	34.20		Tripit Complete at 2.30 m
Remarks: Concrete slab with re-bar observed at ground level.						
Groundwater: No groundwater encountered.						





Trial Pit TP13-13



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-13 Sheet 1 of 1		
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338010E - 348186N Level: 36.62 m AOD		
Location: Marchwiel		Dimensions: - Depth: 2.80m		Date 26/11/2013 Scale 1:15 Logged By M Sweeney		
Client: NGPH						
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	36.42		MADE GROUND: Concrete foundation with re-bar.
			0.40	36.22		MADE GROUND: Brown to black sand with rare ash.
						MADE GROUND: Firm brownish grey very sandy clay with frequent bands of orange, fine to coarse sand.
1.30			1.70	34.92		Firm brownish grey silty sandy CLAY.
			2.80	33.82		Trialpit Complete at 2.80 m.
Remarks: Concrete slab with re-ar observed at ground level.						
Groundwater: At 2.8m, groundwater ingress of moderate flow with a slight hydrocarbon/phenolic odour.						



Trial Pit TP13-15



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-15 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338119E - 348210N Level: 36.21 m AOD	
Location: Marchwiel		Dimensions:		Date 25/11/2013	
Client: NGPH		Depth 1.30m		Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.60			0.10	36.11		MADE GROUND: Grass over brown sandy topsoil.
						MADE GROUND: Brown reworked sandy clay.
			0.50	35.71		MADE GROUND: Medium dense black gravel of coal with ash.
			1.10	35.11		Light brown sandy silty CLAY.
			1.30	34.91		Trialpit Complete at 1.30 m.

Remarks: No surface or subsurface structures observed.		
Groundwater: No groundwater encountered.		



Trial Pit TP13-16



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-16 Sheet 1 of 1		
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338109E - 348199N Level: 36.34 m AOD		
Location: Marchwiel		Dimensions: Depth 1.30m		Date 25/11/2013		
Client: NGPH				Scale 1:15		
				Logged By M Sweeney		
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			36.24			MADE GROUND: Grass over brown sandy loessil.
						MADE GROUND: Brown reworked very sandy clay.
1.20			35.14			Greyish brown very sandy CLAY (possibly reworked).
1.30			35.04			Tripit Complete at 1.30 m
Remarks: No surface or subsurface structures observed.						
Groundwater: No groundwater encountered.						





Trial Pit TP13-17



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-17 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338142E - 348214N Level: 36.29 m AOD	
Location: Marchwiell		Dimensions: -		Date 25/11/2013	
Client: NGPH		Depth 2.20m		Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	36.09		MADE GROUND: Grass over brown sandy topsoil.
			0.80	35.49		MADE GROUND: Demolition waste consisting of wood and bricks and metal pipes.
			1.30	34.99		MADE GROUND: Firm blackish grey gravelly sandy clay. Gravel is fine to coarse of mixed lithology including coal and brick.
			2.20	34.09		Grayish brown sandy silty CLAY.
						Trialpit Complete at 2.20 m

Remarks: No surface or subsurface structures observed.		
Groundwater: No groundwater encountered.		



Trial Pit TP13-18



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-18 Sheet 1 of 1	
Project Name: Maelor Works, Wrexham		Project No. 13627		Co-ords: 338141E - 348191N Level: 36.36 m AOD	
Location: Marchwiel		Dimensions: Depth: 1.30m		Date: 25/11/2013	
Client: NGPH				Scale: 1:15	
				Logged By M Sweeney	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Stratum Description
Depth (m)	Type	Results			
0.10			36.26		MADE GROUND: Grass over brown sandy topsoil with frequent rootlets.
1.30			35.06		MADE GROUND: Brown slightly silty clayey sand with rare pieces of wood and gravel of brick.
Trialpit Complete at 1.30m					
Remarks: No surface or subsurface structures observed.					
Groundwater: No groundwater encountered.					
					



Trial Pit TP13-19



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-19 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338133E - 348204N Level: 36.42 m AOD	
Location: Marchwiel		Dimensions: Depth 1.30m		Date 25/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			36.32			MADE GROUND: Grass over brown sandy topsoil with frequent rootlets.
0.30			36.12			MADE GROUND: Firm brown to black slightly silty clay with frequent gravel of brick and coal
						Firm brown sandy CLAY (possibly reworked).
1.30			35.12			Trialpit Complete at 1.30 m

Remarks: No surface or subsurface structures observed.		
Groundwater: No groundwater encountered.		



Trial Pit TP13-20



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-20 Sheet 1 of 1		
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338086E - 348244N Level: 36.43 m AOD		
Location: Marchwiel		Dimensions: Depth 1.10m		Date 26/11/2013 Scale 1:15 Logged By M Sweeney		
Client: NGPH						
Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.20			36.23			MADE GROUND: Grass over brown sandy topsoil.
1.10			35.33			MADE GROUND: Brown sand containing frequent bricks and rare cobbles of concrete and tarmac.
						Trialpit Complete at 1.10 m
Remarks: No surface or subsurface foundations observed. Redundant service (small pipe) observed in west face of pit at 0.2m bgl. Trial pit moved to east.						
Groundwater: No groundwater encountered.						



Trial Pit TP13-21



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-21 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338083E - 348238N Level: 36.33 m AOD	
Location: Marchwiel		Dimensions: Depth: 2.20m		Date 26/11/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	36.13		MADE GROUND: Gravel of Limestone (Type 1)
						MADE GROUND: Gravel of crushed concrete with rare pieces of pipe lagging
			1.20	35.13		MADE GROUND: Black gravel of coal with ash and rare gravel of slag
			2.10	34.23		Firm orange to brown silty sandy CLAY
			2.20	34.13		Trialpit Complete at 2.20 m

Remarks: No surface or subsurface structures observed.

Groundwater: No groundwater encountered.





Trial Pit TP13-22



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-22 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338052E - 348227N Level: 36.52 m AOD	
Location: Marchwiel		Dimensions: Depth: 0.40m		Date 02/12/2013 Scale 1:15 Logged By M Sweeney	
Client: NGPH					
Sample & In Situ Testing			Depth (m)	Level m AOD	Legend
Depth (m)	Type	Results			Stratum Description
0.30			0.20	36.32	MADE GROUND: Concrete slab with re-bar
			0.40	36.12	MADE GROUND: Firm blackish brown sandy clay with rare ash
Trialpit Complete at 0.40 m					
Remarks: Concrete slab with re-bar observed at ground level.					
Groundwater: No groundwater encountered.					





Trial Pit TP13-23



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Trialpit No
TP13-23
Sheet 1 of 1

Project Name Maelor Works, Wrexham	Project No. 13627	Co-ords: 338047E - 348196N Level: 36.92 m AOD	Date 29/11/2013
Location: Marchwiel	Dimensions: Depth 1.50m		Scale 1:15
Client: NGPH			Logged By M Sweeney

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			0.10	36.82		MADE GROUND: Grass over brown sandy topsoil.
						MADE GROUND: Loose brown clayey sand with waste consisting of wood and bricks and plastic pipes.
1.50			1.50	35.42		Trialpit Completes at 1.50 m

Remarks: No surface or subsurface foundations observed.

Groundwater: At 1m, groundwater ingress of moderate flow.



Trialpit No. TP13-23, Sheet 1 of 1, Date: 29/11/2013



Trial Pit TP13-24



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-24 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338038E - 348208N Level: 37.05 m AOD	
Location: Marchwiel		Dimensions:		Date 02/12/2013	
Client: NGPH		Depth 1.90m		Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	36.85		MADE GROUND: Grass over brown sandy topsoil.
						MADE GROUND: Band of granular tarmacadam.
			0.60	36.45		MADE GROUND: Firm blackish brown sandy clay with frequent sections of plastic pipe and cobbles of brick and concrete.
			0.70	36.35		MADE GROUND: Dark grey (becoming lighter with depth), very sandy clay.
			1.30	35.75		MADE GROUND: Brown sandy clay with cobbles of granular tarmacadam.
						MADE GROUND: Firm orange to brown silty sandy clay.
1.90			1.90	35.15		Trialpit Complete at 1.90 m

Remarks: Band of tarmac observed from 0.2mbgl - 0.6mbgl.

Groundwater: At 1.5m, groundwater ingress of moderate flow.





Trial Pit TP13-25



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-25 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338019E - 348203N Level: 37.04 m AOD	
Location: Marchwiel		Dimensions: Depth 1.60m		Date 02/12/2013 Scale 1:15 Logged By M Sweeney	
Client: NGPH					
Samples & In Situ Testing			Depth (m)	Level m AOD	Legend
Depth (m)	Type	Results			Stratum Description
			0.20	36.84	MADE GROUND: Grass over brown sandy topsoil.
			1.60	35.44	MADE GROUND: Soft brown sandy clay with waste consisting of a car tyre, pieces of wood and bricks, sections of plastic pipe.
Trialpit Complete at 1.60 m					
Remarks: Concrete platform (possible walkway) observed in the western face of the pit. Trial pit is in a large chamber shaped structure.					
Groundwater: At 1.6m, groundwater ingress of low flow.					



Trial Pit TP13-26



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-26 Sheet 1 of 1		
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338052E - 348211N Level: 36.91 m AOD		
Location: Marchwiel		Dimensions: Depth 1.60m		Date 02/12/2013		
Client: NGPH				Scale 1:15		
				Logged By M Sweeney		
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			36.91			MADE GROUND: Grass over brown sandy topsoil.
1.60			35.31			MADE GROUND: Soft brown sandy clay with waste consisting of frequent pieces of wood, plastic sheeting, bricks and plastic pipes.
						Trialpit Complete at 1.60 m
Remarks: Concrete wall observed in North face of the pit from 0.1mbgl to 0.3mbgl.						
Groundwater: At 1.6m, groundwater ingress of low flow.						





Trial Pit TP13-27



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-27 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338065E - 348234N Level: 36.45 m AOD	
Location: Marchwiel		Dimensions: Depth 1.00m		Date 02/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.30			36.15			MADE GROUND: Concrete slab with re-bar.
1.00			35.45			MADE GROUND: Firm blackish brown sandy clay.
Trialpit Complete at 1.00 m						

Remarks: Concrete slab with re-bar observed at ground level.

Groundwater: No groundwater encountered.



Trial Pit TP13-28



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-28 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338057E - 348243N Level: 36.52 m AOD	
Location: Marchwiel		Dimensions: Depth 1.00m		Date 02/12/2013 Scale 1:15 Logged By M Sweeney	
Client: NGPH					
Samples & In Situ Testing			Depth (m)	Level m AOD	Legend
Depth (m)	Type	Results	Depth (m)	Level m AOD	Legend
0.10			36.42		MADE GROUND: Loose rounded fine gravel of mixed lithology.
0.30			36.22		MADE GROUND: Concrete slab with re-bar.
0.30			36.22		MADE GROUND: Firm blackish brown sandy clay.
0.50			36.02		MADE GROUND: Firm blackish brown sandy clay.
1.00			35.52		Trialpit Complete at 1.00 m
Remarks: Trial pit terminated due to suspected service observed at 0.6mbgl. Concrete slab observed at 0.1mbgl.					
Groundwater: No groundwater encountered					





Trial Pit TP13-30



		ikm Consulting Ltd Tel: 01324 876622 Fax: 01324 876623 email: info@ikmconsulting.co.uk		Trialpit No TP13-30 Sheet 1 of 1	
		Project Name Maelor Works, Wrexham		Project No. 13627	Co-ords: 338269E - 348042N Level: 34.55 m AOD
Location: Marchwiel			Dimensions: Depth 2.10m		Scale 1:15
Client: NGPH					Logged By M Sweeney

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			34.45			MADE GROUND: Grass over brown sandy topsoil.
0.30			34.25			MADE GROUND: Gravel of crushed red brick. Firm grey sandy CLAY (possibly reworked) with a band of black, very sandy clay from 0.8mbgl - 0.9mbgl.
2.10			32.45			Tripit Complete at 2.10 m

Remarks: No surface or subsurface structures observed.	
Groundwater: At 2.1m, groundwater ingress of low flow and red in colour.	



Trial Pit TP13-31



		IKM Consulting Ltd Tel: 01324 875822 Fax: 01324 875823 email: info@ikmconsulting.co.uk		Trialpit No TP13-31 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338263E - 348027N Level: 35.17 m AOD	
Location: Marchwiel		Dimensions: Depth 2.10m		Date 02/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.20			34.97			MADE GROUND: Grass over brown sandy topsoil
						Firm grey sandy CLAY (possibly reworked) with a black band of very sandy clay at 0.7 - 1.1mbgl.
2.10			33.07			Trialpit Complete at 2.10 m

Remarks: No surface or subsurface structures observed.		
Groundwater: No groundwater encountered.		



Trial Pit TP13-32



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-32 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338268E - 347999N Level: 35.49 m AOD	
Location: Marchwiel		Dimensions: Depth: 2.00m		Date 02/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	35.29		MADE GROUND: Grass over brown sandy topsoil.
						MADE GROUND: Brown sandy clay with waste including bricks and suspected cordite fuses.
			1.80	33.69		MADE GROUND: Coal tar with a strong hydrocarbon odour.
2.00			2.00	33.49		Trialpit Complete at 2.00 m

Remarks: No surface or subsurface structures observed. PID reading of 14.6ppm for a soil sample taken at 2m bgl. Trial pit terminated at 2.0m bgl due to collapse.

Groundwater: No groundwater encountered.



Trial Pit TP13-33



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-33 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338243E - 347982N Level: 36.25 m AOD	
Location: Marchwiel		Dimensions: Depth 1.90m		Date 03/12/2013	
Client: NGPH				Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.20			36.05			MADE GROUND: Grass over brown sandy topsoil
1.90			34.35			MADE GROUND: Firm brown silty sandy clay with frequent bricks
						Trialpit Complete at 1.90 m

Remarks: Concrete structure observed at 0.2mbgl in the centre of the pit.

Groundwater: No groundwater encountered.



Trial Pit TP13-34



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-34 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338284E - 348000N Level: 34.88 m AOD	
Location: Marchwiel		Dimensions: Depth: 2.10m		Date 03/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.30			34.58			MADE GROUND: Grass over brown sandy topsoil
2.10			32.78			MADE GROUND: Soft brown sandy clay with waste consisting of frequent pieces of wood and brick.
						Traps Complete at 2.10 m

Remarks:	No surface or subsurface structures observed.
Groundwater:	No groundwater encountered.



Trial Pit TP13-35



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-35 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338289E - 348008N Level: 34.37 m AOD	
Location: Marchwiel		Dimensions: Depth 2.30m		Date 03/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.40			0.30	34.07		MADE GROUND: Grass over brown sandy topsoil.
			0.60	33.77		MADE GROUND: Blackish grey coarse grained sand with ash and rare cobbles of concrete and brick.
						Firm to stiff light brown sandy silty CLAY (possibly reworked).
			2.30	32.07		Trialpit Complete at 2.30 m

Remarks: No surface or subsurface structures observed.

Groundwater: No groundwater encountered.



Trial Pit TP13-36



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-36 Sheet 1 of 1					
		Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338288E - 348022N Level: 34.34 m AOD		Date 03/12/2013	
Location: Marchwiel				Dimensions: Depth 2.70m				Scale 1:15	
Client: NGPH								Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	34.14		MADE GROUND: Grass over brown sandy topsoil.
			0.40	33.94		MADE GROUND: Gravel of crushed red brick.
						MADE GROUND: Brown sandy clay with rare cobbles of concrete with re-bar and brick.
			2.70	31.64		Trialpit Complete at 2.70 m

Remarks:	No surface or subsurface structures observed.
Groundwater:	No groundwater encountered.



Trial Pit TP13-37



		IKM Consulting Ltd Tel: 01324 876622 Fax: 01324 876623 email: info@ikmconsulting.co.uk		Trialpit No TP13-37 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338309E - 348023N Level: 33.37 m AOD	
Location: Marchwiel		Dimensions: Depth 2.40m		Date 03/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
			0.20	33.17		MADE GROUND: Grass over brown sandy topsoil.
			0.40	32.97		MADE GROUND: Gravel of crushed red brick.
						MADE GROUND: Brown sand containing frequent bricks and rare cobbles of concrete and metal re-bar.
			2.40	30.97		Trialpit Complete at 2.40 m

Remarks: No surface or subsurface structures observed.

Groundwater: No groundwater encountered.



Trial Pit TP13-38



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-38 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338301E - 348036N Level: 33.82 m AOD	
Location: Marchwiel		Dimensions: Depth: 2.80m		Date 03/12/2013	
Client: NGPH				Scale 1:15	
Logged By M Sweeney					

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
						MADE GROUND: Grass over brown sandy topsoil.
0.30			33.52			MADE GROUND: Gravel of crushed red brick.
0.50			33.32			MADE GROUND: Soft brown sandy clay with rare cobbles of waste consisting concrete with re-bar and brick.
2.50			31.32			MADE GROUND: Soft brown sandy clay with rare cobbles of waste consisting concrete with re-bar and brick.
2.80			31.02			Trialpit Complete at 2.80 m

Remarks: No surface or subsurface structures observed.

Groundwater: At 2.5m, groundwater ingress of low flow.



Trial Pit TP13-39



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-39 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338299E - 348046N Level: 33.92 m AOD	
Location: Marchwiel		Dimensions: Depth 1.80m		Date 03/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Sample & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			33.82		MADE GROUND: Grass over brown sandy topsoil	
0.30			33.62		MADE GROUND: Gravel of crushed red brick	
0.50			33.42		MADE GROUND: Blackish grey coarse grained sand with rare ash	
1.60			32.32		Firm to stiff light brown sandy silty CLAY (possibly reworked)	
1.80			32.12		Firm to stiff light brown sandy silty CLAY (possibly reworked)	
Trialpit Complete at 1.80 m						

Remarks: No surface or subsurface structures observed.

Groundwater: No groundwater encountered.





Trial Pit TP13-40



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-40 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338092E - 348208N Level: 36.26 m AOD	
Location: Marchwiel		Dimensions: Depth: 1.10m		Date 03/12/2013	
Client: NGPH				Scale 1:15 Logged By M Sweeney	
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Stratum Description
Depth (m)	Type	Results			
0.50			0.10	36.16	MADE GROUND: Grass over brown sandy topsoil.
					MADE GROUND: Blackish brown sandy clay with frequent gravel of brick.
			0.60	35.86	Firm to stiff orangish brown sandy CLAY (possibly reworked).
			1.10	35.16	Tripit Complete at 1.10 m
Remarks: No surface or subsurface structures observed.					
Groundwater: No groundwater encountered.					





Trial Pit TP13-41



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-41 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338112E - 348230N Level: 36.01 m AOD	
Location: Marchwiel		Dimensions: Depth 1.10m		Date 03/12/2013 Scale 1:15 Logged By M Sweeney	
Client: NGPH					
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Stratum Description
Depth (m)	Type	Results			
0.10			35.91		MADE GROUND: Brown sandy topsoil.
1.10			34.91		MADE GROUND: Soft brown sandy clay with rare cobbles of brick.
Trialpit Complete at: 1.10 m					
Remarks: No surface or subsurface structures observed.					
Groundwater: No groundwater encountered.					





Trial Pit TP13-49



		iKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-49 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338112E - 348230N Level: 36.01 m AOD	
Location: Marchwiel		Dimensions: Depth 1.30m		Date 04/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.10			35.91		MADE GROUND: Brown sandy topsoil.	
0.40			35.61		MADE GROUND: Firm brown sandy clay with rare cobbles of brick.	
0.70			35.31		MADE GROUND: Firm blackish brown gravelly clay with rare cobbles of brick.	
1.10			34.91		MADE GROUND: Firm brown gravelly clay with rare cobbles of brick and timber.	
1.30			34.71		MADE GROUND: Firm blackish brown gravelly clay with rare cobbles of concrete and brick.	
Trialpit Complete at 1.30 m						

Remarks:		No surface or subsurface structures observed.
Groundwater:		No groundwater encountered.



Trial Pit TP13-50



				IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-50 Sheet 1 of 1			
				Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338116E - 348231N Level: 35.94 m AOD	
Location: Marchwiel				Dimensions: Depth 1.20m		Scale 1:15		Logged By M Sweeney	
Client: NGPH									
Samples & In Situ Testing			Depth (m)	Level m AOD	Legend	Stratum Description			
Depth (m)	Type	Results							
			0.20	35.74		MADE GROUND: Brown sandy topsoil			
			1.20	34.74		MADE GROUND: Firm brown gravelly clay			
						Trialpit Complete at 1.20 m			
Remarks: No surface or subsurface structures observed									
Groundwater: No groundwater encountered									

Trialpit 13-50 (Marchwiel) (1 of 1)

AGS



Trial Pit TP13-51



		IKM Consulting Ltd Tel: 01324 878822 Fax: 01324 878823 email: info@ikmconsulting.co.uk		Trialpit No TP13-51 Sheet 1 of 1	
Project Name Maelor Works, Wrexham		Project No. 13627		Co-ords: 338116E - 348235N Level: 35.68 m AOD	
Location: Marchwiel		Dimensions: Depth 1.00m		Date 04/12/2013	
Client: NGPH				Scale 1:15	
				Logged By M Sweeney	

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
			0.30	35.38		MADE GROUND: Brown sandy topsoil.
			0.50	35.18		MADE GROUND: Firm blackish brown gravelly clay with rare cobbles of concrete and brick.
						MADE GROUND: Black brown sandy gravel of coal with ash.
0.90			1.00	34.88		Trialpit Complete at 1.00 m

Remarks: No surface or subsurface structures observed.	
Groundwater: No groundwater encountered.	



Wrexham Gas Works
Boreholes & Trialpits 12/12/2013

<u>Code</u>	<u>Easting</u>	<u>Northing</u>	<u>Height</u>
BH2	338037.721	348096.252	30.371
BH3	338000.858	348184.194	30.187
BH4	338012.244	348212.040	30.549
BH5	338018.725	348232.438	30.069
BH6	338022.147	348240.949	30.156
BH7	338026.351	348239.900	30.153
BH22	338067.840	348036.290	30.382
BH23	338031.968	348073.744	30.566
BH24	337989.460	348037.140	31.496
BH3A	338000.765	348186.608	30.223
BH4A	338011.461	348217.108	30.627
BH4B	338005.530	348196.377	30.213
BH8A	338039.481	348235.510	30.212
TRP1	338031.455	348045.201	30.290
TRP2	338022.080	348046.362	30.431
TRP3	338006.796	348048.200	30.475
TRP4	337994.410	348077.175	30.516
TRP5	337989.212	348089.521	30.528
TRP6	337997.902	348070.405	30.547
TRP7	338008.617	348098.599	30.344
TRP8	337980.678	348104.304	30.517
TRP9	337994.661	348123.216	30.167
TRP10	338009.401	348120.384	30.487
TRP11	338000.957	348181.600	30.244
TRP12	338011.687	348178.005	30.144
TRP13	338009.958	348185.753	30.260
TRP15	338118.832	348210.439	29.850
TRP16	338109.600	348198.928	29.979
TRP17	338142.523	348213.998	29.930
TRP18	338141.490	348190.538	30.004
TRP19	338133.682	348203.914	30.062
TRP20	338082.990	348237.662	29.974
TRP21	338086.365	348243.473	30.073
TRP22	338052.466	348227.419	30.162
TRP23	338047.063	348196.125	30.561
TRP24	338038.528	348208.446	30.689
TRP25	338019.617	348203.417	30.683
TRP26	338052.621	348210.956	30.553
TRP27	338064.918	348234.005	30.092
TRP28	338057.103	348242.923	30.160
TRP29	338097.152	348237.951	29.395
TRP30	338299.614	348046.069	27.514
TRP30	338269.471	348042.372	28.185
TRP31	338263.526	348027.008	28.811
TRP32	338267.902	347999.050	29.130
TRP33	338243.158	347981.671	29.894
TRP34	338284.369	348000.306	28.524
TRP35	338289.823	348007.479	28.009
TRP36	338288.249	348021.942	27.975
TRP37	338309.788	348023.291	27.009
TRP38	338301.100	348035.514	27.455

TRP39	338298.916	348046.051	27.562
TRP48	337588.891	348123.653	29.986
TRP49	338112.507	348229.805	29.654
TRP50	338116.759	348231.365	29.578
TRP51	338115.936	348234.487	29.322
TRP8A	337993.689	348102.204	30.422
BH99 104	338034.916	348236.813	30.196
WATERPIPE	338093.098	348207.899	29.892

Description

Appendix C

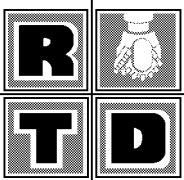
Borehole Logs

ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH1 Page 1 of 1	
					Date 25/11/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	CONCRETE. MADE GROUND (0.23)				ES	2.00	
		0.23	Ceramic tile. MADE GROUND (0.02)							
		0.25								
		0.27	Tile cement. MADE GROUND (0.02)							
		0.45	CONCRETE. MADE GROUND (0.18)							
			1.00	(Dense) grey/brown slightly clayey fine-coarse, subangular GRAVEL/ COBBLES of concrete and sandstone. MADE GROUND (0.55)						
		1.15	Soft grey very sandy (fine-medium) SILT. Deposit is wet. (0.15)							
		2.20	Dark grey/black very gravelly fine-medium SAND. Gravel is fine-coarse, subangular of granite and limestone. Deposit is wet/blowing. very strong oil/chemical odour with visible oil sheen to water. (1.05)							
			3.30	No recovery/possibly very loose dark grey/black very gravelly fine-medium SAND. Gravel is fine-coarse, subrounded of granite and limestone. Deposit is wet/blowing. Very strong oil/chemical odour with visible oil sheen to water. (1.10)						
		4.00	Firm brown very silty CLAY. (0.70)							
			4.00	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.15	very fast							

Remarks Water entry @ 1.15m bgl recorded as very fast.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH2 Page 1 of 1	
					Date 26/11/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	TARMAC. MADE GROUND (0.11)						
			0.11	white/grey fine-coarse, subangular GRAVEL of Limestone. MADE GROUND (0.08)						
			0.75	(Firm) yellow/brown/grey very sandy, gravelly CLAY. Gravel is fine-coarse, subangular of sandstone, brick and concrete. MADE GROUND (0.56)						
			0.90	Grey/brown clayey very silty, fine SAND. Black/dark grey staining, strong chemical/oil odour. Deposit disturbed? Deposit is damp from 0.8m bgl. (0.15)						
			1.60	Grey sandy, slightly peaty SILT. Rare fibrous roots, strong chemical odour. Deposit is wet. (0.70)						
		2.00		Grey very sandy (medium) fine-coarse, subrounded GRAVEL of Limestone, granite and quartzite. Deposit is wet/ blowing. Strong chemical/oil odour, oil sheen to water. (2.20)						
			3.80	Grey very sandy (medium) fine-coarse, subrounded GRAVEL of Limestone, granite and quartzite. Deposit is wet/ blowing. Deposit is black with oil staining, oil sheen to water. (0.05)				ES	3.80	
			4.00	Firm silty CLAY. (0.15)						
				Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
0.90 1.60	slow/med very fast				0.90 2.00	26/11	0.90	CASED

Remarks Break out location, clear services dig GL-1.2m bgl. Note sampling by Engineer. Water entry @ 0.9m recorded as slow/medium, water entry 1.6m recorded as very fast. Standing water level = 0.9m bgl. Borehole cased to 2.0m	
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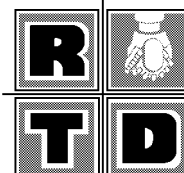
Marshes Farm, Coach Road, off Wigan Road,
Hart Common, West Houghton, Bolton BL5 2BT
Tel: 01942 - 810348 Fax: 01942 - 840543

Date	09/12/13
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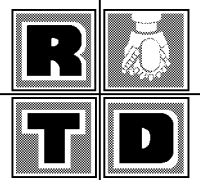
Page 1 of 1

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample
 N - Standard Penetration Test $\bar{\Delta}$ - Water entry $\bar{\Delta}$ - Water level

Concrete cored location.
NOTE. Chain core out for hand dig tools 4x142 mm holes
Clear services.
Very slow progress.
Water entry @ 0.72m recorded as slow, @ 2.0m recorded as very fast. Standing water level 1.2m bgl.



ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13		
					Client I&H Brown			Borehole BH24		
					Date 09/12/13		O.D. Level		Page 1 of 1	
Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.							
			0.20	Brown/grey very sandy fine-coarse, subangular GRAVEL of limestone, TOPSOIL with roots. MADE GROUND (0.20)						
			0.50	(Dense) red/black fine-medium, subangular GRAVEL of burnt shale and ashes. Subangular BOULDERS of sandstone. MADE GROUND (0.30)						
			0.61							
			0.80	CONCRETE (cored). MADE GROUND (0.11)						
				(Dense) red fine-medium, subangular GRAVEL of burnt shale. MADE GROUND (0.19)						
			1.55	Firm yellow/grey sandy (fine) SILT. Deposit is wet. (0.75)						
				Green/grey fine-medium SAND. Deposit is wet/running. (1.05)						
			2.60							
			3.00	Grey very gravelly medium SAND. Gravel is fine-medium, subrounded of granite, limestone and quartzite. Deposit is wet/running. (0.40)				ES	3.00	
				Base of Borehole						
Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level										
Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open		
0.80 1.55	slow fast					09/12	1.10	OPEN		
Remarks Concrete cored 0.5-0.61m bgl. Clear services. Water entry @ 0.8m recorded as slow, @ 1.55m recorded as fast. Standing water level 1.1m										



ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH3 Page 1 of 1	
					Date 05/12/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Brown/grey very sandy (fine-medium) fine-coarse subangular GRAVEL/COBBLES of concrete, brick and tarmac. Very clayey from 0.95m bgl. MADE GROUND (1.10)						
			1.10	Firm dark grey/black very gravelly, very sandy (fine-medium) very silty CLAY. Gravel is fine-coarse, subangular of limestone, brick and ashes. Slight chemical/oil odour. MADE GROUND (1.20)						
			2.30	Firm brown/grey very sandy (fine) very gravelly CLAY. Gravel is fine-medium, subrounded of limestone and sandstone. Deposit is damp. (1.10)						
			3.40	(Dense) brown/grey very sandy (fine-medium) fine-coarse, subrounded GAVEL of limestone, granite and quartzite. Deposit is wet/running/blowing. Occasional subrounded COBBLES of granite. (2.20)						
			5.60	Firm brown very silty CLAY. (1.40)						
			7.00	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
3.10	fast					05/12	4.00	OPEN

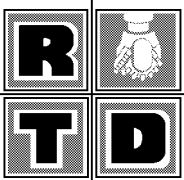
Remarks Reinforced concrete broken out by excavator. Clear services. Chiselling/very slow boring 3.4-5.6m 1 hour 9.30-10.30 am. Water entry @ 3.1m recorded as fast. standing water level 4.0m bgl.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH3A Page 1 of 1	
					Date 25/11/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Reinforced CONCRETE, 6mm rebar at 0.10m bgl. MADE GROUND (0.21)						
			0.21	Black/grey fine, subangular GRAVEL of ashes and brick. MADE GROUND (0.19)						
			0.40	Firm brown very sandy (fine-medium) gravelly CLAY. Gravel is fine-coarse, subangular of Limestone. MADE GROUND (1.00)						
			1.40	Brown/grey clayey fine SAND. Deposit is damp. MADE GROUND (0.10)						
	▲		1.50	Stiff sandy (fine-medium) light brown CLAY. MADE GROUND (0.30)						
			1.80	Firm dark grey/black very silty, gravelly CLAY. Slight oil/chemical odour. MADE GROUND (0.20)						
			2.00	Stiff brown very sandy (fine-medium) gravelly CLAY. Gravel is fine-medfium, subrounded of Limestone. (1.10)						
		3.00	3.10	Grey gravelly, silty fine-medium SAND. Deposit is wet/blowing. Slight chemical/oil odour. (0.90)						
	△		4.00	Grey gravelly, silty fine-medium SAND. Deposit is wet/blowing. Slight chemical/oil odour. Very poor recovery. (1.00)						
			5.00	Grey very gravelly fine-medium SAND. Gravel is fine-coarse, subrounded of granite, limestone and quartzite. Deposit is wet/blowing with strong chemical/oil odour. (0.65)						
			5.65	Firm brown silty CLAY. (0.35)						
			6.00	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test △ - Water entry ▲ - Water level									
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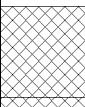
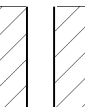
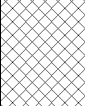
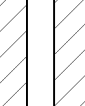
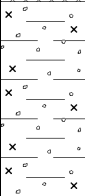
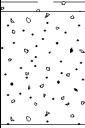
Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
3.10	very fast		1.50		3.00	26/11 26/11	1.50 1.80	OPEN CASED

Remarks Concrete cored location. Cased to 3.0m bgl. NOTE: No samples taken, sampling dictated by Engineer. Water entry @ 3.0m recorded as very fast, standing water level 1.8m borehole cased to 3.0m, standing water level 1.5m open hole.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.				Job No. 52/13	
					Client IH Brown				Borehole BH4 Page 1 of 1	
					Date 29/11/13		O.D. Level			
Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Depth	'N' Value
			G.L.	(Loose) dark brown/grey very clayey fine-coarse, subangular GRAVEL/COBBLES of brick and concrete. Frequent BOULDERS of concrete. Frequent voiding. MADE GROUND (1.40)						
			1.40	Very dense dark grey/brown very clayey, sandy (fine-medium) medium-coarse, subangular GRAVEL/COBBLES of brick, concrete with metallic/cast iron fragments upto 100mm in diameter. Poor recovery, very slow progress. Deposit is wet from 1.8m						
			2.20	MADE GROUND. (0.80)				ES	2.20	
			2.21	Obstruction, chiselling for 1 hour zero progress. (0.01)						
				Base of Borehole						
Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level										
Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open		
1.80	medium					29/11	1.70	OPEN		
Remarks Load & mobilise cable tool rig & tooling arrive on site 10.15am. Clear services. Chiselling 1.4-2.2m from 11.45am till 12.30pm, Chiselling 2.2-2.21m from 12.30 till 1.30pm. Informed Engineer. Water added to assist chiselling 1.4-2.2m NOTE large concrete and sandstone slabs/boulders present in adjacent trial pit ID=TP23 (See photographs) Water entry @ 1.8m recorded as medium, standing water level 1.7m. Water added to assist boring from 1.4m to 2.2m R T D										

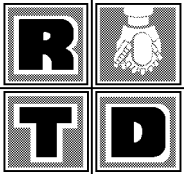
ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.				Job No. 52/13	
					Client I&H Brown				Borehole BH4A Page 1 of 1	
					Date 04/12/13		O.D. Level			
Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Depth	'N' Value
			G.L.	Brown very sandy, very gravelly TOPSOIL with roots. Gravel is fine-coarse, subangular of brick, limestone and ashes. MADE GROUND (0.40)						
			0.40	(Dense) grey/red/brown very sandy, clayey fine-coarse subangular GRAVEL/ COBBLES of brick, sandstone and ashes with timber fragments. MADE GROUND (0.90)						
			1.30	Sandstone OBSTRUCTION/BOULDER. MADE GROUND (0.15)						
			1.45	(Dense) grey/red/brown very sandy, clayey fine-coarse, subangular GRAVEL/ COBBLES of brick, sandstone and ashes with timber fragments. MADE GROUND (0.75)						
			2.20	OBSTRUCTION, chiselling 1 hour. No progress. (0.01)						
			2.21	Base of Borehole						
Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level										
Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open		
Remarks Area cleared/reworked by excavator to 0.4m bgl. Clear services. Chiselling/very slow boring 1.2-2.2m 1 hour. Chiselling 2.2m no progress 1 hour. Water added to assist boring 1.2-2.21m Cased to 2.2m bgl. Water added to assist boring from 1.2m to 2.21m										
R T D										

ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH4B Page 1 of 1	
					Date 05/12/13 - 06/12/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Brown/grey very sandy, very gravelly CLAY. Gravel is fine-coarse, subangular of brick and concrete with metal and timber fragments. MADE GROUND (0.60)						
			0.60	Firm grey/brown very sandy, silty, very gravelly CLAY. Gravel is fine-coarse, subrounded of limestone and granite. Possibly disturbed. MADE GROUND (2.00)				ES	1.00	
			2.60	Firm brown silty, very gravelly CLAY. Gravel is fine-medium, subrounded, elliptical of granite, limestone and quartzite. Deposit is damp. (1.35)				ES	2.50	
			3.95	Grey/brown very sandy (fine-medium) fine-coarse, subrounded, elliptical GRAVEL of limestone, quartzite and granite. Deposit is wet/blowing/running. (0.75)						
			4.70	Firm and stiff brown very silty CLAY. (2.30)						
			7.00	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
3.95	very fast					06/12	2.40	OPEN

Remarks Reinforced concrete broken out by excavator. Clear services. Chiselling/slow boring in gravel(s) 3.95-4.7m 1 hour 7.50-8.50am. Water entry @ 3.95 recorded as very fast, standing water level 2.4m b.l.g.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH5 Page 1 of 1	
					Date 27/11/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Brown very sandy (fine-medium), clayey fine-coarse, subangular GRAVEL of Limestone and concrete. MADE GROUND (1.10)						
			1.10	Firm brown/grey very sandy, very gravelly CLAY. Gravel is fine-coarse, subangular of brick, ashes and limestone. MADE GROUND (0.45)						
	Δ		1.55	Soft black very clayey, very gravelly, sandy (fine-medium) SILT/very silty CLAY. Gravel is fine-coarse, subangular of limestone, ashes, brick with timber fragments. Strong chemical/oil odour. MADE GROUND (1.55)						
			3.10	Soft brown/grey very sandy, very silty CLAY. Fine-medium subrounded gravel of limestone and granite. (0.30)						
	Δ		3.40	(Loose) grey/brown very sandy, silty fine-medium, subrounded GRAVEL of granite/limestone. Deposit is wet/running. Strong chemical/oil odour. (1.10)						
			4.50	Firm brown very silty CLAY. Occasional lenses of laminated silt upto 10mm in thickness. (2.50)						
			7.00	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
2.20 3.60	slow fast							

Remarks Reinforced concrete broken out by excavator. Clear services. Water entry @ 2.2m recorded as slow, @ 3.6m recorded as fast.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client IH Brown			Borehole BH6 Page 1 of 1	
					Date 02/12/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Brown very sandy, clayey fine-coarse, subangular GRAVEL/COBBLES of concrete, brick and tarmac. Sand is of brick fines/topsoil. MADE GROUND (0.80)						
	Δ		0.80	Black clayey, very silty, sandy (fine-medium) fine-coarse, subrounded-subangular GRAVEL. Rare plastic/timber fragments. Deposit is wet from 1.5m, strong chemical/oil odour. Oil sheen to water. Poor recovery 2.0-3.0m, disturbed. MADE GROUND (2.20)				ES	2.00	
	Δ		3.00	Soft brown/grey very silty, sandy (fine), gravelly CLAY. Gravel is fine-medium, subrounded of limestone and granite. Bands of brown/grey sandy fine-medium, subrounded GRAVEL upto 0.3m in thickness. Gravel bands are wet/running. (2.10)						
			5.10	Firm brown very silty CLAY. (1.90)						
			7.00	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.50 4.00	medium medium					02/12	3.80	OPEN

Remarks Reinforced concrete/location broken out by excavator. Clear services. Borehole cased to 5.5m. water entry @ 1.5m recorded as medium, @ 4.0m recorded as medium, standing water level 3.8m bgl.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client IH Brown			Borehole BH7 Page 1 of 1	
					Date 02/12/13 - 03/12/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Brown/grey very gravelly, clayey, fine-medium SAND. Gravel is medium-coarse, subangular of concrete, tarmac and timber fragments. MADE GROUND (0.90)	[Pattern]	[Pattern]				
			0.90	Soft black very sandy, very gravelly SILT/very silty GRAVEL. Gravel is fine-coarse, subangular of brick and ashes. Strong chemical odour. Deposit is wet from 1.5m bgl. Very poor recovery. MADE GROUND (2.30)	[Pattern]	[Pattern]				
			3.20	Soft brown/grey sandy (fine-medium) very silty CLAY/clayey SILT. Chemical/oil odour. Deposit is wet. (0.60)	[Pattern]	[Pattern]				
			3.80	Grey/brown clayey, very sandy (fine-medium) fine-medium, subrounded GRAVEL of limestone and granite. Deposit is wet/running. Strong chemical/oil odour. (0.75)	[Pattern]	[Pattern]				
			4.55	Firm brown very silty CLAY. (2.45)	[Pattern]	[Pattern]				
			7.00	Base of Borehole	[Pattern]	[Pattern]				

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.50 4.00	slow fast					03/12	4.50	OPEN

Remarks Reinforced concrete, broken out by excavator. Clear services. Water entry @ 1.5m recorded as slow, @ 4.0m recorded fast, standing water level 4.5m bgl.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH8A Page 1 of 1	
					Date 03/11/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Dark grey/grey/black very sandy (fine-medium) fine-coarse, subangular GRAVEL of limestone, ashes and cinders. MADE GROUND (0.60)						
			0.60	Dense black/dark grey very sandy, very silty, clayey fine-medium subangular GRAVEL of limestone, granite with timber fragments and ashes. Deposit is wet from 1.4m. Strong oil/chemical odour, oil sheen to water. MADE GROUND (1.00)						
	Δ		1.60	Driving timber fragment (sleeper). No recovery. MADE GROUND (0.20)						
			1.80	Timber/sleeper fragment recovered. MADE GROUND (0.10)						
			1.90	Soft black very gravelly, clayey SILT. Gravel is fine-medium, subangular-subrounded of brick and timber. Deposit is wet. Strong chemical/oil odour. MADE GROUND (1.20)						
	Δ		3.10	Firm brown silty CLAY. (3.90)				ES	3.00	
			7.00	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
1.40 2.50	slow/med medium							

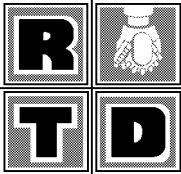
Remarks Reinforced concrete broken out by others. Clear services. Chiselling/slow boring 1.6-1.9m 1 hour 11.10-12.10pm. Water entry @ 1.4m recorded as slow/medium, @ 2.5m recorded as medium.	
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ROTARY TEST DRILLING Marshes Farm, Coach Road, off Wigan Road, Hart Common, West Houghton, Bolton BL5 2BT Tel: 01942 - 810348 Fax: 01942 - 840543					Site Maelor Gas Works, Wrexham.			Job No. 52/13	
					Client I&H Brown			Borehole BH9 Page 1 of 1	
					Date 27/11/13		O.D. Level		

Day	Water Level	Casing Depth	Strata Depth	Description of Strata	Leg-end	Inst.	Reduced Level	Sample Type	Sample Depth	'N' Value
			G.L.	Grass over brown sandy (medium) very clayey TOPSOIL with roots. MADE GROUND (0.20)						
			0.20	Brown very clayey, very sandy (fine-medium) fine-medium subrounded-subangular GRAVEL of Limestone/very gravelly fine-medium SAND. Deposit is damp from 0.6m bgl. MADE GROUND (0.60)				ES	1.00	
			0.80	Black fine-medium, subangular-subrounded GRAVEL of ashes and cinders. Deposit is wet. MADE GROUND (0.25)						
			1.05	Soft grey clayey, sandy (fine-medium) SILT, slightly organic/peaty/fibrous roots. (0.35)						
			1.40	Stiff brown silty CLAY. (1.10)				ES	2.00	
			2.50	Base of Borehole						

Symbols U - undisturbed sample J - jar sample B - bulk sample W - water sample N - Standard Penetration Test Δ - Water entry ▲ - Water level									
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Ground Water Entry	Estimated Rate of Entry	Observation Time (mins)	Water Level Rising to	Depth of Casing at Entry	Depth of Casing to Seal	Date	Standing Water Level	Condition of Borehole Cased / Open
0.80	slow/med					27/11	0.80	OPEN

Remarks Clear services water entry @ 0.8m recorded as slow/medium, standing water level 0.8m bgl.	
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Wrexham Gas Works
Boreholes & Trialpits 12/12/2013

<u>Code</u>	<u>Easting</u>	<u>Northing</u>	<u>Height</u>
BH2	338037.721	348096.252	30.371
BH3	338000.858	348184.194	30.187
BH4	338012.244	348212.040	30.549
BH5	338018.725	348232.438	30.069
BH6	338022.147	348240.949	30.156
BH7	338026.351	348239.900	30.153
BH22	338067.840	348036.290	30.382
BH23	338031.968	348073.744	30.566
BH24	337989.460	348037.140	31.496
BH3A	338000.765	348186.608	30.223
BH4A	338011.461	348217.108	30.627
BH4B	338005.530	348196.377	30.213
BH8A	338039.481	348235.510	30.212
TRP1	338031.455	348045.201	30.290
TRP2	338022.080	348046.362	30.431
TRP3	338006.796	348048.200	30.475
TRP4	337994.410	348077.175	30.516
TRP5	337989.212	348089.521	30.528
TRP6	337997.902	348070.405	30.547
TRP7	338008.617	348098.599	30.344
TRP8	337980.678	348104.304	30.517
TRP9	337994.661	348123.216	30.167
TRP10	338009.401	348120.384	30.487
TRP11	338000.957	348181.600	30.244
TRP12	338011.687	348178.005	30.144
TRP13	338009.958	348185.753	30.260
TRP15	338118.832	348210.439	29.850
TRP16	338109.600	348198.928	29.979
TRP17	338142.523	348213.998	29.930
TRP18	338141.490	348190.538	30.004
TRP19	338133.682	348203.914	30.062
TRP20	338082.990	348237.662	29.974
TRP21	338086.365	348243.473	30.073
TRP22	338052.466	348227.419	30.162
TRP23	338047.063	348196.125	30.561
TRP24	338038.528	348208.446	30.689
TRP25	338019.617	348203.417	30.683
TRP26	338052.621	348210.956	30.553
TRP27	338064.918	348234.005	30.092
TRP28	338057.103	348242.923	30.160
TRP29	338097.152	348237.951	29.395
TRP30	338299.614	348046.069	27.514
TRP30	338269.471	348042.372	28.185
TRP31	338263.526	348027.008	28.811
TRP32	338267.902	347999.050	29.130
TRP33	338243.158	347981.671	29.894
TRP34	338284.369	348000.306	28.524
TRP35	338289.823	348007.479	28.009
TRP36	338288.249	348021.942	27.975
TRP37	338309.788	348023.291	27.009
TRP38	338301.100	348035.514	27.455

TRP39	338298.916	348046.051	27.562
TRP48	337588.891	348123.653	29.986
TRP49	338112.507	348229.805	29.654
TRP50	338116.759	348231.365	29.578
TRP51	338115.936	348234.487	29.322
TRP8A	337993.689	348102.204	30.422
BH99 104	338034.916	348236.813	30.196
WATERPIPE	338093.098	348207.899	29.892

Description

Appendix D
Radiological Survey Report

RESTRICTED * COMMERCIAL

Radiological Survey Report of Maelor Gas Works Site, Wrexham
for
I&H Brown

February 2014

aurora health physics services ltd

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Report Title: Radiological Survey Report of Maelor Gas Works
Site, Wrexham for I&H Brown

Customer Contact: James Wood

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	Name	Position	Date	Signature
Author	Jon Taylor	Radiation Protection Adviser	24/02/14	
Reviewer	Allan May	Director	24/02/14	A. May

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1. INTRODUCTION

Aurora Health Physics Services Ltd (Aurora) were requested by I&H Brown to carry out a surface and intrusive radiological survey of the Maelor Gas Works Site at Wrexham. The survey was carried out from 18th November to 13th December 2013. The site has previously used catalyst pellets containing depleted uranium in a gas recovery process. The depleted uranium pellets and associated contamination were remediated by WasteChem in the late 1990's (ref. 1). Confirmation was obtained from Natural Resources Wales that the Permits for Accumulation and Disposal of Radioactive Waste (AW9498 and AY8590) issued to British Gas, Wales were revoked, in March 1997 and July 1998 respectively. The purpose of this survey was to carry out a complete survey of the site to current standards and legislation and to establish if the extent of any existing radiological contamination of the site at levels of regulatory concern.

2. RADIOLOGICAL SURVEY

2.1 External Areas Survey

The external ground survey was undertaken using Aurora's 'RadSurvey' System (RadSurvey). The RadSurvey instrument consists of a sensitive gamma radiation detection system linked to a Global Positioning System (GPS) enabling accurate gamma radiation contour mapping of the site. The data collected during the survey is used to accurately demonstrate and validate the radiological status of the site.

The survey system is configured using real time differentially corrected GPS to provide continual spatial reference information allowing the survey unit to be operated at sub*metre accuracy. Radiation and positional information is displayed and collected autonomously in the data logger.

2.1.1 RadSurvey Detector and Ratemeter

The survey unit is configured with a 75mm by 75mm high*sensitivity sodium iodide detector mounted in a protective case carried at a height of approximately 0.2m above ground level.

The detector is connected to a multi*channel analyser (MCA) which is configured to provide gross gamma counts per second, every second, to the data logger. However if areas of interest (or areas with above background radiation readings) are identified then the system can be used in gamma spectrometry mode, a spectrum taken, and the likely radionuclides identified. The RadSurvey system is capable of detecting material of regulatory interest to a depth of approximately 0.3m in soil. Therefore at soil depths significantly greater than 0.3m it

is possible that radioactive contamination may not be identified. The RadSurvey detector responds to gamma rays only. The key radionuclide in depleted uranium ^{238}U does not emit a gamma ray however its daughter product ^{234}Th does emit a low energy gamma ray (at 5% abundance) and therefore the system does respond to depleted uranium.

2.1.2 RadSurvey Methodology

The survey methodology involved traversing the site in nominal 1m wide lanes using the survey equipment. Data was accumulated at the rate of one reading per second and recorded in the data logger, resulting in one radiation reading per 1m^2 of the accessible areas of the site. Global Position System (GPS) information is automatically linked to the radiological data for ease of interpretation.

In areas of the site where the ground is populated with trees or shrubs, GPS coverage is not always 100 percent and gaps in the displayed data are possible. Where this occurs, detector data is still collected and reviewed to check if any high count rates are observed in any areas that aren't covered by the GPS.

2.2 RadSurvey Results

Using a Geographical Information System (GIS) the gathered data is displayed in map form. Interpolation was carried out on the data to provide a display of the radiation contours of the site as a surface picture.

During the survey over 236,000 survey points were recorded. Count rates ranged from a minimum of 73 cps to a maximum of 1124 cps with an average of 231 cps. There were 9,532 readings above the mean plus 2 standard deviations (401 cps) representing 4% of results (i.e typical of a normal distribution). Areas of inconsistent elevated count rate were investigated further and are discussed in the following sections.

2.2.1 RadSurvey Results Main Site

The map of radiation count rate for the main site can be seen below in Figures 1 and 2.

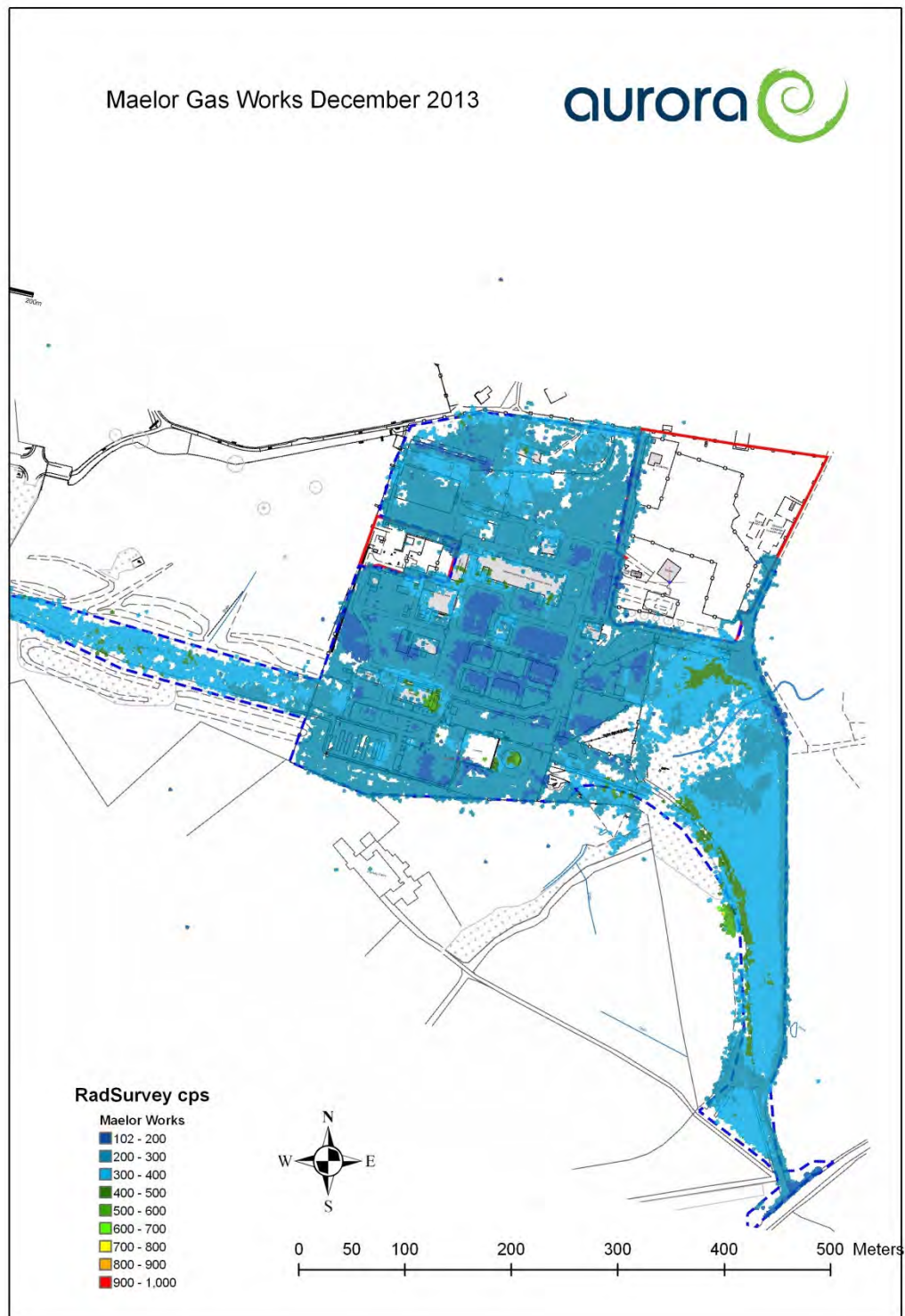


Figure 1 RadSurvey Map of Maelor Gas Works Site.

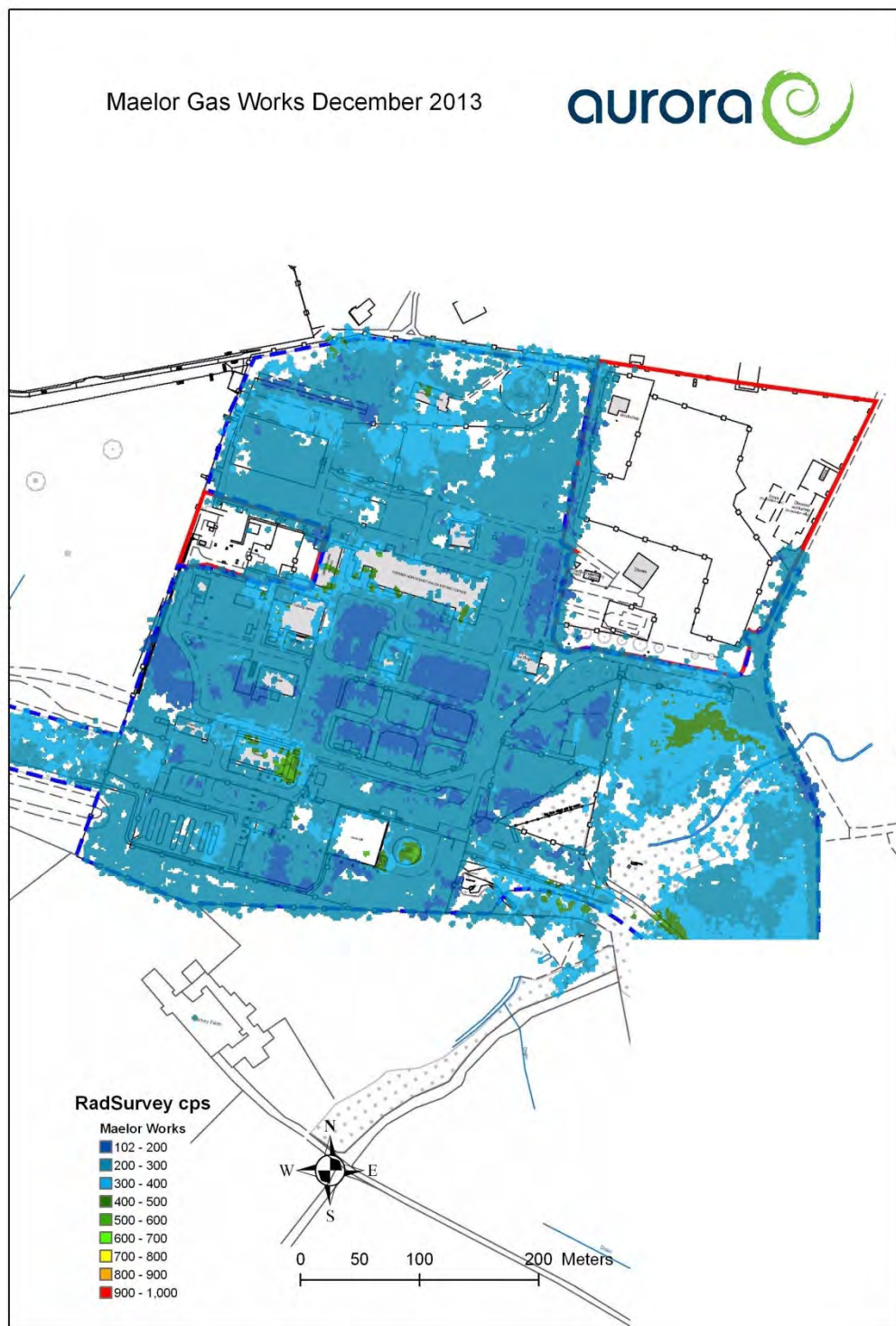


Figure 2 RadSurvey Map of Maelor Gas Works Main Site.

Typical background count rates vary from 150 to 250 cps which are indicated in blue on the above figure. There were some areas of [REDACTED] count rate on the main site in the range 400 to 600 cps as indicated in green on the above figure. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Other areas of [REDACTED]
readings were created by naturally occurring radioactive materials in soil which again gave
higher count rates where the detector was placed next to soil below and to the side such as
near banks, dips and trenches. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

There were some areas of the main site where it was not possible to access because of
dense vegetation. In these areas a gardening contractor was employed to cut access paths
so that good coverage could still be obtained (see Figure A3 in Appendix 1) even though a
reading in every square metre could not be achieved. Some areas of the site had heavy tree
coverage and in these areas it is not possible to obtain GPS satellite data, however they
were still surveyed using the detector. No [REDACTED]

[REDACTED]

2.2.2 RadSurvey Results Area B West

The map of radiation count rate for Area B West can be seen below in Figure 3.

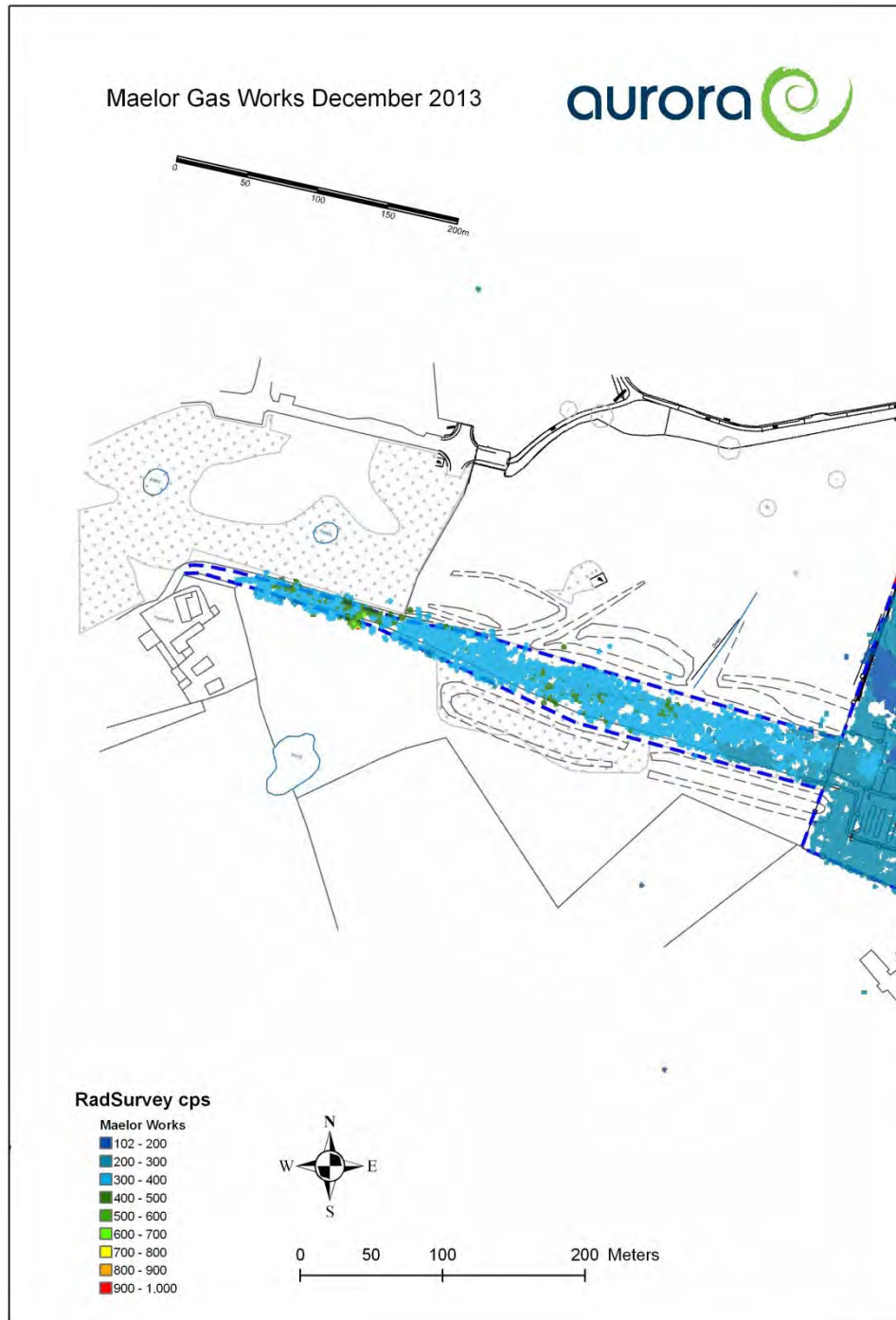


Figure 3 RadSurvey Map of Maelor Gas Works Site Area B West.

Typical background count rates vary from 150 to 250 cps which are indicated in blue on the above figure. There were some areas of [REDACTED] count rate on the Area B West site in the range 400 to 600 cps as indicated in green on the above figure. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

One area [REDACTED] was investigated further (see Figure 3 below). Excavation of this area revealed some pieces of glazed brick (see Figures A10 and A11 in Appendix 1). Decorative glazed bricks containing naturally occurring uranium are often found in municipal structures such as railways and hospitals. [REDACTED]

[REDACTED]



Figure 4 Area of Elevated Count Rate at Area B West.

Some areas of the site had heavy tree coverage and in these areas it is not possible to obtain GPS satellite data, however they were still surveyed using the detector. No [REDACTED]

[REDACTED]

2.2.3 RadSurvey Results Area B East

The map of radiation count rate for Area B East can be seen below in Figure 4.

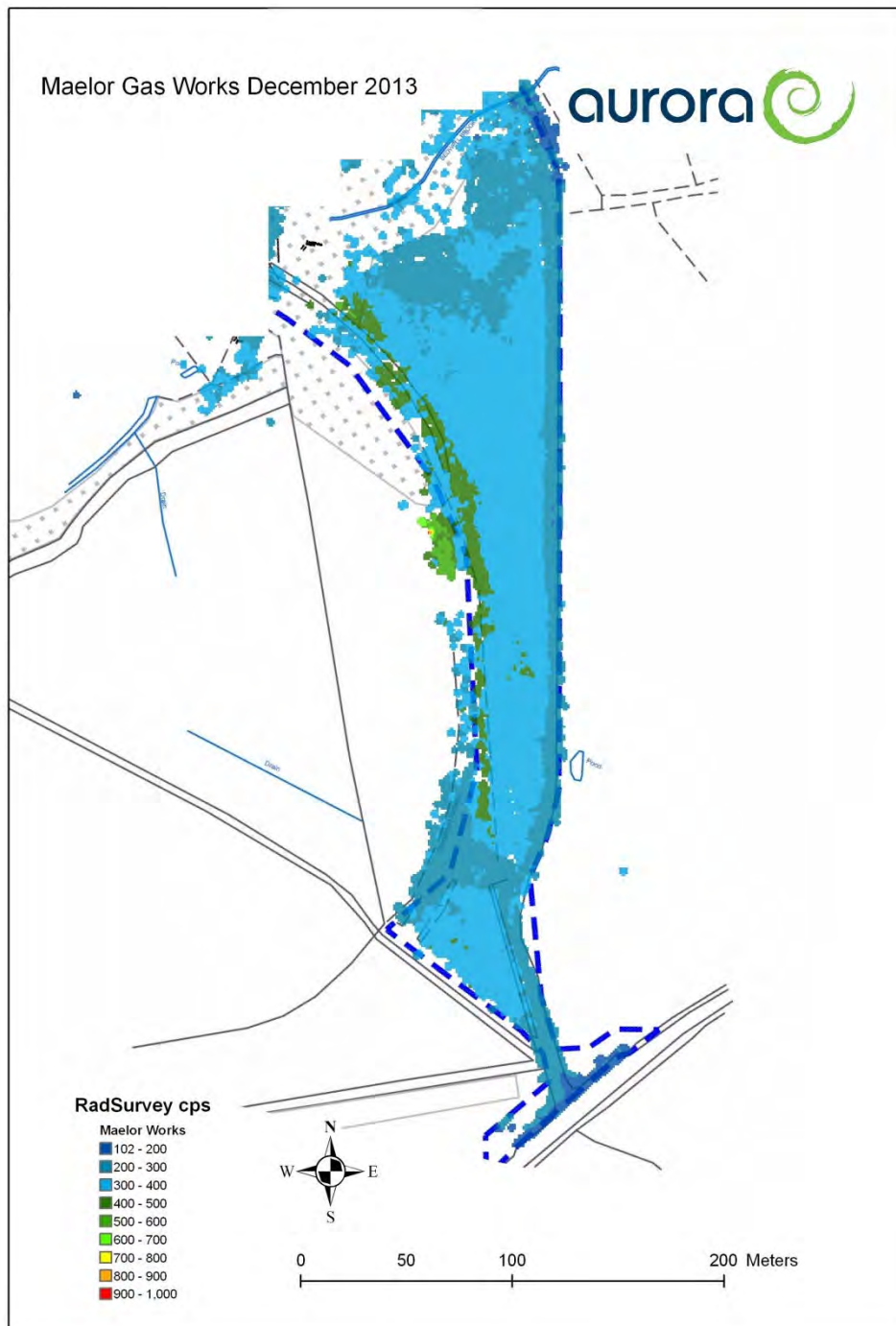


Figure 5 RadSurvey Map of Maelor Gas Works Site Area B East.

Typical background count rates vary from 150 to 250 cps which are indicated in blue on the above figure. There were some areas of [REDACTED] count rate on the Area B East site in the

range 400 to 600 cps as indicated in green on the above figure. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

One area of [REDACTED] count rate (up to 900 cps) [REDACTED]
[REDACTED] was investigated further (see Figure 6 below). Excavation of this area
revealed buried ash. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

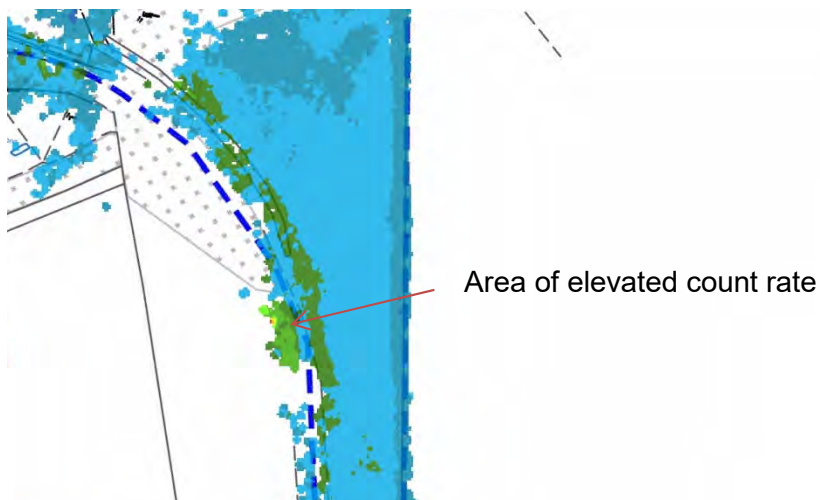


Figure 6 Area of Elevated Count Rate at Area B East.

2.3 Building Surveys

2.3.1 Floor probe

The Ludlum 239*1F floor probe consists of a gas proportional counter linked to a rate meter and is displayed in Figure 7. The height adjustable detector head has a proportional counter with a large active area of 582cm^2 . The counter contains thin anode wires inside a constant flow proportional gas detector using an argon methane gas mix, the gas provides a constant electrical charge gain while excluding air. The counter is sensitive to alpha and beta radiation (although it does not discriminate between them) through the aluminised boPET (biaxially* oriented polyethylene terephthalate) window covered by a protecting mesh. The probe is operated at a low walking speed (approximately 0.2 ms^{-1}).

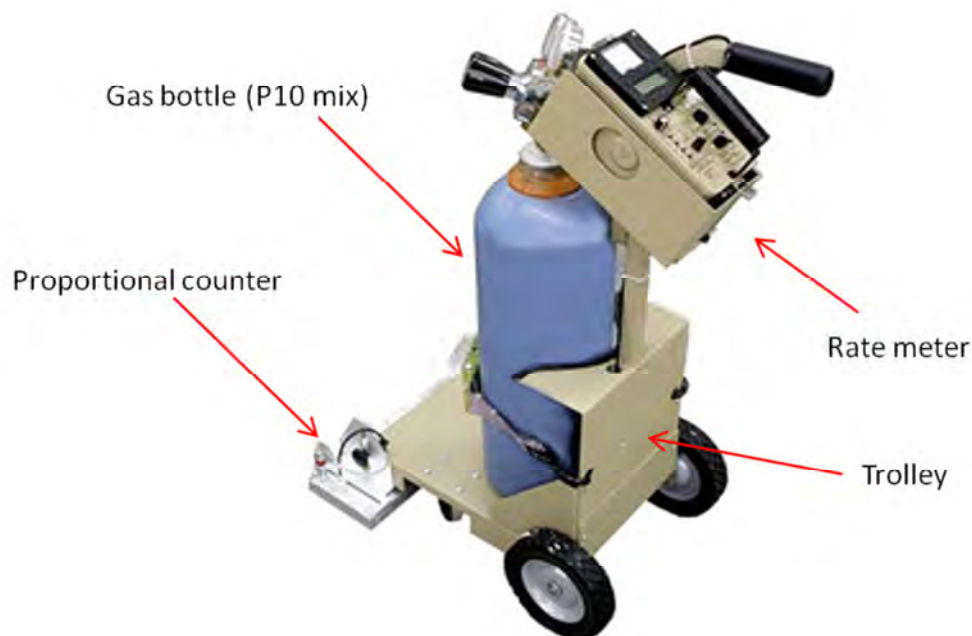


Figure 7: Ludlum 239*1F Floor Monitor

2.3.2 Other instruments

While the floor probe was used to cover some floor areas, hand held probes were also used to survey uneven floors, walls, benches, sinks and ventilation extracts. Details of all the instruments used are provided below in Table 1.

Table 1 Instruments Used

Instrument	Serial number	Calibration Due Date	Background Reading	Function Test Pre Work	Function Test Post Work
Floor Probe	146345 RN 015629	14/01/2014	$\alpha + \beta$ 800 – 1000 cpm	OK	OK
RM6 1667 Beta probe	AHP0236	08/02/2014	β 10 – 15 cps	OK	OK
Electra BP19 Beta probe	AHP0229	15/03/2014	β 10 *15 cps	OK	OK
Electra DP6 Alpha & Beta probe	AHP0098	06/02/2014	α 0.1 cps β 8*12 cps	OK	OK
Electra DP6 Alpha & Beta probe	AHP0273	11/10/2014	α 0.1 cps β 8*12 cps	OK	OK
Mini 900 44A Gamma probe	AHP0129	02/08/2014	γ 5 – 10 cps	OK	OK
Mini 900 44A Gamma probe	AHP0271	21/06/2014	γ 5 – 10 cps	OK	OK
Identifinder Gamma spectrometer	2506	07/02/2014	γ 50 – 80 cps	OK	OK

The background radiation readings measured on site are provided in Table 1 above. All organic materials contain some level of radioactivity. Naturally occurring radionuclides include the uranium (^{238}U and ^{235}U) and thorium (^{232}Th) decay chains commonly found in soils and rock and radioactive potassium (^{40}K) commonly found in wood, clay and brick. These background levels vary between different materials (e.g. rock and soil) and in different areas of the UK. The background readings for different instruments are detailed in this report as measured on the site however they are also typical of average background levels found throughout the UK.

2.4 Building Survey Results

All the buildings on site were surveyed including:

- Main reception
- Workshops
- Western Gas Alliances Building
- Wales and West Stores
- Former paint store
- Former North East Wales District Offices

Floors and walls of all buildings were surveyed (see Figure A4 in Appendix 1) [REDACTED]

[REDACTED]

[REDACTED]

2.5 Drain Surveys and Water Samples

Accessible drains were surveyed and swabbed, each drain cover was lifted and the drain was monitored using surface contamination probes (Electra DP6) and a gamma sensitive detector (Mini 900 44A). Swabs were analysed on the Aurora Tricab Liquid Scintillation Counter, the counter can identify the presence of soft beta emitting radioisotopes such as ^3H (tritium) as well as other radioisotopes. The drain survey results in are given in Table 2.

Table 2 Smear samples & liquid scintillation counter results

Sample	Sample Description	Liquid scintillation counting result counts per minute (cpm)			Surface contamination
		Channel 1 0 * 19 keV	Channel 2 19 * 156 keV	Channel 3 156*2000 keV	
S1	Background standard	14	7	11	
S2	Tritium standard	126,339	604	13	
S3	C14 standard	26,252	100,449	548	
1	Water sample from drain at SJ 38187 48274	10	13	14	<0.1 Bq/ml
2	Water sample from drain at SJ 38173 48272	8	15	13	<0.1 Bq/ml
3	Water sample from drain at SJ 38012 48268	26	13	15	<0.1 Bq/ml
4	Water sample from drain at SJ 38052 48287	28	16	16	<0.1 Bq/ml
5	Swab sample from drain at SJ 38042 48032	16	24	19	<0.1 Bq/cm ²

Sample	Sample Description	Liquid scintillation counting result counts per minute (cpm)			Surface contamination
		Channel 1 0 * 19 keV	Channel 2 19 * 156 keV	Channel 3 156*2000 keV	
6	Swab sample from drain at SJ 38042 48032	28	21	17	<0.1 Bq/cm ²

Note: Count rates exceeding approximately 120 cpm indicate that radioactivity is present

The location of water samples can be seen below in Figure 8

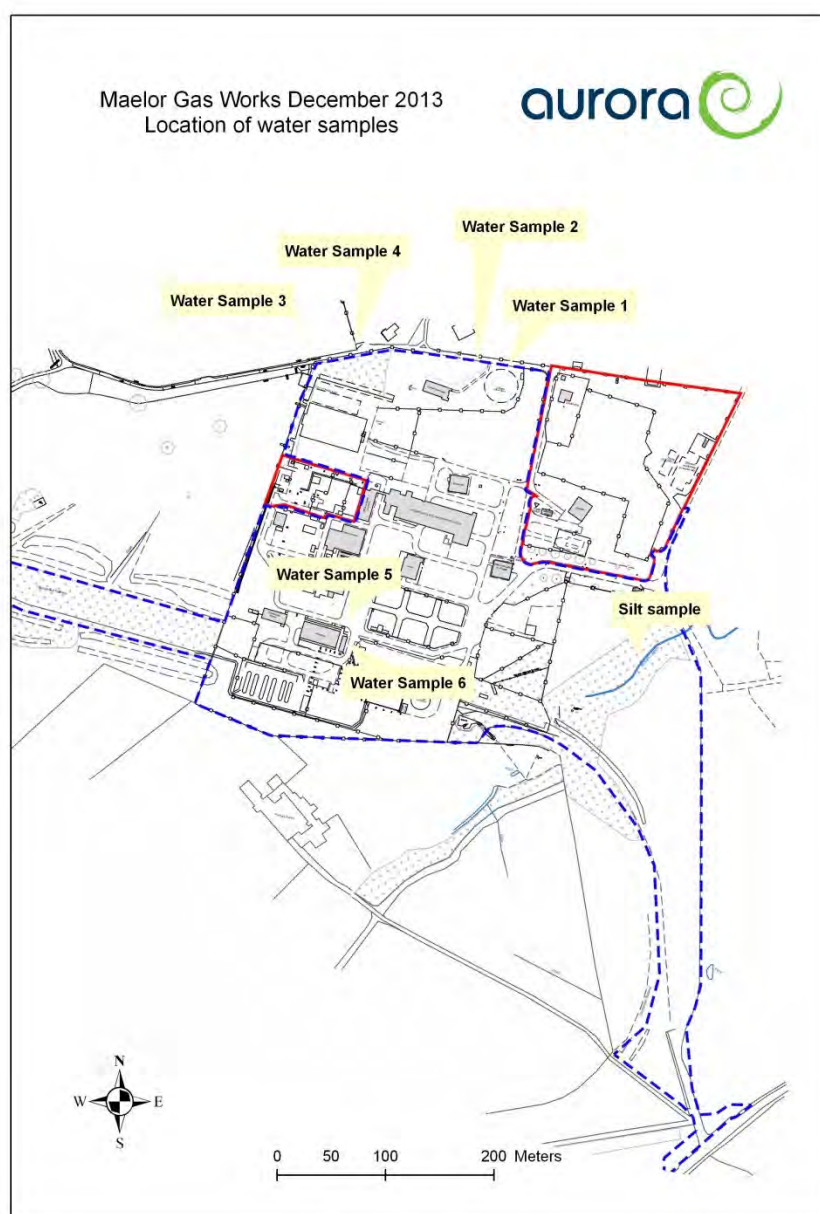


Figure 8 Location of water samples

3. BOREHOLES & TRIAL PITS

Boreholes and trial pits were excavated around the site under supervision by an Aurora Radiation Protection Supervisor (RPS). A cordoned off 'Supervised Area' was designated at each excavation site and a pre*works radiological survey was carried out at the surface.

For trial pits the top soil was removed and placed to one side and monitored for radioactive contamination. All arisings were then placed on a polythene sheet and each load monitored for radioactive contamination. A sample was taken from material with higher count rates if applicable. The trial pit was then back filled and top soil replaced. The bucket and tyres of the excavator were monitored for radioactive contamination before the 'Supervised Area' was removed prior to moving to the next location. Excavators and drilling rigs were regularly monitored during excavation work and again before going off site.

3.1 Trial Pits and Boreholes on the Main Site

The following trial pits were supervised on the main site:

TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP8A, TP9, TP10, TP11, TP12, TP13, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23, TP24, TP25, TP26, TP27, TP28, TP29, TP30, TP31, TP32, TP33, TP34, TP35, TP36, TP37, TP40, TP41, TP49, TP50, TP51.

No regions of [REDACTED] count rate were found during surveys of all the trial pits. Some pellets were observed in Trial Pit 4 although these were not radioactive and matched the previous description of non-radioactive spacers (ref. 1). TP4 was in the location of the previous remediation work in the late 1990s.

The following boreholes were supervised on the main site:

BH1, BH2, BH3, BH4, BH5, BH6, BH7, BH23, BH24

For boreholes, arisings were placed on a large polythene sheet and monitored as earth was removed and readings taken at successive depths. Samples were taken from the region of highest count rate if there were variations. On some of the boreholes it was possible to lower a gamma probe on an extended cable to obtain gamma count rate at various depths. The results of those measurements can be found in the tables below. It should be noted it is common for the probe reading to increase with depth as the probe is increasingly surrounded by naturally occurring radioactivity in soil. Count rates in excess of 50 cps by Mini 900 44A would typically indicate artificial radioactivity. [REDACTED]

Table 3 Excavation ID: **Borehole 6 IHB B/H6 021213**

Depth mm	Gamma Count Rate Mini 900 44A cps
0	10
100	10
200	15*20
300	15*20
500	15*20
1000	15*20
2000	15*20
3000	15*20
4000	15*20
5000	15*20

Table 4 Excavation ID: **Borehole 5 IHB B/H5 041213**

Depth mm	Gamma Count Rate Mini 900 44A cps
0	10
100	10
500	10
1000	10
2000	10
3000	10
4000	10
4500	20
5000	20*25
5500	20*25
6000	20*25
6500	25*30

Water at 6500mm

Table 5 Excavation ID: **Borehole 23 IHB B/H23 091213**

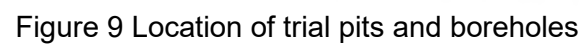
Depth mm	Gamma Count Rate Mini 900 44A cps
0	10
100	10
200	10
300	10
400	10
500	10
600	15*20
700	15*20
800	15*20
900	15*20
1000	15*20
1200	15*20

Water at 1.2m

Table 6 Excavation ID: **Borehole 24 IHB B/H24 091213**

Depth mm	Gamma Count Rate Mini 900 44A cps
0	10
100	10
200	10
300	10
400	10
500	10
600	15*20
700	15*20
800	15*20
900	15*20
1000	15*20
1200	15*20

Water at 1.2m



4. SAMPLE ANALYSIS

Samples from boreholes and trial pits were taken by Aurora for analysis by Environmental Scientifics Group (ESG) a summary of the results is provided in Table 18 below with the full report in Appendix 3.

Some of the samples showed levels of the man*made radionuclide ^{137}Cs above the limit of detection [REDACTED] [REDACTED] S.

The soil sample from TP4 (where the previous remediation work had been carried out in the late 1990's) showed some elevated levels of depleted uranium. Depleted uranium is characterised in a gamma spectroscopy sample by the ^{238}U daughter product ^{234}Th which is a gamma emitter. The absence of daughter products from lower down the decay chain (such as ^{214}Pb and ^{214}Bi) indicate processed rather than natural uranium. The maximum measured depleted uranium level at TP4 was 590 Bq/kg. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Table 18 Sampling results Main Site

Sample Ref	Description	¹³⁷Cs Bq/kg	²¹⁰Pb Bq/kg	²¹⁴Bi Bq/kg	²²⁶Ra Bq/kg	²³⁴Th Bq/kg	²³⁵U Bq/kg
BH4	Soil from BH4	<0.7	<20	14	31	<30	<4
BH7	Soil from BH7	<2	<20	21	45	<20	<4
TP3	Soil from TP3	<2	<30	20	50	<30	<5
TP2	Soil from TP2	<1	<30	19	<20	<30	<2
TP7	Soil from TP7	<2	<30	16	*	81	<4
TP4	Soil from TP4	<2	<30	37	*	590	15
TP5	Soil from TP5	<2	<30	46	90	<30	<6
TP32	Soil from TP32	<2	<20	22	<20	<30	<2
BH24	Soil from BH24	<2	<30	30	59	<40	<6
TP51	Soil from TP51	<2	<30	13	<20	<30	<2
BH11	Soil from BH11	5	<30	27	57	<30	<6
BH1	Soil from BH1	<2	<30	14	<20	<30	<2
TP8	Soil from TP8	<2	<30	31	54	<30	<4
BH6	Soil from BH6	<2	50	28	48	<30	<5
TP15	Soil from TP15	3.7	<30	12	<40	<30	<2
TP28	Soil from TP28	<2	<30	20	<30	<30	<2
W13	Sludge from drain at SJ 38034 48098	12	170	12	<30	<30	<2
W3A	Silt from site stream	3.3	58	13	<20	<30	<1
W4	Sludge from drain at SJ 38002 48047	<2	<20	16	<20	<20	<2
W5	Sludge from drain at SJ 38042 48032	<2	<30	14	<20	<30	<2
W8	Sludge from drain at SJ 38081 48060	31	140	8	<20	<30	<2
W3	Sludge from drain at SJ 37967 48102	23	210	11	<20	<20	<2

Appendix 1 Photos



Figure A1 Non*radioactive pellets found on main site



Figure A2 Using the RadSurvey system on the Maelor site.



Figure A3 Pathways cut through heavy vegetation to facilitate survey



Figure A4 Carrying out internal building surveys



Figure A5 Supervised Radiation Area signs at dig locations.

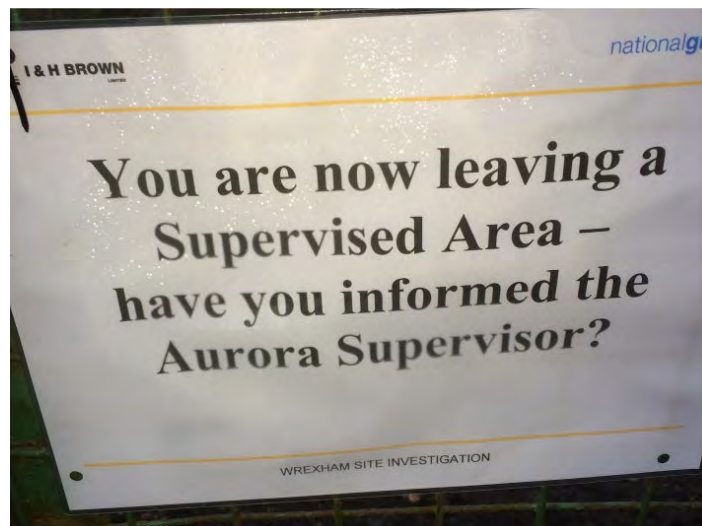


Figure A6 Signs on exit



Figure A7 The health physics surveyor supervises drilling works and monitors excavated material.



Figure A8 Supervising and monitoring drilling works.



Figure A9 [REDACTED] count rates due to naturally occurring radioactivity in ash.



Figure A10 [REDACTED] beta and alpha count rates from naturally occurring radioactivity in a ceramic glazed brick.



Figure A11 [REDACTED] gamma count rates from naturally occurring radioactivity in a ceramic glazed brick.



Figure A12 [REDACTED] count rate on the RadSurvey were due to the proximity of naturally occurring radioactivity in brick.

Appendix 3 Gamma Spectroscopy Results



Test Report: **RM4412**

Radiochemical Analysis of Soil Samples

Prepared for Emma Leishman
Aurora Health Physics
January 2014



Radiochemical Analysis of Soil Samples

Customer: Aurora Health Physics
3 The Terrace
Library Avenue
Harwell Oxford
Oxfordshire
OX11 0SG

Testing Facility: Environmental Scientifics Group
Unit 12
Moorbrook
Southmead Industrial Park
Didcot
Oxon
OX11 7HP

Quote Number: ENR-ANU-7512Rev3

Customer Reference: Maelor Gas Works

Laboratory Reference: RM4412

Samples Received: 18 December 2013

Sample Condition: Satisfactory, Ambient

Analysis Completed: 07 January 2014

Report Author:

A blue ink signature, likely belonging to Carla Madeley, written over a horizontal line.

Author's Name: Carla Madeley

Job Title: Analyst

Approved by: *M. Lane*

Date: 13/01/14

Approver's name: Melanie Lane

Job Title: Analyst

Report Date: 13 January 2014



Test Report RM4412: Page 1 of 8



Introduction

The samples were received in good condition and logged into the Environmental Scientifics Group sample receipt system.

Experimental

The samples were placed in containers to match the appropriate calibration geometries and then measured by high-resolution gamma ray spectrometry.

Radioactivity Analysis by Gamma Ray Spectrometry (SOP/2029 Issue 4)

The measurement technique is based on the use of high purity germanium (HPGe) detectors coupled to an Ortec gamma ray spectroscopy system. The gamma ray spectra are stored on a computer and analysed using the software programme Fitzpeaks for photopeak identification and quantification. The detectors are calibrated for efficiency using a mixed radionuclide standard, which covers an energy range of approximately 60-2000 keV. The efficiency of gamma rays between 30 keV and 120 keV are determined on an individual basis.

Application of decay corrections for the naturally occurring daughter radionuclides of uranium and thorium assumes that the series daughter radionuclides are all in secular equilibrium and therefore decay with the half-life of the first radionuclide in the series.

Results

Results are presented in the following tables. Result uncertainties for each analysis are stated in the results tables or beneath the tables where applicable.

It should be noted that tests/sampling marked with an asterisk "*" in this report are not included in the UKAS accreditation schedule for the laboratory.



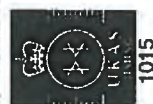


High Resolution Gamma Ray Spectrometry Results

Customer Reference	Laboratory Reference	Be-7	K-40	Co-60	Cs-134	Cs-137	Tl-208	Pb-210	Pb-212	Bi-212
BH4	RM4412	<6	290 ± 27	<0.8	<0.9	<0.7	6.9 ± 0.86	<20	20 ± 1.8	20 ± 7.3
BH7	RM4413	<9	330 ± 38	<2	<2	<2	9.1 ± 1.3	<20	27 ± 2.6	39 ± 13
TP3	RM4414	<9	310 ± 35	<2	<2	<2	8.8 ± 1.5	<30	25 ± 2.5	<20
TP2	RM4415	<8	440 ± 43	<2	<2	<1	9.1 ± 1.2	<30	28 ± 2.5	37 ± 12
TP7	RM4416	<8	280 ± 32	<2	<2	<2	5.7 ± 1.1	<30	17 ± 1.9	<20
TP8	RM4417	<8	340 ± 30	<2	<2	<2	9.1 ± 1.2	<30	20 ± 1.8	20 ± 7.3
TP9	RM4418	<8	500 ± 30	<2	<2	<2	11 ± 2.1	<30	20 ± 1.8	20 ± 7.3
TP4	RM4419	<10	160 ± 27	<2	<2	<2	9.6 ± 1.4	<30	27 ± 2.7	<20
TP5	RM4420	<20	240 ± 38	<3	<2	<2	12 ± 1.8	<30	35 ± 3.6	<30

Notes:

- Results are presented as Bq.kg⁻¹ of sample as received
- Detector calibrations are based upon homogeneous standard solutions. For quantification purposes the samples are assumed to be homogeneous.
- An asterisk * indicates that the analysis is not covered by UKAS accreditation.
- ²²⁶Ra has only one gamma ray at 186 keV and the major gamma ray from ²³⁵U also occurs at 186 keV. ²³⁵U can be measured by the lower abundance gamma ray at 144 keV and if a positive result for ²³⁵U is reported the ²²⁶Ra result will be unreliable and overestimated. However even if ²³⁵U is below the LoD there may still be a contribution to the ²²⁶Ra from ²³⁵U and the ²²⁶Ra result may be unreliable and overestimated. If an accurate result for ²²⁶Ra is required this is better obtained by radiochemical analysis.
- Results below and above the LoD are reported to 1 and 2 significant figures, respectively.



High Resolution Gamma Ray Spectrometry Results

Customer Reference	Laboratory Reference	Be-7	K-40	Co-60	Cs-134	Cs-137	Tl-208	Pb-210	Pb-212	Bi-212
TP32	RM4421	<10	420 ± 45	<2	<2	<2	9.5 ± 1.5	<20	33 ± 2.9	36 ± 14
BH24	RM4422	<20	760 ± 72	<2	<2	<2	17 ± 1.9	<30	52 ± 4	55 ± 18
TP51	RM4423	<20	160 ± 29	<2	<2	<2	4.6 ± 1.2	<30	12 ± 2.1	<20
BH11	RM4424	<20	600 ± 63	<3	<2	5 ± 1.6	14 ± 2	<30	45 ± 3.8	47 ± 19
BH1	RM4425	<8	370 ± 36	<2	<2	<2	8.3 ± 1.2	<30	25 ± 2.3	32 ± 11
TP8	RM4426	<9	110 ± 20	<2	<2	<2	2.9 ± 0.85	<30	7.3 ± 1.4	<20
BH6	RM4427	<9	320 ± 35	<2	<2	<2	8 ± 1.2	50 ± 19	28 ± 2.5	32 ± 12
TP15	RM4428	<20	310 ± 40	<3	<2	3.7 ± 1.4	7.9 ± 1.6	<30	24 ± 2.8	<30
TP28	RM4429	<9	250 ± 31	<2	<2	<2	7.2 ± 1.2	<30	23 ± 2.3	31 ± 12

Notes:

- Results are presented as Bq.kg⁻¹ of sample as received.
- Detector calibrations are based upon homogeneous standard solutions. For quantification purposes the samples are assumed to be homogeneous.
- An asterisk (*) indicates that the analysis is not covered by UKAS accreditation.
- 226Ra has only one gamma ray at 186 keV and the major gamma ray from 235U also occurs at 186 keV. 235U can be measured by the lower abundance gamma ray at 144 keV and if a positive result for 235U is reported the 226Ra result will be unreliable and overestimated. However even if 235U is below the LoD there may still be a contribution to the 226Ra from 235U and the 226Ra result may be unreliable and overestimated. If an accurate result for 226Ra is required this is better obtained by radiochemical analysis.
- Results below and above the LoD are reported to 1 and 2 significant figures, respectively.



1015

High Resolution Gamma Ray Spectrometry Results

Customer Reference	Laboratory Reference	Be-7	K-40	Co-60	Cs-134	Cs-137	Tl-208	Pb-210	Pb-212	Bi-212
W13	RM4432	18 ± 6.9	190 ± 14	<2	<2	<2	11 ± 1.1	<20	14 ± 1.7	<20
W3A	RM4433	25 ± 6.4	130 ± 21	<2	<1	3.3 ± 0.83	3.7 ± 0.84	58 ± 19	7.5 ± 1.3	<20
W13	RM4432	18 ± 6.9	240 ± 28	<2	<2	12 ± 1.5	5 ± 0.99	170 ± 34	14 ± 1.7	<20
W3A	RM4433	25 ± 6.4	130 ± 21	<2	<1	3.3 ± 0.83	3.7 ± 0.84	58 ± 19	7.5 ± 1.3	<20
W4	RM4434	<10	190 ± 27	<2	<2	<2	5 ± 1.1	<20	16 ± 2.1	<20
W5	RM4435	<9	200 ± 27	<2	<2	<2	5.1 ± 1.1	<30	15 ± 1.8	<20
W8	RM4436	<9	170 ± 25	<2	<2	31 ± 2.6	3.6 ± 0.92	140 ± 28	10 ± 1.7	<20
W3	RM4437	22 ± 7	200 ± 27	<2	<2	23 ± 2.1	3.6 ± 0.97	210 ± 37	11 ± 1.6	<20

Notes:

- Results are presented as Bq kg⁻¹ of sample as received.
- Detector calibrations are based upon homogeneous standard solutions. For quantification purposes the samples are assumed to be homogeneous.
- An asterisk "*" indicates that the analysis is not covered by UKAS accreditation.
- ²²⁶Ra has only one gamma ray at 186 keV and the major gamma ray from ²³⁵U also occurs at 186 keV. ²³⁵U can be measured by the lower abundance gamma ray at 144 keV and if a positive result for ²³⁵U is reported the ²²⁶Ra result will be unreliable and overestimated. However even if ²³⁵U is below the LoD there may still be a contribution to the ²²⁶Ra from ²³⁵U and the ²²⁶Ra result may be unreliable and overestimated. If an accurate result for ²²⁶Ra is required this is better obtained by radiochemical analysis.
- Results below and above the LoD are reported to 1 and 2 significant figures, respectively.





High Resolution Gamma Ray Spectrometry Results

Customer Reference	Laboratory Reference	Pb-214	Bi-214	Ra-224	Ra-226*	Ac-228	Th-234	Pa-234m	U-235	Am-241
BH4	RM4412	16 ± 1.6	14 ± 1.7	<20	31 ± 12	21 ± 2.4	<30	<90	<4	<2
BH7	RM4413	24 ± 2.3	21 ± 3	<20	45 ± 15	30 ± 4	<20	<200	<4	<2
TP3	RM4414	23 ± 2.3	20 ± 2.5	<30	50 ± 17	29 ± 3.6	<30	<200	<5	<3
TP2	RM4415	21 ± 2	19 ± 2.4	<30	<20	28 ± 3.3	<30	<200	<2	<3
TP7	RM4416	17 ± 1.9	16 ± 2.3	<20	58 ± 15	17 ± 2.9	81 ± 23	<200	<4	<3
TP4	RM4417	11 ± 0.8	10 ± 1.3	70 ± 13	85 ± 23	61 ± 5.6	30	300	3	<3
TP5	RM4418	38 ± 5.1	34 ± 4.9	30	300	14 ± 6	30	300	3	<3
TP4	RM4419	39 ± 3.1	37 ± 3.6	<30	220 ± 28	27 ± 4.2	590 ± 61	480 ± 150	15 ± 4.1	<3
TP5	RM4420	51 ± 4.1	46 ± 4.7	<30	90 ± 24	36 ± 5.1	<30	<300	<6	<3

Notes:

- Results are presented as Bq.kg⁻¹ of sample as received.
- Detector calibrations are based upon homogeneous standard solutions. For quantification purposes the samples are assumed to be homogeneous.
- An asterisk "*" indicates that the analysis is not covered by UKAS accreditation.
- ²²⁶Ra has only one gamma ray at 186 keV and the major gamma ray from ²³⁵U also occurs at 186 keV. ²³⁵U can be measured by the lower abundance gamma ray at 144 keV and if a positive result for ²³⁵U is reported the ²²⁶Ra result will be unreliable and overestimated. However even if ²³⁵U is below the LoD there may still be a contribution to the ²²⁶Ra from ²³⁵U and the ²²⁶Ra result may be unreliable and overestimated. If an accurate result for ²²⁶Ra is required this is better obtained by radiochemical analysis.
- Results below and above the LoD are reported to 1 and 2 significant figures, respectively



Test Report RM4412: Page 6 of 8



High Resolution Gamma Ray Spectrometry Results

Customer Reference	Laboratory Reference	Pb-214	Bi-214	Ra-224	Ra-226*	Ac-228	Th-234	Pa-234m	U-235	Am-241
TP32	RM4421	26 ± 2.4	22 ± 3.1	<20	<20	33 ± 4.3	<30	<200	<2	<2
BH24	RM4422	33 ± 3.1	30 ± 3.5	<30	59 ± 19	54 ± 5.2	<40	<200	<6	<3
TP51	RM4423	17 ± 2.1	13 ± 3	<20	<20	16 ± 4.9	<30	<200	<2	<3
BH11	RM4424	34 ± 3.4	27 ± 4.1	57 ± 18	57 ± 23	48 ± 6	<30	<300	<6	<3
BH1	RM4425	15 ± 1.9	14 ± 2.2	<20	<20	23 ± 3.3	<30	<200	<2	<2
TP8	RM4426	30 ± 2.6	31 ± 3.1	<30	54 ± 16	8.8 ± 3.3	<30	<200	<4	<3
BH6	RM4427	32 ± 2.6	28 ± 3	<20	48 ± 18	28 ± 3.5	<30	<200	<5	<2
TP15	RM4428	15 ± 2.4	12 ± 3.4	<30	<40	23 ± 4.9	<30	<300	<2	<2
TP28	RM4429	21 ± 2.2	20 ± 2.6	<20	<30	22 ± 3.5	<30	<200	<2	<3

Notes:

- Results are presented as Bq.kg⁻¹ of sample as received.
- Detector calibrations are based upon homogeneous standard solutions. For quantification purposes the samples are assumed to be homogeneous.
- An asterisk "*" indicates that the analysis is not covered by UKAS accreditation.
- ²²⁶Ra has only one gamma ray at 186 keV and the major gamma ray from ²³⁵U also occurs at 186 keV. ²³⁵U can be measured by the lower abundance gamma ray at 144 keV and if a positive result for ²³⁵U is reported the ²²⁶Ra result will be unreliable and overestimated. However even if ²³⁵U is below the LoD there may still be a contribution to the ²²⁶Ra from ²³⁵U and the ²²⁶Ra result may be unreliable and overestimated. If an accurate result for ²²⁶Ra is required this is better obtained by radiochemical analysis.
- Results below and above the LoD are reported to 1 and 2 significant figures, respectively



Test Report RM4412: Page 7 of 8



High Resolution Gamma Ray Spectrometry Results

Customer Reference	Laboratory Reference	Pb-214	Bi-214	Ra-224	Ra-226*	Ac-228	Th-234	Pa-234m	U-235	Am-241
RM4432	RM4432	9.8 ± 2.0	20 ± 2.0	<30	47 ± 4.0	33 ± 3.0	140	200	5	80
RM4434	RM4434	8.8 ± 2.0	22 ± 2.0	<30	54 ± 2.2	42 ± 4.1	140	200	5	80
W13	RM4432	15 ± 1.9	12 ± 2.4	<20	<30	14 ± 3.3	<30	<200	<2	<2
W3A	RM4433	14 ± 1.7	13 ± 2	<20	<20	9.3 ± 3	<30	<200	<1	<2
W4	RM4434	17 ± 2.2	16 ± 2.4	<30	<20	18 ± 3.2	<20	<200	<2	<2
W5	RM4435	15 ± 1.8	14 ± 2.3	<30	<20	17 ± 3.1	<30	<200	<2	<2
W6	RM4436	8.6 ± 1.6	8.3 ± 2	<30	<20	12 ± 2.9	<30	<200	<2	<2
W3	RM4437	12 ± 1.7	11 ± 2.4	<30	<20	15 ± 4.1	<20	<200	<2	<2

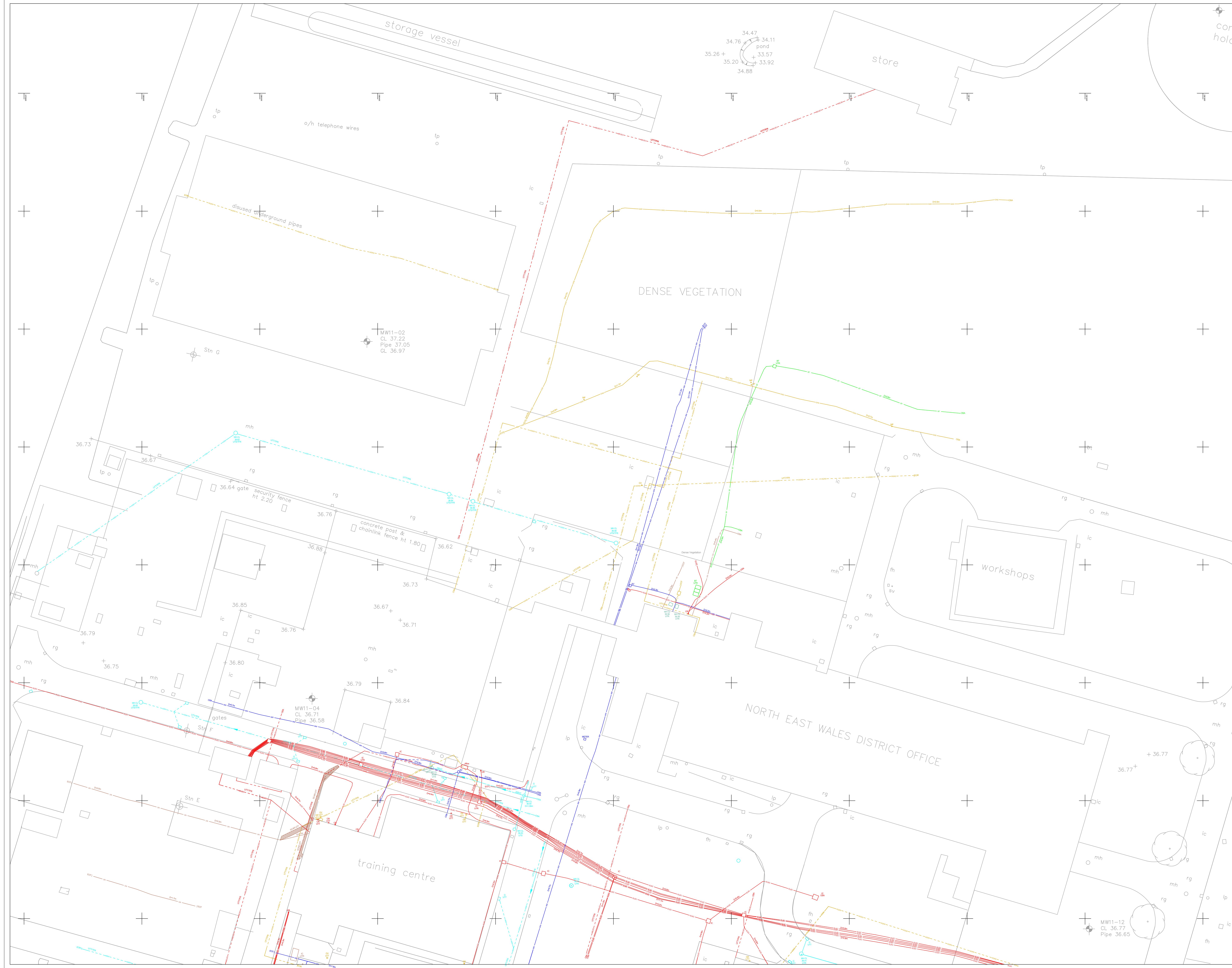
Notes:

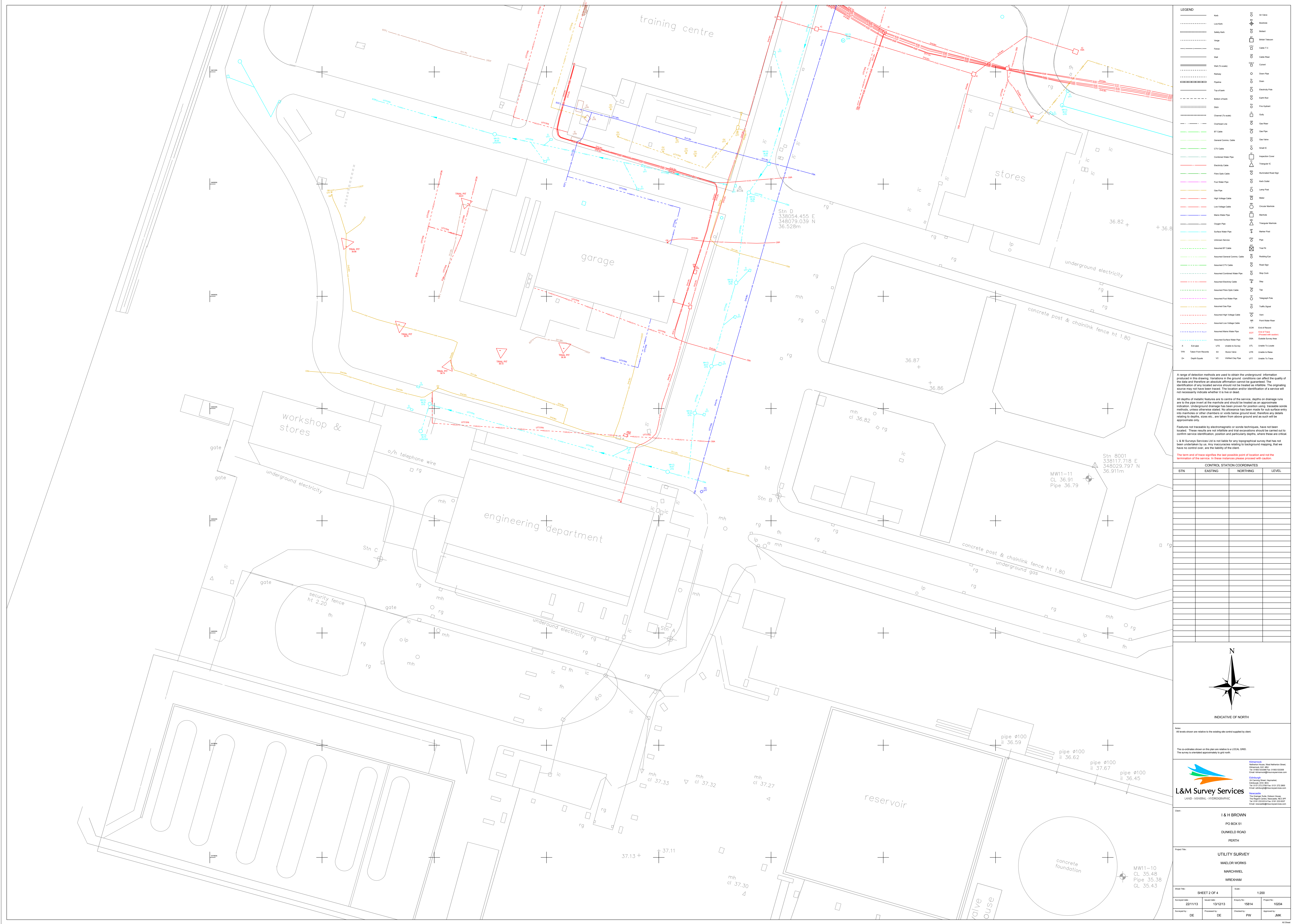
- Results are presented as Bq.kg⁻¹ of sample as received.
- Detector calibrations are based upon homogeneous standard solutions. For quantification purposes the samples are assumed to be homogeneous.
- An asterisk "*" indicates that the analysis is not covered by UKAS accreditation.
- ²²⁶Ra has only one gamma ray at 186 keV and the major gamma ray from ²³⁵U also occurs at 186 keV. ²³⁵U can be measured by the lower abundance gamma ray at 144 keV and if a positive result for ²³⁵U is reported the ²²⁶Ra result will be unreliable and overestimated. However even if ²³⁵U is below the LoD there may still be a contribution to the ²²⁶Ra from ²³⁵U and the ²²⁶Ra result may be unreliable and overestimated. If an accurate result for ²²⁶Ra is required this is better obtained by radiochemical analysis.
- Results below and above the LoD are reported to 1 and 2 significant figures, respectively



Appendix E

Utility Survey

[illegible]

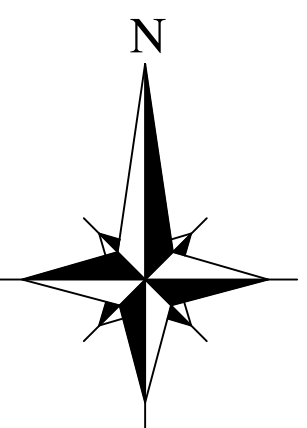
[illegible]

A range of detection methods are used to obtain the underground information produced in this drawing. Variations in the ground conditions can affect the quality of the data and therefore an absolute affirmation cannot be guaranteed. The identification of any located service should not be treated as infallible. The originating source may not have been traced. The location and/or identification of a service will not necessarily indicate whether it is live or dead.

depths of metallic features are to centre of the service, depths on drainage runs refer to the pipe invert at the manhole and should be treated as an approximate indication. Underground drainage has been proven for position using traceable sonde methods, unless otherwise stated. No allowance has been made for sub surface entry to manholes or other chambers or voids below ground level, therefore any details relating to depths, sizes etc., are taken from above ground and as such will be approximate only.

Features not traceable by electromagnetic or sonde techniques, have not been located. These results are not infallible and trial excavations should be carried out to confirm service identification, position and particularly depths, where these are critical.

The term end of trace signifies the last possible point of location and not the termination of the service. In these instances please proceed with caution.

[illegible]

INDICATIVE OF NORTH

all levels shown are relative to the existing site control supplied by client

The co-ordinates shown on this plan are relative to a LOCAL GRID.
The survey is orientated approximately to grid north.



.&M Survey Services

LAND - MINERAL - HYDROGRAPHIC

I & H BROWN

PO BOX 51

DUNKELD ROAD

PERTH

Project Title :

MAJOR WORKS

MASCHEWITZ

WREXHAM

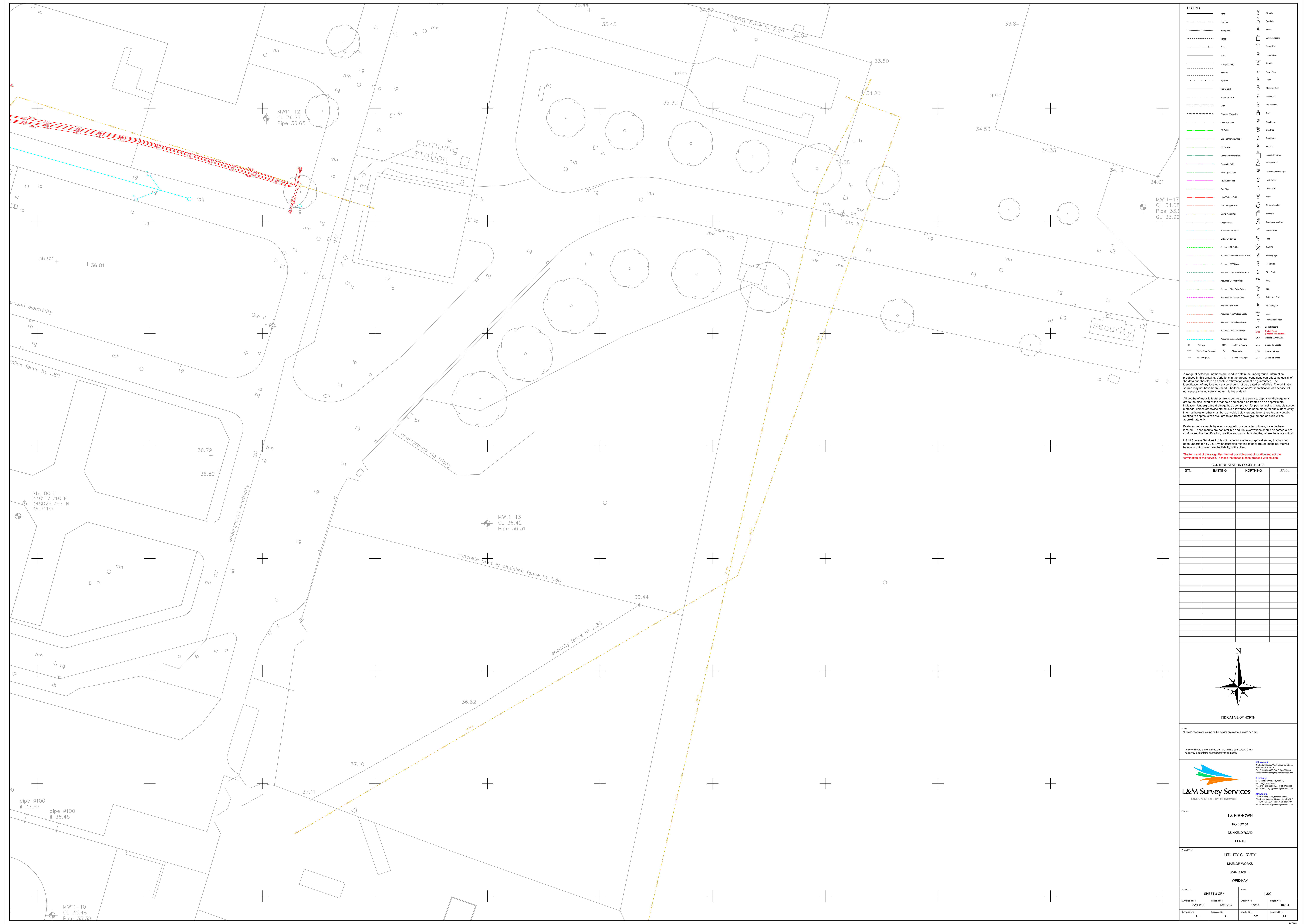
Project Title :	Scale :
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SHEET 2 OF 4

22/11/13	13/12/13	
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Prepared by:	Processed by:	Checked by:
DE	DE	

A4 Sheet



[illegible]

Appendix F
Laboratory Analysis Certificates



2139

Certificate of Analysis

Date: 09/01/2014

Certificate Number: 13-93333-1

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-93333-1

Client Reference: 13627

Contract Title: Wrexham

Description: 4 soil samples

Date Received: 27 November 2013

Date Started: 24 December 2013

Date Completed: 09 January 2014

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: **This report supersedes 13-93333, Asbestos Quantification added**
Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93333-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581148	581149	581150	581151
				Sample ID	TP15	TP16	TP17	BH1
				Depth	0.60	1.30	1.30	2.00
				Sample Ref				
				Sample Type				
				Sampling Date	/ /	/ /	/ /	/ /
				Sampling Time				
Test	Units	DETSxx	LOD					
Stones >2mm	% m/m	DETSC 1003*	1		2.5	4.4	5.1	6.0
Moisture Content	%	DETS 046*	0.1		14	17	14	13
Arsenic	mg/kg	DETSC2301#	0.2		13	6.2	13	5.6
Boron (water soluble)	mg/kg	DETSC2123#	0.2		0.8	1.7	2.2	0.4
Cadmium	mg/kg	DETSC2301#	0.1		0.8	0.7	1.1	0.8
Chromium	mg/kg	DETSC2301#	0.15		21	21	32	18
Copper	mg/kg	DETSC2301#	0.2		84	14	64	14
Lead	mg/kg	DETSC2301#	0.3		45	38	120	16
Mercury	mg/kg	DETSC 2325#	0.05		0.06	< 0.05	1.2	< 0.05
Nickel	mg/kg	DETSC2301#	1		51	18	77	22
Selenium	mg/kg	DETSC2301#	0.5		0.7	< 0.5	0.5	< 0.5
Zinc	mg/kg	DETSC2301#	1		48	58	150	49
Loss on ignition	%	DETSC 2003#	0.01		5.1	3.2	5.8	0.89
pH		DETSC 2008#			7.0	7.5	7.6	10.1
Cyanide total	mg/kg	DETSC 2130#	0.1		2.5	4.0	35	2.7
Cyanide free	mg/kg	DETSC 2130#	0.1		< 0.1	0.6	1.7	0.3
Cyanide complex	mg/kg	DETSC 2130	0.2		2.5	3.4	34	2.5
Thiocyanate	mg/kg	DETSC 2130#	0.6		< 0.6	2.6	2.8	0.9
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		< 0.50	11	1.5	2.1
Chloride Aqueous Extract	mg/l	DETSC 2055	1		20	12	12	15
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		79	260	1400	240
Sulphur (free)	mg/kg	DETSC 3049#	0.75		30	110	20	77
EPH (C10-C40)	mg/kg	DETSC 3311#	10		470	47	1500	62
Benzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	0.01
Ethylbenzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	0.01
Toluene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	0.01
Xylene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	0.03

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93333-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581148	581149	581150	581151
				Sample ID	TP15	TP16	TP17	BH1
				Depth	0.60	1.30	1.30	2.00
				Sample Ref				
				Sample Type				
				Sampling Date	/ /	/ /	/ /	/ /
				Sampling Time				
Test	Units	DETSxx	LOD					
Acenaphthene	mg/kg	DETSC 3301	0.1		0.2	< 0.1	1.0	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1		0.3	< 0.1	4.7	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1		0.9	< 0.1	8.8	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		3.4	< 0.1	13	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		5.5	< 0.1	12	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		3.5	< 0.1	7.6	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		2.1	< 0.1	5.0	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		4.9	< 0.1	6.5	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1		4.8	< 0.1	14	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1		0.2	< 0.1	0.7	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1		9.8	0.6	24	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1		0.1	< 0.1	4.6	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		4.6	< 0.1	5.7	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1		0.3	< 0.1	3.0	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1		3.6	< 0.1	20	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1		12	0.4	21	< 0.1
PAH	mg/kg	DETSC 3301	1.6		56	< 1.6	150	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	16	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	16	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-93333-1

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
581148	TP15 0.60	Soil	Amosite	Loose bundles	Keith Wilson
581149	TP16 1.30	Soil	NAD	na	Keith Wilson
581150	TP17 1.30	Soil	Amosite Chrysotile	Board debris & loose bundles	Keith Wilson
581151	BH1 2.00	Soil	NAD	na	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Summary of Asbestos Analysis Soil Samples

Our Ref: 13-93333-1

Client Ref: 13627

Contract Title: Wrexham

		Lab No.	581148	581150
		Sample Ref	TP15	TP17
		Depth	0.60	1.30
		Other Ref		
		Sample Type	Soil	Soil
Test	Units	DETSxx		
Total Mass% Asbestos (i+ii)	Mass %		<0.001	<0.001
Quantification by Phase Contrast Optical Microscopy (i)	Mass %	DETSC 1102	<0.001	<0.001
Gravimetric Quantification (ii)	Mass %	DETSC 1102	na	na
Breakdown of Gravimetric Analysis				
Mass of Sample	g		423.52	413.53
ACMs present*				
Mass of ACM in sample	g			
% ACM by mass	%			
% asbestos in ACM	%			
% asbestos in sample	%			
Potentially Respirable Fibres	Fibres/g	DETSC 1102	not requested	not requested

* Denotes test or material description outside of UKAS accreditation.

% asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264.

Recommended sample size for quantification is approximately 1kg

denotes deviating sample

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
581148	TP15 0.60 SOIL		Glass Jar 1L (1 litre), Glass Jar 250ml (250ml), Plastic Tub 1L (1kg)	Sample is deviating (no sampled date supplied)		
581149	TP16 1.30 SOIL		Glass Jar 1L (1 litre), Glass Jar 250ml (250ml), Plastic Tub 1L (1kg)	Sample is deviating (no sampled date supplied)		
581150	TP17 1.30 SOIL		Glass Jar 1L (1 litre), Glass Jar 250ml (250ml), Plastic Tub 1L (1kg)	Sample is deviating (no sampled date supplied)		
581151	BH1 2.00 SOIL		Glass Jar 1L (1 litre), Glass Jar 250ml (250ml), Plastic Tub 1L (1kg)	Sample is deviating (no sampled date supplied)		



Certificate of Analysis

Certificate Number 14-96170

24-Jan-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-96170

Client Reference 13627

Contract Title Wrexham

Description 10 Water samples.

Date Received 10-Jan-14

Date Started 16-Jan-14

Date Completed 24-Jan-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Water Samples

Our Ref 14-96170

Client Ref 13627

Contract Title Wrexham

Lab No	595053	595054	595055	595056
Sample ID	SS11-06-1	SS11-06-1D	SS11-07-1	SS11-07-1D
Depth				
Other ID				
Sample Type	WATER	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.2	1.2	0.68	0.76
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	0.06	0.07
Chromium, Dissolved	DETSC 2306	0.25	ug/l	7.4	7.0	6.4	6.7
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.5	3.1	5.5	5.7
Iron, Dissolved	DETSC 2306	5.5	ug/l	190	140	230	280
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.83	0.38	0.33	0.58
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.2	1.1	3.0	3.1
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.58	0.56	0.61	0.74
Zinc, Dissolved	DETSC 2306	1.25	ug/l	36.6	44.1	32.0	55.1
Inorganics							
Conductivity	DETSC 2009	1	uS/cm	704	699	1180	1190
pH	DETSC 2008			7.6	7.5	7.4	7.2
Cyanide total	DETSC 2130	40	ug/l	110	110	230	240
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20	< 20	< 20
Cyanide complex	DETSC 2130	40	ug/l	110	110	230	240
Thiocyanate	DETSC 2130	40	ug/l	< 40	570	< 40	48
Suspended Solids	DETSC 2034	5	mg/l	450	440	280	300
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	< 0.015	0.015	1.9	3.0
Chloride	DETSC 2055	0.1	mg/l	20	22	35	35
Sulphate as SO4	DETSC 2055	0.1	mg/l	130	140	340	350
Sulphide	DETSC 2208	10	ug/l	< 10.0	15	11	< 10.0
Sulphur (free)	DETSC 3049	84	ug/l	< 84	< 84	< 84	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	20	29	30	31
Petroleum Hydrocarbons							
EPH (C10-C40)	DETSC 3311	10	ug/l	280	320	390	350
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 14-96170

Client Ref 13627

Contract Title Wrexham

Lab No	595053	595054	595055	595056
Sample ID	SS11-06-1	SS11-06-1D	SS11-07-1	SS11-07-1D
Depth				
Other ID				
Sample Type	WATER	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
PAHs							
Acenaphthene	DETS 074*	0.01	ug/l	0.02	< 0.01	< 0.01	0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02
Benzo(a)anthracene	DETS 074*	0.01	ug/l	0.01	< 0.01	0.02	0.04
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	0.05	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.03
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	0.03	< 0.01	< 0.01	0.05
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.07
Pyrene	DETS 074*	0.01	ug/l	0.02	0.01	< 0.01	0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	0.24
Phenols							
Catechol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis

Water Samples

Our Ref 14-96170

Client Ref 13627

Contract Title Wrexham

Lab No	595057	595058	595059	595060	595061
Sample ID	UPSTREAM	DOWNSTREAM	OX-BOW	SW1	SW1D
Depth					
Other ID					
Sample Type	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.69	0.72	0.91	0.69	0.59
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.15	0.15	0.18	0.13	0.12
Chromium, Dissolved	DETSC 2306	0.25	ug/l	6.6	8.2	7.7	0.39	0.39
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.7	4.0	5.1	1.9	2.6
Iron, Dissolved	DETSC 2306	5.5	ug/l	110	110	85	43	65
Lead, Dissolved	DETSC 2306	0.09	ug/l	3.2	2.3	1.7	0.42	0.55
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.5	1.7	2.0	1.1	1.2
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.28	0.25	0.72	0.59
Zinc, Dissolved	DETSC 2306	1.25	ug/l	81.6	104	62.2	70.9	115
Inorganics								
Conductivity	DETSC 2009	1	uS/cm	359	356	448	476	484
pH	DETSC 2008			7.6	7.7	7.7	7.2	7.2
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20	< 20	< 20	< 20
Cyanide complex	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40
Thiocyanate	DETSC 2130	40	ug/l	< 40	< 40	< 40	64	45
Suspended Solids	DETSC 2034	5	mg/l	58	48	44	100	68
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	1.5	0.43	0.29	0.19	0.16
Chloride	DETSC 2055	0.1	mg/l	25	23	24	28	28
Sulphate as SO4	DETSC 2055	0.1	mg/l	29	31	56	43	45
Sulphide	DETSC 2208	10	ug/l	13	< 10.0	< 10.0	< 10.0	12
Sulphur (free)	DETSC 3049	84	ug/l	< 84	< 84	< 84	< 84	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	9.8	10	10	9.7	8.3
Petroleum Hydrocarbons								
EPH (C10-C40)	DETSC 3311	10	ug/l	300	97	190	220	290
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 14-96170

Client Ref 13627

Contract Title Wrexham

Lab No	595057	595058	595059	595060	595061
Sample ID	UPSTREAM	DOWNSTREAM	OX-BOW	SW1	SW1D
Depth					
Other ID					
Sample Type	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
PAHs								
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	0.03	< 0.01	< 0.01	< 0.01	0.02
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.02	< 0.01	0.01	0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols								
Catechol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis

Water Samples

Our Ref 14-96170

Client Ref 13627

Contract Title Wrexham

Lab No	595062
Sample ID	SW2
Depth	
Other ID	
Sample Type	WATER
Sampling Date	09/01/14
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.95
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.07
Chromium, Dissolved	DETSC 2306	0.25	ug/l	6.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.3
Iron, Dissolved	DETSC 2306	5.5	ug/l	210
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.41
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.41
Zinc, Dissolved	DETSC 2306	1.25	ug/l	79.0
Inorganics				
Conductivity	DETSC 2009	1	uS/cm	659
pH	DETSC 2008			7.4
Cyanide total	DETSC 2130	40	ug/l	90
Cyanide free	DETSC 2130	20	ug/l	< 20
Cyanide complex	DETSC 2130	40	ug/l	90
Thiocyanate	DETSC 2130	40	ug/l	< 40
Suspended Solids	DETSC 2034	5	mg/l	1300
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.094
Chloride	DETSC 2055	0.1	mg/l	23
Sulphate as SO4	DETSC 2055	0.1	mg/l	110
Sulphide	DETSC 2208	10	ug/l	11
Sulphur (free)	DETSC 3049	84	ug/l	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	48
Petroleum Hydrocarbons				
EPH (C10-C40)	DETSC 3311	10	ug/l	2500
Benzene	DETSC 3322	1	ug/l	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 14-96170

Client Ref 13627

Contract Title Wrexham

Lab No	595062
Sample ID	SW2
Depth	
Other ID	
Sample Type	WATER
Sampling Date	09/01/14
Sampling Time	n/s

Test	Method	LOD	Units	
PAHs				
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	0.03
Pyrene	DETS 074*	0.01	ug/l	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20
Phenols				
Catechol	DETSC 3422*	0.1	ug/l	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10

Information in Support of the Analytical Results

Our Ref 14-96170
Client Ref 13627
Contract Wrexham

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
595053	SS11-06-1 WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595054	SS11-06-1D WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595055	SS11-07-1 WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595056	SS11-07-1D WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595057	UPSTREAM WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595058	DOWNSTREAM WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595059	OX-BOW WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595060	SW1 WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595061	SW1D WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595062	SW2 WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		
595063	BH2 WATER	09/01/14	GJ 1L (1L), GV (40ml), PB 1L (1L)		

Key: G-Glass P-Plastic J-Jar B-Bottle V-Vial

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

Disposal

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

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



Certificate of Analysis

Certificate Number 14-95968

20-Jan-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-95968

Client Reference 13627

Contract Title Wrexham

Description 2 Soil samples, 7 Water samples.

Date Received 13-Jan-14

Date Started 13-Jan-14

Date Completed 20-Jan-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 14-95968

Client Ref 13627

Contract Title Wrexham

Lab No	593984	593986
Sample ID	SD3	SD CULV-UP
Depth		
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	09/01/14	09/01/14
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Preparation					
Stones >2mm	DETS 1003*	1	% m/m	2.9	5.0
Moisture Content	DETS 046*	0.1	%	81	79
Metals					
Arsenic	DETSC2301#	0.2	mg/kg	21	9.5
Boron (water soluble)	DETSC2123#	0.2	mg/kg	0.8	2.4
Cadmium	DETSC2301#	0.1	mg/kg	2.3	1.1
Chromium	DETSC2301#	0.15	mg/kg	26	23
Copper	DETSC2301#	0.2	mg/kg	48	24
Lead	DETSC2301#	0.3	mg/kg	84	740
Mercury	DETSC 2325#	0.05	mg/kg	0.06	0.05
Nickel	DETSC2301#	1	mg/kg	31	23
Selenium	DETSC2301#	0.5	mg/kg	5.3	< 0.5
Zinc	DETSC2301#	1	mg/kg	1400	260
Inorganics					
Loss on ignition	DETSC 2003#	0.01	%	5.9	8.0
pH	DETSC 2008#			8.1	7.5
Cyanide total	DETSC 2130#	0.1	mg/kg	1.3	0.2
Cyanide free	DETSC 2130#	0.1	mg/kg	0.1	< 0.1
Cyanide complex	DETSC 2130	0.2	mg/kg	1.2	< 0.2
Thiocyanate	DETSC 2130#	0.6	mg/kg	< 0.6	1.4
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	6.1	13
Chloride Aqueous Extract	DETSC 2055	1	mg/l	15	19
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	86	120
Sulphur (free)	DETSC 3049#	0.75	mg/kg	13	3.6
Petroleum Hydrocarbons					
EPH (C10-C40)	DETSC 3311#	10	mg/kg	2200	65
Benzene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01
Xylene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01
PAHs					
Acenaphthene	DETSC 3301	0.1	mg/kg	1.5	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	4.9	0.1
Anthracene	DETSC 3301	0.1	mg/kg	3.3	0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	14	0.4
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	14	0.3
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	9.1	0.2
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	6.7	0.3
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	9.0	1.3
Chrysene	DETSC 3301	0.1	mg/kg	14	0.4

Summary of Chemical Analysis

Soil Samples

Our Ref 14-95968

Client Ref 13627

Contract Title Wrexham

Lab No	593984	593986
Sample ID	SD3	SD CULV-UP
Depth		
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	09/01/14	09/01/14
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Dibenzo(a,h)anthracene	DESTC 3301	0.1	mg/kg	1.7	0.8
Fluoranthene	DETSC 3301	0.1	mg/kg	19	0.9
Fluorene	DETSC 3301	0.1	mg/kg	3.8	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	8.1	0.6
Naphthalene	DETSC 3301	0.1	mg/kg	1.9	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	3.4	0.1
Pyrene	DETSC 3301	0.1	mg/kg	18	0.6
PAH	DETSC 3301	1.6	mg/kg	130	6.3
Phenols					
Catechol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50
Cresols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50
Naphthols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50
Phenol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50
Resorcinol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50
Trimethylphenol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50
Xylenols & Ethylphenols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50
Total Phenols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50

Summary of Chemical Analysis

Water Samples

Our Ref 14-95968

Client Ref 13627

Contract Title Wrexham

Lab No	593983	593985	593987	593988	593989	593990	593991
Sample ID	SS11-03-1	CULV-UP	MW11-08B	MW11-07	MW11-07D	MW11-05	MW11-05D
Depth							
Other ID							
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.93	1.1	7.9	2.9	2.3	0.77	0.63
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.10	0.03	< 0.03	< 0.03	0.04	0.11	0.04
Chromium, Dissolved	DETSC 2306	0.25	ug/l	5.3	7.2	0.41	< 0.25	0.33	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	3.6	6.3	1.4	1.6	1.8	0.9	0.4
Iron, Dissolved	DETSC 2306	5.5	ug/l	100	180	780	67	81	70	120
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.79	0.95	0.95	0.37	0.64	0.35	0.15
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.1	2.5	7.6	6.4	6.6	5.4	3.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.87	0.30	0.63	1.1	1.1	0.31	0.86
Zinc, Dissolved	DETSC 2306	1.25	ug/l	142	71.0	44.5	19.1	30.0	20.4	35.7
Inorganics										
Conductivity	DETSC 2009	1	uS/cm	369	363	833	268	268	567	2070
pH	DETSC 2008			7.6	7.7	7.2	7.6	7.7	7.5	7.3
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Cyanide complex	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Thiocyanate	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	91	90
Suspended Solids	DETSC 2034	5	mg/l	33	33	3500	660	820	2100	1100
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.057	0.43	1.5	0.46	0.39	3.5	5.8
Chloride	DETSC 2055	0.1	mg/l	20	31	44	11	9.9	130	140
Sulphate as SO4	DETSC 2055	0.1	mg/l	26	24	63	9.8	9.7	890	970
Sulphide	DETSC 2208	10	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Sulphur (free)	DETSC 3049	84	ug/l	< 84	< 84	< 84	< 84	< 84	< 84	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	4.5	18	150	23	33	8.5	6.1
Petroleum Hydrocarbons										
EPH (C10-C40)	DETSC 3311	10	ug/l	260	170	80000000	1000	510	250	250
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	14	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	1.7	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	47	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	74	< 1.0	< 1.0	< 1.0	< 1.0
PAHs										
Acenaphthene	DETS 074*	0.01	ug/l	0.01	< 0.01	980	0.87	0.89	0.04	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	660	1.3	0.64	0.23	0.28
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	160	0.30	0.25	0.02	0.02
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	67	0.24	0.20	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	49	0.18	0.13	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	28	0.08	0.09	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	32	0.15	0.12	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	25	0.17	0.14	< 0.01	< 0.01

Summary of Chemical Analysis

Water Samples

Our Ref 14-95968

Client Ref 13627

Contract Title Wrexham

Lab No	593983	593985	593987	593988	593989	593990	593991
Sample ID	SS11-03-1	CULV-UP	MW11-08B	MW11-07	MW11-07D	MW11-05	MW11-05D
Depth							
Other ID							
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	520	1.8	1.4	0.28	0.22
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	640	0.94	0.60	0.21	0.14
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	68	0.19	0.20	< 0.01	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.01	4400	0.31	0.05	0.32	0.21
Phenanthrene	DETS 074*	0.01	ug/l	0.01	< 0.01	1600	0.13	0.05	0.23	0.28
Pyrene	DETS 074*	0.01	ug/l	0.02	< 0.01	470	1.7	1.6	0.33	0.23
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	9700	8.3	6.4	1.7	1.4
Phenols										
Catechol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Information in Support of the Analytical Results

Our Ref 14-95968
Client Ref 13627
Contract Wrexham

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
593983	SS11-03-1 WATER	09/01/14	GJ 1L x2, GV x2, PB 1L		
593984	SD3 SOIL	09/01/14	GJ 1L, GV, PT 1L x2		
593985	CULV-UP WATER	09/01/14	GJ 1L x2, GV x2, PB 1L		
593986	SD CULV-UP SOIL	09/01/14	GJ 1L, GV, PT 1L x2		
593987	MW11-08B WATER	09/01/14	GJ 1L x2, GV x2, PB 1L		
593988	MW11-07 WATER	09/01/14	GJ 1L x2, GV x2, PB 1L		
593989	MW11-07D WATER	09/01/14	GJ 1L x2, GV x2, PB 1L		
593990	MW11-05 WATER	09/01/14	GJ 1L x2, GV x2, PB 1L		
593991	MW11-05D WATER	09/01/14	GJ 1L x2, GV x2, PB 1L		

Key: G-Glass P-Plastic J-Jar B-Bottle V-Vial T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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



Certificate of Analysis

Certificate Number 14-95951

20-Jan-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-95951

Client Reference (not supplied)

Contract Title (not supplied)

Description 6 Water samples.

Date Received 13-Jan-14

Date Started 13-Jan-14

Date Completed 20-Jan-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Water Samples

Our Ref 14-95951

Client Ref

Contract Title

Lab No	593937	593938	593939	593940	593941	593942
Sample ID	MW99-106	BH3	BH5	MW11-02	MW99-104	MW99-11-16
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	10/01/14	10/01/14	10/01/14	10/01/14	10/01/14	10/01/14
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	11	2.5	0.43	2.4	2.9	1.2
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.030	0.073	0.070	0.14	< 0.030	0.074
Chromium, Dissolved	DETSC 2306	0.25	ug/l	1.0	0.30	< 0.25	7.4	0.43	6.5
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.3	2.5	1.5	8.8	1.5	4.2
Iron, Dissolved	DETSC 2306	5.5	ug/l	580	200	200	2600	1100	220
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.42	0.82	0.24	9.7	0.39	1.2
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.76	3.0	5.3	2.5	1.9	1.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.41	2.0	10	3.3	0.47	2.4
Zinc, Dissolved	DETSC 2306	1.25	ug/l	22.2	28.2	28.1	30.9	41.1	115
Inorganics									
Conductivity	DETSC 2009	1	uS/cm	1670	1520	992	1080	1800	1150
pH	DETSC 2008			7.7	7.2	7.0	7.3	7.0	7.3
Cyanide total	DETSC 2130	40	ug/l	140	200	180	1100	390	140
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20	< 20	58	< 20	< 20
Cyanide complex	DETSC 2130	40	ug/l	140	200	180	1100	390	140
Thiocyanate	DETSC 2130	40	ug/l	< 40	32000	210	95	18000	270
Suspended Solids	DETSC 2034	5	mg/l	76	6300	1200	2500	400	6300
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	74	77	30	4.6	49	23
Chloride	DETSC 2055	0.1	mg/l	30	23	15	10	29	18
Sulphate as SO4	DETSC 2055	0.1	mg/l	140	370	220	290	520	210
Sulphide	DETSC 2208	10	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Sulphur (free)	DETSC 3049	84	ug/l	120	100	< 84	< 84	< 84	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	31	72	15	28	24	80
Petroleum Hydrocarbons									
EPH (C10-C40)	DETSC 3311	10	ug/l	3700	430	280	490	370	490
Benzene	DETSC 3322	1	ug/l	1.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	13	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 14-95951

Client Ref

Contract Title

Lab No	593937	593938	593939	593940	593941	593942
Sample ID	MW99-106	BH3	BH5	MW11-02	MW99-104	MW99-11-16
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	10/01/14	10/01/14	10/01/14	10/01/14	10/01/14	10/01/14
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
PAHs									
Acenaphthene	DETS 074*	0.01	ug/l	9.0	0.03	< 0.01	0.05	0.04	0.07
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	0.33	< 0.01	< 0.01	0.02	0.04	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	0.04	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	0.03	< 0.01	< 0.01	0.02	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	0.32	0.01	< 0.01	0.03	0.04	< 0.01
Fluorene	DETS 074*	0.01	ug/l	0.88	0.02	< 0.01	0.02	0.05	0.02
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.03	< 0.01	0.08	< 0.01	0.07
Phenanthrene	DETS 074*	0.01	ug/l	0.69	0.03	< 0.01	0.04	0.11	< 0.01
Pyrene	DETS 074*	0.01	ug/l	0.27	< 0.01	< 0.01	0.04	0.05	< 0.01
PAH	DETS 074*	0.2	ug/l	12	< 0.20	< 0.20	0.35	0.34	< 0.20
Phenols									
Catechol	DETSC 3422*	0.1	ug/l	3.6	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	57	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	16	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	59	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	46	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	28	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	210	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Information in Support of the Analytical Results

Our Ref 14-95951
Client Ref
Contract

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
593937	MW99-106 WATER	10/01/14	GJ 1L (1L) x2, GV (40ml) x2, PB 1L (1L)		
593938	BH3 WATER	10/01/14	GJ 1L (1L) x2, GV (40ml) x2, PB 1L (1L)		
593939	BH5 WATER	10/01/14	GJ 1L (1L) x2, GV (40ml) x2, PB 1L (1L)		
593940	MW11-02 WATER	10/01/14	GJ 1L (1L) x2, PB 1L (1L)		
593941	MW99-104 WATER	10/01/14	GJ 1L (1L) x2, PB 1L (1L)		
593942	MW99-11-16 WATER	10/01/14	GJ 1L (1L) x2, PB 1L (1L)		

Key: G-Glass P-Plastic J-Jar B-Bottle V-Vial

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Disposal

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

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



Certificate of Analysis

Certificate Number 14-95950

20-Jan-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-95950

Client Reference (not supplied)

Contract Title (not supplied)

Description 2 Water samples.

Date Received 13-Jan-14

Date Started 13-Jan-14

Date Completed 20-Jan-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Water Samples

Our Ref 14-95950

Client Ref

Contract Title

Lab No	593935	593936
Sample ID	GP1	SS11-02-3
Depth		
Other ID		
Sample Type	WATER	WATER
Sampling Date	10/01/14	10/01/14
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.1	1.2
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.030	0.065
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.63	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.8	1.3
Iron, Dissolved	DETSC 2306	5.5	ug/l	190	45
Lead, Dissolved	DETSC 2306	0.09	ug/l	2.8	0.56
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.2	2.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	1.1
Zinc, Dissolved	DETSC 2306	1.25	ug/l	36.1	155
Inorganics					
Conductivity	DETSC 2009	1	uS/cm	387	564
pH	DETSC 2008			7.2	7.3
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20
Cyanide complex	DETSC 2130	40	ug/l	< 40	< 40
Thiocyanate	DETSC 2130	40	ug/l	< 40	< 40
Suspended Solids	DETSC 2034	5	mg/l	35000	110
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	28	1.1
Chloride	DETSC 2055	0.1	mg/l	27	45
Sulphate as SO4	DETSC 2055	0.1	mg/l	2.6	70
Sulphide	DETSC 2208	10	ug/l	< 10.0	< 10.0
Sulphur (free)	DETSC 3049	84	ug/l	< 90.0	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	250	13
Petroleum Hydrocarbons					
EPH (C10-C40)	DETSC 3311	10	ug/l	42000	430
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 14-95950

Client Ref

Contract Title

Lab No	593935	593936
Sample ID	GP1	SS11-02-3
Depth		
Other ID		
Sample Type	WATER	WATER
Sampling Date	10/01/14	10/01/14
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
PAHs					
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	1.2
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	0.32
Benzo(a)anthracene	DETS 074*	0.01	ug/l	0.02	0.04
Benzo(a)pyrene	DETS 074*	0.01	ug/l	0.06	0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	0.03	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	0.02	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	0.02	0.27
Fluorene	DETS 074*	0.01	ug/l	< 0.01	0.67
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	0.09	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	0.19
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	0.08
Pyrene	DETS 074*	0.01	ug/l	0.06	0.31
PAH	DETS 074*	0.2	ug/l	0.37	3.1
Phenols					
Catechol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10

Information in Support of the Analytical Results

Our Ref 14-95950
Client Ref
Contract

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
593935	GP1 WATER	10/01/14	GJ 1L (1L) x2, GJ 250ml (250ml), PB 1L (1L)		
593936	SS11-02-3 WATER	10/01/14	GJ 1L (1L) x2, GJ 250ml (250ml), PB 1L (1L)		

Key: G-Glass P-Plastic J-Jar B-Bottle

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

Disposal

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

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



Certificate of Analysis

Certificate Number 14-95686

16-Jan-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-95686

Client Reference 13627

Contract Title Wrexham

Description 3 Soil samples, 3 Water samples.

Date Received 10-Jan-14

Date Started 10-Jan-14

Date Completed 16-Jan-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 14-95686

Client Ref 13627

Contract Title Wrexham

Lab No	593358	593359	593360
Sample ID	SD 1	SD 4	SD 2
Depth			
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
Stones >2mm	DETSC 1003*	1	% m/m	4.7	5.1	4.4
Moisture Content	DETS 046*	0.1	%	56	47	140
Metals						
Arsenic	DETSC2301#	0.2	mg/kg	6.9	9.1	11
Boron (water soluble)	DETSC2123#	0.2	mg/kg	2.5	1.9	4.0
Cadmium	DETSC2301#	0.1	mg/kg	0.8	0.9	1.2
Chromium	DETSC2301#	0.15	mg/kg	18	19	22
Copper	DETSC2301#	0.2	mg/kg	20	23	26
Lead	DETSC2301#	0.3	mg/kg	400	980	630
Mercury	DETSC 2325#	0.05	mg/kg	0.24	0.11	0.18
Nickel	DETSC2301#	1	mg/kg	25	20	27
Selenium	DETSC2301#	0.5	mg/kg	< 0.5	< 0.5	0.5
Zinc	DETSC2301#	1	mg/kg	170	270	280
Inorganics						
Loss on ignition	DETSC 2003#	0.01	%	7.3	6.9	12
pH	DETSC 2008#			7.7	7.6	7.4
Cyanide total	DETSC 2130#	0.1	mg/kg	1.5	0.6	0.9
Cyanide free	DETSC 2130#	0.1	mg/kg	0.2	< 0.1	0.1
Cyanide complex	DETSC 2130	0.2	mg/kg	1.4	0.6	0.7
Thiocyanate	DETSC 2130#	0.6	mg/kg	0.7	1.3	2.0
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	31	21	48
Chloride Aqueous Extract	DETSC 2055	1	mg/l	22	18	35
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	63	280	230
Sulphur (free)	DETSC 3049#	0.75	mg/kg	< 0.75	5.8	25
Petroleum Hydrocarbons						
EPH (C10-C40)	DETSC 3311#	10	mg/kg	290	190	1000
Benzene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Toluene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
Xylene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01
PAHs						
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	0.4	3.2
Acenaphthylene	DETSC 3301	0.1	mg/kg	1.0	0.8	4.3
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.9	4.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	1.4	0.8	5.8
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	1.4	0.9	6.0
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	1.1	1.0	3.8
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	0.7	0.4	2.9
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.6	< 0.1	2.0
Chrysene	DETSC 3301	0.1	mg/kg	1.1	0.8	4.0
Dibenzo(a,h)anthracene	DESTC 3301	0.1	mg/kg	0.6	< 0.1	1.2

Summary of Chemical Analysis

Soil Samples

Our Ref 14-95686

Client Ref 13627

Contract Title Wrexham

Lab No	593358	593359	593360
Sample ID	SD 1	SD 4	SD 2
Depth			
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Fluoranthene	DETSC 3301	0.1	mg/kg	2.5	2.4	9.7
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	0.6	3.5
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	1.3	0.6	4.4
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	0.4	0.4
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	2.4	7.8
Pyrene	DETSC 3301	0.1	mg/kg	2.0	1.8	7.8
PAH	DETSC 3301	1.6	mg/kg	14	14	71
Phenols						
Catechol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50
Cresols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50
Naphthols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50
Phenol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50
Resorcinol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50
Trimethylphenol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50
Total Phenols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Water Samples

Our Ref 14-95686

Client Ref 13627

Contract Title Wrexham

Lab No	593361	593362	593363
Sample ID	SS11-08-1	SS11-02-1	SS11-01-1
Depth			
Other ID			
Sample Type	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.0	1.1	0.98
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.034	0.041	0.045
Chromium, Dissolved	DETSC 2306	0.25	ug/l	7.3	7.0	10
Copper, Dissolved	DETSC 2306	0.4	ug/l	5.6	5.5	2.6
Iron, Dissolved	DETSC 2306	5.5	ug/l	500	220	51
Lead, Dissolved	DETSC 2306	0.09	ug/l	3.9	2.1	0.47
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.010	< 0.010	< 0.010
Nickel, Dissolved	DETSC 2306	0.5	ug/l	5.2	3.4	2.0
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.25	0.33	0.61
Zinc, Dissolved	DETSC 2306	1.25	ug/l	65.5	29.2	37.2
Inorganics						
Conductivity	DETSC 2009	1	uS/cm	343	352	385
pH	DETSC 2008			8.4	8.1	7.9
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40	< 40
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Cyanide complex	DETSC 2130	40	ug/l	< 40	< 40	< 40
Thiocyanate	DETSC 2130	40	ug/l	< 40	250	< 40
Suspended Solids	DETSC 2034	5	mg/l	46	31	7.0
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.16	0.21	0.058
Chloride	DETSC 2055	0.1	mg/l	130	44	19
Sulphate as SO4	DETSC 2055	0.1	mg/l	41	33	36
Sulphide	DETSC 2208	10	ug/l	10	15	< 10.0
Sulphur (free)	DETSC 3049	84	ug/l	< 84	< 84	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	20	19	3.4
Petroleum Hydrocarbons						
EPH (C10-C40)	DETSC 3311	10	ug/l	550	200	200
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0
PAHs						
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Water Samples

Our Ref 14-95686

Client Ref 13627

Contract Title Wrexham

Lab No	593361	593362	593363
Sample ID	SS11-08-1	SS11-02-1	SS11-01-1
Depth			
Other ID			
Sample Type	WATER	WATER	WATER
Sampling Date	09/01/14	09/01/14	09/01/14
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20	< 0.20
Phenols						
Catechol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10

Information in Support of the Analytical Results

Our Ref 14-95686
Client Ref 13627
Contract Wrexham

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
593358	SD 1 SOIL	09/01/14	GJ 1L (1L), GV (40ml), PT 1L (1kg) x2		
593359	SD 4 SOIL	09/01/14	GJ 1L (1L), GV (40ml), PT 1L (1kg) x2		
593360	SD 2 SOIL	09/01/14	GJ 1L (1L), GV (40ml), PT 1L (1kg) x2		
593361	SS11-08-1 WATER	09/01/14	GJ 1L (1L) x2, GV (40ml), PB 1L (1L) x2		
593362	SS11-02-1 WATER	09/01/14	GJ 1L (1L) x2, GV (40ml), PB 1L (1L) x2		
593363	SS11-01-1 WATER	09/01/14	GJ 1L (1L) x2, GV (40ml), PB 1L (1L) x2		

Key: G-Glass P-Plastic J-Jar V-Vial T-Tub B-Bottle

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

Soil Analysis Notes

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

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

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

Disposal

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

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



Certificate of Analysis

Certificate Number 14-95669

16-Jan-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-95669

Client Reference (not supplied)

Contract Title (not supplied)

Description One Water sample.

Date Received 10-Jan-14

Date Started 10-Jan-14

Date Completed 16-Jan-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Water Samples

Our Ref 14-95669

Client Ref

Contract Title

Lab No	593290
Sample ID	BH1
Depth	
Other ID	
Sample Type	WATER
Sampling Date	08/01/14
Sampling Time	n/s

Test	Method	LOD	Units	
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.6
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.22
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	2.0
Iron, Dissolved	DETSC 2306	5.5	ug/l	71
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.24
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.010
Nickel, Dissolved	DETSC 2306	0.5	ug/l	4.1
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.81
Zinc, Dissolved	DETSC 2306	1.25	ug/l	161
Inorganics				
Conductivity	DETSC 2009	1	uS/cm	455
pH	DETSC 2008			8.1
Cyanide total	DETSC 2130	40	ug/l	43
Cyanide free	DETSC 2130	20	ug/l	< 20
Cyanide complex	DETSC 2130	40	ug/l	43
Thiocyanate	DETSC 2130	40	ug/l	< 40
Suspended Solids	DETSC 2034	5	mg/l	8600
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	0.30
Chloride	DETSC 2055	0.1	mg/l	43
Sulphate as SO4	DETSC 2055	0.1	mg/l	100
Sulphide	DETSC 2208	10	ug/l	< 10.0
Sulphur (free)	DETSC 3049	84	ug/l	< 84
Total Organic Carbon	DETSC 2033	2	mg/l	36
Petroleum Hydrocarbons				
EPH (C10-C40)	DETSC 3311	10	ug/l	3300
Benzene	DETSC 3322	1	ug/l	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0
PAHs				
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01
Anthracene	DETS 074*	0.01	ug/l	0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01

Summary of Chemical Analysis

Water Samples

Our Ref 14-95669

Client Ref

Contract Title

Lab No	593290
Sample ID	BH1
Depth	
Other ID	
Sample Type	WATER
Sampling Date	08/01/14
Sampling Time	n/s

Test	Method	LOD	Units	
Fluoranthene	DETS 074*	0.01	ug/l	0.09
Fluorene	DETS 074*	0.01	ug/l	0.02
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01
Pyrene	DETS 074*	0.01	ug/l	0.05
PAH	DETS 074*	0.2	ug/l	< 0.20
Phenols				
Catechol	DETSC 3422*	0.1	ug/l	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10

Information in Support of the Analytical Results

Our Ref 14-95669
Client Ref
Contract

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
593290	BH1 WATER	08/01/14	GJ 1L (1L) x2, GV (40ml) x2, PB 1L (1L)		
Key: G-Glass P-Plastic J-Jar B-Bottle V-Vial DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.					

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :- Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months
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Certificate of Analysis

Certificate Number 14-95593

15-Jan-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-95593

Client Reference (not supplied)

Contract Title (not supplied)

Description 2 Water samples.

Date Received 09-Jan-14

Date Started 09-Jan-14

Date Completed 15-Jan-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Water Samples

Our Ref 14-95593

Client Ref

Contract Title

Lab No	592956	592957
Sample ID	R2TB1	R2FB1
Depth		
Other ID		
Sample Type	WATER	WATER
Sampling Date	08/01/14	08/01/14
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	< 0.16	0.24
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.030	0.055
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.47	0.59
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.98	0.97
Iron, Dissolved	DETSC 2306	5.5	ug/l	21	25
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.39	0.30
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.010	< 0.010
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.50	1.3
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.25	ug/l	26.1	22.1
Inorganics					
Conductivity	DETSC 2009	1	uS/cm	8.8	8.3
pH	DETSC 2008			6.0	2.5
Cyanide total	DETSC 2130	40	ug/l	< 40	< 40
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20
Cyanide complex	DETSC 2130	40	ug/l	< 40	< 40
Thiocyanate	DETSC 2130	40	ug/l	< 40	< 40
Suspended Solids	DETSC 2034	5	mg/l	7.0	< 5.0
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	1.4	0.34
Chloride	DETSC 2055	0.1	mg/l	4.0	6.0
Sulphate as SO4	DETSC 2055	0.1	mg/l	1.4	1.3
Sulphide	DETSC 2208	10	ug/l	< 10.0	< 10.0
Sulphur (free)	DETSC 3049	84	ug/l	< 84	< 84
Total Organic Carbon	*	2	mg/l	< 2.0	< 2.0
Petroleum Hydrocarbons					
EPH (C10-C40)	DETSC 3311	10	ug/l	240	270
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 14-95593

Client Ref

Contract Title

Lab No	592956	592957
Sample ID	R2TB1	R2FB1
Depth		
Other ID		
Sample Type	WATER	WATER
Sampling Date	08/01/14	08/01/14
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
PAHs					
Acenaphthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Fluorene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
Pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01
PAH	DETS 074*	0.2	ug/l	< 0.20	< 0.20
Phenols					
Catechol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10

Information in Support of the Analytical Results

Our Ref 14-95593
Client Ref
Contract

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
592956	R2TB1 WATER	08/01/14	GJ 1L (1L) x2, PB 1L (1L)		
592957	R2FB1 WATER	08/01/14	GJ 1L (1L) x2, PB 1L (1L)		

Key: G-Glass P-Plastic J-Jar B-Bottle

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

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :- Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



2139

Certificate of Analysis

Date: 02/01/2014

Certificate Number: 13-94687

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-94687

Client Reference: 13627

Contract Title: Wrexham

Description: 7 soil samples

Date Received: 17 December 2013

Date Started: 17 December 2013

Date Completed: 02 January 2014

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94687

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	588612	588613	588614	588615	588616
				Sample ID	TP8	TP8	TP9	TP9	BH16
				Depth	0.80	2.40	1.00	2.70	0.30
				Sample Ref					
				Sample Type					
				Sampling Date	27/11/2013	27/11/2013	27/11/2013	27/11/2013	27/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	4.9	6.1	4.5	7.1	6.4	
Moisture Content	%	DETS 046*	0.1	17	32	21	15	30	
Arsenic	mg/kg	DETSC2301#	0.2	4.6	5.8	10	6.1	9.8	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	0.2	< 0.2	< 0.2	< 0.2	0.2	
Cadmium	mg/kg	DETSC2301#	0.1	0.3	0.3	0.4	0.3	0.4	
Chromium	mg/kg	DETSC2301#	0.15	18	12	26	19	30	
Copper	mg/kg	DETSC2301#	0.2	14	7.3	21	18	12	
Lead	mg/kg	DETSC2301#	0.3	18	14	26	17	52	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1	20	13	32	23	20	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1	150	49	67	53	68	
Loss on ignition	%	DETSC 2003#	0.01	1.2	0.95	2.3	0.87	6.6	
pH		DETSC 2008#		7.8	7.6	7.9	8.2	7.4	
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	16	9.3	13	6.2	6.1	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	7.7	11	3.6	8.9	3.3	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	20	22	15	< 10	12	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	12	< 0.75	< 0.75	< 0.75	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	240	61	< 10	< 10	< 10	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	0.27	< 0.01	< 0.01	< 0.01	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94687

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	588612	588613	588614	588615	588616
				Sample ID	TP8	TP8	TP9	TP9	BH16
				Depth	0.80	2.40	1.00	2.70	0.30
				Sample Ref					
				Sample Type					
				Sampling Date	27/11/2013	27/11/2013	27/11/2013	27/11/2013	27/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Acenaphthene	mg/kg	DETSC 3301	0.1	1.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1	0.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1	64	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH	mg/kg	DETSC 3301	1.6	65	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5	3.5	< 0.50	4.5	3.8	3.3	
Cresols	mg/kg	DETSC 3421*	0.5	10	< 0.50	27	16	4.8	
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5	14	< 0.50	36	21	4.1	
Resorcinol	mg/kg	DETSC 3421*	0.5	17	< 0.50	7.8	13	18	
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5	45	< 0.50	75	54	30	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94687

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	588617	588618
				Sample ID	BH16	BH13
				Depth	2.00	0.50
				Sample Ref		
				Sample Type		
				Sampling Date	27/11/2013	27/11/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Stones >2mm	% m/m	DETSC 1003*	1		5.3	5.0
Moisture Content	%	DETS 046*	0.1		18	16
Arsenic	mg/kg	DETSC2301#	0.2		9.4	13
Boron (water soluble)	mg/kg	DETSC2123#	0.2		< 0.2	0.3
Cadmium	mg/kg	DETSC2301#	0.1		0.4	0.4
Chromium	mg/kg	DETSC2301#	0.15		29	26
Copper	mg/kg	DETSC2301#	0.2		20	30
Lead	mg/kg	DETSC2301#	0.3		20	31
Mercury	mg/kg	DETSC 2325#	0.05		< 0.05	< 0.05
Nickel	mg/kg	DETSC2301#	1		33	32
Selenium	mg/kg	DETSC2301#	0.5		< 0.5	< 0.5
Zinc	mg/kg	DETSC2301#	1		57	61
Loss on ignition	%	DETSC 2003#	0.01		1.9	6.6
pH		DETSC 2008#			8.6	7.6
Cyanide total	mg/kg	DETSC 2130#	0.1		< 0.1	< 0.1
Cyanide free	mg/kg	DETSC 2130#	0.1		< 0.1	< 0.1
Cyanide complex	mg/kg	DETSC 2130	0.2		< 0.2	< 0.2
Thiocyanate	mg/kg	DETSC 2130#	0.6		< 0.6	< 0.6
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		4.4	7.8
Chloride Aqueous Extract	mg/l	DETSC 2055	1		3.2	11
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		48	24
Sulphur (free)	mg/kg	DETSC 3049#	0.75		< 0.75	3.9
EPH (C10-C40)	mg/kg	DETSC 3311#	10		< 10	< 10
Benzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Ethylbenzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Toluene	mg/kg	DETS 062#	0.01		< 0.01	0.01
Xylene	mg/kg	DETS 062#	0.01		0.02	0.01

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94687

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	588617	588618
				Sample ID	BH16	BH13
				Depth	2.00	0.50
				Sample Ref		
				Sample Type		
				Sampling Date	27/11/2013	27/11/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Cresols	mg/kg	DETSC 3421*	0.5	12	< 0.50	
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Phenol	mg/kg	DETSC 3421*	0.5	15	< 0.50	
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Total Phenols	mg/kg	DETSC 3421*	0.5	27	< 0.50	

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-94687

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
588612	TP8 0.80	Soil	NAD	na	Andrew Little
588613	TP8 2.40	Soil	NAD	na	Andrew Little
588614	TP9 1.00	Soil	NAD	na	Andrew Little
588615	TP9 2.70	Soil	NAD	na	Andrew Little
588616	BH16 0.30	Soil	NAD	na	Andrew Little
588617	BH16 2.00	Soil	NAD	na	Andrew Little
588618	BH13 0.50	Soil	NAD	na	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
588612	TP8 0.80 SOIL	27/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	BTEX Solid (14 days), BTEX Solid (calc) (14 days), Naphthalene (14 days), PAH FID Solid (14 days), PAH FID Solid (calc) (14 days), EPH/TPH Solid (14 days), EPH/TPH Solid (calc) (14 days)		
588613	TP8 2.40 SOIL	27/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	BTEX Solid (14 days), BTEX Solid (calc) (14 days), Naphthalene (14 days), PAH FID Solid (14 days), PAH FID Solid (calc) (14 days), EPH/TPH Solid (14 days), EPH/TPH Solid (calc) (14 days)		
588614	TP9 1.00 SOIL	27/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	BTEX Solid (14 days), BTEX Solid (calc) (14 days), Naphthalene (14 days), PAH FID Solid (14 days), PAH FID Solid (calc) (14 days), EPH/TPH Solid (14 days), EPH/TPH Solid (calc) (14 days)		

588615	TP9 2.70 SOIL	27/11/2013	Glass Jar 1L (1 litre), Plastic Tub 1L (1kg)	BTEX Solid (14 days), BTEX Solid (calc) (14 days), Naphthalene (14 days), PAH FID Solid (14 days), PAH FID Solid (calc) (14 days), EPH/TPH Solid (14 days), EPH/TPH Solid (calc) (14 days)	BTEX Solid
588616	BH16 0.30 SOIL	27/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	BTEX Solid (14 days), BTEX Solid (calc) (14 days), Naphthalene (14 days), PAH FID Solid (14 days), PAH FID Solid (calc) (14 days), EPH/TPH Solid (14 days), EPH/TPH Solid (calc) (14 days)	
588617	BH16 2.00 SOIL	27/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	BTEX Solid (14 days), BTEX Solid (calc) (14 days), Naphthalene (14 days), PAH FID Solid (14 days), PAH FID Solid (calc) (14 days), EPH/TPH Solid (14 days), EPH/TPH Solid (calc) (14 days)	
588618	BH13 0.50 SOIL	27/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	BTEX Solid (14 days), BTEX Solid (calc) (14 days), Naphthalene (14 days), PAH FID Solid (14 days), PAH FID Solid (calc) (14 days), EPH/TPH Solid (14 days), EPH/TPH Solid (calc) (14 days)	



2139

Certificate of Analysis

Date: 10/01/2014

Certificate Number: 13-93782-1

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-93782-1

Client Reference: 13627

Contract Title: Wrexham

Description: 15 soil samples

Date Received: 04 December 2013

Date Started: 24 December 2013

Date Completed: 10 January 2014

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: **This report supersedes 13-93782, additional testing carried out**
Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583602	583603	583604	583605	583606
				Sample ID	TP3	TP3	TP2	TP2	TP1
				Depth	0.50	2.00	0.50	1.00	0.40
				Sample Ref					
				Sample Type					
				Sampling Date	29/11/2013	29/11/2013	29/11/2013	29/11/2013	29/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	2.3	6.3	4.0	8.3	4.9	
Moisture Content	%	DETS 046*	0.1	15	24	11	12	18	
Arsenic	mg/kg	DETSC2301#	0.2	13	8.7	20	13	54	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	1.5	< 0.2	0.4	0.3	1.6	
Cadmium	mg/kg	DETSC2301#	0.1	0.7	0.7	1.3	0.8	0.8	
Chromium	mg/kg	DETSC2301#	0.15	17	32	30	22	28	
Copper	mg/kg	DETSC2301#	0.2	18	22	45	23	81	
Lead	mg/kg	DETSC2301#	0.3	77	23	100	43	48	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	< 0.05	0.26	0.09	0.07	
Nickel	mg/kg	DETSC2301#	1	69	37	56	49	67	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	0.7	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1	59	65	140	72	72	
Loss on ignition	%	DETSC 2003#	0.01	2.4	2.0	4.9	1.9	7.4	
pH		DETSC 2008#		9.2	8.5	8.3	8.4	8.6	
Cyanide total	mg/kg	DETSC 2130#	0.1	3.8	0.1	29	16	0.5	
Cyanide free	mg/kg	DETSC 2130#	0.1	1.2	0.1	2.2	0.5	0.2	
Cyanide complex	mg/kg	DETSC 2130	0.2	2.6	< 0.2	26	15	0.3	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	< 0.6	5.1	1.5	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	55	71	19	20	7.4	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	12	10	13	11	15	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	190	22	200	74	150	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	110	< 0.75	750	160	4.2	
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01	0.05					
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01	2.0					
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01	14					
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5	260					
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2	1200					
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5	880					
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4	320					
Aliphatic C5-C35	mg/kg	DETSC 3072*	10	2600					
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01	0.16					
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01	0.46					
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01	28					
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9	120					
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5	930					
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6	1100					
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4	670					
Aromatic C5-C35	mg/kg	DETSC 3072*	10	2900					
TPH Ali/Aro	mg/kg	DETSC 3072*	10	5500					

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583602	583603	583604	583605	583606
				Sample ID	TP3	TP3	TP2	TP2	TP1
				Depth	0.50	2.00	0.50	1.00	0.40
				Sample Ref					
				Sample Type					
				Sampling Date	29/11/2013	29/11/2013	29/11/2013	29/11/2013	29/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
EPH (C10-C40)	mg/kg	DETSC 3311#	10	8600	< 10	18000	7400	< 10	
Benzene	mg/kg	DETS 062#	0.01	0.16	< 0.01	0.02	0.13	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	4.9	0.12	0.95	2.7	0.02	
Toluene	mg/kg	DETS 062#	0.01	0.46	< 0.01	0.08	0.03	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	8.3	< 0.01	2.2	4.3	0.04	
Acenaphthene	mg/kg	DETSC 3301	0.1	53	< 0.1	17	20	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1	71	< 0.1	150	73	0.1	
Anthracene	mg/kg	DETSC 3301	0.1	43	< 0.1	21	11	< 0.1	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	29	< 0.1	11	8.7	< 0.1	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	25	< 0.1	16	8.7	< 0.1	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	17	< 0.1	8.5	4.7	< 0.1	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	9.8	< 0.1	4.6	2.4	< 0.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	11	< 0.1	11	5.9	< 0.1	
Chrysene	mg/kg	DETSC 3301	0.1	28	< 0.1	13	9.3	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	DETSC 3301	0.1	1.9	< 0.1	1.1	1.0	< 0.1	
Fluoranthene	mg/kg	DETSC 3301	0.1	68	< 0.1	45	40	< 0.1	
Fluorene	mg/kg	DETSC 3301	0.1	58	< 0.1	21	18	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	12	< 0.1	11	6.5	< 0.1	
Naphthalene	mg/kg	DETSC 3301	0.1	160	< 0.1	99	40	0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1	100	< 0.1	45	29	< 0.1	
Pyrene	mg/kg	DETSC 3301	0.1	62	< 0.1	51	42	< 0.1	
PAH	mg/kg	DETSC 3301	1.6	750	< 1.6	530	320	< 1.6	
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583607	583608	583609	583610	583611
				Sample ID	TP1	TP23	BH4	TP24	TP24D
				Depth	1.50	1.50	2.20	1.90	1.90
				Sample Ref					
				Sample Type					
				Sampling Date	29/11/2013	29/11/2013	29/11/2013	02/12/2013	02/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1		4.2	5.1	6.1	3.8	6.5
Moisture Content	%	DETS 046*	0.1		9.6	14	13	9.5	11
Arsenic	mg/kg	DETSC2301#	0.2		12	8.6	4.2	6.8	6.5
Boron (water soluble)	mg/kg	DETSC2123#	0.2		< 0.2	0.3	0.4	0.2	< 0.2
Cadmium	mg/kg	DETSC2301#	0.1		0.7	0.9	0.6	0.5	0.5
Chromium	mg/kg	DETSC2301#	0.15		23	37	14	15	13
Copper	mg/kg	DETSC2301#	0.2		22	28	15	17	19
Lead	mg/kg	DETSC2301#	0.3		20	42	26	45	54
Mercury	mg/kg	DETSC 2325#	0.05		< 0.05	0.07	< 0.05	0.10	0.15
Nickel	mg/kg	DETSC2301#	1		28	31	11	13	12
Selenium	mg/kg	DETSC2301#	0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETSC2301#	1		61	100	58	57	56
Loss on ignition	%	DETSC 2003#	0.01		1.5	3.6	3.2	2.9	2.5
pH		DETSC 2008#			8.1	8.7	8.7	8.4	8.2
Cyanide total	mg/kg	DETSC 2130#	0.1		1.3	0.3	1.4	0.4	0.5
Cyanide free	mg/kg	DETSC 2130#	0.1		0.3	0.1	0.1	< 0.1	0.2
Cyanide complex	mg/kg	DETSC 2130	0.2		1.0	0.2	1.2	0.4	0.3
Thiocyanate	mg/kg	DETSC 2130#	0.6		< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		13	6.1	8.9	6.8	6.3
Chloride Aqueous Extract	mg/l	DETSC 2055	1		16	9.4	14	11	10
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		64	24	42	39	31
Sulphur (free)	mg/kg	DETSC 3049#	0.75		100	1.1	1.1	< 0.75	2.9
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01						
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01						
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01						
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5						
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2						
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5						
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4						
Aliphatic C5-C35	mg/kg	DETSC 3072*	10						
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01						
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01						
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01						
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9						
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5						
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6						
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4						
Aromatic C5-C35	mg/kg	DETSC 3072*	10						
TPH Ali/Aro	mg/kg	DETSC 3072*	10						

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583607	583608	583609	583610	583611
				Sample ID	TP1	TP23	BH4	TP24	TP24D
				Depth	1.50	1.50	2.20	1.90	1.90
				Sample Ref					
				Sample Type					
				Sampling Date	29/11/2013	29/11/2013	29/11/2013	02/12/2013	02/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
EPH (C10-C40)	mg/kg	DETSC 3311#	10		8400	600	1200	310	60
Benzene	mg/kg	DETS 062#	0.01		0.28	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	mg/kg	DETS 062#	0.01		7.6	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	DETS 062#	0.01		0.71	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	mg/kg	DETS 062#	0.01		26	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	mg/kg	DETSC 3301	0.1		50	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1		120	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1		7.7	< 0.1	0.7	0.2	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		1.4	< 0.1	1.3	0.4	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		1.0	0.7	1.4	0.7	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		0.5	< 0.1	0.8	0.6	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		0.3	< 0.1	0.8	0.4	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		0.7	< 0.1	0.5	0.4	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1		1.6	< 0.1	0.9	0.6	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DETSC 3301	0.1		0.3	< 0.1	0.2	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1		11	0.7	2.6	1.4	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1		130	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		1.1	< 0.1	1.3	1.0	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1		280	< 0.1	0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1		21	< 0.1	1.2	0.5	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1		6.9	0.6	2.1	1.2	< 0.1
PAH	mg/kg	DETSC 3301	1.6		640	1.9	14	7.3	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583612	583613	583614	583615
				Sample ID	TP22	TP22D	BH6	TP32
				Depth	0.30	0.30	2.00	2.00-2.50
				Sample Ref				
				Sample Type				
				Sampling Date	02/12/2013	02/12/2013	02/12/2013	02/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Stones >2mm	% m/m	DETSC 1003*	1		4.8	4.1	4.8	7.3
Moisture Content	%	DETS 046*	0.1		17	22	25	
Arsenic	mg/kg	DETSC2301#	0.2		9.9	8.2	11	
Boron (water soluble)	mg/kg	DETSC2123#	0.2		1.0	1.1	0.8	
Cadmium	mg/kg	DETSC2301#	0.1		0.5	0.5	0.6	
Chromium	mg/kg	DETSC2301#	0.15		20	18	19	
Copper	mg/kg	DETSC2301#	0.2		19	16	39	
Lead	mg/kg	DETSC2301#	0.3		45	48	80	
Mercury	mg/kg	DETSC 2325#	0.05		0.05	< 0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1		19	17	26	
Selenium	mg/kg	DETSC2301#	0.5		< 0.5	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1		61	61	75	
Loss on ignition	%	DETSC 2003#	0.01		4.3	4.8	4.0	
pH		DETSC 2008#			7.3	7.1	8.6	
Cyanide total	mg/kg	DETSC 2130#	0.1		1.6	0.9	9.6	
Cyanide free	mg/kg	DETSC 2130#	0.1		< 0.1	0.1	0.3	
Cyanide complex	mg/kg	DETSC 2130	0.2		1.6	0.7	9.3	
Thiocyanate	mg/kg	DETSC 2130#	0.6		1.8	1.8	7.0	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		49	70	110	
Chloride Aqueous Extract	mg/l	DETSC 2055	1		7.0	5.6	9.7	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		26	17	360	
Sulphur (free)	mg/kg	DETSC 3049#	0.75		45	64	110	
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01					
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01					
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01					
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5					
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2					
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5					
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4					
Aliphatic C5-C35	mg/kg	DETSC 3072*	10					
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01					
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01					
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01					
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9					
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5					
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6					
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4					
Aromatic C5-C35	mg/kg	DETSC 3072*	10					
TPH Ali/Aro	mg/kg	DETSC 3072*	10					

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583612	583613	583614	583615
				Sample ID	TP22	TP22D	BH6	TP32
				Depth	0.30	0.30	2.00	2.00-2.50
				Sample Ref				
				Sample Type				
				Sampling Date	02/12/2013	02/12/2013	02/12/2013	02/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	34	< 10		
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.04		
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.09		
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.04		
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.04		
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Dibenzo(a,h)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.5		
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1		
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.3		
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	< 1.6		
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50		

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583616
				Sample ID	TP32
				Depth	2.00
				Sample Ref	
				Sample Type	
				Sampling Date	02/12/2013
				Sampling Time	
Test	Units	DETSxx	LOD		
Stones >2mm	% m/m	DETSC 1003*	1	5.2	
Moisture Content	%	DETS 046*	0.1	23	
Arsenic	mg/kg	DETSC2301#	0.2	37	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	0.7	
Cadmium	mg/kg	DETSC2301#	0.1	1.1	
Chromium	mg/kg	DETSC2301#	0.15	35	
Copper	mg/kg	DETSC2301#	0.2	64	
Lead	mg/kg	DETSC2301#	0.3	300	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1	35	
Selenium	mg/kg	DETSC2301#	0.5	2.6	
Zinc	mg/kg	DETSC2301#	1	290	
Loss on ignition	%	DETSC 2003#	0.01	8.6	
pH		DETSC 2008#		10.1	
Cyanide total	mg/kg	DETSC 2130#	0.1	3.2	
Cyanide free	mg/kg	DETSC 2130#	0.1	0.6	
Cyanide complex	mg/kg	DETSC 2130	0.2	2.7	
Thiocyanate	mg/kg	DETSC 2130#	0.6	1.1	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	15	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	15	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	300	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	360	
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01	1.3	
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01	0.81	
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01	24	
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5	180	
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2	1100	
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5	1400	
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4	580	
Aliphatic C5-C35	mg/kg	DETSC 3072*	10	3300	
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01	< 0.01	
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01	0.55	
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01	170	
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9	2300	
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5	12000	
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6	18000	
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4	8300	
Aromatic C5-C35	mg/kg	DETSC 3072*	10	41000	
TPH Ali/Aro	mg/kg	DETSC 3072*	10	44000	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

Lab No. 583616
Sample ID TP32
Depth 2.00
Sample Ref
Sample Type
Sampling Date 02/12/2013
Sampling Time

Test	Units	DETSxx	LOD	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	2000
Benzene	mg/kg	DETS 062#	0.01	< 0.01
Ethylbenzene	mg/kg	DETS 062#	0.01	6.1
Toluene	mg/kg	DETS 062#	0.01	0.55
Xylene	mg/kg	DETS 062#	0.01	14
Acenaphthene	mg/kg	DETSC 3301	0.1	83
Acenaphthylene	mg/kg	DETSC 3301	0.1	17
Anthracene	mg/kg	DETSC 3301	0.1	30
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	11
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	13
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	6.9
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	3.9
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	17
Chrysene	mg/kg	DETSC 3301	0.1	12
Dibenzo(a,h)anthracene	mg/kg	DETSC 3301	0.1	0.4
Fluoranthene	mg/kg	DETSC 3301	0.1	70
Fluorene	mg/kg	DETSC 3301	0.1	34
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	9.5
Naphthalene	mg/kg	DETSC 3301	0.1	67
Phenanthrene	mg/kg	DETSC 3301	0.1	120
Pyrene	mg/kg	DETSC 3301	0.1	88
PAH	mg/kg	DETSC 3301	1.6	590
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50

Summary of Chemical Analysis

Leachate Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	591842
				Sample ID	TP32
				Depth	2.00
				Sample Ref	
				Sample Type	
				Sampling Date	02/12/2013
				Sampling Time	
Test	Units	DETSxx	LOD		
BS EN 12457 10:1		DETS 036*		Y	
Arsenic, Dissolved	ug/l	DETSC 2306	0.16	3.4	
Cadmium, Dissolved	ug/l	DETSC 2306	0.03	< 0.030	
Chromium, Dissolved	ug/l	DETSC 2306	0.25	< 0.25	
Copper, Dissolved	ug/l	DETSC 2306	0.4	< 0.40	
Iron, Dissolved	ug/l	DETSC 2306	5.5	8.4	
Lead, Dissolved	ug/l	DETSC 2306	0.09	0.12	
Mercury, Dissolved	ug/l	DETSC 2306	0.01	< 0.010	
Nickel, Dissolved	ug/l	DETSC 2306	0.5	0.93	
Selenium, Dissolved	ug/l	DETSC 2306	0.25	< 0.25	
Zinc, Dissolved	ug/l	DETSC 2306	1.25	3.57	
Conductivity	uS/cm	DETSC 2009	1	55.8	
pH		DETSC 2008		8.4	
Cyanide total	ug/l	DETSC 2130	40	< 40	
Cyanide free	ug/l	DETSC 2130	20	< 20	
Cyanide complex	ug/l	DETSC 2130	40	< 40	
Thiocyanate	ug/l	DETSC 2130	40	< 40	
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015	1.4	
Chloride	mg/l	DETSC 2055	0.1	2.1	
Sulphate as SO4	mg/l	DETSC 2055	0.1	8.0	
Sulphide	ug/l	DETSC 2208	10	< 10	
Sulphur (free)	ug/l	DETSC 3049	84	< 84	
Total Organic Carbon	mg/l	DETSC 2033	2	7.5	
EPH (C10-C40)	ug/l	DETSC 3311	10	2400	
Benzene	ug/l	DETSC 3322	1	2.0	
Toluene	ug/l	DETSC 3322	1	2.0	
Ethylbenzene	ug/l	DETSC 3322	1	11	
Xylene	ug/l	DETSC 3322	1	24	

Summary of Chemical Analysis

Leachate Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

Lab No. 591842
Sample ID TP32
Depth 2.00
Sample Ref
Sample Type
Sampling Date 02/12/2013
Sampling Time

Test	Units	DETSxx	LOD	
Acenaphthene	ug/l	DETS 074*	0.01	240
Acenaphthylene	ug/l	DETS 074*	0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01	22
Benzo(a)anthracene	ug/l	DETS 074*	0.01	1.4
Benzo(a)pyrene	ug/l	DETS 074*	0.01	1.4
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01	0.85
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01	0.37
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01	1.2
Chrysene	ug/l	DETS 074*	0.01	0.98
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	0.01	23
Fluorene	ug/l	DETS 074*	0.01	67
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01	1.3
Naphthalene	ug/l	DETS 074*	0.01	31
Phenanthrene	ug/l	DETS 074*	0.01	110
Pyrene	ug/l	DETS 074*	0.01	23
PAH	ug/l	DETS 074*	0.2	520
Catechol	ug/l	DETSC 3422*	0.1	< 0.10
Cresols	ug/l	DETSC 3422*	0.1	< 0.10
Naphthols	ug/l	DETSC 3422*	0.1	< 0.10
Phenol	ug/l	DETSC 3422*	0.1	< 0.10
Resorcinol	ug/l	DETSC 3422*	0.1	< 0.10
Trimethylphenol	ug/l	DETSC 3422*	0.1	< 0.10
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1	< 0.10
Total Phenols	ug/l	DETSC 3422*	0.1	< 0.10

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
583602	TP3 0.50	Soil	Amosite	Loose Amosite fibres present	Andrew Little
583603	TP3 2.00	Soil	NAD	na	Andrew Little
583604	TP2 0.50	Soil	Amosite	Loose Amosite fibres present	Andrew Little
583605	TP2 1.00	Soil	Amosite	Loose Amosite fibres present	Andrew Little
583606	TP1 0.40	Soil	Amosite	Loose Amosite fibres present	Andrew Little
583607	TP1 1.50	Soil	NAD	na	Andrew Little
583608	TP23 1.50	Soil	NAD	na	Andrew Little
583609	BH4 2.20	Soil	Amosite	na	Andrew Little
583610	TP24 1.90	Soil	NAD	na	Andrew Little
583611	TP24D 1.90	Soil	NAD	na	Andrew Little
583612	TP22 0.30	Soil	NAD	na	Andrew Little
583613	TP22D 0.30	Soil	NAD	na	Andrew Little
583614	BH6 2.00	Soil	NAD	na	Andrew Little
583615	TP32 2.00-2.50	Soil	NAD	na	Andrew Little
583616	TP32 2.00	Soil	NAD	na	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Summary of Asbestos Analysis Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

		Lab No.	583602	583604	583605
		Sample Ref	TP3	TP2	TP2
		Depth	0.50	0.5	1
		Other Ref			
		Sample Type	Soil	Soil	Soil
Test	Units	DETSxx			
Total Mass% Asbestos (i+ii)	Mass %		<0.001	<0.001	0.001
Quantification by Phase Contrast Optical Microscopy (i)	Mass %	DETSC 1102	<0.001	<0.001	<0.001
Gravimetric Quantification (ii)	Mass %	DETSC 1102	na	na	0.000
Breakdown of Gravimetric Analysis					
Mass of Sample	g		1225.95	1167.59	1538.10
ACMs present*					Loose Bundle
Mass of ACM in sample	g				0.01
% ACM by mass	%				0.000
% asbestos in ACM	%				100
% asbestos in sample	%				0.000
Potentially Respirable Fibres	Fibres/g	DETSC 1102	not requested	not requested	not requested

* Denotes test or material description outside of UKAS accreditation.

% asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264.

Recommended sample size for quantification is approximately 1kg

denotes deviating sample

Summary of Asbestos Analysis Soil Samples

Our Ref: 13-93782-1

Client Ref: 13627

Contract Title: Wrexham

		Lab No.	583606	583609
		Sample Ref	TP1	BH4
		Depth	0.4	2.2
		Other Ref		
		Sample Type	Soil	Soil
Test	Units	DETSxx		
Total Mass% Asbestos (i+ii)	Mass %		<0.001	<0.001
Quantification by Phase Contrast Optical Microscopy (i)	Mass %	DETSC 1102	<0.001	<0.001
Gravimetric Quantification (ii)	Mass %	DETSC 1102	na	na
Breakdown of Gravimetric Analysis				
Mass of Sample	g		849.10	1579.94
ACMs present*				
Mass of ACM in sample	g			
% ACM by mass	%			
% asbestos in ACM	%			
% asbestos in sample	%			
Potentially Respirable Fibres	Fibres/g	DETSC 1102	not requested	not requested

* Denotes test or material description outside of UKAS accreditation.

% asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264.

Recommended sample size for quantification is approximately 1kg

denotes deviating sample

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
583602	TP3 0.50 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583603	TP3 2.00 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583604	TP2 0.50 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583605	TP2 1.00 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583606	TP1 0.40 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583607	TP1 1.50 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583608	TP23 1.50 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583609	BH4 2.20 SOIL	29/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			

583610	TP24 1.90 SOIL	02/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
583611	TP24D 1.90 SOIL	02/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
583612	TP22 0.30 SOIL	02/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
583613	TP22D 0.30 SOIL	02/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
583614	BH6 2.00 SOIL	02/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
583615	TP32 2.00-2.50 SOIL	02/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
583616	TP32 2.00 SOIL	02/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
591842	TP32 2.00 LEACHATE	02/12/2013	Glass Jar 1L (1 litre)



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Certificate of Analysis

Date: 10/01/2014

Certificate Number: 14-95242

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 14-95242

Client Reference: 13627

Contract Title: Wrexham

Description: 1 soil sample

Date Received: 24 December 2013

Date Started: 06 January 2014

Date Completed: 10 January 2014

Test Procedures: Identified by prefix DETSn, details available upon request.

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 14-95242

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	591851
				Sample ID	TP1
				Depth	1.70
				Sample Ref	
				Sample Type	
				Sampling Date	05/12/2013
				Sampling Time	
Test	Units	DETSxx	LOD		
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01	< 0.01	
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01	< 0.01	
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01	< 0.01	
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5	360	
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2	1100	
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5	910	
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4	350	
Aliphatic C5-C35	mg/kg	DETSC 3072*	10	2700	
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01	< 0.01	
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01	< 0.01	
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01	< 0.01	
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9	290	
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5	950	
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6	970	
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4	330	
Aromatic C5-C35	mg/kg	DETSC 3072*	10	2500	
TPH Ali/Aro	mg/kg	DETSC 3072*	10	5300	

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
591851	TP1 1.70 SOIL	05/12/2013	Plastic Tub 1L (1kg)	Aliphatics/Aromatics Solid (14 days), Aliphatics/Aromatics Solid (calc) (14 days), BTEX Solid (14 days), BTEX Solid (calc) (14 days), Chromium (14 days)	Aliphatics/Aromatics Solid, BTEX Solid, Chromium	



2139

Certificate of Analysis

Date: 10/01/2014

Certificate Number: 13-94416-1

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-94416-1

Client Reference:

Contract Title:

Description: 4 soil samples, 4 water samples

Date Received: 12 December 2013

Date Started: 12 December 2013

Date Completed: 10 January 2014

Test Procedures: Identified by prefix DETSn, details available upon request.

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94416-1

Client Ref:

Contract Title:

				Lab No.	587078	587079	587080	587085
				Sample ID	SD1	SD2	SD4	RB1
				Depth				
				Sample Ref				
				Sample Type				
				Sampling Date	10/12/2013	10/12/2013	10/12/2013	10/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Stones >2mm	% m/m	DETSC 1003*	1		4.7	6.2	5.3	3.5
Moisture Content	%	DETS 046*	0.1		26	39	68	65
Arsenic	mg/kg	DETSC2301#	0.2		13	8.7	8.4	32
Boron (water soluble)	mg/kg	DETSC2123#	0.2		0.7	1.3	2.2	0.8
Cadmium	mg/kg	DETSC2301#	0.1		1.2	0.9	1.1	2.3
Chromium	mg/kg	DETSC2301#	0.15		19	16	24	20
Copper	mg/kg	DETSC2301#	0.2		20	18	23	14
Lead	mg/kg	DETSC2301#	0.3		1800	690	660	220
Mercury	mg/kg	DETSC 2325#	0.05		< 0.05	0.09	0.15	< 0.05
Nickel	mg/kg	DETSC2301#	1		110	19	22	19
Selenium	mg/kg	DETSC2301#	0.5		< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETSC2301#	1		300	210	260	140
Loss on ignition	%	DETSC 2003#	0.01		2.3	5.1	9.9	9.9
pH		DETSC 2008#			8.5	7.9	7.3	7.8
Cyanide total	mg/kg	DETSC 2130#	0.1		0.6	0.7	1.5	4.1
Cyanide free	mg/kg	DETSC 2130#	0.1		< 0.1	0.1	0.2	0.4
Cyanide complex	mg/kg	DETSC 2130	0.2		0.6	0.6	1.3	3.7
Thiocyanate	mg/kg	DETSC 2130#	0.6		< 0.6	< 0.6	< 0.6	< 0.6
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		6.2	6.0	18	8.1
Chloride Aqueous Extract	mg/l	DETSC 2055	1		19	18	19	6.6
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		51	42	190	170
Sulphur (free)	mg/kg	DETSC 3049#	0.75		< 0.75	2.5	13	< 0.75
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01	
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01	
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01	
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5			< 1.5	< 1.5	
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2			< 1.2	3.8	
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5			< 1.5	3.5	
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4			< 3.4	< 3.4	
Aliphatic C5-C35	mg/kg	DETSC 3072*	10			< 10	< 10	
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01	
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01			< 0.01	< 0.01	
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01	0.24	
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9			< 0.9	1.4	
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5			5.8	15	
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6			21	31	
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4			37	43	
Aromatic C5-C35	mg/kg	DETSC 3072*	10			64	90	
TPH Ali/Aro	mg/kg	DETSC 3072*	10			64	97	
EPH (C10-C40)	mg/kg	DETSC 3311#	10		< 10	190	2900	< 10

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94416-1

Client Ref:

Contract Title:

				Lab No.	587078	587079	587080	587085
				Sample ID	SD1	SD2	SD4	RB1
				Depth				
				Sample Ref				
				Sample Type				
				Sampling Date	10/12/2013	10/12/2013	10/12/2013	10/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Benzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Xylene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	6.8	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1		< 0.1	0.6	14	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1		< 0.1	0.3	28	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		< 0.1	0.9	27	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	0.9	21	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	0.8	14	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	0.5	9.3	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		< 0.1	0.3	9.3	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1		< 0.1	0.8	24	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1		< 0.1	0.3	2.7	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	1.6	55	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	13	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	1.0	11	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1		< 0.1	0.2	5.7	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1		< 0.1	0.4	56	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1		< 0.1	1.3	47	< 0.1
PAH	mg/kg	DETSC 3301	1.6		< 1.6	10	340	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94416-1

Client Ref:

Contract Title:

				Lab No.	587081	587082	587083	587084
				Sample ID	SS11-02-1	SS11-02-3	SS11-01-1	SS11-08-1
				Depth				
				Sample Ref				
				Sample Type				
				Sampling Date	10/12/2013	10/12/2013	10/12/2013	10/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Arsenic, Dissolved	ug/l	DETSC 2306	0.16		1.1	2.0	1.7	1.3
Cadmium, Dissolved	ug/l	DETSC 2306	0.03		< 0.030	< 0.030	0.080	0.050
Chromium, Dissolved	ug/l	DETSC 2306	0.25		0.33	< 0.25	0.48	0.35
Copper, Dissolved	ug/l	DETSC 2306	0.4		2.9	0.90	1.7	2.9
Iron, Dissolved	ug/l	DETSC 2306	5.5		73	70	35	70
Lead, Dissolved	ug/l	DETSC 2306	0.09		0.64	0.38	0.10	0.69
Mercury, Dissolved	ug/l	DETSC 2306	0.01		< 0.010	< 0.010	< 0.010	< 0.010
Nickel, Dissolved	ug/l	DETSC 2306	0.5		2.1	1.7	1.7	2.3
Selenium, Dissolved	ug/l	DETSC 2306	0.25		0.25	0.45	0.27	0.25
Zinc, Dissolved	ug/l	DETSC 2306	1.25		28.0	10.0	16.0	62.0
Conductivity	uS/cm	DETSC 2009	1		588	503	514	597
pH		DETSC 2008			8.1	8.0	7.8	8.0
Cyanide total	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40
Cyanide free	ug/l	DETSC 2130	20		< 20	< 20	< 20	< 20
Cyanide complex	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40
Thiocyanate	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40
Suspended Solids	mg/l	DETSC 2034	5		31	140	19	< 5.0
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015		0.16	0.45	0.48	0.17
Chloride	mg/l	DETSC 2055	0.1		38	46	46	49
Sulphate as SO4	mg/l	DETSC 2055	0.1		55	60	54	41
Sulphide	ug/l	DETSC 2208	10		< 10	< 10	< 10	< 10
Sulphur (free)	ug/l	DETSC 3049	84		< 84	< 84	< 84	< 84
Total Organic Carbon	mg/l	DETSC 2033	2		13	13	6.7	11
EPH (C10-C40)	ug/l	DETSC 3311	10		120	130	130	140
Benzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0
Xylene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94416-1

Client Ref:

Contract Title:

				Lab No.	587081	587082	587083	587084
				Sample ID	SS11-02-1	SS11-02-3	SS11-01-1	SS11-08-1
				Depth				
				Sample Ref				
				Sample Type				
				Sampling Date	10/12/2013	10/12/2013	10/12/2013	10/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Acenaphthene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Acenaphthylene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01	< 0.01	0.04	< 0.01	0.07	
Benzo(a)anthracene	ug/l	DETS 074*	0.01	0.02	0.02	0.02	0.01	
Benzo(a)pyrene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	0.01	0.12	0.09	0.09	< 0.01	< 0.01
Fluorene	ug/l	DETS 074*	0.01	0.01	0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	ug/l	DETS 074*	0.01	0.03	0.01	< 0.01	0.03	
Phenanthrene	ug/l	DETS 074*	0.01	< 0.01	0.09	< 0.01	< 0.01	< 0.01
Pyrene	ug/l	DETS 074*	0.01	0.12	0.08	0.11	0.06	
PAH	ug/l	DETS 074*	0.2	0.35	0.36	0.26	< 0.20	
Catechol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
587078	SD1 SOIL	10/12/2013	Glass Jar 1L (1 litre), Glass Jar 250ml (250ml), Glass Vial (40ml), Plastic Tub 1L (1kg)			
587079	SD2 SOIL	10/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
587080	SD4 SOIL	10/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
587081	SS11-02-1 WATER	10/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587082	SS11-02-3 WATER	10/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587083	SS11-01-1 WATER	10/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587084	SS11-08-1 WATER	10/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587085	RB1 SOIL	10/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			



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Certificate of Analysis

Date:08/01/2014

Certificate Number: 13-93391-2

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-93391-2

Client Reference: 13627

Contract Title: Wrexham

Description: 9 soil samples

Date Received: 28 November 2013

Date Started: 28 November 2013

Date Completed: 06 December 2013

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: **This report supersedes 13-93391-1, Asbestos Quantification added**
Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93391-2

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581493	581494	581495	581496	581497
				Sample ID	BH2	TP11	TP13	TP12	TP21
				Depth	3.80	0.30	1.30	2.20	2.00
				Sample Ref					
				Sample Type					
				Sampling Date	26/11/2013	26/11/2013	26/11/2013	26/11/2013	26/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	3.2	6.5	4.2	6.8	5.4	
Moisture Content	%	DETS 046*	0.1	10	34	33	16	16	
Arsenic	mg/kg	DETSC2301#	0.2	8.3	18	8.7	6.3	7.1	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	0.3	0.3	0.9	< 0.2	< 0.2	
Cadmium	mg/kg	DETSC2301#	0.1	0.5	0.7	0.7	0.3	0.4	
Chromium	mg/kg	DETSC2301#	0.15	22	32	26	23	9.4	
Copper	mg/kg	DETSC2301#	0.2	17	70	12	9.0	100	
Lead	mg/kg	DETSC2301#	0.3	44	29	59	18	12	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	0.11	0.06	< 0.05	0.39	
Nickel	mg/kg	DETSC2301#	1	18	52	19	17	27	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1	58	59	76	43	32	
Loss on ignition	%	DETSC 2003#	0.01	0.68	5.1	6.3	2.0	4.7	
pH		DETSC 2008#		8.0	8.3	8.2	8.1	7.9	
Cyanide total	mg/kg	DETSC 2130#	0.1	0.2	13	1.8	0.6	3.2	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	0.2	0.2	0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	0.2	13	1.7	0.5	3.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	12	8.7	0.9	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	4.9	2.9	540	350	20	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	8.4	13	6.1	5.5	12	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	71	150	290	97	37	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	51	3.5	660	45	300	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	20	< 10	< 10	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93391-2

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581493	581494	581495	581496	581497
				Sample ID	BH2	TP11	TP13	TP12	TP21
				Depth	3.80	0.30	1.30	2.20	2.00
				Sample Ref					
				Sample Type					
				Sampling Date	26/11/2013	26/11/2013	26/11/2013	26/11/2013	26/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Acenaphthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH	mg/kg	DETS 3301	1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93391-2

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581498	581499	581500	581501
				Sample ID	TP21	BH13	BH12	BH12
				Depth	1.00	2.00	0.50	5.00
				Sample Ref				
				Sample Type				
				Sampling Date	26/11/2013	26/11/2013	26/11/2013	26/11/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Stones >2mm	% m/m	DETSC 1003*	1		4.2	5.3	1.6	
Moisture Content	%	DETS 046*	0.1		18	3.6	21	
Arsenic	mg/kg	DETSC2301#	0.2		12	16	8.5	
Boron (water soluble)	mg/kg	DETSC2123#	0.2		< 0.2	0.4	0.4	
Cadmium	mg/kg	DETSC2301#	0.1		0.7	0.8	0.7	
Chromium	mg/kg	DETSC2301#	0.15		51	36	46	
Copper	mg/kg	DETSC2301#	0.2		24	41	22	
Lead	mg/kg	DETSC2301#	0.3		24	81	25	
Mercury	mg/kg	DETSC 2325#	0.05		< 0.05	< 0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1		41	40	37	
Selenium	mg/kg	DETSC2301#	0.5		< 0.5	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1		71	150	72	
Loss on ignition	%	DETSC 2003#	0.01		3.0	3.8	2.5	
pH		DETSC 2008#			8.5	7.9	8.8	
Cyanide total	mg/kg	DETSC 2130#	0.1		< 0.1	0.1	< 0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1		< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2		< 0.2	< 0.2	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6		< 0.6	< 0.6	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		0.96	< 0.50	0.87	
Chloride Aqueous Extract	mg/l	DETSC 2055	1		5.6	6.0	7.4	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		97	34	42	
Sulphur (free)	mg/kg	DETSC 3049#	0.75		< 0.75	< 0.75	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10		< 10	< 10	< 10	
Benzene	mg/kg	DETS 062#	0.01		< 0.01	0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01		< 0.01	0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93391-2

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581498	581499	581500	581501
				Sample ID	TP21	BH13	BH12	BH12
				Depth	1.00	2.00	0.50	5.00
				Sample Ref				
				Sample Type				
				Sampling Date	26/11/2013	26/11/2013	26/11/2013	26/11/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Acenaphthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
PAH	mg/kg	DETSC 3301	1.6		< 1.6	< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-93391-2

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
581493	BH2 3.80	Soil	NAD	na	Andrew Little
581494	TP11 0.30	Soil	NAD	na	Andrew Little
581495	TP13 1.30	Soil	NAD	na	Andrew Little
581496	TP12 2.20	Soil	NAD	na	Andrew Little
581497	TP21 2.00	Soil	Amosite Chrysotile	na	Andrew Little
581498	TP21 1.00	Soil	NAD	na	Andrew Little
581499	BH13 2.00	Soil	NAD	na	Andrew Little
581500	BH12 0.50	Soil	NAD	na	Andrew Little
581501	BH12 5.00	Soil	NAD	na	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Summary of Asbestos Analysis Soil Samples

Our Ref: 13-93391-2

Client Ref: 13627

Contract Title: Wrexham

		Lab No.	581497
		Sample Ref	TP21
		Depth	2.00
		Other Ref	
		Sample Type	Soil
Test	Units	DETSxx	
Total Mass% Asbestos (i+ii)	Mass %		<0.001
Quantification by Phase Contrast Optical Microscopy (i)	Mass %	DETSC 1102	<0.001
Gravimetric Quantification (ii)	Mass %	DETSC 1102	na
Breakdown of Gravimetric Analysis			
Mass of Sample	g		729.70
ACMs present*			
Mass of ACM in sample	g		
% ACM by mass	%		
% asbestos in ACM	%		
% asbestos in sample	%		
Potentially Respirable Fibres	Fibres/g	DETSC 1102	not requested

* Denotes test or material description outside of UKAS accreditation.

% asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264.

Recommended sample size for quantification is approximately 1kg

denotes deviating sample

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
581493	BH2 3.80 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
581494	TP11 0.30 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
581495	TP13 1.30 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
581496	TP12 2.20 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
581497	TP21 2.00 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
581498	TP21 1.00 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
581499	BH13 2.00 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
581500	BH12 0.50 SOIL	26/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			



581501 BH12 5.00 SOIL

26/11/2013 Glass Jar 1L (1 litre), Glass Vial
(40ml), Plastic Tub 1L (1kg)



2139

Certificate of Analysis

Date: 09/01/2014

Certificate Number: 13-94538-1

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-94538-1

Client Reference: 13627

Contract Title: Wrexham

Description: 2 soil samples, 8 water samples

Date Received: 13 December 2013

Date Started: 13 December 2013

Date Completed: 09 January 2014

Test Procedures: Identified by prefix DETSn, details available upon request.

Notes: **This report supersedes 13-94538, additional testing carried out**
Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94538-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	587744	587745
				Sample ID	OX-BSD	SD3
				Depth		
				Sample Ref		
				Sample Type		
				Sampling Date	11/12/2013	11/12/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Stones >2mm	% m/m	DETSC 1003*	1		2.8	5.3
Moisture Content	%	DETS 046*	0.1		240	140
Arsenic	mg/kg	DETSC2301#	0.2		12	8.6
Boron (water soluble)	mg/kg	DETSC2123#	0.2		3.1	2.2
Cadmium	mg/kg	DETSC2301#	0.1		8.7	0.8
Chromium	mg/kg	DETSC2301#	0.15		37	31
Copper	mg/kg	DETSC2301#	0.2		43	19
Lead	mg/kg	DETSC2301#	0.3		690	32
Mercury	mg/kg	DETSC 2325#	0.05		0.20	< 0.05
Nickel	mg/kg	DETSC2301#	1		31	28
Selenium	mg/kg	DETSC2301#	0.5		0.6	0.5
Zinc	mg/kg	DETSC2301#	1		1300	120
Loss on ignition	%	DETSC 2003#	0.01		12	9.7
pH		DETSC 2008#			8.0	7.5
Cyanide total	mg/kg	DETSC 2130#	0.1		1.1	0.2
Cyanide free	mg/kg	DETSC 2130#	0.1		0.2	< 0.1
Cyanide complex	mg/kg	DETSC 2130	0.2		0.9	< 0.2
Thiocyanate	mg/kg	DETSC 2130#	0.6		6.5	< 0.6
Total Organic Carbon	%	DETSC 2084*	0.1		7.1	4.7
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		66	51
Chloride Aqueous Extract	mg/l	DETSC 2055	1		48	20
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		670	51
Sulphur (free)	mg/kg	DETSC 3049#	0.75		59	< 0.75
Aliphatic C5-C6	mg/kg	DETSC 3321*	0.01			< 0.01
Aliphatic C6-C8	mg/kg	DETSC 3321*	0.01			< 0.01
Aliphatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01
Aliphatic C10-C12	mg/kg	DETSC 3072#	1.5			< 1.5
Aliphatic C12-C16	mg/kg	DETSC 3072#	1.2			< 1.2
Aliphatic C16-C21	mg/kg	DETSC 3072#	1.5			< 1.5
Aliphatic C21-C35	mg/kg	DETSC 3072#	3.4			< 3.4
Aliphatic C5-C35	mg/kg	DETSC 3072*	10			< 10
Aromatic C5-C7	mg/kg	DETSC 3321*	0.01			< 0.01
Aromatic C7-C8	mg/kg	DETSC 3321*	0.01			< 0.01
Aromatic C8-C10	mg/kg	DETSC 3321*	0.01			< 0.01
Aromatic C10-C12	mg/kg	DETSC 3072#	0.9			< 0.9
Aromatic C12-C16	mg/kg	DETSC 3072#	0.5			< 0.5
Aromatic C16-C21	mg/kg	DETSC 3072#	0.6			< 0.6
Aromatic C21-C35	mg/kg	DETSC 3072#	1.4			< 1.4
Aromatic C5-C35	mg/kg	DETSC 3072*	10			< 10
TPH Ali/Aro	mg/kg	DETSC 3072*	10			< 10
EPH (C10-C40)	mg/kg	DETSC 3311#	10		< 10	< 10

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94538-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	587744	587745
				Sample ID	OX-BSD	SD3
				Depth		
				Sample Ref		
				Sample Type		
				Sampling Date	11/12/2013	11/12/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Benzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Ethylbenzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Toluene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Xylene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Acenaphthene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Acenaphthylene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Anthracene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Chrysene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Fluoranthene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Fluorene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Naphthalene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Phenanthrene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
Pyrene	mg/kg	DETS 3301	0.1		< 0.1	< 0.1
PAH	mg/kg	DETS 3301	1.6		< 1.6	< 1.6
Catechol	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50
Cresols	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50
Naphthols	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50
Phenol	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50
Resorcinol	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50
Trimethylphenol	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50
Total Phenols	mg/kg	DETS 3421*	0.5		< 0.50	< 0.50

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94538-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	587738	587739	587740	587741	587742
				Sample ID	SS1103-1	Upstream	Downstream	OX-B	BH3
				Depth					
				Sample Ref					
				Sample Type					
				Sampling Date	11/12/2013	11/12/2013	11/12/2013	11/12/2013	11/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Arsenic, Dissolved	ug/l	DETSC 2306	0.16	0.67	0.66	0.42	0.87	2.2	
Cadmium, Dissolved	ug/l	DETSC 2306	0.03	0.058	0.28	0.29	0.21	0.17	
Chromium, Dissolved	ug/l	DETSC 2306	0.25	1.9	7.9	5.9	1.0	< 0.25	
Copper, Dissolved	ug/l	DETSC 2306	0.4	1.4	3.9	1.6	0.80	2.2	
Iron, Dissolved	ug/l	DETSC 2306	5.5	210	170	31	450	180	
Lead, Dissolved	ug/l	DETSC 2306	0.09	1.4	2.2	0.82	2.1	0.97	
Mercury, Dissolved	ug/l	DETSC 2306	0.01	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	
Nickel, Dissolved	ug/l	DETSC 2306	0.5	< 0.50	1.3	0.67	1.2	4.2	
Selenium, Dissolved	ug/l	DETSC 2306	0.25	0.60	0.33	0.27	0.35	0.89	
Zinc, Dissolved	ug/l	DETSC 2306	1.25	67.1	48.5	52.1	63.5	47.6	
Conductivity	uS/cm	DETSC 2009	1	469	672	670	794	1670	
pH		DETSC 2008		7.3	8.2	8.2	7.4	7.0	
Cyanide total	ug/l	DETSC 2130	40	< 40	< 40	< 40	43	260	
Cyanide free	ug/l	DETSC 2130	20	< 20	< 20	< 20	< 20	< 20	
Cyanide complex	ug/l	DETSC 2130	40	< 40	< 40	< 40	43	260	
Thiocyanate	ug/l	DETSC 2130	40	< 40	< 40	< 40	< 40	250	
Suspended Solids	mg/l	DETSC 2034	5	10000	46	6.0	55	12000	
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015	1.6	0.75	0.17	0.66	46	
Chloride	mg/l	DETSC 2055	0.1	16	41	41	32	24	
Sulphate as SO4	mg/l	DETSC 2055	0.1	26	69	69	100	420	
Sulphide	ug/l	DETSC 2208	10	< 10	< 10	< 10	< 10	11	
Sulphur (free)	ug/l	DETSC 3049	84	< 84	< 84	< 84	< 84	< 84	
Total Organic Carbon	mg/l	DETSC 2033	2	110	4.9	3.8	18	76	
EPH (C10-C40)	ug/l	DETSC 3311	10	1900	280	360	440	730	
Benzene	ug/l	DETSC 3322	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Toluene	ug/l	DETSC 3322	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Ethylbenzene	ug/l	DETSC 3322	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
Xylene	ug/l	DETSC 3322	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94538-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	587738	587739	587740	587741	587742
				Sample ID	SS1103-1	Upstream	Downstream	OX-B	BH3
				Depth					
				Sample Ref					
				Sample Type					
				Sampling Date	11/12/2013	11/12/2013	11/12/2013	11/12/2013	11/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Acenaphthene	ug/l	DETS 074*	0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	ug/l	DETS 074*	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01	0.01	0.11	0.01	0.02	< 0.01	< 0.01
Benzo(a)anthracene	ug/l	DETS 074*	0.01	0.21	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	DETS 074*	0.01	0.17	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01	0.14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01	0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01	0.16	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	DETS 074*	0.01	0.09	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	0.01	0.23	0.05	< 0.01	0.02	< 0.01	< 0.01
Fluorene	ug/l	DETS 074*	0.01	0.01	0.13	0.01	0.03	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01	0.23	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Naphthalene	ug/l	DETS 074*	0.01	0.26	0.07	0.05	0.04	0.02	0.02
Phenanthrene	ug/l	DETS 074*	0.01	0.05	0.24	0.02	0.05	0.01	0.01
Pyrene	ug/l	DETS 074*	0.01	0.31	0.05	0.01	0.02	< 0.01	< 0.01
PAH	ug/l	DETS 074*	0.2	2.0	0.67	< 0.20	< 0.20	< 0.20	< 0.20
Catechol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94538-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	587743	587746	587747
				Sample ID	BH5	MW11-16	MW99-104
				Depth			
				Sample Ref			
				Sample Type			
				Sampling Date	11/12/2013	11/12/2013	11/12/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Arsenic, Dissolved	ug/l	DETSC 2306	0.16		6.3	1.1	2.1
Cadmium, Dissolved	ug/l	DETSC 2306	0.03		0.70	0.23	0.069
Chromium, Dissolved	ug/l	DETSC 2306	0.25		1.4	4.6	< 0.25
Copper, Dissolved	ug/l	DETSC 2306	0.4		4.7	3.9	0.89
Iron, Dissolved	ug/l	DETSC 2306	5.5		1900	180	250
Lead, Dissolved	ug/l	DETSC 2306	0.09		27	1.1	0.73
Mercury, Dissolved	ug/l	DETSC 2306	0.01		< 0.010	< 0.010	< 0.010
Nickel, Dissolved	ug/l	DETSC 2306	0.5		8.1	2.3	4.3
Selenium, Dissolved	ug/l	DETSC 2306	0.25		0.39	1.9	0.35
Zinc, Dissolved	ug/l	DETSC 2306	1.25		45.7	66.8	27.1
Conductivity	uS/cm	DETSC 2009	1		1350	1490	1550
pH		DETSC 2008			6.2	6.9	6.9
Cyanide total	ug/l	DETSC 2130	40		230	250	310
Cyanide free	ug/l	DETSC 2130	20		< 20	< 20	< 20
Cyanide complex	ug/l	DETSC 2130	40		230	250	310
Thiocyanate	ug/l	DETSC 2130	40		1200	< 40	4000
Suspended Solids	mg/l	DETSC 2034	5		8400	33000	1600
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015		34	0.61	70
Chloride	mg/l	DETSC 2055	0.1		13	20	23
Sulphate as SO4	mg/l	DETSC 2055	0.1		450	380	330
Sulphide	ug/l	DETSC 2208	10		< 10	< 10	< 10
Sulphur (free)	ug/l	DETSC 3049	84		< 84	< 84	< 84
Total Organic Carbon	mg/l	DETSC 2033	2		78	190	31
EPH (C10-C40)	ug/l	DETSC 3311	10		2100	720	600
Benzene	ug/l	DETSC 3322	1		1.3	< 1.0	< 1.0
Toluene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0
Xylene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94538-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	587743	587746	587747
				Sample ID	BH5	MW11-16	MW99-104
				Depth			
				Sample Ref			
				Sample Type			
				Sampling Date	11/12/2013	11/12/2013	11/12/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Acenaphthene	ug/l	DETS 074*	0.01		0.01	< 0.01	< 0.01
Acenaphthylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01		0.03	< 0.01	< 0.01
Benzo(a)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Chrysene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	0.01		0.02	< 0.01	< 0.01
Fluorene	ug/l	DETS 074*	0.01		0.03	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01
Naphthalene	ug/l	DETS 074*	0.01		0.06	0.04	0.01
Phenanthrene	ug/l	DETS 074*	0.01		0.06	< 0.01	0.03
Pyrene	ug/l	DETS 074*	0.01		0.03	< 0.01	0.02
PAH	ug/l	DETS 074*	0.2		0.26	< 0.20	< 0.20
Catechol	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10
Cresols	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10
Naphthols	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10
Phenol	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10
Resorcinol	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10
Trimethylphenol	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10
Total Phenols	ug/l	DETSC 3422*	0.1		< 0.10	< 0.10	< 0.10

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
587738	SS1103-1 WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			
587739	Upstream WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			
587740	Downstream WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			
587741	OX-B WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			
587742	BH3 WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			
587743	BH5 WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			
587744	OX-BSD SOIL	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Tub 1L			
587745	SD3 SOIL	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Tub 1L			
587746	MW11-16 WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			
587747	MW99-104 WATER	11/12/2013	Glass Jar 1L x2, Glass Vial x2, Plastic Bottle 1L			



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Certificate of Analysis

Date: 08/01/2014

Certificate Number: 13-93443-1

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-93443-1

Client Reference: 13627

Contract Title: Wrexham

Description: 13 soil samples

Date Received: 29 November 2013

Date Started: 29 November 2013

Date Completed: 09 December 2013

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: **This report supersedes 13-93443, Asbestos Quantification added**
Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581819	581820	581821	581822	581823
				Sample ID	TP7	TP10	TP10	BH8	BH8
				Depth	0.80	1.80	2.00	0.50	2.00
				Sample Ref					
				Sample Type					
				Sampling Date	27/11/2013	27/11/2013	27/11/2013	27/11/2013	27/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	3.0	8.1	6.4	7.6	5.1	
Moisture Content	%	DETS 046*	0.1	31	23	13	21	16	
Arsenic	mg/kg	DETSC2301#	0.2	3.4	10	6.7	7.4	9.6	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	2.3	1.0	1.0	1.1	0.8	
Cadmium	mg/kg	DETSC2301#	0.1	0.6	0.6	0.5	0.5	0.7	
Chromium	mg/kg	DETSC2301#	0.15	42	18	17	24	39	
Copper	mg/kg	DETSC2301#	0.2	38	15	15	12	21	
Lead	mg/kg	DETSC2301#	0.3	67	15	15	290	22	
Mercury	mg/kg	DETSC 2325#	0.05	0.50	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1	150	22	21	20	37	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1	140	51	45	66	63	
Loss on ignition	%	DETSC 2003#	0.01	72	0.84	0.75	4.1	2.8	
pH		DETSC 2008#		10.1	7.8	8.1	6.4	8.4	
Cyanide total	mg/kg	DETSC 2130#	0.1	2.8	0.1	0.1	< 0.1	< 0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	2.7	< 0.2	< 0.2	< 0.2	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	1.1	< 0.6	1.0	0.7	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	3.1	29	64	0.60	1.8	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	15	13	11	6.4	18	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	150	17	16	< 10	120	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	130	1.6	8.4	< 0.75	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	12000	28	900	< 10	< 10	
Benzene	mg/kg	DETS 062#	0.01	0.01	0.23	0.02	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	0.01	0.10	0.06	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	0.04	0.27	0.07	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	0.09	0.15	0.30	< 0.01	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581819	581820	581821	581822	581823
				Sample ID	TP7	TP10	TP10	BH8	BH8
				Depth	0.80	1.80	2.00	0.50	2.00
				Sample Ref					
				Sample Type					
				Sampling Date	27/11/2013	27/11/2013	27/11/2013	27/11/2013	27/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Acenaphthene	mg/kg	DETSC 3301	0.1	100	0.4	12	< 0.1	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1	99	0.3	7.5	< 0.1	< 0.1	
Anthracene	mg/kg	DETSC 3301	0.1	18	< 0.1	0.1	< 0.1	< 0.1	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	6.3	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	9.0	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	5.5	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	5.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	3.2	< 0.1	< 0.1	< 0.1	< 0.1	
Chrysene	mg/kg	DETSC 3301	0.1	6.4	< 0.1	< 0.1	< 0.1	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	1.5	< 0.1	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	DETSC 3301	0.1	44	< 0.1	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	DETSC 3301	0.1	20	< 0.1	1.1	< 0.1	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	8.5	< 0.1	< 0.1	< 0.1	< 0.1	
Naphthalene	mg/kg	DETSC 3301	0.1	40	2.0	23	< 0.1	< 0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1	37	< 0.1	0.5	< 0.1	< 0.1	
Pyrene	mg/kg	DETSC 3301	0.1	32	< 0.1	< 0.1	< 0.1	< 0.1	
PAH	mg/kg	DETSC 3301	1.6	440	2.7	44	< 1.6	< 1.6	
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581824	581825	581826	581827	581828
				Sample ID	BH9	BH9	BH11	BH11	BH14
				Depth	1.00	2.00	0.30	1.60	2.60
				Sample Ref					
				Sample Type					
				Sampling Date	27/11/2013	27/11/2013	27/11/2013	27/11/2013	27/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	1.0	5.4	7.6	5.0	3.5	
Moisture Content	%	DETS 046*	0.1	49	34	30	20	20	
Arsenic	mg/kg	DETSC2301#	0.2	38	16	13	10	11	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	1.6	4.6	2.8	0.8	0.9	
Cadmium	mg/kg	DETSC2301#	0.1	0.9	0.7	0.7	0.7	0.7	
Chromium	mg/kg	DETSC2301#	0.15	22	36	40	46	50	
Copper	mg/kg	DETSC2301#	0.2	62	15	26	22	22	
Lead	mg/kg	DETSC2301#	0.3	33	110	65	20	20	
Mercury	mg/kg	DETSC 2325#	0.05	0.06	< 0.05	0.07	< 0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1	67	28	30	38	40	
Selenium	mg/kg	DETSC2301#	0.5	2.1	1.7	< 0.5	< 0.5	0.8	
Zinc	mg/kg	DETSC2301#	1	110	81	60	68	66	
Loss on ignition	%	DETSC 2003#	0.01	7.8	6.2	7.1	2.7	2.5	
pH		DETSC 2008#		7.4	6.7	7.0	8.5	8.6	
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	0.3	0.1	< 0.1	< 0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	1.9	< 0.6	< 0.6	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	0.68	27	9.5	4.4	< 0.50	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	8.8	4.1	6.3	2.7	4.0	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	58	54	54	52	28	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	< 0.75	30	< 0.75	< 0.75	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	67	< 10	16	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581824	581825	581826	581827	581828
				Sample ID	BH9	BH9	BH11	BH11	BH14
				Depth	1.00	2.00	0.30	1.60	2.60
				Sample Ref					
				Sample Type					
				Sampling Date	27/11/2013	27/11/2013	27/11/2013	27/11/2013	27/11/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Acenaphthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETS 3301	0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	DETS 3301	0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETS 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH	mg/kg	DETS 3301	1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETS 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581829	581830	581831
				Sample ID	BH14	BH10	BH15
				Depth	0.40	1.10	0.50
				Sample Ref			
				Sample Type			
				Sampling Date	27/11/2013	27/11/2013	27/11/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Stones >2mm	% m/m	DETSC 1003*	1	5.0	6.5	6.1	
Moisture Content	%	DETS 046*	0.1	8.1	18	10	
Arsenic	mg/kg	DETSC2301#	0.2	6.4	14	10	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	1.6	1.5	1.4	
Cadmium	mg/kg	DETSC2301#	0.1	0.9	1.5	0.8	
Chromium	mg/kg	DETSC2301#	0.15	29	26	30	
Copper	mg/kg	DETSC2301#	0.2	21	44	26	
Lead	mg/kg	DETSC2301#	0.3	21	140	18	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	0.13	< 0.05	
Nickel	mg/kg	DETSC2301#	1	23	35	30	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	0.6	0.5	
Zinc	mg/kg	DETSC2301#	1	41	340	53	
Loss on ignition	%	DETSC 2003#	0.01	1.3	8.2	2.0	
pH		DETSC 2008#		7.9	8.3	7.6	
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	0.5	< 0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	< 0.2	0.5	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	< 0.6	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	< 0.50	< 0.50	0.74	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	3.4	12	3.3	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	83	35	55	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	< 0.75	< 0.75	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	58	< 10	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	581829	581830	581831
				Sample ID	BH14	BH10	BH15
				Depth	0.40	1.10	0.50
				Sample Ref			
				Sample Type			
				Sampling Date	27/11/2013	27/11/2013	27/11/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Acenaphthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1		< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	0.5	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1		< 0.1	0.2	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1		< 0.1	0.3	< 0.1
PAH	mg/kg	DETSC 3301	1.6		< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
581819	TP7 0.80	Soil	Amosite	loose bundles	Colin Patrick
581820	TP10 1.80	Soil	NAD	na	Colin Patrick
581821	TP10 2.00	Soil	NAD	na	Colin Patrick
581822	BH8 0.50	Soil	NAD	na	Colin Patrick
581823	BH8 2.00	Soil	NAD	na	Colin Patrick
581824	BH9 1.00	Soil	NAD	na	Colin Patrick
581825	BH9 2.00	Soil	NAD	na	Colin Patrick
581826	BH11 0.30	Soil	NAD	na	Colin Patrick
581827	BH11 1.60	Soil	NAD	na	Colin Patrick
581828	BH14 2.60	Soil	NAD	na	Colin Patrick
581829	BH14 0.40	Soil	NAD	na	Colin Patrick
581830	BH10 1.10	Soil	NAD	na	Colin Patrick
581831	BH15 0.50	Soil	NAD	na	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Summary of Asbestos Analysis Soil Samples

Our Ref: 13-93443-1

Client Ref: 13627

Contract Title: Wrexham

		Lab No.	581819
		Sample Ref	TP7
		Depth	0.80
		Other Ref	
		Sample Type	Soil
Test	Units	DETSxx	
Total Mass% Asbestos (i+ii)	Mass %		0.002
Quantification by Phase Contrast Optical Microscopy (i)	Mass %	DETSC 1102	0.002
Gravimetric Quantification (ii)	Mass %	DETSC 1102	na
Breakdown of Gravimetric Analysis			
Mass of Sample	g		693.68
ACMs present*			
Mass of ACM in sample	g		
% ACM by mass	%		
% asbestos in ACM	%		
% asbestos in sample	%		
Potentially Respirable Fibres	Fibres/g	DETSC 1102	not requested

* Denotes test or material description outside of UKAS accreditation.

% asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264.

Recommended sample size for quantification is approximately 1kg

denotes deviating sample

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
581819	TP7 0.80 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581820	TP10 1.80 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581821	TP10 2.00 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581822	BH8 0.50 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581823	BH8 2.00 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581824	BH9 1.00 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581825	BH9 2.00 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581826	BH11 0.30 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581827	BH11 1.60 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581828	BH14 2.60 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581829	BH14 0.40 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			
581830	BH10 1.10 SOIL	27/11/2013	Glass Jar 1L, Glass Vial, Plastic Tub 1L			



581831 BH15 0.50 SOIL

27/11/2013 Glass Jar 1L, Glass Vial, Plastic
Tub 1L



2139

Certificate of Analysis

Date: 08/01/2014

Certificate Number: 13-93702-1

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-93702-1

Client Reference: 13627

Contract Title: Wrexham

Description: 16 soil samples

Date Received: 03 December 2013

Date Started: 03 December 2013

Date Completed: 08 January 2014

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93702-1

Client Ref: 13627

Contract Title: Wrexham

				583101	583102	583103	583104	583105	583106	583107	583108
Lab No.				583101	583102	583103	583104	583105	583106	583107	583108
Sample ID				TP8A	TP8A	TP5	TP5	TP6	TP6	TP4	TP4
Depth				1.70	2.40	0.30	1.70	0.40	0.90	0.40	1.00
Sample Ref											
Sample Type											
Sampling Date				28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013
Sampling Time											
Test	Units	DETSxx	LOD								
Stones >2mm	% m/m	DETSC 1003*	1	2.4	5.0	3.5	6.0	7.0	6.9	6.4	5.1
Moisture Content	%	DETS 046*	0.1	16	15	7.0	20	13	22	24	14
Arsenic	mg/kg	DETSC2301#	0.2	2.8	5.0	5.6	3.7	14	10	8.9	17
Boron (water soluble)	mg/kg	DETSC2123#	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Cadmium	mg/kg	DETSC2301#	0.1	1.4	0.4	0.9	0.3	1.3	0.8	0.7	0.6
Chromium	mg/kg	DETSC2301#	0.15	22	14	10	13	31	19	43	20
Copper	mg/kg	DETSC2301#	0.2	11	14	20	12	55	42	21	16
Lead	mg/kg	DETSC2301#	0.3	14	16	52	9.5	170	60	21	30
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	< 0.05	0.11	< 0.05	0.52	0.21	< 0.05	< 0.05
Nickel	mg/kg	DETSC2301#	1	29	20	15	16	61	32	36	22
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETSC2301#	1	56	46	64	34	200	170	67	51
Loss on ignition	%	DETSC 2003#	0.01	1.3	1.4	1.4	0.91	4.5	2.3	1.9	1.9
pH		DETSC 2008#		8.2	8.0	9.6	8.6	8.5	8.3	8.8	8.3
Cyanide total	mg/kg	DETSC 2130#	0.1	0.2	< 0.1	1.0	< 0.1	18	6.0	0.2	0.8
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.9	0.3	< 0.1	< 0.1
Cyanide complex	mg/kg	DETSC 2130	0.2	0.2	< 0.2	1.0	< 0.2	17	5.7	0.2	0.8
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	< 0.6	< 0.6	< 0.6	1.4	1.1	< 0.6	< 0.6
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	8.2	5.1	< 0.50	< 0.50	9.6	6.5	550	15
Chloride Aqueous Extract	mg/l	DETSC 2055	1	4.8	9.5	9.8	8.7	9.0	11	12	10
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	20	32	140	12	140	< 10	53	46
Sulphur (free)	mg/kg	DETSC 3049#	0.75	11	< 0.75	1.2	< 0.75	110	140	2.5	160
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	400	< 10	6100	9500	< 10	10000
Benzene	mg/kg	DETS 062#	0.01	0.39	0.01	0.01	< 0.01	0.03	0.01	0.32	0.67
Ethylbenzene	mg/kg	DETS 062#	0.01	1.6	0.01	< 0.01	< 0.01	0.02	0.05	0.21	6.0
Toluene	mg/kg	DETS 062#	0.01	0.04	< 0.01	< 0.01	< 0.01	0.09	0.02	0.87	6.0
Xylene	mg/kg	DETS 062#	0.01	3.6	0.01	0.01	< 0.01	0.96	0.15	2.8	29
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.3	< 0.1	5.5	6.7	< 0.1	130
Acenaphthylene	mg/kg	DETSC 3301	0.1	0.2	< 0.1	0.8	< 0.1	1.6	3.4	< 0.1	93
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.4	< 0.1	2.0	4.3	< 0.1	87
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.4	< 0.1	3.3	6.0	< 0.1	64
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	2.0	< 0.1	3.6	5.8	< 0.1	47
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.1	< 0.1	2.2	4.3	< 0.1	31
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.6	< 0.1	1.3	2.3	< 0.1	19
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.0	< 0.1	1.7	2.8	< 0.1	17
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.0	< 0.1	3.7	6.3	< 0.1	55
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	0.2	< 0.1	0.3	0.6	< 0.1	6.5
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.3	< 0.1	9.1	17	< 0.1	120
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.3	< 0.1	5.0	18	< 0.1	120
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.7	0.1	2.4	3.5	< 0.1	24
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.2	< 0.1	12	20	< 0.1	460
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.3	< 0.1	5.4	13	< 0.1	230
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.1	< 0.1	5.0	11	< 0.1	96
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	14	< 1.6	64	120	< 1.6	1600

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93702-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583101	583102	583103	583104	583105	583106	583107	583108
				Sample ID	TP8A	TP8A	TP5	TP5	TP6	TP6	TP4	TP4
				Depth	1.70	2.40	0.30	1.70	0.40	0.90	0.40	1.00
				Sample Ref								
				Sample Type								
				Sampling Date	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013
				Sampling Time								
Test	Units	DETSxx	LOD									
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.53
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	4.1
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	8.7
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	6.3
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	20

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93702-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583109	583110	583111	583112	583113	583114	583115	583116
				Sample ID	BH21	TP3	BH20	BH20	BH19	BH18	BH17	BH17
				Depth	0.50	5.00	0.30	2.00	0.40	0.30	0.50	4.00
				Sample Ref								
				Sample Type								
				Sampling Date	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013
				Sampling Time								
Test	Units	DETSxx	LOD									
Stones >2mm	% m/m	DETSC 1003*	1	5.6	3.0	3.0	6.3	3.8	9.0	4.6	7.3	
Moisture Content	%	DETS 046*	0.1	20	22	18	26	15	18	12	26	
Arsenic	mg/kg	DETSC2301#	0.2	18	8.7	10	6.7	13	11	11	8.3	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	0.4	< 0.2	0.3	1.7	< 0.2	< 0.2	< 0.2	< 0.2	
Cadmium	mg/kg	DETSC2301#	0.1	1.4	0.8	2.9	0.6	1.3	0.8	1.2	0.7	
Chromium	mg/kg	DETSC2301#	0.15	28	42	18	38	24	24	22	33	
Copper	mg/kg	DETSC2301#	0.2	88	23	64	21	57	91	39	21	
Lead	mg/kg	DETSC2301#	0.3	220	27	230	17	220	110	200	22	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1	53	37	32	36	37	31	24	35	
Selenium	mg/kg	DETSC2301#	0.5	0.6	0.6	0.9	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1	640	70	560	65	550	110	670	66	
Loss on ignition	%	DETSC 2003#	0.01	11	2.7	20	2.3	11	9.4	3.1	1.9	
pH		DETSC 2008#		7.2	8.7	6.8	8.7	7.2	6.4	6.8	8.6	
Cyanide total	mg/kg	DETSC 2130#	0.1	0.5	< 0.1	0.2	< 0.1	< 0.1	0.2	0.2	< 0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	0.5	< 0.2	< 0.2	< 0.2	< 0.2	0.2	0.2	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	0.8	< 0.6	1.2	< 0.6	< 0.6	0.9	< 0.6	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	2.8	3.9	6.3	3.7	2.5	4.2	2.7	3.3	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	10	7.8	21	6.0	8.1	12	7.2	5.1	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	46	38	68	25	51	25	27	41	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	9.3	1.1	6.5	< 0.75	< 0.75	< 0.75	< 0.75	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	35	< 10	< 10	< 10	55	85	21	< 10	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.04	0.01	< 0.01	
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1	
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-93702-1

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	583109	583110	583111	583112	583113	583114	583115	583116
				Sample ID	BH21	TP3	BH20	BH20	BH19	BH18	BH17	BH17
				Depth	0.50	5.00	0.30	2.00	0.40	0.30	0.50	4.00
				Sample Ref								
				Sample Type								
				Sampling Date	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013	28/11/2013
				Sampling Time								
Test	Units	DETSxx	LOD									
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-93702-1

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
583101	TP8A 1.70	Soil	NAD	na	John Leeson
583102	TP8A 2.40	Soil	NAD	na	John Leeson
583103	TP5 0.30	Soil	Amosite	Amosite present as lots of fibre bundles and loose fibres	John Leeson
583104	TP5 1.70	Soil	NAD	na	John Leeson
583105	TP6 0.40	Soil	Amosite	Amosite present as lots of fibre bundles and loose fibres	John Leeson
583106	TP6 0.90	Soil	Amosite	Amosite present as lots of fibre bundles and loose fibres	John Leeson
583107	TP4 0.40	Soil	NAD	na	John Leeson
583108	TP4 1.00	Soil	NAD	na	John Leeson
583109	BH21 0.50	Soil	NAD	na	John Leeson
583110	TP3 5.00	Soil	NAD	na	John Leeson
583111	BH20 0.30	Soil	NAD	na	John Leeson
583112	BH20 2.00	Soil	NAD	na	John Leeson
583113	BH19 0.40	Soil	NAD	na	John Leeson
583114	BH18 0.30	Soil	NAD	na	John Leeson
583115	BH17 0.50	Soil	NAD	na	John Leeson
583116	BH17 4.00	Soil	NAD	na	John Leeson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Summary of Asbestos Analysis Soil Samples

Our Ref: 13-93702-1

Client Ref: 13627

Contract Title: Wrexham

		Lab No.	583103	583105	583106
		Sample Ref	TP5	TP6	TP6
		Depth	0.30	0.40	0.90
		Other Ref			
		Sample Type	Soil	Soil	Soil
Test	Units	DETSxx			
Total Mass% Asbestos (i+ii)	Mass %		0.109	0.047	<0.001
Quantification by Phase Contrast Optical Microscopy (i)	Mass %	DETSC 1102	0.002	<0.001	<0.001
Gravimetric Quantification (ii)	Mass %	DETSC 1102	0.108	0.046	na
Breakdown of Gravimetric Analysis					
Mass of Sample	g		977.27	623.55	854.72
ACMs present*			Insulation	Insulation	
Mass of ACM in sample	g		1.24	0.34	
% ACM by mass	%		0.127	0.055	
% asbestos in ACM	%		85	85	
% asbestos in sample	%		0.108	0.046	
Potentially Respirable Fibres	Fibres/g	DETSC 1102	not requested	not requested	not requested

* Denotes test or material description outside of UKAS accreditation.

% asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264.

Recommended sample size for quantification is approximately 1kg

denotes deviating sample

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
583101	TP8A 1.70 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583102	TP8A 2.40 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583103	TP5 0.30 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583104	TP5 1.70 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583105	TP6 0.40 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583106	TP6 0.90 SOIL	28/11/2013	Glass Jar 1L (1 litre)		BTEX Solid	
583107	TP4 0.40 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
583108	TP4 1.00 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			

583109	BH21 0.50 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	
583110	TP3 5.00 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	
583111	BH20 0.30 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	
583112	BH20 2.00 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	
583113	BH19 0.40 SOIL	28/11/2013	Glass Jar 1L (1 litre)	BTEX Solid
583114	BH18 0.30 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	
583115	BH17 0.50 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	
583116	BH17 4.00 SOIL	28/11/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)	



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Certificate of Analysis

Date: 02/01/2014

Certificate Number: 13-94677

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-94677

Client Reference: 13627

Contract Title: Wrexham

Description: 2 soil samples, 5 water samples

Date Received: 16 December 2013

Date Started: 17 December 2013

Date Completed: 02 January 2014

Test Procedures: Identified by prefix DETSn, details available upon request.

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94677

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	588505	588506
				Sample ID	SED3(A)	UPCUVSD
				Depth		
				Sample Ref		
				Sample Type		
				Sampling Date	13/12/2013	13/12/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Stones >2mm	% m/m	DETSC 1003*	1		2.4	7.2
Moisture Content	%	DETS 046*	0.1		36	110
Arsenic	mg/kg	DETSC2301#	0.2		25	8.1
Boron (water soluble)	mg/kg	DETSC2123#	0.2		0.3	2.4
Cadmium	mg/kg	DETSC2301#	0.1		2.1	1.1
Chromium	mg/kg	DETSC2301#	0.15		20	24
Copper	mg/kg	DETSC2301#	0.2		44	25
Lead	mg/kg	DETSC2301#	0.3		93	440
Mercury	mg/kg	DETSC 2325#	0.05		0.05	0.07
Nickel	mg/kg	DETSC2301#	1		20	23
Selenium	mg/kg	DETSC2301#	0.5		4.3	0.8
Zinc	mg/kg	DETSC2301#	1		1200	240
Loss on ignition	%	DETSC 2003#	0.01		2.8	9.0
pH		DETSC 2008#			8.2	7.3
Cyanide total	mg/kg	DETSC 2130#	0.1		1.8	0.2
Cyanide free	mg/kg	DETSC 2130#	0.1		< 0.1	< 0.1
Cyanide complex	mg/kg	DETSC 2130	0.2		1.8	< 0.2
Thiocyanate	mg/kg	DETSC 2130#	0.6		< 0.6	1.2
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		16	52
Chloride Aqueous Extract	mg/l	DETSC 2055	1		9.6	25
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		53	86
Sulphur (free)	mg/kg	DETSC 3049#	0.75		< 0.75	< 0.75
EPH (C10-C40)	mg/kg	DETSC 3311#	10		68	< 10
Benzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Ethylbenzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Toluene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Xylene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01
Acenaphthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1		< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1
PAH	mg/kg	DETSC 3301	1.6		< 1.6	< 1.6

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94677

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	588505	588506
				Sample ID	SED3(A)	UPCUVSD
				Depth		
				Sample Ref		
				Sample Type		
				Sampling Date	13/12/2013	13/12/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94677
 Client Ref: 13627
 Contract Title: Wrexham

				Lab No.	588500	588501	588502	588503	588504
				Sample ID	TB1	FB1	UPCUV	SS11-03-1	BED UP
				Depth					
				Sample Ref					
				Sample Type					
				Sampling Date	13/12/2013	13/12/2013	13/12/2013	13/12/2013	13/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Arsenic, Dissolved	ug/l	DETSC 2306	0.16		0.43	< 0.16	1.1	0.73	1.2
Cadmium, Dissolved	ug/l	DETSC 2306	0.03		< 0.030	< 0.030	< 0.030	0.056	0.038
Chromium, Dissolved	ug/l	DETSC 2306	0.25		0.35	0.67	0.49	0.41	0.46
Copper, Dissolved	ug/l	DETSC 2306	0.4		1.5	1.3	2.9	2.2	3.4
Iron, Dissolved	ug/l	DETSC 2306	5.5		9.2	16	40	21	48
Lead, Dissolved	ug/l	DETSC 2306	0.09		0.26	0.25	0.21	0.28	0.62
Mercury, Dissolved	ug/l	DETSC 2306	0.01		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nickel, Dissolved	ug/l	DETSC 2306	0.5		0.86	1.0	3.3	2.6	1.9
Selenium, Dissolved	ug/l	DETSC 2306	0.25		< 0.25	< 0.25	< 0.25	0.45	< 0.25
Zinc, Dissolved	ug/l	DETSC 2306	1.25		99.6	30.9	50.4	49.0	10.0
Conductivity	uS/cm	DETSC 2009	1		1.4	1.0	594	434	605
pH		DETSC 2008			7.4	6.7	8.0	7.5	7.9
Cyanide total	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40	< 40
Cyanide free	ug/l	DETSC 2130	20		< 20	< 20	< 20	< 20	< 20
Cyanide complex	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40	< 40
Thiocyanate	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40	< 40
Suspended Solids	mg/l	DETSC 2034	5		< 5.0	< 5.0	12	140	48
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015		0.13	0.15	0.26	0.27	0.16
Chloride	mg/l	DETSC 2055	0.1		1.9	1.4	36	15	35
Sulphate as SO4	mg/l	DETSC 2055	0.1		4.9	2.7	49	32	48
Sulphide	ug/l	DETSC 2208	10		< 10	< 10	< 10	< 10	< 10
Sulphur (free)	ug/l	DETSC 3049	84		< 84	< 84	< 84	< 84	< 84
Total Organic Carbon	mg/l	DETSC 2033	2		< 2.0	< 2.0	11	16	13
EPH (C10-C40)	ug/l	DETSC 3311	10		180	160	210	1200	240
Benzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.06	< 0.01	0.05
Benzo(a)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.03	0.22	0.03
Benzo(a)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.01	0.30	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.19	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.22	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.27	< 0.01
Chrysene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.02	0.13	0.04
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.08	0.28	0.10
Fluorene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.04	< 0.01	0.03
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.36	< 0.01
Naphthalene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.01	< 0.01	< 0.01
Phenanthrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.18	0.07	0.13
Pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	0.14	0.63	0.14
PAH	ug/l	DETS 074*	0.2		< 0.20	< 0.20	0.60	2.7	0.51

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94677

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	588500	588501	588502	588503	588504
				Sample ID	TB1	FB1	UPCUV	SS11-03-1	BED UP
				Depth					
				Sample Ref					
				Sample Type					
				Sampling Date	13/12/2013	13/12/2013	13/12/2013	13/12/2013	13/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Catechol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
588500	TB1 WATER	13/12/2013	Glass Jar 1L x2, Glass Vial, Plastic Bottle 1L			
588501	FB1 WATER	13/12/2013	Glass Jar 1L x2, Glass Vial, Plastic Bottle 1L			
588502	UPCUV WATER	13/12/2013	Glass Jar 1L x2, Glass Vial, Plastic Bottle 1L			
588503	SS11-03-1 WATER	13/12/2013	Glass Jar 1L x2, Glass Vial, Plastic Bottle 1L			
588504	BED UP WATER	13/12/2013	Glass Jar 1L x2, Glass Vial, Plastic Bottle 1L			
588505	SED3(A) SOIL	13/12/2013	Glass Jar 1L x2, Glass Vial, Plastic Tub 1L			
588506	UPCUVSD SOIL	13/12/2013	Glass Jar 1L x2, Glass Vial, Plastic Tub 1L			



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Certificate of Analysis

Date: 20/12/2013

Certificate Number: 13-94466

Client:

I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference:

13-94466

Client Reference:

Contract Title:

Description:

10 water samples

Date Received:

13 December 2013

Date Started:

13 December 2013

Date Completed:

20 December 2013

Test Procedures:

Identified by prefix DETSn, details available upon request.

Notes:

Observations and interpretations are outside the scope of UKAS accreditation

Approved By:



Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis Water Samples

Our Ref: 13-94466

Client Ref:

Contract Title:

				Lab No.	587332	587333	587334	587335	587336	587337	587338	587339
				Sample ID	MW11-05	MW99-108	MW11-08B	MW99-202	BH1	BH2	BH17	BH12
				Depth								
				Sample Ref								
				Sample Type								
				Sampling Date	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013
				Sampling Time								
Test	Units	DETSxx	LOD									
Arsenic, Dissolved	ug/l	DETSC 2306	0.16		1.2	8.0	15	12	4.2	4.6	0.60	17
Cadmium, Dissolved	ug/l	DETSC 2306	0.03		0.067	0.078	0.098	4.3	0.041	< 0.030	0.037	1.2
Chromium, Dissolved	ug/l	DETSC 2306	0.25		< 0.25	< 0.25	0.92	190	0.83	0.48	< 0.25	1.8
Copper, Dissolved	ug/l	DETSC 2306	0.4		0.59	1.7	3.6	550	3.8	1.8	1.8	17
Iron, Dissolved	ug/l	DETSC 2306	5.5		1400	270	7200	120000	530	290	81	1500
Lead, Dissolved	ug/l	DETSC 2306	0.09		0.75	1.3	0.48	14	4.8	2.7	0.42	5.4
Mercury, Dissolved	ug/l	DETSC 2306	0.01		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nickel, Dissolved	ug/l	DETSC 2306	0.5		3.7	8.4	9.0	270	3.5	3.8	3.0	5.9
Selenium, Dissolved	ug/l	DETSC 2306	0.25		< 0.25	0.44	< 0.25	6.0	0.35	< 0.25	0.40	7.0
Zinc, Dissolved	ug/l	DETSC 2306	1.25		28.8	111	50.6	3090	45.5	35.7	93.4	77.6
Conductivity	uS/cm	DETSC 2009	1		2290	622	998	3760	646	623	588	1150
pH		DETSC 2008			7.6	7.3	6.9	2.7	7.8	7.5	7.2	7.3
Cyanide total	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40	240	< 40	< 40	< 40
Cyanide free	ug/l	DETSC 2130	20		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Cyanide complex	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40	240	< 40	< 40	< 40
Thiocyanate	ug/l	DETSC 2130	40		240	< 40	< 40	91	58	40	57	46
Suspended Solids	mg/l	DETSC 2034	5		610	7100	1400	3500	44000	88000	14000	14000
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015		6.4	3.1	13	7.7	2.1	1.4	0.054	0.053
Chloride	mg/l	DETSC 2055	0.1		140	22	65	15	36	30	17	15
Sulphate as SO4	mg/l	DETSC 2055	0.1		930	54	9.0	2400	110	60	62	160
Sulphide	ug/l	DETSC 2208	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sulphur (free)	ug/l	DETSC 3049	84		< 84	< 84	< 84	< 84	< 84	< 84	< 84	< 84
Total Organic Carbon	mg/l	DETSC 2033	2		15	190	91	43	790	670	160	110
EPH (C10-C40)	ug/l	DETSC 3311	10		220	1100	300000	440	19000	2500	270	190
Benzene	ug/l	DETSC 3322	1		1.1	< 1.0	< 1.0	< 1.0	< 1.0	2.5	< 1.0	< 1.0
Toluene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0	6.7	4.2	< 1.0	< 1.0
Xylene	ug/l	DETSC 3322	1		< 1.0	< 1.0	15	< 1.0	4.7	11	< 1.0	< 1.0
Acenaphthene	ug/l	DETS 074*	0.01		< 0.01	0.48	24	< 0.01	0.04	0.15	< 0.01	< 0.01
Acenaphthylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01		0.03	3.9	5.1	< 0.01	0.08	0.03	0.01	< 0.01
Benzo(a)anthracene	ug/l	DETS 074*	0.01		< 0.01	0.77	1.3	< 0.01	0.07	0.02	< 0.01	< 0.01
Benzo(a)pyrene	ug/l	DETS 074*	0.01		< 0.01	0.42	0.49	< 0.01	0.01	0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	0.27	0.39	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	0.22	0.30	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01		< 0.01	0.28	0.17	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	ug/l	DETS 074*	0.01		< 0.01	0.24	0.29	< 0.01	0.13	0.15	< 0.01	< 0.01
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01		< 0.01	0.07	0.17	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	0.01		0.15	3.7	3.0	0.02	0.14	0.04	< 0.01	< 0.01
Fluorene	ug/l	DETS 074*	0.01		0.02	2.0	110	< 0.01	0.14	0.07	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01		< 0.01	0.44	0.41	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Naphthalene	ug/l	DETS 074*	0.01		0.38	1.2	45	0.02	< 0.01	0.38	< 0.01	< 0.01
Phenanthrene	ug/l	DETS 074*	0.01		0.02	6.1	13	0.02	0.04	0.09	< 0.01	< 0.01
Pyrene	ug/l	DETS 074*	0.01		0.20	3.9	3.6	0.04	0.09	0.03	< 0.01	< 0.01
PAH	ug/l	DETS 074*	0.2		0.80	24	110	< 0.20	0.78	0.98	< 0.20	< 0.20

Summary of Chemical Analysis Water Samples

Our Ref: 13-94466

Client Ref:

Contract Title:

				Lab No.	587332	587333	587334	587335	587336	587337	587338	587339
				Sample ID	MW11-05	MW99-108	MW11-08B	MW99-202	BH1	BH2	BH17	BH12
				Depth								
				Sample Ref								
				Sample Type								
				Sampling Date	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013
				Sampling Time								
Test	Units	DETSxx	LOD									
Catechol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	ug/l	DETSC 3422*	0.1	1.4	3.4	1.1	1.9	1.6	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	ug/l	DETSC 3422*	0.1	1.4	3.4	1.1	1.9	1.6	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94466

Client Ref:

Contract Title:

				Lab No.	587340	587341
				Sample ID	BH9	MW99-106
				Depth		
				Sample Ref		
				Sample Type		
				Sampling Date	12/12/2013	12/12/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Arsenic, Dissolved	ug/l	DETSC 2306	0.16		3.4	6.8
Cadmium, Dissolved	ug/l	DETSC 2306	0.03		0.086	0.041
Chromium, Dissolved	ug/l	DETSC 2306	0.25		< 0.25	0.81
Copper, Dissolved	ug/l	DETSC 2306	0.4		0.76	2.6
Iron, Dissolved	ug/l	DETSC 2306	5.5		790	710
Lead, Dissolved	ug/l	DETSC 2306	0.09		0.52	2.7
Mercury, Dissolved	ug/l	DETSC 2306	0.01		< 0.010	< 0.010
Nickel, Dissolved	ug/l	DETSC 2306	0.5		16	1.1
Selenium, Dissolved	ug/l	DETSC 2306	0.25		0.48	0.53
Zinc, Dissolved	ug/l	DETSC 2306	1.25		48.4	28.9
Conductivity	uS/cm	DETSC 2009	1		844	1600
pH		DETSC 2008			6.9	7.9
Cyanide total	ug/l	DETSC 2130	40		< 40	130
Cyanide free	ug/l	DETSC 2130	20		< 20	< 20
Cyanide complex	ug/l	DETSC 2130	40		< 40	130
Thiocyanate	ug/l	DETSC 2130	40		< 40	64
Suspended Solids	mg/l	DETSC 2034	5		40000	140
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015		1.2	120
Chloride	mg/l	DETSC 2055	0.1		6.2	38
Sulphate as SO4	mg/l	DETSC 2055	0.1		61	87
Sulphide	ug/l	DETSC 2208	10		< 10	13
Sulphur (free)	ug/l	DETSC 3049	84		< 84	< 84
Total Organic Carbon	mg/l	DETSC 2033	2		660	33
EPH (C10-C40)	ug/l	DETSC 3311	10		120	2300
Benzene	ug/l	DETSC 3322	1		< 1.0	< 1.0
Toluene	ug/l	DETSC 3322	1		< 1.0	< 1.0
Ethylbenzene	ug/l	DETSC 3322	1		< 1.0	< 1.0
Xylene	ug/l	DETSC 3322	1		< 1.0	< 1.0
Acenaphthene	ug/l	DETS 074*	0.01		< 0.01	0.13
Acenaphthylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Benzo(a)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Benzo(a)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Chrysene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Fluoranthene	ug/l	DETS 074*	0.01		< 0.01	0.02
Fluorene	ug/l	DETS 074*	0.01		< 0.01	0.02
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Naphthalene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Phenanthrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01
Pyrene	ug/l	DETS 074*	0.01		< 0.01	0.04
PAH	ug/l	DETS 074*	0.2		< 0.20	0.22

Summary of Chemical Analysis Water Samples

Our Ref: 13-94466

Client Ref:

Contract Title:

				Lab No.	587340	587341
				Sample ID	BH9	MW99-106
				Depth		
				Sample Ref		
				Sample Type		
				Sampling Date	12/12/2013	12/12/2013
				Sampling Time		
Test	Units	DETSxx	LOD			
Catechol	ug/l	DETSC 3422*	0.1	< 0.10	33	
Cresols	ug/l	DETSC 3422*	0.1	< 0.10	29	
Naphthols	ug/l	DETSC 3422*	0.1	< 0.10	6.9	
Phenol	ug/l	DETSC 3422*	0.1	< 0.10	23	
Resorcinol	ug/l	DETSC 3422*	0.1	< 0.10	0.75	
Trimethylphenol	ug/l	DETSC 3422*	0.1	< 0.10	22	
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1	< 0.10	22	
Total Phenols	ug/l	DETSC 3422*	0.1	< 0.10	140	

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
587332	MW11-05 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587333	MW99-108 WATER	12/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587334	MW11-08B WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587335	MW99-202 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587336	BH1 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587337	BH2 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587338	BH17 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			
587339	BH12 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)			



587340	BH9 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)
587341	MW99-106 WATER	12/12/2013	Glass Jar 1L (1 litre) x2, Glass Vial (40ml) x2, Plastic Bottle 1L (1 litre)



2139

Certificate of Analysis

Date: 17/12/2013

Certificate Number: 13-94240

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-94240

Client Reference: 13627

Contract Title: Wrexham

Description: 19 soil samples

Date Received: 10 December 2013

Date Started: 11 December 2013

Date Completed: 17 December 2013

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586205	586206	586207	586208	586209
				Sample ID	TP42	TP42D	TP43	TP43	TP44
				Depth	0.40	0.40	0.30	1.70	0.30
				Sample Ref					
				Sample Type					
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	2.5	6.3	5.0	6.1	4.3	
Moisture Content	%	DETS 046*	0.1	9.0	6.7	20	21	28	
Arsenic	mg/kg	DETSC2301#	0.2	8.1	9.2	12	5.3	16	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	0.9	0.8	0.7	0.3	0.5	
Cadmium	mg/kg	DETSC2301#	0.1	1.1	0.8	0.8	0.6	1.6	
Chromium	mg/kg	DETSC2301#	0.15	29	25	24	14	34	
Copper	mg/kg	DETSC2301#	0.2	25	21	88	12	180	
Lead	mg/kg	DETSC2301#	0.3	21	15	41	18	150	
Mercury	mg/kg	DETSC 2325#	0.05	0.06	< 0.05	< 0.05	< 0.05	0.11	
Nickel	mg/kg	DETSC2301#	1	23	20	44	18	56	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.5	
Zinc	mg/kg	DETSC2301#	1	59	47	110	57	370	
Loss on ignition	%	DETSC 2003#	0.01	2.8	2.7	7.7	1.1	18	
pH		DETSC 2008#		7.9	7.7	6.3	7.5	6.7	
Cyanide total	mg/kg	DETSC 2130#	0.1	0.2	< 0.1	0.1	< 0.1	0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	< 0.6	1.0	< 0.6	1.9	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	6.6	5.5	6.2	5.1	7.0	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	9.3	7.3	27	12	34	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	95	53	110	< 10	51	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	< 0.75	< 0.75	7.2	3.1	0.79	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	< 10	< 10	< 10	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586205	586206	586207	586208	586209
				Sample ID	TP42	TP42D	TP43	TP43	TP44
				Depth	0.40	0.40	0.30	1.70	0.30
				Sample Ref					
				Sample Type					
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586210	586211	586212	586213	586214
				Sample ID	TP44D	TP44	TP44D	TP45	TP45D
				Depth	0.30	1.00	1.00	0.20	0.20
				Sample Ref					
				Sample Type					
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	5.0	2.0	8.6	5.3	6.1	
Moisture Content	%	DETS 046*	0.1	26	29	25	17	18	
Arsenic	mg/kg	DETSC2301#	0.2	18	9.2	9.2	58	67	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	1.6	0.6	< 0.2	0.9	0.7	
Cadmium	mg/kg	DETSC2301#	0.1	1.6	0.9	0.8	17	19	
Chromium	mg/kg	DETSC2301#	0.15	17	38	26	15	16	
Copper	mg/kg	DETSC2301#	0.2	150	22	20	300	280	
Lead	mg/kg	DETSC2301#	0.3	120	19	22	7800	8200	
Mercury	mg/kg	DETSC 2325#	0.05	0.13	< 0.05	< 0.05	0.14	0.15	
Nickel	mg/kg	DETSC2301#	1	41	39	31	53	50	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	< 0.5	1.2	
Zinc	mg/kg	DETSC2301#	1	290	71	63	23000	23000	
Loss on ignition	%	DETSC 2003#	0.01	19	2.2	1.6	9.5	11	
pH		DETSC 2008#		6.5	8.5	8.6	7.2	7.3	
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	0.1	0.6	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2	
Cyanide complex	mg/kg	DETSC 2130	0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.3	
Thiocyanate	mg/kg	DETSC 2130#	0.6	1.9	< 0.6	< 0.6	0.8	2.2	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	6.7	7.1	6.1	6.2	6.0	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	37	4.3	4.8	7.9	17	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	67	43	29	43	59	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	1.1	< 0.75	< 0.75	1.4	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	24	< 10	< 10	< 10	44	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	mg/kg	DETSC 3301	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Anthracene	mg/kg	DETSC 3301	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Fluoranthene	mg/kg	DETSC 3301	0.1	0.7	< 0.1	< 0.1	< 0.1	< 0.1	
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Naphthalene	mg/kg	DETSC 3301	0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1	0.6	< 0.1	< 0.1	< 0.1	< 0.1	
Pyrene	mg/kg	DETSC 3301	0.1	0.7	< 0.1	< 0.1	< 0.1	< 0.1	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586210	586211	586212	586213	586214
				Sample ID	TP44D	TP44	TP44D	TP45	TP45D
				Depth	0.30	1.00	1.00	0.20	0.20
				Sample Ref					
				Sample Type					
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
PAH	mg/kg	DETSC 3301	1.6		2.7	< 1.6	< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586215	586216	586217	586218	586219
				Sample ID	TP45	TP45D	TP46	TP51	HP48
				Depth	1.30	1.30	0.30	0.90	0.30
				Sample Ref					
				Sample Type					
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
Stones >2mm	% m/m	DETSC 1003*	1	4.4	4.1	2.9	8.8	4.7	
Moisture Content	%	DETS 046*	0.1	24	24	26	12	17	
Arsenic	mg/kg	DETSC2301#	0.2	11	10	13	12	33	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	0.5	0.5	0.6	0.8	0.7	
Cadmium	mg/kg	DETSC2301#	0.1	1.0	1.9	1.2	0.7	7.9	
Chromium	mg/kg	DETSC2301#	0.15	34	34	19	12	24	
Copper	mg/kg	DETSC2301#	0.2	24	26	69	36	260	
Lead	mg/kg	DETSC2301#	0.3	69	58	78	63	1800	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	< 0.05	0.06	0.18	0.11	
Nickel	mg/kg	DETSC2301#	1	37	38	44	20	41	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	
Zinc	mg/kg	DETSC2301#	1	210	560	300	110	9000	
Loss on ignition	%	DETSC 2003#	0.01	2.0	2.1	14	3.4	8.1	
pH		DETSC 2008#		8.5	8.4	7.3	8.1	8.3	
Cyanide total	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	13	0.3	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	1.1	0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	< 0.2	< 0.2	< 0.2	12	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	< 0.6	0.7	1.8	1.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	8.8	6.8	5.8	5.4	5.3	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	9.2	11	20	11	9.3	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	42	40	33	110	79	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	< 0.75	< 0.75	1.5	3.7	< 0.75	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	< 10	620	1100	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.1	
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	1.0	< 0.1	
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	0.9	< 0.1	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	2.5	< 0.1	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	4.4	< 0.1	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	2.4	< 0.1	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	1.4	< 0.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	2.3	< 0.1	
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	2.6	< 0.1	
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	< 0.1	0.6	< 0.1	
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	3.0	< 0.1	
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	0.4	< 0.1	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	3.7	< 0.1	
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	1.0	< 0.1	
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	< 0.1	3.2	0.1	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586215	586216	586217	586218	586219
				Sample ID	TP45	TP45D	TP46	TP51	HP48
				Depth	1.30	1.30	0.30	0.90	0.30
				Sample Ref					
				Sample Type					
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time					
Test	Units	DETSxx	LOD						
PAH	mg/kg	DETSC 3301	1.6		< 1.6	< 1.6	< 1.6	30	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586220	586221	586222	586223
				Sample ID	TP47	TP47	BH22	BH4
				Depth	0.20	1.00	0.70	7.00
				Sample Ref				
				Sample Type				
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Stones >2mm	% m/m	DETSC 1003*	1		7.2	4.6	3.9	6.4
Moisture Content	%	DETS 046*	0.1		25	24	8.4	27
Arsenic	mg/kg	DETSC2301#	0.2		45	9.7	8.7	9.9
Boron (water soluble)	mg/kg	DETSC2123#	0.2		0.7	0.4	< 0.2	0.8
Cadmium	mg/kg	DETSC2301#	0.1		18	0.9	0.6	0.8
Chromium	mg/kg	DETSC2301#	0.15		18	35	18	30
Copper	mg/kg	DETSC2301#	0.2		490	24	14	29
Lead	mg/kg	DETSC2301#	0.3		6500	41	20	28
Mercury	mg/kg	DETSC 2325#	0.05		0.10	< 0.05	< 0.05	< 0.05
Nickel	mg/kg	DETSC2301#	1		58	37	22	36
Selenium	mg/kg	DETSC2301#	0.5		0.7	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	DETSC2301#	1		18000	130	63	90
Loss on ignition	%	DETSC 2003#	0.01		9.4	2.2	1.0	2.2
pH		DETSC 2008#			7.0	8.6	9.0	8.7
Cyanide total	mg/kg	DETSC 2130#	0.1		< 0.1	< 0.1	< 0.1	18
Cyanide free	mg/kg	DETSC 2130#	0.1		< 0.1	< 0.1	< 0.1	0.5
Cyanide complex	mg/kg	DETSC 2130	0.2		< 0.2	< 0.2	< 0.2	17
Thiocyanate	mg/kg	DETSC 2130#	0.6		1.9	< 0.6	< 0.6	0.7
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5		5.4	6.8	4.7	13
Chloride Aqueous Extract	mg/l	DETSC 2055	1		7.4	3.8	7.8	9.0
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10		120	17	16	19
Sulphur (free)	mg/kg	DETSC 3049#	0.75		< 0.75	< 0.75	< 0.75	< 0.75
EPH (C10-C40)	mg/kg	DETSC 3311#	10		73	< 10	< 10	< 10
Benzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Toluene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Xylene	mg/kg	DETS 062#	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Naphthalene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	DETSC 3301	0.1		< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586220	586221	586222	586223
				Sample ID	TP47	TP47	BH22	BH4
				Depth	0.20	1.00	0.70	7.00
				Sample Ref				
				Sample Type				
				Sampling Date	04/12/2013	04/12/2013	04/12/2013	04/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-94240

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
586205	TP42 0.40	Soil	NAD	na	Andrew Little
586206	TP42D 0.40	Soil	NAD	na	Andrew Little
586207	TP43 0.30	Soil	NAD	na	Andrew Little
586208	TP43 1.70	Soil	NAD	na	Andrew Little
586209	TP44 0.30	Soil	NAD	na	Andrew Little
586210	TP44D 0.30	Soil	NAD	na	Andrew Little
586211	TP44 1.00	Soil	NAD	na	Andrew Little
586212	TP44D 1.00	Soil	NAD	na	Andrew Little
586213	TP45 0.20	Soil	NAD	na	Andrew Little
586214	TP45D 0.20	Soil	NAD	na	Andrew Little
586215	TP45 1.30	Soil	NAD	na	Andrew Little
586216	TP45D 1.30	Soil	NAD	na	Andrew Little
586217	TP46 0.30	Soil	NAD	na	Andrew Little
586218	TP51 0.90	Soil	Amosite	Loose Amosite fibres present	Andrew Little
586219	HP48 0.30	Soil	Amosite	Loose Amosite fibres present	Andrew Little
586220	TP47 0.20	Soil	NAD	na	Andrew Little
586221	TP47 1.00	Soil	NAD	na	Andrew Little
586222	BH22 0.70	Soil	NAD	na	Andrew Little
586223	BH4 7.00	Soil	NAD	na	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
586205	TP42 0.40 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586206	TP42D 0.40 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586207	TP43 0.30 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586208	TP43 1.70 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586209	TP44 0.30 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586210	TP44D 0.30 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586211	TP44 1.00 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586212	TP44D 1.00 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			

586213	TP45 0.20 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586214	TP45D 0.20 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586215	TP45 1.30 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586216	TP45D 1.30 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586217	TP46 0.30 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586218	TP51 0.90 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586219	HP48 0.30 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586220	TP47 0.20 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586221	TP47 1.00 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586222	BH22 0.70 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)
586223	BH4 7.00 SOIL	04/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)



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Certificate of Analysis

Date: 18/12/2013

Certificate Number: 13-94289

Client: I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference: 13-94289

Client Reference: 13627

Contract Title: Wrexham

Description: 3 soil samples, 4 water samples

Date Received: 11 December 2013

Date Started: 11 December 2013

Date Completed: 18 December 2013

Test Procedures: Identified by prefix DETSn (details on request), Asbestos Analysis (DETS 082).

Notes: Observations and interpretations are outside the scope of UKAS accreditation

Approved By: 
Rob Brown, Business Manager

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Information in Support of the Analytical Results

Analysis

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

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

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

Key

- * Denotes test not included in laboratory scope of accreditation
- # Denotes test that holds MCERTS accreditation, however, MCERTS accreditation is only implied if the report carries the MCERTS logo
- \$ Denotes tests completed by an approved subcontractor
- I/S Denotes insufficient sample to carry out test
- U/S Denotes that the sample is not suitable for testing

Disposal

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

Soils - 1 month

Liquids - 2 weeks

Asbestos (test portion) - 6 months

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94289

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586403	586404	586405
				Sample ID	BH23	BH24	WS23
				Depth	2.00	3.00	2.60
				Sample Ref			
				Sample Type			
				Sampling Date	09/12/2013	09/12/2013	09/12/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Stones >2mm	% m/m	DETSC 1003*	1	4.7	3.8	9.1	
Moisture Content	%	DETS 046*	0.1	17	17	9.7	
Arsenic	mg/kg	DETSC2301#	0.2	7.7	6.0	9.6	
Boron (water soluble)	mg/kg	DETSC2123#	0.2	< 0.2	< 0.2	< 0.2	
Cadmium	mg/kg	DETSC2301#	0.1	0.5	0.6	0.7	
Chromium	mg/kg	DETSC2301#	0.15	20	20	22	
Copper	mg/kg	DETSC2301#	0.2	24	15	17	
Lead	mg/kg	DETSC2301#	0.3	14	20	15	
Mercury	mg/kg	DETSC 2325#	0.05	< 0.05	< 0.05	< 0.05	
Nickel	mg/kg	DETSC2301#	1	18	20	22	
Selenium	mg/kg	DETSC2301#	0.5	< 0.5	< 0.5	< 0.5	
Zinc	mg/kg	DETSC2301#	1	43	41	51	
Loss on ignition	%	DETSC 2003#	0.01	0.49	0.60	0.70	
pH		DETSC 2008#		8.7	8.1	8.3	
Cyanide total	mg/kg	DETSC 2130#	0.1	0.1	< 0.1	< 0.1	
Cyanide free	mg/kg	DETSC 2130#	0.1	< 0.1	< 0.1	< 0.1	
Cyanide complex	mg/kg	DETSC 2130	0.2	< 0.2	< 0.2	< 0.2	
Thiocyanate	mg/kg	DETSC 2130#	0.6	< 0.6	< 0.6	< 0.6	
Ammoniacal Nitrogen as N	mg/kg	DETSC 2119#	0.5	18	5.5	22	
Chloride Aqueous Extract	mg/l	DETSC 2055	1	15	16	8.8	
Sulphate Aqueous Extract as SO4	mg/l	DETSC 2076#	10	65	27	63	
Sulphur (free)	mg/kg	DETSC 3049#	0.75	32	0.94	87	
EPH (C10-C40)	mg/kg	DETSC 3311#	10	< 10	< 10	940	
Benzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.02	
Ethylbenzene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.04	
Toluene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.03	
Xylene	mg/kg	DETS 062#	0.01	< 0.01	< 0.01	0.34	
Acenaphthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	16	
Acenaphthylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	3.6	
Anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	12	
Benzo(a)anthracene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	5.7	
Benzo(a)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	5.2	
Benzo(b)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	2.9	
Benzo(k)fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	2.1	
Benzo(g,h,i)perylene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.5	
Chrysene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	5.9	
Dibenzo(a,h)anthracene	mg/kg	DESTC 3301	0.1	< 0.1	< 0.1	0.5	
Fluoranthene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	16	
Fluorene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	14	
Indeno(1,2,3-c,d)pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	2.2	
Naphthalene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	1.5	
Phenanthrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	28	
Pyrene	mg/kg	DETSC 3301	0.1	< 0.1	< 0.1	12	
PAH	mg/kg	DETSC 3301	1.6	< 1.6	< 1.6	130	

Summary of Chemical Analysis

Soil Samples

Our Ref: 13-94289

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586403	586404	586405
				Sample ID	BH23	BH24	WS23
				Depth	2.00	3.00	2.60
				Sample Ref			
				Sample Type			
				Sampling Date	09/12/2013	09/12/2013	09/12/2013
				Sampling Time			
Test	Units	DETSxx	LOD				
Catechol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		38
Cresols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		5.0
Naphthols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		3.1
Phenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		8.0
Resorcinol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		19
Trimethylphenol	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		210
Xylenols & Ethylphenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		32
Total Phenols	mg/kg	DETSC 3421*	0.5	< 0.50	< 0.50		310

Summary of Chemical Analysis

Water Samples

Our Ref: 13-94289

Client Ref: 13627

Contract Title: Wrexham

				Lab No.	586399	586400	586401	586402
				Sample ID	SS11-07-1	SS11-06-1	SS11-05-1	SS11-09-1
				Depth				
				Sample Ref				
				Sample Type				
				Sampling Date	09/12/2013	09/12/2013	09/12/2013	09/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Arsenic, Dissolved	ug/l	DETSC 2306	0.16		0.98	0.85	0.91	1.4
Cadmium, Dissolved	ug/l	DETSC 2306	0.03		0.080	0.042	0.032	0.040
Chromium, Dissolved	ug/l	DETSC 2306	0.25		< 0.25	< 0.25	< 0.25	< 0.25
Copper, Dissolved	ug/l	DETSC 2306	0.4		3.6	2.5	1.1	1.4
Iron, Dissolved	ug/l	DETSC 2306	5.5		220	140	34	36
Lead, Dissolved	ug/l	DETSC 2306	0.09		0.26	0.72	0.37	0.44
Mercury, Dissolved	ug/l	DETSC 2306	0.01		< 0.010	< 0.010	< 0.010	< 0.010
Nickel, Dissolved	ug/l	DETSC 2306	0.5		3.8	2.2	1.4	1.4
Selenium, Dissolved	ug/l	DETSC 2306	0.25		0.35	< 0.25	< 0.25	0.33
Zinc, Dissolved	ug/l	DETSC 2306	1.25		37.3	49.7	30.8	40.6
Conductivity	uS/cm	DETSC 2009	1		1400	806	668	641
pH		DETSC 2008			7.2	7.6	7.3	7.6
Cyanide total	ug/l	DETSC 2130	40		250	130	< 40	< 40
Cyanide free	ug/l	DETSC 2130	20		< 20	< 20	< 20	< 20
Cyanide complex	ug/l	DETSC 2130	40		250	130	< 40	< 40
Thiocyanate	ug/l	DETSC 2130	40		< 40	< 40	< 40	< 40
Suspended Solids	mg/l	DETSC 2034	5		90	540	130	88
Ammoniacal Nitrogen as N	mg/l	DETSC 2207	0.015		14	1.6	1.1	0.42
Chloride	mg/l	DETSC 2055	0.1		4.6	5.1	8.6	12
Sulphate as SO4	mg/l	DETSC 2055	0.1		84	42	15	11
Sulphide	ug/l	DETSC 2208	10		< 10	< 10	< 10	< 10
Sulphur (free)	ug/l	DETSC 3049	84		< 84	< 84	< 84	< 84
Total Organic Carbon	mg/l	DETSC 2033	2		18	34	8.1	11
EPH (C10-C40)	ug/l	DETSC 3311	10		550	150	250	11000
Benzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0
Xylene	ug/l	DETSC 3322	1		< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	2.4
Acenaphthylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	2.7
Benzo(a)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.67
Benzo(a)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.50
Benzo(b)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.64
Benzo(k)fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.29
Benzo(g,h,i)perylene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.27
Chrysene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.31
Dibenzo(a,h)anthracene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.27
Fluoranthene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	2.9
Fluorene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	4.9
Indeno(1,2,3-c,d)pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	0.52
Naphthalene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	3.7
Phenanthrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	1.1
Pyrene	ug/l	DETS 074*	0.01		< 0.01	< 0.01	< 0.01	2.6
PAH	ug/l	DETS 074*	0.2		< 0.20	< 0.20	< 0.20	24

Summary of Chemical Analysis Water Samples

Our Ref: 13-94289
Client Ref: 13627
Contract Title: Wrexham

				Lab No.	586399	586400	586401	586402
				Sample ID	SS11-07-1	SS11-06-1	SS11-05-1	SS11-09-1
				Depth				
				Sample Ref				
				Sample Type				
				Sampling Date	09/12/2013	09/12/2013	09/12/2013	09/12/2013
				Sampling Time				
Test	Units	DETSxx	LOD					
Catechol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	ug/l	DETSC 3422*	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Asbestos Analysis

Soil Samples

Our Ref: 13-94289

Client Ref: 13627

Contract Title: Wrexham

Lab No	Sample Ref	Material Type*	Result	Comment	Analyst
586403	BH23 2.00	Soil	NAD	na	Andrew Little
586404	BH24 3.00	Soil	NAD	na	Andrew Little
586405	WS23 2.60	Soil	NAD	na	Andrew Little

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. NAD = No Asbestos Detected. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETS 082 using polarised light microscopy in accordance with HSG248 and documented in-house methods. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'.

Sample Comments

DETS cannot be held responsible for the integrity of sample(s) received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating.

Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note "Guidance on Deviating Samples".

All samples received are listed below. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations.

If no sampled date (soils) or date/time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters), this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Lab No.	Sample ID	Date Sampled	Containers Received	Deviating due to holding time being exceeded for test(s)	Deviating due to inappropriate container for test(s)	Deviating due to headspace presence in container for test(s)
586399	SS11-07-1 WATER	09/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Bottle 1L (1 litre)			
586400	SS11-06-1 WATER	09/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Bottle 1L (1 litre)			
586401	SS11-05-1 WATER	09/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Bottle 1L (1 litre)			
586402	SS11-09-1 WATER	09/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Bottle 1L (1 litre)			
586403	BH23 2.00 SOIL	09/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586404	BH24 3.00 SOIL	09/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			
586405	WS23 2.60 SOIL	09/12/2013	Glass Jar 1L (1 litre), Glass Vial (40ml), Plastic Tub 1L (1kg)			



Certificate of Analysis

Certificate Number 14-01342

27-Mar-14

Client I & H Brown Limited
174 Dunkeld Road
Perth
PH1 3AA

Our Reference 14-01342

Client Reference (not supplied)

Contract Title Wrexham

Description 4 Soil samples, 5 Water samples.

Date Received 14-Mar-14

Date Started 14-Mar-14

Date Completed 27-Mar-14

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

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

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 14-01342

Client Ref

Contract Title Wrexham

Lab No	620863	620864	620865	620866
Sample ID	SS 11-02-1	SED 4	SS 11-02-3	RB1
Depth				
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	12/03/14	12/03/14	12/03/14	12/03/14
Sampling Time	1200	1200	1200	1200

Test	Method	LOD	Units				
Preparation							
Stones >2mm	DETSC 1003*	1	% m/m	2.3	5.0	6.2	5.4
Moisture Content	DETS 046*	0.1	%	90	180	68	420
Metals							
Arsenic	DETSC2301#	0.2	mg/kg	10	8.0	19	45
Boron (water soluble)	DETSC2123#	0.2	mg/kg	4.3	5.5	3.2	5.6
Cadmium	DETSC2301#	0.1	mg/kg	1.5	1.0	0.7	4.1
Chromium	DETSC2301#	0.15	mg/kg	29	28	23	11
Copper	DETSC2301#	0.2	mg/kg	30	28	21	13
Lead	DETSC2301#	0.3	mg/kg	680	380	40	41
Mercury	DETSC 2325#	0.05	mg/kg	0.08	0.13	< 0.05	< 0.05
Nickel	DETSC2301#	1	mg/kg	28	22	15	7.6
Selenium	DETSC2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC2301#	1	mg/kg	450	250	110	92
Inorganics							
Loss on ignition	DETSC 2003#	0.01	%	9.8	17	9.1	35
pH	DETSC 2008#			7.6	7.4	7.6	7.7
Cyanide total	DETSC 2130#	0.1	mg/kg	0.3	0.8	2.2	29
Cyanide free	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	0.2	0.5
Cyanide complex	DETSC 2130*	0.2	mg/kg	0.3	0.6	2.0	28
Thiocyanate	DETSC 2130#	0.6	mg/kg	1.4	0.9	0.7	1.4
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	3.9	7.4	3.2	4.6
Chloride Aqueous Extract	DETSC 2055	1	mg/l	20	19	30	560
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	220	100	190	68
Sulphur (free)	DETSC 3049	0.75	mg/kg	7.6	5.0	< 0.75	< 0.75
Petroleum Hydrocarbons							
EPH (C10-C40)	DETSC 3311#	10	mg/kg	20	800	< 10	620
Benzene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETS 062#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 14-01342

Client Ref

Contract Title Wrexham

Lab No	620863	620864	620865	620866
Sample ID	SS 11-02-1	SED 4	SS 11-02-3	RB1
Depth				
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	12/03/14	12/03/14	12/03/14	12/03/14
Sampling Time	1200	1200	1200	1200

Test	Method	LOD	Units				
PAHs							
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	6.2	< 0.1	1.0
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	4.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	8.5	< 0.1	1.0
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	6.1	0.7	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	4.6	0.2	1.3
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	2.8	< 0.1	2.9
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	2.4	0.2	2.2
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	1.7	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	5.9	0.3	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.6	0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	16	0.2	2.2
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	6.5	< 0.1	0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	2.5	< 0.1	0.7
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	3.6	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	18	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	12	0.2	0.6
PAH	DETSC 3301	1.6	mg/kg	< 1.6	100	2.0	12
Phenols							
Catechol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Cresols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Naphthols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Phenol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Resorcinol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Trimethylphenol	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Xylenols & Ethylphenols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Total Phenols	DETSC 3421*	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Chemical Analysis

Water Samples

Our Ref 14-01342

Client Ref

Contract Title Wrexham

Lab No	620867	620868	620869	620870	620871
Sample ID	AC 4-L1	SS 11-02-1	SS 11-02-3	RB1	SS 11-08-1
Depth					
Other ID					
Sample Type	WATER	WATER	WATER	WATER	WATER
Sampling Date	12/03/14	12/03/14	12/03/14	12/03/14	12/03/14
Sampling Time	1200	1200	1200	1200	1200

Test	Method	LOD	Units					
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.3	1.5	2.8	2.0	1.3
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.48	0.47	0.79	0.45	0.34
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.8	4.4	1.5	1.0	3.2
Iron, Dissolved	DETSC 2306	5.5	ug/l	150	91	49	9900	120
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.34	0.58	0.21	1.7	1.0
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	2.1	2.6	2.0	5.6	2.0
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.30	0.27	0.30	0.50	0.28
Zinc, Dissolved	DETSC 2306	1.25	ug/l	37.8	27.5	47.3	59.8	74.1
Inorganics								
Conductivity	DETSC 2009	1	uS/cm	982	547	400	1490	565
pH	DETSC 2008			6.8	7.4	7.5	6.7	7.2
Cyanide total	DETSC 2130	40	ug/l	41	< 40	< 40	51	< 40
Cyanide free	DETSC 2130	20	ug/l	< 20	< 20	< 20	< 20	< 20
Cyanide complex	DETSC 2130*	40	ug/l	41	< 40	< 40	51	< 40
Thiocyanate	DETSC 2130	40	ug/l	< 40	< 40	< 40	54	44
Suspended Solids	DETSC 2034	5	mg/l	48	15	6.0	38000	15
Ammoniacal Nitrogen as N	DETSC 2207	0.015	mg/l	1.8	0.094	0.95	3.9	0.12
Chloride	DETSC 2055	0.1	mg/l	40	34	39	15	34
Sulphate as SO4	DETSC 2055	0.1	mg/l	170	38	46	540	43
Sulphide	DETSC 2208	10	ug/l	21	17	16	16	17
Sulphur (free)	DETSC 3049	84	ug/l	< 84	< 84	< 84	< 84	< 84
Total Organic Carbon	DETSC 2085*	1	mg/l	8.1	14	4.1	1000	14
Petroleum Hydrocarbons								
EPH (C10-C40)	DETSC 3311	10	ug/l	270	110	260	240	100
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 14-01342

Client Ref

Contract Title Wrexham

Lab No	620867	620868	620869	620870	620871
Sample ID	AC 4-L1	SS 11-02-1	SS 11-02-3	RB1	SS 11-08-1
Depth					
Other ID					
Sample Type	WATER	WATER	WATER	WATER	WATER
Sampling Date	12/03/14	12/03/14	12/03/14	12/03/14	12/03/14
Sampling Time	1200	1200	1200	1200	1200

Test	Method	LOD	Units					
PAHs								
Acenaphthene	DETS 074*	0.01	ug/l	7.0	0.01	0.01	0.16	< 0.01
Acenaphthylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETS 074*	0.01	ug/l	0.24	0.02	< 0.01	0.13	< 0.01
Benzo(a)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.09	< 0.01	< 0.01
Benzo(a)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.07	< 0.01	< 0.01
Benzo(b)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.13	< 0.01	< 0.01
Benzo(k)fluoranthene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.05	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Chrysene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.07	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETS 074*	0.01	ug/l	0.44	0.23	0.34	0.15	0.02
Fluorene	DETS 074*	0.01	ug/l	2.1	< 0.01	0.03	0.18	< 0.01
Indeno(1,2,3-c,d)pyrene	DETS 074*	0.01	ug/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01
Naphthalene	DETS 074*	0.01	ug/l	0.68	< 0.01	0.79	0.36	< 0.01
Phenanthrene	DETS 074*	0.01	ug/l	0.06	0.10	< 0.01	0.02	0.03
Pyrene	DETS 074*	0.01	ug/l	0.40	0.31	1.0	0.13	0.06
PAH	DETS 074*	0.2	ug/l	11	0.68	2.6	1.1	< 0.20
Phenols								
Catechol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Cresols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Resorcinol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Trimethylphenol	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Xylenols & Ethylphenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Phenols	DETSC 3422*	0.1	ug/l	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Information in Support of the Analytical Results

Our Ref 14-01342
 Client Ref
 Contract Wrexham

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
620863	SS 11-02-1 SOIL	12/03/14	GJ 250ml (250ml), GJ 60ml (60ml), PT 1L (1kg)		
620864	SED 4 SOIL	12/03/14	GJ 250ml (250ml), GJ 60ml (60ml), PT 1L (1kg)		
620865	SS 11-02-3 SOIL	12/03/14	GJ 250ml (250ml), GJ 60ml (60ml), PT 1L (1kg)		
620866	RB1 SOIL	12/03/14	GJ 250ml (250ml), GJ 60ml (60ml), PT 1L (1kg)		
620867	AC 4-L1 WATER	12/03/14	GJ 1L (1L) x2, GV (40ml), PB 1L (1L)		
620868	SS 11-02-1 WATER	12/03/14	GJ 1L (1L) x2, GV (40ml), PB 1L (1L)		
620869	SS 11-02-3 WATER	12/03/14	GJ 1L (250ml) x4, GV (40ml), PB 1L (1L)		
620870	RB1 WATER	12/03/14	GJ 1L (1L) x2, GV (40ml), PB 1L (1L)		
620871	SS 11-08-1 WATER	12/03/14	GJ 1L (500ml) x3, GV (40ml), PB 1L (1L)		

Key: G-Glass P-Plastic J-Jar T-Tub B-Bottle V-Vial

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

Soil Analysis Notes

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

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

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

Disposal

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

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

