Galliford Try Building North West

Wrexham Custody Facility

Verification Report

July 2018

A098075

Prepared on behalf of WYG Environment Planning Transport Limited.

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1.0 INTRODUCTION

1.1 Instruction

WYG Environment Planning Transport Ltd (WYG) was commissioned by Galliford Try Building North West to compile a Verification Report associated with land owned by North Wales Police. A Site Location Plan is presented as Drawing No. A098075-MAN-N-01. The proposed re-development comprises the demolition of the existing Sharp Precision warehouse and construction of a new custody facility comprising police offices, storage and custody building with ancillary parking and new access as shown on Drawing No. WXM-L-TP-DR-GA-04-001 – Landscape Masterplan, prepared by TEP.

A remediation strategy (A098075-RS-V2, dated November 2016) was submitted to Wrexham County Borough Council (WCBC) in order to support the discharge of condition 3 of the planning application P/2015/0583 for the site. This report has been prepared to support the discharge condition 4 of the planning permission.

A Materials Management Plan (MMP) has also been prepared associated with the re-use of site won soils to create a piling mat for the proposed custody building and form ecological landscape features.

Previous reports have been completed for the site which should be read in conjunction with this report, these include:

- Phase 1 Geo-Environmental Appraisal, New Police Facility, Llay Industrial Site, Capita Symonds, June 2013;
- Report on Ground Investigation, North Wales Police New Custody Suite & Administration Office, Llay, Wrexham, Ian Farmer Associates (IFA), February 2015;
- Ground Investigation Report, Police and Crime Commissioner for North Wales Eastern Command & Custody Facility, Llay, Wrexham, Ian Farmer Associates, February, 2016;
- Technical Peer Review, Wrexham Custody Facility: Geo-Environmental Land Contamination, WYG, July 2016;
- Wrexham Custody Facility, Remediation Strategy Report V2, WYG, November 2016;
- Materials Management Plan (MMP) V1, WYG, March 2017;
- Gas Risk Assessment, Eastern Command and Custody Facility, The Environmental Protection Group, April 2017; and,

- Revision to MMP, V2, WYG, June 2018.

1.2 Report Conditions

Attention is drawn to the report conditions included in Appendix A, and the terms and conditions of engagement. Some information presented in this Verification Report has been supplied by Galliford Try Building North West. Therefore, whilst the information has been presented in good faith, WYG cannot be held liable for its accuracy or completeness.

2.0 BACKGROUND INFORMATION

2.1 Environmental Setting

The site is located off Davy Way / Rackery Lane (B5373) in Llay Industrial Estate, approximately 6km north-west of Wrexham Town Centre. The site previously comprised a warehouse (Sharp Precision) in the east with associated land with a pond and drain in the west. The site is bounded to the north-west by Davy Way and to the north-east by Rackery Lane, beyond which are undeveloped fields. To the south-east, south and south-west of the site are commercial and industrial premises.

The site was formerly undeveloped land with a marsh area in the south-west and a pond in the north-eastern part of the site. From circa. 1980's, the site was part of the Llay Industrial Estate with an industrial building located in the western part of the site.

The nearest surface water feature is approximately 110m south of the site with a further spring and watercourse approximately 250m south-west of the site. Published geology indicates the site is underlain by Made Ground with superficial deposits of Glacial Till (Secondary Undifferentiated Aquifer) beneath this. Immediately to the north-west of site is Alluvium (Secondary A Aquifer). Bedrock of the Salop Formation (Sandstone, Mudstone and Conglomerate) is present beneath the site with the Etruria Formation present beneath the north-western part of site. The bedrock is classified as a Secondary A Aquifer. The site is not located in Groundwater Source Protection Zone for potable water supply.

Ground conditions based upon historical investigations at the site show either topsoil or hardstanding underlain by Made Ground up to 6.0m below ground level (bgl) which was predominately re-worked Clay. Beneath this was natural sandy gravelly Clay and Sand up to 9.95m bgl with occasional spongy fibrous dark brown peat and organic silt/peaty pockets encountered across the site.

Sandstone bedrock was encountered in one location at 19.80m bgl during the IFA 2016 investigation at the site. Historical groundwater monitoring identified groundwater levels between ground level and 6.00m bgl.

2.2 Ground Contamination Summary

Following the IFA investigation in 2016, hydrocarbon impacted groundwater was identified beneath the footprint of the former building in the west. Elevated ground gases (methane and carbon dioxide) were recorded in the central and southern parts of the site with Characteristic Situation 4 protection measures recommended by WYG. A radon report also indicated that 5-10% of properties in the area were above the Action Level and that basic radon protections measures were required. In 2016, WYG carried out

the delineation of shallow hydrocarbon impacted groundwater beneath the footprint of the former building and undertook additional chemical analysis of shallow soils across the site. Following this, the overall risk posed to human health and controlled waters receptors was considered to be low with exception of the risk from ground conditions to future water supply pipelines which was considered to be low to moderate without Statutory Undertaker liaison and the risk from ground gases, vapours and radon gas which posed a moderate to high risk without mitigation.

The Environmental Protection Group Limited (EPG) were appointed in April 2017 to undertake a review of the gas data collected for the site and complete a detailed quantitative risk assessment for the proposed building, informed by mathematical (quantitative) modelling. Utilising the results from the advection modelling, the site would be re-classified as Characteristic Situation 1 in accordance with BS8485:2015; however, basic measures were recommended due to the requirement for radon protection measures at the site. Consultation with the Environmental Protection Officer (EPO) at Wrexham County Borough Council (WCBC) was made by EPG via email on 3rd April 2017 (see Section 2.3 below) who agreed with the revised gas protection measures at the site. The full EPG report and detailed design of gas protection measures required for the development can be found in Appendix B.

Based on the above, the following mitigation and validation measures were recommended for the proposed development (commercial) end use:

- A radon resistant membrane with suitable installation and validation. Inspections and detailed photographic record to be carried out;
- Excavated waste to be removed by suitably licenced contractor;
- Validation of imported and site won soil prior to re-use; and,
- A pre-demolition asbestos survey to be carried out prior to the demolition of existing warehouse.

Due to landscaping requirements, site won soil was re-used to form two bunds to enhance the ecological status of the site in line with BREEAM requirements under the CL:AIRE Definition of Waste Code of Practice using a Materials Management Plan (MMP). An email copy of the Qualified Person Declaration of the revised MMP is provided in Appendix C.

2.3 Regulatory Consultation

The following consultation has been undertaken with Angela Guy, Environmental Protection Officer (EPO) at WCBC associated with the project:

- Determination of acceptability of proposed remediation strategy for the site (letter dated 26th October 2016);
- Determination of acceptability of proposed remediation strategy and recommendation for Condition 3 to be discharged (email dated 21st November 2016);
- Agreement on proposed gas mitigation measures at the site (email dated 03rd April 2017 from EPG);
- Liaison re. unsuitability of material imported from 'Holywell Learning Campus' and requirement to remove from site (email dated 12th June 2017).
- Agreement on suitability of imported material to site (email dated 19th June 2017);
- Confirmation of the construction of the storm water catchment area out with the requirements of the MMP (email dated 19th June 2017);
- Confirmation of satisfactory stockpile sampling of material for re-use as liner to the storm water catchment area (email dated 21st July 2017); and,
- Confirmation on receiving waste transfer notes for 'Holywell Learning Campus' material removed from site (email dated 13th February 2018).

A copy of all the above correspondence is provided in Appendix D. Further details are provided in the relevant sections below.

3.0 VALIDATION WORKS UNDERTAKEN

WYG has undertaken site meetings and validation visits to site in relation to the implementation of the remediation strategy and MMP throughout the construction phase of the project. A summary of the validation is given below with relevant supporting documentation appended.

3.1 Re-Use of Site Won Materials

3.1.1 Storm Water Catchment Area

On 30th June 2017, WYG visited site to validate approximately 500m^3 of stockpiled material which was excavated from an area adjacent to a proposed car park on site for future re-use as a liner to a storm water catchment area. The site won material was chemically validated in line with the requirements of the WYG Remediation Strategy Report dated November 2016. No chemicals of concern were reported. A copy of the full site report is presented in Appendix E.

3.1.2 Piling Mat Beneath Proposed Building

Under an MMP, the concrete floor slab of the former building was crushed and re-used as a piling mat beneath the proposed custody facility. The material (1350m^3) was compacted and geotechnically tested in compliance with WYG Structural Specification – Highways Specification (ref: A095257, dated April 2017). Copies of the geotechnical testing carried out on the material is provided in Appendix F.

3.1.3 Landscaping

Under an MMP, approximately 3500m^3 of material was cut from the proposed car park area and used to construct an ecological landscape feature along the southern boundary of the site. Additionally, approximately 1500m^3 of material was cut for the formation of the pile caps and installation of new drainage to construct a further ecological feature in the south-east of the proposed car parking area. It was considered that the creation of high and relatively steep sided bunds was integral to the conservation objectives of the area.

On 14th June 2018, WYG visited site to validate the soil within the bunds noted above. The material was chemically validated in line with the requirements of the WYG Remediation Strategy Report for site won soils (1 no. sample per 250m^3). No chemicals of concern were reported. A copy of the full site report is presented in Appendix E.

3.2 Importation of Materials to Site

3.2.1 Car Parking/Hard Paved Areas

Approximately 125m^3 of material was imported to site from 'Holywell Learning Campus' in Holywell. The material was imported to use as fill beneath the proposed car parking area. On 24th April 2017, WYG visited site to undertake validation sampling of the soil. In line with the WYG Remediation Strategy and the sampling and testing requirements provided in 'Welsh Land Contamination Working Group Document' dated May 2013, 4 no. soil samples were taken. Chemical results were screened against validation criteria specified within the Remediation Strategy report. Slightly elevated TPH C16-C35 concentrations were reported, particularly in sample SP1. Information on the chemical status of the material was communicated with the WCBC CLO. As details of the source of the material could not be provided, it was requested that the material was removed from site under a duty of care. The material was subsequently removed from site under a duty of care. The full site report is provided in Appendix E which contains all necessary waste transfer notes etc. Regulatory correspondence in relation to this, is presented in Appendix D.

Approximately 485m^3 of recycled material was imported from the Eccles New Road site and 900m^3 from Tudor Griffith, both of which operate under the 'Waste & Resources Programme' scheme. It was confirmed via email dated 19th June 2017 with the WCBC CLO that this material was suitable for re-use at the site without the requirement for WYG to carry out further chemical testing. Regulatory correspondence in relation to this, is presented in Appendix D. The results of any chemical or geotechnical laboratory testing carried out on imported material is presented in Appendix G.

Approximately 6800m^3 of quarried material from Halkyn and Alberdo Quarries in Wales was imported to be used beneath external hard paved areas and the proposed car parking area. Copies of any import certification relating to the quarried material is presented in Appendix G. The material did not require chemically testing by WYG as per the requirements of the Remediation Strategy Report.

3.2.2 Proposed Building

Approximately 575m^3 of recycled material was imported from Tudor Griffith in April 2017 and a further 885m^3 was imported from the Eccles New Road site in March/April 2017. The material imported was used to form the piling mat beneath the proposed building. The results of any chemical or geotechnical laboratory testing carried out on imported material is presented in Appendix G. Correspondence via email between WYG and the Contracts Manager on site in March 2017 confirmed that geotechnical tests

carried out at formation level in the building footprint were sufficient and that no further tests were required. A copy of this email correspondence is provided in Appendix G.

Approximately 2900m^3 of quarried material was imported to site from Denbigh Quarry to be used beneath the building footprint. Copies of any import certification relating to the quarried material is presented in Appendix G. The material did not require chemically testing by WYG as per the requirements of the Remediation Strategy Report.

3.2.3 Drainage Trenches

Approximately 1290m^3 of material was imported from Eccles New Road to infill drainage trenches beneath hard standing on site. Under the WRAP protocol, the material was chemically tested prior to import and the results of which are presented in Appendix G.

3.2.4 Landscaping

In May 2018, approximately 630m^3 of topsoil was imported to site to be used in landscaped Areas 1 to 5. The full site report is presented in Appendix E which shows the locations of these areas. On 31st May and 14th June 2018, WYG visited site to retrieve up to ten samples for laboratory testing as per the requirements of the WYG Remediation Strategy Report and Welsh Land Contamination Working Group Document, dated May 2013 i.e. 4 samples per 250m^3. The results of the laboratory testing were screened against updated WYG screening values as presented within the Remediation Strategy Report. No soil samples from this source exceeded the relevant screening criteria and were suitable to be retained on site.

3.3 Export of Materials from Site

During excavation of drainage trenches in the south-western corner of the proposed custody building in August 2017, approximately 20m^3 of hydrocarbon impacted material was encountered (slight hydrocarbon odour and staining). Although the material was not chemically testing, from visual and olfactory observations, it was deemed unsuitable to be retained on site for re-use. It was therefore removed from site under a duty of care by Biffa Waste Services Limited to Meece Landfill facility in Staffordshire as hazardous waste. From visual and olfactory observations, it was confirmed that all impacted material was removed from site and none was left in-situ. A watching brief was implemented on site during excavation activities to ensure that if further impacted material was encountered it could be dealt with under a duty of care. Copies of waste transfer documentation and chemical testing carried out on the material is presented in Appendix H.

3.4 Ground Gas Mitigation

Acrefield Developments installed the gas protection measures required at the site and SCLT undertook the verification of such measures. A copy of the gas validation documentation is included in Appendix I.

3.5 Water Supply Pipeline

Reference was made by Galliford Try Building North West to Welsh Water Documentation and guidelines for the selection of water supply pipelines. Galliford Try Building North West reported that barrier pipe was installed at the site. Photographic evidence of the installed pipelines is provided in Appendix E.

3.6 Building Demolition

An asbestos survey was undertaken in 2014 prior to building demolition. A copy of which is provided is provided in Appendix J. Asbestos containing material was identified within a gasket in a gas lever mechanism. This was removed under a duty of care as per the control of Asbestos Regulations 2012. Confirmation of asbestos from site is provided in Appendix J.

3.7 Unforeseen Contamination

Galliford Try Building North West have confirmed that no unforeseen contamination was encountered during the development works with exception to the hydrocarbon impacted material mentioned in Section 3.3 which was removed from site under a duty of care.

4.0 RESIDUAL RISK ASSESSMENT

A Residual risk assessment has been undertaken for the site based on the verification works undertaken.

4.1 Contaminant Sources

The main sources of contamination have been identified as:

- Site soils (Ecological bunds, beneath car park and other landscaped areas);
- Residual soils / impacted groundwater (hydrocarbon impacted material encountered during excavation of drainage trench, south-west of building);
- Imported topsoil/sub-soil;
- Asbestos within former building; and
- Ground Gases (Radon).

4.2 Contamination Pathways

Potential pathways are listed below, considering the identified sources and future use of the site:

- Dermal contact;
- Direct contact/plant root uptake;
- Inhalation of vapours or dusts;
- Ingestion of dusts;
- Migration into pipe work; and,
- Ground gas and vapour migration and accumulation.

The risk to controlled waters (Secondary A Aquifer and watercourse 110m south) has previously been determined as low and remedial works were not required for these receptors.

4.3 Contamination Receptors

The main receptors listed below are proposed considering the end use of the site:

- Future site users (commercial end-use);
- Future maintenance workers excavating ground;
- Adjacent properties and land users (predominantly commercial buildings);
- Future buildings and installations; and,
- Flora (landscaping).

4.4 Post Validation Residual Ground Contamination Risk Assessment

By considering the sources, pathways and receptors, an assessment of the residual environmental risk is made with reference to the significance and degree of the risk based on the validation of remedial measures undertaken as part of the development. The assessment is based on consideration of whether the source of contamination can reach a receptor and hence whether it is of major or minor significance. The risk assessment addresses a residential with plant uptake end-use which is deemed suitably conservative for Custody building.

The qualitative risk assessment has been undertaken in accordance with BS10175:2001 and CIRIA Document C552: Contaminated Land Risk assessment, A Guide to Good Practice. The source – pathway – receptor linkages are developed around the information presented above.

The risk assessment has been carried out by assessing the severity of the potential consequence, taking into account both the potential severity of the hazard and the sensitivity of the target, based on the categories given below (Tables 4.1 to 4.3). A table summarising the preliminary risk assessment for both on-site and off-site sources is given in Table 4.4.

Table 4.1: Potential Hazard Severity Definition

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species.
Mild	Pollution of non-sensitive waters, significant damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species, minor damage to buildings or structures

The likelihood of an event (probability) considers both the presence of the hazard and target and the integrity of the pathway and has been assessed based on the categories given below.

Table 4.2: Probability of Risk Definition

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

The potential severity of the risk and the probability of the risk occurring have been combined in accordance with the following matrix in order to give a level of risk for each potential hazard.

Table 4.3: Level of Risk for Potential Hazard Definition

		Potential Severity			
		Severe	Medium	Mild	Minor
Probability of Risk	High Likelihood	High	High	Moderate	Low/ Moderate
	Likely	High	Moderate	Low/Moderate	Low
	Low Likelihood	Moderate	Low/Moderate	Low	Low
	Unlikely	Low/Moderate	Low	Low	Low

Table 4.4: Summary of Residual Risk Assessment Post Remediation and Validation

Source	Pathway	Receptor	Severity	Probability	Pre-Mitigation Risk	Remediation /Mitigation Measure	Severity	Probability	Post Mitigation Risk	Justification
Site won soils (ecological bunds, car parking & landscaping)	Dermal contact, ingestion and/or inhalation of dusts	Human Health – Future site users	Medium	Unlikely	Low	Remediation Strategy	Minor	Unlikely	Low	Validation Testing Undertaken.
		Human Health – maintenance workers excavating ground	Minor	Low	Low	Remediation Strategy	Minor	Unlikely	Low	Validation Testing Undertaken.
	Direct contact/plant root uptake	Flora (landscaping)	Minor	Low	Low	Remediation Strategy	Minor	Unlikely	Low	Validation/ testing to BS:3882 2015 undertaken.
Residual soils following trench excavation / potential hydrocarbon impacted groundwater	Dermal contact, Ingestion and/or inhalation of dusts	Human Health – Future site users	N/A	N/A	N/A	Remediation Strategy	Minor	Unlikely	Low	Validation Testing Undertaken.
		Human Health – maintenance workers excavating ground	N/A	N/A	N/A	Remediation Strategy	Minor	Unlikely	Low	Validation Testing Undertaken.
	Migration into pipework	Future buildings and installations	Medium	Likely	Moderate	Remediation Strategy	Medium	Unlikely	Low	Barrier pipe installed.
Imported topsoil / subsoil	Dermal contact and/or inhalation/ingestion	Human Health – Future Users	N/A	N/A	N/A	Remediation Strategy	Minor	Unlikely	Low	Validation Testing Undertaken.
	Dermal contact, Ingestion and/or inhalation of dusts	Human Health – maintenance workers excavating ground	N/A	N/A	N/A	Remediation Strategy	Minor	Unlikely	Low	Validation Testing Undertaken.

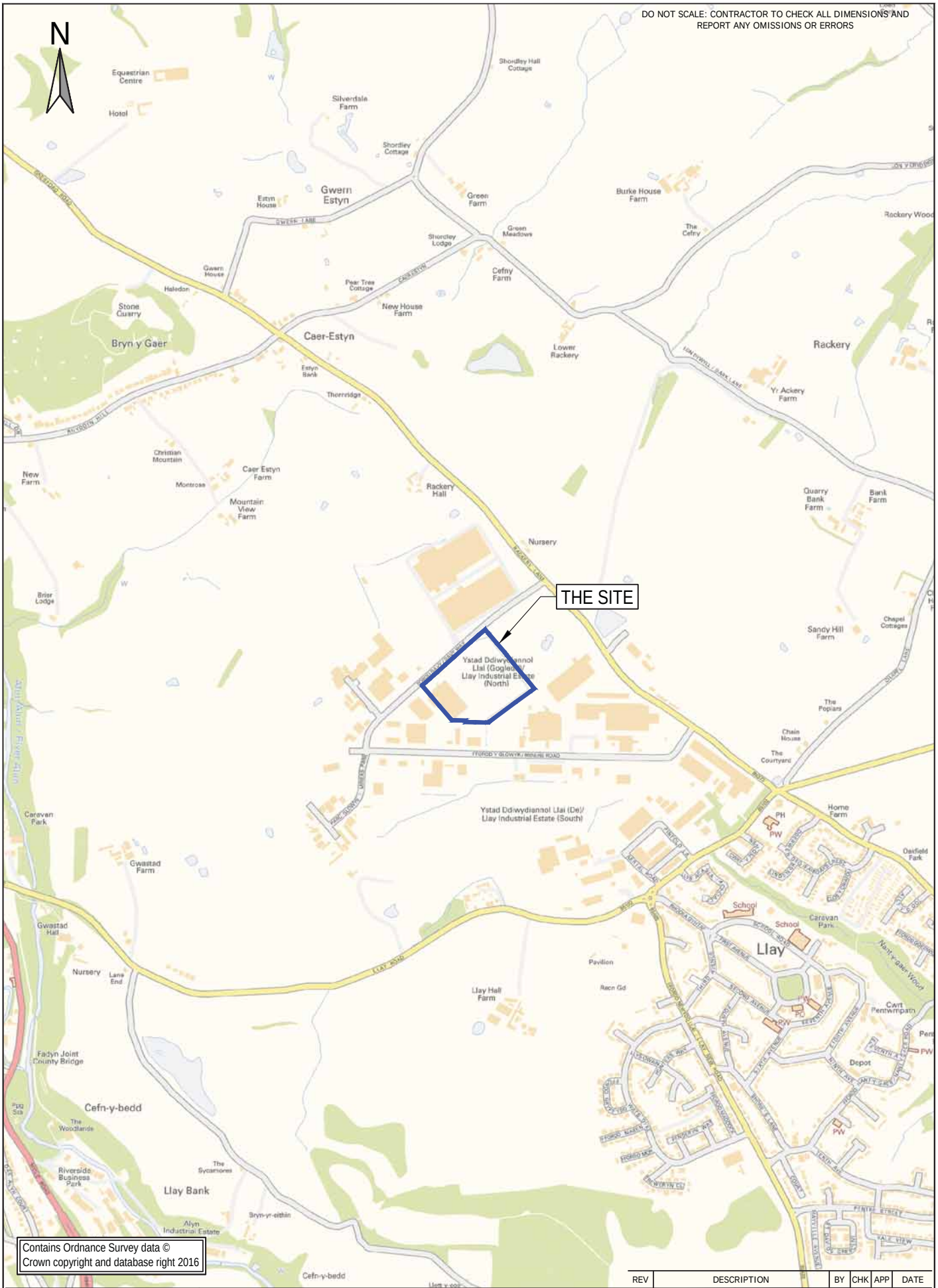
Source	Pathway	Receptor	Severity	Probability	Pre-Mitigation Risk	Remediation /Mitigation Measure	Severity	Probability	Post Mitigation Risk	Justification
Asbestos presence within former building	Dermal contact, Ingestion and/or inhalation of dusts	Human Health – Future Users	Medium	Likely	Moderate	Removal of source	Medium	Unlikely	Low	Asbestos removal documentation provided.
		Human Health – maintenance workers excavating ground	Medium	Likely	Moderate		Minor	Unlikely	Low	Asbestos removal documentation provided.
Ground gas generation, migration & accumulation	Generation and migration / accumulation of ground gases	Human Health – future site users (asphyxiation)	Severe	Unlikely	Low to Moderate	Gas mitigation measures installed with radon protective membrane	Medium	Unlikely	Low	Interserve installed suitable validated radon resistant membrane into building

4.5 Summary of Residual Risk Assessment Post Validation

Based on the construction works undertaken in general accordance with the remediation strategy, the revised risk assessment highlights that the site poses a **low residual risk**.

The residual risks are not considered to be unacceptable and this report should be included in the sites Operation and Maintenance (O&M) Manual.

Drawings



REV	DESCRIPTION	BY	CHK	APP	DATE

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Client: GALLIFORD TRY BUILDING NORTHWEST

Project: A098075 WREXHAM CUSTODY FACILITY

Drawing Title: SITE LOCATION PLAN

Scale @ A4	Drawn	Date	Checked	Date	Approved	Date
1:20,000	PMC	07.09.16	SH	07.09.16	CM	07.09.16

Project No.	Office	Type	Drawing No.	Revision
A098075	MAN	N	01	

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Key

Existing Features

- Trees
- Tree and Shrub Groups
- Hay Meadow

Proposed Features

- Building
- Footpaths
- Roads
- Pond
- Amenity Grass
- Traditional Hay Meadow
- Wet Meadow
- Trees
- Shrub Planting
- Marginal Aquatic Planting
- Aquatic Planting
- Dingy Skipper Protected Area
- Bee Orchid Protected Area

Note:
Contractor to check for services prior to commencing works on site, trees in close proximity to services to receive root barriers to edges of planting pit as per tree pit details.

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Rev	Description	Drawn	Approved	Date
L	Pond update	AJG	GDA	09/05/18
K	Pond, surfacing & Gate update	AJG	GDA	23/04/18
J	Bollards removed pond updated	AJG	GDA	01/11/17
I	Amended pond layouts	AJG	RJC	11/08/17
H	Layout updated	AJG	GDA	25/03/17
G	Revised inline with comments	AJG	GDA	25/04/17
F	Layout updated	AJG	GDA	14/03/17
E	Layout updated	AJG	GDA	08/03/17
D	Pond and tree positions updated	AJG	GDA	24/11/16
C	Tree positions updated	AJG	GDA	24/11/16
B	Updated as per GT comments	AJG	GDA	11/11/16
A	Updated to reflect planting changes	AJG	GDA	8/11/16

TEP | THE ENVIRONMENT PARTNERSHIP
Genesis Centre, Birchwood Science Park, Warrington WA3 7BH
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Project
Eastern Command and Custody Facility

Title
Landscape Masterplan

Drawing Number
WXM-L-TP-DR-GA-04-001
D6032.C100.001L

Scale	Date
1:500 @ A1	27/10/2016

Drawn	Checked	Approved
AJG	GDA	GDA

Appendices

Appendix A – Report Conditions

APPENDIX A - REPORT CONDITIONS
GROUND INVESTIGATION

This report is produced solely for the benefit of **Galliford Try Building North West** and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on a visual site inspection, reference to accessible referenced historical records, information supplied by those parties referenced in the text and preliminary discussions with local and Statutory Authorities. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research. Where ground contamination is suspected but no physical site test results are available to confirm this, the report must be regarded as initial advice only, and further assessment should be undertaken prior to activities related to the site. Where test results undertaken by others have been made available these can only be regarded as a limited sample. The possibility of the presence of contaminants, perhaps in higher concentrations, elsewhere on the site cannot be discounted.

Whilst confident in the findings detailed within this report because there are no exact UK definitions of these matters, being subject to risk analysis, we are unable to give categoric assurances that they will be accepted by Authorities or Funds etc. without question as such bodies often have unpublished, more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to WYG Environment Planning Transport Ltd. In time improved practices or amended legislation may necessitate a re-assessment.

The assessment of ground conditions within this report is based upon the findings of the study undertaken. We have interpreted the ground conditions in between locations on the assumption that conditions do not vary significantly. However, no investigation can inspect each and every part of the site and therefore changes or variances in the physical and chemical site conditions as described in this report cannot be discounted.

The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites. If migrating pollution or contamination (past or present) exists further extensive research will be required before the effects can be better determined.

Appendix B – The Environmental Protection Group Report, April 2017 and Gas Protection Measures

The Environmental Protection Group Ltd







Gas Risk Assessment

Eastern Command and Custody Facility, Wrexham

April 2017

The Environmental Protection Group
Warrington Business Park
Long Lane Warrington WA2 8TX

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Email: epg@epg-ltd.co.uk www.epg-ltd.co.uk
Company Number: 3506162

ace consultancy engineering business environment

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1. INTRODUCTION

1.1 Purpose

P.P O'Connor are appointed as Principal Contractor for the construction of the Eastern Command and Custody Facility located off Davy Way, Wrexham (the site).

The current ground gas protection design and recommendations for the proposed building is based on a rudimentary screening assessment of available gas monitoring data, i.e. the use of generic gas screening values. The current assessment requires ground gas protection measures to be incorporated below the buildings floor slab construction, including provision of a gas resistant membrane and active sub-floor ventilation.

The Environmental Protection Group Limited (EPG) has been appointed by P.P O'Connor (the client) to undertake a thorough review of all information relating to soil gas (specifically bulk gases – methane and carbon dioxide) and complete a rigorous detailed quantitative risk assessment for the proposed building, informed by mathematical (quantitative) modelling.

The results of EPG's risk assessment will be used to specify what ground gas protection measures need to be incorporated within the floor slab construction makeup of the proposed building. The rigorous assessment completed by EPG will supersede previous recommendations for the ground gas protection strategy – which were based on a generic screening approach.

The process outlined above is consistent with BS8485:2015 (Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings), whereby it is accepted that the use of generic screening approaches can result in over-conservatism. In such circumstances BS8485:2015 is clear that the assessment of risks can be augmented and overridden by the completion of detailed quantitative risk modelling.

1.2 Information

This report is based on the following information, as provided to EPG:

- Capita Symonds. New Police Facility, Llay Industrial Site; Phase 1 Geo-Environmental Appraisal. June 2013.
- Ian Farmer Associates. Report on Ground Investigation; New Custody Suite and Administration Office, Llay. May 2015.
- Ian Farmer Associates. Ground Investigation Report; Eastern Command & Custody Facility, Llay Wrexham. February 2016.
- Terrain Geotechnical Consultants. Report on a Supplementary Trial Pit Investigation, Eastern Command Custody Facility Llay, Wrexham. October 2016.
- WYG Environment Planning Transport. Remediation Strategy; Wrexham Custody Facility. November 2016.
- Current development plans (draft) provided by the client, as attached in Appendix E.

It is noted the 2015 IFA report was not made available to EPG, however the bore logs, a field plan and gas monitoring results were provided in the 2016 IFA report and have been used in this risk assessment.

1.3 Proposed development

The following information is based on the preliminary development plans provided by P.P O'Connor (see Appendix E). The proposed development comprises the construction of a large rectangular shaped building, not dissimilar to the building currently standing. The proposed facility will incorporate office space, operational areas and custody cells.

A row of smaller rooms (mains services room, generator compound, motorcycle garage, vehicle maintenance and inspection facilities) are proposed along the western boundary with car parking proposed on the northern, southern and eastern side of the main building.

Based on the WYG (2016) remediation strategy report and plans provided by the client, it is understood a ground bearing slab of 150 mm thickness will be constructed across the eastern side of the main buildings, while a raft slab of 300 mm thickness will be constructed across the western side of the main building. The Structural Slab Level (SSL) will be typically ay 95.43 m

AOD. Further, isolated thickening of the slab is proposed to 360 mm (with 90 mm cover to top) to meet the security requirements of the proposed future use.

It is understood a lift will be constructed towards the eastern side of the proposed building.

2. SITE CONDITIONS

2.1 Current use and layout

A large building (approximately 95 m by 45 m) and open grassed field currently occupy the site, which is located on the southern side of Davy Way, as shown in Figure 1 below. The site is roughly rectangular with approximate dimensions 225 m by 190 m.



Figure 1. Site Location and Layout (WYG 2016)

The site forms part of the Llay Industrial Estate formerly used as a manufacturing plant by Sharp Electronics (IFA 2013). According to IFA (2016), the presently standing building comprised an open warehouse-type with ancillary offices. IFA (2016) indicate the warehouse was constructed circa 1980s.

The ground surface immediately surrounding the building is a mixture of hardstanding and grass, while the greater norther-eastern half of the site is unpaved and grassed.

Predominantly commercial and industrial land uses surround the site including the Wrexham Plastics Company to the south (plastics manufacturing and fabrication), Magellan Aerospace to the immediate west (aircraft and engine manufacturers) and Sharps Manufacturing to the north (electronics manufacturing). The exception to this is to the north-northeast which is currently vacant and grassed.

2.2 Summary of site history

Based on the reports provided, the history of the site is summarised, as follows:

- Prior to 1980s: The site was used for rural, likely arable, land.
- 1980s: Present warehouse built in the south-southwest part of the site. The central and north eastern part of the site remained undeveloped. It is extremely unlikely that the building was provided with gas protection measures.
- 1990s: Extensions to the present warehouse were completed, used as a manufacturing plant by Sharp Electronics. The central and north eastern part of the site remained undeveloped.

The historical land use surrounding the site is summarised, as follows:

- Late 1800s/early 1900s: Largely undeveloped.
- 1910s to early 1980s: Llay Main Colliery established to the southeast, followed by expansion in the 1950s and 1960s, including construction of a mineral railway and an extensive area of colliery spoil. The colliery was disused or redeveloped by the early 1980s.
- 1980s: Establishment of the current industrial/commercial estate.

In addition to the above, an historical plan (BGS 1977) appended to the Capita Symonds report (2013) indicates the former presence of a textiles factory and engineering works at the industrial estate.

Other important information obtained from the previous reporting is an identified area of marshland within the central area of the site, see Figure 2. The marshland was inferred to have been in-filled/treated during construction of the industrial estate during the 1980s. Additionally, a ponded area was also identified in the southern region of the site.

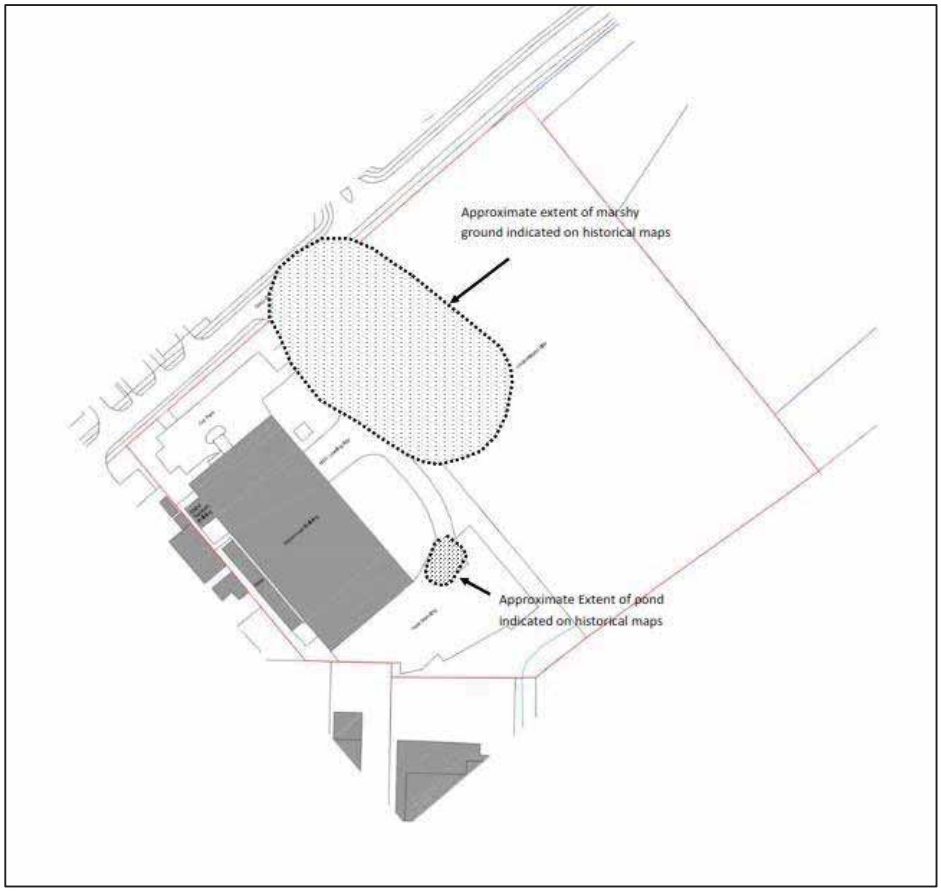


Figure 2. Marshland Area On-Ste (IFA 2016)

2.3 Geology

Made Ground is present beneath the proposed development area, generally ranging in thickness between 0.2 m and 2 m bgl, and up to 5.5 m bgl in isolated areas (BH2). This Ground comprises brown silty gravelly SAND and reworked Till with occasional brick. There is no evidence of significant quantities of degradable material in the general Made Ground across the site. The Made Ground would have been placed during earthworks to reprofile the site during construction of the previous development.

Elsewhere on the site, including to the immediate east and potentially beneath the eastern edge of the proposed development the Made Ground extends to depths of up to 5.5 m bgl. This deeper Made Ground comprises firm brown, slightly sandy, slightly gravelly CLAY, some

mudstone, sandstone, limestone (i.e. reworked Till) with occasional rootlets, and coincides with the identified marshland (see Figure 2) which was identified on the Ordnance Surveys (OS) obtained by IFA (2013).

Geological maps indicate the site to be underlain by superficial deposits of Glacial Till. Underlying bedrock comprise the Etruria Formation (mottled mudstone with lenticular sandstones) to the northwest while the remainder of the site is underlain by the Salop Formation which forms part of the Warwickshire Group (WAWK), comprising red and red-brown mudstone and sandstone containing beds of pebbly sandstone and conglomerate with thin limestone beds.

The bore logs provided are consistent with the geological maps. The only exception being the presence of PEAT which was also logged beneath the Made Ground across the central area of the site, corresponding with the former marshland area. More recent investigations by WGY (2016) also identified a thin zone of silty clay and PEAT exhibiting organic odours towards the central western side of the proposed development.

2.4 Hydrogeology and Perched Water

Groundwater within the drift deposits are classified Unproductive Strata, while the underlying bedrock formations are classified as a Secondary A Aquifer.

Based on the topographical setting, the direction of groundwater flow is inferred to be towards the southeast and, to a lesser degree, to the northeast (IFA 2013).

Previous investigations did not encounter regional groundwater, while perched waters were at depths typically between 0.5 m and 3.5 m bgl. These waters were found to reside in Made Ground and the within the marshland region and presumably perch on the underlying Till.

2.5 Landfills

IFA (2016) identified the presence of a landfill (Astbury Quarry/Dark Lane) approximately 500 m to the northeast of the site. The site was licensed to accept a range of wastes including inert, industrial, commercial, household and difficult waste from 1983. Based on the correspondence from Ms Angela Guy (Contaminated Land Officer) appended to the WYG report (2016), it understood the landfill is closed.

Given the landfills distance from the site, this landfill is considered to pose a ‘Low’ risk with respect to landfill gas.

2.6 Radon

The site is in a radon-affected area, where between 5% and 10% of dwellings are affected by radon above the action level. Therefore, 'Basic' radon protection measures are required in the construction of new buildings or extensions.

2.7 Scope of Intrusive Works Summary

Two main phases of ground gas investigation were undertaken at the site by Ian Farmer Associates. The works included:

- Installation of five (5) gas bores (BH02, BH04, BH05, WS01 and WS07) in November 2014 to depths between 3.5 m and 10 m bgl. These bores targeted PEAT and underlying bedrock.
- The IFA (2013) investigation monitored for permanent gases and screened for volatile compounds (via a photo-ionisation detector, or equivalent) on six occasions:
    - 28th November 2014;
    - 4th December 2014;
    - 15th December 2014;
    - 12th January 2015;
    - 26th January 2015;
    - 9th February 2015.

- Advancement and installation of a further eight (8) gas bores (BH101, BH102, BH103, BH104, BH105 and BH106) in October 2015 of which nested screens were installed at BH102 and BH105 (shallow and deep). These bores along with some of the gas bores installed in November 2014 were monitored for permanent gases and screened for volatile (via a photo-ionisation detector, or equivalent) on six occasions:
    - 12th November 2015;
    - 25th November 2015;
    - 9 December 2015;
    - 16 December 2015;
    - 6 January 2016;
    - 20 January 2016.

The laboratory analysis of ground gas was not undertaken. However this has not impact on the results of this assessment because the field monitoring results for gas concentrations are consistent with the source of gas.

Other intrusive works were completed by WYG (2016) and Terrain Geotechnical (2016). Although no active ground gas monitoring works were completed during these investigations, these two reports comprised valuable soil and groundwater (perched) data for the site, which included:

- the analysis of soils and groundwater for key potential volatile contaminants of concern including TPH, BTEX, naphthalene and other VOCs (including chlorinated compounds); and
- additional investigation locations with complementary bore logs detailing the presence or absence of any visual or olfactory contamination.

Ground gas and perched water bore locations are shown in the attached Figures 1 and 2. The findings of the chemical analysis of soils and groundwater are discussed in Section 2.9 below.

2.8 Ground Conditions

Gas bore logs applicable to this gas risk assessment are provided in Appendix A, while the locations are provided in Figure 1 and 2 attached.

For the purpose of this Gas Risk Assessment, ground conditions in the proximity of the proposed building footprint are critical and thus all of the data from exploratory holes completed at the site have been considered. All gas bores installed and monitored at the site have been used to assess ground gas conditions. The findings of relevant bores (i.e. gas bores) are summarised in Table 1 below.

Table 1. Summary of Ground Conditions

Hole ID	Ground Level (m AOD)	Made Ground	Bore Depth (m bgl)	Main Observations		Water Strike[1] (m bgl)
				Made Ground	Natural Ground	
BH02	-	GL to 5.5m	10.0	Sandy, gravelly CLAY – reworked. Occasional rootlets	Coarse gravelly SAND	NR
BH04	-	GL to 5.5m	13.45	Sandy, gravelly CLAY – reworked. Slight sulphur odour	5.5-9.5 bgl: spongy, dark brown/black pseudo-fibrous PEAT and black very organic clayey SILT. Gravelly CLAY underlying	NR
BH05	-	GL to 5.3m	10.0	Sandy, gravelly CLAY – reworked.	5.3-8.0m bgl: spongy, dark brown/black pseudo-fibrous PEAT and black very organic clayey SILT. Gravelly CLAY underlying	8.0

Hole ID	Ground Level (m AOD)	Made Ground	Bore Depth (m bgl)	Main Observations		Water Strike[1] (m bgl)
				Made Ground	Natural Ground	
WS01	-	GL to 2.5m	5.45	Sandy, slightly gravelly CLAY with occasional rootlets – reworked.	2.5-2.8m bgl: CLAY with occasional organic matter. Gravelly CLAY underlying with occasional sand lenses.	4.0
WS07	-	GL to 2.5m	5.45	Sandy, slightly gravelly CLAY with occasional rootlets – reworked.	2.5-3.5m bgl: plastic dark brown, clayey amorphous and fibrous PEAT with occasional fragments of wood. Gravelly CLAY underlying.	NR
BH101	95.2	GL to 0.9m	24.08	Limestone and brick.	Gravelly CLAY.	NR
BH102	95.2	GL to 0.8m	24.5	SAND and GRAVEL.	0.8-4.8m bgl: gravelly CLAY. 4.8-16.8m bgl: SAND 16.8-24.5m bgl: gravelly CLAY	NR
BH103	95.2	GL to 3.5m	25	SAND and GRAVEL, occasional CLAY.	3.5-8.9m bgl: gravelly CLAY. 8.9-19.1m bgl: SAND 19.1-20.1m bgl: gravelly CLAY 20.1-23.2: SAND 23.2-25m bgl: gravelly CLAY	NR
BH104	94.8	GL to 0.2m	19.2	Gravelly CLAY, occasional brick.	0.2-5.0m bgl: gravelly CLAY. 5.0-17.9m bgl: SAND and sandy SILT 17.9-19.2m bgl: gravelly CLAY	NR
BH105	95.0	GL to 0.4m	20.0	Topsoil only.	0.4-7.4m bgl: gravelly CLAY. 7.4-16.5m bgl: SAND, occasionally gravelly. 16.5-19.8m bgl: gravelly CLAY	NR
BH106	95.7	GL to 0.1m	6.0	Topsoil only	0.5-2.7m bgl: gravelly CLAY. 2.7-6.0 m bgl: SAND tending fine to coarse GRAVEL.	NR

Notes:

GL ground level

MG made ground

NG natural ground

1 Water strike during bore hole advancement.

Ground conditions across the site are summarised below.

Generally ground conditions encompass a layer of Made Ground comprising predominantly re-worked materials (silty gravelly SAND with occasional brick and rootlets). This Made Ground has been reported to extend to depths of up to 5.5 m bgl both under the proposed building and

to the east of the building. There has been no evidence of large volumes of undegraded organic material such as fresh domestic refuse.

Peat is typically present beneath the Made Ground located in the vicinity of the marshland (see Figure 1), comprising spongy dark brown/black pseudo-fibrous, fibrous, amorphous PEAT with occasional wood fragments or dark brown grey black slightly sandy clayey SILT with occasional organic matter. The thickness of the PEAT has been found to range between 1 m and 4 m in the marshland region, while narrow bands were also identified in the central western side of the proposed development.

Beneath the Made Ground or PEAT, CLAY is typically present (i.e. Glacial Till). This material is typically described as stiff grey, brown silty/sandy gravelly (fine to coarse) CLAY with sandstone, mudstone and siltstone. This CLAY typically extends to depths between 0.5 m and 10 m bgl and is underlain by dense slightly gravelly orange brown SAND (fine to coarse) (i.e. Salop Formation) tending to CLAY at depths greater than 17.5 m bgl.

Water strikes during the intrusive works were typically recorded between 0.5 m and 3.5 m within the Made Ground on the eastern side of the proposed building and in the marshland area, however water was not always encountered suggesting there is discontinuous perched water within the Made Ground. A region of perched water was also encountered at WS101 to WS103 (refer to Figure 2 attached) beneath the central western side of the proposed development.

Regional groundwater did not appear to be intercepted at the maximum bore screen depth of 17 m bgl.

2.9 Contamination

Laboratory soil testing was completed during both investigations completed by IFA (2013 and 2016) and WYG (2016). The analytical schedule consisted of a metals screen, TPH, BTEX, PAH, cyanide, pH, SOM, asbestos, soluble sulphate, phenols and a general VOC screen which included PCE, TCE, DCE and vinyl chloride. The concentrations of all soil contaminants were below the commercial land use soil criteria adopted by IFA (2016).

Marginally elevated adsorbed concentrations of petroleum hydrocarbons, PAH, and chlorinated compounds were reported during the previous investigations mentioned above, summarised as follows:

TPH impacts (central western area – refer to Figure 2 attached)

- WS103: TPH aliphatics: - 0.8 mg/kg, O-xylene – 0.005 mg/kg and Ethylbenzene – 0.008 mg/kg.

- WS101: Toluene – 0.005 mg/kg.

PAH and Chlorinated impacts (northern and southern area – refer to Figure 2 attached)

- HDP101: 1,1,1-TCA – 0.012 mg/kg, TCE - 0.021 mg/kg, 2-methylnaphthalene – 0.056 mg/kg, naphthalene – 0.044 mg/kg, phenanthrene – 0.091 mg/kg and dibenzofuran – 0.054 mg/kg.

- HDP103: 1,1,1-TCA – 0.016 ug/kg.

The concentrations of all soil contaminants were below the commercial land use soil criteria adopted by IFA (2016) and WYG (2016). Thus VOC vapour ingress to buildings is not of concern.

Four groundwater samples were collected around the zone of TPH impacted soils and perched water. PLT02, WS101, WS102 and WS103 (refer to attached Figure 2 for location) were sampled on one occasion after an oily sheen and hydrocarbon odour were observed during field works completed by IFA. IFA have suggested the presence of oily water is localised at 0.6 m bgl, and most likely perched on top of the CLAY encountered beneath the Made Ground. Further it is suggested by IFA that the hydrocarbon impacts are localised potentially from leaking petrol/oil interceptors or car park drainage. The additional perched water sampling completed by WYG at WS101 to WS103 partly assisted to delineate the TPH impacts and certainly did not suggest gross contamination.

PLT02 was analysed for metals, TPH and PAH, while WS101 to WS103 were tested for PAH, TPH, VOCs and phthalates. It is inferred that WS104 was advanced to delineate the chlorinated soil impacts identified in the north of the site, however no significant moisture was observed and therefore a standpipe was not installed. Detectable concentrations of TPH mainly >C16 were reported in the perched water at the site, as summarised:

- Aliphatic C10-C12: up to 230 μg/l;
- Aliphatic C12-C16: up to 660 μg/l;
- Aliphatic C16-C21: up to 680 μg/l;
- Aliphatic C21-C35: up to 15,000 μg/l;
- Aromatic C10-C12: up to 15 μg/l;

- Aromatic C12-C16: up to 64 μg/l;
- Aromatic C16-C21: up to 320 μg/l;
- Aromatic C21-C35: up to 6,400 μg/l;
- Bis(2-ethylhexyl) phthalate: up to 7 ug/l;
- Di-n-butyl phthalate; up to 2.4 ug/l;
- Diethyl phthalate; up to 10 ug/l; and
- Dimethyl phthalate; up to 9 ug/l.

The concentration gradient between PLT02 and WS101-WS103 decreased from the west to the east (i.e. all TPH concentrations were higher at PLT02). As shown above the TPH speciation is not typical of volatile petroleum mixture with very minor reported concentrations of TPH C10-C12. The TPH concentrations were below the groundwater vapour-specific Generic Assessment Criteria (GAC) developed by The Society of Brownfield Risk Assessment (Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater (Version 1, February 2017).

With the exception of the hydrocarbon sheen at PLT02, no other samples exhibited staining. Hydrocarbon odours were observed at PLT02, while strong sweet odours were observed at HDP101 (0.18 m and 0.43 m bgl) and slight chemicals odours at WS101 at 0.2 m to 0.62 m bgl.

In summary, the results of the soil and groundwater testing indicates the contamination in the central western region of the site is of a non-volatile nature (heavy TPH and PAHs) and is mixed across Made Ground and intermittent perched water, while there also appears to be minor sporadic PAH impacts within the Made Ground as well as some marginal levels of TCE and 1,1,1-TCA within the Made Ground. However, the investigations completed by others at the site have not suggested any widespread volatile contamination at concentrations above the adopted soil and groundwater commercial land use criteria. Thus VOC vapour ingress to the buildings is not relevant and specific protection measures are not required in this respect.

3. GROUND GAS

3.1 Gas monitoring

Gas monitoring was completed by IFA at the end of 2014/start of 2015 and again at the end of 2015/start of 2016, copies of which are presented in Appendix B. A summary of the materials targeted by the gas monitoring standpipes is presented in Table 2.

Table 2. Summary of Gas Monitoring Standpipes

Hole ID	Made Ground	Organic Material	Standpipe Installation	Water Levels
BRD (2012)				
BH02	GL to 5.5m	-	Slotted standpipe 6m to 10m, targeting SAND	Water at top of screened interval on one occasion (4/12/14) and submerged on 25/11/15.
BH04	GL to 5.5m	Spongy pseudo-fibrous PEAT and black very organic clayey SILT.	Slotted standpipe 6m to 9m, targeting PEAT	**Gas valve was water logged during all monitoring events.**
BH05	GL to 5.3m	Spongy pseudo-fibrous PEAT and black very organic clayey SILT.	Slotted standpipe 5m to 10m, targeting PEAT and bedrock	**Screen submerged during all monitoring events.**
WS01	GL to 2.5m	-	Unknown	Cannot determine
WS07	GL to 2.5m	Plastic dark brown, clayey amorphous and fibrous PEAT with occasional fragments of wood.	Slotted standpipe 2.5m to 3.5m, targeting PEAT	**Borderline submerged screen during all monitoring events.**
BH101	GL to 0.9m	-	Slotted standpipe 7.5m to 17m, targeting CLAY	Bore dry or measured below the top of screen during all monitoring events.
BH102(S)	GL to 0.8m	-	Slotted standpipe 0.4m to 0.8m, targeting MG comprising sandstone and coal (reworked)	
BH102(D)		-	Slotted standpipe 5m to 7m, targeting SAND	
BH103	GL to 3.5m	-	Slotted standpipe 1.5m to 8m, targeting MG and CLAY	
BH104	GL to 0.2m	-	Slotted standpipe 1m to 4m, targeting CLAY	
BH105(S)	GL to 0.4m	-	Slotted standpipe 0.2m to 4m, targeting MG.	
BH105(D)		-	Slotted standpipe 8m to 13m, targeting dense SAND	
BH106	GL to 0.1m	-	Slotted standpipe 3.0m to 6.0m, targeting SAND and GRAVEL	

Notes:

Standpipe screen installed across PEAT.

As demonstrated in Table 2, the slotted section of the standpipes were exposed (in part) to unsaturated ground conditions, except for, BH04 and BH05 during all monitoring events, WS07 which was very close to be being submerged during all monitoring events, and BH0 which was either dry, submerged or very close to being submerged depending on the season. The gas bores in question here were installed outside of the present buildings footprint and in or adjacent to the marshland. Gas monitoring data from flooded wells should be used with caution however, it is accepted that given the shallow water levels within the Made Ground and PEAT across presently unpaved parts of the site, it is unlikely that the situation could have been avoided.

The standpipe construction and seals appeared to be suitable for the monitoring of ground gas. Further, the gas monitoring data did not suggest atmospheric leakage.

A total of six to twelve monitoring visits were completed between the end of 2014 and beginning of 2016, as summarised in Table 3. Water logged valves prevented some of the monitoring on occasion. Monitoring details are summarised in the tabulated gas results provided in Appendix C.

Table 3. Summary of Gas Monitoring Events

Date	Atmospheric Pressure (mb)	Pressure Trend
28-Nov-14	994	Falling
04-Dec-14	1012	Falling
15-Dec-14	1002	Slightly rising
12-Jan-15	995	Falling to stable
26-Jan-15	1016	Stable
09-Feb-15	1028	Gradually falling
12-Nov-15	1012	Falling
25-Nov-15	1002	Gradually rising
09-Dec-15	1015	Falling
16-Dec-15	1005	Stable to rising
06-Jan-16	970	Slightly falling
20-Jan-16	1007	Stable

Atmospheric pressures during the monitoring events varied between 970mb and 1028mb, including periods of falling, steady and rising pressure trends, as summarised in Table above.

All monitoring rounds were completed by IFA (2013 and 2016) and were generally completed 1-2 weeks apart over a two month period at the end of 2014/start of 2015 and then again a two month period at the end of 2015/start of 2016.

In summary, the majority of the gas monitoring data is considered to span an appropriate range of temporal conditions consistent with the requirements of BS8576:2013 – Guidance on Investigations for Ground Gas, Permanent Gases and Volatile Organic Compounds.

3.2 Gas monitoring results

EPG have summarised the gas monitoring records provided by IFA (2013 and 20146). The results and observations are presented in Appendix C. Field records are provided in Appendix B. The results of the methane, carbon dioxide, oxygen and borehole flow monitoring data are summarised in Figure 3 to 6 below.

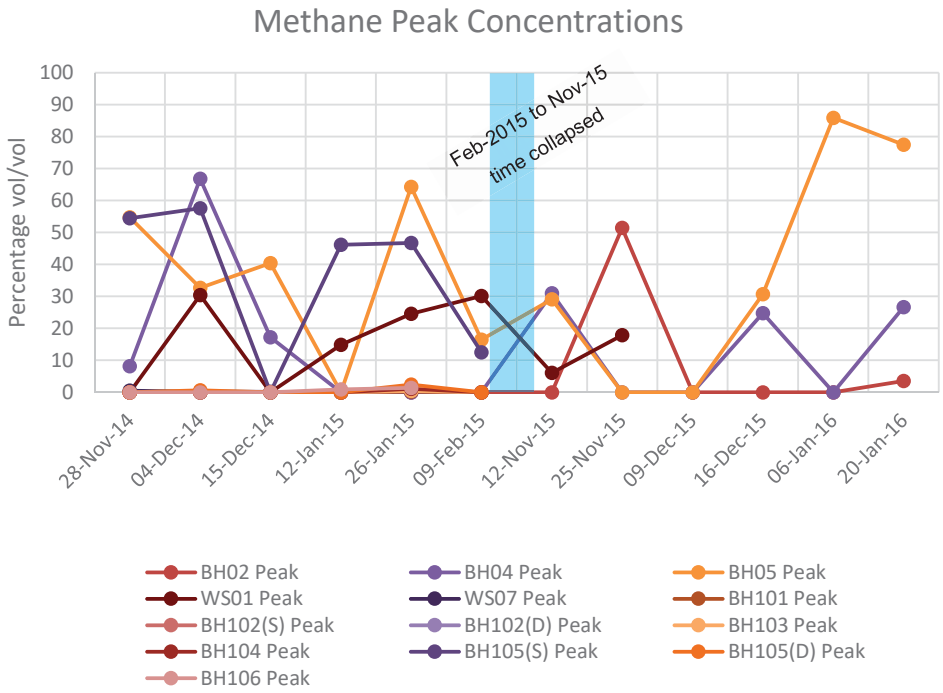


Figure 3. Peak Methane Readings

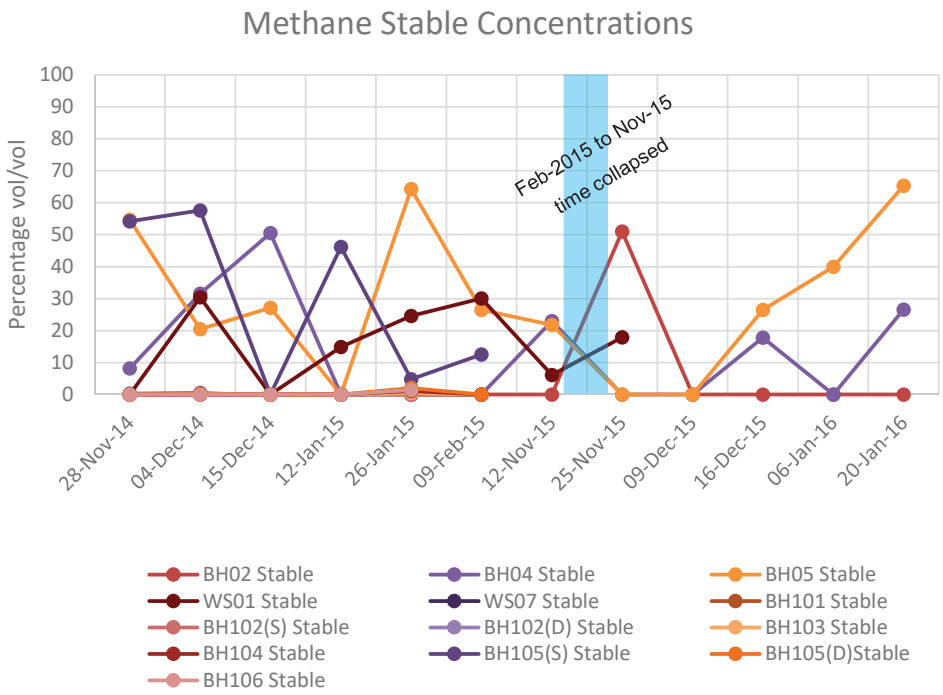


Figure 4. Stable Methane Readings

For initial screening purposes 1%v/v has been adopted for screening of methane concentrations. Methane concentrations above this screening level were recorded at several gas bores including those predominantly within or in the immediate vicinity of the marshland, as shown in the attached Figure 1 (BH04, BH05, WS01 and BH105 (S)). The concentrations of methane in this region of the site generally ranged between 20% v/v and 40% v/v, however were detected as low as 6.1% v/v (WS01) and as high as 85.9% v/v (peak) at BH05 which was, screened across PEAT.

A general declining concentrations was evident moving from the marshland region towards the proposed building, which will be located in the southwestern side of the site, with maximum of 0.6% v/v methane reported across the western region of proposed building (based on BH101, BH102 and BH103 – refer to Figure 2).

Evidence of methane oxidation was also seen at BH103 located in the central area of the proposed building, where concentrations of methane, carbon dioxide and oxygen were reported at 0.0%, 7.0% and 6.6%v/v, respectively, on 20 January 2016.

Deeper gas bores screened across the underlying CLAY reported methane concentrations up to 2.4% v/v with the highest concentrations being reported in BH105(D), located closest to the marshland region.

In general, whether elevated or not the gas bores showed relatively consistent levels of methane. The exception to this was at BH02 where methane concentrations were all measured equal to or below 3.5% v/v apart from on one occasion (25 November 2015) where 51.4% v/v was reported.

The distribution of methane was typically seen to be radial, generally highest near the former marshland containing 1 m to 4 m of black spongy PEAT with occasional wood fragments and organic matter. Based on the observed methane distribution, the source of methane is considered to be from residual ground gas from the organic materials within the peat.

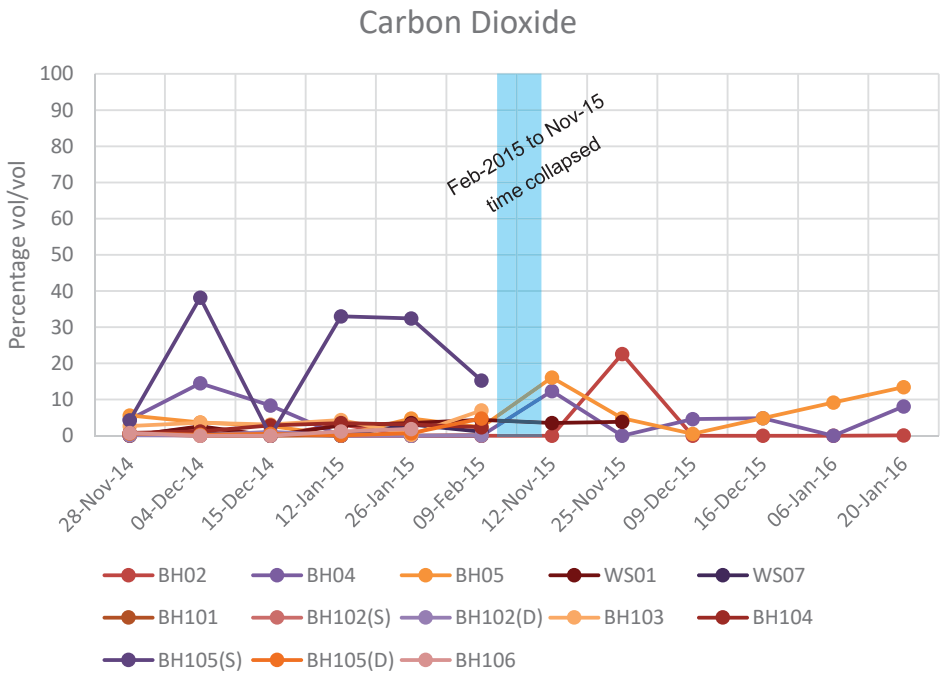


Figure 5. Stable Carbon Dioxide Readings

For initial screening purposes 5%v/v has been adopted for screening of carbon dioxide concentrations. This screening level was exceeded at five locations and coincided with the presence of elevated methane, being predominantly in the marshland area. Peak concentrations were measured at gas bore BH105 (S) at 38.2% v/v.

Methane to carbon dioxide ratios were generally 3:1, however were as high as 10:1 suggesting dissolution of carbon dioxide may be occurring potentially due to the perched waters located within the reworked materials identified in the marshland region and towards the eastern side of the proposed building. This is typical of gas monitoring results in Peat.

Deeper gas monitoring bores screened across the CLAY or dense SAND reported concentrations of carbon dioxide up to 3.5% v/v (BH104). The exception to this was the one instance at BH02 (as per the anomalous methane results) where 22.6% v/v was reported.

Inclusions of organic material within the peat are considered likely to be the source of the carbon dioxide.

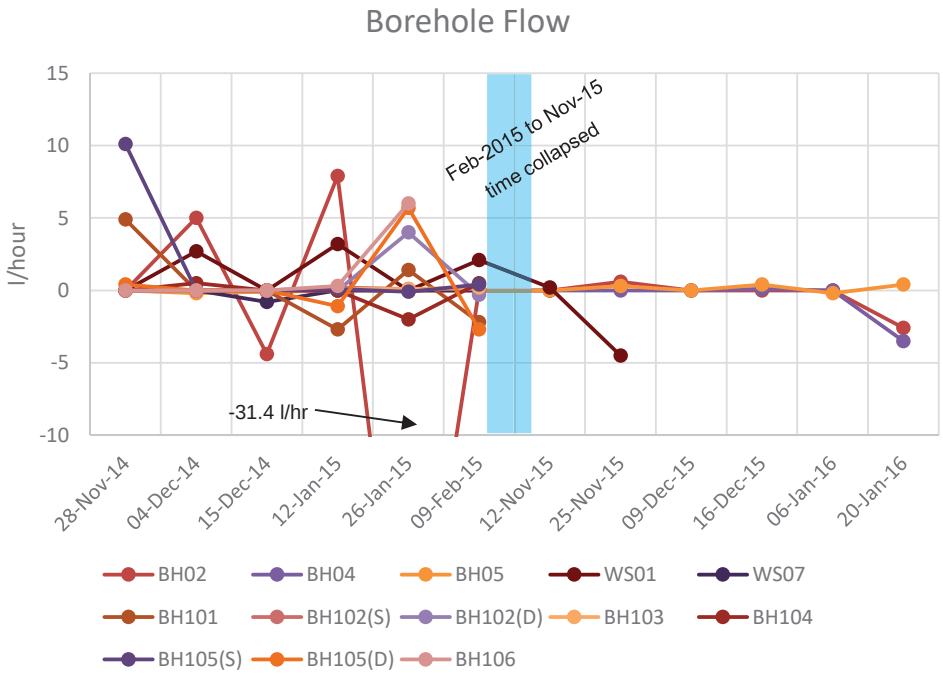


Figure 6. Stable Borehole Flow Rates

Borehole flow rates measured in gas bores targeting natural ground (i.e. CLAY and/or SAND) were generally measured on either of two dates (12 November 2015 or 6 January 2016) and coincided with falling and slightly falling barometric pressures with a peak of **+6.0 l/hour recorded at BH106**. The main exception to this was at BH02 where a peak borehole flow of -31.4 l/hour was measured during a relatively stable barometric pressure on 26 January 2015. Flow rates measured at this bore otherwise ranged between **-4.4 l/hour and 7.9 l/hour**. Flows of this magnitude (i.e. >7.9 l/hour) were not measured at any other time across the site. During

this monitoring event, BH05 also recorded an initial flow of -31.6 l/hour, however the field record then states the flow dropped to 0.0 l/hour (see Appendix B). Based on this examination, it is possible the flow at BH02 also returned to 0.0 l/hour stable, but was not recorded on the field record. Further, the negative pressure readings initially measured may have been a result of residual gas pressure from the previous monitoring round (where atmospheric pressures were much higher). In any case, the anomalous result is not believed to be representative and will not be used in the following sections.

Unlike the standpipes which targeted natural ground (i.e. Glacial Till and SAND), the gas bores screened across the Made Ground and PEAT (where the elevated ground gas was measured) did not show an overriding or consistent trend in borehole flow. Borehole flow rates ranged between +10.1 l/hour stable and -4.5 l/hour stable. All of these gas bore screens were completely or partially submerged by perched water, which fluctuated by as much as 0.6 m and 1.0 m during the gas investigation. Any change in the perched water level will have a significant influence on the flow/pressure measured within the headspace of the gas bore, particularly where there is a small section of solid pipe, as was the case where +10.1 l/hour was measured at BH105(S) which had just 0.2 m of solid pipe. In summary, the increased flow rates are likely to be a direct response to the water fluctuations (known as the piston effect), it is not indicative of increased gas pressure in the ground and thus an increased gas risk. This position is consistent with CL:AIRE guidance note RB17 – A Pragmatic Approach to Ground Gas Risk Assessment (2012).

Excluding any borehole flow data collected where the piston effect and/or bore screen submergence was suspected, borehole flow rates within Made Ground and the PEAT were in the range of **0.0 to +0.3 l/hour** (based on BH102(S), BH103 and BH05 when dry). The low flow rates indicate that any gas being generated is under a very low pressure and that the dominant flow mechanism for the gas is likely to be via diffusion (i.e. not pressure driven, advective flow). This is consistent with the source of the gas being organic material predominantly located within the peat. Such material is not capable of generating large volumes of gas under pressure.

Typically oxygen concentrations ranged between 2.7% and 16.7% v/v within the peat (BH4 and BH5), while higher concentrations generally above 16% v/v were reported in the deeper bores screened across the underlying Till. Low oxygen levels were reported in shallow materials on the western boundary of the marshland region at WS01 and BH105(S), as low as 0.0% v/v.

Hydrogen sulphide and carbon monoxide were generally reported below the field instruments limit of detection during all gas monitoring events, except for an anomalous reading at BH106 (20 ppm) on the 16 December 2015.

Volatile compounds were reported at less than 0.1 ppm in the headspace of all gas bores, based on the field screening method (via a photo-ionisation detector).

4. CONCEPTUAL SITE MODEL

4.1 Sources

In summary, the source of the ground gas is organic material (comprising plant/woody fragments) primarily associated with the peat soils (1-4 m thick) underlying the Made Ground which extends to depths of 5.5 m bgl. Occasional rootlets mixed within the Made Ground may also be contributing to the gas situation.

Methane and carbon dioxide concentrations have been measured up to 85.9% and 38.2% v/v, respectively. This is consistent with what would be expected from the peat, which is a carbon-rich source.

The peat material borders the eastern boundary of the proposed building and extends to the east. The location of the peat identified via intrusive ground investigation works is consistent with historical site plans showing marshland in the centre of the site. Although there is insufficient information to be certain, based on the findings of the intrusive works (5.5 m of Made Ground above peat in the region where a marshland formerly existed) and the historical records (suggesting the industrial precinct was developed in the early 1980s), it is likely the bulk of the gassing source (marshland/peat) was removed during development of the industrial precinct in the early 1980s followed by backfilling with re-worked natural materials.

Any ground gas sourced from such materials within the Made Ground and/or the peat materials will not represent a risk of significant gas generation. Further, the majority of the peat is and associated ground gas is will be located to the northeast of the proposed building.

No remediation of the gas source is proposed during redevelopment. Therefore, the gas concentrations are unlikely to change from present. However, the peat (with wood fragments and organic matter) are not capable of generating large volumes of gas under pressure.

The site is in a radon-affected area, where between 5% and 10% of dwellings are affected by radon above the action level.

Minor concentrations of volatile organic compounds found within the Made Ground do not indicate a vapour intrusion risk under the proposed commercial land use. In any case, the gas mitigation strategy recommended in this report will be driven by the presence of methane and carbon dioxide and BRE requirements for the protection against radon.

4.2 Pathways

The principal mechanisms for gas migration are diffusion and pressure driven flow.

Gas migrating could potentially migrate into the proposed building via a number of ingress routes, primarily via:

- Cracks in the floor slab construction, albeit this is expected to be negligible given the proposed RC ground bearing and raft slab construction, which will be 150 mm to 300 mm thick and in some parts 360 mm thick; and/or
- Through the any construction gaps or joints in the lift core; and/or
- Through gaps around service penetrations which penetrate the floor slab construction.

On this site there is no evidence to suggest that large volumes of gas are present in the ground – if they were, higher flow rates than reported would be expected and the flows would be expected in a positive direction (not oscillating between negative and positive). To clarify, the gas monitoring standpipes provide an artificial 'sump' for the gas which will not be present as part of the proposed construction. Ultimately, the source of the gas (peat) will not be able to sustain any driving pressure for gas migration and the dominant mechanism for gas migration will be via diffusion flow and sporadically via barometric pumping (difference in air and ground pressure).

Credible flow rates of 0.3 l/hour and 7.9 l/hour have been measured in gas bores targeting the Made Ground and/or Peat, and natural Glacial Till, respectively.

Advection (pressure driven) flow of gas is typically considered to be of greater concern and thus will form the basis of EPG's risk assessment and recommendations.

4.3 Receptors

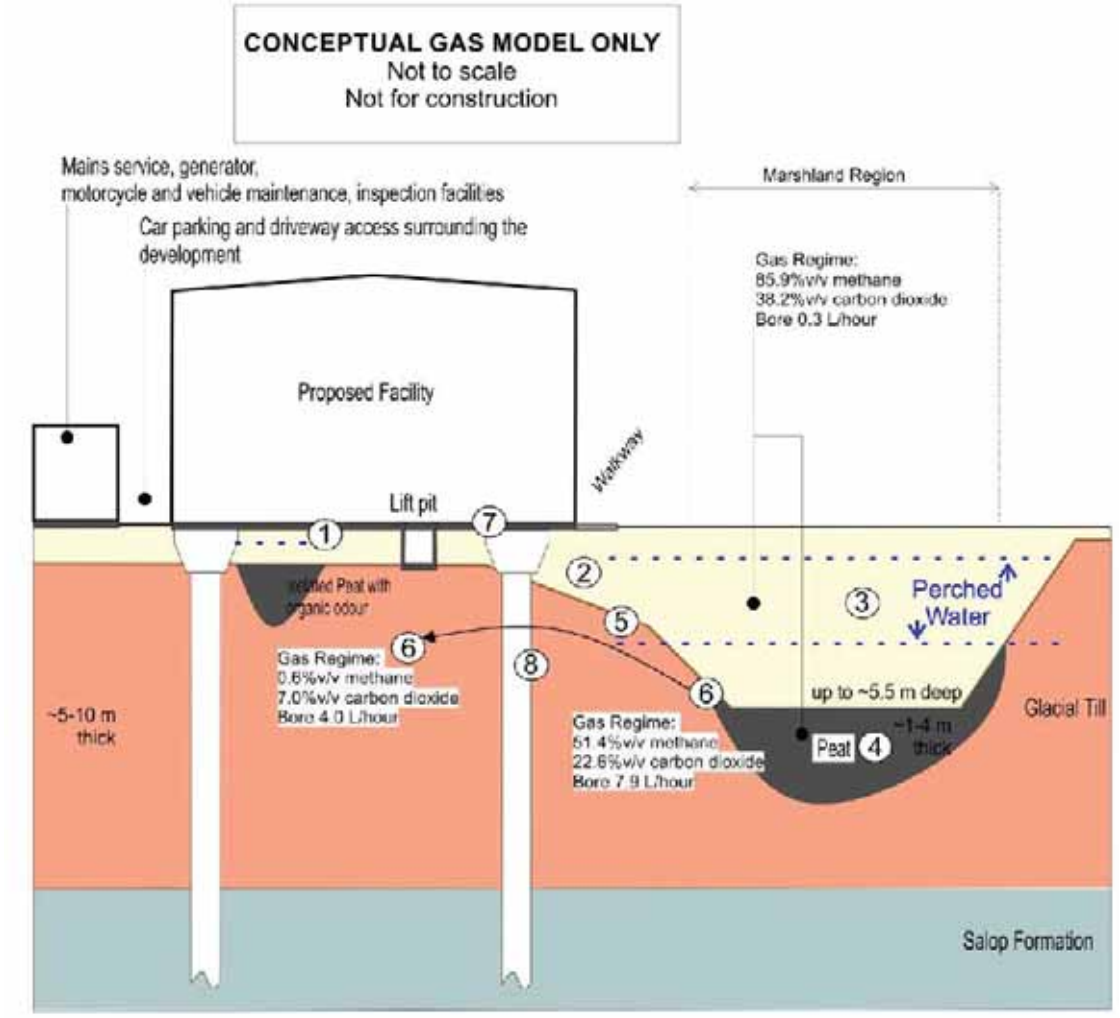
Receptors to ground gas primarily include construction workers, the building infrastructure itself and future users of the building, including staff, visitors and maintenance workers.

It is anticipated that risks to construction workers will be managed via the implementation of appropriate methods of working and the utilisation of all necessary Personnel Protective Equipment. On this basis, no further consideration of risks to this Receptor are required and the focus of this Gas Risk Assessment going forward will be risks to building infrastructure / future occupants.

4.4 Ground Model

Utilising the information summarised in Sections 1 to 4 a Ground Model for ground gas post completion of the proposed development is presented as Figure 7.

EPG notes, the CSM does not include any gas mitigations measures, which are proposed in this report (refer to later sections).



Key Points:

1. TPH >C12 and phthalate contamination at ~0.6 m below central western part of building across perched water table. Detectable concentration(s) of TCE (HDP101 - 21 ug/kg) and 1,1,1-TCA (HDP101 - 12 ug/kg & HDP103 - 16 ug/kg) in Made Ground but the results of soil and groundwater testing do not indicate a vapour intrusion risk.

2. Made Ground (containing silty gravelly SAND with occasional brick and rootlets).

3. Perched waters in Made Ground mostly outside of building footprint resulting in saturated soil conditions.

4. Alluvium/peat contains organic material (wood fragments and organic materials). Gas in peat historically generated and trapped or adsorbed in soil. Current generation rate is very low posing a 'Low' risk for on-site development (Local Authority Guide to Ground Gas, 2008).

5. Bore hole flows in Made Ground and Peat due to generation of gas, rather the shallow bore construction and perched water which fluctuates seasonally.

6. Oxidation of methane occurng as ground gas from Peat diffuses through Till.

7. 150 mm ground bearing RC slab and 300 mm raft slab.

8. Piles cast in-situ such that they will form an intimate skin friction with the cohesive soils and not provide a preferential pathway for gas migration.

Figure 7. Ground Gas Conceptual Site Model

5. GAS RISK ASSESSMENT

Typically ground gas risks are assessed using two generic frameworks as set out in CIRIA Report C665, Assessing Risk Posed by Hazardous Ground Gases to Buildings (2007):

- Modified Wilson and Card Classification; and/or
- NHBC Traffic Lights System.

Characterising a site using the rudimentary Gas Screening Value (GSV) approach may be summarised, as follows:

Made Ground and Peat

- Methane: 85.9%v/v
- Carbon Dioxide: 38.2%v/v
- Flow: 0.3l/hour
- $GSV_{Methane}$ = (85.9/100)*0.3 = 0.25l/hr (CS2).
- $GSV_{Carbon\ Dioxide}$ = (38.2/100)*0.3 = 0.12/hr (CS2)

Natural Ground

- Methane: 51.4%v/v
- Carbon Dioxide: 22.6%v/v
- Flow: 7.9l/hour
- $GSV_{Methane}$ = (51.4/100)*7.9 = 4.1l/hr (CS4).
- $GSV_{Carbon\ Dioxide}$ = (22.6/100)*7.9 = 1.8l/hr (CS3)

In accordance with BS8485:2015, the calculated GSV's result in a site classification of Characteristic Situation 4 (CS4).

5.1 Quantitative Risk Assessment Approach

BS8485:2015 (Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings) recognises that these generic frameworks are likely to result in an over-conservative assessment of ground gas risks and outlines a strategy for undertaking detailed quantitative risk assessment to allow a more pragmatic assessment of associated risks.

BS 8485:2015 recognises that the detailed quantitative risk assessment can override or augment the simplistic GSV approach.

Reflecting on the above, and consistent with BS8485:2015, EPG has undertaken a series of quantitative calculations to assess gas risk at the site. The modelling completed by EPG (presented in Appendix D) is consistent with the guidance set out in The Local Authority Guide to Ground Gas (Chartered Institute of Environmental Health, 2008) and includes calculations to determine the anticipated equilibrium concentrations which could accumulate within the new building proposed for construction.

5.2 Assessment of Risk to the Proposed Building

When considering risks associated with the Peat deposits (Alluvium) the worst-case scenario for any commercial building constructed on the site is that it is constructed directly on top of this gassing source.

The advection calculations are based on assessment of a small ground floor room (e.g. an office) and a small ground floor shed (e.g. maintenance or plant room) with an air exchange rate of 1 air change per hour (consistent with SR3). This assessment is conservative because:

- It assumes that the maximum methane concentration ever recorded on site (85.9%v/v) is present across the full extent of the proposed building at a constant concentration;
- It assumes the gas plume is shallow (~1m below the floor slab construction);
- It assumes there is no dilution and/or oxidation of the gas as it migrates through the overlying Made Ground; and
- It ignores the presence of any floor slab and/or DPM / gas membrane construction.

As discussed in Section 4, risks associated with Alluvium / Peat are considered to be low. This is demonstrated in EPG's quantitative calculations (see Appendix D), which indicate that assuming the maximum concentration of methane recorded in the Alluvium / Peat (85.9% v/v) is present in a shallow plume beneath the commercial property (~1m depth) the vertical migration rate will be **1.53E-05 $m^3/h/m^2$**, which equates to an equivalent borehole flow rate of **0.15 l/hour**.

The rate of vertical emission is limited by the permeability of the Alluvium itself, which is predominately cohesive. Within EPG's modelling a Peat permeability of 1E-07 m/s has been utilised. This is considered reasonable for a unit which, whilst variable, is typically described as comprising Amorphous Peat.

As outlined in SR3 (Updated Technical Background to the CLEA Model, Environment Agency, Ref. Science Report SC050021/SR3, 2009), assuming the driving force for gas migration is the stack effect inside the commercial building (5Pa) and default building dimensions / ventilation parameters this would equate to an equilibrium methane concentration within the property of 0.0006% v/v.

This equilibrium value is indicative of a CS1 site designation in accordance with BS8485:2015.

The estimate is extremely conservative as it assumes a shallow gas plume is present beneath the full footprint of the building (at 1m depth, when in reality the gas source is likely be 2-7 m below the proposed slab) and does not take into account the proposed floor slab construction of the building. In reality gas concentrations will be much lower than predicted because the RC floor slab will provide a barrier to gas migration. The concrete floor slab will reduce the estimated concentration by a factor of at least 100 so that predicted methane concentration inside the building will be negligible.

In conclusion, risks from ground gas in the Alluvium/Peat are considered to be Minimal, even in the worst-case, whereby the dwelling is physically constructed on the Alluvium / Peat.

6. MITIGATION RECOMMENDATIONS

With regard to the proposed building, EPG has demonstrated that anticipated equilibrium concentrations are unlikely to exceed 0.0006%v/v, which equates to Characteristic Situation 1 site in accordance with the Modified Wilson and Card Classification. In accordance with BS8485:2015 a Type C (managed commercial / public) building designated as CS1 does not require the incorporation of any gas protection measures.

The site is in a radon-affected area, where between 5% and 10% of dwellings are affected by radon above the action level. Therefore, 'Basic' radon protection measures are required at the development.

P.P. O'Connor Ltd have agreed that a proprietary gas resistant membrane will be incorporated within the floor slab construction of the proposed building. A nominal underfloor venting system will also be required to prevent gas becoming trapped below the floor slab.

The membrane should be specified in accordance with BS8485:2015 and installed in accordance with CIRIA Report C735, Good Practice on the Testing and Verification of Protection Systems for Buildings Against Hazardous Ground Gases.

In accordance with Annex 1, Table A2 of CIRIA Report C735 the membrane may be installed either by the Ground Worker for the scheme or by a Specialist Contractor. Regardless, the membrane installation should be subject to independent inspection by an independent verifier who should be able to demonstrate their competence, training and relevant experience.

If the membrane is installed by the Ground Worker the independent inspection should cover 100% of the membrane surface area. If the membrane is installed by a Specialist Contractor (at least one operative being qualified with an NVQ Level 2 in Gas Protection Installation) the regime of inspection may be reduced to 50% of the membrane surface area.

The inspection process should include a thorough visual inspection of the membrane. In the event of holes being detected during the membrane inspection process consideration should be given to extending the inspection regime to include dielectric testing (or similar).

All joints, pipe penetrations etc. of the membrane should be independently air lanced to ASTM D4437.

Notwithstanding, all service penetrations of the floor slab construction should be cast into the floor slab and sealed.

Further, construction joints should be sealed in the usual manner and any below ground elements (e.g. the lift core) should be constructed using a waterproof membrane and waterproof concrete system designed in accordance with BS8102: 2009.

On a purely precautionary basis it has been further agreed that P.P. O'Connor will install a nominal underfloor venting/pressure relief system beneath the proprietary membrane. No active ventilation is required beneath the floor slab construction of the proposed building. It is considered that nominal venting/pressure relief will allow release of any small quantities of gas from below the building.

With regard to the proposed passive venting/pressure relief system, EPG recommends that the venting should comprise 450 mm wide venting strips (25mm geocomposite) at nominal 5m centres located below the gas membrane at the top of the existing sub-base. The vents should run parallel to the short side of the building and should be connected to ground level vent boxes or similar at each end (to give a vent area at each end of 18,000mm^2), including the use of maximum methane concentrations and maximum credible flow rates. Detailed design drawings for the system are to be prepared by Juta Limited.

The vent layer should also be installed and verified in accordance with the guidance BS8485:2015 and CIRIA Report C735.

7. CONCLUSIONS AND RECOMMENDATIONS

In summary, the site has a low gas generation potential. There are elevated concentrations of methane and carbon dioxide in the ground attributed to the organic material contained within the underlying Alluvium/Peat but there is no evidence of large-scale pressure driven (advective) flow. Importantly, there is no evidence of material that could drive gas out of the ground in large volumes.

Utilising the results from the advection modelling the site would be classified as CS1 in accordance with BS8485:2015, i.e. requiring no specific gas protection measures. Basic protection measures are however required given the site falls within a radon affected area.

To be clear risks posed by methane and carbon dioxide to the proposed main building, proposed small buildings and car parking are Minimal.

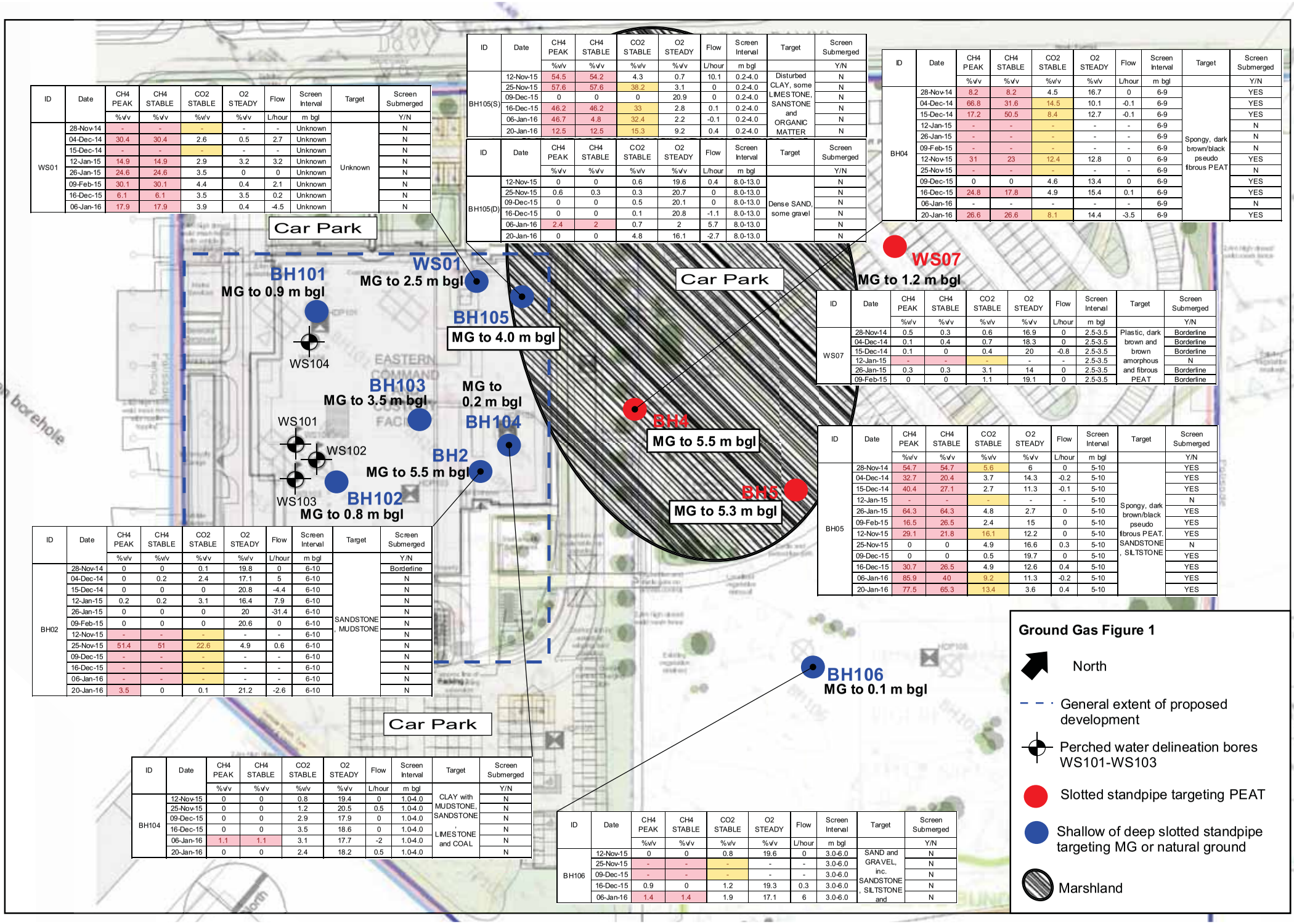
Notwithstanding the above, P.P. O'Connor Ltd have agreed that a proprietary gas resistant membrane and passive venting/pressure relief system will be incorporated within the floor slab construction of the proposed building. The proprietary membrane and venting system should be installed beneath all enclosed structures at the site.

The membrane and venting system should be specified in accordance with BS8485:2015 and installed in accordance with CIRIA Report C735, Good Practice on the Testing and Verification of Protection Systems for Buildings Against Hazardous Ground Gases. All recommendations in Section 6 above should be followed.

A copy of this report should be provided to the Local Contaminated Land Officer for comment and approval.

FIGURES

 © EPG LTD



ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
WS01	28-Nov-14	-	-	-	-	-	Unknown	Unknown	N
	04-Dec-14	30.4	30.4	2.6	0.5	2.7	Unknown		N
	15-Dec-14	-	-	-	-	-	Unknown		N
	12-Jan-15	14.9	14.9	2.9	3.2	3.2	Unknown		N
	26-Jan-15	24.6	24.6	3.5	0	0	Unknown		N
	09-Feb-15	30.1	30.1	4.4	0.4	2.1	Unknown		N
	16-Dec-15	6.1	6.1	3.5	3.5	0.2	Unknown		N
	06-Jan-16	17.9	17.9	3.9	0.4	-4.5	Unknown		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH105(S)	12-Nov-15	54.5	54.2	4.3	0.7	10.1	0.2-4.0	Disturbed CLAY, some LIMESTONE, SANSTONE and ORGANIC MATTER	N
	25-Nov-15	57.6	57.6	38.2	3.1	0	0.2-4.0		N
	09-Dec-15	0	0	0	20.9	0	0.2-4.0		N
	16-Dec-15	46.2	46.2	33	2.8	0.1	0.2-4.0		N
	06-Jan-16	46.7	4.8	32.4	2.2	-0.1	0.2-4.0		N
	20-Jan-16	12.5	12.5	15.3	9.2	0.4	0.2-4.0		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH105(D)	12-Nov-15	0	0	0.6	19.6	0.4	8.0-13.0	Dense SAND, some gravel	N
	25-Nov-15	0.6	0.3	0.3	20.7	0	8.0-13.0		N
	09-Dec-15	0	0	0.5	20.1	0	8.0-13.0		N
	16-Dec-15	0	0	0.1	20.8	-1.1	8.0-13.0		N
	06-Jan-16	2.4	2	0.7	2	5.7	8.0-13.0		N
	20-Jan-16	0	0	4.8	16.1	-2.7	8.0-13.0		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH04	28-Nov-14	8.2	8.2	4.5	16.7	0	6-9	Spongy, dark brown/black pseudo fibrous PEAT	YES
	04-Dec-14	66.8	31.6	14.5	10.1	-0.1	6-9		YES
	15-Dec-14	17.2	50.5	8.4	12.7	-0.1	6-9		YES
	12-Jan-15	-	-	-	-	-	6-9		N
	26-Jan-15	-	-	-	-	-	6-9		N
	09-Feb-15	-	-	-	-	-	6-9		N
	12-Nov-15	31	23	12.4	12.8	0	6-9		YES
	25-Nov-15	-	-	-	-	-	6-9		N
	09-Dec-15	0	0	4.6	13.4	0	6-9		YES
	16-Dec-15	24.8	17.8	4.9	15.4	0.1	6-9		YES
	06-Jan-16	-	-	-	-	-	6-9		N
	20-Jan-16	26.6	26.6	8.1	14.4	-3.5	6-9		YES

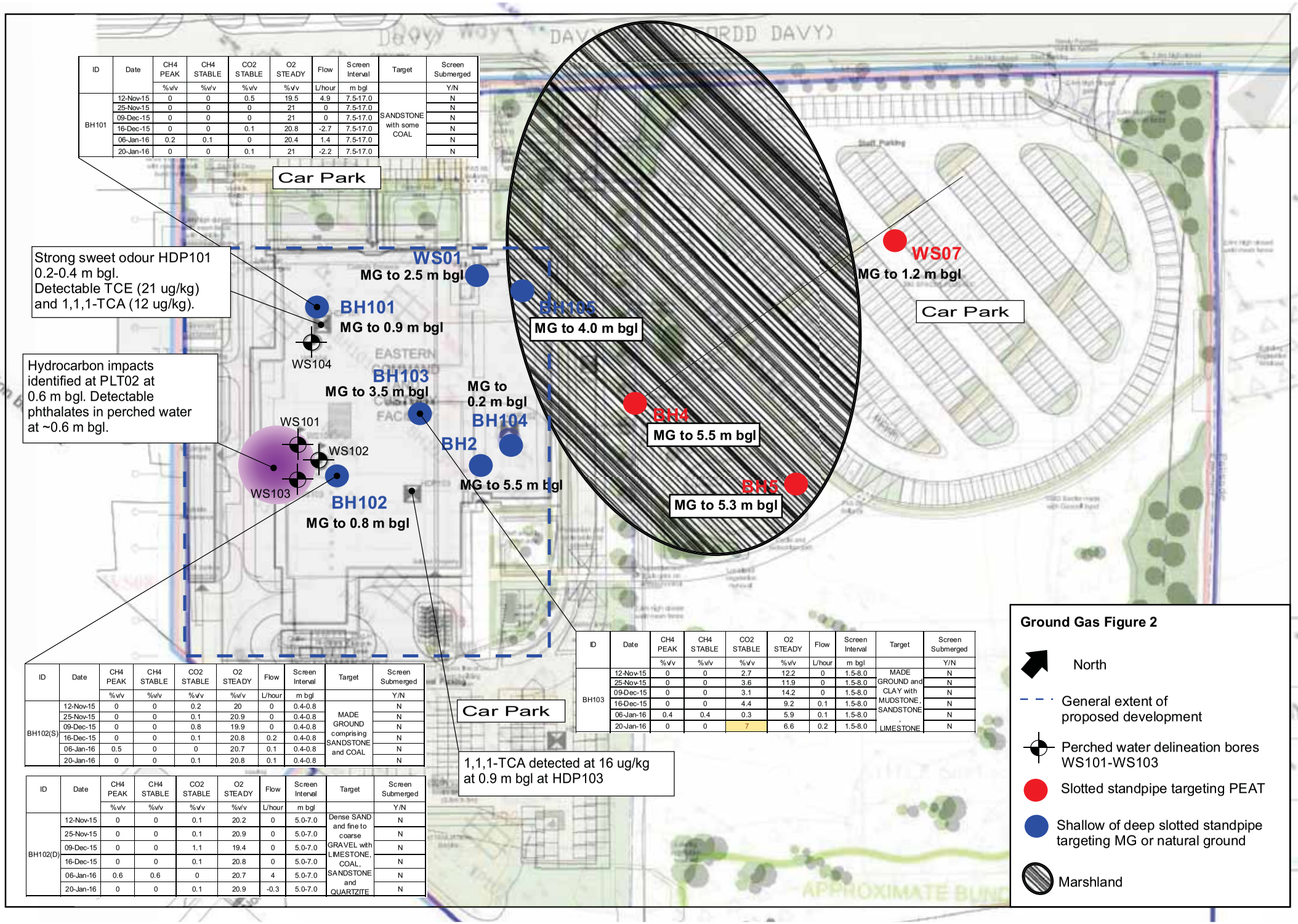
ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
WS07	28-Nov-14	0.5	0.3	0.6	16.9	0	2.5-3.5	Plastic, dark brown and brown amorphous and fibrous PEAT	Borderline
	04-Dec-14	0.1	0.4	0.7	18.3	0	2.5-3.5		Borderline
	15-Dec-14	0.1	0	0.4	20	-0.8	2.5-3.5		Borderline
	12-Jan-15	-	-	-	-	-	2.5-3.5		N
	26-Jan-15	0.3	0.3	3.1	14	0	2.5-3.5		Borderline
	09-Feb-15	0	0	1.1	19.1	0	2.5-3.5		Borderline

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH05	28-Nov-14	54.7	54.7	5.6	6	0	5-10	Spongy, dark brown/black pseudo fibrous PEAT, SANDSTONE , SILTSTONE	YES
	04-Dec-14	32.7	20.4	3.7	14.3	-0.2	5-10		YES
	15-Dec-14	40.4	27.1	2.7	11.3	-0.1	5-10		YES
	12-Jan-15	-	-	-	-	-	5-10		N
	26-Jan-15	64.3	64.3	4.8	2.7	0	5-10		YES
	09-Feb-15	16.5	26.5	2.4	15	0	5-10		YES
	12-Nov-15	29.1	21.8	16.1	12.2	0	5-10		YES
	25-Nov-15	0	0	4.9	16.6	0.3	5-10		N
	09-Dec-15	0	0	0.5	19.7	0	5-10		YES
	16-Dec-15	30.7	26.5	4.9	12.6	0.4	5-10		YES
	06-Jan-16	85.9	40	9.2	11.3	-0.2	5-10		YES
	20-Jan-16	77.5	65.3	13.4	3.6	0.4	5-10		YES

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH02	28-Nov-14	0	0	0.1	19.8	0	6-10	SANDSTONE , MUDSTONE	Borderline
	04-Dec-14	0	0.2	2.4	17.1	5	6-10		N
	15-Dec-14	0	0	0	20.8	-4.4	6-10		N
	12-Jan-15	0.2	0.2	3.1	16.4	7.9	6-10		N
	26-Jan-15	0	0	0	20	-31.4	6-10		N
	09-Feb-15	0	0	0	20.6	0	6-10		N
	12-Nov-15	-	-	-	-	-	6-10		N
	25-Nov-15	51.4	51	22.6	4.9	0.6	6-10		N
	09-Dec-15	-	-	-	-	-	6-10		N
	16-Dec-15	-	-	-	-	-	6-10		N
	06-Jan-16	-	-	-	-	-	6-10		N
	20-Jan-16	3.5	0	0.1	21.2	-2.6	6-10		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH104	12-Nov-15	0	0	0.8	19.4	0	1.0-4.0	CLAY with MUDSTONE, SANDSTONE , LIMESTONE and COAL	N
	25-Nov-15	0	0	1.2	20.5	0.5	1.0-4.0		N
	09-Dec-15	0	0	2.9	17.9	0	1.0-4.0		N
	16-Dec-15	0	0	3.5	18.6	0	1.0-4.0		N
	06-Jan-16	1.1	1.1	3.1	17.7	-2	1.0-4.0		N
	20-Jan-16	0	0	2.4	18.2	0.5	1.0-4.0		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH106	12-Nov-15	0	0	0.8	19.6	0	3.0-6.0	SAND and GRAVEL, inc. SANDSTONE , SILTSTONE and	N
	25-Nov-15	-	-	-	-	-	3.0-6.0		N
	09-Dec-15	-	-	-	-	-	3.0-6.0		N
	16-Dec-15	0.9	0	1.2	19.3	0.3	3.0-6.0		N
	06-Jan-16	1.4	1.4	1.9	17.1	6	3.0-6.0		N



ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH101	12-Nov-15	0	0	0.5	19.5	4.9	7.5-17.0	SANDSTONE with some COAL	N
	25-Nov-15	0	0	0	21	0	7.5-17.0		N
	09-Dec-15	0	0	0	21	0	7.5-17.0		N
	16-Dec-15	0	0	0.1	20.8	-2.7	7.5-17.0		N
	06-Jan-16	0.2	0.1	0	20.4	1.4	7.5-17.0		N
	20-Jan-16	0	0	0.1	21	-2.2	7.5-17.0		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH102(S)	12-Nov-15	0	0	0.2	20	0	0.4-0.8	MADE GROUND comprising SANDSTONE and COAL	N
	25-Nov-15	0	0	0.1	20.9	0	0.4-0.8		N
	09-Dec-15	0	0	0.8	19.9	0	0.4-0.8		N
	16-Dec-15	0	0	0.1	20.8	0.2	0.4-0.8		N
	06-Jan-16	0.5	0	0	20.7	0.1	0.4-0.8		N
	20-Jan-16	0	0	0.1	20.8	0.1	0.4-0.8		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH102(D)	12-Nov-15	0	0	0.1	20.2	0	5.0-7.0	Dense SAND and fine to coarse GRAVEL with LIMESTONE, COAL, SANDSTONE and QUARTZITE	N
	25-Nov-15	0	0	0.1	20.9	0	5.0-7.0		N
	09-Dec-15	0	0	1.1	19.4	0	5.0-7.0		N
	16-Dec-15	0	0	0.1	20.8	0	5.0-7.0		N
	06-Jan-16	0.6	0.6	0	20.7	4	5.0-7.0		N
	20-Jan-16	0	0	0.1	20.9	-0.3	5.0-7.0		N

ID	Date	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	Flow	Screen Interval	Target	Screen Submerged
		%v/v	%v/v	%v/v	%v/v	L/hour	m bgl		Y/N
BH103	12-Nov-15	0	0	2.7	12.2	0	1.5-8.0	MADE GROUND and CLAY with MUDSTONE, SANDSTONE, LIMESTONE	N
	25-Nov-15	0	0	3.6	11.9	0	1.5-8.0		N
	09-Dec-15	0	0	3.1	14.2	0	1.5-8.0		N
	16-Dec-15	0	0	4.4	9.2	0.1	1.5-8.0		N
	06-Jan-16	0.4	0.4	0.3	5.9	0.1	1.5-8.0		N
	20-Jan-16	0	0	7	6.6	0.2	1.5-8.0		N

Appendix A

Applicable Bore Logs

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IAN FARMER ASSOCIATES

Site	Borehole Number
Custody Suite & Administration Office, Llay, Wrexham	BH02

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 9.00m		North Wales Police	41543
	Location	**Dates** 04/11/2014	**Engineer** Willmott Dixon	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						0.10	Grass over TOPSOIL (driller's description).			
0.10-0.30	B1					(0.20)				
0.20	D2					0.30	Firm, dark brown, sandy, gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded, fine to coarse including mudstone (reworked).			
0.20	J3									
0.30-1.20	B4						Stiff, mottled brown/grey, slightly sandy, slightly gravelly, silty CLAY. Gravel is subangular to subrounded, fine to coarse including mudstone (reworked).			
0.70	D5									
0.70	J6									
1.20-1.65	U7 0.45		DRY	64 blows						
1.70	D8									
2.00-2.45	SPT N=23		DRY	3,4/5,6,5,7						
2.00-2.45	D10									
2.00-2.50	B9									
						(5.20)				
3.00-3.45	U11 0.23	3.00	DRY	100 blows						
3.50	D12						Below 3.50m: sandy and gravelly.			
4.00-4.45	SPT N=43	4.00	DRY	5,5/8,7,13,15			Below 4.00m: stiff.			
4.00-4.45	B13									
4.00-4.50	D14									
5.00-5.45	SPT 50/295	4.70	DRY	7,8/7,12,15,16						
5.00-5.45	D16									
5.00-5.50	B15									
						5.50	Medium dense, orange brown, gravelly, fine to coarse SAND. Gravel is subangular to subrounded including sandstone and mudstone			
6.00-6.45	SPT N=14	6.00	DRY	2,3/2,3,5,4						
6.00-6.45	D18									
6.00-6.50	B17									
7.50-7.95	SPT N=21	7.50	DRY	3,4/5,4,5,7			Below 7.50m: slightly clayey, slightly gravelly.			
7.50-7.95	D20					(4.50)				
7.50-8.00	B19									
9.20-9.65	SPT N=25	9.00	8.00	3,5/5,6,6,8						
9.20-9.65	D22									
9.20-10.00	B21					10.00				

From previous investigation

Remarks
Samples marked J comprise of 1 x amber jar and 1 x vial.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:50	DD

Figure No. 41543.BH02

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IAN FARMER ASSOCIATES

Site	Borehole Number
Custody Suite & Administration Office, Llay, Wrexham	BH04

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 10.50m		North Wales Police	41543
	Location	**Dates** 06/11/2014	**Engineer** Willmott Dixon	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50	B1						Firm, brown, slightly sandy, slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded, fine to coarse including mudstone with a low cobble content (reworked).			
0.50	D2									
0.50	J3									
0.50-1.20	B4									
1.00	D5									
1.00	J6									
1.20-1.65	U7 0.14		DRY	25 blows						
1.70	D8					(3.50)				
2.00-2.45	SPT N=13	1.70	DRY	2,1/3,4,3,3						
2.00-2.45	D10									
2.00-2.50	B9									
3.00-3.45	U11 0.27	3.00	DRY	47 blows						
3.50	D12					3.50	Stiff, grey brown, sandy, slightly gravelly CLAY. Gravel is subangular to subrounded, fine and medium (reworked).			
						(0.70)				
4.20-4.65	SPT N=12	4.00	DRY	1,2/2,3,3,4		4.20	Firm, grey brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular to subrounded, fine and medium, slight sulphur odour noted (reworked).			
4.20-4.65	D14									
4.20-4.70	B13									
						(1.30)				
5.00-5.45	U15 0.36	4.70	DRY	40 blows						
5.50	D16					5.50	Spongy, dark brown/black pseudo-fibrous PEAT.			
6.50-6.95	SPT N=3	6.00	DRY	1,0/1,0,1,1						
6.50-6.95	D17									
6.50-7.00	B18									
						(3.00)				
8.00-8.45	U19 0.45	8.00	DRY	28 blows						
8.50	D20					8.50	Firm, dark brown and black, very organic, clayey SILT.			
						(1.00)				
9.50-9.95	SPT N=4	9.00	DRY	1,0/1,1,1,1		9.50	Soft, grey, brown, silty CLAY.			
9.50-9.95	D22					(0.45)				
9.50-10.00	B21					9.95				

From previous investigation

Remarks
Samples marked J comprise of 1 x amber jar and 1 x vial.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:50	DD

Figure No. 41543.BH04

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IAN FARMER ASSOCIATES

Site	Borehole Number
Custody Suite & Administration Office, Llay, Wrexham	BH04

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 10.50m		North Wales Police	41543
	Location	**Dates** 06/11/2014	**Engineer** Willmott Dixon	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.50-11.00	B23						Firm, mottled brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse including mudstone.			
11.00-11.45	U24 0.27	10.50	DRY	50 blows						
11.50	D25					(3.50)				
12.00-12.45 12.00-12.45 12.00-12.50	SPT N=19 D27 B26	10.50	DRY	2,2/4,4,5,6			Below 12.00m: stiff.			
13.00-13.45 13.00-13.45	SPT N=25 D28	10.50	DRY	3,3/5,6,6,8						
						13.45	Complete at 13.45m			

From previous investigation

Remarks

Scale (approx)	Logged By
1:50	DD

Figure No. 41543.BH04

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IAN FARMER ASSOCIATES

Site	Borehole Number
Custody Suite & Administration Office, Llay, Wrexham	BH05

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 9.95m		North Wales Police	41543
	Location	**Dates** 10/11/2014	**Engineer** Willmott Dixon	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00-0.50	B1					0.10	Grass over TOPSOIL.			
0.50	D3						Firm, brown, slightly sandy, gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded, fine to coarse including mudstone (reworked)..			
0.50	J4									
0.50-1.20	B2									
1.00	D5									
1.00	J6									
1.20	D7									
1.20-1.65	U8 0.23		DRY	30 blows						
2.00-2.45	SPT N=7	1.70	DRY	1,1/2,2,1,2						
2.00-2.45	D10									
2.00-2.50	B9									
						(5.20)				
3.00-3.45	U11 0.32	3.00	DRY	42 blows						
3.50	D12									
4.00-4.45	SPT N=11	4.00	DRY	2,1/2,3,3,3					▼1	
4.00-4.45	D14									
4.00-4.50	B13									
4.80-5.25	U15 0.09	4.50	DRY	22 blows						
5.30	D16					5.30	Spongy, dark brown black, pseudo-fibrous PEAT.			
						(1.20)				
6.50-6.95	SPT N=1	6.50	DRY	1,0/0,0,0,1		6.50	Very soft, dark brown grey black, slightly sandy, clayey SILT with occasional organic matter.			
6.50-6.95	D18									
6.50-7.00	B17									
						(1.50)				
8.00	W21			Water strike(1) at 8.00m, rose to 4.00m in 20 mins.		8.00	Medium dense, brown, slightly clayey, slightly gravelly, fine to coarse SAND. Gravel is subangular to subrounded, fine and medium of sandstone, quartz and siltstone.		▽1	
8.00-8.45	D20									
8.00-8.50	B19									
8.00-8.45	SPT N=13	8.00	4.00	1,2/3,2,4,4						
						(1.95)				
9.50-9.95	SPT N=14	9.00	4.00	1,2/3,2,4,5						
9.50-9.95	B22									
9.50-9.95	D23					9.95				

From previous investigation

Remarks
Samples marked J comprise of 1 x amber jar and 1 x vial.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:50	DD

Figure No. 41543.BH05

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IAN FARMER ASSOCIATES

Site	Number
Custody Suite & Administration Office, Llay, Wrexham	WS01

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			North Wales Police	41543
	Location	**Dates** 05/11/2014	**Engineer** Willmott Dixon	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10) 0.10	Grass over TOPSOIL.		
0.10-0.50	B1				(0.40)	MADE GROUND: Firm, brown, sandy, slightly gravelly CLAY with occasional rootlets. Gravel is subangular to subrounded including mudstone, brick and limestone.		
0.40	D2				0.50			
0.40	J3					Stiff, mottled brown, sandy, gravelly CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse including mudstone and sandstone (reworked).		
0.50-1.20	B4							
0.80	D5				(0.70)			
0.80	J6							
					1.20			
1.20-1.65	SPT N=10		1,2/1,3,2,4		(0.30)	Medium dense. brown, slightly clayey, gravelly, fine and coarse SAND. Gravel is angular to subrounded, fine to coarse including mudstone and sandstone (reworked).		
1.20-1.65	D7				1.50			
1.50	D8					Firm, mottled brown, slightly sandy, gravelly CLAY with low cobble content of mudstone. Gravel is subangular to subrounded, fine to coarse including mudstone, sandstone (reworked).		
1.80	D9							
2.00-2.45	SPT N=11		2,2/2,2,3,4		(1.00)			
2.00-2.45	D10							
					2.50			
2.50	D11				(0.30)	Firm, dark brown, slightly sandy, slightly gravelly CLAY with occasional organic matter. Gravel is subangular to subrounded, fine to medium including mudstone and sandstone.		
2.80	D12				2.80			
3.00-3.45	SPT N=9		2,1/2,2,2,3			Firm, dark brown, slightly sandy, silty CLAY. Between 2.80m and 5.00m: occasional sand lenses.		
3.00-3.45	D13							
3.50	D14							
3.80	D15							
4.00-4.45	D16		Water strike(1) at 4.00m.					▽1
4.00-4.45	SPT N=10		2,2/2,3,2,3		(2.65)			
4.50	D17							
4.80	D18							
5.00-5.45	SPT N=15		2,2/3,3,4,5			Below 5.00m: stiff.		
5.00-5.45	D19							
					5.45	Complete at 5.45m		

From previous investigation

Remarks
Samples marked J comprise of 1 x amber jar and 1 x vial.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:40	DD

Figure No. 41543.WS01

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IAN FARMER ASSOCIATES

Site	Number
Custody Suite & Administration Office, Llay, Wrexham	WS07

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Drive-in Window Sampler			North Wales Police	41543
	Location	**Dates** 11/11/2014	**Engineer** Willmott Dixon	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					(0.30)	Grass over MADE GROUND: Friable, brown, sandy CLAY with occasional rootlets.			
					0.30	MADE GROUND: Firm, yellow brown mottled dark brown, sandy, gravelly CLAY. Gravel is angular to subrounded, fine to coarse including concrete, mudstone and sandstone (reworked).			
0.50	D1								
0.50	D2								
0.50	J3				(0.90)				
1.00	D4								
1.00	D5								
1.00	J6				1.20				
1.20-1.65	SPT N=5		2,2/1,1,1,2			Soft, dark brown mottled grey, sandy, gravelly CLAY. Gravel is angular to subrounded, fine to coarse including sandstone, mudstone and siltstone (reworked).			
1.20-1.65	D7								
					(1.30)				
2.00-2.45	SPT N=4		1,1/1,1,1,1						
2.00-2.45	D8								
2.50	D10				2.50	Plastic, dark brown, clayey amorphous PEAT.			
2.50	D9								
2.50	J11				(0.70)				
3.00-3.45	SPT N=5		1,1/1,1,1,2						
3.00-3.45	D12								
3.20	D13				3.20	Spongy, brown, fibrous PEAT with occasional fragments of wood.			
					(0.30)				
3.50	D14				3.50	Firm, blue grey, sandy, gravelly CLAY. Gravel is angular to subrounded, fine to coarse including sandstone, mudstone and siltstone.			
4.00-4.45	SPT N=8		2,2/2,2,2,2						
4.00-4.45	D15								
					(1.95)				
5.00-5.45	SPT N=13		2,2/3,3,3,4						
5.00	D16								
5.00-5.45	D17								
					5.45	Complete at 5.45m			

From previous investigation

Remarks
Samples marked J comprise of 1 x amber jar and 1 x vial.
Excavating from 0.00m to 0.30m for 0.25 hours.

Scale (approx)	Logged By
1:40	DO

Figure No. 41543.WS07

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH101

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 11.00m 150mm cased to 24.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-28/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.30)	MADE GROUND: Concrete.			
					94.90	0.30	MADE GROUND: Grey, subangular to angular, fine to coarse including limestone and brick.			
0.50	D1					(0.60)				
0.50	E2									
					94.30	0.90	Firm, brown, occasionally mottled grey, slightly gravelly CLAY. Gravel is fine and medium including mudstone, sandstone, siltstone and quartzite.			
1.00	D3									
1.00	E4									
1.20-1.65	U5 (P/0.41)	1.20	DRY	51 blows						
1.70	D6									
2.00-2.45	SPT N=22	1.70	DRY	3,3/4,5,6,7						
2.00-2.50	B7									
2.00-2.50	D8						Below 2.00m: stiff.			
3.00-3.45	B9									
3.00-3.45	U10 (P/NR)	3.00	DRY	100 blows						
4.00-4.45	SPT N=24	4.00	DRY	3,4/5,7,6,6		(6.20)				
4.00-4.45	D12									
4.00-4.50	B11									
5.00-5.45	U13 (P/0.45)	5.00	4.50	100 blows						
5.50	D14									
6.00-6.45	SPT N=33	6.00	DRY	7,8/8,8,8,9						
6.00-6.45	D16									
6.00-6.50	B15									
7.00	D17									
					88.10	7.10	Medium dense, brown, fine SAND.			
7.50-7.95	SPT N=26	7.50	DRY	3,4/5,7,7,7						
7.50-7.95	D19									
7.50-8.00	B18						Between 7.90m and 8.40m: gravelly. (driller			

Remarks
Elevation estimated from site survey plan.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH101

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH101

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 11.00m 150mm cased to 24.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-28/10/2015	**Project Contractor** Galliford Try	**Sheet** 2/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
							notes coal and sandstone).			
9.00-9.45 9.00-9.45 9.00-9.50	SPT N=25 D21 B20	9.00	2.50	3,4/4,6,7,8						
10.50-10.95 10.50-10.95 10.50-11.00	SPT N=29 D23 B22			3,4/5,7,7,10						
						(9.30)				
12.00-12.45 12.00-12.45 12.00-12.50	SPT N=14 D25 B24	12.00	1.90	2,1/4,4,3,3						
13.50-13.95 13.50-13.95 13.50-14.00	SPT N=14 D27 B26	13.50	2.40	2,3/3,3,4,4						
15.00-15.45 15.00-15.45 15.00-15.50	SPT N=27 D29 B28	15.00	7.90	4,5/7,6,7,7						

Remarks
Elevation estimated from site survey plan.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH101

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH101

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 11.00m 150mm cased to 24.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-28/10/2015	**Project Contractor** Galliford Try	**Sheet** 3/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					78.80	16.40				
16.50-16.71	SPT(C) 25*/125 50/85	16.50	15.10	8,17/41,9			Very dense dark brown, sandy, angular to rounded, coarse GRAVEL including sandstone.			
16.50-16.95	B30					(0.60)				
					78.20	17.00				
							Stiff, dark brown, slightly gravelly CLAY with low cobble content. Gravel is angular to rounded, fine to coarse of sandstone and mudstone.			
18.00-18.45	SPT N=37	18.00	DRY	4,5/7,9,10,11						
18.00-18.45	D32									
18.00-18.50	B31									
19.50-19.95	U33 (P/0.23)	19.50	DRY	100 blows						
20.00	D34									
						(7.08)				
21.00-21.45	SPT N=40	21.00	DRY	5,5/8,9,12,11						
21.00-21.45	D36									
21.00-21.50	B35									
22.50-22.95	U37 (P/0.22)	22.50		100 blows						
23.00	D38									
24.00-24.08	50/0 SPT 25*/75			8,17/50						

Remarks
Elevation estimated from site survey plan.
Chiselling from 16.70m to 17.00m for 0.75 hours.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH101

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Site	Borehole Number
Eastern Command & Custody Facility	BH101

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 11.00m 150mm cased to 24.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		26/10/2015- 28/10/2015	Galliford Try	4/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
24.00-24.08	D39				71.12	24.08 (24.08)	Complete at 24.08m			

Remarks
Elevation estimated from site survey plan.
Chiselling from 24.20m to 24.20m for 0.75 hours.

Scale (approx)	Logged By
1:40	BL

Figure No.
41788.BH101

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Site	Borehole Number
Eastern Command & Custody Facility	BH102

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 8.50m 150mm cased to 24.50m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		21/10/2015- 23/10/2015	Galliford Try	1/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					95.00	(0.20) 0.20	MADE GROUND: Concrete.			
0.20	D1				94.90	(0.10) 0.30	MADE GROUND: Brown, slightly gravelly SAND. Gravel is angular to subangular, fine to coarse including sandstone and coal.			
0.20-0.80	B3					(0.50)				
0.40	E2						MADE GROUND: Brown, sandy, angular to subangular, fine to coarse GRAVEL including limestone and sandstone.			
0.80-1.20	B5				94.40	0.80				
1.00	E4						Stiff, brown, slightly gravelly, slightly sandy CLAY. Gravel is subangular to subrounded, fine to coarse including coal, mudstone, sandstone and quartzite.			
1.20-1.65	U6 (P/0.36)	1.20	DRY	100 blows						
1.70	D7									
2.00	E8									
2.20-2.65	SPT N=21	2.20	DRY	4,4/4,5,5,7						
2.20-2.65	D9									
2.20-2.70	B10									
						(4.00)				
3.00-3.45	U11 (P/0.27)	3.00	DRY	100 blows						
3.50	D12									
4.00-4.45	SPT N=21	4.00	DRY	2,4/4,5,6,6						
4.00-4.45	D13									
4.00-4.50	B14									
					90.40	4.80	Dense, brown, slightly silty, fine SAND.			
5.00-5.45	SPT N=30	4.50	DRY	4,5/6,6,8,10						
5.00-5.45	D15					(0.70)				
5.00-5.50	B16									
					89.70	5.50	Dense brown, slightly cobbly, slightly sandy, angular to rounded, fine to coarse GRAVEL including limestone, coal, sandstone and quartzite.			
						(1.50)				
6.50-6.95	SPT(C) N=30	6.50	6.00	3,6/8,6,8,8						
6.50-6.95	D17									
6.50-7.00	B18									
					88.20	7.00	Medium dense, brown, slightly gravelly, silty, fine and medium SAND. Gravel is subrounded to rounded, fine, including coal and sandstone.			
8.00-8.45	SPT N=28	8.00	7.50	3,4/4,6,8,10						

Remarks
Elevation estimated from site survey plan.
Chiselling from 1.85m to 1.90m for 1.00 hour. Water added from 4.80m to 6.00m. Water added from 6.00m to 18.00m. Excavating from 0.00m to 1.20m for 2.00 hours.

Scale (approx)	Logged By
1:40	BL

Figure No.
41788.BH102

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Site	Borehole Number
Eastern Command & Custody Facility	BH102

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 8.50m 150mm cased to 24.50m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		21/10/2015- 23/10/2015	Galliford Try	2/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
8.00-8.45 8.00-8.50	D19 B20									
9.50-9.95 9.50-1.00 9.50-9.95	SPT N=34 B22 D21	9.20	9.00	4,5/8,8,9,9			Between 9.50m and 11.50m: dense.			
11.00-11.45 11.00-11.45 11.00-11.50	SPT N=34 D23 B24	11.00	10.50	4,6/7,8,9,10		(9.80)				
12.20-12.65 12.20-12.65 12.20-12.70	SPT N=24 D25 B26	12.20	12.00	2,3/4,7,5,8						
14.00-14.45 14.00-14.45 14.00-14.50	SPT N=29 D27 B28	14.00	13.50	3,4/6,6,8,9						
15.50-15.95 15.50-15.95 15.50-16.00	SPT N=38 D29 B30	15.20	14.70	6,8/8,8,10,12			Below 15.50,: dense.			

Remarks

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH102

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Site	Borehole Number
Eastern Command & Custody Facility	BH102

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 8.50m 150mm cased to 24.50m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		21/10/2015- 23/10/2015	Galliford Try	3/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
16.80-17.20	B31				78.40	16.80	Stiff, dark brown, silty, sandy CLAY.			
17.20-17.50 17.20-17.65 17.20-17.70	SPT 50/145 D32 B33	17.20	16.70	7,12/16,34		(1.20)				
					77.20	18.00	Very stiff, dark brown, slightly gravelly CLAY with medium cobble content. Gravel is angular to subangular, fine to coarse of sandstone and mudstone.			
18.50-18.84 18.50-18.95 18.50-19.00	SPT(C) 50/190 D34 B35	18.50	18.00	9,10/12,18,20						
20.00-20.26 20.00-20.45 20.00-20.50	SPT(C) 50/105 D36 B37	20.00	DRY	25/28,22			Below 20.50m: driller notes sandstone cobbles.			
21.50-21.83 21.50-21.95 21.50-22.00	SPT(C) 50/180 D38 B39	21.50	20.50	9,10/12,18,20		(7.00)				
23.00-23.37 23.00-23.45 23.00-23.50	SPT 50/220 D40 B41	23.00	22.00	10,10/15,18,17						
23.70-24.50	B42									

Remarks
Chiselling from 20.20m to 20.50m for 1.00 hour.

Scale (approx)	Logged By
1:40	BL

Figure No.
41788.BH102

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Site	Borehole Number
Eastern Command & Custody Facility	BH102

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 8.50m 150mm cased to 24.50m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		21/10/2015- 23/10/2015	Galliford Try	4/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
24.50-24.95	U43 (P/0.14)	24.50	WET	120 blows						
25.00	D44				70.20	25.00	Complete at 25.00m			

Remarks

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH102

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Site	Borehole Number
Eastern Command & Custody Facility	BH103

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 12.00m 150mm cased to 25.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		28/10/2015- 30/10/2015	Galliford Try	1/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.30)	MADE GROUND: Concrete.			
					94.90	0.30				
0.50 0.50	D1 E2					(0.60)	MADE GROUND: Brown, silty, very gravelly, fine and medium SAND. Gravel is angular to subangular, medium and coarse including limestone and sandstone.			
					94.30	0.90				
1.00 1.00 1.20-1.65 1.20-2.50	D3 E4 U NR B5	1.20	DRY	100 blows			MADE GROUND: Firm, brown, slightly gravelly, occasionally cobbly CLAY. Gravel is subangular to subrounded, fine, including limestone, sandstone, siltstone and mudstone. (Reworked clay) Between 1.20m and 2.50m: driller notes cobble.			
2.00-2.16	SPT 50/10	1.70	DRY	4,19/50		(2.60)				
3.00-3.45	U6 (P/0.45)	3.00	DRY	39 blows						
3.50	D7			28/10/2015: 29/10/2015:DRY	91.70	3.50	Firm, grey blue, silty CLAY. Driller notes rootlets.			
						(0.50)				
4.00-4.45 4.00-4.45 4.00-4.50	SPT N=16 D9 B8	4.00	DRY	2,2/3,4,4,5	91.20	4.00	Stiff locally firm, brown, occasionally mottled grey, slightly gravelly CLAY. Gravel is subangular to subrounded, fine and medium including mudstone, sandstone, limestone and coal.			
5.00-5.15	U NR	4.50	DRY	100 blows						
6.00-6.45 6.00-6.45 6.00-6.50	SPT N=18 D11 B10	6.00	DRY	2,3/4,4,5,5		(4.90)				
7.50-7.95	U12 (P/0.45)	7.50	DRY	100 blows						

Remarks
Elevation estimated from site survey plan.
Pushing cobble ahead of casing from 2.00 to 2.50m.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:40	BL

Figure No.
41788.BH103

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Site	Borehole Number
Eastern Command & Custody Facility	BH103

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 12.00m 150mm cased to 25.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		28/10/2015- 30/10/2015	Galliford Try	2/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
8.00	D13									
					86.30	8.90				
9.00-9.45 9.00-9.45 9.00-9.50	SPT N=20 D15 B14	9.00	1.20	4,4/4,5,5,6			Medium dense brown, slightly gravelly, fine and medium SAND. Gravel is subrounded to rounded, fine and medium including sandstone, limestone, siltstone, coal and quartzite.			
10.50-10.95 10.50-10.95 10.50-11.00	SPT N=11 D17 B16			2,1/2,3,3,3						
13.00-13.45 13.00-13.45 13.00-13.50	SPT N=25 D19 B18			2,3/4,7,7,7						
						(9.60)				
14.00-14.45 14.00-14.45 14.00-14.50	SPT N=30 D21 B20	14.50	7.90	3,4/7,7,8,8			At 14.00: dense. Between 14.00m and 18.50m: light brown, silty, fine sand.			
15.00-15.45 15.00-15.45 15.00-15.50	SPT N=27 D23 B22	15.00	7.90	3,4/5,7,7,8						

Remarks

Scale (approx)	Logged By
1:40	BL

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Site	Borehole Number
Eastern Command & Custody Facility	BH103

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 12.00m 150mm cased to 25.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 28/10/2015-30/10/2015	**Project Contractor** Galliford Try	**Sheet** 3/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
16.50-16.95 16.50-16.95 16.50-16.95	SPT N=28 B24 D25	16.50	10.10	4,5/5,7,7,9						
18.00-18.45 18.00-18.45 18.00-18.50	SPT N=34 D27 B26			3,4/7,8,9,10						
				29/10/2015:10.10m	76.70	18.50	Brown, medium dense, silty, fine and medium SAND.			
				30/10/2015:DRY		(0.60)				
					76.10	19.10	Firm, brown mottled grey, slightly sandy, slightly gravelly, silty CLAY. Gravel is subangular to rounded, fine and medium including sandstone and coal.			
19.50-19.95	U NR	19.50	DRY	40 blows		(1.00)				
					75.10	20.10	Very dense, brown, silty, fine and medium SAND.			
21.00-21.19 21.00-21.45 21.00-21.50	SPT 25*/105 50/80 B28 D29	21.00	DRY	12,13/35,15		(3.10)				
22.50-22.75 22.50-22.95 22.50-22.95	SPT 25*/115 50/135 B30 D31	22.50	DRY	14,11/29,21						
					72.00	23.20	Stiff, brown, slightly gravelly CLAY. Gravel is angular to subrounded, fine to coarse including sandstone and quartzite.			
24.00-24.45	SPT N=29	24.00	21.50	4,4/4,7,9,9						

Remarks
Chiselling from 19.90m to 20.30m for 0.75 hours. Water added from 23.00m.

Scale (approx)	Logged By
1:40	BL

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Site	Borehole Number
Eastern Command & Custody Facility	BH103

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 12.00m 150mm cased to 25.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		28/10/2015- 30/10/2015	Galliford Try	4/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
24.00-24.45 24.00-24.50	D33 B32					(2.20)				
25.00-25.45	D34			30/10/2015:22.60m						
25.00-25.45	SPT N=42	25.00	22.60	5,10/10,9,11,12	69.80	25.40	Complete at 25.45m			

Remarks

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH103

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Site	Borehole Number
Eastern Command & Custody Facility	BH104

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 7.00m 150mm cased to 19.20m	94.80	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-27/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	D1				94.60	(0.20) 0.20	MADE GROUND: Grass over, soft brown, occasionally gravelly CLAY (Topsoil). Gravel is subangular to subrounded, fine to coarse including sandstone, limestone with occasional brick.			
0.10	E2									
0.20-0.50	B3									
0.50	E4						Firm brown, occasionally mottled grey, gravelly CLAY. Gravel is angular to subrounded, fine to coarse including mudstone, siltstone, sandstone, limestone and coal.			
0.50-1.20	B5									
1.00	E6									
1.20-1.65	U7 (P/0.23)		DRY	62 blows						
1.70	D8									
2.00-2.45	SPT N=22	2.00	DRY	2,4/5,5,5,7			Below 2.00m: stiff.			
2.00-2.45	D9									
2.00-2.50	B10					(4.80)				
3.00-3.45	U11 (P/0.27)	3.00	DRY	100 blows						
3.50	D12									
4.00-4.45	SPT N=36	4.00	DRY	5,7/8,9,9,10						
4.00-4.45	D13									
4.00-4.50	B14									
5.00-5.45	SPT N=28	5.00	DRY	2,3/6,8,6,8	89.80	5.00	Medium dense brown, gravelly, silty SAND. Gravel is subangular to rounded, fine and medium including sandstone, limestone and siltstone.			
5.00-5.45	D15									
5.00-5.50	B16					(2.00)				
6.50-6.95	SPT N=27	6.20	5.70	4,5/6,7,7,7						
6.50-6.95	D17									
6.50-7.00	B18				87.80	7.00	Medium dense brown, silty, fine to coarse SAND.			
8.00-8.45	SPT N=18	8.00	7.50	2,3/5,4,4,5						

Remarks
Elevation estimated from site survey plan.
Water added from 5.00m to 11.00m. Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH104

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Site	Borehole Number
Eastern Command & Custody Facility	BH104

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 7.00m 150mm cased to 19.20m	94.80	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-27/10/2015	**Project Contractor** Galliford Try	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
8.00-8.45 8.00-8.50	D19 B20									
9.50-9.95 9.50-9.45 9.50-10.00	SPT N=16 D21 B22	9.50	9.00	2,3/4,4,4,4						
11.00-11.45 11.00-11.50	D23 B24			26/10/2015:10.00m 27/10/2015:DRY		(8.50)				
11.00-11.45	SPT N=22	11.00	DRY	3,4/3,5,6,8						
12.50-12.95 12.50-12.95 12.50-13.00	SPT N=25 D25 B26	12.00	12.00	3,3/4,5,7,9						
14.00-14.45 14.00-14.45 14.00-14.50	SPT N=29 D27 B28	14.00	13.50	3,5/6,7,8,8						
15.50-15.91 15.50-15.95 15.50-16.00	SPT 50/255 D29 B30	15.50	15.00	3,6/8,10,17,15	79.30	15.50	very dense dark brown, sandy SILT.			

Remarks
Water added from 11.00m to 17.90m.

Scale (approx)	Logged By
1:40	BL

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Site	Borehole Number
Eastern Command & Custody Facility	BH104

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	200mm cased to 7.00m 150mm cased to 19.20m	94.80	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-27/10/2015	**Project Contractor** Galliford Try	**Sheet** 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(2.40)				
17.00-17.38 17.00-17.45 17.00-17.50	SPT 50/225 D31 B32	17.00	16.50	6,8/12,17,21						
					76.90	17.90	Very stiff, dark brown, gravelly, sandy CLAY with low cobble content. Gravel is angular to subangular, fine to coarse including sandstone and quartzite.			
18.50-18.75 18.50-18.95 18.50-19.00	SPT(C) 50/95 D33 B34	18.50	DRY	10,15/36,14		(1.42)				
19.20	B35			27/10/2015:DRY	75.48	19.32	Complete at 19.32m			
19.20-19.32	SPT(C) 25*/50 50/70	19.50	DRY	25/50						

Remarks
Chiselling from 18.50m to 19.32m for 2.00 hours.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH104

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH105

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 20.00m 200mm cased to 12.00m	95.00	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 20/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description
						(0.40)	Grass over TOPSOIL.
					94.60	0.40	
0.50	D1						Firm, brown, slightly gravelly CLAY. Gravel is angular to subrounded, fine to coarse including mudstone and sandstone. (Possibly reworked)
0.50	E2					(0.50)	
					94.10	0.90	
1.00	D3						Soft, brown, slightly sandy, slightly gravelly, silty CLAY. Gravel is angular to subrounded, fine to coarse. (Possibly reworked)
1.00	E4					(0.50)	
					93.60	1.40	
1.50	E5						Firm, light brown, brown, mottled grey orangey, gravelly CLAY. Gravel is subangular to rounded, fine and medium including limestone and sandstone. (Possibly reworked)
1.60-2.05	U6 (P/0.41)	1.50	DRY	39 blows		(0.80)	
2.10-2.55	SPT N=21	1.50	DRY	2,3/3,6,6,6	92.80	2.20	
2.10-2.55	D7						Firm, brown, slightly gravelly CLAY. Gravel is angular to rounded, fine and medium including sandstone.
2.20-2.70	B8						At 2.20m: driller notes organic matter.
3.00-3.45	U9 (P/0.43)	3.00	DRY	65 blows			
3.50	D10					(2.60)	
4.00-4.45	SPT N=23	4.00	DRY	4,3/5,5,6,7			
4.00-4.45	D12						
4.00-4.50	B11						
					90.20	4.80	
				20/10/2015:DRY			Stiff, grey, slightly gravelly CLAY. Gravel is angular to subrounded, fine, including sandstone and coal.
				21/10/2015:DRY			
5.00-5.45	U13 (P/0.45)	4.50	DRY	100 blows		(1.20)	
5.50	D14						
					89.00	6.00	
6.00-6.45	SPT N=19	6.00	DRY	3,4/4,5,5,5			Stiff, grey, slightly gravelly CLAY. Gravel is subangular, fine and medium including limestone, coal and occasional large cobbles.
6.00-6.45	D16						
6.00-6.50	B15						
						(1.40)	
7.00	D17						
					87.60	7.40	
7.50-7.95	SPT N=34	7.50	DRY	8,10/8,8,8,10			Dense, brown, gravelly, fine SAND.
7.50-7.95	D18						

Legend | Water | Instr

Remarks
Elevation estimated from site survey plan.
Water added from 8.00m. Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH105

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH105

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 20.00m 200mm cased to 12.00m	95.00	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 20/10/2015	**Project Contractor** Galliford Try	**Sheet** 2/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
9.00-9.45 9.00-9.45	SPT N=29 D19	9.00	1.40	4,4/8,8,7,6			Between 8.20 and 9.00m: gravelly			
						(5.60)				
10.50-10.95 10.50-10.95	SPT N=25 D20	10.50	3.10	1,2/4,5,9,7						
12.00-12.45 12.00-12.45	SPT N=20 D21	12.00	7.50	3,4/4,5,5,6						
					82.00	13.00	Medium dense, light brown, silty, medium SAND.			
13.50-13.95 13.50-13.95	SPT N=30 D22	13.50	10.00	2,4/9,7,7,7						
						(3.50)				
15.00-15.45 15.00-15.45	SPT N=24 D23	15.00	14.10	3,4/6,6,6,6						

Remarks
Water added from 8.00m.

Scale (approx)	Logged By
1:40	BL

Figure No.
41788.BH105

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH105

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 20.00m 200mm cased to 12.00m	95.00	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 20/10/2015	**Project Contractor** Galliford Try	**Sheet** 3/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					78.50	16.50				
				21/10/2015:14.10m			Firm, gravelly, silty CLAY with low cobble content. Gravel is angular to subrounded, fine to coarse including sandstone, coal and quartzite.			
16.50-16.95	U24 (P/0.41)	16.50	DRY	22/10/2015:DRY 100 blows						
17.00	D25									
17.50	D26									
18.00-18.45	SPT(C) N=25	18.00	DRY	4,5/6,6,6,7		(3.30)				
18.00-18.45	B27									
19.00	D28									
19.50-19.87	SPT 50/220	19.50	DRY	4,5/10,10,30						
19.50-19.95	D29									
19.80	D30			22/10/2015:18.50m	75.20	19.80				
						(0.26)	Weathered brown SANDSTONE recovered as angular to subangular, medium and coarse gravel.			
19.80-19.96	SPT(C) 25*/75 50/85	19.80	18.50	19,6/50	74.94	20.06				
20.00-20.06	SPT(C) 25*/50 50/10			25/50			Complete at 20.06m			

Remarks
Chiselling from 17.10m to 17.40m for 1.00 hour. Chiselling from 19.80m to 20.06m for 1.00 hour. Water added from 19.80m.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH105

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH106

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 6.00m	95.70	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 19/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					95.60	(0.10) 0.10	MADE GROUND: Grass over TOPSOIL.			
						(0.40)	Firm, brown, slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse including sandstone and occasional brick.			
0.50	D1				95.20	0.50	Firm, orange brown, slightly sandy, gravelly CLAY. Gravel is subangular to rounded, fine and medium including siltstone and sandstone.			
1.00	D2					(2.20)				
2.00	D3									
					93.00	2.70	Orange, slightly clayey, fine and medium SAND.			
3.00 3.00-3.50	D4 B5					(1.00)				
					92.00	3.70	Orange brown, slightly silty, fine to coarse SAND.			
4.00	D6					(1.10)				
					90.90	4.80	Brown, very sandy, subangular to rounded, fine to coarse GRAVEL including sandstone, siltstone and limestone.			
5.50	D7					(1.20)				
					89.70	6.00	Complete at 6.00m			

Remarks
Elevation estimated from site survey plan.
Falling head testing undertaken within the borehole.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH106

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH107

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable Percussion	150mm cased to 6.00m	95.90	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 20/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					95.80	(0.10) 0.10	Grass over TOPSOIL.		
0.50	D1						Firm, brown, mottled grey, silty, slightly gravelly CLAY. Gravel is angular subangular, fine to coarse including mudstone and sandstone.		
1.00	D2					(2.30)			
2.00	D3								
					93.50	2.40	Brown, slightly silty, gravelly, fine SAND. Gravel is subangular to subrounded, fine including sandstone.		
3.00	D4					(1.60)			
4.00 4.00-4.50	D5 B6				91.90	4.00	Brown, coarse, sandy, subangular to subrounded GRAVEL including sandstone and limestone.		
						(2.00)	At 5.50m: gravel is fine and medium.		
6.00	D7				89.90	6.00	Complete at 6.00m		

Remarks
Falling head testing undertaken within the borehole.
Elevation estimated from site survey plan.
Excavating from 0.00m to 1.20m for 1.00 hour.

Scale (approx)	Logged By
1:40	BL

Figure No. 41788.BH107

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Eastern Command & Custody Facility	TP101

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
13t. Tracked excavator	3.88m x 0.70m x 2.65m	95.60	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 23/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10	D2			95.45	(0.15) 0.15	Dark, psuedofibrous PEAT, slight organic odour noted.		
0.10	E1					MADE GROUND: Soft, grey mottled brown, silty, slightly sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine to coarse including sandstone, siltstone, quartzite, with occasional brick.		
0.50	B5				(0.60)			
0.50	D4							
0.50	E3			94.85	0.75	Firm, brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine to coarse including sandstone, siltstone and occasional coal.		
1.00	D7							
1.00	E6							
1.50	B8				(1.90)			
2.00	D9							
2.50	B10					Below 2.50m: stiff.		
				92.95	2.65	Complete at 2.65m		

Plan

Remarks

Trail pit remained dry and stable during excavation
Elevation estimated from site survey plan.

Scale (approx)	Logged By	Figure No.
1:40	BL	41788.TP101

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Eastern Command & Custody Facility	TP102

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
13t. Tracked excavator	3.70m x 0.70m x 1.50m	94.30	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 23/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10 0.10	D1 E2			94.10	(0.20) 0.20	MADE GROUND: Firm, brown, slightly sandy, gravelly CLAY. Gravel is angular to subangular, fine to coarse including sandstone, limestone, siltstone, occasional brick and occasional concrete boulders and cobble.		
0.50 0.50 0.50	B3 D4 E5			93.75	(0.35) 0.55	MADE GROUND: Stiff, brown, slightly sandy,m slightly gravelly CLAY. Gravel is subangular to rounded, fine to coarse including sandstone, quartzite and siltstone.		
1.00	E6				(0.95)	Very stiff, friable, brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine to coarse including sandstone, siltstone and coal.		
1.50 1.50	B7 E8			92.80	1.50	Complete at 1.50m		

Plan

Remarks

Trail pit remained dry and stable during excavation.
Elevation estimated from site survey plan.

Scale (approx)	Logged By	Figure No.
1:40	BL	41788.TP102

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Eastern Command & Custody Facility	PLT01

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
13t. Tracked excavator	1.00m x .00m x 0.50m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 21/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.21)	MADE GROUND: Concrete.		
0.21-0.36	B1			94.99	0.21			
					(0.15)	MADE GROUND: Dark brown, slightly sandy, angular to subangular, fine to coarse GRAVEL including limestone		
0.36-0.50	B2			94.84	0.36			
					(0.14)	Stiff, brown, slightly gravelly, slightly sandy CLAY. Gravel is subangular to subrounded, fine to coarse including sandstone and siltstone.		
				94.70	0.50			
						Complete at 0.50m		

Plan

Remarks

Elevation estimated from site survey plan.

Scale (approx)	Logged By	Figure No.
1:20	BL	41788.PLT01

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Eastern Command & Custody Facility	PLT02

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
13t. Tracked excavator	1.00m x 1.00m x 0.75m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 21/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.21)	MADE GROUND; Concrete.		
0.20-0.60	B1			94.99	0.21	MADE GROUND: Sandy, angular to subangular, fine to coarse GRAVEL including limestone and sandstone.		
					(0.39)			
0.60-0.75	B3		Water strike(1) at 0.60m.	94.60	0.60			▽1
0.70	E2				(0.15)	Firm, brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular to rounded, fine to coarse including sandstone and siltstone.		
				94.45	0.75	Complete at 0.75m		

Plan

Remarks

Oily sheen and hydrocarbon odour in water
Elevation estimated from site survey plan.

Scale (approx)	Logged By	Figure No.
1:20	BL	41788.PLT02

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Eastern Command & Custody Facility	PLT03

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Trial Pit		95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates**	**Project Contractor**	**Sheet**
		01/11/2015	Galliford Try	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.21)	MADE GROUND: Concrete.		
0.21-0.45	B1			94.99	0.21			
					(0.24)	MADE GROUND: Dark grey, sandy, angular to subangular, fine to coarse GRAVEL including limestone.		
0.45-0.60	B2			94.75	0.45			
					(0.15)	Stiff brown, slightly sandy, slightly gravelly CLAY. Gravel is subrounded to rounded, fine to coarse including sandstone, siltstone and occasional coal.		
				94.60	0.60			
						Complete at 0.60m		

Plan

Remarks

Elevation estimated from site survey plan.

Scale (approx)	Logged By	Figure No.
1:20	JM	41788.PLT03

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IAN FARMER ASSOCIATES

Site	Trial Pit Number
Eastern Command & Custody Facility	PLT04

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
13t. Tracked excavator	1.00m x 1.00m x 2.00m	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 23/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	MADE GROUND: Concrete.		
0.20-1.00	B1			95.00	0.20	MADE GROUND: Dark grey, angular to subangular, fine to coarse GRAVEL including limestone.		
					(0.80)	Below 0.70m: occasional brick, metal and ash.		
1.00-2.00	B2			94.20	1.00	Stiff, brown, slightly sandy, slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse including sandstone, siltstone and quartzite.		
					(1.00)			
				93.20	2.00	Complete at 2.00m		

Plan

Remarks

Elevation estimated from site survey plan.

Scale (approx)	Logged By	Figure No.
1:20	BL	41788.PLT04

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH101

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-28/10/2015	**Project Contractor** Galliford Try	**Sheet** 1/7

Height of casing above ground level:	0.70	**m**
Depth to Base of Borehole:	8.60	**m bgl**
Depth to Base of Casing:	7.10	**m bgl**
Depth to equilibrium water level:	8.60	**m btoc**
Test Length L:	1.50	**m**
Diameter of Test Length D:	0.20	**m**
Area of Test Section:	0.0314	**m2**
Intake Factor F: (after condition C, figure 6, BS 5930)	3.0589	

PERMEABILITY (after Hvorslev, 1951)

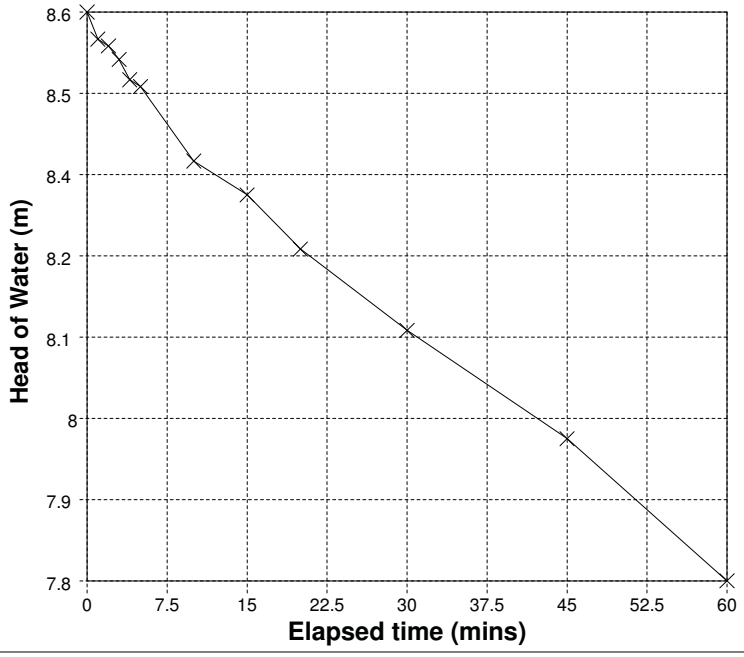
General Approach

H1 selected at t= 8.54 mins (=t1 = 60.6 secs)

H2 selected at t= 7.913 mins (=t2 = 2699.4 secs)

k = 2.97E-07 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	8.600	1.000
1.0	0.040	8.560	0.995
2.0	0.050	8.550	0.994
3.0	0.070	8.530	0.992
4.0	0.100	8.500	0.988
5.0	0.110	8.490	0.987
10.0	0.220	8.380	0.974
15.0	0.270	8.330	0.969
20.0	0.350	8.250	0.959
30.0	0.470	8.130	0.945
45.0	0.630	7.970	0.927
60.0	0.840	7.760	0.902



Remarks

Borehole dry.
Water level assumed for calculation.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH102

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 21/10/2015-23/10/2015	**Project Contractor** Galliford Try	**Sheet** 2/7

Height of casing above ground level:	0.50	**m**
Depth to Base of Borehole:	6.00	**m bgl**
Depth to Base of Casing:	5.50	**m bgl**
Depth to equilibrium water level:	6.00	**m btoc**
Test Length L:	0.50	**m**
Diameter of Test Length D:	0.20	**m**
Area of Test Section:	0.0314	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	1.9072	

PERMEABILITY (after Hvorslev, 1951)

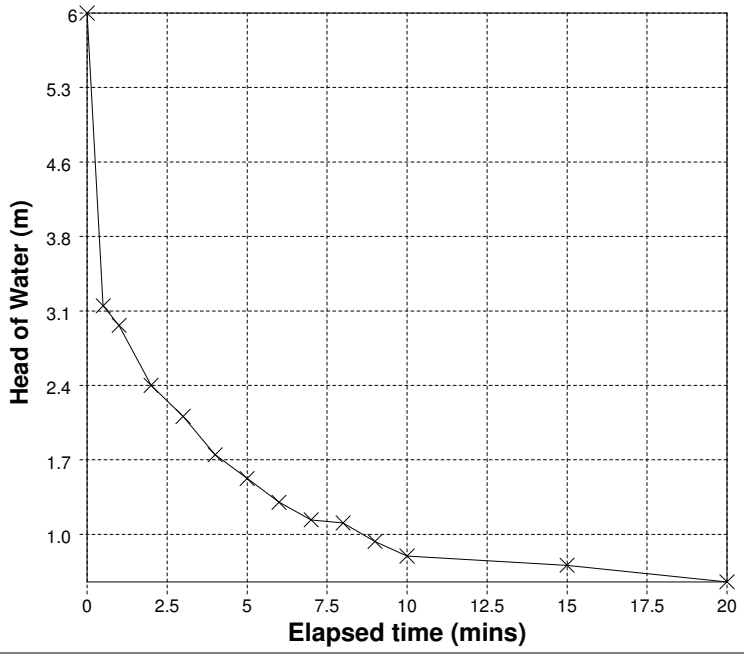
General Approach

H1 selected at t= 3.16 mins (=t1 = 32.4 secs)

H2 selected at t= 0.774 mins (=t2 = 606 secs)

k = 4.04E-05 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	6.000	1.000
0.5	2.830	3.170	0.528
1.0	3.020	2.980	0.497
2.0	3.600	2.400	0.400
3.0	3.900	2.100	0.350
4.0	4.270	1.730	0.288
5.0	4.500	1.500	0.250
6.0	4.730	1.270	0.212
7.0	4.900	1.100	0.183
8.0	4.930	1.070	0.178
9.0	5.110	0.890	0.148
10.0	5.250	0.750	0.125
15.0	5.340	0.660	0.110
20.0	5.500	0.500	0.083



Remarks

Borehole dry.
Water level assumed for calculation.
Borehole collapsed back to 5.50m during test.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH103

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	95.20	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 28/10/2015-30/10/2015	**Project Contractor** Galliford Try	**Sheet** 3/7

Height of casing above ground level:	0.80	**m**
Depth to Base of Borehole:	10.90	**m bgl**
Depth to Base of Casing:	9.90	**m bgl**
Depth to equilibrium water level:	10.90	**m btoc**
Test Length L:	1.00	**m**
Diameter of Test Length D:	0.20	**m**
Area of Test Section:	0.0314	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	2.7171	

PERMEABILITY (after Hvorslev, 1951)

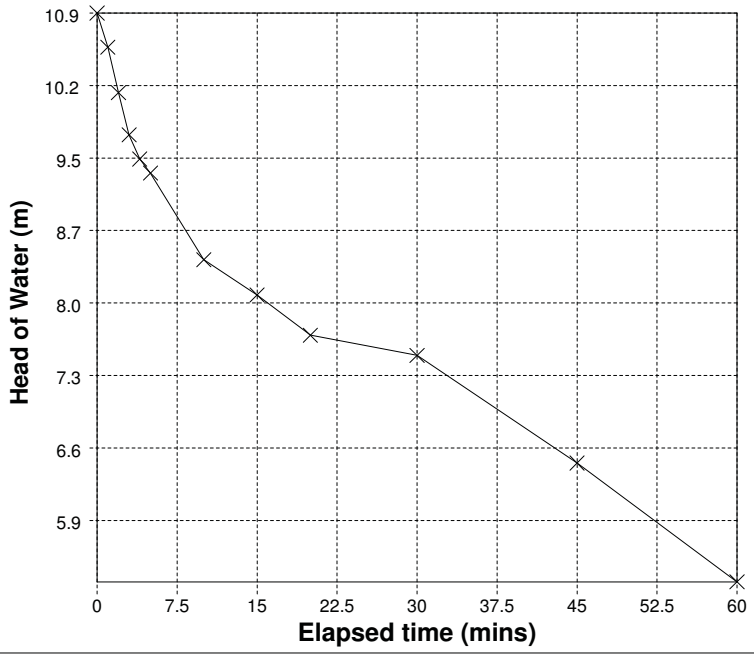
General Approach

H1 selected at t= 10.11 mins (=t1 = 121.2 secs)

H2 selected at t= 7.66 mins (=t2 = 1203.6 secs)

k = 2.96E-06 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	10.900	1.000
1.0	0.340	10.560	0.969
2.0	0.790	10.110	0.928
3.0	1.210	9.690	0.889
4.0	1.450	9.450	0.867
5.0	1.590	9.310	0.854
10.0	2.450	8.450	0.775
15.0	2.800	8.100	0.743
20.0	3.200	7.700	0.706
30.0	3.400	7.500	0.688
45.0	4.470	6.430	0.590
60.0	5.650	5.250	0.482



Remarks

Borehole dry.
Water level assumed for calculation.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH104

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	94.80	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 26/10/2015-27/10/2015	**Project Contractor** Galliford Try	**Sheet** 4/7

Height of casing above ground level:	1.00	**m**
Depth to Base of Borehole:	7.00	**m bgl**
Depth to Base of Casing:	6.50	**m bgl**
Depth to equilibrium water level:	7.00	**m btoc**
Test Length L:	0.50	**m**
Diameter of Test Length D:	0.20	**m**
Area of Test Section:	0.0314	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	1.9072	

PERMEABILITY (after Hvorslev, 1951)

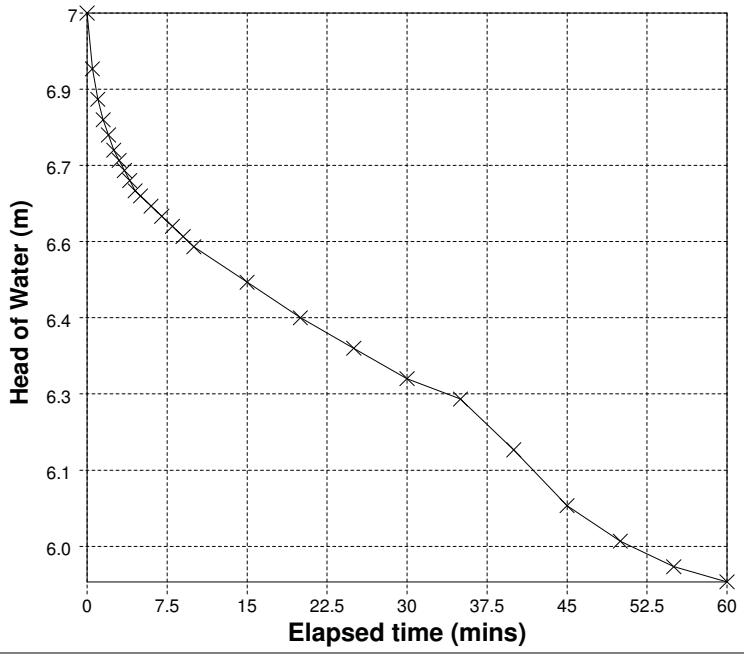
General Approach

H1 selected at t= 6.82 mins (=t1 = 61.8 secs)

H2 selected at t= 6.223 mins (=t2 = 2110.2 secs)

k = 7.37E-07 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	7.000	1.000
0.5	0.110	6.890	0.984
1.0	0.170	6.830	0.976
1.5	0.210	6.790	0.970
2.0	0.240	6.760	0.966
2.5	0.270	6.730	0.961
3.0	0.290	6.710	0.959
3.5	0.310	6.690	0.956
4.0	0.330	6.670	0.953
4.5	0.350	6.650	0.950
5.0	0.360	6.640	0.949
6.0	0.380	6.620	0.946
7.0	0.400	6.600	0.943
8.0	0.420	6.580	0.940
9.0	0.440	6.560	0.937
10.0	0.460	6.540	0.934
15.0	0.530	6.470	0.924
20.0	0.600	6.400	0.914
25.0	0.660	6.340	0.906
30.0	0.720	6.280	0.897
35.0	0.760	6.240	0.891
40.0	0.860	6.140	0.877
45.0	0.970	6.030	0.861
50.0	1.040	5.960	0.851
55.0	1.090	5.910	0.844
60.0	1.120	5.880	0.840



Remarks

Borehole dry.
Water level assumed for calculation.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH105

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	95.00	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 20/10/2015	**Project Contractor** Galliford Try	**Sheet** 5/7

Height of casing above ground level:	1.00	**m**
Depth to Base of Borehole:	8.80	**m bgl**
Depth to Base of Casing:	8.20	**m bgl**
Depth to equilibrium water level:	8.80	**m btoc**
Test Length L:	0.60	**m**
Diameter of Test Length D:	0.20	**m**
Area of Test Section:	0.0314	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	2.0731	

PERMEABILITY (after Hvorslev, 1951)

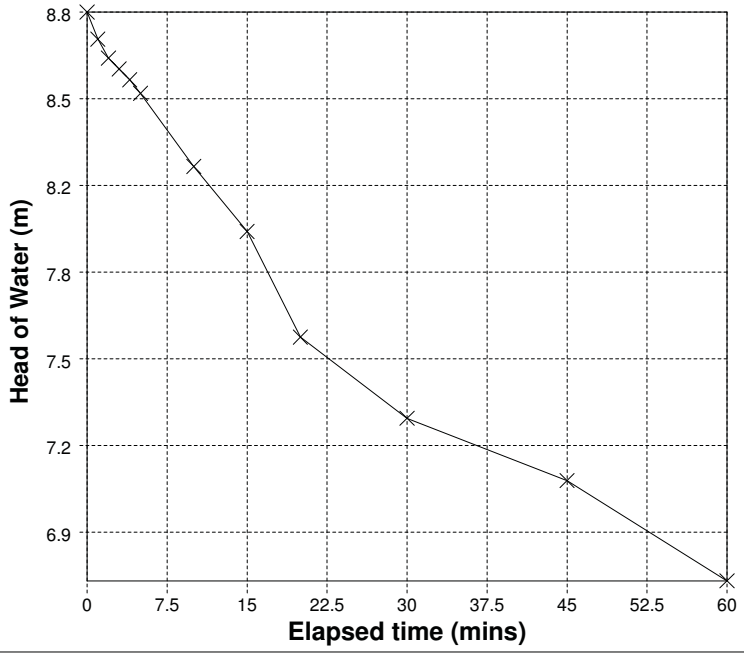
General Approach

H1 selected at t= 8.67 mins (=t1 = 60.6 secs)

H2 selected at t= 7.057 mins (=t2 = 2704.8 secs)

k = 1.18E-06 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	8.800	1.000
1.0	0.100	8.700	0.989
2.0	0.170	8.630	0.981
3.0	0.210	8.590	0.976
4.0	0.250	8.550	0.972
5.0	0.300	8.500	0.966
10.0	0.570	8.230	0.935
15.0	0.810	7.990	0.908
20.0	1.200	7.600	0.864
30.0	1.500	7.300	0.830
45.0	1.730	7.070	0.803
60.0	2.100	6.700	0.761



Remarks

Borehole dry.
Water level assumed for calculation.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH106

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	95.70	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 19/10/2015	**Project Contractor** Galliford Try	**Sheet** 6/7

Height of casing above ground level:	0.20	**m**
Depth to Base of Borehole:	4.70	**m bgl**
Depth to Base of Casing:	3.00	**m bgl**
Depth to equilibrium water level:	4.70	**m btoc**
Test Length L:	1.70	**m**
Diameter of Test Length D:	0.15	**m**
Area of Test Section:	0.0177	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	3.4204	

PERMEABILITY (after Hvorslev, 1951)

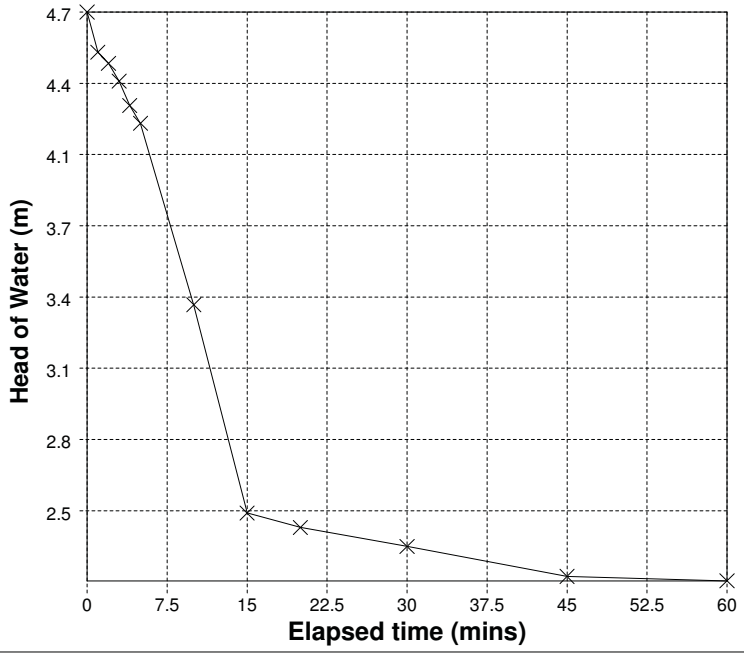
General Approach

H1 selected at t= 4.51 mins (=t1 = 60.6 secs)

H2 selected at t= 2.457 mins (=t2 = 905.4 secs)

k = 3.71E-06 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	4.700	1.000
1.0	0.180	4.520	0.962
2.0	0.230	4.470	0.951
3.0	0.310	4.390	0.934
4.0	0.420	4.280	0.911
5.0	0.500	4.200	0.894
10.0	1.315	3.385	0.720
15.0	2.250	2.450	0.521
20.0	2.315	2.385	0.507
30.0	2.400	2.300	0.489
45.0	2.535	2.165	0.461
60.0	2.555	2.145	0.456



Remarks

Borehole dry.
Water level assumed for calculation.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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IAN FARMER ASSOCIATES

Site	Borehole Number
Eastern Command & Custody Facility	BH107

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	95.90	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 20/10/2015	**Project Contractor** Galliford Try	**Sheet** 7/7

Height of casing above ground level:	0.30	**m**
Depth to Base of Borehole:	4.50	**m bgl**
Depth to Base of Casing:	3.00	**m bgl**
Depth to equilibrium water level:	4.50	**m btoc**
Test Length L:	1.50	**m**
Diameter of Test Length D:	0.15	**m**
Area of Test Section:	0.0177	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	3.1435	

PERMEABILITY (after Hvorslev, 1951)

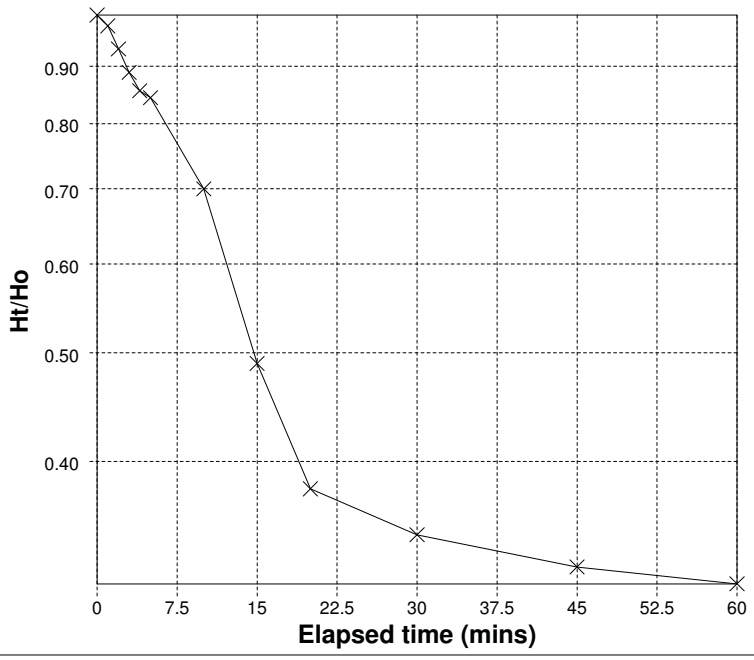
Basic Time Lag Analysis

The value T when Ht/Ho = 0.37 is the basic time lag, T

T = 22.35

k = 4.19E-06 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	4.500	1.000
1.0	0.100	4.400	0.978
2.0	0.300	4.200	0.933
3.0	0.500	4.000	0.889
4.0	0.650	3.850	0.856
5.0	0.700	3.800	0.844
10.0	1.350	3.150	0.700
15.0	2.300	2.200	0.489
20.0	2.800	1.700	0.378
30.0	2.950	1.550	0.344
45.0	3.050	1.450	0.322
60.0	3.100	1.400	0.311



Remarks

Borehole dry.
Water level assumed for calculation.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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Site	Borehole Number
Eastern Command & Custody Facility	BH04 HIST

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	96.00	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 06/11/2014	**Project Contractor** Galliford Try	**Sheet** 1/4

Height of casing above ground level:	0.00	**m**
Depth to Base of Borehole:	9.00	**m bgl**
Depth to Base of Casing:	6.00	**m bgl**
Depth to equilibrium water level:	0.40	**m btoc**
Test Length L:	3.00	**m**
Diameter of Test Length D:	0.15	**m**
Area of Test Section:	0.0177	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	5.1090	

PERMEABILITY (after Hvorslev, 1951)

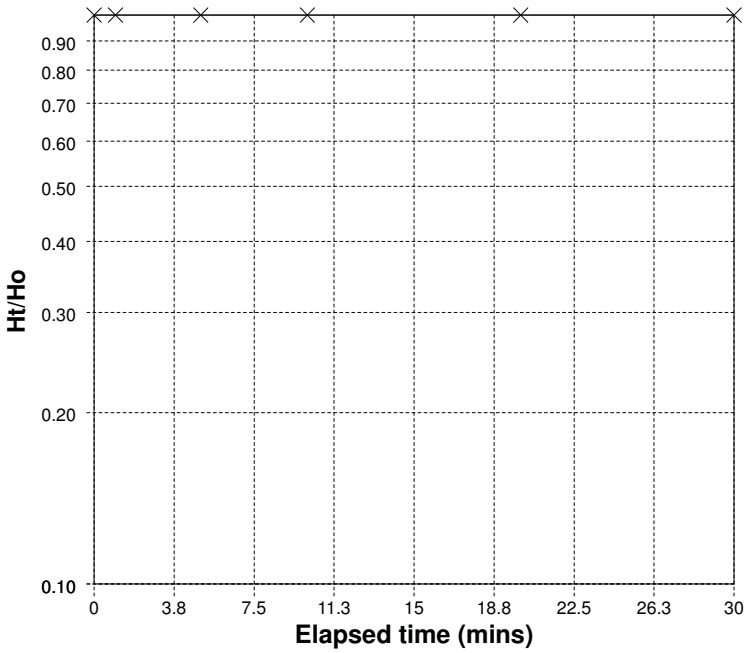
Basic Time Lag Analysis

The value T when Ht/Ho = 0.37 is the basic time lag, T

T =

k = **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	0.400	1.000
1.0	0.000	0.400	1.000
5.0	0.000	0.400	1.000
10.0	0.000	0.400	1.000
20.0	0.000	0.400	1.000
30.0	0.000	0.400	1.000



Remarks

No fall in water level.
Permeability not calculated.

Key: bgl = Below Ground Level btoc = Below Top of Casing

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Site	Borehole Number
Eastern Command & Custody Facility	BH05 HIST

In Situ Permeability Type	Test No.	Ground Level (mOD)	Client	Job Number
Falling Head	1	96.00	Police & Crime Commissioner for North Wales	41788
	Location	**Dates** 10/11/2014	**Project Contractor** Galliford Try	**Sheet** 2/4

Height of casing above ground level:	0.00	**m**
Depth to Base of Borehole:	10.00	**m bgl**
Depth to Base of Casing:	5.00	**m bgl**
Depth to equilibrium water level:	3.54	**m btoc**
Test Length L:	5.00	**m**
Diameter of Test Length D:	0.15	**m**
Area of Test Section:	0.0177	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	7.4801	

PERMEABILITY (after Hvorslev, 1951)

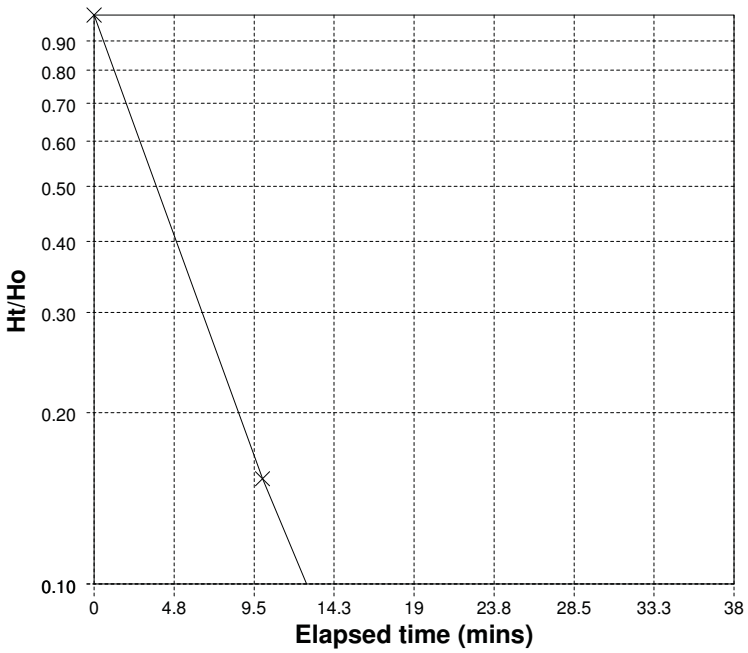
Basic Time Lag Analysis

The value T when Ht/Ho = 0.37 is the basic time lag, T

T = 7.44

k = 5.29E-06 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	3.540	1.000
10.0	3.000	0.540	0.153
15.0	3.300	0.240	0.068
20.0	3.400	0.140	0.040
25.0	3.460	0.080	0.023
30.0	3.500	0.040	0.011
38.0	3.540	0.000	0.000



Remarks

Key: bgl = Below Ground Level btoc = Below Top of Casing

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			Site Eastern Command & Custody Facility	**Borehole Number** BH05 HIST
In Situ Permeability Type Falling Head	**Test No.** 2	**Ground Level (mOD)** 96.00	**Client** Police & Crime Commissioner for North Wales	**Job Number** 41788
	Location	**Dates** 10/11/2014	**Project Contractor** Galliford Try	**Sheet** 3/4

Height of casing above ground level:	0.00	**m**
Depth to Base of Borehole:	10.00	**m bgl**
Depth to Base of Casing:	5.00	**m bgl**
Depth to equilibrium water level:	3.54	**m btoc**
Test Length L:	5.00	**m**
Diameter of Test Length D:	0.15	**m**
Area of Test Section:	0.0177	**m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	7.4801	

PERMEABILITY (after Hvorslev, 1951)

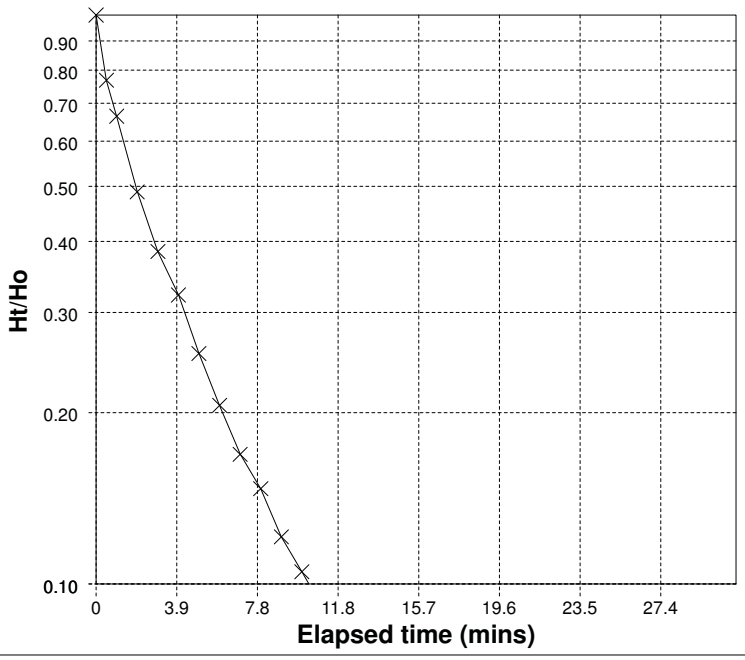
Basic Time Lag Analysis

The value T when Ht/Ho = 0.37 is the basic time lag, T

T = 3.23

k = 1.22E-05 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	3.540	1.000
0.5	0.820	2.720	0.768
1.0	1.190	2.350	0.664
2.0	1.810	1.730	0.489
3.0	2.180	1.360	0.384
4.0	2.400	1.140	0.322
5.0	2.640	0.900	0.254
6.0	2.810	0.730	0.206
7.0	2.940	0.600	0.169
8.0	3.020	0.520	0.147
9.0	3.110	0.430	0.121
10.0	3.170	0.370	0.105
15.0	3.360	0.180	0.051
20.0	3.440	0.100	0.028
25.0	3.480	0.060	0.017
30.0	3.510	0.030	0.008
31.1	3.540	0.000	0.000



Remarks

Key: bgl = Below Ground Level btoc = Below Top of Casing

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			Site Eastern Command & Custody Facility	**Borehole Number** **BH05 HIST**
In Situ Permeability Type Falling Head	**Test No.** 3	**Ground Level (mOD)** 96.00	**Client** Police & Crime Commissioner for North Wales	**Job Number** 41788
	Location	**Dates** 10/11/2014	**Project Contractor** Galliford Try	**Sheet** 4/4

Height of casing above ground level:	0.00 **m**
Depth to Base of Borehole:	10.00 **m bgl**
Depth to Base of Casing:	5.00 **m bgl**
Depth to equilibrium water level:	3.54 **m btoc**
Test Length L:	5.00 **m**
Diameter of Test Length D:	0.15 **m**
Area of Test Section:	0.0177 **m2**
Intake Factor F: (after condition D, figure 6, BS 5930)	7.4801

PERMEABILITY (after Hvorslev, 1951)

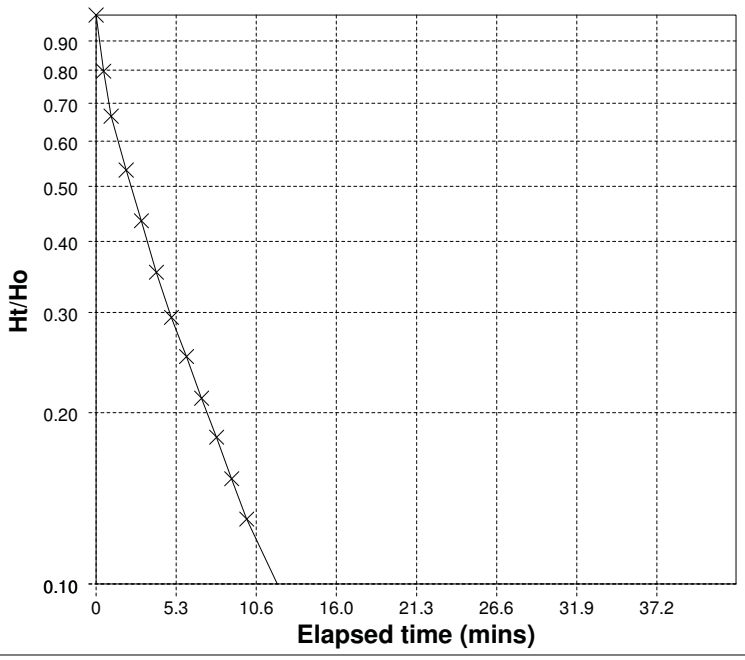
Basic Time Lag Analysis

The value T when Ht/Ho = 0.37 is the basic time lag, T

T = 3.79

k = 1.04E-05 **ms-1**

Elapsed time (mins)	Depth to water (m btoc)	Head of Water, H (m)	Ht / Ho
0.0	0.000	3.540	1.000
0.5	0.720	2.820	0.797
1.0	1.190	2.350	0.664
2.0	1.650	1.890	0.534
3.0	2.000	1.540	0.435
4.0	2.290	1.250	0.353
5.0	2.500	1.040	0.294
6.0	2.650	0.890	0.251
7.0	2.790	0.750	0.212
8.0	2.900	0.640	0.181
9.0	3.000	0.540	0.153
10.0	3.080	0.460	0.130
15.0	3.300	0.240	0.068
20.0	3.410	0.130	0.037
25.0	3.460	0.080	0.023
30.0	3.490	0.050	0.014
40.0	3.520	0.020	0.006
42.5	3.540	0.000	0.000



Remarks

Key: bgl = Below Ground Level btoc = Below Top of Casing

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WYG ENVIRONMENT
Quay West, Trafford Wharf Road, Salford Quays
Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number
HDP101

Project : **Wrexham Custody Facility, Wrexham**
Project Number : **A098075**
Client : **Galliford Try Building**
Method : **Hand Excavation**
Co-ordinates :
Level :

Scale 1:50 **Sheet 1 of 1**
Logged By : **NS**
Checked By : **SH**
Start Date : **25/08/16**
Finish Date : **25/08/16**

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth	Sample Test Type	Notes / Remarks
MADE GROUND: CONCRETE. Reinforced.			0.18					
MADE GROUND: Light greyish brown very sandy fine to coarse GRAVEL of sub-angular to sub-rouded limestone and concrete. Sand is fine to medium. - Strong sweet chemical odour between 0.18m and 0.43m bgl.			0.43			0.30	ES	PID=0.0ppm
			1.00			0.90	ES	PID=0.0ppm
MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium angular to sub-rounded coal, mudstone, siltstone and sandstone. Sand is fine to medium.								
End of Trial Pit at 1.00 m								

Observations / Remarks

1. Hand dug pit was backfilled with arisings upon completion.
2. Groundwater was not observed.

Excavation Information

Length : 0.34m
Width : 0.35m
Orientation : -
Stability : Stable
Shoring : Not required

Groundwater

Struck	Rising to	Time	Remarks

WYG ENVIRONMENT

Quay West, Trafford Wharf Road, Salford Quays

Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number

HDP102

Project : **Wrexham Custody Facility, Wrexham**
Project Number : **A098075**
Client : **Galliford Try Building**
Method : **Hand Excavation**
Co-ordinates :
Level :

Scale 1:50 **Sheet 1 of 1**

Logged By : **NS**
Checked By : **SH**
Start Date : **25/08/16**
Finish Date : **25/08/16**

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth	Sample Test Type	Notes / Remarks
MADE GROUND: Firm dark brown slightly sandy slightly gravelly clayey TOPSOIL. Gravel is fine to medium sub-angular to rounded sandstone, mudstone and coal. Sand is fine to medium.			**0.19**			0.10	ES	PID=0.0ppm
			0.43			0.30	ES	PID=0.0ppm
MADE GROUND: Yellowish brown fine to coarse SAND.				▽ 0.76		0.80	ES	PID=0.0ppm
MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub-angular to sub-rounded coal, mudstone, sandstone and quartzite. Sand is fine to medium. Slight organic odour. - Slightly damp below 0.76m bgl.			**1.00**					
End of Trial Pit at 1.00 m								

Observations / Remarks

1. Hand dug pit was backfilled with arisings upon completion.
2. Groundwater seepage was encountered at 0.76m bgl.

Excavation Information

Length : 0.40m
Width : 0.36m
Orientation : -
Stability : Stable
Shoring : Not required

Groundwater

Struck	Rising to	Time	Remarks
0.76	-	-	

WYG ENVIRONMENT

Quay West, Trafford Wharf Road, Salford Quays

Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number

HDP103

Project : **Wrexham Custody Facility, Wrexham**
Project Number : **A098075**
Client : **Galliford Try Building**
Method : **Hand Excavation**
Co-ordinates :
Level :

Scale 1:50 **Sheet 1 of 1**

Logged By : **NS**
Checked By : **SH**
Start Date : **25/08/16**
Finish Date : **25/08/16**

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth	Sample Test Type	Notes / Remarks
MADE GROUND: CONCRETE. Reinforced.			0.21					
MADE GROUND: Light grey very sandy fine to coarse GRAVEL with low cobble content. Gravel of angular to sub-rounded limestone and concrete. Sand is fine to coarse.			0.53			0.40	ES	PID=0.0ppm
MADE GROUND: Firm reddish brown slightly sandy gravelly CLAY. Gravel is fine to coarse angular to sub-rounded coal, mudstone, siltstone and sandstone. Sand is fine to coarse (reworked).			1.00			0.90	ES	PID=0.0ppm
End of Trial Pit at 1.00 m								

Observations / Remarks

1. Hand dug pit was backfilled with arisings upon completion.
2. Groundwater was not observed.

Excavation Information

Length : 0.50m
Width : 0.40m
Orientation : -
Stability : Stable.
Shoring : Not required.

Groundwater

Struck	Rising to	Time	Remarks

WYG ENVIRONMENT

Quay West, Trafford Wharf Road, Salford Quays

Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number

HDP104

Project : **Wrexham Custody Facility, Wrexham**
Project Number : **A098075**
Client : **Galliford Try Building**
Method : **Hand Excavation**
Co-ordinates :
Level :

Scale 1:50 **Sheet 1 of 1**

Logged By : **NS**
Checked By : **SH**
Start Date : **25/08/16**
Finish Date : **25/08/16**

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Water Strike (m)	Installation/ Backfill	Sample Test Depth	Sample Test Type	Notes / Remarks
MADE GROUND: Firm brown slightly gravelly sandy clayey TOPSOIL. Gravel of fine to coarse sub-angular to rounded sandstone, mudstone and coal with occassional rootlets. Sand is fine to medium.			0.35			0.30	ES	PID=0.0ppm
MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY with low cobble content. Gravel is of fine to coarse angular to sub-rounded coal, mudstone, sandstone and siltstone.			1.00			0.90	ES	PID=0.0ppm
End of Trial Pit at 1.00 m								

Observations / Remarks

1. Hand dug pit was backfilled with arisings upon completion.
2. Groundwater was not observed.

Excavation Information

Length : 0.36m
Width : 0.43m
Orientation : -
Stability : Stable.
Shoring : Not required.

Groundwater

Struck	Rising to	Time	Remarks

WYG ENVIRONMENT
Quay West, Trafford Wharf Road, Salford Quays
Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number
WS101

Project	:	**Wrexham Custody Facility, Wrexham**
Project Number	:	**A098075**
Client	:	**Galliford Try Building**
Method	:	**Dynamic Sampling Rig**
Co-ordinates	:	
Level	:	

Hole Information

From	To	Method
0.00m	1.20m	Hand Excavation
1.20m	5.45m	Dynamic Sampling Rig

Scale 1:50 **Sheet 1 of 1**

Logged By : NS
Checked By : SH
Start Date : 25/08/16
Finish Date : 25/08/16

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation Backfill	Sample Test Depth	Sample Test Type	Notes / Remarks
MADE GROUND: CONCRETE. Reinforced.			0.20						
MADE GROUND: Light greyish brown sandy fine to medium GRAVEL of angular to sub-rounded limestone and sandstone. Slight chemical odour.			0.62				0.40	ES	PID=0ppm
MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY. Gravel is of fine to medium angular to rounded sandstone, coal, siltstone and mudstone. Sand is fine to medium (reworked).					1.00		1.00	ES	PID=0ppm
							1.20	S D	N=4 (1,1,1,1,1,1)
- Damp between 1.6m and 2.0m bgl.							1.50	ES	PID=0ppm
							2.00	S D	N=2 (0,0,0,0,1,1)
			2.35				2.40	ES	PID=0ppm
Firm greyish brown slightly sandy slightly gravelly silty CLAY. Gravel is of fine to medium sub-angular to sub-rounded mudstone, sandstone, siltstone and coal.							2.70	ES	PID=0ppm
							3.00	S D	N=10 (2,2,2,2,3,3)
			3.33				3.50	ES	PID=0ppm
Firm greyish dark brown slightly silty CLAY. Strong organic odour.							3.70	D	
			3.76				3.90	ES	PID=0ppm
Spongy fibrous brown silty PEAT. Strong organic odour.			4.04				4.00	S D	N=8 (2,2,2,2,2,2)
Firm greyish brown silty CLAY.							4.50	ES	PID=0ppm
							5.00	S D	N=11 (1,2,2,3,3,3)
			5.45						
End of Window Sample at 5.45 m									

Observations / Remarks

1. Inspection pit hand excavated to 1.2m bgl prior to drilling.
2. Slight groundwater seepage at 1.0m bgl.
3. Upon completion exploratory hole installed with 50mm monitoring well.

Window Sampler Runs

From	To	Diameter	Recovery	Remarks
0.00m	1.20m	200mm	100%	
1.20m	2.00m	87mm	100%	
2.00m	3.00m	77mm	100%	
3.00m	4.00m	67mm	100%	
4.00m	5.45m	57mm	100%	

Groundwater

Struck	Rising to	Time	Remarks
1.00m	-	-	

WYG ENVIRONMENT
Quay West, Trafford Wharf Road, Salford Quays
Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number
WS102

Project	:	**Wrexham Custody Facility, Wrexham**
Project Number	:	**A098075**
Client	:	**Galliford Try Building**
Method	:	**Dynamic Sampling Rig**
Co-ordinates	:	
Level	:	

Hole Information

From	To	Method
0.00m	1.20m	Hand Excavation
1.20m	5.45m	Dynamic Sampling Rig

Scale 1:50 **Sheet 1 of 1**

Logged By : NS
Checked By : SH
Start Date : 25/08/16
Finish Date : 25/08/16

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation Backfill	Sample Depth	Sample Type	Notes / Remarks
MADE GROUND: CONCRETE. Reinforced.			0.20						
MADE GROUND: Light greyish brown very sandy fine to coarse GRAVEL of angular to sub-angular limestone, sandstone and mudstone. Sand is fine to coarse.			0.74				0.40	ES	PID=0ppm
MADE GROUND: Soft reddish brown to brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub-angular to angular sandstone, mudstone, coal, siltstone and quartzite. Sand is fine to medium (reworked).			1.80		1.00		0.90	ES	PID=0ppm
							1.20	S D	N=4 (1,1,1,1,1,1)
							1.50	ES	PID=0ppm
Firm brown mottled grey slightly sandy slightly gravelly silty CLAY. Gravel of fine to medium sub-angular to sub-rounded sandstone, mudstone and coal. Slight organic odour.							2.00	S D	N=3 (0,0,0,1,1,1)
							2.50	ES	PID=0ppm
							3.00	S D	N=11 (3,3,2,3,3,3)
							3.50	ES	PID=0ppm
			3.73				3.80	ES	PID=0ppm
Spongy fibrous dark brown silty clayey PEAT.			3.92				4.00	S D	N=8 (2,2,2,2,2,2)
Firm greyish brown silty CLAY. Slight organic odour.							4.50	ES	PID=0ppm
							5.00	S D	N=14 (3,3,3,3,4,4)
			5.45						
End of Window Sample at 5.45 m									

Observations / Remarks

1. Inspection pit hand excavated to 1.2m bgl prior to drilling.
2. Slight groundwater seepage at 1.0m bgl.
3. Upon completion exploratory hole installed with 50mm monitoring well.

Window Sampler Runs

From	To	Diameter	Recovery	Remarks
0.00m	1.20m	200mm	100%	
1.20m	2.00m	87mm	100%	
2.00m	3.00m	77mm	100%	
3.00m	4.00m	67mm	100%	
4.00m	5.45m	57mm	100%	

Groundwater

Struck	Rising to	Time	Remarks
1.00m	-	-	

WYG ENVIRONMENT
Quay West, Trafford Wharf Road, Salford Quays
Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number
WS103

Project	:	**Wrexham Custody Facility, Wrexham**
Project Number	:	**A098075**
Client	:	**Galliford Try Building**
Method	:	**Dynamic Sampling Rig**
Co-ordinates	:	
Level	:	

Hole Information

From	To	Method
0.00m	1.20m	Hand Excavation
1.20m	5.00m	Dynamic Sampling Rig

Scale 1:50 **Sheet 1 of 1**

Logged By : NS
Checked By : SH
Start Date : 25/08/16
Finish Date : 25/08/16

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation Backfill	Sample Test Depth	Sample Test Type	Notes / Remarks
MADE GROUND: CONCRETE. Reinforced.			0.20						
MADE GROUND: Light greyish brown very sandy fine to coarse GRAVEL of angular to sub-angular limestone and sandstone. Sand is fine to coarse. - Damp with slight hydrocarbon odour between 0.7m and 0.9m bgl.			0.90				0.40	ES	PID=0ppm
MADE GROUND: Soft reddish brown slightly sandy slightly gravelly CLAY. Gravel is of fine to medium sub-angular to rounded sandstone, mudstone, coal and siltstone. Sand is fine to medium. - Sandstone cobble at 1.74m bgl.			1.84				1.10 1.20 1.50	ES S D ES	PID=0ppm N=6 (1,1,1,2,1,2) PID=0ppm
Soft brownish grey slightly sandy slightly silty slightly gravelly CLAY. Gravel is of fine to medium sub-angular to sub-rounded sandstone, coal and mudstone. Rare organic matter with slight organic odour. - Sandstone cobble at 2.92m bgl.			3.38				2.00 2.50 3.00	S D ES S D	N=3 (0,0,1,0,1,1) PID=0ppm N=7 (2,2,1,2,2,2)
Soft dark greyish brown slightly sandy slightly silty CLAY with organic odour. Sand is fine to medium.			3.90				3.50	ES	PID=0ppm
Spongy fibrous brown PEAT.			4.10				4.00	S D	N=8 (2,2,2,2,2,2)
Firm greyish brown silty CLAY with organic odour.			5.00				4.50	ES	PID=0ppm
End of Window Sample at 5.00 m									

Observations / Remarks

1. Inspection pit hand excavated to 1.2m bgl prior to drilling.
2. Groundwater was not observed.
3. Upon completion exploratory hole installed with 50mm monitoring well.

Window Sampler Runs

From	To	Diameter	Recovery	Remarks
0.00m	1.20m	200mm	100%	
1.20m	2.00m	87mm	100%	
2.00m	3.00m	77mm	100%	
3.00m	4.00m	67mm	100%	
4.00m	5.00m	57mm	100%	

Groundwater

Struck	Rising to	Time	Remarks

WYG ENVIRONMENT
Quay West, Trafford Wharf Road, Salford Quays
Tel: 0161 8723223 Fax: 0161 8723193

Exploratory Hole Number
WS104

Project	:	**Wrexham Custody Facility, Wrexham**
Project Number	:	**A098075**
Client	:	**Galliford Try Building**
Method	:	**Dynamic Sampling Rig**
Co-ordinates	:	
Level	:	

Hole Information

From	To	Method
0.00m	1.20m	Hand Excvation
1.20m	5.45m	Dynamic Sampling Rig

Scale 1:50 **Sheet 1 of 1**

Logged By : NS
Checked By : SH
Start Date : 25/08/16
Finish Date : 25/08/16

Strata Description	Legend	Reduced Level (mOD)	Depth (m)	Casing (m)	Water Strike (m)	Installation Backfill	Sample Depth	Sample Type	Notes / Remarks
MADE GROUND: CONCRETE. Reinforced.			0.21						
- Plastic membrane beneath concrete.									
MADE GROUND: Light greyish brown very sandy fine to coarse GRAVEL of sub-angular to sub-rounded of limestone and concrete. Sand is fine to medium.			0.87				0.50	ES	PID=0ppm
Soft brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium sub-angular to sub-rounded sandstone, coal, mudstone and siltstone. Sand is fine to medium (reworked).							1.00	ES	PID=0ppm
							1.20	S D	N=5 (1,1,1,1,1,2)
							1.50	ES	PID=0ppm
			2.05				2.00	S D	N=7 (2,1,1,2,2,2)
Firm greyish reddish brown slightly sandy slightly silty slightly gravelly CLAY with low cobble content. Gravel is of fine to medium sub-angular to rounded sandstone, mudstone, coal and siltstone. Cobbles are of sandstone and timber.							2.40	ES	PID=0ppm
- Slight organic odour between 2.05m and 2.78m bgl.							3.00	S D	N=17 (3,3,4,4,4,5)
- Stiff below 3.0m bgl.							3.50	ES	PID=0ppm
							4.00	S D	N=20 (4,4,4,5,5,6)
							4.50	ES	PID=0ppm
							5.00	S D	N=27 (4,6,6,6,7,8)
			5.45						
End of Window Sample at 5.45 m									

Observations / Remarks

1. Inspection pit hand excavated to 1.2m bgl prior to drilling.
2. Groundwater was not observed.
3. Upon completion exploratory hole was backfilled with arisings.

Window Sampler Runs

From	To	Diameter	Recovery	Remarks
0.00m	1.20m	200mm	100%	
1.20m	2.00m	87mm	100%	
2.00m	3.00m	77mm	100%	
3.00m	4.00m	67mm	100%	
4.00m	5.00m	57mm	100%	

Groundwater

Struck	Rising to	Time	Remarks

Appendix B

Gas Monitoring Records

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Geotechnical & Environmental Specialists

Gas and Groundwater Monitoring Results

Contract Number:	*41543*	**Gas Monitor:**	*GFM430*
Contract Name:	*Wrexham Custody Suite*	**Readings Taken By:**	*NM*
Date:	*28th November 2014*	**Checked By:**	*HH*

Background Readings:			O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm	
	Weather Conditions:	*Dry, Cloudy, 6.2 °c*						
	Ground Conditions (dry / wet etc):	*Wet*						
	Atmospheric Pressure (Start):	*994mb*	*20.3*	*0.0*	*0.0*	*0*	*0*	
	Atmospheric Pressure (Finish):	*994mb*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		LEL	CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH02	*0.0*	*19.8*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0*	*0.00*	*0.0*	*9.76*	*6.05*	*NR*
BH04	*0.0*	*16.7*	*4.5*	*8.2*	*8.2*	*>max*	*0*	*0*	*0.00*	*0.0*	*9.08*	*0.53*	*NR*
BH05	*0.0*	*6.0*	*5.6*	*54.7*	*54.7*	*>max*	*0*	*0*	*0.00*	*0.0*	*9.11*	*3.43*	*NR*
WS07	*0.0*	*16.9*	*0.6*	*0.5*	*0.3*	*0*	*0*	*0*	*0.00*	*0.0*	*3.50*	*2.49*	*NR*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: NR = Not recorded

Readings from previous investigation

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Geotechnical & Environmental Specialists

Gas and Groundwater Monitoring Results

Contract Number:	*41543*	**Gas Monitor:**	*GA200*
Contract Name:	*Wrexham Custody Suite*	**Readings Taken By:**	*LT*
Date:	*4th December 2014*	**Checked By:**	*HH*

Background Readings:		O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm	
	Weather Conditions: *Overcast*						
	Ground Conditions (dry / wet etc): *Wet, muddy*						
	Atmospheric Pressure (Start): *1012mb*	*20.9*	*0.0*	*0.0*	*0*	*0*	
	Atmospheric Pressure (Finish): *1011mb*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		LEL	CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH02	*NR*	*17.1*	*2.4*	*0.0*	*0.2*	*0*	*0*	*0*	*0.35*	*5.0*	*9.91*	*DRY*	*NR*
BH04	*NR*	*10.1*	*14.5*	*66.8*	*31.6*	*0*	*0*	*0*	*0.40*	*-0.1*	*9.15*	*0.83*	*NR*
BH05	*NR*	*14.3*	*3.7*	*32.7*	*20.4*	*0*	*0*	*0*	*0.40*	*-0.2*	*9.10*	*3.54*	*NR*
WS01	*NR*	*0.5*	*2.6*	*30.4*	*30.4*	*0*	*0*	*0*	*0.34*	*2.7*	*4.39*	*1.86*	*NR*
WS07	*NR*	*18.3*	*0.7*	*0.1*	*0.4*	*2*	*0*	*0*	*0.41*	*0.0*	*3.50*	*2.51*	*NR*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: NR = Not recorded

Readings from previous investigation

IAN FARMER ASSOCIATES
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Gas and Groundwater Monitoring Results

Contract Number:	*41543*	**Gas Monitor:**	*GA2000*
Contract Name:	*Wrexham Custody Suite*	**Readings Taken By:**	*LT*
Date:	*15th December 2014*	**Checked By:**	*HH*

Background Readings:			O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm	
	Weather Conditions:	*Sunny spells*						
	Ground Conditions (dry / wet etc):	*Wet, muddy*						
	Atmospheric Pressure (Start):	*1002mb*	*20.3*	*0.0*	*0.0*	*0*	*0*	
	Atmospheric Pressure (Finish):	*1002mb*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		LEL	CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH02	*0.0*	*20.8*	*0.0*	*0.0*	*0.0*	*0*	*0*	*0*	*0.00*	*-4.4*	*9.79*	*DRY*	*NR*
BH04	*0.0*	*12.7*	*8.4*	*17.2*	*50.5*	*0*	*0*	*0*	*0.00*	*-0.1*	*9.18*	*0.30*	*NR*
BH05	*0.0*	*11.3*	*2.7*	*40.4*	*27.1*	*0*	*0*	*0*	*0.00*	*-0.1*	*9.00*	*3.36*	*NR*
WS01	*Gas readings not taken due to waterlogged gas valve*										*4.35*	*1.40*	*NR*
WS07	*0.0*	*20.0*	*0.4*	*0.1*	*0.0*	*0*	*0*	*0*	*0.62*	*-0.8*	*3.49*	*2.47*	*NR*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: WS01 Flooded.

NR = Not recorded

Readings from previous investigation

IAN FARMER ASSOCIATES
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Gas and Groundwater Monitoring Results

Contract Number:	*41543*					**Gas Monitor:**	*GA2000*						
Contract Name:	*Wrexham Custody Suite*					**Readings Taken By:**	*LT*						
Date:	*12th January 2015*					**Checked By:**	*HH*						
Background Readings:	Weather Conditions:	*Overcast*	O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm						
	Ground Conditions (dry / wet etc):	*Wet, muddy*											
	Atmospheric Pressure (Start):	*995mb*	*20.8*	*0.0*	*0.0*	*0*	*0*						
	Atmospheric Pressure (Finish):	*995mb*											

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		LEL	CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH02	*0.0*	*16.4*	*3.1*	*0.2*	*0.2*	*0*	*0*	*0*	*-0.85*	*7.9*	*9.92*	*Dry*	*NR*
BH04	*Gas readings not taken due to waterlogged gas valve*										*9.18*	*GL*	*NR*
BH05	*Unable to take gas readings due to empty battery on the gas monitor*										*9.04*	*3.31*	*NR*
WS01	*0.0*	*3.2*	*2.9*	*14.9*	*14.9*	*>max*	*0*	*0*	*-0.07*	*3.2*	*4.28*	*1.73*	*NR*
WS07	*Unable to take gas readings due to empty battery on the gas monitor*										*3.52*	*2.54*	*NR*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: NR = Not recorded

Readings from previous investigation

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Gas and Groundwater Monitoring Results

Contract Number:	*41543*	**Gas Monitor:**	*GFM Series*
Contract Name:	*Wrexham Custody Suite*	**Readings Taken By:**	*LT*
Date:	*26th January 2015*	**Checked By:**	*HH*

Background Readings:		O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm	
	Weather Conditions: *Slightly overcast*	*20.0*	*0.0*	*0.0*	*0*	*0*	
	Ground Conditions (dry / wet etc): *We,t Muddy*						
	Atmospheric Pressure (Start): *1016mb*						
	Atmospheric Pressure (Finish): *1015mb*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		LEL	CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH02	*0.0*	*20.0*	*0.0*	*0.0*	*0.0*	*0*	*0*	*0*	*-260.00*	*-31.4*	*9.96*	*DRY*	*NR*
BH04	*Gas readings not taken due to waterlogged gas valve*										*9.16*	*GL*	*NR*
BH05	*>>>*	*2.7*	*4.8*	*64.3*	*64.3*	*>max*	*0*	*0*	*0.00*	*0.0*	*9.03*	*3.34*	*NR*
WS01	*>>>*	*0.0*	*3.5*	*24.6*	*24.6*	*>max*	*0*	*0*	*0.00*	*0.0*	*4.30*	*1.76*	*NR*
WS07	*0.0*	*14.0*	*3.1*	*0.3*	*0.3*	*6.4*	*0*	*0*	*0.00*	*0.0*	*3.48*	*2.54*	*NR*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: NR = Not recorded

BH05 Gas flow started at -31.6, dropped to 0. Rel pressure started at -27 dropped to 0.

Readings from previous investigation

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Gas and Groundwater Monitoring Results

Contract Number:	*41543*	**Gas Monitor:**	*GA2000*
Contract Name:	*Wrexham Custody Suite*	**Readings Taken By:**	*LT*
Date:	*9th February 2015*	**Checked By:**	*HH*

Background Readings:			O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm	
	Weather Conditions:	*Overcast*						
	Ground Conditions (dry / wet etc):	*Wet*						
	Atmospheric Pressure (Start):	*1028mb*	*20.9*	*0.0*	*0.0*	*0*	*0*	
	Atmospheric Pressure (Finish):	*1027mb*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		LEL	CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH02	*NR*	*20.6*	*0.0*	*0.0*	*0.0*	*0*	*0*	*0*	*0.38*	*0.0*	*9.95*	*DRY*	*NR*
BH04	*Gas readings not taken due to waterlogged gas valve*										*9.13*	*GL*	*NR*
BH05	*NR*	*15.0*	*2.4*	*16.5*	*26.5*	*>max*	*0*	*0*	*0.44*	*0.0*	*9.03*	*3.58*	*NR*
WS01	*NR*	*0.4*	*4.4*	*30.1*	*30.1*	*>max*	*0*	*0*	*0.36*	*2.1*	*4.26*	*2.05*	*NR*
WS07	*NR*	*19.1*	*1.1*	*0.0*	*0.0*	*0*	*0*	*0*	*0.38*	*0.0*	*3.51*	*2.59*	*NR*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: WS01, Gas flow started at +7.8 and fell to steady +2.1 gas flow.

Readings from previous investigation

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Gas and Groundwater Monitoring Results

Contract Number:	*41788*	**Gas Monitor:**	*GFM*
Contract Name:	*Eastern Command & Custody Facility*	**Readings Taken By:**	*MH/BL*
Date:	*12th November 2015*	**Checked By:**	*HH*

Background Readings:								
	Weather Conditions:	*Dry*	O_2%	CO_2%	CH_4%	CO	H_2S	
	Ground Conditions (dry / wet etc):	*Dry*	v/v	v/v	v/v	ppm	ppm	
	Atmospheric Pressure (Start):	*1012mb*	*20.1*	*0.1*	*0.0*	*0.0*	*0.0*	
	Atmospheric Pressure (Finish):	*1012mb*						
	Time (Start):	*12:30*						
	Time (Finish):	*13:30*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH101	*NR*	*19.5*	*0.5*	*0.0*	*0.0*	*0*	*0*	*37.00*	*4.9*	*11.19*	*Dry*	*ND*
BH102(S)	*NR*	*20.0*	*0.2*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*0.78*	*Dry*	*ND*
BH102(D)	*NR*	*20.2*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*7.04*	*Dry*	*ND*
BH103	*NR*	*12.2*	*2.7*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*7.80*	*7.72*	*ND*
BH104	*NR*	*19.4*	*0.8*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*4.02*	*Dry*	*ND*
BH105(S)	*NR*	*0.7*	*4.3*	*54.5*	*54.2*	*0*	*0*	*0.00*	*10.1*	*4.37*	*2.39*	*ND*
BH105(D)	*NR*	*19.6*	*0.6*	*0.0*	*0.0*	*0*	*0*	*62.00*	*0.4*	*12.67*	*Dry*	*ND*
BH106	*NR*	*19.6*	*0.8*	*0.0*	*0.0*	*0*	*0*	*1.00*	*0.0*	*5.74*	*Dry*	*ND*
BH02	*Not located*											
BH04	*NR*	*12.8*	*12.4*	*31.0*	*23.0*	*0*	*0*	*0.00*	*0.0*	*9.04*	*0.41*	*ND*
BH05	*NR*	*12.2*	*16.1*	*29.1*	*21.8*	*0*	*0*	*0.00*	*0.0*	*8.95*	*3.64*	*ND*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks:

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Gas and Groundwater Monitoring Results

Contract Number:	*41788*	**Gas Monitor:**	*GA5000*
Contract Name:	*Eastern Command & Custody Facility*	**Readings Taken By:**	*DM*
Date:	*25th November 2015*	**Checked By:**	*HH*

Background Readings:			O_2%	CO_2%	CH_4%	CO	H_2S	
	Weather Conditions:	*Rain*	v/v	v/v	v/v	ppm	ppm	
	Ground Conditions (dry / wet etc):	*Wet*						
	Atmospheric Pressure (Start):	*1002mb*	*21.0*	*0.0*	*0.0*	*0.0*	*0.0*	
	Atmospheric Pressure (Finish):	*1003mb*						
	Time (Start):	*10:00*						
	Time (Finish):	*12:30*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH101	*0.0*	*21.0*	*0.0*	*0.0*	*0.0*	*0*	*0*	*-2.17*	*0.0*	*17.23*	*DRY*	*ND*
BH102(S)	*0.0*	*20.9*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.37*	*0.0*	*0.79*	*DRY*	*ND*
BH102(D)	*0.0*	*20.9*	*0.1*	*0.0*	*0.0*	*0*	*0*	*-0.93*	*0.0*	*7.07*	*7.05*	*ND*
BH103	*0.0*	*11.9*	*3.6*	*0.0*	*0.0*	*0*	*0*	*0.31*	*0.0*	*7.80*	*7.75*	*ND*
BH104	*0.0*	*20.5*	*1.2*	*0.0*	*0.0*	*0*	*0*	*0.10*	*0.5*	*4.10*	*4.05*	*ND*
BH105(S)	*0.0*	*3.1*	*38.2*	*57.6*	*57.6*	*0*	*0*	*-0.02*	*0.0*	*17.23*	*DRY*	*ND*
BH105(D)	*0.0*	*20.7*	*0.3*	*0.6*	*0.3*	*0*	*0*	*-2.24*	*0.0*	*12.68*	*DRY*	*ND*
BH106	-	-	-	-	-	-	-	-	-	-	-	-
BH02	*0.0*	*4.9*	*22.6*	*51.4*	*51*	*0*	*0*	*2.8*	*0.6*	*9.06*	*0.35*	*ND*
BH04	*Not found - Possibly under water*											
BH05	*0.0*	*16.6*	*4.9*	*0.0*	*0.0*	*0*	*0*	*-2.07*	*0.3*	*5.68*	*DRY*	*ND*

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Remarks:

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Gas and Groundwater Monitoring Results

Contract Number:	*41788*	**Gas Monitor:**	*GA5000*
Contract Name:	*Eastern Command & Custody Facility*	**Readings Taken By:**	*NM*
Date:	*9th December 2015*	**Checked By:**	*HH*

Background Readings:							
Weather Conditions:	*Dry, 8.1c*	O_2%	CO_2%	CH_4%	CO	H_2S	
Ground Conditions (dry / wet etc):	*Dry*	v/v	v/v	v/v	ppm	ppm	
Atmospheric Pressure (Start):	*1015mb*	*21.1*	*0.0*	*0.0*	*0.0*	*0.0*	
Atmospheric Pressure (Finish):	*1014mb*						
Time (Start):	*11.30*						
Time (Finish):	*12.55*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH101	*0.0*	*21.0*	*0.0*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*17.46*	*Dry*	-
BH102(S)	*0.0*	*19.9*	*0.8*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*0.79*	*Dry*	-
BH102(D)	*0.0*	*19.4*	*1.1*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*7.06*	*Dry*	-
BH103	*0.0*	*14.2*	*3.1*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*7.95*	*Dry*	-
BH104	*0.0*	*17.9*	*2.9*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*4.06*	*3.01*	-
BH105(S)	*0.0*	*20.9*	*0.0*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*7.95*	*Dry*	-
BH105(D)	*0.0*	*20.1*	*0.5*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*4.36*	*Dry*	-
BH106	*0.0*											
BH02	-	-	-	-	-	-	-	-	-	-	-	-
BH04	*0.0*	*13.4*	*4.6*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*8.06*	*0.41*	-
BH05	*0.0*	*19.7*	*0.5*	*0.0*	*0.0*	*0*	*0*	*0.00*	*0.0*	*8.94*	*3.63*	-

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks:

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Gas and Groundwater Monitoring Results

Contract Number:	*41788*	**Gas Monitor:**	*GA5000*
Contract Name:	*Eastern Command & Custody Facility*	**Readings Taken By:**	*DM*
Date:	*16th December 2015*	**Checked By:**	*HH*

Background Readings:							
Weather Conditions:	*Light Cloud, Breezy, 13c*	O_2%	CO_2%	CH_4%	CO	H_2S	
Ground Conditions (dry / wet etc):	*Wet/Breezy*	v/v	v/v	v/v	ppm	ppm	
Atmospheric Pressure (Start):	*1005mb*	*21.0*	*0.0*	*0.0*	*0.0*	*0.0*	
Atmospheric Pressure (Finish):	*1006mb*						
Time (Start):	*11.30*						
Time (Finish):							

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH101	*0.0*	*20.8*	*0.1*	*0.0*	*0.0*	*0*	*0*	*-3.04*	*-2.7*	*17.16*	*Dry*	-
BH102(D)	*0.0*	*20.8*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.02*	*0.0*	*7.03*	*Dry*	-
BH102(S)	*0.0*	*20.8*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.07*	*0.2*	*0.79*	*Dry*	-
BH103	*0.0*	*9.2*	*4.4*	*0.0*	*0.0*	*0*	*0*	*0.05*	*0.1*	*7.83*	*7.81*	-
BH104	*0.0*	*18.6*	*3.5*	*0.0*	*0.0*	*0*	*0*	*0.14*	*0.0*	*4.06*	*4.04*	-
BH105(S)	*0.0*	*2.8*	*33.0*	*46.2*	*46.2*	*0*	*0*	*0.07*	*0.1*	*4.36*	*3.57*	-
BH105(D)	*0.0*	*20.8*	*0.1*	*0.0*	*0.0*	*0*	*0*	*-2.27*	*-1.1*	*12.66*	*Dry*	-
BH106	*0.0*	*19.3*	*1.2*	*0.9*	*0.0*	*20*	*0*	*-2.79*	*0.3*	*5.71*	*Dry*	
BH02		-	-	-	-	-	-	-	-	-	-	-
BH04	*0.0*	*15.4*	*4.9*	*24.8*	*17.8*	*0*	*0*	*0.10*	*0.1*	*9.70*	*0.25*	-
BH05	*0.0*	*12.6*	*4.9*	*30.7*	*26.5*	*0*	*0*	*0.08*	*0.4*	*8.90*	*3.62*	-
WS01	*0.0*	*3.5*	*3.5*	*6.1*	*6.1*	*0*	*0*	*-1.55*	*0.2*	*4.02*	*1.94*	-

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks:

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Gas and Groundwater Monitoring Results

Contract Number:	*41788*	**Gas Monitor:**	*GA2000*
Contract Name:	*Eastern Command & Custody Facility*	**Readings Taken By:**	*MH/BL*
Date:	*6th January 2016*	**Checked By:**	*HH*

Background Readings:		O_2%	CO_2%	CH_4%	CO	H_2S	
	Weather Conditions: *Overcast*						
	Ground Conditions (dry / wet etc): *Wet*	v/v	v/v	v/v	ppm	ppm	
	Atmospheric Pressure (Start): *970mb*	*20.3*	*0.0*	*0.1*	*0.0*	*0.0*	
	Atmospheric Pressure (Finish): *970mb*						
	Time (Start): *10.40*						
	Time (Finish):						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH101	*NR*	*20.4*	*0.0*	*0.2*	*0.1*	*0*	*0*	*0.17*	*1.4*	*17.31*	*Dry*	*NR*
BH102(D)	*NR*	*20.7*	*0.0*	*0.6*	*0.6*	*0*	*0*	*0.17*	*4.0*	*7.09*	*Dry*	*NR*
BH102(S)	*NR*	*20.7*	*0.0*	*0.5*	*0.0*	*0*	*0*	*0.17*	*0.1*	*0.75*	*Dry*	*NR*
BH103	*NR*	*5.9*	*0.3*	*0.4*	*0.4*	*0*	*0*	*0.17*	*0.1*	*7.88*	*7.72*	*NR*
BH104	*NR*	*17.7*	*3.1*	*1.1*	*1.1*	*0*	*0*	*0.21*	*-2.0*	*4.06*	*1.96*	*NR*
BH105(S)	*NR*	*2.2*	*32.4*	*46.7*	*4.8*	*<<<*	*0*	*0.17*	*-0.1*	*4.35*	*3.29*	*NR*
BH105(D)	*NR*	*2.0*	*0.7*	*2.4*	*2.0*	*<<<*	*0*	*0.17*	*5.7*	*12.77*	*Dry*	*NR*
BH106	*NR*	*17.1*	*1.9*	*1.4*	*1.4*	*<<<*	*0*	*0.21*	*6.0*	*5.73*	*Dry*	*NR*
BH02	*NR*											
BH04	*NR*											
BH05	*NR*	*11.3*	*9.2*	*85.9*	*40.0*	*0*	*0*	*0.21*	*-0.2*	*8.94*	*3.57*	*NR*
WS01	*NR*	*0.4*	*3.9*	*17.9*	*17.9*	*0*	*0*	*0.21*	*-4.5*	*4.25*	*1.64*	*NR*

>>>> = Flow above detection limit of 30 l/hr, <<< = Negative flow greater than -10 l/hr. >Max = In excess of lower explosive limit.

Remarks: Borehole BH04 Flooded unable to take reading.

Borehole BH02 Not located

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Gas and Groundwater Monitoring Results

Contract Number:	*41788*	**Gas Monitor:**	*GA5000*
Contract Name:	*Eastern Command & Custody Facility*	**Readings Taken By:**	*DM*
Date:	*20th January 2016*	**Checked By:**	*HH*

Background Readings:								
	Weather Conditions:	*Bright, Mild & c*	O_2% v/v	CO_2% v/v	CH_4% v/v	CO ppm	H_2S ppm	
	Ground Conditions (dry / wet etc):	*Wet*						
	Atmospheric Pressure (Start):	*1007*	*21.2*	*0.0*	*0.0*	*0.0*	*0.0*	
	Atmospheric Pressure (Finish):	*1008*						
	Time (Start):	*14:00*						
	Time (Finish):	*15:15*						

Hole No:	VOC ppm	O_2% v/v	CO_2% v/v	CH_4% v/v		CO ppm	H_2S ppm	Rel Pressure (mb)	Gas flow Rate (l/hr)	Depth to base of well	SWL	LNAPL or DNAPL
	Steady	Steady	Steady	Peak	Steady	Steady	Steady	Steady	Range	mBGL	mBGL	mBGL
BH101	*0.0*	*21.0*	*0.1*	*0.0*	*0.0*	*0*	*0*	*-2.36*	*-2.2*	*17.24*	*dry*	*ND*
BH102(S)	*0.0*	*20.8*	*0.1*	*0.0*	*0.0*	*0*	*0*	*0.02*	*0.1*	*0.60*	*dry*	*ND*
BH102(D)	*0.0*	*20.9*	*0.1*	*0.0*	*0.0*	*0*	*0*	*-0.65*	*-0.3*	*7.02*	*dry*	*ND*
BH103	*0.0*	*6.6*	*7.0*	*0.0*	*0.0*	*0*	*0*	*0.07*	*0.2*	*7.86*	*dry*	*ND*
BH104	*0.0*	*18.2*	*2.4*	*0.0*	*0.0*	*0*	*0*	*5.40*	*0.5*	*4.07*	*1.77*	*ND*
BH105(S)	*0.0*	*9.2*	*15.3*	*12.5*	*12.5*	*0*	*0*	*0.10*	*0.4*	*4.37*	*3.55*	*ND*
BH105(D)	*0.0*	*16.1*	*4.8*	*0.0*	*0.0*	*0*	*0*	*-2.68*	*-2.7*	*12.65*	*dry*	*ND*
BH04	*0.0*	*14.4*	*8.1*	*26.6*	*26.6*	*0*	*0*	*4.28*	*-3.5*	*9.09*	*0.1*	*ND*
BH02	*0.0*	*21.2*	*0.1*	*3.5*	*0.0*	*0*	*0*	*0.03*	*-2.6*	*9.70*	*9.69*	*ND*
BH05	*0.0*	*3.6*	*13.4*	*77.5*	*65.3*	*0*	*0*	*0.12*	*0.4*	*8.90*	*3.68*	*ND*

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Remarks:

Appendix C

Tabulated Gas Monitoring Data

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SITE: PROPOSED POLICE STATION, WREXHAM

Hole ID	Events	Date	BP	BP diff	PID	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	LEL STEADY	CO	H2S	Flow	Depth to Base of Well	Screen Interval	Target	Standing Water Level	Screen Submerged	LNAPL or DNAPL	Comment
			hPa	hPa	ppm	%v/v	%v/v	%v/v	%v/v		ppm	ppm	L/hour	m bgl	m bgl		m bgl	Y/N		
IAN FARMER ASSOCIATES																				
BH02	1	28-Nov-14	994	0	0	0	0	0.1	19.8	0	0	0	0	9.76	6-10	SANDSTONE, MUDSTONE	6.05	Borderline	NR	
	2	04-Dec-14	1012	0.35	NR	0	0.2	2.4	17.1	0	0	0	5	9.91	6-10		DRY	N	NR	
	3	15-Dec-14	1002	0	0	0	0	0	20.8	0	0	0	-4.4	9.79	6-10		DRY	N	NR	
	4	12-Jan-15	995	-0.85	0	0.2	0.2	3.1	16.4	0	0	0	7.9	9.92	6-10		Dry	N	NR	
	5	26-Jan-15	1016	-260	0	0	0	0	20	0	0	0	-31.4	9.96	6-10		DRY	N	NR	
	6	09-Feb-15	1028	0.38	NR	0	0	0	20.6	0	0	0	0	9.95	6-10		DRY	N	NR	
	-	12-Nov-15	1012	-	-	-	-	-	-	-	-	-	-	-	6-10		-	NA	-	Not located
	7	25-Nov-15	1002	2.8	0	51.4	51	22.6	4.9		0	0	0.6	9.06	6-10		0.35	YES	ND	
	-	09-Dec-15	1015	-	-	-	-	-	-	-	-	-	-	-	6-10		-	NA	-	
	-	16-Dec-15	1005	-	-	-	-	-	-	-	-	-	-	-	6-10		-	NA	-	
	-	06-Jan-16	970	-	NR	-	-	-	-	-	-	-	-	-	6-10		-	NA	-	
	8	20-Jan-16	1007	0.03	0	3.5	0	0.1	21.2	-	0	0	-2.6	9.7	6-10		9.69	N	ND	
BH04	1	28-Nov-14	994	0	0	8.2	8.2	4.5	16.7	>max	0	0	0	9.08	6-9	Spongy, dark brown/black pseudo fibrous PEAT	0.53	YES	NR	
	2	04-Dec-14	1012	0.4	NR	66.8	31.6	14.5	10.1	0	0	0	-0.1	9.15	6-9		0.83	YES	NR	
	3	15-Dec-14	1002	0	0	17.2	50.5	8.4	12.7	0	0	0	-0.1	9.18	6-9		0.3	YES	NR	
	-	12-Jan-15	995	-	-	-	-	-	-	-	-	-	-	-	6-9		-	YES	-	Gas readings not taken due to waterlogged gas valve
	-	26-Jan-15	1016	-	-	-	-	-	-	-	-	-	-	-	6-9		-	YES	-	Gas readings not taken due to waterlogged gas valve
	-	09-Feb-15	1028	-	-	-	-	-	-	-	-	-	-	-	6-9		-	YES	-	Gas readings not taken due to waterlogged gas valve
	4	12-Nov-15	1012	0	NR	31	23	12.4	12.8	-	0	0	0	9.04	6-9		0.41	YES	ND	
		25-Nov-15	1002	-	-	-	-	-	-	-	-	-	-	-	6-9		-	YES	-	Not found - Possibly under water
	5	09-Dec-15	1015	0	0	0	0	4.6	13.4	-	0	0	0	8.06	6-9		0.41	YES	-	
	6	16-Dec-15	1005	0.1	0	24.8	17.8	4.9	15.4	-	0	0	0.1	9.7	6-9		0.25	YES	-	
	-	06-Jan-16	970		NR	-	-	-	-	-	-	-	-	-	6-9		-	NA		
	7	20-Jan-16	1007	4.28	0	26.6	26.6	8.1	14.4	-	0	0	-3.5	9.09	6-9		0.1	YES	ND	
BH05	2	28-Nov-14	994	0	0	54.7	54.7	5.6	6	>max	0	0	0	9.11	5-10	Spongy, dark brown/black pseudo fibrous PEAT, SANDSTONE, SILTSTONE	3.43	YES	NR	
	3	04-Dec-14	1012	0.4	NR	32.7	20.4	3.7	14.3	0	0	0	-0.2	9.1	5-10		3.54	YES	NR	
	4	15-Dec-14	1002	0	0	40.4	27.1	2.7	11.3	0	0	0	-0.1	9	5-10		3.36	YES	NR	
	-	12-Jan-15	995	-	-	-	-	-	-	-	-	-	-	-	5-10		-	NA	-	Unable to take gas readings due to empty battery on the gas monitor
	4	26-Jan-15	1016	0	>>>	64.3	64.3	4.8	2.7	>max	0	0	0	9.03	5-10		3.34	YES	NR	BH05 gas flow started at -31.6, dropped to 0. Rel. pressure started at -27, dropped to 0
	5	09-Feb-15	1028	0.44	NR	16.5	26.5	2.4	15	>max	0	0	0	9.03	5-10		3.58	YES	NR	
	6	12-Nov-15	1012	0	NR	29.1	21.8	16.1	12.2	-	0	0	0	8.95	5-10		3.64	YES	ND	
	7	25-Nov-15	1002	-2.07	0	0	0	4.9	16.6	-	0	0	0.3	5.68	5-10		DRY	N	ND	
	8	09-Dec-15	1015	0	0	0	0	0.5	19.7	-	0	0	0	8.94	5-10		3.63	YES	-	
	9	16-Dec-15	1005	0.08	0	30.7	26.5	4.9	12.6	-	0	0	0.4	8.9	5-10		3.62	YES	-	
	10	06-Jan-16	970	0.21	NR	85.9	40	9.2	11.3	-	0	0	-0.2	8.94	5-10		3.57	YES	NR	
	11	20-Jan-16	1007	0.12	0	77.5	65.3	13.4	3.6	-	0	0	0.4	8.9	5-10		3.68	YES	ND	
WS01	-	28-Nov-14	994	-	-	-	-	-	-	-	-	-	-	-	Unknown	Unknown	-	Cannot determine	-	
	1	04-Dec-14	1012	0.34	NR	30.4	30.4	2.6	0.5	0	0	0	2.7	4.39	Unknown	Unknown	1.86	Cannot determine	NR	
	-	15-Dec-14	1002	-	-	-	-	-	-	-	-	-	-	4.35	Unknown	Unknown	1.4	Cannot determine	NR	
	2	12-Jan-15	995	-0.07	0	14.9	14.9	2.9	3.2	>max	0	0	3.2	4.28	Unknown	Unknown	1.73	Cannot determine	NR	
	3	26-Jan-15	1016	0	>>>	24.6	24.6	3.5	0	>max	0	0	0	4.3	Unknown	Unknown	1.76	Cannot determine	NR	
	4	09-Feb-15	1028	0.36	NR	30.1	30.1	4.4	0.4	>max	0	0	2.1	4.26	Unknown	Unknown	2.05	Cannot determine	NR	WS01 gas flow started at +7.8 and fell to steady +2.1 gas flow
	5	16-Dec-15	1005	-1.55	0	6.1	6.1	3.5	3.5	-	0	0	0.2	4.02	Unknown	Unknown	1.94	Cannot determine	-	
	6	06-Jan-16	970	0.21	NR	17.9	17.9	3.9	0.4	-	0	0	-4.5	4.25	Unknown	Unknown	1.64	Cannot determine	NR	
WS07	1	28-Nov-14	994	0	0	0.5	0.3	0.6	16.9	0	0	0	0	3.5	2.5-3.5	Plastic, dark brown and brown amorphous and fibrous PEAT	2.49	Borderline	NR	
	2	04-Dec-14	1012	0.41	NR	0.1	0.4	0.7	18.3	2	0	0	0	3.5	2.5-3.5		2.51	Borderline	NR	
	3	15-Dec-14	1002	0.62	0	0.1	0	0.4	20	0	0	0	-0.8	3.49	2.5-3.5		2.47	Borderline	NR	
	-	12-Jan-15	995	-	-	-	-	-	-	-	-	-	-	-	2.5-3.5		-	NA	-	Unable to take gas readings due to empty battery on the gas monitor
	4	26-Jan-15	1016	0	0	0.3	0.3	3.1	14	6.4	0	0	0	3.48	2.5-3.5		2.54	Borderline	NR	
	5	09-Feb-15	1028	0.38	NR	0	0	1.1	19.1	0	0	0	0	3.51	2.5-3.5		2.59	Borderline	NR	

Gas Monitoring Data - SUMMARY

Hole ID	Events	Date	BP	BP diff	PID	CH4 PEAK	CH4 STABLE	CO2 STABLE	O2 STEADY	LEL STEADY	CO	H2S	Flow	Depth to Base of Well	Screen Interval	Target	Standing Water Level	Screen Submerged	LNAPL or DNAPL	Comment
			hPa	hPa	ppm	%v/v	%v/v	%v/v	%v/v		ppm	ppm	L/hour	m bgl	m bgl		m bgl	Y/N		
BH101	1	12-Nov-15	1012	37	NR	0	0	0.5	19.5	-	0	0	4.9	11.19	7.5-17.0	SANDSTONE with some COAL	Dry	N	ND	
	2	25-Nov-15	1002	-2.17	0	0	0	0	21	-	0	0	0	17.23	7.5-17.0		DRY	N	ND	
	3	09-Dec-15	1015	0	0	0	0	0	21	-	0	0	0	17.46	7.5-17.0		Dry	N	-	
	4	16-Dec-15	1005	-3.04	0	0	0	0.1	20.8	-	0	0	-2.7	17.16	7.5-17.0		Dry	N	-	
	5	06-Jan-16	970	0.17	NR	0.2	0.1	0	20.4	-	0	0	1.4	17.31	7.5-17.0		Dry	N	NR	
	6	20-Jan-16	1007	-2.36	0	0	0	0.1	21	-	0	0	-2.2	17.24	7.5-17.0		dry	N	ND	
BH102(S)	1	12-Nov-15	1012	0	NR	0	0	0.2	20	-	0	0	0	0.78	0.4-0.8	MADE GROUND comprising SANDSTONE and COAL	Dry	N	ND	
	2	25-Nov-15	1002	0.37	0	0	0	0.1	20.9	-	0	0	0	0.79	0.4-0.8		DRY	N	ND	
	3	09-Dec-15	1015	0	0	0	0	0.8	19.9	-	0	0	0	0.79	0.4-0.8		Dry	N	-	
	4	16-Dec-15	1005	0.07	0	0	0	0.1	20.8	-	0	0	0.2	0.79	0.4-0.8		Dry	N	-	
	5	06-Jan-16	970	0.17	NR	0.5	0	0	20.7	-	0	0	0.1	0.75	0.4-0.8		Dry	N	NR	
	6	20-Jan-16	1007	0.02	0	0	0	0.1	20.8	-	0	0	0.1	0.6	0.4-0.8		dry	N	ND	
BH102(D)	1	12-Nov-15	1012	0	NR	0	0	0.1	20.2	-	0	0	0	7.04	5.0-7.0	Dense SAND and fine to coarse GRAVEL with LIMESTONE, COAL, SANDSTONE and QUARTZITE	Dry	N	ND	
	2	25-Nov-15	1002	-0.93	0	0	0	0.1	20.9	-	0	0	0	7.07	5.0-7.0		7.05	N	ND	
	3	09-Dec-15	1015	0	0	0	0	1.1	19.4	-	0	0	0	7.06	5.0-7.0		Dry	N	-	
	4	16-Dec-15	1005	0.02	0	0	0	0.1	20.8	-	0	0	0	7.03	5.0-7.0		Dry	N	-	
	5	06-Jan-16	970	0.17	NR	0.6	0.6	0	20.7	-	0	0	4	7.09	5.0-7.0		Dry	N	NR	
	6	20-Jan-16	1007	-0.65	0	0	0	0.1	20.9	-	0	0	-0.3	7.02	5.0-7.0		dry	N	ND	
BH103	1	12-Nov-15	1012	0	NR	0	0	2.7	12.2	-	0	0	0	7.8	1.5-8.0	MADE GROUND and CLAY with MUDSTONE, SANDSTONE, LIMESTONE and COAL	7.72	N	ND	
	2	25-Nov-15	1002	0.31	0	0	0	3.6	11.9	-	0	0	0	7.8	1.5-8.0		7.75	N	ND	
	3	09-Dec-15	1015	0	0	0	0	3.1	14.2	-	0	0	0	7.95	1.5-8.0		Dry	N	-	
	4	16-Dec-15	1005	0.05	0	0	0	4.4	9.2	-	0	0	0.1	7.83	1.5-8.0		7.81	N	-	
	5	06-Jan-16	970	0.17	NR	0.4	0.4	0.3	5.9	-	0	0	0.1	7.88	1.5-8.0		7.72	N	NR	
	6	20-Jan-16	1007	0.07	0	0	0	7	6.6	-	0	0	0.2	7.86	1.5-8.0		dry	N	ND	
BH104	1	12-Nov-15	1012	0	NR	0	0	0.8	19.4	-	0	0	0	4.02	1.0-4.0	CLAY with MUDSTONE, SANDSTONE, LIMESTONE and COAL	Dry	N	ND	
	2	25-Nov-15	1002	0.1	0	0	0	1.2	20.5	-	0	0	0.5	4.1	1.0-4.0		4.05	N	ND	
	3	09-Dec-15	1015	0	0	0	0	2.9	17.9	-	0	0	0	4.06	1.0-4.0		3.01	N	-	
	4	16-Dec-15	1005	0.14	0	0	0	3.5	18.6	-	0	0	0	4.06	1.0-4.0		4.04	N	-	
	5	06-Jan-16	970	0.21	NR	1.1	1.1	3.1	17.7	-	0	0	-2	4.06	1.0-4.0		1.96	N	NR	
	6	20-Jan-16	1007	5.4	0	0	0	2.4	18.2	-	0	0	0.5	4.07	1.0-4.0		1.77	N	ND	
BH105(S)	1	12-Nov-15	1012	0	NR	54.5	54.2	4.3	0.7	-	0	0	10.1	4.37	0.2-4.0	Disturbed CLAY, some LIMESTONE, SANSTONE and ORGANIC MATTER	2.39	N	ND	
	2	25-Nov-15	1002	-0.02	0	57.6	57.6	38.2	3.1	-	0	0	0	17.23	0.2-4.0		DRY	N	ND	
	3	09-Dec-15	1015	0	0	0	0	0	20.9	-	0	0	0	7.95	0.2-4.0		Dry	N	-	
	4	16-Dec-15	1005	0.07	0	46.2	46.2	33	2.8	-	0	0	0.1	4.36	0.2-4.0		3.57	N	-	
	5	06-Jan-16	970	0.17	NR	46.7	4.8	32.4	2.2	-	<<<	0	-0.1	4.35	0.2-4.0		3.29	N	NR	
	6	20-Jan-16	1007	0.1	0	12.5	12.5	15.3	9.2	-	0	0	0.4	4.37	0.2-4.0		3.55	N	ND	
BH105(D)	1	12-Nov-15	1012	62	NR	0	0	0.6	19.6	-	0	0	0.4	12.67	8.0-13.0	Dense SAND, some gravel	Dry	N	ND	
	2	25-Nov-15	1002	-2.24	0	0.6	0.3	0.3	20.7	-	0	0	0	12.68	8.0-13.0		DRY	N	ND	
	3	09-Dec-15	1015	0	0	0	0	0.5	20.1	-	0	0	0	4.36	8.0-13.0		Dry	N	-	
	4	16-Dec-15	1005	-2.27	0	0	0	0.1	20.8	-	0	0	-1.1	12.66	8.0-13.0		Dry	N	-	
	5	06-Jan-16	970	0.17	NR	2.4	2	0.7	2	-	<<<	0	5.7	12.77	8.0-13.0		Dry	N	NR	
	6	20-Jan-16	1007	-2.68	0	0	0	4.8	16.1	-	0	0	-2.7	12.65	8.0-13.0		dry	N	ND	
BH106	1	12-Nov-15	1012	1	NR	0	0	0.8	19.6	-	0	0	0	5.74	3.0-6.0	SAND and GRAVEL, inc. SANDSTONE, SILTSTONE and LIMESTONE	Dry	N	ND	
	-	25-Nov-15	1002	-	-	-	-	-	-	-	-	-	-	-	3.0-6.0		-	NA	-	
	-	09-Dec-15	1015	-	0	-	-	-	-	-	-	-	-	-	3.0-6.0		-	NA	-	
	2	16-Dec-15	1005	-2.79	0	0.9	0	1.2	19.3	-	20	0	0.3	5.71	3.0-6.0		Dry	N	-	
	3	06-Jan-16	970	0.21	NR	1.4	1.4	1.9	17.1	-	<<<	0	6	5.73	3.0-6.0		Dry	N	NR	

Notes:

10 Exceedence of methane (1%v/v) gas screening criteria

10 Exceedence of carbon dioxide (5%v/v) gas screening criteria

Date	Weather Conditions	Ground Conditions
28/11/2014	Dry, cloudy	Wet
4/12/2014	Overcast	Wet, muddy
15/12/2014	Sunny spells	Wet, muddy
12/01/2015	Overcast	Wet, muddy
26/01/2015	Slightly overcast	Wet, muddy
9/02/2015	Overcast	Wet
12-Nov-15	Dry	Dry
25-Nov-15	Rain	Wet
09-Dec-15	Dry	Dry
16-Dec-15	Light cloud, breezy	Wet, breezy
06-Jan-16	Overcast	Wet
20-Jan-16	Mild	Wet

Appendix D

Modelling Data Input Sheet

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Wrexham Police Station - Alluvium (Peat)

Assessment of Advection Flow and Associated Risks to Proposed Development

Vertical gas migration by advection
Approach from Local Authority Guide to Ground Gas

	Gas flow vertically through ground - Plant room (or similar)	Gas flow vertically through ground - Main Building		
K_{Darcy} of soil migration pathway	1.00E-07	1.00E-07	m/s	Based on Peat - 1 x 10 -7 m/s
Intrinsic permeability K_i	1.02E-14	1.02E-14	m^2	Intrinsic permeability - K_{Darcy} x 1.02 x 10^{-7}
Unit weight of methane	7.2	7.2	N/m^3	
Viscosity of methane	1.03E-05	1.03E-05	Ns/m^2	
Pressure within ground	5	5	Pa	Assume stack effect inside building is driving force for vertical migration
Length of soil migration area	1	1	m	Look at emission in $1m^2$ column of soil for vertical flow
Width of gas migration area	1	1	m	
Therefore area of migration , A	1	1	m^2	
Migration pathway depth	1	1	m	Assume migration from upper 1m of Peat directly beneath building footprint - ignores any migration through the overlying Made Ground (conservative as ignores any oxidation processes)
Methane concentration	85.9	85.9	%	Maximum methane concentration recorded in Alluvium / Peat
i= pressure gradient along migration route (as a fluid gradient)	0.69	0.69	Dimensionless	Fluid gradient = (gas pressure/unit weight)/length
Q = flow of methane in m^3/h through area A x methane concentration	1.53E-05	1.53E-05	m^3/h	$=\left[\frac{K_i \gamma A i}{\mu}\right]$ x concentration

Note this assumes that there are no changes to the chemical composition of the gas during migration (eg oxidation of methane).

Vertical migration rate	1.53E-05	1.53E-05	$m^3/h/m^2$	
Equivalent borehole flow rate	0.15	0.15	l/h	

Ventilation in building

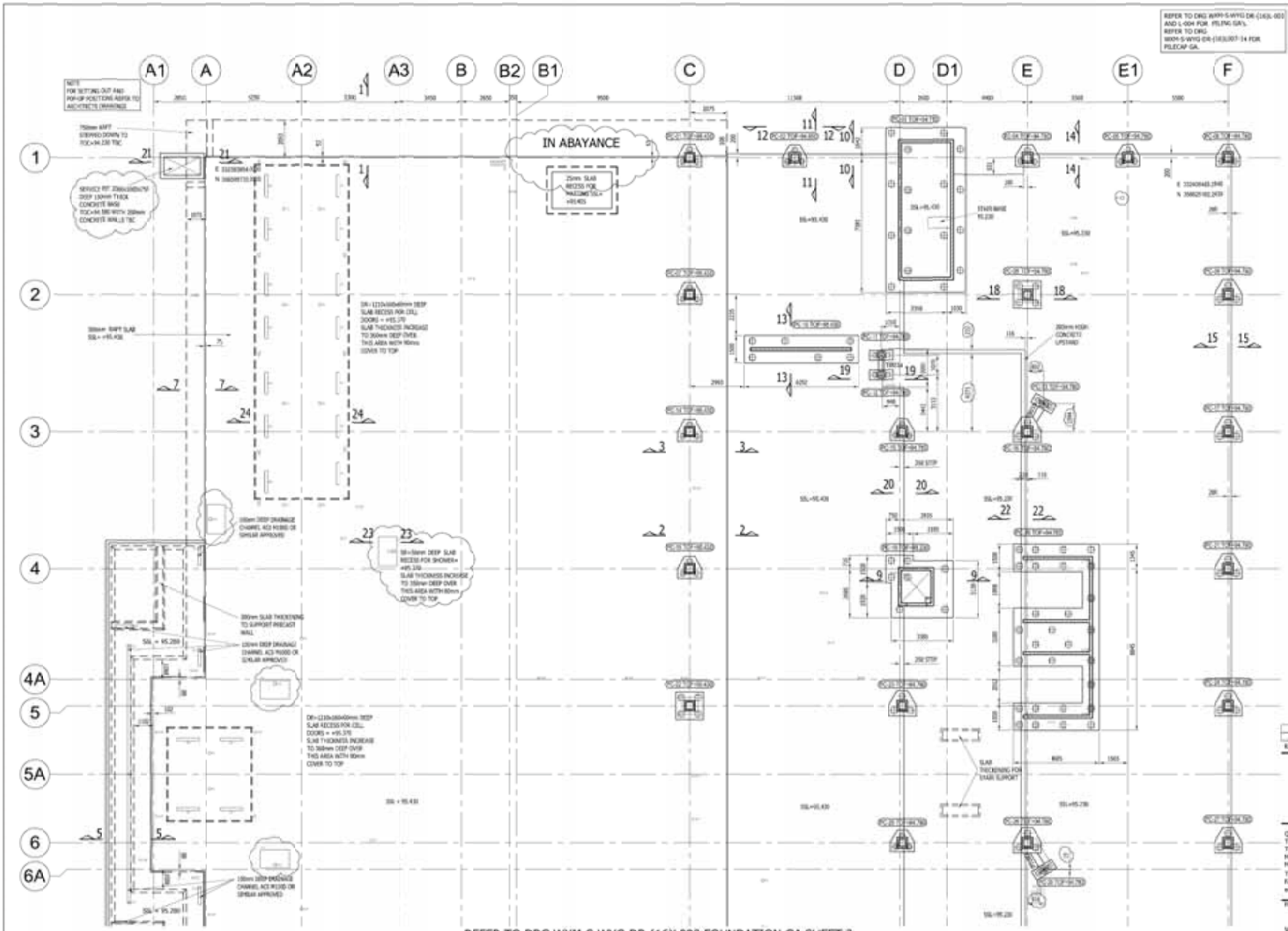
Maximum likely surface emission rate of gas	1.53E-05	1.53E-05	$m^3/h/m^2$	
Height of building	2.4	2.4	m	Assume small room
Length of building	3	3	m	Assume small room
Width of building	2	2	m	Assume small room
Ventilation rate in building	1	1	Air change per hour	SR3 Defaults for commercial land use
Equilibrium gas concentration in the building	6.38E-04	6.38E-04	%	
	0.00064	0.00064		

Ignores presence of slab and any DPM / Gas membrane

Appendix E

Drawings

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REFER TO DRG WXM-S-WYG-DR-(16)L-003 AND L-004 FOR PILING GA's.
REFER TO DRG WXM-S-WYG-DR-(16)L007-14 FOR PILECAP GA.

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

WYG SUBSTRUCTURE NOTES

REFER TO DRG WXM-S-WYG-DR-(00)L-010 FOR SUBSTRUCTURE NOTES

REV	DESCRIPTION	BY	CHK	APP	DATE
B	UPDATED AS INDICATED	PR	AJ	JS	30/08/17
A	ISSUED FOR CONSTRUCTION	PR	AJ	JS	24.03.17

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Project

WREXHAM CUSTODY SUITE

Drawing Title

FOUNDATION GA SHEET 1

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:100	CH	31.11.16				

Project No.	Office	Type	Drawing No.	Revision
WXM-S-WYG-DR	81	CS	(16) L001	B

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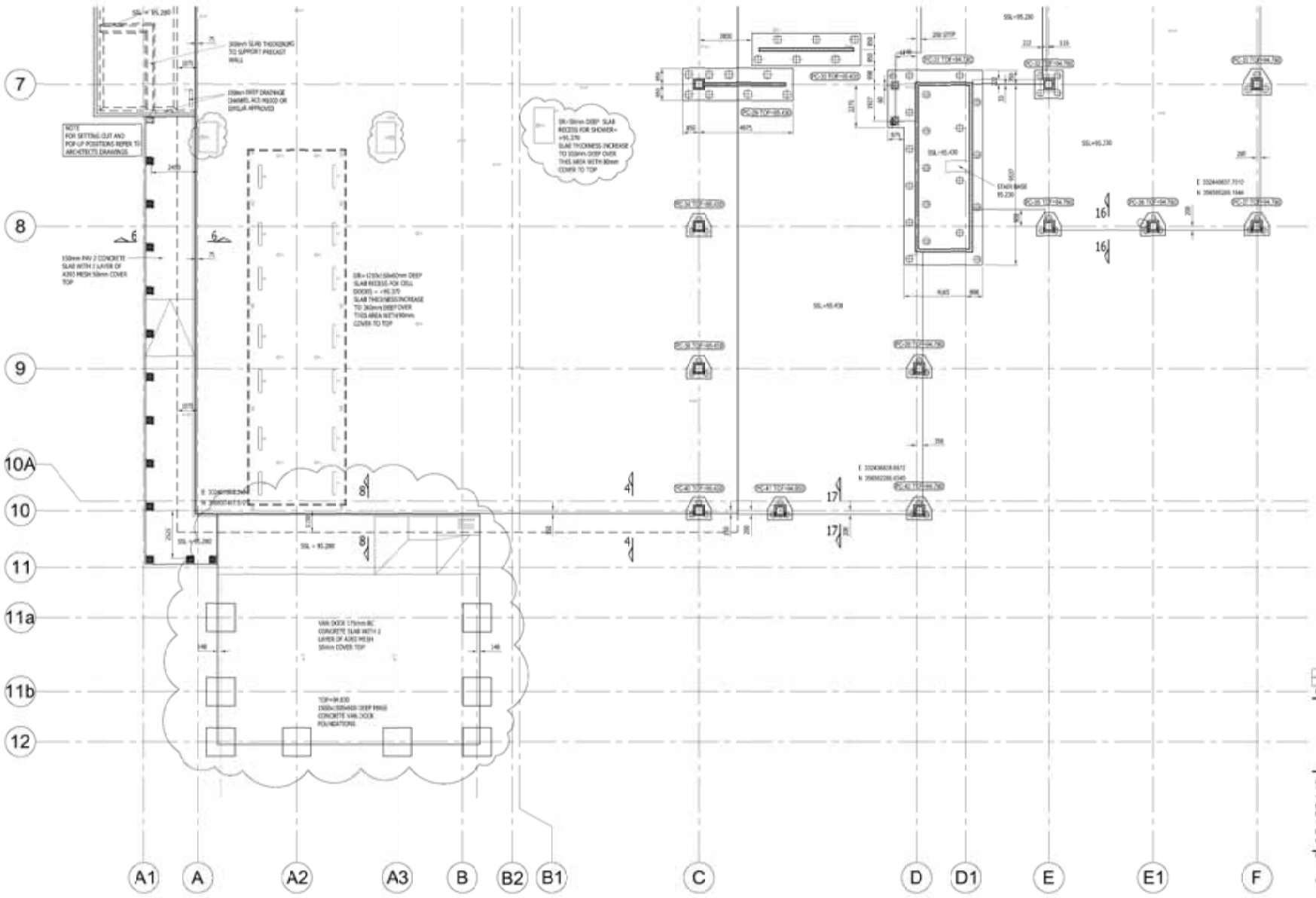
REFER TO DRG WXM-S-WYG-DR-(16)L001 FOUNDATION GA SHEET 1

REFER TO DRG WXM-S-WYG-DR-(16)L-003 AND L-004 FOR PILING GA's.
REFER TO DRG WXM-S-WYG-DR-(16)L007-14 FOR PILECAP GA.

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

WYG SUBSTRUCTURE NOTES

REFER TO DRG WXM-S-WYG-DR-(00)L-010 FOR SUBSTRUCTURE NOTES



REV	DESCRIPTION	BY	CHK	APP	DATE
B	UPDATED AS INDICATED	PR	AJ	JS	30/04/20
A	ISSUED FOR CONSTRUCTION	PR	AJ	JS	24.03.17

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Project

WREXHAM CUSTODY SUITE

Drawing Title

FOUNDATION GA SHEET 2

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:100	CH	31.11.16				

Project No.	Office	Type	Drawing No.	Revision
WXM-S-WYG-DR	81	CS	(16) L002	B

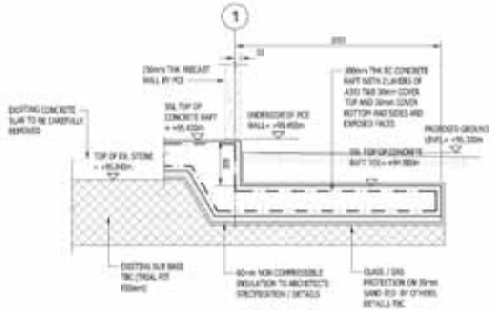
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REFER TO DRG WXM-S-WYG-DR-(-)(L)-001 AND L-002 FOR PILING GA's.
REFER TO DRG WXM-S-WYG-DR-(-)(L)-003 AND L-004 FOR FOUNDATION GA's.

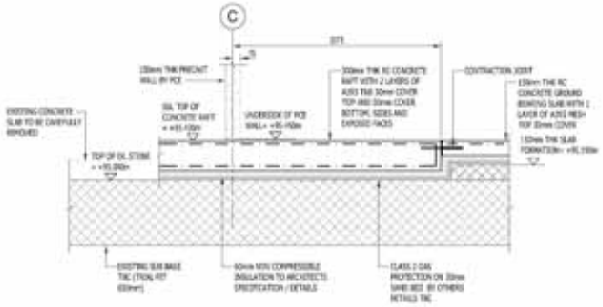
DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

WYG SUBSTRUCTURE NOTES

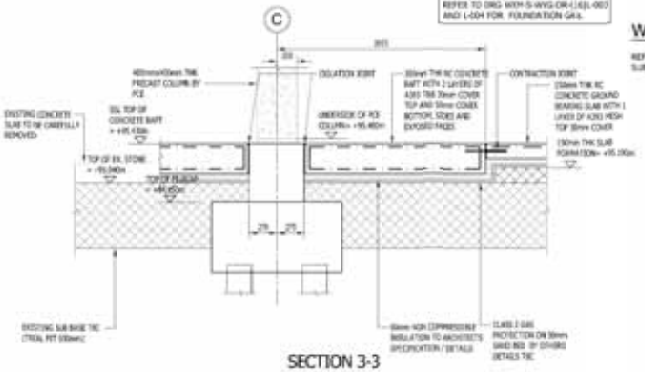
REFER TO DRG WXM-S-WYG-DR-(00)L-010 FOR SUBSTRUCTURE NOTES



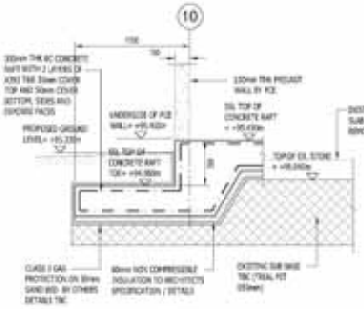
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SCALE 1:25



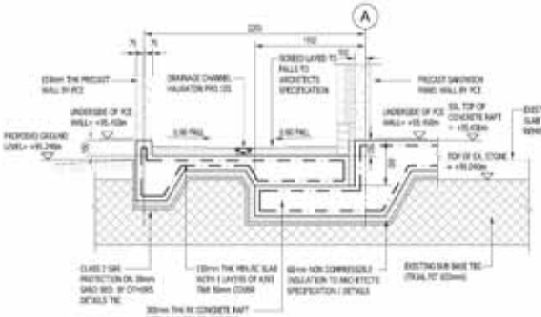
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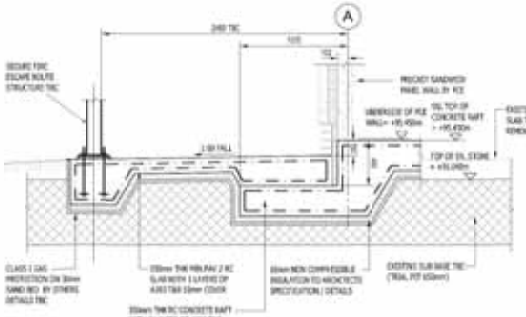
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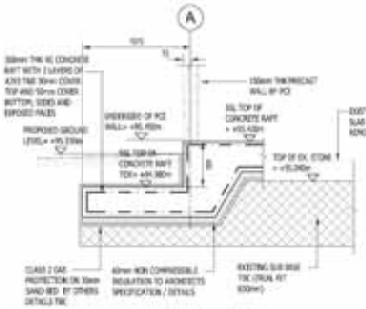
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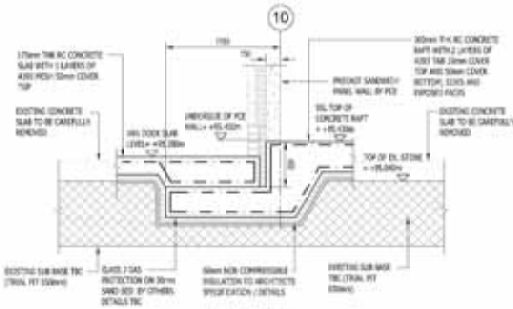
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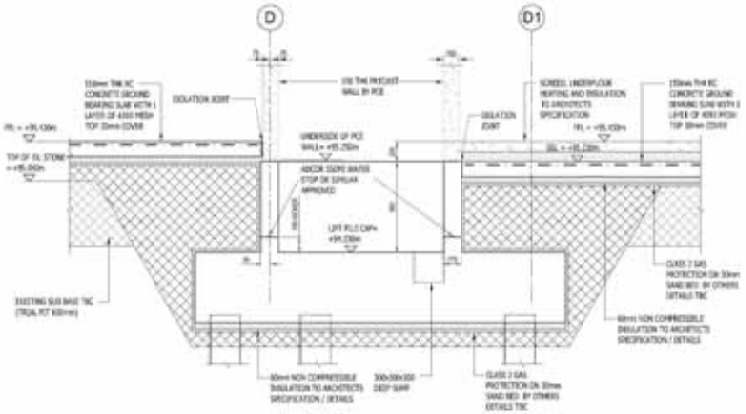
SECTION 6-6
SCALE 1:25



SECTION 7-7
SCALE 1:25



SECTION 8-8
SCALE 1:25



SECTION 9-9
SCALE 1:25

P1	FOR INFORMATION	PR	AJ	JS	XX/XX/XX
REV	DESCRIPTION	BY	CHK	APP	DATE

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Project

WREXHAM CUSTODY SUITE

Drawing Title

FOUNADTION SECTIONS SHEET 1

Scale @A1,A3	Drawn	Date	Checked	Date	Approved	Date
1:50	CH	NOV 16				

Project No.	Office	Type	Drawing No.	Revision
WXM-S-WYG-DR	81	CS	(16) L005	P1

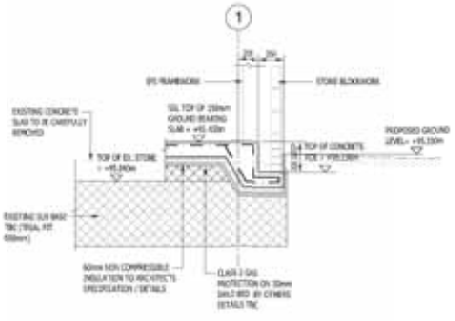
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REFER TO DRG WXM-S-WYG-DR-(-)(L)-001 AND L-002 FOR PILING Gd's.
REFER TO DRG WXM-S-WYG-DR-(-)(L)-003 AND L-004 FOR FOUNDATION Gd's.

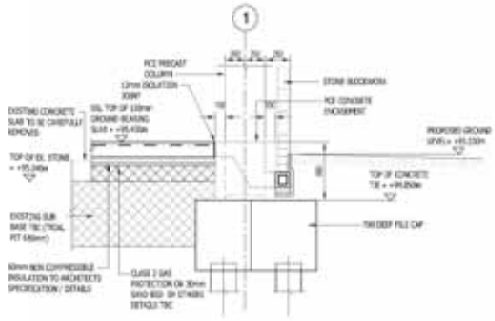
DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

WYG SUBSTRUCTURE NOTES

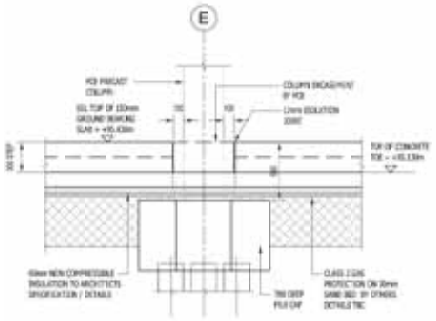
REFER TO DRG WXM-S-WYG-DR-(00)L-010 FOR SUBSTRUCTURE NOTES



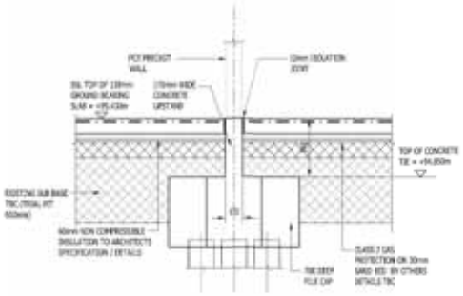
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SCALE 1:25



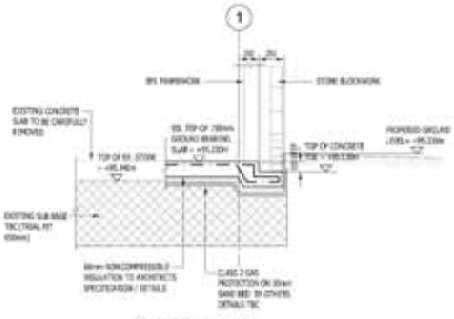
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SCALE 1:25



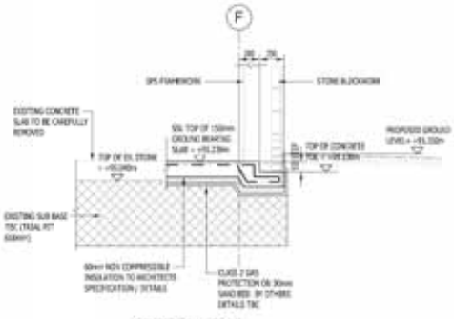
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SCALE 1:25



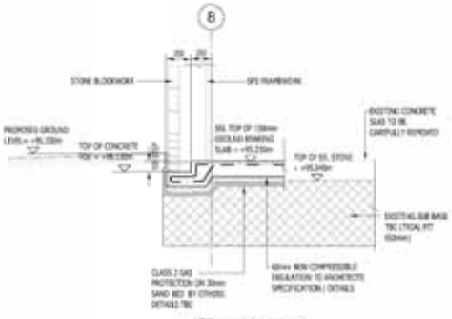
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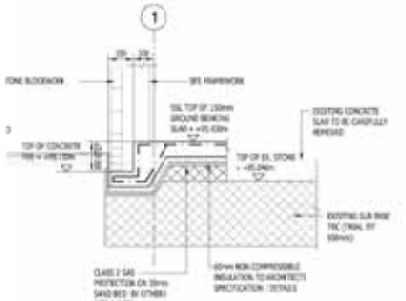
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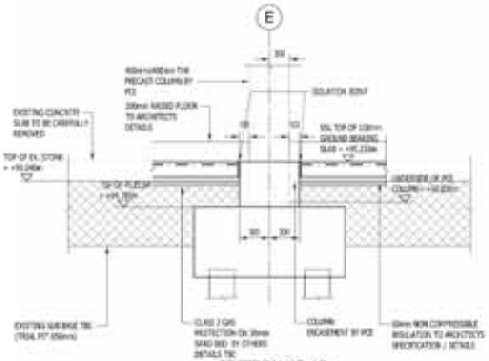
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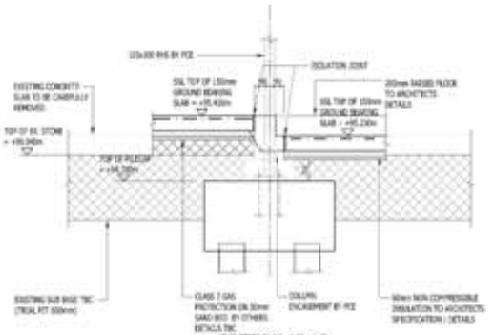
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SCALE 1:25



SECTION 17-17
SCALE 1:25



SECTION 18-18
SCALE 1:25



SECTION 19-19
SCALE 1:25

P1	FOR INFORMATION	PR	AJ	JS	XX/XX/XX
REV	DESCRIPTION	BY	CHK	APP	DATE

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Project

WREXHAM CUSTODY SUITE

Drawing Title

FOUNADTION SECTIONS SHEET 2

Scale @A1,A3	Drawn	Date	Checked	Date	Approved	Date
1:25	CH	NOV 16				

Project No.	Office	Type	Drawing No.	Revision
WXM-S-WYG-DR	81	CS	(16) L015	P1

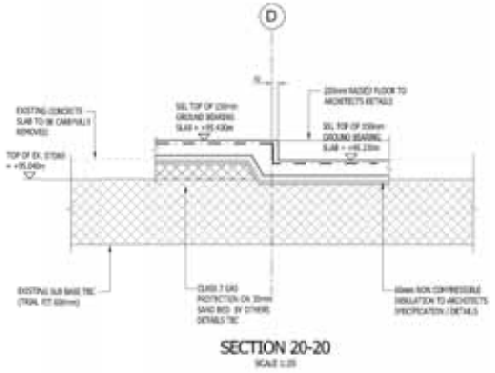
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REFER TO DRG WXM-S-WYG-DR-(16)L-001 AND L-002 FOR PILING GA's.
REFER TO DRG WXM-S-WYG-DR-(16)L-003 AND L-004 FOR FOUNDATION GA's.

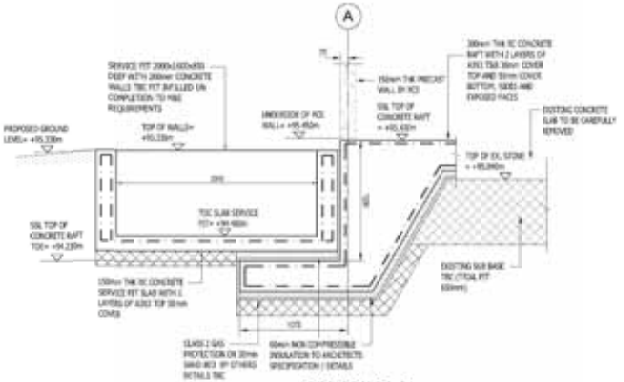
DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

WYG SUBSTRUCTURE NOTES

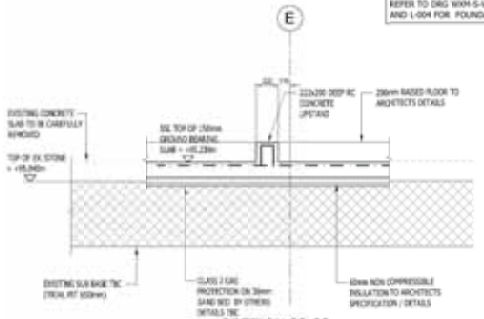
REFER TO DRG WXM-S-WYG-DR-(00)L-010 FOR SUBSTRUCTURE NOTES



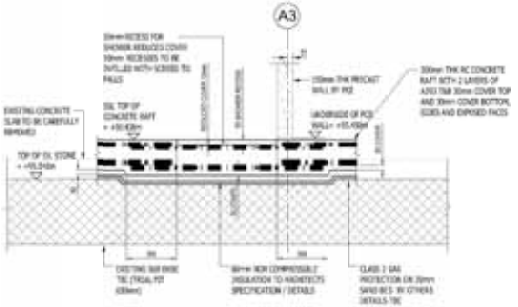
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SCALE 1:25



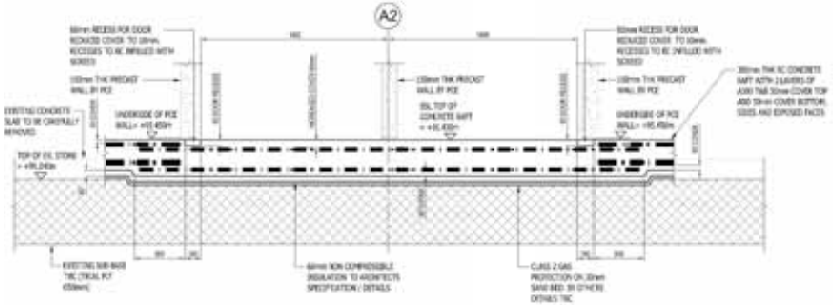
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SCALE 1:25



SECTION 22-22
SCALE 1:25



SECTION 23-23
SCALE 1:25



SECTION 24-24
SCALE 1:25

Rev	Description	By	Chk	App	Date
P1	FOR INFORMATION	PR	AJ	JS	XX/XX/XX

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e-mail: manchester@wyg.com

Project

WREXHAM CUSTODY SUITE

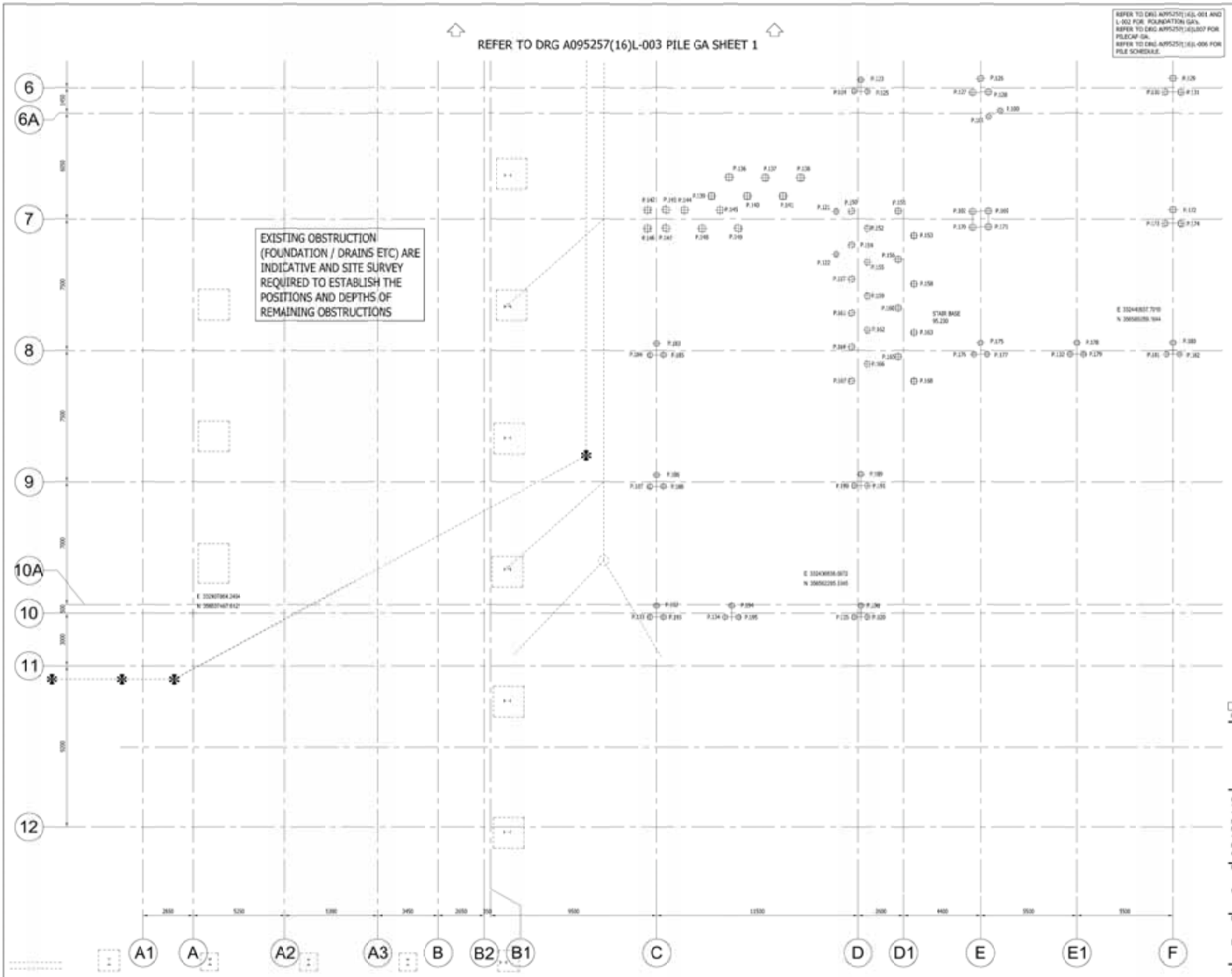
Drawing Title

FOUNADTION SECTIONS SHEET 3

Scale @A1	Drawn	Date	Checked	Date	Approved	Date
1:25	CH	NOV 16				

Project No.	Office	Type	Drawing No.	Revision
WXM-S-WYG-DR	81	CS	(16) L016	P1

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REFER TO DRG A095257(16)L-001 AND L-002 FOR FOUNDATION GA's.
REFER TO DRG A095257(16)L007 FOR PILECAP GA.
REFER TO DRG A095257(16)L-006 FOR PILE SCHEDULE.

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

WYG SUBSTRUCTURE NOTES

REFER TO DRG A095257(00)L-010 FOR SUBSTRUCTURE NOTES

NOTE
REINFORCEMENT TO PROJECT
675mm (UPLIFT AND SHEAR)
480mm (COMPRESSION) ABOVE
PILE CUT OFF LEVEL.(T12 BARS)

REV	DESCRIPTION	BY	CHK	APP	DATE
A	ISSUED FOR CONSTRUCTION	PR	AJ	JS	17.03.17

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e-mail: manchester@wyg.com

Project

WREXHAM CUSTODY SUITE

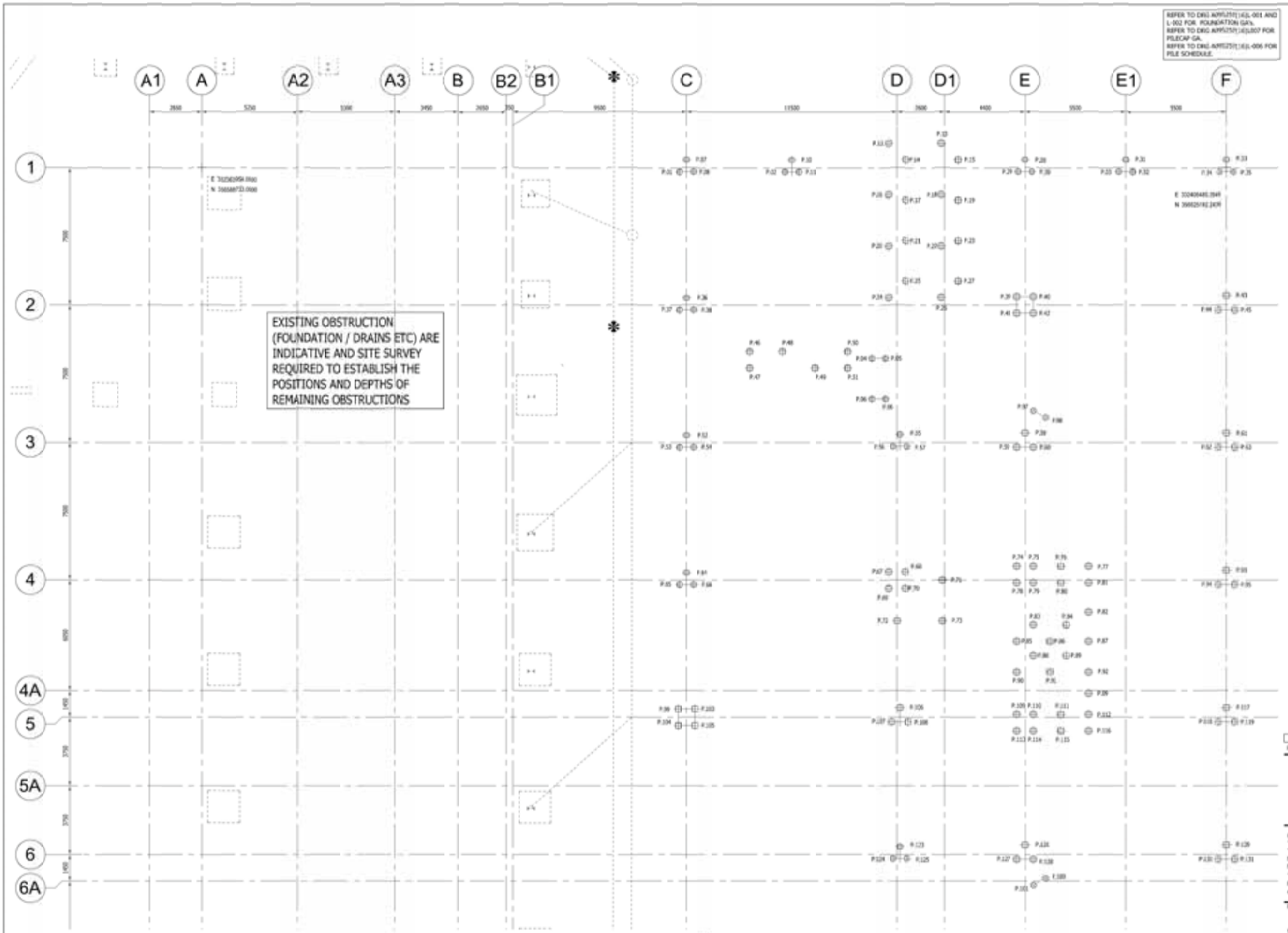
Drawing Title

PILE GA SHEET 2

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:100	CH	31.11.16				

Project No.	Office	Type	Drawing No.	Revision
A095257	81	CS	(16) L004	A

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REFER TO DRG A095257(16)L-001 AND L-002 FOR FOUNDATION GA's.
REFER TO DRG A095257(16)L007 FOR PILECAP GA.
REFER TO DRG A095257(16)L-006 FOR PILE SCHEDULE.

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

WYG SUBSTRUCTURE NOTES

REFER TO DRG A095257(00)L-010 FOR SUBSTRUCTURE NOTES

NOTE
REINFORCEMENT TO PROJECT
675mm (UPLIFT AND SHEAR)
480mm (COMPRESSION) ABOVE
PILE CUT OFF LEVEL.(T12 BARS)

REV	DESCRIPTION	BY	CHK	APP	DATE
A	ISSUED FOR CONSTRUCTION	PR	AJ	JS	17.03.17

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Project

WREXHAM CUSTODY SUITE

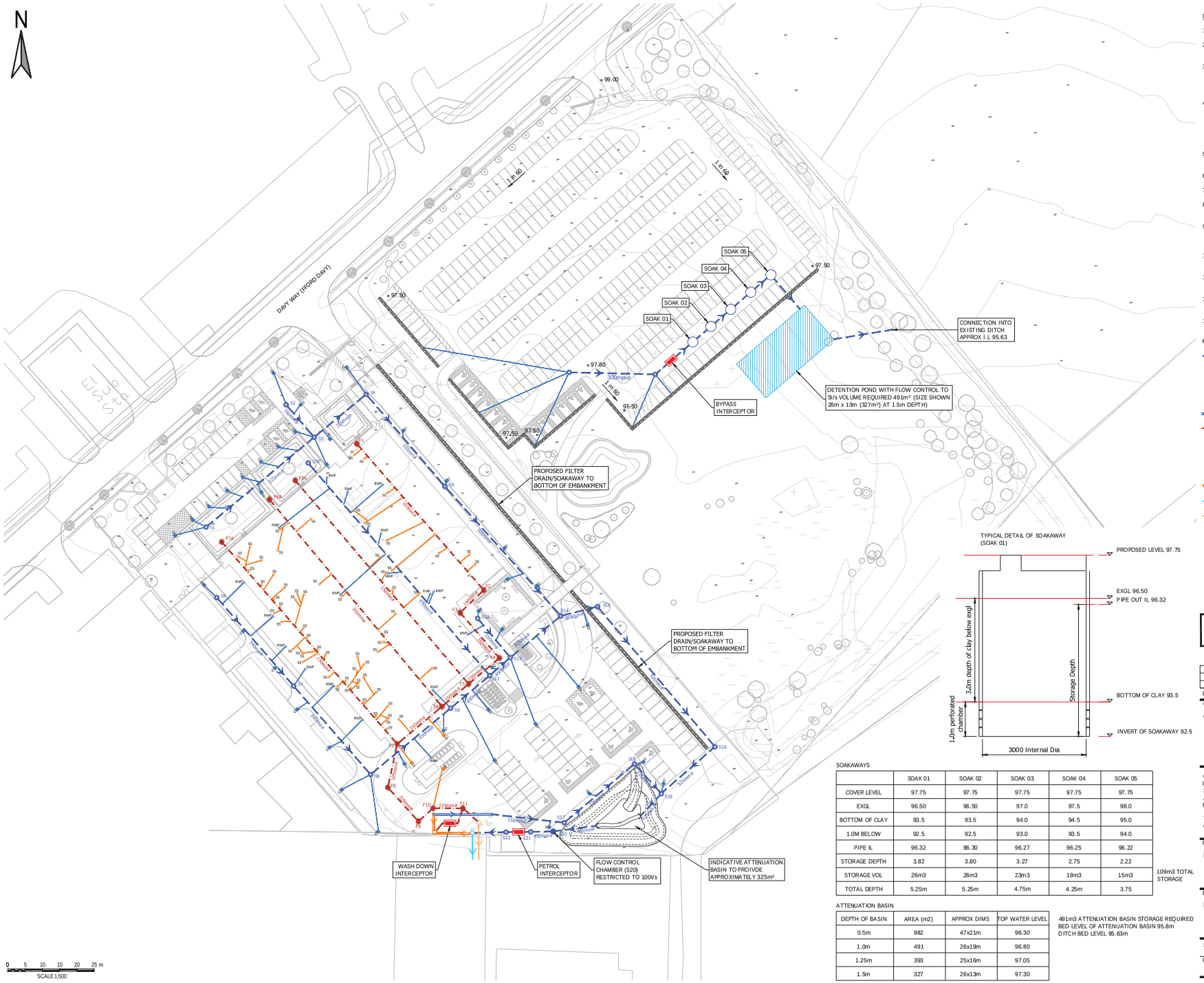
Drawing Title

PILE GA SHEET 1

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:100	CH	31.11.16				

Project No.	Office	Type	Drawing No.	Revision
A095257	81	CS	(16) L003	A

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DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

GENERAL NOTES:

1. DO NOT SCALE. ALL DIMENSIONS ARE IN MILLIMETRES.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT CONTRACT DRAWINGS.
3. THE CONTRACTOR SHOULD SITE CHECK ALL EXISTING DIMENSIONS SHOWN, ANY DISCREPANCIES IDENTIFIED BY THE CONTRACTOR SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO CONSTRUCTION ON SITE.
4. THE CONTRACTOR SHALL CONFORM TO ALL STATUTORY AUTHORITY REQUIREMENTS, CHECKING WITH THE EMPLOYER/CLIENT TO IDENTIFY BOTH BELOW GROUND AND OVERHEAD SERVICES, CONTRACTOR TO FULLY COMPLY WITH ALL CDM, H&S AND PARTY WALL ACTS THAT ARE CURRENT, ALL BS REFERENCES ARE TO CURRENT EDITIONS.
5. ALL TEMPORARY WORKS FOR FORMWORK, EXCAVATIONS ETC, TO BE THE DESIGN RESPONSIBILITY OF THE CONTRACTOR.
6. ALL LEVELS ARE IN METERS (A.O.D.)
7. COVER LEVELS ARE ASSUMED AT THIS STAGE.
8. FINISHED FLOOR LEVEL OF THE BUILDING IS ASSUMED TO BE 95.30m AOD.
9. DRAINAGE AREAS WILL BE SUBJECT TO A DETAILED ARCHITECTS LAYOUT WITH ALL RAINWATER PIPES AND FOUL WATER POP-UPS SPECIFIED.
10. DRAINAGE DESIGN IS INDICATIVE ONLY. PIPE DIAMETERS, COVER LEVELS AND INVERT LEVELS ARE LIKELY TO CHANGE.
11. DRAINAGE TO BE SLEEVED THROUGH BUILDING FOUNDATIONS WHERE NECESSARY.
12. INVERT LEVEL AND PIPE DIAMETERS OF EXISTING SEWERS SHOULD BE CONFIRMED PRIOR TO CONSTRUCTION.
13. REFER TO WYG DRAWING A095257-C-301 & 302 FOR TYPICAL DRAINAGE DETAILS.

KEY:

- PROPOSED SURFACE WATER PIPE
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER GULLY CONNECTION
- PROPOSED SURFACE WATER RWP CONNECTION
- PROPOSED SURFACE WATER CHANNEL
- PROPOSED FOUL SEWER PIPE
- PROPOSED FOUL SEWER MANHOLE
- PROPOSED INTERNAL FOUL SEWER PIPE
- PROPOSED FOUL SEWER GULLY CONNECTION
- PROPOSED FOUL SEWER CHANNEL
- EXISTING SURFACE WATER PIPE
- EXISTING FOUL SEWER PIPE
- EXISTING SURFACE WATER MANHOLE
- EXISTING FOUL SEWER MANHOLE
- PROPOSED FILTER DRAIN
- PROPOSED BYPASS INTERCEPTOR
- PROPOSED ATTENUATION TANK

TYPICAL DETAIL OF SOAKAWAY (SOAK 01)

SOAKAWAYS

	SOAK 01	SOAK 02	SOAK 03	SOAK 04	SOAK 05
COVER LEVEL	97.75	97.75	97.75	97.75	97.75
EXGL	96.50	96.50	97.0	97.5	98.0
BOTTOM OF CLAY	93.5	93.5	94.0	94.5	95.0
1.0M BELOW	92.5	92.5	93.0	93.5	94.0
PIPE IL	96.32	96.30	96.27	96.25	96.22
STORAGE DEPTH	3.82	3.80	3.27	2.75	2.22
STORAGE VOL	26m3	26m3	23m3	19m3	15m3
TOTAL DEPTH	5.25m	5.25m	4.75m	4.25m	3.75

109m3 TOTAL STORAGE

ATTENUATION BASIN

DEPTH OF BASIN	AREA (m2)	APPROX DIMS	TOP WATER LEVEL
0.5m	982	47x21m	96.30
1.0m	491	26x19m	96.80
1.25m	393	25x16m	97.05
1.5m	327	26x13m	97.30

491m3 ATTENUATION BASIN STORAGE REQUIRED
BED LEVEL OF ATTENUATION BASIN 95.8m
DITCH BED LEVEL 95.63m

PRELIMINARY ISSUE

REV	DESCRIPTION	BY	CHK	APP	DATE
P3	EASTERN ATTENUATION AMENDED	RJ	AJ	AJ	19.10.16
P2	PIPE DIAMETERS UP-SIZED	RJ	CD	AJ	29.09.16
P1	FIRST ISSUE	DJS			

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e-mail: nottingham@wyg.com

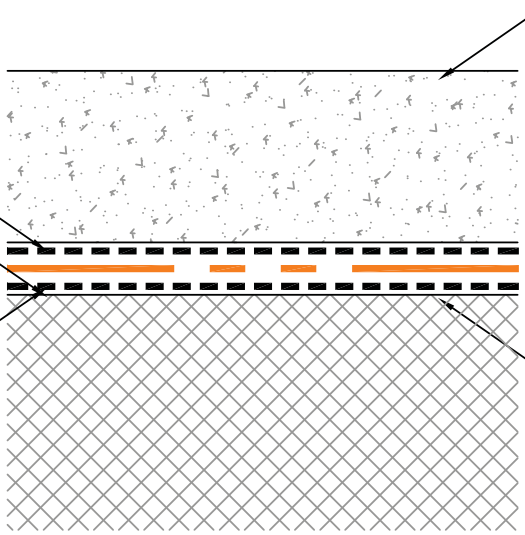
Project:
EASTERN COMMAND CUSTODY FACILITY

Drawing Title:
PROPOSED DRAINAGE LAYOUT

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
1:500	DJS	23/09/16				

Project No.	Office	Type	Drawing No.	Revision
A095257	51	C	300	P3

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UPPER PROTECTION GEOTEXTILE - JUTA PF3 - ABOVE JUTA GP1 TO PROTECT AGAINST FOOT TRAFFIC. ADDITIONAL PROTECTION BOARD REQUIRED FOR VEHICLE TRAFFIC

JUTA GP1

EITHER

1. LOWER PROTECTION GEOTEXTILE - JUTA PF3 - LAID ON TOP OF PREPARED FORMATION PRIOR TO JUTA GP1 DEPLOYMENT.

2. JUTA VOID VENT 25mm VENTING GEOCOMPOSITE (0.45m x 50m) LAID AT 5.0m CENTRES

PROJECT: Eastern Command Centre, WREXHAM	DRAWING NUMBER: 001 : TYPICAL SLAB SECTION
DRAWING TITLE: GAS PROTECTION MEASURES	DRAWN BY: PF / CHECKED BY: PF / SCALE: Not to Scale / DATE: 04/04/2017

NOTES

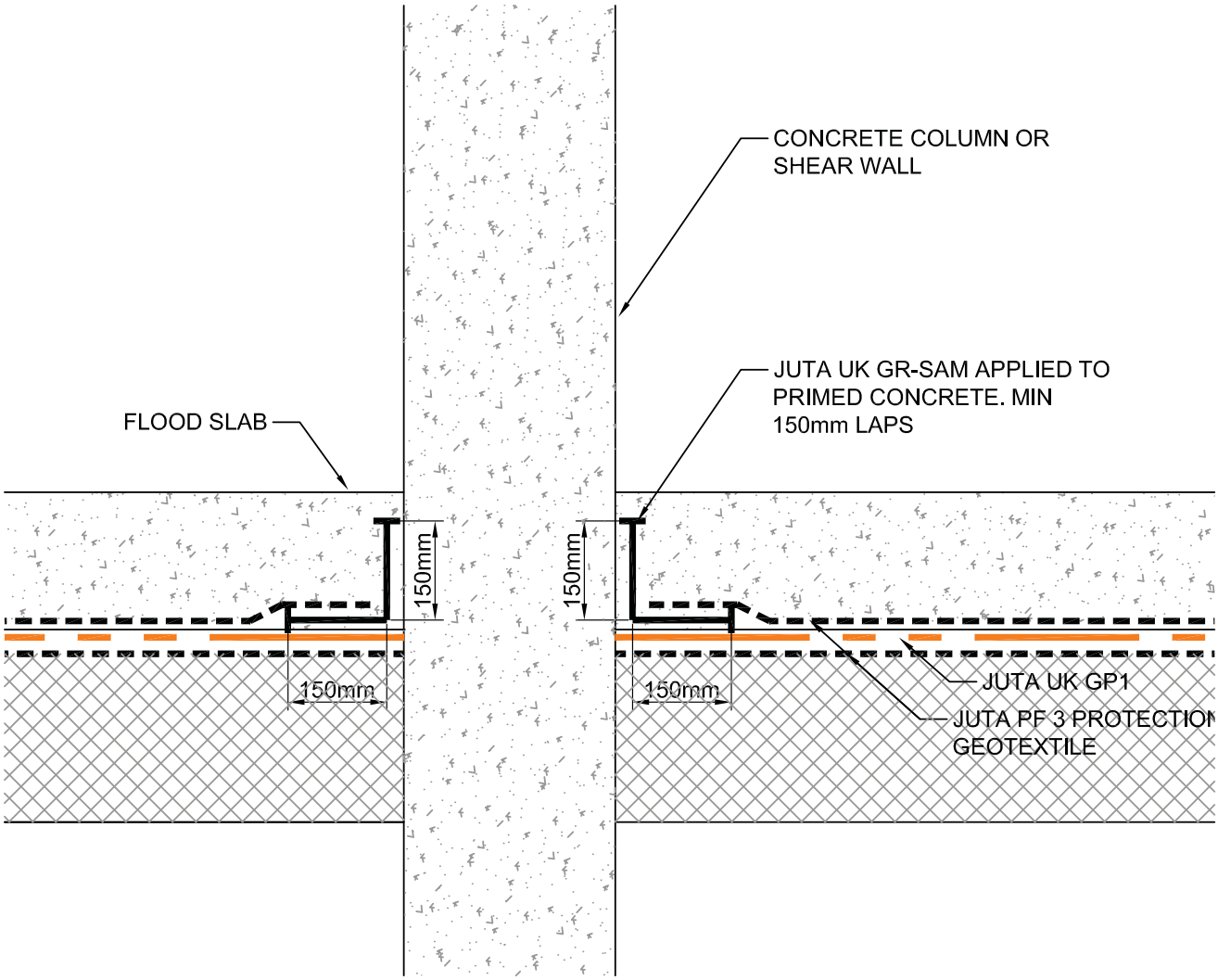
DESIGN COMPLETED IN ACCORDANCE WITH BS8484:2015

JUTA GP1 ACCEPTABLE FOR USE AS BS8485:2015 COMPLIANT GAS MEMBRANE. (2PTS)

JUTA Ability to Adapt

Unit 8
St Georges Court
Kirkham
Preston
PR4 2EF

Tel: 01772 754177



PROJECT

Eastern Command Centre, WREXHAM

DRAWING TITLE

GAS PROTECTION MEASURES

NOTES

JUTA BITUMEN PRIMER

RECOMMENDED OVERLAPS AT >150mm

DRAWING NUMBER

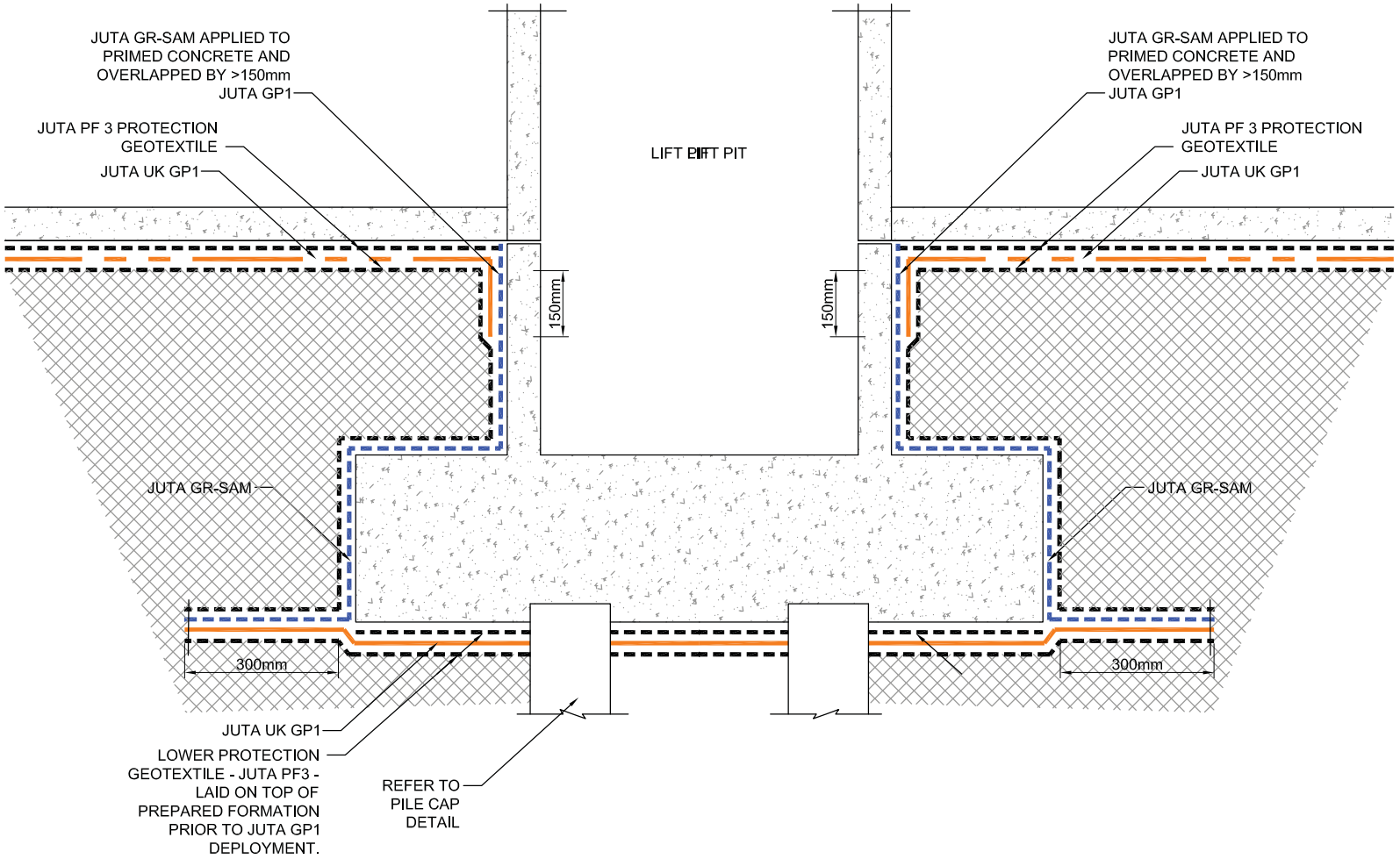
002 : TYPICAL SEAL TO COLUMN

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

JUTA
Ability to Adapt

Unit 8
St Georges Court
Kirkham
Preston
PR4 2EF

Tel: 01772 754177



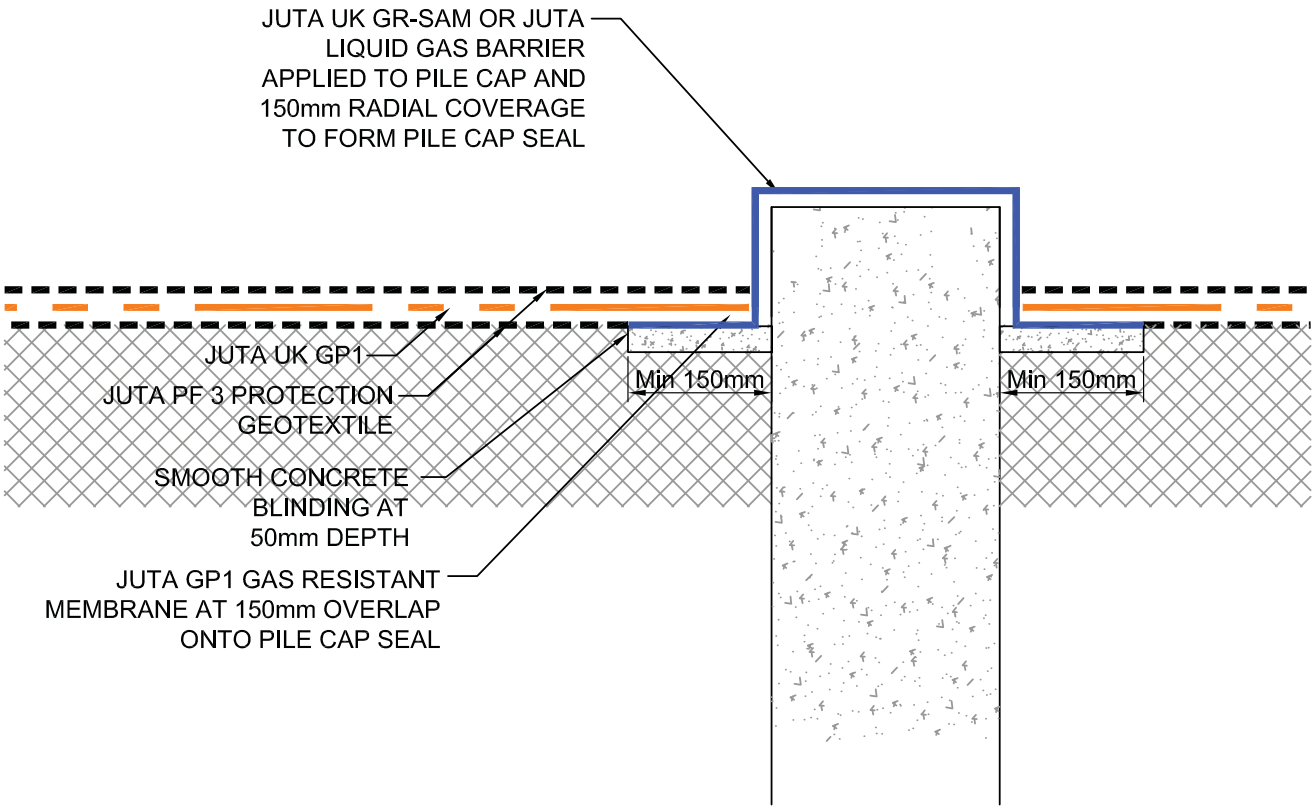
PROJECT	Eastern Command Centre, WREXHAM
DRAWING TITLE	GAS PROTECTION MEASURES
NOTES	REFER TO PILE CAP DETAIL
DRAWING NUMBER	003 : LIFT PIT DETAIL

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

JUTA
Ability to Adapt

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PROJECT

Eastern Command Centre, WREXHAM

DRAWING TITLE

GAS PROTECTION MEASURES

NOTES

DRAWING NUMBER

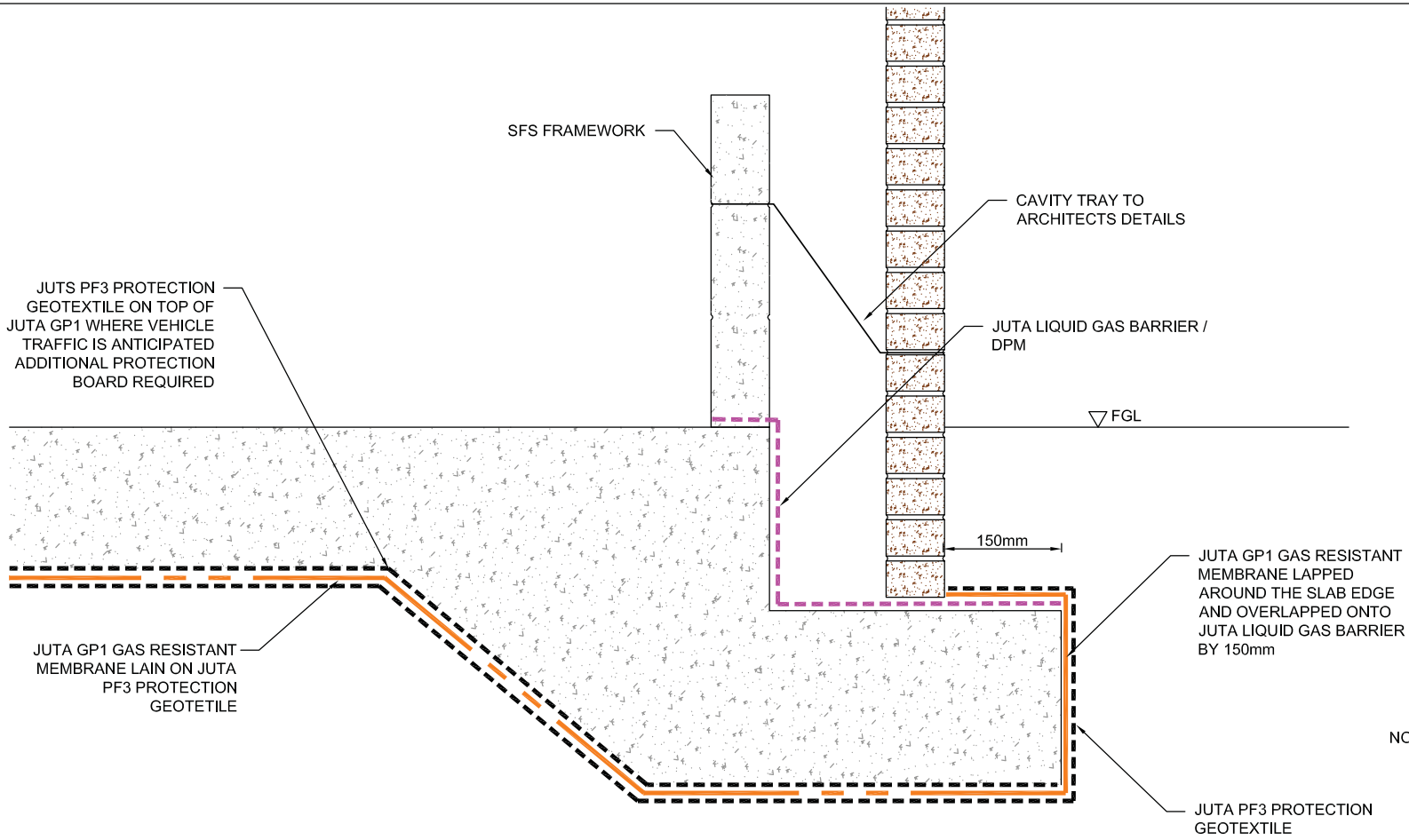
004 : PILE CAP / RING BEAM DETAIL

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

JUTA
Ability to Adapt

Unit 8
St Georges Court
Kirkham
Preston
PR4 2EF

Tel: 01772 754177



PROJECT
Eastern Command Centre, WREXHAM

DRAWING TITLE
GAS PROTECTION MEASURES

NOTES
JUTA GP1 AND GR-SAM ARE BS8485:2015 COMPLAINT GAS MEMBRANES AND ARE TESTED IN ACCORDANCE WITH BS8485:2015 FOR SUITABLE RESISTANCE TO METHANE PERMEATION TO ISO 15105-1

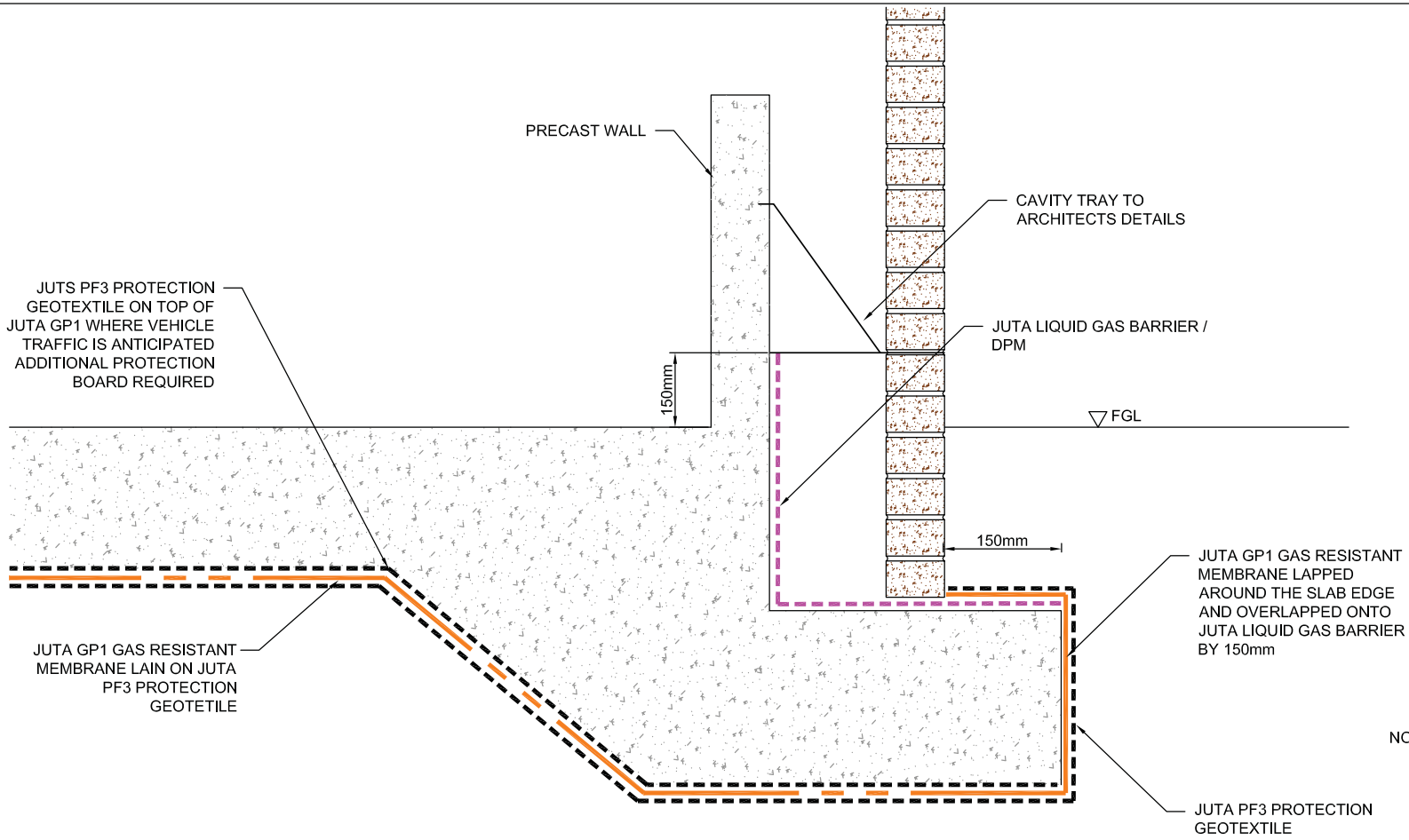
DRAWING NUMBER
005a : PERIMETER DRAIN WITH VENTING

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

JUTA
Ability to Adapt

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St Georges Court
Kirkham
Preston
PR4 2EF

Tel: 01772 754177



PROJECT
Eastern Command Centre, WREXHAM

DRAWING TITLE
GAS PROTECTION MEASURES

NOTES
JUTA GP1 AND GR-SAM ARE BS8485:2015 COMPLAINT GAS MEMBRANES AND ARE TESTED IN ACCORDANCE WITH BS8485:2015 FOR SUITABLE RESISTANCE TO METHANE PERMEATION TO ISO 15105-1

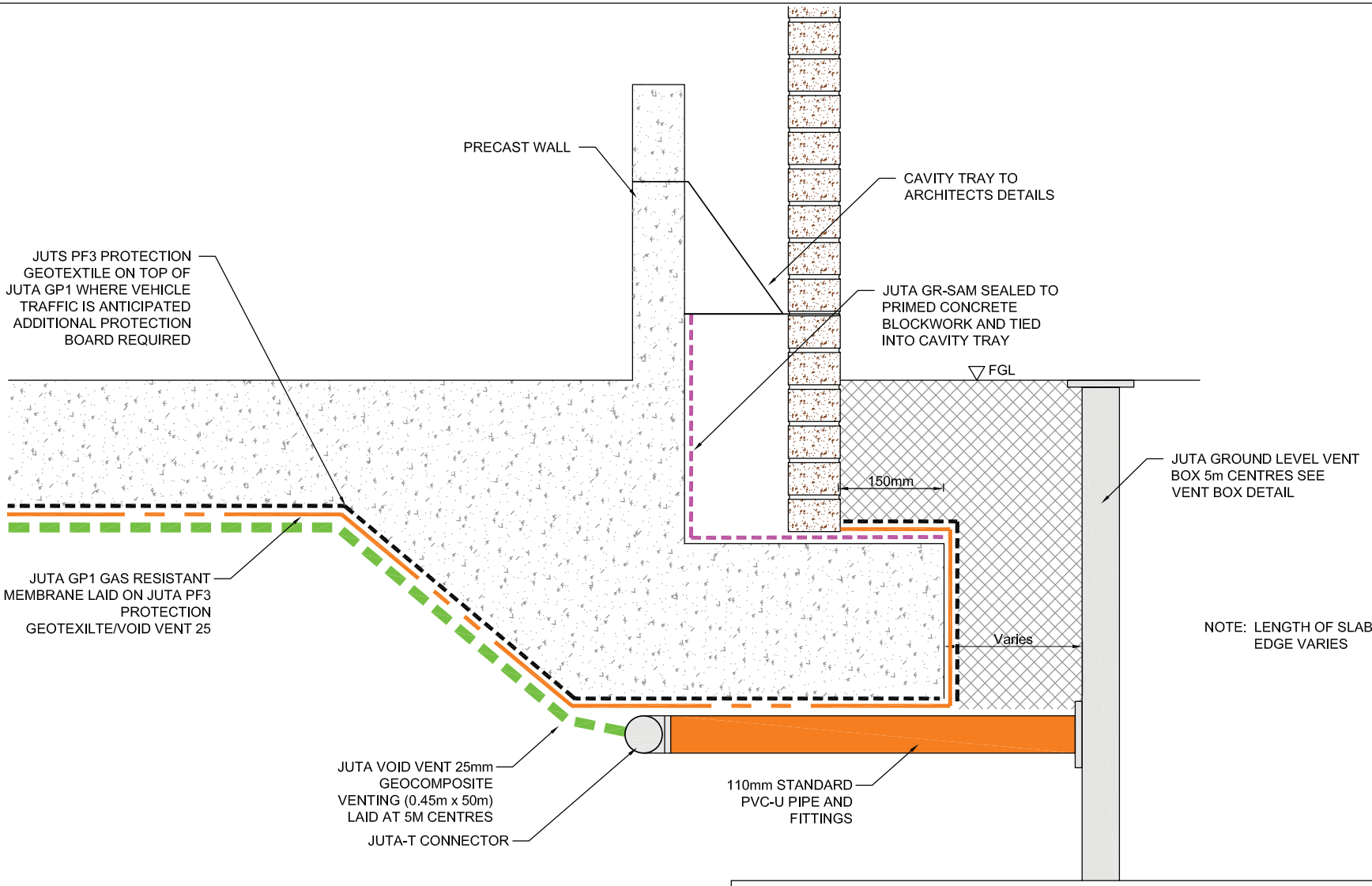
DRAWING NUMBER
005b : PERIMETER DRAIN WITH VENTING

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

JUTA
Ability to Adapt

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St Georges Court
Kirkham
Preston
PR4 2EF

Tel: 01772 754177



PROJECT
Eastern Command Centre, WREXHAM

DRAWING TITLE
GAS PROTECTION MEASURES

DRAWING NUMBER
006 : PERIMETER DRAIN WITH VENTING

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

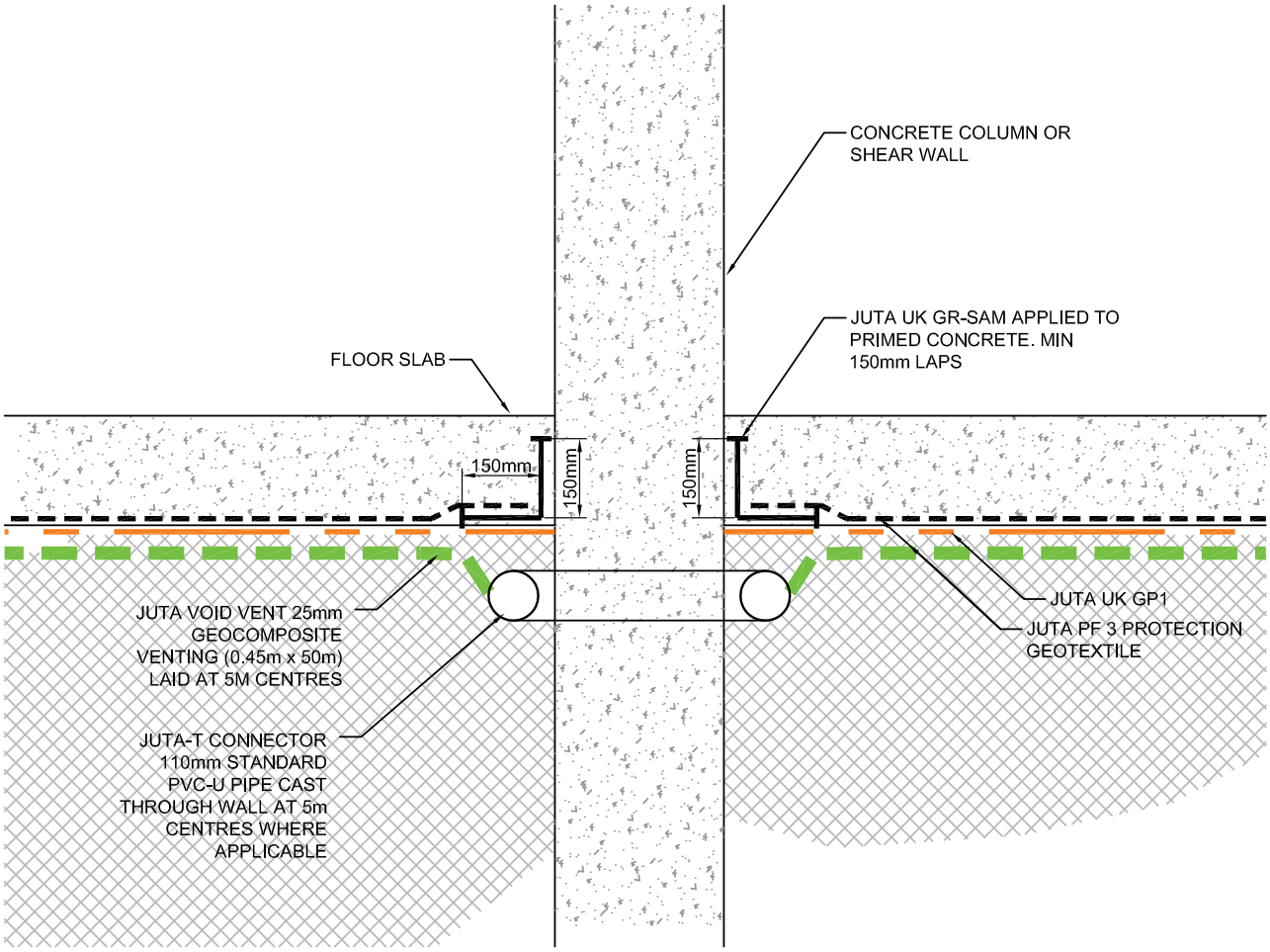
NOTES
JUTA GP1 AND GR-SAM ARE BS8485:2015 COMPLAINT GAS MEMBRANES AND ARE TESTED IN ACCORDANCE WITH BS8485:2015 FOR SUITABLE RESISTANCE TO METHANE PERMEATION TO ISO 15105-1

JUTA VOID VENT 25mm SHOULD BE PLACED SUCH THAT THE VENTING RUNS PARALLEL TO THE SHORT SIDE OF THE BUILDING

JUTA
Ability to Adapt

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Preston
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Tel: 01772 754177



PROJECT

Eastern Command Centre, WREXHAM

DRAWING TITLE

GAS PROTECTION MEASURES

NOTES

DRAWING NUMBER

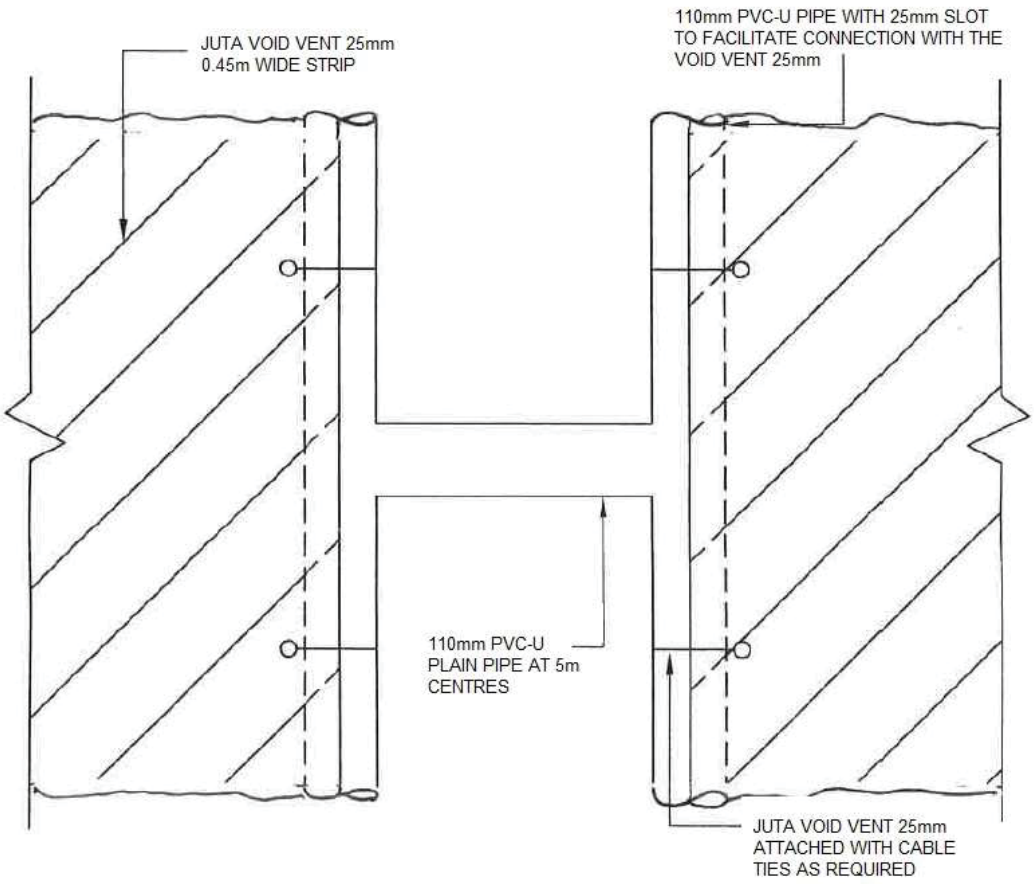
007 : VENTING THROUGH SHEAR WALL

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

JUTA
Ability to Adapt

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Kirkham
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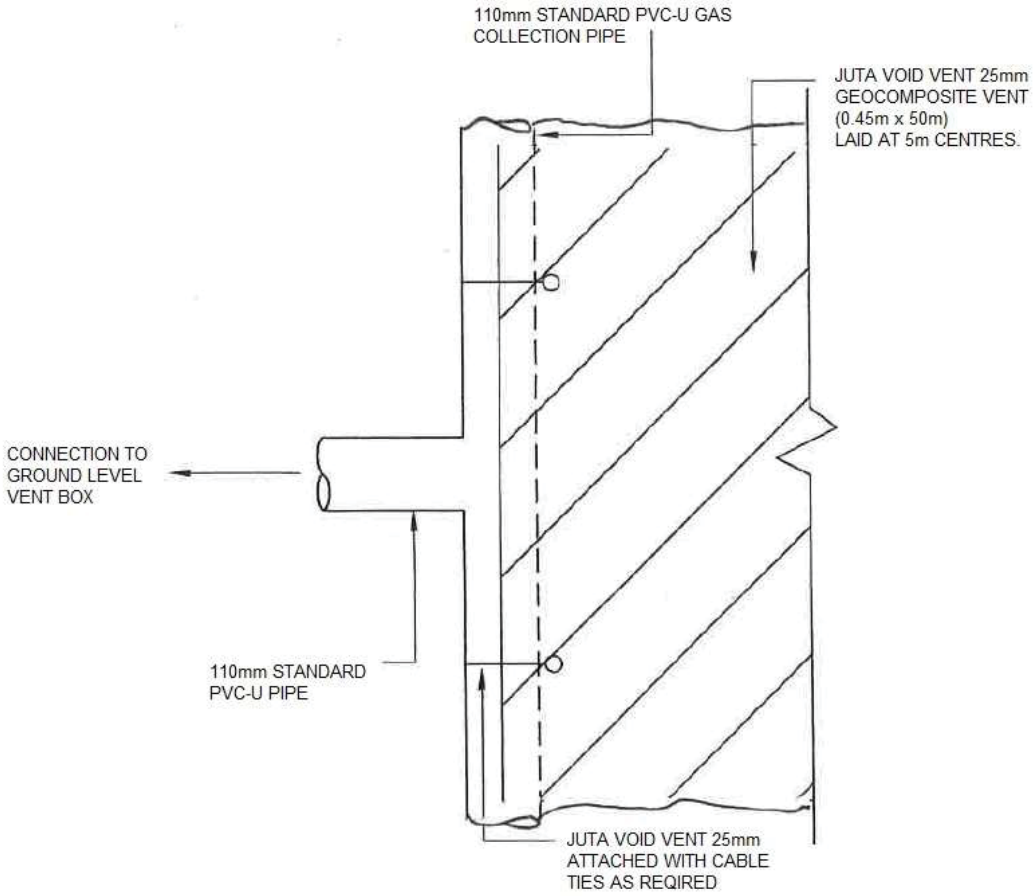


PROJECT: Eastern Command Centre, WREXHAM	DRAWING NUMBER: 008 - VENTING THROUGH SHEAR WALL PLAN
DRAWING TITLE: GAS PROTECTION MEASURES	DRAWN BY: PF / CHECKED BY: PF / SCALE: Not to Scale / DATE: 04/04/2017
NOTES:	

JUTA
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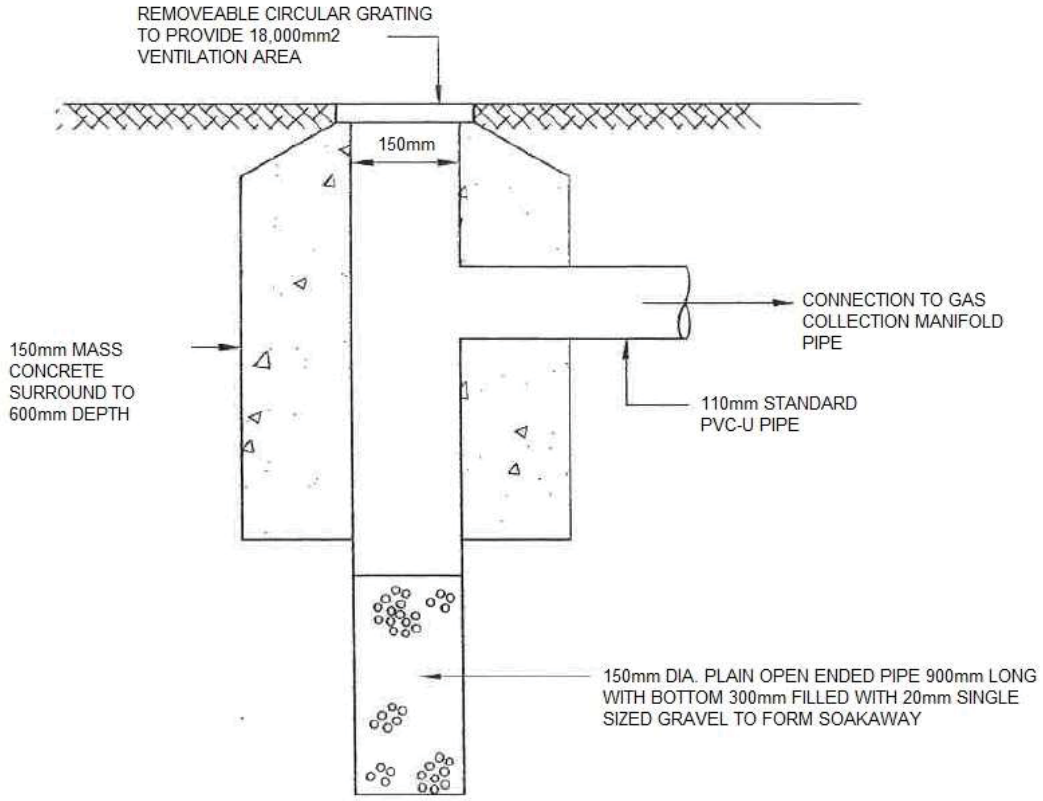


PROJECT: Eastern Command Centre, WREXHAM	DRAWING NUMBER: 009 - VENTING CONNECTION TO MANIFOLD
DRAWING TITLE: GAS PROTECTION MEASURES	DRAWN BY: PF / CHECKED BY: PF / SCALE: Not to Scale / DATE: 04/04/2017
NOTES	

JUTA
Ability to Adapt

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Tel: 01772 754177



PROJECT: Eastern Command Centre, WREXHAM	DRAWING NUMBER: 010 - GROUND LEVEL VENT BOX
DRAWING TITLE: GAS PROTECTION MEASURES	

DRAWN BY	CHECKED BY	SCALE	DATE
PF	PF	Not to Scale	04/04/2017

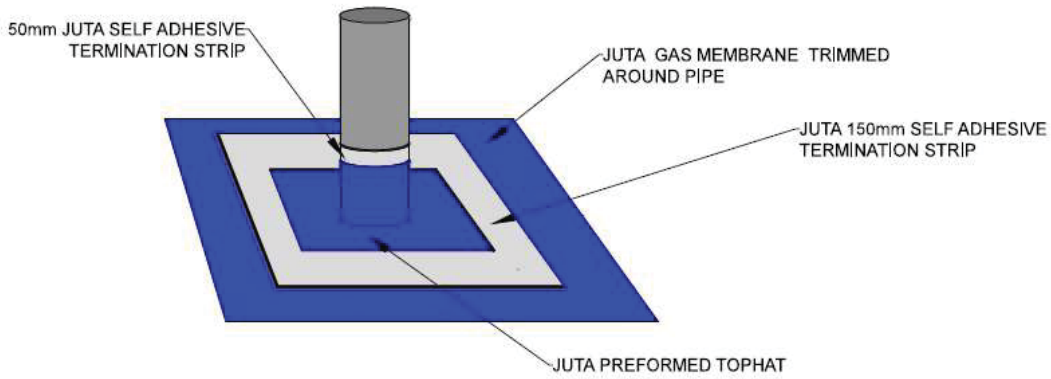
NOTES

DETAILS OF GROUND LEVEL VENT BOX TO BE AGREED WITH THE DESIGN ENGINEER AND ADAPTED TO SUIT SITE SPECIFIC REQUIREMENTS

JUTA
Ability to Adapt

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St Georges Court
Kirkham
Preston
PR4 2EF

Tel: 01772 754177

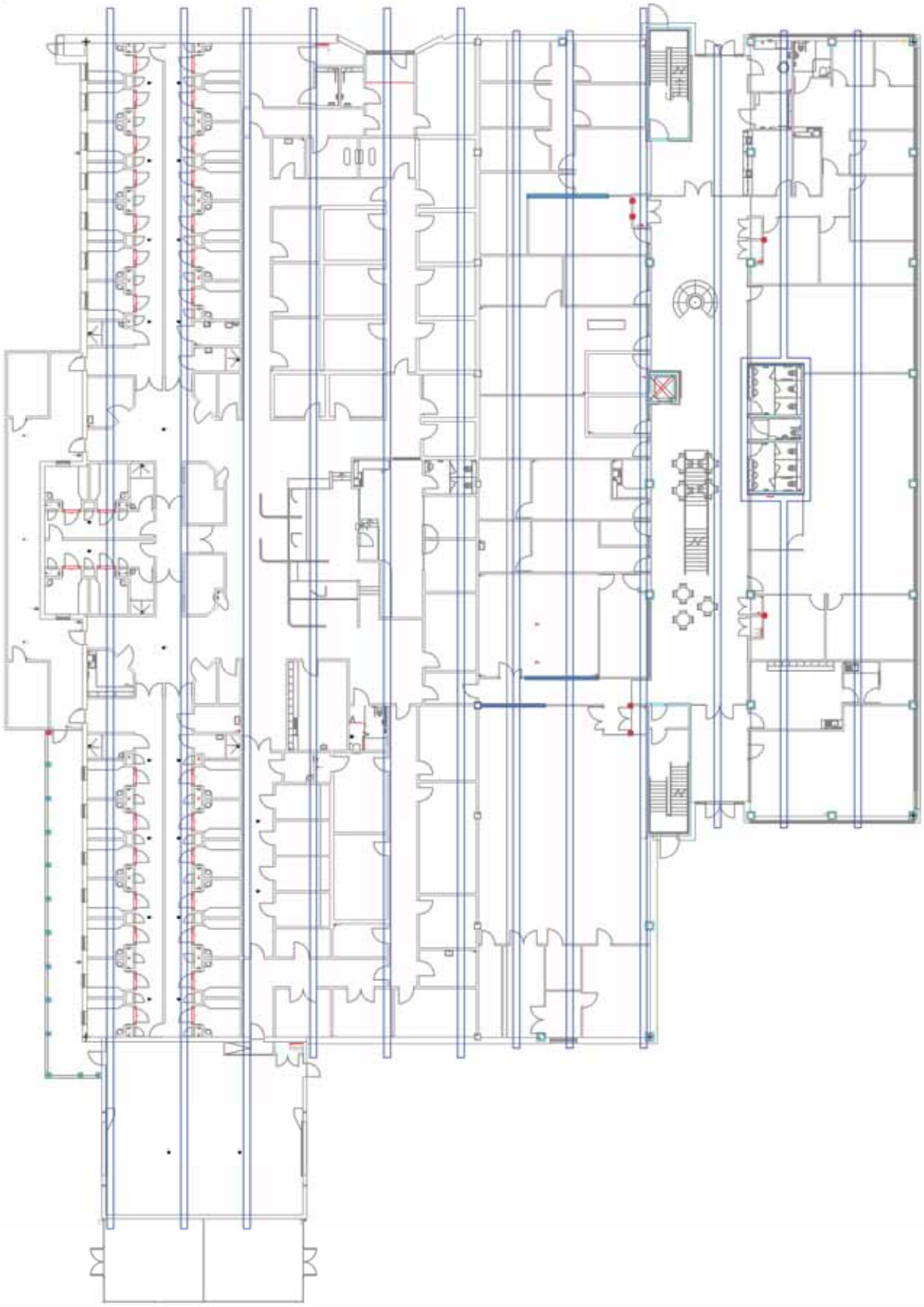


TYPICAL PIPE PENETRATION ISOMETRIC

PROJECT: Eastern Command Centre, WREXHAM	DRAWING NUMBER: 011 - TOP HAT DETAIL
DRAWING TITLE: GAS PROTECTION MEASURES	DRAWN BY: PF / CHECKED BY: PF / SCALE: Not to Scale / DATE: 04/04/2017
NOTES	JUTA Ability to Adapt

Unit 8
St Georges Court
Kirkham
Preston
PR4 2EF

Tel: 01772 754177



PROJECT	Eastern Command Centre, WREXHAM	DRAWING NUMBER	GAS DRAINAGE LAYOUT	
DRAWING TITLE	GAS PROTECTION MEASURES	DRAWN BY: PF	CHECKED BY: PF	SCALE: Not to Scale / DATE: 04/04/2017
NOTES		JUTA Ability to Adapt	Unit 8 St Georges Court Kirkham Preston PR4 2EF Tel: 01772 754177	

Appendix C – MMP Declaration

sara.brennan

Subject: FW: CL:AIRE Def. of Waste Code of Practice Declaration - 01/06/2018 11:04:59

From: Yueming Lu [mailto:yueming.lu@claire.co.uk]
Sent: 06 June 2018 14:22
To: david.howes <david.howes@wyg.com>; waste-exemptions@environment-agency.gov.uk
Subject: CL:AIRE Def. of Waste Code of Practice Declaration - 01/06/2018 11:04:59

Thank you for your recent submission of a Definition of Waste: Development Industry Code of Practice Declaration (DoW CoP).

This Declaration will be submitted to the Environment Agency / Natural Resources Wales under the DoW CoP.

You are reminded that if materials are not used in accordance with the Materials Management Plan or risk assessment or if it is discovered that materials were not suitable for use, were used in excessive quantity or in such a manner as to harm human health or pollute the environment, the Environment Agency / Natural Resources Wales may conclude that those materials were discarded and were waste.

You are also reminded that a Verification Report must be prepared on completion of the work as set out in the Remediation Strategy / Design Statement covering the site. This Verification Report must be provided to the Environment Agency / Natural Resources Wales upon request.

This acknowledgement email relates to the following Declaration

Timestamp	01/06/2018 11:04:59
Qualified Person Name	David Howes
Qualified Person Number	QP288
1. This Declaration relates to -	Site of Origin - Route A: Land affected by contamination or suspected of being affected by contamination.
2. Proposed Volumes	6,450
3a. Site of origin - name of site owner, address & contact details	Liz Bryan, North Wales Police, Wrexham Police Station, Tel 01745 588434
3b. Site of origin - site name & address	Site of Former Sharp Precision Warehouse, Llay Industrial Estate, Wrexham, LL12 0PB
3c. Site of origin - developer name, address & contact details	Graham Ford, Galliford Try Building – North West Crab Lane, Fearnhead, Warrington, Cheshire, WA2 0XR Email: graham.ford@gallifordtry.co.uk Tel: 07483 341328
4a. Donor Site - developer name, address & contact details	
4b. Donor Site - site name & address	
4c. Receiver Site - developer name, address & contact details	
4d. Receiver Site - site name & address	
5a. Soil Treatment Facility / Hub site owner / operator - name, address & contact details	
5b. EA / NRW Permit number for Mobile Treatment Plant or Fixed Soil Treatment site	
5c. Donor site - developer name, address & contact details	
5d. Donor site - name & address	

5e. Receiver site - developer name, address & contact details	
5f. Receiver site name and address	
6a. Local Authority name, address	Wrexham County Borough Council Environment and Planning Department Ruthin Road Wrexham LL13 7TU
6b. Local Authority - name and contact details:	Angela Guy Contaminated Land Officer – Environmental Protection Tel: 01978 297433 Email: Angela.Guy@wrexham.gov.uk
6c. Environment Agency / Natural Resources Wales local office address & contact details	Natural Resource Wales, Chester Road, Buckley, CH7 3AJ Elaine Wort Technical Officer, Geoscience Tel: 0300 065 3828 elaine.wort@naturalresourceswales.gov.uk
7. How will payment be made	Credit card by phone - please call 01844 296 112 between 10:00 & 13:30
8. Who will pay the Declaration fee?	Sara Brennan, Senior Geo-Environmental Consultant, WYG, Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, M17 1HH
9. Email address of person identified in Q8	sara.brennan@wyg.com
10. Terms & Conditions	Person identified in Q8 has read and agreed to the Terms & Conditions.
11. Please provide a purchase order number	NR
12a. I confirm that -	I satisfy the Qualified Person requirements set out in Appendix 6 of the Definition of Waste: Development Industry Code of Practice to complete this Declaration. I have reviewed the Materials Management Plan for the above project. I have reviewed the risk assessment. I have reviewed the Remediation Strategy/Design Statement covering the above site. I have requested correspondence / documentation relating to the development and how that relates to the use of materials.
12b. Please provide a reference for the Materials Management Plan	WYG, MMP (Revision 1: Updated Masterplan), 23 May 2018
12c. Please provide a reference for the Risk Assessment	Included in Remediation Strategy, 12d.
12d. Please provide a reference for the Remediation Strategy or Design Statement documents.	WYG, November 2016. Wrexham Custody Facility: Remediation Strategy. Ref. A098075-RS-V2
12e. Please provide a reference for the Verification Plan and identify the individual / organisation (and contact details) with responsibility for producing the Verification Report	Included in Remediation Strategy, 12d Sara Brennan, Senior Geo-Environmental Consultant, WYG, Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, M17 1HH. Sara.brennan@wyg.com Tel: +44 161 874 4687
12f. Please provide an estimated production date for the Verification Report.	31/08/2018
12g. Please reference other supporting documents as required in the MMP.	WYG, April 2017. Structural Specification, Wrexham Custody Suite. Ref. A095257. Capita Property and Infrastructure Ltd. May 2018. Llay Industrial Estate & Former Sharp Site. Ecological Assessment for BREEAM. Drawing No. A098075-MAN-N-01 – Site Location Plan Landscape masterplan – WXM-L-TP-DR-GA-04-001 Cut and Fill / Mound Volume Drawing, Galliford Try
13a. I confirm that I have reviewed the following correspondence / documentation relating to the	a) The Local Authority, b) Environment Agency / NRW

development and how that relates to the use of materials from:	
13b. Please reference the correspondence with the Local Authority.	Email, A Guy, Contaminated Land Officer – Environmental Protection. 21 Nov 2016. Approval of Remediation Strategy. Ref. P/2016/0990
13c. Please reference the correspondence with the EA / NRW.	G Thomas, Natural Resources Wales. I am advised that there was correspondence between the NRW Technical Officer, Geoscience, and Planning Liaison, resulting in the NRW notification of no further interest in contaminated land aspects. (This was also noted in an earlier Declaration applicable to this site for other material, Declaration Receipt 23/03/2017 16:16:07
13d. Please reference the correspondence with other relevant regulatory bodies	
14a. I have reviewed the planning consent including planning conditions	LLA P/2015/0583
14b. I have reviewed correspondence concerning the planning consent regarding the development from	a) The Local Authority , b) Environment Agency / NRW, d) Planning consent not required
14c. Please list correspondence reviewed in 15.	Email, G Thomas, Environment Agency, Planning Liaison. 09 March 2016. Ref. CAS-16184-X3S9. Notification of no regulatory interest in discharge of Planning Condition 3, Contamination
15. If planning consent is not required please explain why	(Revised layout under NMA submission - Verified by telecom, C Menzies, Galliford Try that Planning Authority has indicated no objection to change)
16. I confirm that the MMP contains the information required:-	The risk assessment assesses human health and environmental risks in relation to the proposed uses of all the materials in the MMP. The risk assessment concludes that the objectives of preventing harm to human health and pollution of the environment will be met if materials are used in the proposed manner., The Local Authority, the Environment Agency / Natural Resources Wales and other relevant environmental regulatory bodies have not objected to the proposed development / land remediation on the basis that the use of any material is likely to cause harm to human health or pollution of the environment. [This confirmation should be given regardless of whether planning consent is required for the activity. Also see paragraph 3.37 of the CoP.]., The EA/NRW have not objected to the reuse of materials on the grounds that it a.) constitutes a waste management operation or b.) has had a previous application for an environmental permit for waste recovery refused (on the grounds that the project represents waste disposal)., The project or phase to which this Declaration applies has not yet commenced; this is not a retrospective application of the DoW CoP., The project does not involve land-spreading / agricultural re-profiling.

Appendix D – Regulatory Correspondence

Cerys Jones

From: Matthew Phillips
Sent: 21 November 2016 12:59
To: planning_admin
Subject: FW: P/2016/0990

Public Protection response

From: Angela Guy
Sent: 21 November 2016 12:51
To: Matthew Phillips
Subject: RE: P/2016/0990

Matthew

Thank you for forwarding the revised Remediation Strategy. I can confirm that it addresses the queries raised and can now recommend that condition 3 is discharged.

Regards Angela

Ms Angela Guy
Contaminated Land Officer - Environmental Protection
Swyddog Tir wedi ei Halogi - Diogelu'r Amgylchedd

01978 297433
Environment and Planning Department, Ruthin Road, Wrexham LL13 7TU
Adran Amgylchedd a Chynllunio, Ffordd Rhuthun, Wrecsam LL13 7TU
wrexham.gov.uk | wrecsam.gov.uk
twitter.com/wrexhamcbc | twitter.com/cbswrecsam
facebook.com/wrexhamcouncil | facebook.com/cyngorwrecsam

"Parcio AM DDIM ym mhob maes parcio canol y dref y cyngor yn ystod mis Rhagfyr. Gobeithiwn y byddwch yn manteisio ar hyn ac ymweld â chanol y dref i wneud eich siopa Nadolig."

"FREE parking in all council town centre car parks during December. We hope you will take this opportunity to visit the town centre to do your Christmas shopping."

From: Matthew Phillips
Sent: 18 November 2016 09:49
To: Angela Guy
Subject: P/2016/0990

Angela,

Please find attached an updated remediation strategy submitted in respect of the above application.

Regards

Matthew Phillips

Planning Control Lead/Arweinydd Rheoli Cynllunio
Environment and Planning/Amgylchedd a Chynllunio
Wrexham County Borough Council/Cyngor Bwrdeistref Sirol Wrecsam
Telephone/Ffôn: 01978 298780

sara.brennan

From: Angela Guy <Angela.Guy@wrexham.gov.uk>
Sent: 19 June 2017 10:17
To: sara.hegewald
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Thanks for clarifying, provided the works are fully documented and verified this is fine.

Regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 19 June 2017 10:16
To: Angela Guy
Cc: kathryn.ellis
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

Our MMP which has been written for the Wrexham Custody site only covers the re-use of material for a bund on site and not the re-use of material for the pond areas. This work would be outside of the MMP. The material is however, being dug out and is being re-used in practically the same area as a liner to the pond. The clay is undisturbed natural ground in this area.

Kind Regards

Sara

Sara Hegewald
Senior Geo-Environmental Consultant

For more information about WYG Environment, please have a look at our brochure

WYG
Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, M17 1HH
Tel: +44 161 874 4687

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Registered Office: Arndale Court, Otley Road, Headingley, Leeds, West Yorkshire LS6 2UJ VAT No: 431-0326-08.

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 19 June 2017 09:57
To: sara.hegewald <sara.hegewald@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)
Importance: Low

Sara
Your Remediation Strategy has proposals to use the CL:AIRE Code of Practice and a Materials Management Plan for re-use of materials on site, therefore this will be acceptable (I am assuming the clay undisturbed natural ground?)
Kind regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 16 June 2017 15:18
To: Angela Guy
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

The client has asked if they can re-use approximately 500m^3 of stiff Clay excavated from an area adjacent to the proposed car park on site as a liner for a couple of pond features on site. I have advised them that additional chemical testing is required (3 no. samples) in line with the WYG Remediation Strategy for re-use of soils. Are you happy with us to proceed with the sampling as I don't want to visit site if you are not happy with them to re-use the soil on site in this manner. I have attached a copy of our remediation strategy report for your reference.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

For more information about WYG Environment, please have a look at our brochure

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Rydym yn croesawu gohebiaeth yn Gymraeg. Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.

Ewch i weld - mi fedrwch chi dalu, rhoi gwybod, gwneud cais, dweud eich dweud, a dod o hyd i wybodaeth ar-lein yn www.wrecsam.gov.uk. Arbedwch bapur - meddyliwch cyn argraffu!

Mae'r neges e-bost hon ac unrhyw atodiadau wedi eu bwriadu ar gyfer yr unigolyn neu?r sefydliad y?i cyfeirir atynt yn unig. Am yr amodau llawn yngl?n ? chynnwys a defnyddio?r neges e-bost hon, ac unrhyw atodiadau, cyfeiriwch at www.wrecsam.gov.uk/top_navigation/disclaimersw.htm

We welcome correspondence in Welsh. We will respond to any correspondence in Welsh and this will not lead to any delay.

Take a look - you can pay, report, request, have your say and find information online at www.wrexham.gov.uk. Save paper - think before you print!

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sara.brennan

From: Angela Guy <Angela.Guy@wrexham.gov.uk>
Sent: 19 June 2017 11:05
To: sara.hegewald
Cc: kathryn.ellis
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

On the basis that these sites are regulated under appropriate permits and the construction recycling scheme is being managed under a recognised scheme (WRAP) then I acknowledge that WYG consider this material to be suitable for the uses it has been stated as being used for.

Regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 15 June 2017 15:30
To: Angela Guy
Cc: kathryn.ellis
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

Thank you for your email. In response to your queries below:

The addresses for both WRAP sites are:

- Eccles Transfer Station, Salford, M50 1DG
- Tudor Griffiths Ltd, Wood Lane, Ellesmere, Shropshire, SY12 0HY

Please find attached information pertaining to the quality protocols that both sites adhere to, to ensure that the material is suitable for re-use.

In relation to the material imported from Holywell, I have notified the site that the material must be removed under a duty of care and must not be used on site. I have asked for transfer notes as proof of removal which I will provide to you in due course.

I hope that this information is satisfactory. If you require any further information, please let me know.

Sara

Sara Hegewald
Senior Geo-Environmental Consultant

For more information about WYG Environment, please have a look at our brochure

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 11 May 2017 11:08
To: sara.hegewald <sara.hegewald@wyg.com>
Cc: kathryn.ellis <kathryn.ellis@wyg.com>; natalie.stephens <natalie.stephens@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Thank you for your email.

With regard to the recycled material imported from 2 sources under WRAP, you have provided the following information:

- A Murray Rix Test Report for PSD for 'recycled 6F2' for PP O Connor Ltd from a site called Eccles New Road, Salford.
- An SAL Certificate of Analysis for a sample 'analysed as soil' from '6F2 Fines' also from a site called Eccles New Road, Salford.
- A Celtest Lab Test Report for a PSD test from TG Stock 'Docks' for 'crushed aggregate'.
- A second Celtest Lab Test Report for a PSD test for 'Crushed Rock' from 'TG'.

Please can you clarify exactly where the sites are for both sources of material and what procedures are in place under the WRAP scheme which ensures the treatment and re-use of these materials is checked/monitored to ensure they are suitable for their re-use.

With regard to your Site Report for the material from Holywell, further information about the site that the material has come from will be required. I will need to know the actual site address/location, whether it is brownfield or greenfield (I am assuming brownfield based on the photos and material description). I will also need sight of the waste transfer notes and have details about the circumstances of why this material has been imported– i.e. is it under the CL:AIRE Code of Practice? It should also be noted that the WLCWG 'Requirements for the Chemical Testing of 'Imported Materials for Various End Uses and 'Validation of Cover Systems' Table 2 states that for:

By products from
industrial processes.
Mechanically screened and
sorted demolition wastes.

Additional testing to that in **TABLE 3** will be required
to determine the suitability of these materials for
specific uses prior to CLO/EHO acceptance for import.
This is likely to include leachability testing in line with
WAC testing or Remedial Targets Methodology
Appendix B Leachate testing.

Regards Angela

Ms Angela Guy
Contaminated Land Officer - Environmental Protection
Swyddog Tir wedi ei Halogi - Diogelu'r Amgylchedd

01978 298771
Environment and Planning Department, 16 Lord Street, Wrexham LL11 1LG
Adran Amgylchedd a Chynllunio, 16 Stryt yr Arglwydd, Wrecsam LL11 1LG
wrexham.gov.uk | wrecsam.gov.uk
twitter.com/wrexhamcbc | twitter.com/cbswrecsam
facebook.com/wrexhamcouncil | facebook.com/cyngorwrecsam

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 10 May 2017 14:19
To: Angela Guy
Cc: kathryn.ellis; natalie.stephens
Subject: Wrexham Custody Facility (2015/0583)

Angela,

Construction works are currently underway at the Wrexham Custody Facility site. They are currently constructing the car park area and forming the piling mat of the building footprint. Material has been imported to site to build up the levels of the car park, much of it from a natural quarried source where no additional chemical testing has been required in line with WYG Remediation Strategy Report, dated November 2016.

Material imported from two sources however, - Tudor Griffith and Eccles New Road was recycled in nature. Both sites are working under the Waste & Resources Action Programme (WRAP) and therefore additional chemical testing is not considered to be required. I have attached the source certificates for your review. The material will be used as a piling mat for the future building and also beneath the car parking area with limited pathways to contamination.

Additional recycled material from a site called 'Holywell' which doesn't operate under the WRAP protocol was imported and stockpiled for WYG to carry out chemical testing on it in accordance with the WYG Remediation Strategy report and Welsh Land Contamination Working Group Document, dated May 2013. I have attached the site visit report for your review.

Please can you let me know if you are happy with the presented information.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

For more information about WYG Environment, please have a look at our brochure

WYG
Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, M17 1HH
Tel: +44 161 874 4687

www.wyg.com

WYG Environment Planning Transport Limited. Registered in England number: 3050297.
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Brick Dust

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Hadfield House
Hadfield Street
Combrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Scientific Analysis Laboratories is a limited company registered in England and Wales (No 2514788) whose address is at Hadfield House, Hadfield Street, Manchester M16 9FE

Report Number: 549276-1

Date of Report: 16-FEB-2017

Customer: PP O'Connor
Woodrow Way
Thames Trading Estate
Iriam
Manchester
M44 6NN

Customer Contact: Mr Nigel Hambleton

Customer Job Reference:
Customer Purchase Order:
Customer Site Reference: Eccles New Road Salford
Date Job Received at SAL: 10-FEB-2017
Date Analysis Started: 11-FEB-2017
Date Analysis Completed: 16-FEB-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.
Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
Tests covered by this certificate were conducted in accordance with SAL SOPs
All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

UKAS TESTING
1549

Report checked and authorised by :
Mr Richard Wong
Project Manager

Issued by :
Mr Richard Wong
Project Manager

This document has been printed from a digitally signed master copy

SAL Reference: 549276
Project Site: Eccles New Road Salford
Customer Reference: SF2 Fines

Soil
Heavy Metals(9)

Analysed as Soil

SAL Reference	549276 001
Customer Sample Reference	Eccles New Road Salford
Date Sampled	16-FEB-2017

Determinand	Method	Test Sample	LOD	Units	
Arsenic	T6	AR	1	mg/kg	11
Cadmium	T6	AR	1	mg/kg	<1
Chromium	T6	AR	1	mg/kg	21
Copper	T6	AR	1	mg/kg	68
Lead	T6	AR	1	mg/kg	180
Mercury	T6	AR	1	mg/kg	<1
Nickel	T6	AR	1	mg/kg	17
Selenium	T6	AR	3	mg/kg	<3
Zinc	T6	AR	1	mg/kg	280

SAL Reference: 549276
Project Site: Eccles New Road Salford
Customer Reference: SF2 Fines

Soil
Miscellaneous

Analysed as Soil

SAL Reference	549276 001
Customer Sample Reference	Eccles New Road Salford
Date Sampled	16-FEB-2017

Determinand	Method	Test Sample	LOD	Units	
Asbestos ID	T27	AR			N.D.
Total Petroleum Hydrocarbons	T8	AR	1	mg/kg	(13) 460

SAL Reference: 549276
Project Site: Eccles New Road Salford
Customer Reference: SF2 Fines

Soil
Total and Speciated USEPA16 PAH

Analysed as Soil

SAL Reference	549276 001
Customer Sample Reference	Eccles New Road Salford
Date Sampled	16-FEB-2017

Determinand	Method	Test Sample	LOD	Units	
Naphthalene	T16	AR	0.1	mg/kg	0.5
Acenaphthylene	T16	AR	0.1	mg/kg	<0.1
Acenaphthene	T16	AR	0.1	mg/kg	0.7
Fluorene	T16	AR	0.1	mg/kg	0.7
Phenanthrene	T16	AR	0.1	mg/kg	2.6
Anthracene	T16	AR	0.1	mg/kg	0.8
Fluoranthene	T16	AR	0.1	mg/kg	2.5
Pyrene	T16	AR	0.1	mg/kg	2.3
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	1.1
Chrysene	T16	AR	0.1	mg/kg	1.1
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	1.7
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	1.1
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	0.5
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	0.2
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	0.6
PAH(total)	T16	AR	0.1	mg/kg	16

Index to symbols used in 549276-1

Value	Description
AR	As Received
N.D.	Not Detected
13	Results have been blank corrected.
S	Analysis was subcontracted
U	Analysis is UKAS accredited

Notes

Asbestos ID performed at REC Asbestos

Method Index

Value	Description
T6	ICP/OES
T27	PLM
T16	GC/MS
T8	GC/FID

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Asbestos ID	T27	AR			SU	001
Total Petroleum Hydrocarbons	T8	AR	1	mg/kg	U	001
Arsenic	T6	AR	1	mg/kg	U	001
Cadmium	T6	AR	1	mg/kg	U	001
Chromium	T6	AR	1	mg/kg	U	001
Copper	T6	AR	1	mg/kg	U	001
Lead	T6	AR	1	mg/kg	U	001
Mercury	T6	AR	1	mg/kg	U	001
Nickel	T6	AR	1	mg/kg	U	001
Selenium	T6	AR	3	mg/kg	U	001
Zinc	T6	AR	1	mg/kg	U	001
Naphthalene	T16	AR	0.1	mg/kg	U	001
Acenaphthylene	T16	AR	0.1	mg/kg	U	001
Acenaphthene	T16	AR	0.1	mg/kg	U	001
Fluorene	T16	AR	0.1	mg/kg	U	001
Phenanthrene	T16	AR	0.1	mg/kg	U	001
Anthracene	T16	AR	0.1	mg/kg	U	001
Fluoranthene	T16	AR	0.1	mg/kg	U	001
Pyrene	T16	AR	0.1	mg/kg	U	001
Benzo(a)Anthracene	T16	AR	0.1	mg/kg	U	001
Chrysene	T16	AR	0.1	mg/kg	U	001
Benzo(b/k)Fluoranthene	T16	AR	0.1	mg/kg	U	001
Benzo(a)Pyrene	T16	AR	0.1	mg/kg	U	001
Indeno(123-cd)Pyrene	T16	AR	0.1	mg/kg	U	001
Dibenzo(ah)Anthracene	T16	AR	0.1	mg/kg	U	001
Benzo(ghi)Perylene	T16	AR	0.1	mg/kg	U	001
PAH(total)	T16	AR	0.1	mg/kg	U	001

celtest
INDEPENDENT MATERIALS TESTING

Tudor Griffiths Ltd
Wood Lane,
Ellesmere,

Shropshire,
SY12 0HY

Date: 04 October 2016
Test Report Ref: STR 484073

Contract: Wood lane Ellesmere

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Loss on Ignition of an aggregate sample in accordance with **BS EN 1744-1 : 2009 + A1 : 2012 Clause 17**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S60500 / 255785**
Client Ref. No:	**Crushed Rubble**
Date and Time of Sampling:	**21/09/2016**
Date of Receipt at Lab:	**23/09/2016**
Date of Start of Test:	**30/09/2016**
Sampling Location:	**Stock**
Name of Source:	**T.G.**
Method of Sampling:	**Unknown**
Sampled By:	**Client**
Material Description	**Crushed Rock**
Target Specification:	**N/A**

RESULTS:

Loss on Ignition (LOI) =	**9.5**	**(nearest 0.1%)**
*95% Confidence limit**		*9.36% - 9.64%*

Comments

*95% Confidence limit is the expanded uncertainty which is the combined uncertainty standard multiplied by a factor (k) of 2

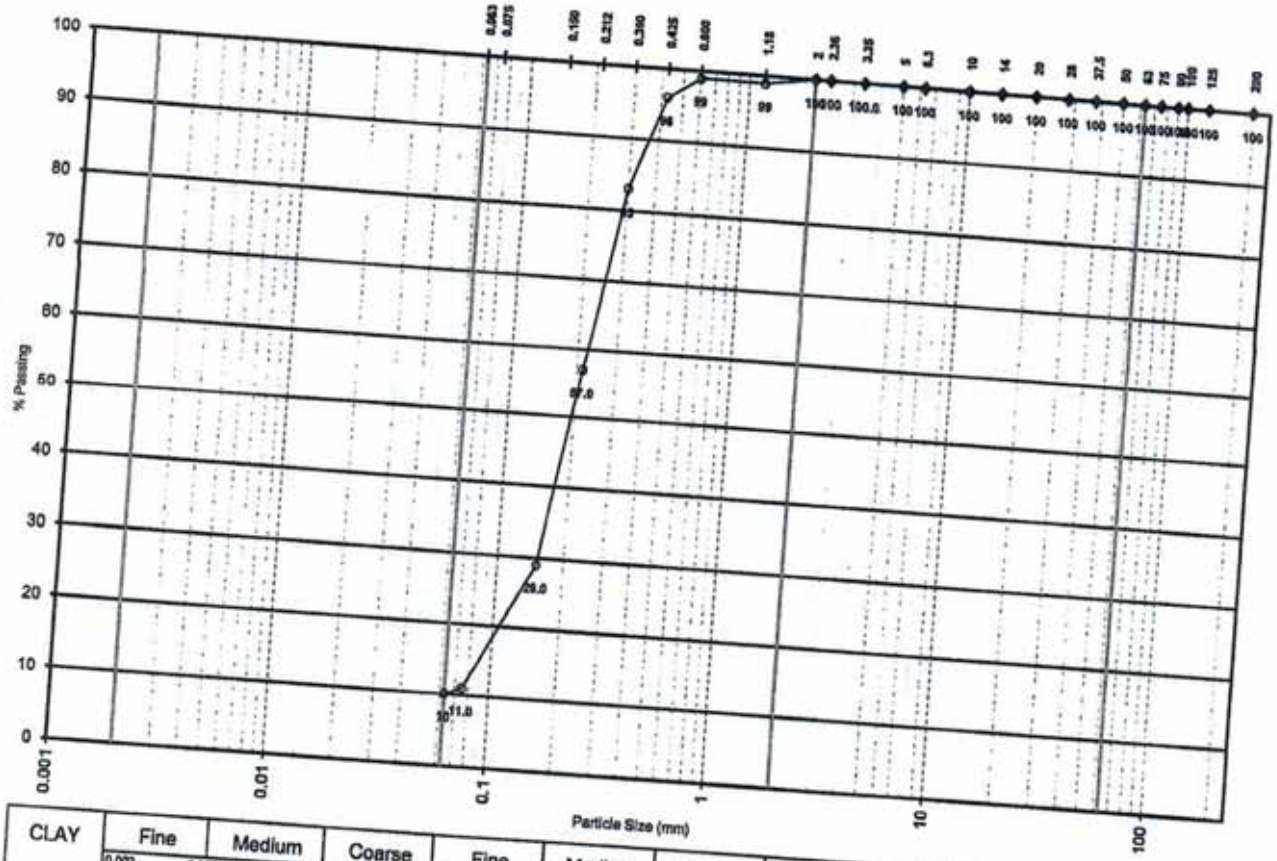
Certificate Prepared by:- Dyfed Jones
Job Coordinator

Approved by: - Eric Goulden
Technical Manager

MATERIAL DESCRIPTION

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100	3.35	100
125	100	2.36	100
100	100	2.0	100
90	100	1.18	99
75	100	0.600	99.0
63	100	0.425	96.0
50	100	0.300	83.0
37.5	100	0.212	57.0
28	100	0.150	29.0
20	100	0.075	11.0
14	100	0.063	10.1
10	100		
6.3	100		
5.0	100		

Cobbles	0.0
Gravel	0.0
Sand	89.9
Silt/Clay	10.1



CLAY	SILT			SAND			GRAVEL			COBBLES
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
	0.002 – 0.006	0.006 – 0.02		0.063 – 0.2	0.2 – 0.63		2.0 – 6.3	6.3 – 20		63 – 200

Trefelin Bangor Gwynedd LL57 4LH T +44 (0)1248 355269 F +44 (0)1248 351563 E postmaster@celtest.com W www.celtest.com

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celtest

Tudor Griffiths Ltd
Wood Lane,
Ellesmere,

Shropshire,
SY12 0HY

Date: 13 March 2017

LABORATORY TEST REPORT

TEST REQUIREMENTS: To determine the Particle Size Distribution (PSD) of a soil sample- washing and sieving method in accordance with **BS EN 933-1: 2012.**

SAMPLE DETAILS:

Certificate of sampling received:	**Yes**
Laboratory Ref. No:	**S59703 / 255774**
Client Ref. No:	**Docks**
Date and Time of Sampling:	**13/02/2017**
Date of Receipt at Lab:	**13/02/2017**
Date of Start of Test:	**14/02/2017**
Sampling Location:	**T.G. Stock**
Name of Source:	**Docks**
Method of Sampling:	**EN 932-1**
Sampled By:	**Client**
Material Description:	**Crushed Aggregate**
Target Specification:	**N/A**

RESULTS:

SEE ATTACHED

Comments
None

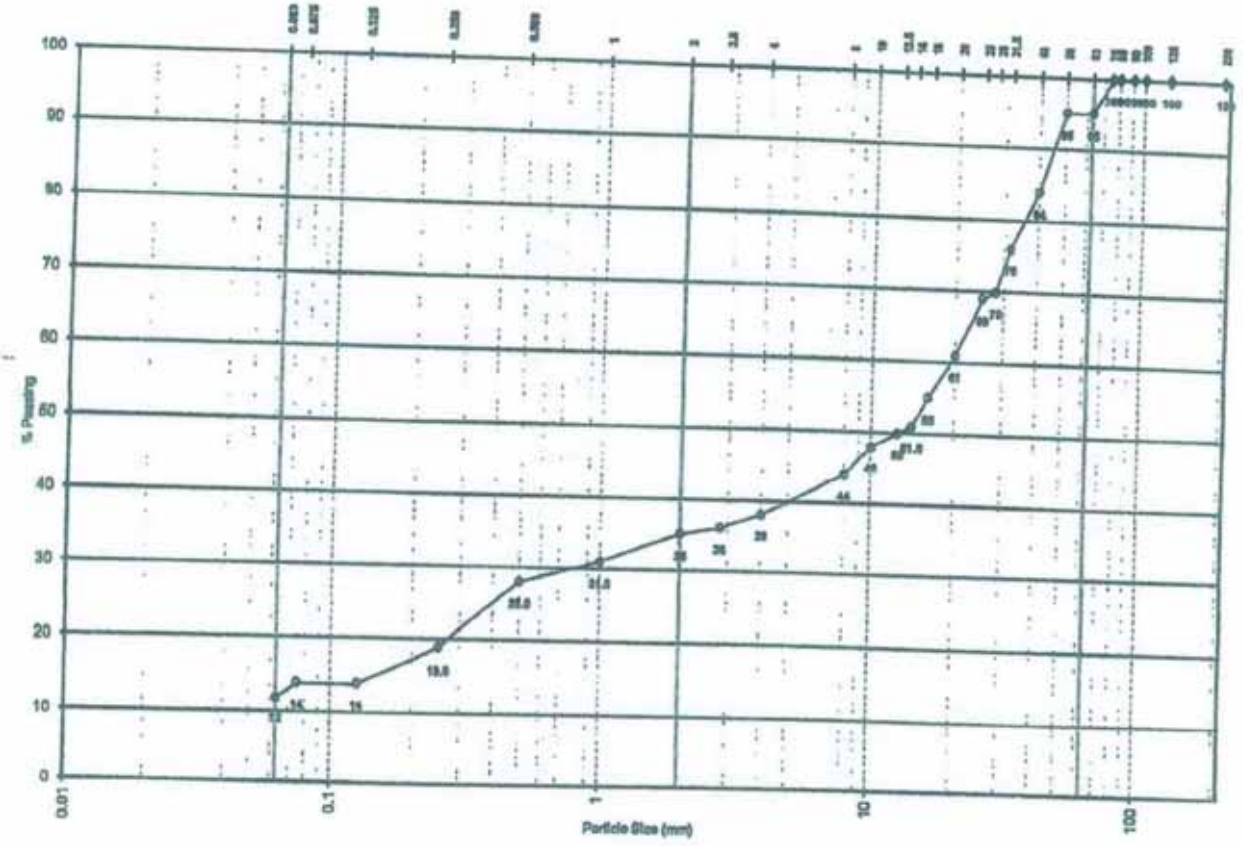
Certificate Prepared by:-
Dyfed Jones
Job Coordinator

Approved by: -
Eric Goulden
Technical Manager

MATERIAL DESCRIPTION

Crushed Aggregate

Sieve Size mm	% Passing	Sieve Size mm	% Passing
200	100	14	51
125	100	12.5	50
100	100	10.0	48
90	100	8.0	44
80	100	4.0	38
75	100	2.8	36
63	95	2.0	35
50	95	1.0	31
40	84	0.500	28
31.5	76	0.250	19
28	70	0.125	14
25	69	0.075	14
20	61	0.063	11.9
16	55		



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MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client P.P. O'Connor Ltd

Address Thames Trading Estate
Woodrow Way
Irlam
Manchester
M44 6NN

Contract Eccles New Road, Salford

Job Number MRN 1927/39
Date of Issue 27 February 2017
Page **1 of 2**

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation

4 Certified that the samples have been examined and tested in accordance with the terms of the contract/order and unless otherwise stated conform to the standards/specifications quoted. This does not, however, guarantee the balance of the materials from which the tested samples have been taken to be of equal quality.

33C, Vauxhall Industrial Estate, Greg Street, Reddish, Stockport SK5 7BR Tel: 0161 475 0870 Fax: 0161 475 0871
Email: steve@mtt-uk.com Website: www.murrayrix.com
Also at: London: 020 8523 1999
Murray Rix is the trading name of Murray Rix (Northern) Limited. Registered in England 2878361

MURRAY RIX

33C Vauxhall Ind. Estate, Greg Street
Reddish, Stockport SK5 7BR
TEL 0161 475 0870 FAX 0161 475 0871

UKAS TESTING 1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

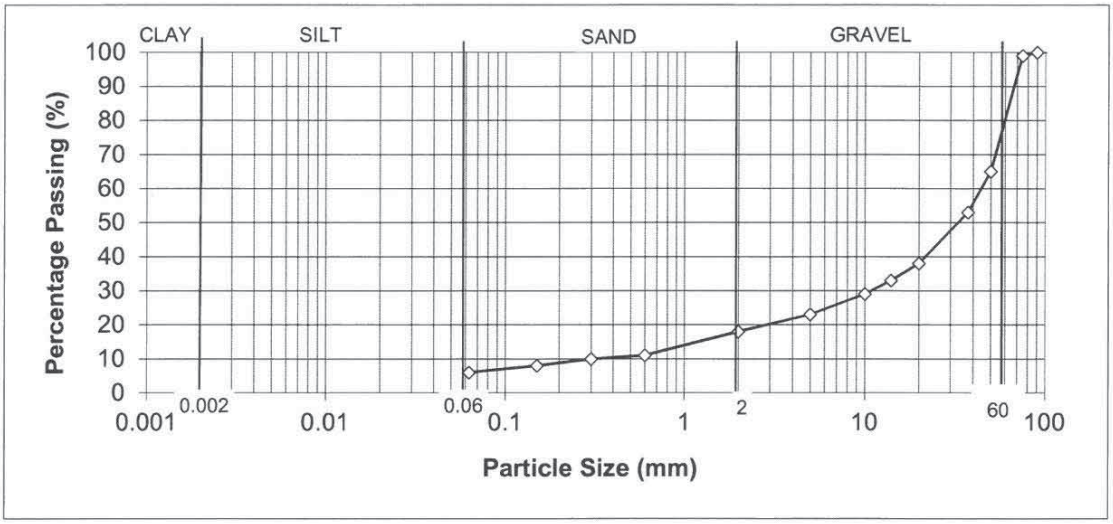
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	P.P. O'Connor Ltd
SITE	Eccles New Road, Salford
JOB NUMBER	MRN 1927/39

SAMPLE LABEL	Recycled 6F2	DATE SAMPLED	17-Feb-17
LAB SAMPLE No	69081	DATE RECEIVED	17-Feb-17
DATE TESTED	20-Feb-17	SAMPLED BY	Client

MATERIAL	6F2
ADVISED SOURCE	Eccles New Road, Salford

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100	100	10	29	15-60
90	100	80-100	5	23	10-45
75	99	65-100	2	18	
50	65		0.6	11	0-25
37.5	53	45-100	0.3	10	
20	38		0.15	8	
14	33		0.063	6	0-12



REMARKS

Sample complies with the grading requirements for a 6F2 material (SHW 2016)

As received moisture content = 8.0%

SIGNED

NAME O.P. Davies (Deputy Laboratory Manager) DATE 27-Feb-17

AGGREGATE PROTOCOL

TG WASTE SERVICES
SECONDARY AGGREGATE PRODUCTION PROTOCOL 1/3/2017

Introduction

1. Recent ECJ (European Court of Justice) rulings have resulted in the establishment within the UK of a decision that the products obtained from processing many recyclable waste streams are still waste until they are finally used. This decision creates uncertainty for the users of such products and pushes their decision making towards virgin materials away from the waste hierarchy; in particular the re-use of construction waste is one of the most affected activities at present.

   The purpose of this document is to confirm that TG Waste Services support "the quality protocol" produced by WRAP (Waste and Resources Action Programme) and to document which waste streams are best utilised for the production of secondary or recovered aggregates and the quality controls involved in the production of such materials. Once materials have met the requirements of this protocol they are no longer considered to be waste.

2. For customers using our recycled products there will be little or no observable difference from virgin materials in their normal construction use. However, there are significant advantages in confirming beyond reasonable doubt that recovered aggregates are not waste, namely:

   - The term 'waste' has a blight effect even where customers are fully aware of the source and are satisfied as to the composition and analysis.

   - Use of waste in construction requires the registration of a Paragraph 19A exemption and is subject to a 35 day notification period. Customers place orders at short notice and the Wood Lane facility has stock available to meet this requirement. If a customer has to wait 35 days for the Environment Agency ("EA") to make a decision then they will find an alternative source, often virgin materials which is contrary to all current recycling policies. Faced with such a cost most users would opt for less costly but virgin materials, despite the increased environmental impact.

3. The Waste Framework Directive definition of waste is well documented and discussed elsewhere. The status of the inert construction wastes as received at the Material Recycling Area is not in dispute but the point at which they cease to be waste when processed requires confirmation. The EA considers that once a substance or object has become waste, it will remain waste until it has been fully recovered and it no longer poses a potential threat to the environment or human health, however, the crucial test of self interest is not considered in recent case law. One of the main considerations in determining a substance as waste has been that the producer of the waste does not have the self interest to deal with the waste satisfactorily. In the case of recovered aggregates the self interest is met by virtue of the fact that the customer will reject materials which are substandard and

reduce the likelihood of using the same supplier. The products have to be fit for purpose.

4. If a recovered aggregate meets a specification which is fit for an intended use and does not pose a threat to the environment i.e. it has beneficial use then it should be considered to be a product if the following procedures are followed.

5. Recycled aggregates resulting from the processing of inorganic material previously used in construction can be processed to a plethora of specifications which easily demonstrate their equivalence to natural materials. The main specifications currently prepared by TG Waste Services are 6F2 and other products are prepared to customer requirements.

6. The production of a saleable product does not itself ensure recovery and remove the designation as waste. However, it is stated that there must be a need and a market for the recovered waste and that it will not be merely stockpiled pending development of such a need or market. The market for recovered aggregates of the specifications stated above is well established and the materials meet a recognised need.

Acceptance Criteria and The Process

7. TG Waste Services operates a Material Recycling Facility on the Wood Lane Landfill Site, Ellesmere, Shropshire which is licensed by the Environment Agency (Licence Number EPR CP3698VW-V002). A waste management licence is required for the pre-sorting of the construction waste prior to crushing (Regulated by Shropshire County Council).

8. The Wood Lane Facility has a broad licence and can accept household, commercial and industrial wastes for treatment and disposal. The inert wastes suitable for aggregate production are separated from non-hazardous waste after receipt.

9. The inert waste feedstock for aggregate production consists of construction and demolition wastes in the form of bricks, tiles, concrete, stone etc. which are separated from the incoming waste stream after receipt and stored in a separate stockpile prior to crushing to reduce the risk of cross contamination by litter etc. Inert waste arrives at the site either in whole loads or within skips containing mixed construction and demolition waste, as follows:

    - The whole loads are weighed in and the Duty of Care documentation checked to ensure that the waste has been properly described and can be accepted at the site. The load is then unsheeted and a visual inspection carried our prior to the contents of the load being discharged adjacent to the pre – crushing stockpile and visually inspected for a second time. If

inspection reveals unwanted materials then the load will be moved to the mixed waste stockpile.

- Mixed loads will be inspected in the manner described above in accordance with the waste management licence. If the waste does not conform they will be rejected and returned to the waste producer in accordance with the agreed procedures in the site working plan and waste management licence. The loads will then be transferred to the pre crushing stockpile.

The Quality Protocol

10. The following details are known for all incoming loads:

    - Date
    - Description
    - Source/producer
    - Quantity of weight/volume
    - Carrier

11. The working plan for the site describes how the site will meet the requirements of the waste management licence and how wastes are inspected and segregated.

12. Research of other recycled aggregate producers has revealed a wide variability in testing regimes and product specification. It would appear that the use of materials is widespread and is not sold as waste.

13. The inspection and testing regime including frequency and methods of test for finished product shall be detailed and appropriate to the material end use, the quality of incoming waste and the complexity of the waste recovery process. As a minimum the stockpiles will be sampled monthly for materials other than 6F2 and quarterly for 6F2.

14. These testing rates may be varied to ensure a controlled process.

15. Records of incoming waste and products will be kept at the site weighbridge.

16. Results of tests are required to meet the customer's specification.

17. If further tests are required for assessment of suitability for a particular use, then the results shall also be retained.

18. Delivery documentation shall state that the product was produced under a quality protocol conforming to this document.

TG WASTE SERVICES
SECONDARY AGGREGATE PRODUCTION PROTOCOL 1/3/2017

19. TG Waste Services undertake to provide the following when requested by the customer;

    - Test results
    - Test procedures
    - Outline details of the production method
    - Provide samples for independent testing

20. Inert waste used for processing will fall within the following European Waste Catalogue Codes:

    - 170102 Bricks
    - 170103 Tiles and ceramics
    - 170107 Mixtures of concrete, bricks, tiles and ceramics
    - 170504 Soils and stones including gravel
    - 170508 Crushed rock, sand
    - 200202 Soils and stones

21. Samples for analysis will be aggregate sampled from the respective stockpile. 4-8 samples shall be taken to make a 2kg sample, which will provide sufficient additional material for further analysis at the customer's request.

JHP

1/3/2017

3/1/2017

Tudor Griffiths Group
GROUP Established 1874
Wood Lane, Ellesmere, Shropshire, SY12 0HY Tel: 01691 626262 Fax: 01691 626263
www.tggroup.co.uk

TECHNICAL APPRAISAL CRUSHED HARDCORE

sieve	% cumulative Dates	specifications	
mm	3/9/08	6f1	6f2
75	100	100	65-100
37.5	100	75-100	45-100
10	47	40-95	15-60
5	28	30-85	10-45
600	7	10-50	0-25
63	1	<15	0-12

P S MOLD
TECHNICAL MANAGER

Did you know the construction industry produces over 120 million tonnes of waste very year and over 25 million tonnes of this is sent to landfill without any form of recovery or re-use. This accounts for nearly a third of all UK Waste arisings!

With our staffs extensive knowledge of Recycling and Waste Management at the TG Group. Waste and Recycling provide and environmentally sustainable, cost-effective solution to the construction industry.

The TG Group support the government policy of promoting recycled aggregates as a cost effective alternative to Quarried aggregates thus reducing the onus on landfill. Our mobile crushing and screening equipment at our facility in Telford, Shropshire has the capability to supply a wide variety of quality materials for use in road construction, ground improvements and every day commercial construction use.

In the last year we have invested heavily in our crushing and screening process to ensure we provide the best recycled aggregate to the industry. This material is selected from our Waste transfer stations, run through screening equipment and handpicked, finally to be crushed for construction projects and turned into a recycled product.

Hardcore



Consists of concrete, bricks and stone from the construction, demolition and building industry. We collect the raw material in our tippers and skips, and our customers can bring it in with their own transport. This is the raw material that generates our recycled products.

Ideal to be used for rough tracks, farm roads, landfill site haul roads etc

Size subject to nature of raw material on stock.

70mm - dust, 3 " down, 6F2



Consists of crushed hardcore (brick and concrete) screened and graded to a maximum 70mm size and blended with recycled fines to aid compaction. Material is suitable for making up ground, piling mats, unadopted road sub base, and can be used a lot in wet weather on construction sites to keep the ground firm.

A good all round material can be used for virtually any job.

40mm to dust, MOT type 1, 6F1



Our type 1 graded recycled product consists of crushed brick and concrete screened and graded to a 40mm to dust. Suitable for use as a sub base for roads, car parks, paths and shed/housing/garage bases. This contains fines so when compacted it binds together.

70 - 40mm single size, 70mm clean aggregate



Made up from Crushed concrete and brick. Screened and graded to a maximum 70mm size and a minimum 40mm sieve.

No fines content in the produce therefore ideally suited to be used on wet ground or for drainage layers

40 - 10mm clean aggregate



Made up from crushed concrete and brick. Screened and graded to a maximum 40m clean and a minimum 10mm sieve.

Mainly used on wet ground or for drainage purposes and also pipe bedding for large pipes.

10mm to Dust also known as 6N, Graded Re-cycled crushed concrete fines.



A by product from the production of crushed concrete and brick. But will also contain other recycled materials such as sand and soil.

6N/6F1 refers to the class in the specification for highway works. This material is used as a capping layer, for eg. if it was contaminated land.

Can be use as a cost saving gravel ballast to make concrete.

14mm to 5mm single size also known as pipe bedding



Made from crushed concrete and brick, this is an alternative to 10mm or 20 mm pipe bedding gravel.

10mm to Dust also known as 6N, Graded Re-cycled crushed concrete fines.



A by product from the production of crushed concrete and brick. But will also contain other recycled materials such as sand and soil.

6N/6F1 refers to the class in the specification for highway works. This material is used as a capping layer, for eg. if it was contaminated land.

Can be use as a cost saving gravel ballast to make concrete.

14mm to 5mm single size also known as pipe bedding



Made from crushed concrete and brick, this is an alternative to 10mm or 20 mm pipe bedding gravel.

Can be used for filling around pipes and the gravel ballast in production of ready mixed concrete.

5mm to 0mm also known as sharp sand



A cost saving alternative to quarried sharp sand or reject sand. Ideal for bedding to Paving, Cable/Pipe Laying or as Blinding Sand.

Screened Top Soil



We screen the as dug topsoil over a 10mm mesh to remove large lumps, roots and pebbles. The end result is a fine screened topsoil suitable for turfing and planting, and is easily handled.

Can be delivered in Bulk loads (loose) or is available for collection.

As dug Topsoil



Ideal for large landscaping and seeding / planting projects. Can be used as a cheaper alternative to screened topsoil for flower beds etc and smaller jobs depending on the time of the year.



ECCLES NEW ROAD MANAGEMENT SYSTEM WORKING PLAN

Rev No.	Date	Author	Modification	Status
0	Oct 2013	Melanie Priestly	Initial Copy	Live Copy
1	June 2014	Melanie Priestly	Revised Following discussions with the Environment Agency	Live Copy
2	June 2015	Steve Doolan	Reviewed	Live Copy
3	November 2015	Portia Reece	Reviewed	Live Copy
4	January 2016	Portia Reece	Reviewed	Live Copy

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	D	Technical Competent Manager Certificates
	E	Waste Carriers Licence
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Part 1 - Introduction

1.1 Management System

P.P. O'Connor has a documented Health, Safety, Environmental and Quality Management System which has been audited and certified to ISO9001; ISO14001 and OHSAS18001 Standards. The management system applies to all persons, workplaces and all works undertaken by or on behalf of P.P. O'Connor and is communicated to our workforce via internal seminars, inductions and toolbox talk briefings.

1.2 Purpose of the Working Plan

This plan is a dynamic document demonstrating how P.P. O'Connor Ltd will plan and manage its recycling activities, with due regard to safety, health and environmental matters.

The identification of specific environmental issues and the manner in which the works will be managed are set out within this Working Plan. This plan sets out the organisation and arrangements that have been put in place to manage risk and co-ordinate the work on site. The plan must be reviewed annually to ensure its suitability, adequacy and effectiveness.

The purpose of this working plan is to demonstrate that the Management System meets all the requirements of the Environmental Permit and provides guidance and direction for the implementation and operation of the Management System to all personnel including all relevant documents. The working plan is a living document that requires reviewing to ensure it reflects the sites operational practices. The working plan takes guidance from the Environment Agency's documents:

- *How to comply with your Environmental Permit*
- *Horizontal Guidance Note H6 – Environmental Management Systems*

The main objectives of this EMP are to:

- Minimise the potential likelihood and impact of environmental risks related to the site activities.
- Define responsibilities ensuring the requirements of this Management Plan are maintained.
- Identify control measures required to ensure there is no unplanned or uncontrolled release that would adversely affect the environment.

1.3 Quality Protocol

A Quality Protocol for the manufacture of aggregate has been produced in line with the WRAP Quality Protocol for the production of aggregate from inert waste, further complemented by the Factory Production Control of the European Standards on Aggregates.

Quality controls are required for the production of aggregates from inert waste in order to ensure customer satisfaction and demonstrate that the waste has been recovered.

Part 2 – Site Description

2.1 Scope of Management System

The scope of the Management System applies to the skip hire business undertaken by P.P. O'Connor as permitted by the Environmental Permit as issued by the Environment Agency. It does not cover the financial / accounting side of the company.

2.2 Site Background

PP O'Connor took over the environmental permit during June 2012. The previous site's uses were primarily a skip company. This changes the risk profile of the site, as slightly different waste types will be recycled at the site (more inert and less active waste).

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Part 3 – Site Directory

3.1 Managing Director

Name: Peter O'Connor
Telephone: 0161 776 0333
Mobile: 07980 775843
E-mail: peter.oconnor@ppoconnor.co.uk

3.2 Logistics Director

Name: Justin O'Connor
Telephone: 0161 776 0333
Mobile: 07973508680
E-mail: justin.oconnor@ppoconnor.co.uk

3.3 Technical Competent Manager

Name: Paul Moss
Telephone: 0161 776 0333
Mobile: 07973927536
E-mail:

3.4 SHEQ Manager

Name: Steve Doolan
Telephone: 0161 776 0333
Mobile: 07970 465885
E-mail: steve.doolan@ppoconnor.co.uk

3.5 Environment Officer

Name: Portia Reece
Telephone: 07557667386
Email: portia.reece@ppoconnor.co.uk

3.6 Specialist Company (oil or chemical spillage)

Mantank Environmental Services Ltd
Contact Person: Dave Royal
Telephone: 0161 799 3337 / 0800 107 1746
Email : dave@mantank.co.uk

3.7 Environment Agency (EA)

Contact: Jay Ibrahim
Address: North West Regional Office
PO Box 12,
Richard Fairclough House
Knutsford Road
Latchford
Warrington
Cheshire,
WA4 1HT
Telephone: 0370 8506506
Email: jay.ibrahim@environment-agency.gov.uk

EA EMERGENCY HOTLINE: 0800 80 70 60

3.8 Health & Safety Executive (HSE)

Address: Redgrave Court,
Merton Road,
Bootle,
Merseyside,
L20 7HS
Telephone: 0151 951 4000

3.9 Local Authority Environmental Health (EHO)

Salford Council
Telephone: 0161 794 4711

3.10 Water Authority

Water and wastewater enquiries emergencies (24hr)
Telephone: 0845 746 2200
Pollution Hotline Telephone: 0800 015 1230

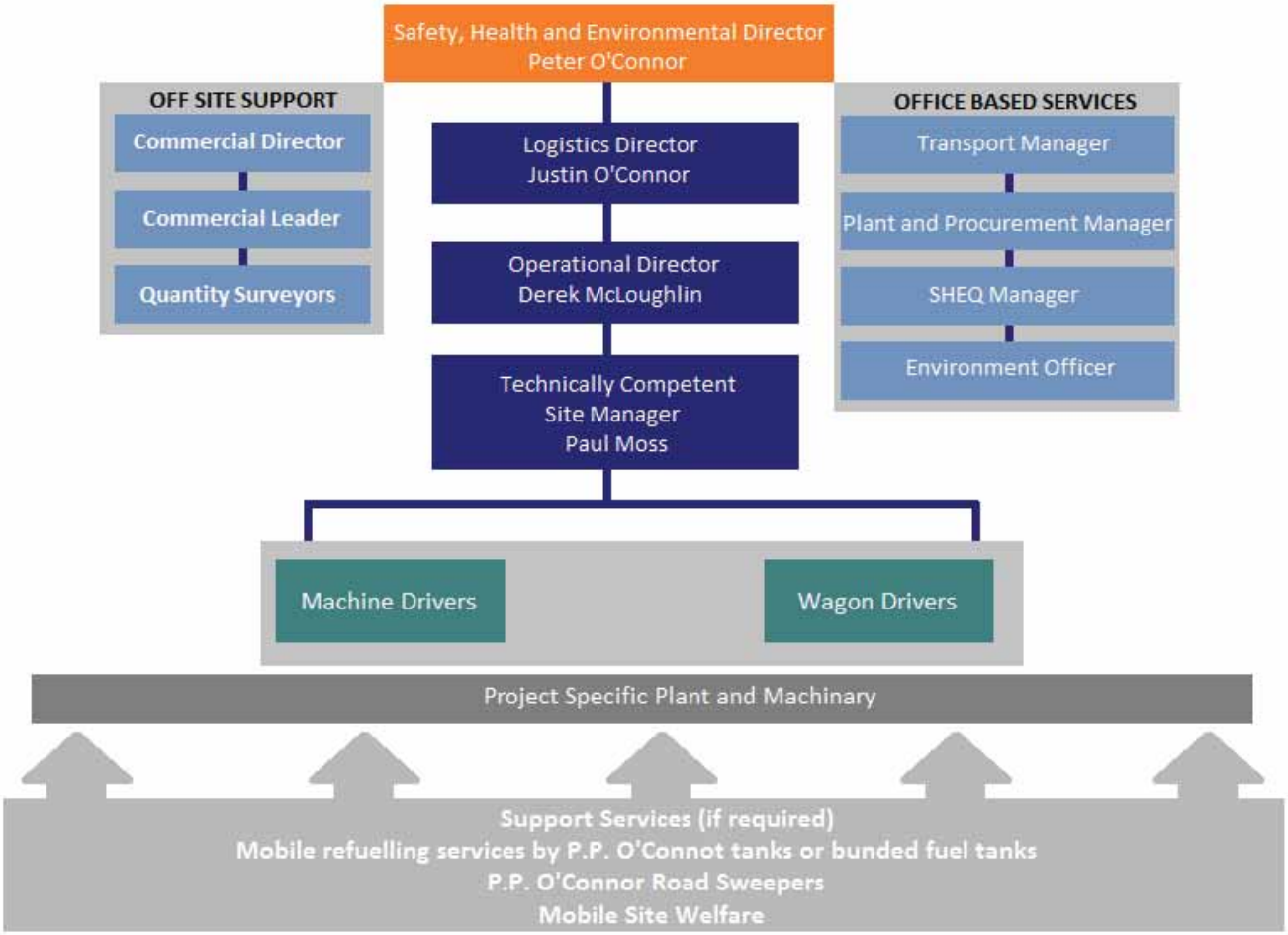
3.11 Scottish Power

Telephone: 0845 2727 999

3.12 National Grid

Telephone: 0800 111 999

Management Structure



Part 4 – Management Responsibilities

4.1 Technical Competence and Supervision of Waste Operations

P.P. O'Connor is committed to excellence in people development. Our workforce has become a cohesive, well trained and highly qualified professional team to work together to achieve client satisfaction. We fully support the need to train and develop our people through the provision of appropriate resources, equipment, time and opportunities to ensure that staff are able to successfully carry out their roles and deliver the business objectives as required by the Training and Competency Procedure (SPD 9). P.P. O'Connor maintains a training matrix which identifies the necessary training including refresher training for personnel which allows them to fulfil their duties. Training Summary's and Certificates are produced and retained within the employees training files and online via the training matrix.

P.P. O'Connor have employed a technically Competent Manager who will control the day to day activities on the Eccles Site. The manager of the site holds a Level 4 WAMITAB Diploma in Waste Management Operations qualification demonstrating that he has the skills and knowledge to ensure that the recycling plant site complies with the Environmental Permitting Regulations 2007. It is also mandatory that all P.P. O'Connor managers hold a Level 3 First Aid Qualification ensuring that they demonstrate competence in first-aid management of illness and injury in the workplace.

SHEQ roles and responsibilities are outlined within P.P. O'Connor's Health & Safety, Environmental & Quality policy statements, and are detailed within the Management Responsibilities Procedure (SPD17). Named positions have been assigned specific SHEQ roles and responsibilities.

4.2 Regulations, Monitoring and Review

P.P. O'Connor has a documented Regulations, Monitoring and Review procedure (SPD18) which describe the process by which all applicable legal and other requirements are identified and reviewed for its impact on the company's Business Management Systems and Processes. It also describes how compliance with legislation and other requirements are reviewed.

PP O'Connor has identified all relevant regulations, codes of practice and guidelines that are applicable to the environmental aspects of its activities, products and services, and records this information in the Register of Legal and Other Requirements. This information is maintained up-to-date.

4.3 Communication and Coordination

Communication on site between the contractors, managers and other stakeholders is a vital aspect of environmental management and will be dealt with as follows:

4.3.1 Internal Communication

- The Management Plan and any associated revisions will be communicated through the team via briefings.
- Meetings will be held to review performance and coordinate forthcoming activities, to include any environmental requirements.
- All subcontractors and visitors to be briefed on environmental sensitivities and obligations prior to entry to site.
- Dissemination of environmental audits, inspections and environmental updates as appropriate.

4.3.2 External Communication

External communication is considered to be that between the Contractor and its stakeholders, including the local authority, statutory regulatory authorities (including the Environment Agency) and with local community groups. The Environmental Manager will be responsible for receiving, documenting and responding to any environmental communication from other stakeholders. Records are kept of all written communication, including notes of verbal communications giving key information, instructions or decisions.

4.4 Accidents, Incidents, Near Miss

In the event of an accident, incident, a breach of legislation, or a near miss occurring on site, or as a result of a P.P. O'Connor Ltd activity, the Accidents and Incidents Procedure (SPD15) must be followed.

It is particularly important that any visit from the regulator, together with details of any issues raised or enforcement action taken, is reported immediately to the company SHEQ Manager and details of the visit should be recorded.

Also, any enforcement or warning letter issued by the regulator must be forwarded upon receipt to the Managing Director who is responsible for environmental issues and the company SHEQ Manager for their immediate action.

4.5 Non Conformances and Corrective Action

All non-conformances identified on this site will be reported to the SHEQ department where they will be logged, categorised, monitored and reviewed. An action plan will be developed detailing what corrective and preventative actions will be taken to rectify the non-conformance.

4.6 Corrective Action

Where practicable to do so, environmental deviations are dealt with immediately, ensuring the potential for environmental impact is minimised and contained. Findings will be tracked to closure by the Environmental Officer or nominee. The action owner is responsible for feeding back the closure confirmation.

4.7 Complaints

On receipt of a call from a client, customer or other sourced contact, the contact will be logged on the Customer contact log Form RP-FORM-3.

The nominated person completes the report including:-

- Complainants name and address or Customer reference
- Date received
- Name of the person who is dealing with the complaint
- Category of complaint
- Description of the complaint
- Cost incurred
- Action taken

On receipt of a complaint, it is the responsibility of the Company personnel receiving the complaint to notify the Company Management. All complaints will be logged, investigated where necessary and tracked to a suitable closeout.

Following investigation of the complaint a plan will be put in place to prevent a reoccurrence of the complaint / issue.

4.8 Quarantine Storage

A designated quarantine area will be identified within the site boundaries of Eccles New Road Site and signage clearly displayed highlighting the quarantine area. Any rejected and quarantined wastes will be stored in this area and the relevant testing of the material will be undertaken and remain in this area until final analysis. If the waste is found to be contaminated it will be returned to the client or the originator or to a suitable transfer station, who will be able to deal with the contaminated materials. The quarantined waste will be documented on the RP-FORM-1.

4.9 Ground Contamination

If an operative or visitor at the recycling plant discovers ground contamination from either a current operational activity or from any plant or equipment, they should urgently inform the technical manager of their findings. Once the technical Manager has been informed the incident can be dealt with immediately and effectively.

4.10 Environmental Incidents

All environmental incidents shall be reported directly to the Environmental Manager including the following as a minimum:

- Environmental Incidents / Pollution
- Discovery of protected / invasive species
- Discovery of asbestos in soil or other material
- Reportable Accidents

All environmental incidents and near misses will be reported to the Technical Manager and recorded on the company incident reporting system. All incidents will be fully investigated and reported to ensure appropriate mitigation is applied to avoid reoccurrence.

4.11 Storage and handling of fuels

A site specific Method Statement/Risk Assessment shall be prepared for fuel/oil refuelling taking into account the need for communication, responsibilities, H&S, security, deliveries, maintenance and sensitive locations.

Fuel will not be stored on site to prevent the premises being targeted by thieves. All plant will be refuelled via a fuel tanker which will visit the site once daily between 7-8am. All fuel tankers and bowsers shall be constructed with an integral bund built to 110% capacity and be regularly maintained and inspected. The fuel tanker will be serviced annually. As a precautionary principle the fuel tanker will carry a fire extinguisher and a spill kit. Tanks should be filled no more than 90-95% to prevent overflow. Any spills that occur during fuelling must be promptly cleaned up and contaminated soil/gravel disposed of properly.

Dispensing nozzles and hose valves must be locked within the bunded tank/bowser when not in use. Flexible delivery pipes must be fitted with an automatic shut-off device but it mustn't be possible to fix the tap or valve in the open position.

Spill kit equipment will be kept on site at all times. Regular checks will be undertaken to ensure adequate supplies of kit are available which are fit for purpose. All operatives at the Eccles Road Recycling Plant have received spill kit training via toolbox talks (TBT).

Operatives transporting fuel or refuelling shall be competent and trained in refuelling and spill response procedures e.g. TBT training. Only competent staff/contractors trained in refuelling and spill response are to carry out refuelling of plant and machinery. Correct equipment shall be used e.g. nozzles and funnels of an appropriate size.

All static/semi-static items of plant e.g. generators shall only be used if they have an integral bund or where not possible with a drip tray placed underneath and of a sufficient size to contain all possible spills from the plant. A plant nappy should be used for small / medium plant if it is sufficient for the plant size and the amount of oil it contains. Drip trays have to be kept clean and free from rainwater. Plant nappies shall be visually inspected for oil contamination and if appears to be stained/soaked it must be cleaned/replaced according to

manufacturer's instructions. Drip trays can be emptied by skimming any visible oil with e.g. absorbent pads until there is no visible oil sheen on the water and then water can be disposed of over ground.

Refuelling shall be carried out in designated areas. If necessary mobile bowsers can be used to refuel static plant. A drip tray or plant nappy must be used during all refuelling on site to catch any spills and/or drips.

Bunded areas must be made impermeable to water and oil. The base and walls must not be penetrated by any valve, pipe or opening that is used for draining the system.

Areas used to store fuel / oil and other potential contaminants will be identified in the Fire Safety & Other Emergencies Plan.

4.12 Hazardous Substances

Only chemicals required for current use in the site activities shall be permitted on site.

All chemicals must be stored and segregated on spill trays in lockable containers. The container must have a raised lip at the entrance designed to contain any spills that may occur within. Suitable COSHH storage boxes may be used for small quantities of materials if necessary. A designated person must hold the key to control access to the store.

Spill kit material appropriate for the volume and type of substances stored shall be kept within the container for use in an emergency along with the current and specific incident procedure.

Details of the quantities and types of hazardous materials held at the site must be recorded on the COSHH register.

4.13 Vehicle Maintenance

The maintenance of the HGV's is tightly regulated by the Driver and Vehicle Standards Agency (DVSA). Under this government department vehicles are maintained on a scheduled basis.

All plant/machinery prior to entry onto site shall be thoroughly inspected for internal bunding or other spill control, leaks of fuel, hydraulic fluid and engine oil. Any item of plant deemed to be a possible pollution threat shall not be brought to the site.

All mobile plant, including but not limited to excavators, crushers, generators etc. shall be maintained and operated such that all potential leaks and spills of fuel/lubricants are prevented or if not possible absolutely minimised. All plant at the recycling centre (Loading Shovel – Liebherr 576, Excevator - NH305, Screen Plant – Powerscreen 1800) will be serviced every 500 hours except for the Crushing Plant – Kleeman MC110Z which will be serviced every

250 hours.

Where possible, plant maintenance shall be carried out in a designated area on site and shall be suitably monitored. This includes hire plant. Plant maintenance to be carried out only with a drip tray under the work area and with spill kit equipment to hand.

Certified plant on site shall be recorded on the Plant Register. Plant shall be maintained as per regulations and manufacturer's specifications.

4.14 Site Identification Board

Signage will be prominently displayed and maintained at the site entrance. The board will display the hours when the site is open 07:00 – 18:00 Monday to Saturday with the Waste Management Licence Number, the site name, site address and telephone number including out of hours emergency number, name, address and out of hours telephone number of the Environment Agency.

4.15 Site Office

This site will have the following facilities installed:

Type of facility	Used by	Location	Maintenance/Cleaning Frequency
Toilets	All	Site Compound	Daily
Office & Canteen	All	Site Compound	Daily

4.16 Site Security

The site is secured by a perimeter fence and gate to prevent unauthorised access. The entrance gate will be kept securely locked out of working hours other than in an emergency situation. All site security measures will be inspected daily. Any damage will be repaired within 3 working days and shall be temporarily repaired to maintain security by the end of the working day.

4.17 Maintenance of Site Infrastructure

All facilities and site infrastructure will be maintained at all times in a good state of repair, checked weekly unless otherwise specified and all necessary maintenance carried out within one week of detection.

Part 5 – Control of Waste Management Operations

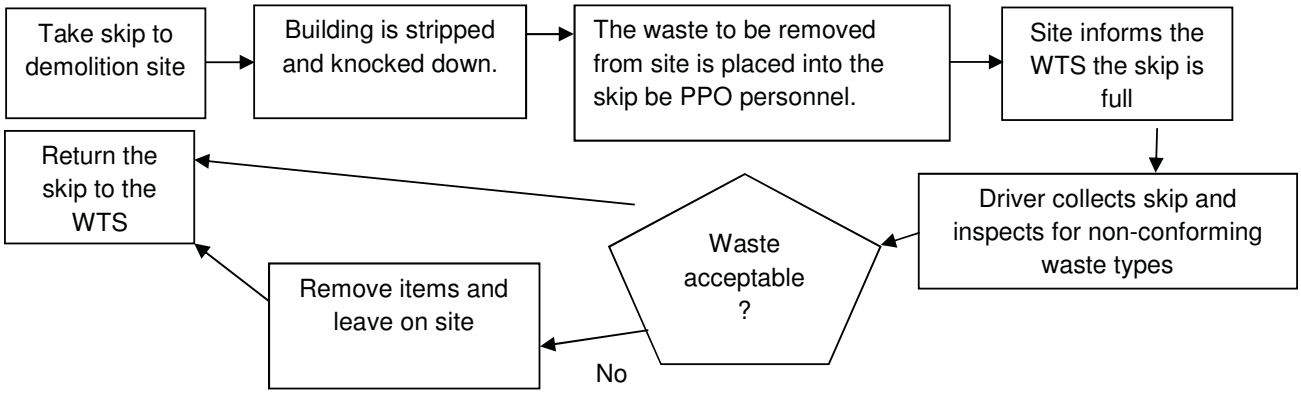
P.P. O'Connor specialise in complex demolition and deconstruction, sustainable disposal and aggregate supply. Generally on demolition sites the building is stripped of internal structures then knocked down. The aggregates are then crushed and left on site for the next build. Any waste that does not comply shall be rejected and shall be removed from site or placed in the quarantine area pending removal.

The waste is inspected and segregated at the point of pickup so the probability of 'non-compliant waste is far lower than a standard skip yard.

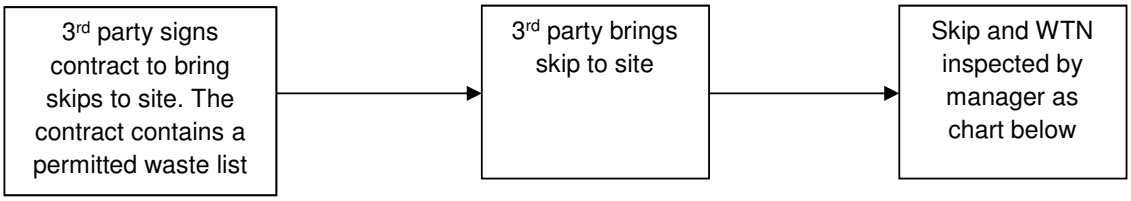
Inert excavation waste is also brought back to the yard to separate the aggregates from the soils. The aggregates can then be processed into a recycled stone. The soils can be tested and if suitable used as soil.

Waste will only be accepted into the site if the Standard Operating Procedure E-SOP-11 is followed (waste acceptance and rejection).

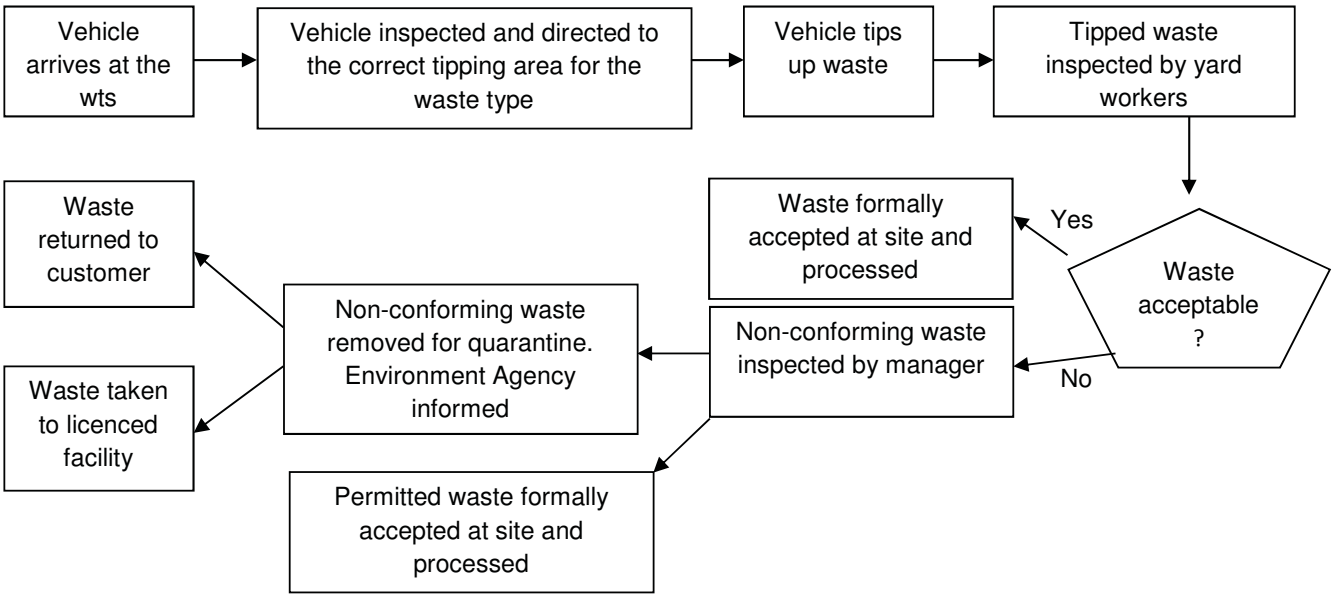
5.1 Pre Site Inspection Process



5.2 Pre site inspection process (Third party waste)



5.3 Site inspections (All skips & trucks)



5.4 Wastes Requiring Segregation

During the sorting process should wood, plastic or metal be identified within a load we will segregate in a skip in the quarantine area to be removed off-site. If the skips are full they should go directly to a suitable transfer station, as this site is permitted to accept waste in the form of bricks, concrete, stone etc.

5.5 Treatment of Waste

The site also operates under a Quality Protocol for the production of aggregates. This details the treatment methods and flow charts for the waste into the site.

5.6 Reporting

On a quarterly basis the input of waste to the site will be reported to the Environment Agency in a format the Environment Agency require.

Part 6 – Environmental Controls & Monitoring

6.1 Noise

The site operates under an environmental permit no EPR/BB3001KN/A001. Waste is currently sorted and treated outdoors. All practical measures will be taken to reduce the impact of the waste transfer station with regard to noise.

Plant has been situated as far away from housing as possible. All plant has been fitted with industry standard silencing equipment. Working with the council's environmental health department, all measures to reduce noise has been implemented. Any future noise reduction methods will be discussed with the council and where financially practical, implemented.

6.2. Dust from Site Operations

During periods of dry weather and strong winds all reasonable measures shall be taken to prevent annoyance and inconvenience to local residents, occupiers and potential pedestrians due to blown dust caused by site operations.

Mitigation measures that shall be implemented by all contractors as relevant to the scope/area of works are as follows:

- Sheeting of haul lorries
- Damping down the site and stockpiled aggregate using water sprays or bowser
- Cleaning paved access roads by a road sweeper or mechanical brush
- Adhering to the speed limits of 5 mph on site
- Water spray dampening of areas to be undertaken to prevent dust blow

6.3 Mud

Under Section 79 of The Environmental Protection Act 1990, mud on the public highways constitutes as a statutory nuisance. The access road and adjoining road (Eccles New Road, A57) is cleaned using a road sweeper. The road sweeper will visit the site periodically throughout the day and can be beckoned by the Recycling Plant Manager during periods of bad weather.

6.4 Emergency Response Instructions

This section prescribes what pollution equipment shall be available, the immediate actions to take in the event of a pollution incident and the method of reporting.

The Emergency Response shall be tested periodically on site to ensure that training and provisions are adequate.

Response Strategies

The first stages of response in the event of a pollution incident are:

Stop – Stop the leak immediately and all work in the immediate area.

Contain – by using granules and spill kits, or inert material such as sand or soil, or by digging trenches etc.

Notify – Notify your supervisor immediately who in turn **shall without delay** inform the Environmental Manager.

Recover – by using absorbent pads, booms or skimmers. Bag all contaminated materials.

Dispose - by placing contaminated material back in the appropriate bin/container and in accordance with the waste management procedure.

All spillages into a watercourse shall be reported to EA as soon as possible – this will be the responsibility of the Environmental Manager.

No waste will be burnt on site. Measures will be taken to minimise the potential of fires on site.

Activities which introduce naked flames to the environment (eg welding) will be controlled under a hot work permit system. This involves the removal of all combustible material from the area of work.

All outbreaks of fire will be notified immediately to the Environmental Agency.

6.5 Cleanliness of Vehicles

All vehicles leaving site will be checked to ensure that they do not foul the highway with waste, mud or other material. Appropriate measures such as road sweepers / wheel cleaning equipment will be used when required. Document RP-Form-1 will be used to document inspections on the site.

6.6 Litter

Daily inspections will be carried out to prevent escape of litter or other wastes leaving site. The site will be cleared of litter daily.

6.7 Vermin and Pests

The site will be checked on a weekly basis for the presence of vermin or other pests and where required appropriate measures will be taken to eliminate such vermin or pests if detected. Document RP-Form-1 will be used to document inspections on the site.

Part 7 – Site Records

7.1 Reporting

On a quarterly basis the input of waste to the site will be reported to the Environment Agency in a format the Environment Agency require.

7.2 Log Book

A Site Log Book shall be maintained on site for the purpose of recording the following site activities:

- Emergencies e.g. fires, spillages, blockages, pest control visits, odour problems, visitors to the site
- Complaints
- Maintenance records for vehicle breakdowns
- Maintenance and calibration procedures

Part 8 – Risk Assessment

The identification of the hazards and the risk assessment process is in the attached risk assessment.

Part 9 – Standard Procedures

SPD9 Training Awareness & Competency

SPD7 Plant Maintenance

SPD15 Accident & Incident Reporting

SPD17 Management Responsibilities

SPD26 Emergency Preparedness & Response

SOP5 Delivery, Storage, Refueling and Spillage of Fuel & Chemicals

SOP11 Waste Pre-Acceptance, Acceptance and Rejection

Part 10 – Standard Forms

Q-Form-22	Complaints Log
E-Form-9	Duty of Care Audit Form
RP-Form-2	Waste Rejection Form
RP-Form-1	Weekly Inspection Form
HS-Form-31	Hot Work Permit

Appendices

A Environmental Permit

B Environmental Policy

C WEE Policy

D Technical Competent Manager Certificates

E Waste Carriers Licence

F Site Plan



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ECCLES NEW ROAD

QUALITY PROTOCOL

Rev No.	Date	Author	Modification	Status
0	August 2013	Melanie Priestly	Initial Copy	Live Copy
1	November 2015	Portia Reece	Revised Copy	Live Copy
2	January 2017	Portia Reece	Revised Copy	Live Copy
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	E	Technical Competent Manager Certificates
		Duty of Care Waste Transfer Note

Part 1 – Background Issues

1.1 Scope

P. P. O'Connor operates a licenced waste transfer and treatment facility at their site located within an industrial estate. The site processes solid and inert wastes from the construction and demolition industry. The site is inspected and regulated by the Environment Agency. Waste is sorted, screened and crushed in order to manufacture a number of recycled materials suitable to be re-used in the construction industry. The reuse of construction and demolition waste reduces the need for virgin, quarried aggregates.

This manual is designed to give our customers the confidence that our products are manufactured in accordance with the requirements of the Quality Protocol. Minimal frequencies of inspection and testing are specified within the manual to ensure that our products conform to any relevant technical specification.

1.2 Definition of Waste

"Any substances or object the holder discards, intends to discard or is required to discard" is waste under current legislation.

Once a substance or object has become waste, it will remain waste until it has been fully recovered and no longer poses a potential threat to the environment or to human health.

From this point onwards, the waste ceases to be waste and there is no longer any reason for it to be subject to the controls and other measures required by the Directive.

1.3 The Environment Agency

The Environment Agency considers waste to remain waste until fully recovered. This view also applies to waste used as aggregate/construction material in civil engineering applications.

Full recovery can be obtained when such waste is incorporated into a road or building or, for inert waste, after processing if such a process is conducted following the criteria specified in the Quality Protocol for the Production of Aggregates.

Until the point of recovery, the transport, treatment, management and use of such materials need to be undertaken in accordance with the Environmental Permitting Regulations. It is also a requirement that materials recovered from waste should not cause any harm to the environment or to human health. The recycled aggregates should have no additional levels of contamination than that of the virgin aggregates it replaces.

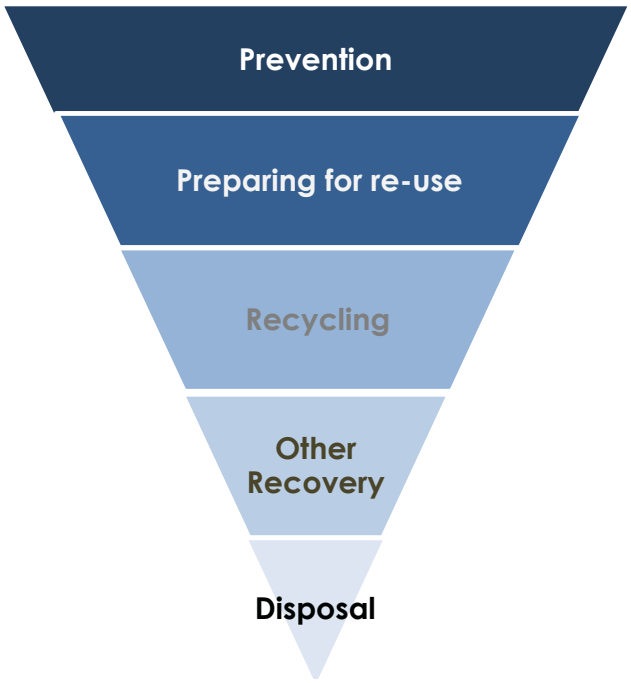
P. P. O'Connor has determined that the construction and demolition waste ceases to be waste after the material has undergone treatment and is fully recovered, in accordance with the Quality Protocol Management System and is placed into aggregate stockpiles.

1.4 Recycled Aggregate Demand

The use of recycled aggregates is a growing sector within the house building and general construction industry. This follows the waste management hierarchy. The hierarchy highlights the need to move practices away from landfill disposal and to promote reduction, re-use, recycling and recovery.

1.5 The Waste Hierarchy

The "waste hierarchy" ranks waste management options according to what is best for the environment. It gives top priority to primarily preventing the production of waste. When waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all disposal (e.g. landfill).



Using less material in design and manufacture.
Keeping products for longer; re-use.
Using less hazardous material

Checking, cleaning, repairing, refurbishing.

Turning waste into a substance or product including composting if it meets quality protocols

Including anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) amd materials from waste, some backfilling operations.

Landfill and incineration without energy recovery.

Should the material be designated as waste it will have implications on the use of recycled aggregates as the Environment Agency require a waste management licence exemption application.

This document has been produced in line with a WRAP (Waste and Resources Action Programme) document entitled "The Quality Protocol". It contains the relevant management controls to ensure the produced aggregates have been fully recovered and thus not waste at the point of production.

Part 2 – Management and Resources

2.1 Management System

P. P. O'Connor has a documented Health, Safety, Environmental and Quality Management System which has been audited and certified to ISO9001; ISO14001 and OHSAS18001 Standards. The management system applies to all persons, workplaces and all works undertaken by or on behalf of P. P. O'Connor and is communicated to our workforce via internal seminars, inductions and toolbox talk briefings.

2.2 Overview

P. P. O'Connor operates under an Environmental Permit to hold and recycle waste. They have been supplying quarried stone, virgin soils and recycled aggregates for many years. P. P. O'Connor supply recycled aggregates to large scale engineering projects, house builders and small developers. Recycled stone is supplied in road haulage wagons.

The site can produce 5 recycled products:

- Recycled MOT
- Hardcore
- 6f2
- 6f5
- Screened Soil

2.3 Reviews

The Factory Production Control (FPC) shall be periodically reviewed by the Quality Manager, Site Manager and Sampling Supervisor. (Please see Part 4, Page 12 of this document).

2.4 Source of Waste

Inert soils and hardcore are selectively brought to site from construction and demolition sites. Materials not suitable for the recycling process and would not be transferred back to site e.g. heavy clay based soils or contaminated material. The input material is controlled under The Eccles Road Recycling Plant EPR/BB3001KN/A001.

2.5 Asbestos

Before a building is demolished, a Demolition and Refurbishment Fully Intrusive Survey is carried out on the fabric of the building / structure premises by competent surveyors with personal certification whose organisation is accredited by UKAS to BS EN 17020. Analysis is carried out by an organisation accredited by UKAS to BS EN17025. The asbestos is then removed by an organisation that holds a licence issued by the HSE. Following the removal of the asbestos an independent UKAS accredited organisation is commissioned to carry out air monitoring and the 4-stage clearance test which verifies that the building / structure has been adequately cleaned and is safe to re-occupy, and issue certificates of re-occupation. This organisation must hold BS EN17020/17025 accreditation for the scope of the work they are carrying out. On receipt of the re-occupation certificate P. P. O'Connor can commence demolition activities.

2. 6 Training

P. P. O'Connor Ltd ensures that employees under their control have the necessary training to carry out their duties as required by the Training and Competency Procedure (SPD 9). P. P. O'Connor maintains a training matrix which identifies the necessary training including refresher training for personnel which allows them to fulfil their duties. Training Summary's and Certificates are produced and retained within the employees training files.

P. P. O'Connor has appointed a Technically Competent Manager to control the day to day activities on this site.

HSEQ roles and responsibilities are outlined within the Health & Safety, Environmental & Quality policy statements, and are detailed within the Management Responsibilities Procedure (SPD17). Named positions have been assigned specific HSE&Q roles and responsibilities.

2.7 Vehicle Maintenance

The maintenance of the HGV's is tightly regulated by the Vehicle Operators Standards Agency (VOSA). Under this government department vehicles are maintained on a scheduled basis, they are serviced every six weeks and undergo a full MOT annually.

The onsite plant is not subject to the VOSA regime. However the same ethos of continual scheduled servicing is used in accordance with SPD7 Plant Maintenance. This is a preventative approach and keeps the plant in a good working condition. Should plant break down then there is coverage to carry on operating. The current plant on site will be serviced as per the manufactures recommendations and be inspected by the plant operator in accordance with current legislation, to ensure good working order.

2.8 Storage Areas

Storage areas for materials are identified by the Recycling Plant Manager and are segregated and are stored to prevent contamination and deterioration. Storage areas can vary depending on the influx of different products from construction and demolition sites.

Part 3 – Method Statement and Resources

3.1 Source of Waste

Inert soils and hardcore are tested at the source. Once it has been confirmed that the materials are not contaminate, they will be collected and transported to The Eccles Road Recycling Plant. Materials not suitable for the treatment process would not be brought back to site e.g. contaminated material. The input material is controlled under the Environmental Permit.

Inert bulk loads of mixed soil and stone are delivered from excavation sites and hardcore is delivered from demolition projects. A load ticket to show where the waste has originated from will be completed along with a valid waste transfer note in relation to the consignment.

Provided there is no suspicion of contamination, the wastes listed below are considered to be inert wastes:

European Waste Catalogue Code	Description	Restrictions
10 11 03	Waste glass based fibrous materials	Only without organic binders
15 01 07	Glass packaging	Selected construction and demolition waste acceptable only with low content of other types of materials (like metals, plastics, organics, wood, rubber etc). the origin of the waste must be known.
17 01 01	Concrete including solid dewatered concrete process waste	
17 01 02	Bricks	
17 01 03	Tiles and ceramics	
17 01 07	Mixtures of concrete, bricks, tiles and ceramics	
17 02 02	Glass	
17 05 04	Soils and stones including gravel, crushed rock, sand, clay, road base and planings, and track ballast	Excluding topsoil, peat; excluding soil and stones from contaminated sites.
19 12 05	Glass	
20 01 02	Glass	Separately collected glass only.
20 02 02	Soils and stones restricted to parks waste	Only from garden and parks waste; excluding topsoil, peat.

Inert waste is defined by the Landfill Directive, article 2(e):

1. It does not undergo any significant physical, chemical or biological transformations;
2. It does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and
3. Its total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of the surface water or groundwater."

3.2 Acceptance Criteria

Inert waste arriving at the waste transfer station has already been checked for contamination. All waste from external contractors must first submit a chemical analysis of the waste, or declare it inert on the waste transfer note. This is compared to the Environmental Permit for suitability. Visual inspections of the loads are carried out at the site by the site foreman and entered onto the input deliveries form. The load is visually inspected again when it is tipped in the processing area.

3.3 Manufactured Products

Hardcore

The first product manufactured on site is hardcore. Hardcore is the first size to be removed from the screening process. The screener removes all the large lumps and stone, concrete and brick from the waste. The vast majority of the hardcore is processed further to manufacture a 6F2 recycled aggregate.

MOT Type 1 Recycled / Quarried

Crushed concrete, sizes range from 40mm down to dust to create an easily compacted Crushed Concrete aggregate. MOT Type 1 Crushed Concrete is graded according to the Specification for Highway Works. It is commonly used for hard-standings, haul roads, building sub-bases, path / road / highway/ driveway / patio sub-bases.

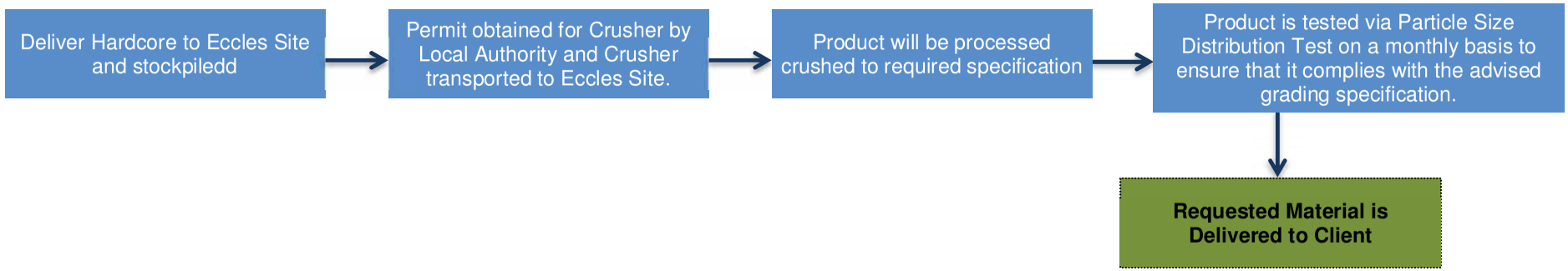
6F2 Aggregate

An aggregate composed of crushed concrete, brick and mortar produced as a by-product of demolition projects. It is a capping material used for pavements, roads, car parks and airport projects. It is commonly used in foundations and for pilling mats. It is manufactured from crushed brick, stone and concrete. It complies with grading specification and certification.

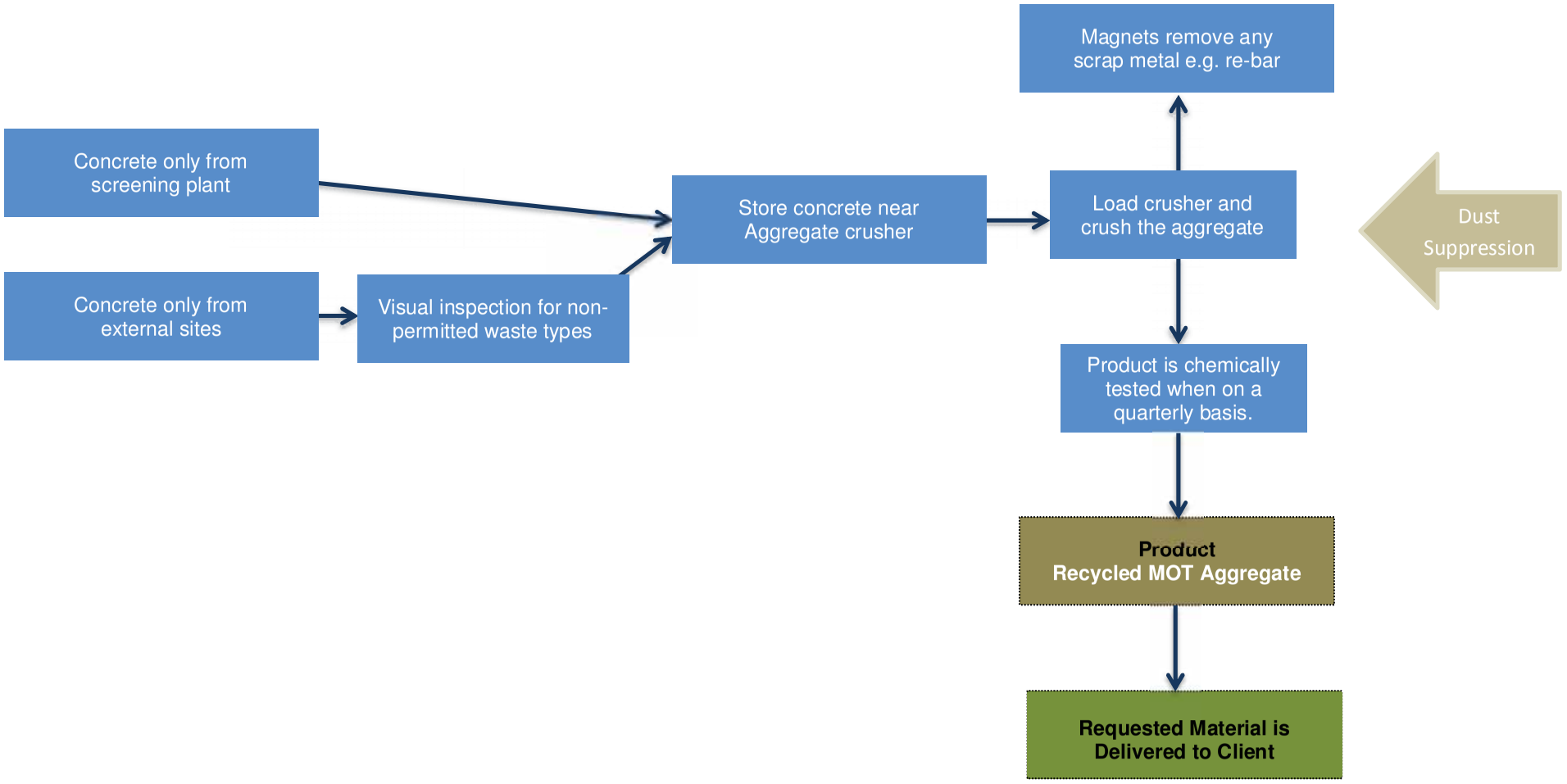
3.4 Processes Used

The following flowcharts detail the processes used in the recycling operation.

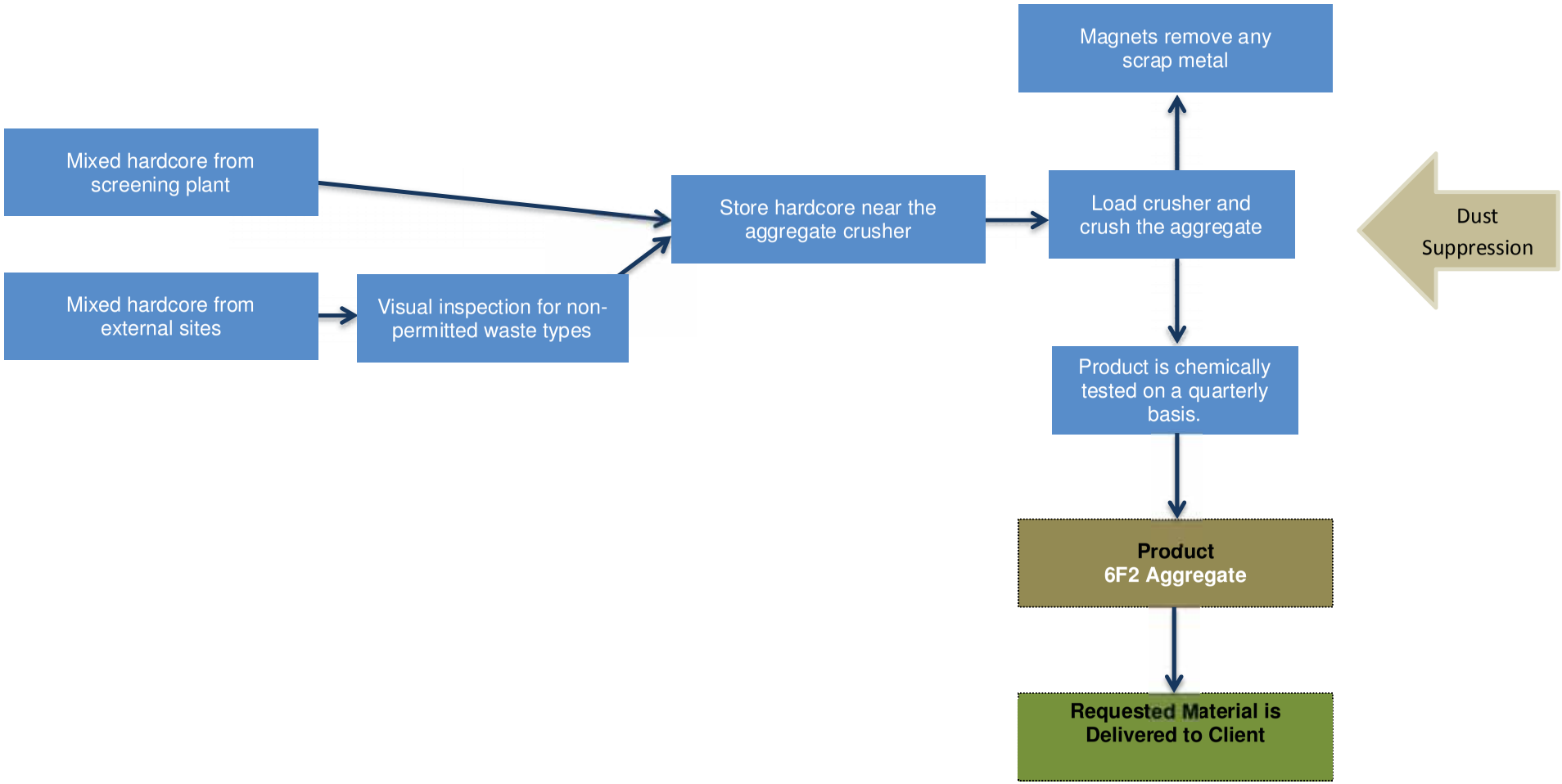
Production of Hardcore



Production of MOT Aggregate



Production of 6F2 Aggregate



Part 4 - Factory Production and Control

4.1 The Factory Production Control

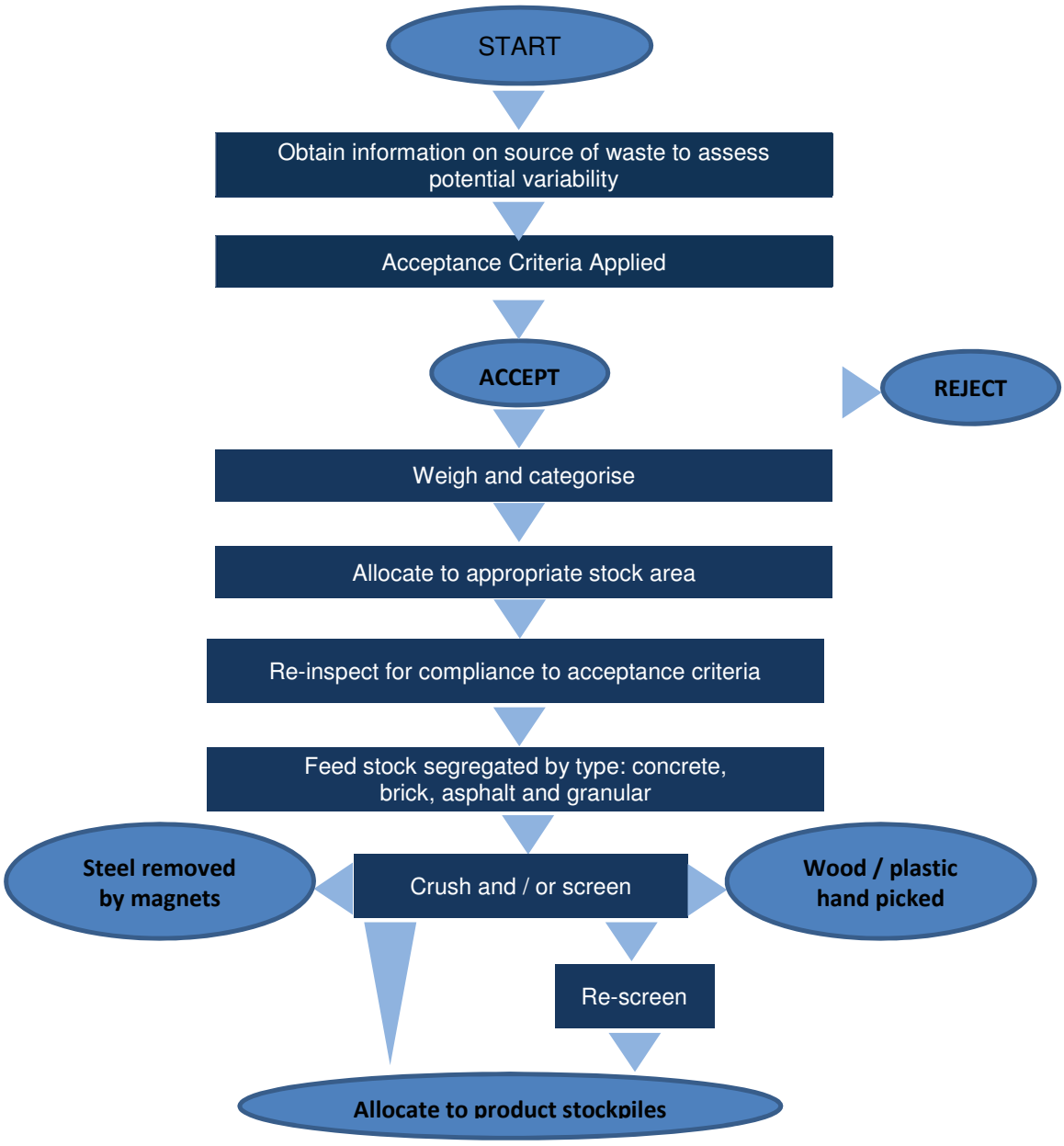
The Factory Production Control (FPC) is defined in the Construction Products Directive as a control system to be introduced by the manufacturers to monitor their production, to ensure that the required product characteristics are achieved and maintained consistently by the output. Every aspect of this control system should be documented in a body of written policies and procedures, and as such is an integral part of the QMS.

4.2 FPC Requirements

Organisation	Part 2 - Management and Resources
Control Procedures	Part 3 - Method Statement of Production Part 4 - FPC Part 5 - Implementation of the Method Statement of Production and the Factory Production Control
Management of Production	5.1 - Process Flowchart 3.2 - Acceptance Criteria 3.4 - Processes Used 2.6 - Storage Areas 5.8 - Quarantine Storage 5.4 - Site Record 5.5 - Information to be provided by the Producer 5.6 - Quality Statement
Inspection and Testing	5.2 - Testing 5.3 - Testing Schedule
Control of Non-Conforming Product	5.5 - Non Conformances
Training of Personnel	2.5 - Training

Part 5 – Implementation of the Method Statement of production and the factory production control.

5.1 The following flow chart and procedures detail the process for the manufacture of aggregates from waste.



5.2 Testing and Sampling

In order to demonstrate that an aggregate meets a specified standard, a sample will be taken to a UKAS accredited laboratory, and will be analysed under their standard operating procedures for;

- Particle size distribution testing BS EN 993-1 : 2012 (Washing and Sieving Method)
- Chemical testing in accordance with Section 25 of the SAL Quality Manual
-

The chemical testing is carried out utilising the scope of UKAS accreditation and the chemical constituents tested for include:

Arsenic	Boron
Chromium	Copper
Lead	Mercury
Nickel	Selenium
Zinc	Cyanide
pH	Phenols(mono)
SO4(2:1)	Sulphide

The following Testing Methods are employed:

Particle size distribution -	BS 1377 Part 2 1990 or BS EN 933-1:2012
Moisture Content -	BS 1377 Part 2 1990 or BS EN 1097-5:2008
Los Angeles Coefficient -	BE EN 1097-2:2010

Should test results be unsatisfactory, than a Non Conformance Report will be raised to identify the root cause analysis. All test results will be filed by the Sampling Supervisor. Unsatisfactory test results will result in increased testing frequencies until satisfactory results are once again obtained.

Sampling of the processed / recovered product shall be carried out in accordance with BSEN 932-1. The following minimum test frequencies, in accordance with the FPC system and detailed in the table below, shall be used.

Property description	BSEN Test Method	Minimum Test Frequency
General description	-	Every incoming load by visual inspection
Grading	933-1	1 per week
Fines Content	933-1	1 per week
Particle Shape	933-3	1 per month

** Time periods relate to production periods not calendar period

***For unbound aggregates PD 6682-6 recommends that 'no requirement' be adopted in the UK for particle shape.

5.3 Testing Schedule

The frequency of test is based on the amount manufactured. 6F2 is by most aggregate. MOT is manufactured at a much lower amount.

Aggregate		
	Chemical	Particle Grading
Quarried / Recycled MOT	Yearly	Monthly
6F2 aggregate	3 months	Monthly
Hardcore	3 months	Monthly

5.4 Validation

Test results are cross checked against the Clients issued specification to ensure the material meets the required standards.

Internally test results are cross checked against contamination level guidelines to provide our clients with confidence that all material supplied remains inert and uncontaminated.

5.5 Site Records

Records of incoming wastes and products shall be kept. Statutory records e.g. those arising from waste management licences or registered licensing exemption and the duty of care must be observed.

Records shall be kept of all inspection and testing carried out on samples taken. Results of test shall be compared to the applicable specification.

If further tests are required for assessment of suitability for a particular end use, then the results shall also be retained.

5.6 Information to be provided by the Producer

When requested by the Purchaser, P. P. O'Connor shall provide:

- Test Results
- Test Procedures
- Outline details of the factory production

5.7 Quality Statement

Delivery documentation shall state that the product was produced under a quality protocol conforming to this document.

5.8 Non Conformances

All non-conformances identified on site shall be reported to the HSEQ department where they will be logged, categorised, monitored and reviewed. An investigation will be carried out and an action plan will be developed detailing what corrective and preventative actions will be taken to rectify the non-conformance.

Where NCR's are identified on this site the Site Manager will endeavor to close these out, providing evidence where applicable within 5 working days from the date from when they were first raised. If it is felt this can't be achieved, the Site Manager will approach the SHEQ Department for an extension to this timeframe, qualifying why this is necessary.

5.9 Quarantine Storage

A designated quarantine area will be identified and signage displayed. Rejected and quarantined waste will be documented on the RP-Form-2.

Appendices

A - SPD 9 Training and Competency

B - SPD 17 Management Responsibilities Procedure

C - SPD7 Plant Maintenance

D - RP-FORM-1 Rejected & Quarantined Waste

E - Technical Competent Manager Certificates - WAMITAB

F - Duty of Care Waste Transfer Note

Certificate of Registration under the Waste (England and Wales) Regulations 2011

Regulation authority

Name: Environment Agency

Address:
- National Customer Service Centre
- 99 Parkway Avenue
- Sheffield
- S9 4WF

Telephone number 03708 506506

The Environment Agency certify that the following information is entered in the register which they maintain under regulation 28 of the Waste (England and Wales) Regulations 2011.

Carriers details

Name of registered carrier	P P O'CONNOR LTD
Registered as	an upper tier waste carrier, broker and dealer
Registration number	CBDU101751
Address of place of business	P P O'CONNOR LTD THAMES TRADING ESTASTE WOODROW WAY IRLAM MANCHESTER M44 6NN
Telephone number	0161 776 0333
Date of registration	Monday 18th April 2016

Expiry date of registration (unless revoked) Tuesday 7th May 2019

Making changes to your registration

Your registration will last 3 years and will need to be renewed after this period. If any of your details change, you must notify us within 28 days of the change.

Environment Agency

The Company Director and/or Secretary
P P O'Connor Limited
Thames Trading Estate
Woodrow Way
Irlam
Manchester
M44 6NN

Our ref: EPR/BB3001KN/V002

Date: 2 March 2016

Dear Sir or Madam,

Your permit variation is complete

Permit reference: EPR/BB3001KN/V002
Operator: P P O'Connor Limited
Facility: Land to rear of 656 Eccles New Road, Salford, Lancashire, M50 1DA

Our determination of your application to vary your permit is complete. We're satisfied that you can continue to carry out your activities in accordance with the variation, without harm to the environment or human health. I enclose a notice showing the changes to your permit. Please keep this in a safe place with your other permit records.

This letter contains web links to other documents. If you aren't able to access these phone our Customer Contact Centre for help on 03708 506 506.

If you're not familiar with our guidance on how to comply with your permit please look at the following guides:

www.gov.uk/guidance/develop-a-management-system-environmental-permits

www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit

www.gov.uk/guidance/legal-operator-and-competence-requirements-environmental-permits

Please look at the table below and note any of the information or actions that apply to your permit.

If...	then..
the variation means you're now carrying out a waste operation or activity and need to submit quarterly waste returns on waste movements **Note:** This does not apply to permits that only have stand alone water discharge or groundwater activities.	you can get the forms you need from our website https://www.gov.uk/government/collections/national-operator-waste-returns When you complete your return use the waste returns reference above.
you need to submit other returns	send these to your area office. Speak to your area officer to check local arrangements.
your variation has added an installation to your permit for the first time	we've enclosed the pollution inventory letter, notice and fact sheet.

Land Team, Permitting and Support Centre, Quadrant 2, 99 Parkway Avenue, Sheffield, S9 4WF
Phone: 03708 506 506
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

Rights of appeal

If you're not happy with any permit condition that has been imposed by the variation you may appeal to the Secretary of State. If you want to appeal any condition imposed as a result of your application you must make your appeal no later than six months from the date of the variation notice. If you want to appeal any condition we've added as an Environment Agency initiated variation you must make your appeal no later than two months from the date of the notice.

Further information about making an appeal and the forms you will need are available from the Planning Inspectorate website or from the contact details below. .

Environment Appeals, Enforcement and Specialist case work division, The Planning Inspectorate, 3/25 Hawk Wing, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6PN. Phone: 0303 444 5584

Email: environment.appeals@pins.gsi.gov.uk

You must send written notice of the appeal and the documents listed below to the Secretary of State to the Planning Inspectorate address above. At the same time you must send us a copy of the notice and documents to

Victoria Douglass, Appeals Coordinator, Environment Agency, National Permitting Service, Knutsford Road, Latchford, Warrington, WA4 1HG.
Phone: 01925 542456

Email : victoria.douglass@environment-agency.gov.uk

The documents are:

- a statement of the grounds of appeal
- a copy of any relevant application
- a copy of any relevant environmental permit
- a copy of any relevant correspondence between the appellant and the regulator
- a copy of any decision or notice which is the subject matter of the appeal; and
- a statement indicating whether you wish the appeal to be in the form of a hearing or dealt with by way of written representations.

You may withdraw an appeal by notifying the Secretary of State in writing and sending a copy of that notification to us.

If you have any questions about this permit phone our Customer Contact Centre on 03708 506 506. They will put you in touch with a local regulatory officer.

Yours sincerely

Ria Moffatt
Permitting Support Advisor

Notice of variation and consolidation with introductory note

The Environmental Permitting (England & Wales) Regulations 2010

P P O'Connor Limited

Land to rear of 656 Eccles New Road
Salford
Lancashire
Greater Manchester
M50 1DA

Variation application number

EPR/BB3001KN/V002

Permit number

EPR/BB3001KN

Land to rear of 656 Eccles New Road
Permit number EPR/BB3001KN

Introductory note

This introductory note does not form a part of the notice.

Under the Environmental Permitting (England & Wales) Regulations 2010 (schedule 5, part 1, paragraph 19) a variation may comprise a consolidated permit reflecting the variations and a notice specifying the variations included in that consolidated permit.

Schedule 1 of the notice specifies the conditions that have been varied and schedule 2 comprises a consolidated permit which reflects the variations being made. All the conditions of the permit have been varied.

The site has an existing permit under Standard SR2010 No12 which allows the treatment of waste to produce soil, soil substitutes and aggregate up to 75,000 tonnes of inert wastes per annum. Treatment comprises of one or more of the following: sorting, separation, crushing, screening and blending of waste for recovery as a soil, soil substitute or aggregate.

This variation is to upgrade from the standard rules to a bespoke permit to allow increased throughput of waste from 75,000 to 250,000 tonnes per annum. There will be no new treatment processes or waste types and no new land is required.

The schedules specify the changes made to the permit.

The status log of a permit sets out the permitting history, including any changes to the permit reference number.

Status log of the permit		
Description	**Date**	**Comments**
Application received	Duly made 07/11/2013	Application for SR2010 No12 – Treatment of waste to produce soil, soil substitutes and aggregate.
Permit determined EAWML 401005	15/11/2013	Permit issued to P P O' Connor Limited.
Application EPR/BB3001KN/V002 (variation and consolidation)	Duly made 16/12/2015	Application to increase annual tonnage and update the permit to modern conditions.
Variation determined EPR/BB3001KN	01/03/2016	Varied permit issued.

End of introductory note

Notice of variation and consolidation

The Environmental Permitting (England and Wales) Regulations 2010

The Environment Agency in exercise of its powers under regulation 20 of the Environmental Permitting (England and Wales) Regulations 2010 varies and consolidates

Permit number

EPR/BB3001KN

Issued to

P P O'Connor Limited ("the operator")

whose registered office is

Thames Trading Estate
Woodrow Way
Irlam
Manchester
M44 6NN

company registration number 02545561

to operate a regulated facility at

Land to rear of 656 Eccles New Road
Salford
Lancashire
Greater Manchester
M50 1DA

to the extent set out in the schedules.

The notice shall take effect from 01/03/2016

Name	Date
Samantha Haddock	**01/03/2016**

Authorised on behalf of the Environment Agency

Schedule 1

All conditions have been varied by the consolidated permit as a result of the application made by the operator.

Schedule 2 – consolidated permit

Consolidated permit issued as a separate document.

Permit

The Environmental Permitting (England and Wales) Regulations 2010

Permit number

EPR/BB3001KN

This is the consolidated permit referred to in the variation and consolidation notice for application EPR/BB3001KN/V002 authorising,

P P O'Connor Limited ("the operator"),

whose registered office is

Thames Trading Estate
Woodrow Way
Irlam
Manchester
M44 6NN

company registration number 02545561

to operate waste operations at

Land to rear of 656 Eccles New Road
Salford
Lancashire
Greater Manchester
M50 1DA

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

Name	Date
Samantha Haddock	**01/03/2016**

Authorised on behalf of the Environment Agency

Conditions

1 Management

1.1 General management

1.1.1 The operator shall manage and operate the activities:

(a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and

(b) using sufficient competent persons and resources.

1.1.2 Records demonstrating compliance with condition 1.1.1 shall be maintained.

1.1.3 Any person having duties that are or may be affected by the matters set out in this permit shall have convenient access to a copy of it kept at or near the place where those duties are carried out.

1.1.4 The operator shall comply with the requirements of an approved competence scheme.

1.2 Avoidance, recovery and disposal of wastes produced by the activities

1.2.1 The operator shall take appropriate measures to ensure that:

(a) the waste hierarchy referred to in Article 4 of the Waste Framework Directive is applied to the generation of waste by the activities; and

(b) any waste generated by the activities is treated in accordance with the waste hierarchy referred to in Article 4 of the Waste Framework Directive; and

(c) where disposal is necessary, this is undertaken in a manner which minimises its impact on the environment.

1.2.2 The operator shall review and record at least every four years whether changes to those measures should be made and take any further appropriate measures identified by a review.

2 Operations

2.1 Permitted activities

2.1.1 The operator is only authorised to carry out the activities specified in schedule 1 table S1.1 (the "activities").

2.2 The site

2.2.1 The activities shall not extend beyond the site, being the land shown edged in green on the site plan at schedule 7 to this permit.

2.3 Operating techniques

2.3.1 The activities shall, subject to the conditions of this permit, be operated using the techniques and in the manner described in the documentation specified in schedule 1, table S1.2, unless otherwise agreed in writing by the Environment Agency.

2.3.2 If notified by the Environment Agency that the activities are giving rise to pollution, the operator shall submit to the Environment Agency for approval within the period specified, a revision of any plan or other documentation ("plan") specified in schedule 1, table S1.2 or otherwise required under this permit which identifies and minimises the risks of pollution relevant to that plan , and shall implement the approved revised plan in place of the original from the date of approval, unless otherwise agreed in writing by the Environment Agency.

2.3.3 Waste shall only be accepted if:

(a) it is of a type and quantity listed in schedule 2 table S2.1; and

(b) it conforms to the description in the documentation supplied by the producer and holder.

3 Emissions and monitoring

3.1 Emissions of substances not controlled by emission limits

3.1.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

3.1.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution, submit to the Environment Agency for approval within the period specified, an emissions management plan which identifies and minimises the risks of pollution from emissions of substances not controlled by emission limits;

(b) implement the approved emissions management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.2 Odour

3.2.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

3.2.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to odour, submit to the Environment Agency for approval within the period specified, an odour management plan which identifies and minimises the risks of pollution from odour;

(b) implement the approved odour management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.3 Noise and vibration

3.3.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of the Environment Agency, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

3.3.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to pollution outside the site due to noise and vibration, submit to the Environment Agency for approval within the period specified, a noise and vibration management plan which identifies and minimises the risks of pollution from noise and vibration;

(b) implement the approved noise and vibration management plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

3.4 Fire prevention

3.4.1 The operator shall take all appropriate measures to prevent fires on site and minimise the risk of pollution from them including, but not limited to, those specified in any approved fire prevention plan.

3.4.2 The operator shall:

(a) if notified by the Environment Agency that the activities are giving rise to a risk of fire, submit to the Environment Agency for approval within the period specified, a fire prevention plan which prevents fires and minimises the risk of pollution from fires;

(b) implement the fire prevention plan, from the date of approval, unless otherwise agreed in writing by the Environment Agency.

4 Information

4.1 Records

4.1.1 All records required to be made by this permit shall:

(a) be legible;

(b) be made as soon as reasonably practicable;

(c) if amended, be amended in such a way that the original and any subsequent amendments remain legible, or are capable of retrieval; and

(d) be retained, unless otherwise agreed in writing by the Environment Agency, for at least 6 years from the date when the records were made, or in the case of the following records until permit surrender:

(i) off-site environmental effects; and

(ii) matters which affect the condition of the land and groundwater.

4.1.2 The operator shall keep on site all records, plans and the management system required to be maintained by this permit, unless otherwise agreed in writing by the Environment Agency.

4.2 Reporting

4.2.1 The operator shall send all reports and notifications required by the permit to the Environment Agency using the contact details supplied in writing by the Environment Agency.

4.2.2 Within one month of the end of each quarter, the operator shall submit to the Environment Agency using the form made available for the purpose, the information specified on the form relating to the site and the waste accepted and removed from it during the previous quarter.

4.3 Notifications

4.3.1 The Environment Agency shall be notified without delay following the detection of:

(a) any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution;

(b) the breach of a limit specified in the permit; or

(c) any significant adverse environmental effects.

4.3.2 Any information provided under condition 4.3.1 shall be confirmed by sending the information listed in schedule 5 to this permit within the time period specified in that schedule.

4.3.3 Where the Environment Agency has requested in writing that it shall be notified when the operator is to undertake monitoring and/or spot sampling, the operator shall inform the Environment Agency when the relevant monitoring and/or spot sampling is to take place. The operator shall provide this information to the Environment Agency at least 14 days before the date the monitoring is to be undertaken.

4.3.4 The Environment Agency shall be notified within 14 days of the occurrence of the following matters, except where such disclosure is prohibited by Stock Exchange rules:

Where the operator is a registered company:

(a) any change in the operator's trading name, registered name or registered office address; and

(b) any steps taken with a view to the operator going into administration, entering into a company voluntary arrangement or being wound up.

Where the operator is a corporate body other than a registered company:

(a) any change in the operator's name or address; and

(b) any steps taken with a view to the dissolution of the operator.

In any other case:

(a) the death of any of the named operators (where the operator consists of more than one named individual);

(b) any change in the operator's name(s) or address(es); and

(c) any steps taken with a view to the operator, or any one of them, going into bankruptcy, entering into a composition or arrangement with creditors, or, in the case of them being in a partnership, dissolving the partnership.

4.3.5 Where the operator proposes to make a change in the nature or functioning, or an extension of the activities, which may have consequences for the environment and the change is not otherwise the subject of an application for approval under the Regulations or this permit:

(a) the Environment Agency shall be notified at least 14 days before making the change; and

(b) the notification shall contain a description of the proposed change in operation.

4.4 Interpretation

4.4.1 In this permit the expressions listed in schedule 6 shall have the meaning given in that schedule.

4.4.2 In this permit references to reports and notifications mean written reports and notifications, except where reference is made to notification being made "without delay", in which case it may be provided by telephone.

Schedule 1 – Operations

Table S1.1 activities	
Description of activities for waste operations	**Limits of activities**
R3: Recycling/reclamation of organic substances which are not used as solvents R5: Recycling/reclamation of other inorganic materials R13: Storage of waste pending any of the operations numbered R1 to R12 (excluding temporary storage, pending collection, on the site where the waste is produced)	Physical treatment including manual and mechanical sorting/ separation, screening, crushing and blending for recovery. Wastes shall be stored for no longer than 3 years prior to recovery. Waste types as specified in Table S2.1

Table S1.2 Operating techniques		
Description	**Parts**	**Date Received**
Application	Documents provided in response to section 3a – technical standards, Part C4 of the application form.	16/12/2015
Application	WRAP Quality Protocol for Aggregates 'End of waste criteria for the production of aggregates from inert waste'	16/12/2015

Schedule 2 – Waste types, raw materials and fuels

Table S2.1 Permitted waste types and quantities for the treatment of waste to produce soil, soil substitutes and aggregate	
Maximum quantity	**The total quantity of waste accepted at the site shall be less than 250,000 tonnes a year.**
Waste code	**Description**
01	Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals
01 04	wastes from physical and chemical processing of non-metalliferous minerals
01 04 08	waste gravel and crushed rocks other than those mentioned in 01 04 07
01 04 09	waste sand and clays
02	Wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing
02 02	wastes from the preparation and processing of meat, fish and other foods of animal origin
02 02 02	shellfish shells from which the soft tissue or flesh has been removed only
03	Wastes from wood processing and the production of panels and furniture, pulp, paper and cardboard
03 01	wastes from wood processing and the production of panels and furniture
03 01 01	waste bark and cork
03 03	wastes from pulp, paper and cardboard production and processing
03 03 01	waste bark and wood
10	Wastes from thermal processes
10 01	wastes from power stations and other combustion plants
10 01 01	bottom ash and slag only
10 01 02	pulverised fuel ash only
10 01 05	gypsum (solid) only
10 01 07	gypsum (sludge) only
10 01 15	bottom ash and slag only from co-incineration other than those mentioned in 10 01 14
10 11	wastes from manufacture of glass and glass products
10 11 12	clean glass other than those mentioned in 10 11 11
10 12	wastes from manufacture of ceramic goods, bricks, tiles and construction products
10 12 08	waste ceramics, bricks, tiles and construction products (after thermal processing)
10 13	wastes from manufacture of cement, lime and plaster and articles and products made from them
10 13 14	waste concrete only
15	Waste packaging
15 01	packaging
15 01 07	clean glass only
17	Construction and demolition wastes (including excavated soil from contaminated sites)

Table S2.1 Permitted waste types and quantities for the treatment of waste to produce soil, soil substitutes and aggregate	
Maximum quantity	**The total quantity of waste accepted at the site shall be less than 250,000 tonnes a year.**
Waste code	**Description**
17 01	concrete, bricks, tiles and ceramics
17 01 01	concrete
17 01 02	bricks
17 01 03	tiles and ceramics
17 01 07	mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02	wood, glass and plastic
17 02 02	clean glass only
17 03	bituminous mixtures, coal tar and tarred products
17 03 02	road base and road planings (other than those containing coal tar) only
17 05	soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 04	soil and stones other than those mentioned in 17 05 03
17 05 06	dredging spoil other than those mentioned in 17 05 05
17 05 08	track ballast other than those mentioned in 17 05 07
17 08	gypsum-based construction material
17 08 02	gypsum only other than that mentioned in 17 08 01
19	Wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption/industrial waste
19 05	wastes from aerobic treatment of solid wastes
19 05 03	compost from source segregated biodegradable waste only
19 08	wastes from waste water treatment plants not otherwise specified
19 08 02	washed sewage grit (waste from desanding) free from sewage contamination only
19 08 99	Stone filter media if free from sewage contamination only
19 09	wastes from the preparation of water intended for human consumption or water for industrial use
19 09 02	sludges from water clarification
19 12	wastes from the mechanical treatment of wastes
19 12 05	clean glass only
19 12 09	minerals (for example sand, stones)
19 12 12	Treated bottom ash including IBA and slag other than that containing dangerous substances only
19 13	wastes from soil and groundwater remediation
19 13 02	solid wastes from soil remediation other than those mentioned in 19 13 01
19 13 04	sludges from soil remediation other than those mentioned in 19 13 03
20	Municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions
20 01	separately collected fractions

Table S2.1 Permitted waste types and quantities for the treatment of waste to produce soil, soil substitutes and aggregate	
Maximum quantity	**The total quantity of waste accepted at the site shall be less than 250,000 tonnes a year.**
Waste code	**Description**
20 01 02	clean glass only
20 02	garden and park wastes
20 02 02	soil and stones

Schedule 3 – Emissions and monitoring

There are no emission limits or associated monitoring requirements.

Schedule 4 – Reporting

There is no reporting under this schedule.

Schedule 5 – Notification

These pages outline the information that the operator must provide.

Units of measurement used in information supplied under Part A and B requirements shall be appropriate to the circumstances of the emission. Where appropriate, a comparison should be made of actual emissions and authorised emission limits.

If any information is considered commercially confidential, it should be separated from non-confidential information, supplied on a separate sheet and accompanied by an application for commercial confidentiality under the provisions of the EP Regulations.

Part A

Permit Number	
Name of operator	
Location of Facility	
Time and date of the detection	

(a) Notification requirements for any malfunction, breakdown or failure of equipment or techniques, accident, or emission of a substance not controlled by an emission limit which has caused, is causing or may cause significant pollution	
To be notified within 24 hours of detection	
Date and time of the event	
Reference or description of the location of the event	
Description of where any release into the environment took place	
Substances(s) potentially released	
Best estimate of the quantity or rate of release of substances	
Measures taken, or intended to be taken, to stop any emission	
Description of the failure or accident.	

(b) Notification requirements for the breach of a limit	
To be notified within 24 hours of detection unless otherwise specified below	
Emission point reference/ source	
Parameter(s)	
Limit	
Measured value and uncertainty	
Date and time of monitoring	
Measures taken, or intended to be taken, to stop the emission	

Time periods for notification following detection of a breach of a limit	
Parameter	**Notification period**

(c) Notification requirements for the detection of any significant adverse environmental effect	
To be notified within 24 hours of detection	
Description of where the effect on the environment was detected	
Substances(s) detected	
Concentrations of substances detected	
Date of monitoring/sampling	

Part B – to be submitted as soon as practicable

Any more accurate information on the matters for notification under Part A.	
Measures taken, or intended to be taken, to prevent a recurrence of the incident	
Measures taken, or intended to be taken, to rectify, limit or prevent any pollution of the environment which has been or may be caused by the emission	
The dates of any unauthorised emissions from the facility in the preceding 24 months.	

Name*	
Post	
Signature	
Date	

* authorised to sign on behalf of the operator

Schedule 6 – Interpretation

"accident" means an accident that may result in pollution.

"Annex I" means Annex I to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"Annex II" means Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"application" means the application for this permit, together with any additional information supplied by the operator as part of the application and any response to a notice served under Schedule 5 to the EP Regulations.

"authorised officer" means any person authorised by the Environment Agency under section 108(1) of The Environment Act 1995 to exercise, in accordance with the terms of any such authorisation, any power specified in section 108(4) of that Act.

"building" means a construction that has the objective of providing sheltering cover and minimising emissions of noise, particulate matter, odour and litter.

"emissions of substances not controlled by emission limits" means emissions of substances to air, water or land from the activities, either from the emission points specified in schedule 3 or from other localised or diffuse sources, which are not controlled by an emission or background concentration limit.

"EP Regulations" means The Environmental Permitting (England and Wales) Regulations SI 2010 No.675 and words and expressions used in this permit which are also used in the Regulations have the same meanings as in those Regulations.

"groundwater" means all water, which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.

"List of Wastes" means the list of wastes established by Commission Decision 2000/532/EC replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste, as amended from time to time.

"pests" means birds, vermin and insects.

"quarter" means a calendar year quarter commencing on 1 January, 1 April, 1 July or 1 October.

"R" means a recovery operation provided for in Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste.

"Waste code" means the six digit code referable to a type of waste in accordance with the List of Wastes and

"year" means calendar year ending 31 December.

When the following terms appear in the waste code list in Schedule 2, table S2.1, for that table, they have the meaning given below:

"hazardous substance" means a substance classified as hazardous as a consequence of fulfilling the criteria laid down in parts 2 to 5 of Annex I to Regulation (EC) No 1272/2008.

"heavy metal" means any compound of antimony, arsenic, cadmium, chromium (VI), copper, lead, mercury, nickel, selenium, tellurium, thallium and tin, as well as these materials in metallic form, as far as these are classified as hazardous substances.

"PCBs" means

- polychlorinated biphenyls
- polychlorinated terphenyls
- monomethyl-tetrachlorodiphenyl methane, Monomethyl-dichloro-diphenyl methane, Monomethyldibromo-diphenyl methane

- any mixture containing any of the above mentioned substances in a total of more than 0,005 %by weight.

"transition metals" means any of the following metals: any compound of scandium, vanadium, manganese, cobalt, copper, yttrium, niobium, hafnium, tungsten, titanium, chromium, iron, nickel, zinc, zirconium, molybdenum and tantalum, as well as these materials in metallic form, as far as these are classified as hazardous substances.

"stabilisation" means processes which change the hazardousness of the constituents in the waste and transform hazardous waste into non-hazardous waste.

"solidification" means processes which only change the physical state of the waste by using additives without changing the chemical properties of the waste.

"partly stabilised wastes" means wastes containing, after the stabilisation process, hazardous constituents which have not been changed completely into non-hazardous constituents and could be released into the environment in the short, middle or long term.

Schedule 7 – Site plan for Land to rear of 656 Eccles New Road, Salford, Lancashire, M50 1DA



END OF PERMIT



the quality protocol

for the production of aggregates from inert waste

HIGHWAYS AGENCY

QUARRY PRODUCTS ASSOCIATION

wrap

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foreword

Rulings by the European Court of Justice (ECJ) have provided some further guidance on how the definition of waste should be interpreted and applied by Member States and have led to the conclusion that more things are waste and remain waste for longer. This has an impact on the use and potential use of construction aggregates processed from inert wastes due to the uncertainty of when the inert waste could be considered to be fully recovered and no longer a waste. A key objective of the WRAP Aggregates Programme is to reduce the demand for aggregates from primary resources through promoting and increasing the use of more sustainable resources, therefore addressing the challenge resulting from these ECJ rulings became a WRAP priority.

After initial debate with a broad range of stakeholders from the construction supply chain attending the WRAP Aggregates Forum it was agreed that WRAP would facilitate a working group of Forum members with a brief to produce a guidance document for the producers and purchasers of aggregates produced from inert wastes. The objective was to establish a defined quality management scheme that controlled both the management of environmental risk from feedstock and the management of aggregate processing to established standards. This management scheme was called the Quality Protocol.

The purpose of the Quality Protocol is to provide a uniform control process for producers from which they can reasonably state and demonstrate that their product has been fully recovered and is no longer a waste. It also provides purchasers with a quality-managed product to common aggregate standards increasing confidence in performance. Furthermore the framework created by the Protocol provides a clear audit trail for those responsible for ensuring compliance with Waste Management legislation.

When reaching a decision on when a waste ceases to be a waste, the Environment Agency requires its staff to take all the circumstances of each case, based on current case law, into account. The Environment Agency considers that the protocol is suitable for use to decide how to regulate wastes, and has circulated this QP to its staff and advised them to also take account of it in their decision making.

WRAP will continue to assist in the growth of the production and use of sustainable aggregates and is optimistic that the Quality Protocol will achieve this through giving greater confidence to producers, purchasers and regulators.

Introduction

This document is published by WRAP (Waste and Resources Action Programme) and has been produced by QPA (Quarry Products Association), HA (Highways Agency) and WRAP as a formalised quality control procedure for the production of aggregates from recovered inert waste. These are referred to in the document as "recovered aggregates". The document has two main purposes:

i. To assist in identifying the point at which the inert waste used to produce recovered aggregates has been fully recovered, ceases to be a waste and becomes a product. (Further information on the definition of waste and recovery is given in section 1.)

ii. To give adequate assurance that recovered aggregate products conform to standards common to both recovered and primary aggregates.

The protocol seeks to ensure that recovered aggregates meet the quality and conformity requirements for European Standards for Aggregates. If they do then they are likely to be regarded as having been completely recovered and having ceased to be waste at that point. However, whether a substance or object is waste, in any particular situation, must still be determined in the light of all the circumstances, having regard to the aims of the Waste Framework Directive (75/442/EEC as amended by 91/156/EEC) and the need to ensure that its effectiveness is not undermined.

This document supersedes the Quality Control Protocol, called 'Quality Control – the production of recycled aggregates', reference BR 392, ISBN 1 86081 381 X.

1 | the definition of waste

Waste is defined in the Waste Framework Directive as any substance or object that the holder discards, intends to discard or is required to discard. As a result of European and national case law over the last few years, the circumstances under which a substance or object may be said to have been discarded (or to be intended or required to be discarded) have broadened considerably.

Furthermore, it is considered that once a substance or object has become waste, it will remain waste until it has been fully recovered and it no longer poses a potential threat to the environment or human health. This will be the point when there is no longer any reason to subject it to the controls and other measures required by the Directive, and the Environment Agency takes the view that waste remains waste until it is fully recovered. The Agency considers that, as a starting point, waste which is used as aggregate/ construction material will only cease to be waste when it is incorporated into a structure such as a road or building, even if it has been through a recovery process such as screening or crushing. (The use of such waste would need to be carried out in compliance with waste management legislation, including licensing or registered licensing exemption, registration of carriers and duty of care, for example.) However, the Agency also considers that it is possible, in some cases, for certain wastes to be fully recovered and cease to be waste before they are actually used as aggregate.

It is the responsibility of the holder of the substance or object to determine, on a case by case basis, whether it is waste or not.

This protocol will provide support in taking that decision i.e. if all the criteria specified in this protocol are met, then it would indicate that the material is probably no longer waste. Of course, whether a substance or object is waste is ultimately a matter for the Courts and the holder is advised to keep a record of any decisions made.

This paper represents the understanding of the law at the date of the document. The law may change and the reader must take account of future developments, for example, by checking the WRAP website to ensure that they are using the latest version.

2 | other definitions

Aggregates recovered from processing inert wastes are defined within the European and British standards and specifications as illustrated in the definitions below:

Aggregate	Granular material used in construction. Aggregate may be natural, manufactured or recycled.
Recycled Aggregate	Aggregate resulting from the processing of inorganic material previously used in construction.
RA	A designation used in BS 8500 for recycled aggregate principally comprising crushed masonry (brickwork and blockwork).
RCA	A designation used in BS 8500 for recycled aggregate principally comprising crushed concrete.
RAP	Recycled aggregate consisting of crushed or milled asphalt. This may include millings, planings, returned loads, joint offcuts and plant waste.
Inert Waste	Refer to definition in Appendix C

3 | the quality protocol

3.1 | Factory Production Control

A system for factory production control (FPC) shall be set up in accordance with the Annex which is included in all BS ENs for aggregates. For example, Annex C of BS EN 13242 specifies a system to ensure that aggregates for unbound applications conform to the relevant requirements of the standard. PD 6682-6 provides further guidance for UK users of BS EN 13242. Both documents are available from the British Standards Institution.

In the UK, the required level of attestation of conformity to European Standards for aggregates is 4 (with the exception of aggregates for use in skid-resistant surfacings).

This means that the aggregate producer must operate a "first party" system of factory production control following initial type testing. Certification and surveillance by notified accreditation bodies ("third parties") are not required. Further details are provided in PD 6682 series, available from the British Standards Institution.

3.2 | Description of products being provided

Each product provided shall be described. When applicable, this description shall be the same as given to the product when produced with natural aggregates, e.g. 20/40 Type B filter drain material. In other cases the description shall, as far as possible, detail the product and use. The producer should note that the production of an aggregate to an established specification does not in itself ensure recovery from waste. It must also be demonstrated that there is a need and a market for the recovered waste and that it will not be merely stockpiled pending development of such a need or market.

3.3 | Reference to the specification requirements for aggregate products

Under the description of products the Specification to which these products conform shall also be included. In cases where there is no specification then the classification of, 'no specification', shall be used. Where an internal specification is used then reference shall be as such.

3.4 | Acceptance criteria for incoming waste

3.4.1 To ensure that only inert waste is accepted the producer shall have and maintain procedures in the form of 'Acceptance Criteria' specific to each site/location. All Statutory and regulatory requirements for the receipt of incoming waste shall be observed and included in the Acceptance Criteria. These requirements include those arising from a waste management licence or a registered licensing exemption and the duty of care.

The following shall also be included in the Criteria;

a) the types of waste that are accepted
b) the method of acceptance

3.4.2 Only waste that can meet the definition of inert (see Appendix C) shall be accepted.

3.4.3 A visual inspection shall be carried out on every load, on initial receipt and after tipping, to ensure compliance with the Acceptance Criteria. Where the percentage of any contaminant or foreign material is higher than that defined in the acceptance criteria, the consignment must be rejected.

3.4.4 A record of each load delivered and accepted shall be kept giving;

a) date
b) nature and quality
c) place of origin (where known)
d) quantity by weighing/volume
e) carrier
f) supplier

3.5 | Method Statement of Production

A method statement shall be prepared detailing the waste recovery process and the range of products produced. A flow chart (example Appendix A) may be used for this purpose with additional qualifications as necessary. The method statement shall form a part of the Factory Production Control System (see 3.1). It should be noted that some incoming wastes can be supplied for certain categories of end use with little or no processing. This should be detailed in the method statement for production.

3.6 Inspection and testing regime including frequency and methods of test for finished product

3.6.1 The inspection and testing regime shall be detailed and appropriate to the material end use, the quality of incoming waste and the complexity of the waste recovery process.

3.6.2 Sampling of the processed/recovered product shall be carried out in accordance with BSEN 932-1. The following minimum test frequencies, in accordance with the FPC system and detailed in the table below, shall be used.

Products shall be sampled and tested in accordance with the minimum test frequencies in order to provide sufficient data to demonstrate compliant product. These testing rates shall be varied to ensure a controlled process.

3.7 Records

3.7.1 Records of incoming wastes and products shall be kept. Statutory record keeping requirements for waste must be observed (eg those arising from a waste management licence or a registered licensing exemption and the duty of care.)

3.7.2 In addition to records kept in accordance with FPC, records shall be kept of all testing carried out on samples taken in accordance with 3.6. Results of tests shall be shown compared to the applicable specification.

3.7.3 If further tests are required for assessment of suitability for a particular end use, then the results shall also be retained.

3.8 Quality Statement

Delivery documentation shall state that the product was produced under a quality protocol conforming to this document.

3.9 Information to be provided by the producer

When requested by the purchaser, the producer shall provide;

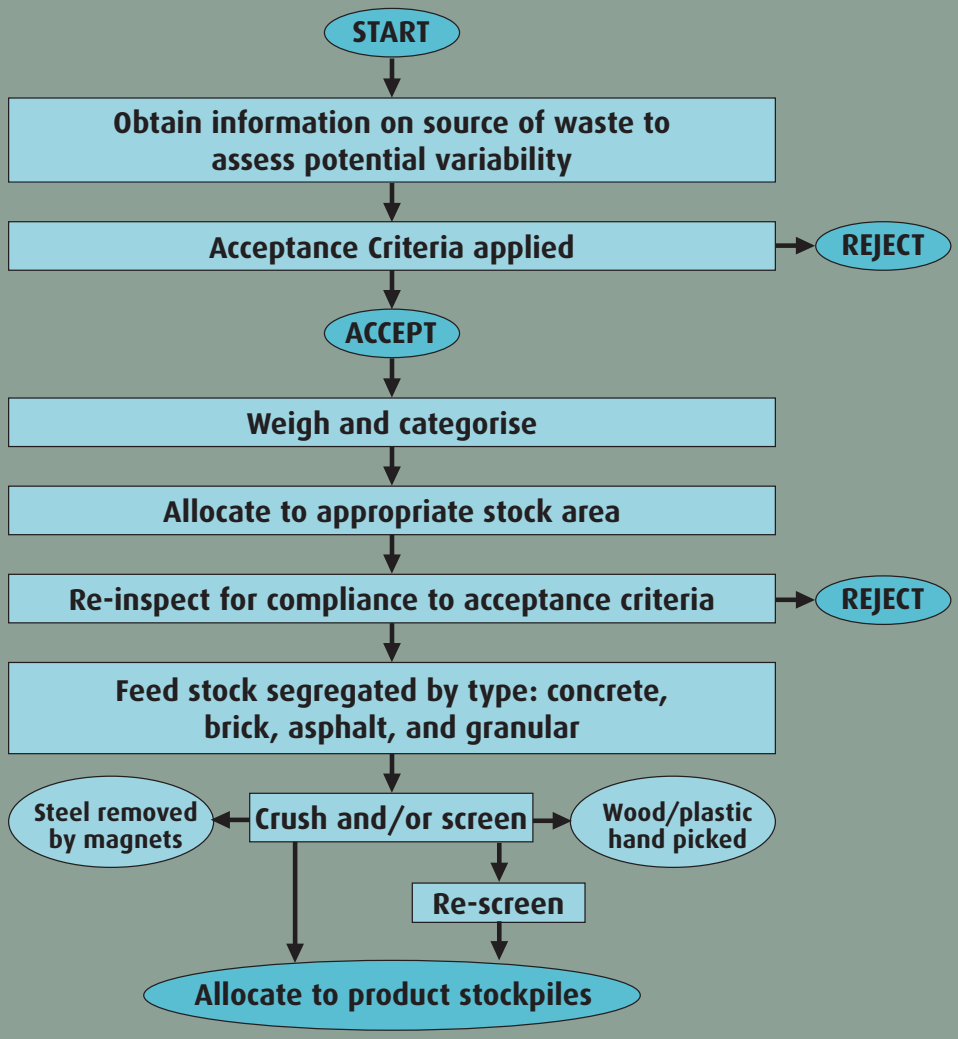
a) test results
b) test procedures
c) outline details of the factory production control manual

Property description	BSEN test method	Minimum Test Frequency
General description	_	Every incoming load by visual inspection
Aggregate composition including organics	Visual sorting of the plus 8mm fraction*	1 per week**
Grading	933-1	1 per week**
Fines Content	933-1	1 per week**
Particle Shape***	933-3	1 per month**

*Test procedure detailed in Highways Agency Specification for Highway Works Clause 710.
**Time periods relate to production periods not calendar periods.
***For unbound aggregates PD 6682-6 recommends that 'no requirement' be adopted in the UK for particle shape.
Note: To illustrate suitability for a particular end use the test methods detailed in Annex B may prove useful.

appendix A

Example of a flow chart for acceptance and processing of inert waste



appendix B

Aggregate Properties

The following test methods may be used as a means of either deciding or illustrating suitability for a particular end use.

	TEST REFERENCE	
	BS EN	**BS**
All end uses		
Particle Density	1097-6	
Resistance to Fragmentation:		
Los Angeles	1097-2	-
Bulk Density	1097-3	
Use in concrete/hydraulically bound materials		
Water Absorption	1097-6	
Magnesium Sulfate	1367-2	-
Abrasion Resistance:		
AAV	1097-8	
Drying Shrinkage	1367-4	
Chlorides	1744-1	
Sulfate and Sulfides	1744-1	
Alkali Silica Reaction*	-	-
Organic Contamination	1744-1	-
*All RCA must be classed as highly reactive		
Uses as fill		
Water Absorption	1097-6	
CBR	-	1377: Part 4
Plasticity of Fines		1377: Part 2
Use as unbound, pipe bedding		
Particle Density	1097-6	
Resistance to Fragmentation:		
Los Angeles	1097-2	-
Plasticity of Fines	-	1377: Part 2
Frost Heave		812: Part 124
Water Soluble Sulfate	1744-1	
Magnesium Sulfate	1367-2	
Use in asphalt		
Particle Density	1097-6	
Water Absorption	1097-6	
Resistance to Fragmentation:		
Los Angeles	1097-2	-
Abrasion Resistance (AAV)	1097-8	
Polishing Resistance	1097-8	
Resistance to heat	1367-5	

appendix C

Wastes considered to be inert waste for the purpose of this Protocol

Provided that there is no suspicion of contamination, the wastes listed below are considered to be inert wastes.

European Waste Catalogue Code	Description	Restrictions
10 11 03	Waste glass based fibrous materials	Only without organic binders
15 01 07	Glass packaging	Selected construction and demolition waste acceptable only with low content of other types of materials (like metals, plastics, organics, wood, rubber etc). The origin of the waste must be known
17 01 01	Concrete including solid dewatered concrete process waste	
17 01 02	Bricks	
17 01 03	Tiles and ceramics	
17 01 07	Mixtures of concrete, bricks, tiles and ceramics	
17 02 02	Glass	
17 05 04 17 05 08	Soils and stones including gravel, crushed rock, sand, clay, road base and planings, and track ballast	Excluding topsoil, peat; excluding soil and stones from contaminated sites
19 12 05	Glass	
20 01 02	Glass	Separately collected glass only
20 02 02	Soils and stones restricted to parks waste	Only from garden and parks waste; excluding topsoil, peat

The following definition of inert is taken from the Landfill (England and Wales) Regulations 2002 and is included for clarity.

Waste is inert if

(a) it does not undergo any significant physical, chemical or biological transformations;

(b) it does not dissolve, burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health; and

(c) its total leachability and pollutant content and the ecotoxicity of its leachate are insignificant and, in particular, do not endanger the quality of any surface water or groundwater.

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Subject: FW: Wrexham Gas Risk Assessment - C2 confirmed
Attachments: Gas Risk Assessment_Wrexham_3April2017.pdf

Sara

FYI – Wrexham CLO has accepted gas membrane down to C2 spec.

Awaiting design info off Juta – will pass over when I get it – but 30mm membrane zone for your design drawings stay in!

Are WYG to update the verification report – in light of this change?

Regards

Chris

Chris Menzies
Design Manager
chris.menzies@gallifordtry.co.uk

Tel: 01925 284 272
Mob: 07841 030 195

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From: Andrew Peacock [mailto:Andrew.Peacock@ppoconnor.co.uk]
Sent: 03 April 2017 17:10
To: Paul Robinson (Galliford Try) <paul.robinson@gallifordtry.co.uk>; Graham Ford (Galliford Try) <Graham.Ford@gallifordtry.co.uk>; Chris Menzies (Galliford Try) <Chris.Menzies@Gallifordtry.co.uk>
Cc: Mark Lovatt (Galliford Try) <Mark.Lovatt@Gallifordtry.co.uk>; Michael Smith <Michael.Smith@ppoconnor.co.uk>
Subject: FW: Wrexham Gas Risk Assessment

Paul / Chris

Please see below.

It's a good outcome, the site has been reclassified.

In short gas protection measures are required with NVQ lvl 2 installers and verification to satisfy the condition 4 discharge consent.

Juta will continue to supply the details, I will now get an installer on board.

Any queries please do not hesitate to contact me.

Regards

Andy

Andrew Peacock
Contracts Director

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 03 April 2017 15:37
To: James Lucas <jameslucas@epg-ltd.co.uk>
Cc: Patrick@juta.co.uk; Steve Wilson <stevewilson@epg-ltd.co.uk>; Andrew Peacock <Andrew.Peacock@ppoconnor.co.uk>; Matthew Phillips <Matthew.Phillips@wrexham.gov.uk>
Subject: RE: Wrexham Gas Risk Assessment

Hi James

Thank you for your email attaching the report 'Gas Risk Assessment' dated April 2017 prepared by EPG which provides an updated gas risk assessment for the Eastern Command and Custody Facility in Llay.

I can confirm that the report is satisfactory and note that it supersedes the previous gas risk assessments which required more detailed gas protection measures (to include active venting). It is understood that Section 6 of the report which details the new gas protection measures to be installed supersedes section 4.1.1 of the WYG Remediation Strategy (V1) dated Nov 16.

The details of the verification requirements for the installation of the gas protection measures are also within Section 6 and these should be complied with and a report submitted for approval in due course so that this may be approved in regard to the discharge of Condition 4.

I have checked with the Planning Officer (Matthew Phillips) and would request that this report is formally submitted with the Verification Report for the discharge of Condition 4 and, at that time, reference is made to this email which demonstrates consultation and agreement with me on the amendment to the design of the gas protection measures being verified. Please note that all verification works should be undertaken by a suitably qualified person.

Please don't hesitate to contact me should you have any queries.

Regards Angela

Ms Angela Guy
Contaminated Land Officer - Environmental Protection
Swyddog Tir wedi ei Halogi - Diogelu'r Amgylchedd

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From: James Lucas [mailto:jameslucas@epg-ltd.co.uk]
Sent: 03 April 2017 12:25
To: Angela Guy

Cc: Patrick@juta.co.uk; Steve Wilson; Andrew Peacock
Subject: FW: Wrexham Gas Risk Assessment

Hi Angela,

Please find attached our gas risk assessment for the proposed Eastern Command and Custody Facility at Wrexham.

May we ask when a response can be expected? As the project is due to commence very shortly.

Please feel free to contact Steve or myself should you have any queries.

Kind Regards,

James Lucas, Principal Engineer
The Environmental Protection Group Ltd

Tel 07930 364016
www.epg-ltd.co.uk

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sara.brennan

From: Angela Guy <Angela.Guy@wrexham.gov.uk>
Sent: 13 February 2018 15:08
To: sara.brennan
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Apologies, I thought I had replied to your email as I had filed it, however I can't actually find a reply in my records.

Yes I can confirm that this clarifies my query.

Regards Angela

Ms Angela Guy BSc (Hons) MSc
Contaminated Land Officer
Swyddog Tir wedi ei Halogi

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From: sara.brennan [mailto:sara.brennan@wyg.com]
Sent: 09 February 2018 09:37
To: Angela Guy
Subject: FW: Wrexham Custody Facility (2015/0583)

This email's attachments were cleaned of potential threats by Wrexham Council's Security Gateway.
Click here if the original attachments are required (justification needed).

Angela

Back in December, I sent you though information in regards to the disposal of Holywell material from Wrexham Custody Facility (as per email below). I since haven't heard back from you. I am just checking that you are happy with the information provided for insertion into our validation report.

Kind Regards

Sara Brennan
Senior Geo-Environmental Consultant

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From: sara.brennan
Sent: 12 December 2017 14:13
To: Angela Guy <Angela.Guy@wrexham.gov.uk>
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela,

For clarity, I have attached the transfer notes from the site (Holywell material) to Eccles New Road transfer station.

I have also requested information on water supply pipelines which I will provide within the Verification Report.

Kind Regards

Sara Brennan
Senior Geo-Environmental Consultant

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 30 November 2017 16:30
To: sara.brennan <sara.brennan@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Thank you for sending an updated site report. I cannot see the documentary evidence that you refer to on p9 in the appendix, please can you indicate which page it is on?

As per section 6.4 of your Remediation Strategy I look forward to receiving the Verification Report in due course (please note that verification regarding site services (4.1.2) will also be required).

Regards Angela

Ms Angela Guy BSc (Hons) MSc
Contaminated Land Officer
Swyddog Tir wedi ei Halogi

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From: sara.brennan [mailto:sara.brennan@wyg.com]
Sent: 17 November 2017 15:58
To: Angela Guy
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela,

I don't know if you remember, but a while back some material was imported from Holywell to Wrexham Custody Facility and following testing and lack of source information, it was recommended that this material was removed from site.

I have now received documentary evidence that the material was removed from site and taken to Eccles New Rd facility.
I have attached an updated site report for your reference which will also help you jog your memory. The following information was inserted into the report:

- Conveyance ticket for the hardcore material removed from Wrexham Custody Facility and taken to Eccles new road.
- Soil receipt document for Eccles New Rd.
- Copy of materials received document extracted from costing system showing the material imported originally from Holywell.
- Conveyance notes for the material hauled from Holywell to Wrexham Custody Facility.

I hope that this is sufficient.

Kind Regards

Sara Brennan
Senior Geo-Environmental Consultant

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 19 June 2017 11:05
To: sara.hegewald <sara.hegewald@wyg.com>
Cc: kathryn.ellis <kathryn.ellis@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

On the basis that these sites are regulated under appropriate permits and the construction recycling scheme is being managed under a recognised scheme (WRAP) then I acknowledge that WYG consider this material to be suitable for the uses it has been stated as being used for.

Regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 15 June 2017 15:30
To: Angela Guy
Cc: kathryn.ellis
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

Thank you for your email. In response to your queries below:

The addresses for both WRAP sites are:

- Eccles Transfer Station, Salford, M50 1DG
- Tudor Griffiths Ltd, Wood Lane, Ellesmere, Shropshire, SY12 0HY

Please find attached information pertaining to the quality protocols that both sites adhere to, to ensure that the material is suitable for re-use.

In relation to the material imported from Holywell, I have notified the site that the material must be removed under a duty of care and must not be used on site. I have asked for transfer notes as proof of removal which I will provide to you in due course.

I hope that this information is satisfactory. If you require any further information, please let me know.

Sara

Sara Hegewald
Senior Geo-Environmental Consultant

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 11 May 2017 11:08
To: sara.hegewald <sara.hegewald@wyg.com>
Cc: kathryn.ellis <kathryn.ellis@wyg.com>; natalie.stephens <natalie.stephens@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Thank you for your email.

With regard to the recycled material imported from 2 sources under WRAP, you have provided the following information:

- A Murray Rix Test Report for PSD for 'recycled 6F2' for PP O Connor Ltd from a site called Eccles New Road, Salford.
- An SAL Certificate of Analysis for a sample 'analysed as soil' from '6F2 Fines' also from a site called Eccles New Road, Salford.
- A Celtest Lab Test Report for a PSD test from TG Stock 'Docks' for 'crushed aggregate'.
- A second Celtest Lab Test Report for a PSD test for 'Crushed Rock' from 'TG'.

Please can you clarify exactly where the sites are for both sources of material and what procedures are in place under the WRAP scheme which ensures the treatment and re-use of these materials is checked/monitored to ensure they are suitable for their re-use.

With regard to your Site Report for the material from Holywell, further information about the site that the material has come from will be required. I will need to know the actual site address/location, whether it is brownfield or greenfield (I am assuming brownfield based on the photos and material description). I will also need sight of the waste transfer notes and have details about the circumstances of why this material has been imported– i.e. is it under the CL:AIRE Code of Practice? It should also be noted that the WLCWG 'Requirements for the Chemical Testing of 'Imported Materials for Various End Uses and 'Validation of Cover Systems' Table 2 states that for:

By products from
industrial processes.

Mechanically screened and
sorted demolition wastes.

Additional testing to that in **TABLE 3** will be required to determine the suitability of these materials for specific uses prior to CLO/EHO acceptance for import. This is likely to include leachability testing in line with WAC testing or Remedial Targets Methodology Appendix B Leachate testing.

Regards Angela

Ms Angela Guy
Contaminated Land Officer - Environmental Protection
Swyddog Tir wedi ei Halogi - Diogelu'r Amgylchedd

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From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 10 May 2017 14:19
To: Angela Guy
Cc: kathryn.ellis; natalie.stephens
Subject: Wrexham Custody Facility (2015/0583)

Angela,

Construction works are currently underway at the Wrexham Custody Facility site. They are currently constructing the car park area and forming the piling mat of the building footprint. Material has been imported to site to build up the levels of the car park, much of it from a natural quarried source where no additional chemical testing has been required in line with WYG Remediation Strategy Report, dated November 2016.

Material imported from two sources however, - Tudor Griffith and Eccles New Road was recycled in nature. Both sites are working under the Waste & Resources Action Programme (WRAP) and therefore additional chemical testing is not considered to be required. I have attached the source certificates for your review. The material will be used as a piling mat for the future building and also beneath the car parking area with limited pathways to contamination.

Additional recycled material from a site called 'Holywell' which doesn't operate under the WRAP protocol was imported and stockpiled for WYG to carry out chemical testing on it in accordance with the WYG Remediation Strategy report and Welsh Land Contamination Working Group Document, dated May 2013. I have attached the site visit report for your review.

Please can you let me know if you are happy with the presented information.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

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sara.brennan

From: Angela Guy <Angela.Guy@wrexham.gov.uk>
Sent: 12 June 2017 12:56
To: sara.hegewald
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Further to your call last week when you informed me that the 'Holywell material' was imported from a Galliford Try site known as Holywell Learning Campus, but the contractor couldn't confirm whether this was material won from that site or was imported and then exported from that site, I have now had a further response from Flintshire County Council on this matter.

The Council have informed me that the school is not a greenfield site and even if it were then the risk of lead contamination due to widespread historic mining in the area could not be ruled out.

With this in mind and without clarity on the original origin of this material and paperwork (e.g. waste transfer notes or whatever would be appropriate to trace the material) and despite the lab results, I do not feel it appropriate to recommend it is suitable to remain on site.

I am aware that you have already proposed that this material may be removed from site if need be and as you have mentioned WAC testing has already been carried out.

To ensure that this material is now handled properly I would require that the disposal documents (waste transfer notes) are provided as part of the validation process for the remediation of the site.

Regards Angela

Ms Angela Guy
Contaminated Land Officer - Environmental Protection
Swyddog Tir wedi ei Halogi - Diogelu'r Amgylchedd

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From: Angela Guy
Sent: 11 May 2017 11:08
To: 'sara.hegewald'
Cc: kathryn.ellis; natalie.stephens
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Thank you for your email.

With regard to the recycled material imported from 2 sources under WRAP, you have provided the following information:

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- A Celtest Lab Test Report for a PSD test from TG Stock 'Docks' for 'crushed aggregate'.
- A second Celtest Lab Test Report for a PSD test for 'Crushed Rock' from 'TG'.

Please can you clarify exactly where the sites are for both sources of material and what procedures are in place under the WRAP scheme which ensures the treatment and re-use of these materials is checked/monitored to ensure they are suitable for their re-use.

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to determine the suitability of these materials for
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This is likely to include leachability testing in line with
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Appendix B Leachate testing.

Regards Angela

Ms Angela Guy
Contaminated Land Officer - Environmental Protection
Swyddog Tir wedi ei Halogi - Diogelu'r Amgylchedd

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twitter.com/wrexhamcbc | twitter.com/cbswrecsam
facebook.com/wrexhamcouncil | facebook.com/cyngorwrecsam

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 10 May 2017 14:19
To: Angela Guy
Cc: kathryn.ellis; natalie.stephens
Subject: Wrexham Custody Facility (2015/0583)

Angela,

Construction works are currently underway at the Wrexham Custody Facility site. They are currently constructing the car park area and forming the piling mat of the building footprint. Material has been imported to site to build up the levels of the car park, much of it from a natural quarried source where no additional chemical testing has been required in line with WYG Remediation Strategy Report, dated November 2016.

Material imported from two sources however, - Tudor Griffith and Eccles New Road was recycled in nature. Both sites are working under the Waste & Resources Action Programme (WRAP) and therefore additional chemical testing is not considered to be required. I have attached the source certificates for your review. The material will be used as a piling mat for the future building and also beneath the car parking area with limited pathways to contamination.

Additional recycled material from a site called 'Holywell' which doesn't operate under the WRAP protocol was imported and stockpiled for WYG to carry out chemical testing on it in accordance with the WYG Remediation Strategy report and Welsh Land Contamination Working Group Document, dated May 2013. I have attached the site visit report for your review.

Please can you let me know if you are happy with the presented information.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

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Quay West at MediaCityUK, Trafford Wharf Road, Trafford Park, Manchester, M17 1HH
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Pennaeth yr Amgylchedd a Chynllunio/Head of Environment and Planning
Lawrence Isted

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Sara Hegewald
WYG
Quay West at MediaCityUK
Trafford Wharf Road
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Manchester
M17 1HH

Eich Cyf/Your Ref	A098075
Ein Cyf/Our Ref	P/2015/0583
Dyddiad/Date	26 October 2016
Gofynner am/Ask for	Angela Guy
Rhif Union/Direct Dial	01978 297433
E-bost/E-mail	angela.guy@wrexham.gov.uk

SENT BY EMAIL ONLY

Dear Sara

P/2015/0583 WREXHAM CUSTODY FACILITY: REMEDIATION STRATEGY, SEPTEMBER 2016

Thank you for providing a copy of the above report. As stated in my email dated 12 October 2016, I understand the Planning Team have not yet received a formal submission for the discharge of condition 3, therefore the following comments on this report are provided for information only and do not mean that the requirements of the Condition has been met. Should you require any further advice in respect to the formal submission and discharge of the condition please contact Matthew Phillips.

1. The second paragraph of Section 4.1.1 states that a damp proof membrane is suitable to mitigate the effects of radon, based upon BRE Report BR211 (2015) Radon: Protective measures for new buildings guidance. It then goes on to state "*Gas protection measures for the proposed building will therefore comprise either the following Option 1…. Or Option 2…*". Neither of the options refer to a membrane therefore I interpret this as the damp proof membrane being the membrane that protects against methane and carbon dioxide gas ingress.

   However BR211 does not provide guidance on measures for methane, carbon dioxide and hydrocarbon vapours and reference should be made to the appropriate guidance such as BS8485:2015 (Table 7 states the membrane is required to be impervious to the relevant gases (i.e. methane and carbon dioxide)) and CIRIA VOC guidance (with regard to protection against the risk from hydrocarbon vapours).

   It is noted that Spilman Associates Ltd report in Appendix G does however reference this guidance but little if any mention is made of the verification being in compliance with CIRIA C735.

   Therefore final clarification on the type of gas protection membrane to be used is required and what verification will be undertaken.

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Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.

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2. As is stated, both of the two options proposed involve active measures which will therefore require long term maintenance programmes to be in place for the lifetime of the building. Therefore provision for this long term maintenance should be made and information supplied to the Council which will demonstrate that this provision is in place.

3. In accordance with BS8485, the installation of the gas membrane should be by a qualified person. In addition reference has not been made to undertaking the installation in accordance with the manufacturers instructions, just that it will be done in general general accordance with BS8485.

4. In 3.2.2 and 3.3.2 it is noted that some contamination has been observed however there is limited discussion about this in relation to the findings of the SI and therefore it is not clear what risk assessment has been undertaken of these areas.

5. It is noted that a brief procedure for dealing with unexpected contamination is provided in section 4.1.3 and this is sufficient, in addtion to notifying the Council should any unforeseen contamination be found, the checks and records on this this matter should be detailed in the Verfication Report required to be submitted under Condition 4.

6. It is noted that section 6.2 provides details of the proposed testing regime for exacvated and imported soils, this is not in accordance with the Councils adopted guidance, a copy of which is enclosed.

7. There is a bund shown on the proposed development drawings, what is this for and what will be used to construct it? Depending on the response to these queries will depend on what requirements will be in place for verification purposes.

8. Details of what measures were in place and used for the management of contaminated water (referred to in section 5.3) should be provided in the Verfication Report.

Should you have any queries regarding this letter then please do not hesitate to contact me.

Yours sincerely



Angela Guy
Contaminated Land Officer

cc Matthew Phillips, Planning Officer

Rydym yn croesawu gohebiaeth yn Gymraeg.
Byddwn yn ymateb i unrhyw ohebiaeth yn Gymraeg ac ni fydd hyn yn arwain at unrhyw oedi.

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sara.brennan

From: Angela Guy <Angela.Guy@wrexham.gov.uk>
Sent: 21 July 2017 16:11
To: sara.hegewald
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Apologies for the delay in responding to your email. Thank you for providing your Site Report dated 30 June 2017 regarding the sampling of the stockpile of material to be used for a liner for the storm water catchment area. I can confirm that the report is satisfactory and have no further comments to make on this matter. I look forward to receiving the remaining verification documents in due course.

Kind regards Angela

Ms Angela Guy
Contaminated Land Officer
Swyddog Tir wedi ei Halogi

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From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 12 July 2017 13:44
To: Angela Guy
Subject: RE: Wrexham Custody Facility (2015/0583)

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Angela

Please find attached a site report following the sampling of the stockpile of material to be re-used as a liner to a pond at Wrexham Custody Facility. I am currently chasing the contractor for certificates for the material from Holywell being taken off site.

Please confirm that you are happy with the report attached. If you require any further information, please do not hesitate to contact me.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 19 June 2017 10:17
To: sara.hegewald <sara.hegewald@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Thanks for clarifying, provided the works are fully documented and verified this is fine.

Regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 19 June 2017 10:16
To: Angela Guy
Cc: kathryn.ellis
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

Our MMP which has been written for the Wrexham Custody site only covers the re-use of material for a bund on site and not the re-use of material for the pond areas. This work would be outside of the MMP. The material is however, being dug out and is being re-used in practically the same area as a liner to the pond. The clay is undisturbed natural ground in this area.

Kind Regards

Sara

Sara Hegewald
Senior Geo-Environmental Consultant

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 19 June 2017 09:57
To: sara.hegewald <sara.hegewald@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)
Importance: Low

Sara
Your Remediation Strategy has proposals to use the CL:AIRE Code of Practice and a Materials Management Plan for re-use of materials on site, therefore this will be acceptable (I am assuming the clay undisturbed natural ground?)
Kind regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 16 June 2017 15:18
To: Angela Guy
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

The client has asked if they can re-use approximately 500m^3 of stiff Clay excavated from an area adjacent to the proposed car park on site as a liner for a couple of pond features on site. I have advised them that additional chemical testing is required (3 no. samples) in line with the WYG Remediation Strategy for re-use of soils. Are you happy with us to proceed with the sampling as I don't want to visit site if you are not happy with them to re-use the soil on site in this manner. I have attached a copy of our remediation strategy report for your reference.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

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Appendix E – Site Visit Reports

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Barrier Pipe Installation – Galliford Try Building North West

Site: Wrexham Custody Facility
Photos provided by Galliford Try Building North West

Works in Progress:

Galliford Try Building North West provided photographic evidence of the installation of barrier pipelines which are presented below.



Photograph 1 – Installation of barrier pipe at the site



Photograph 2 – Details of barrier pipe installed at the site

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Barrier Pipe Installation – Galliford Try Building North West



Photograph 3 – Installation of barrier pipe at the site



Photograph 4 – Installation of barrier pipe at the site

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SITE REPORT

Site: Wrexham Custody Facility
Date: 30/06/17
Name of WYG Engineer: Sara Hegewald
Job No: A098075
Weather: Wet, cloudy
Visiting: Michael Smith – site manager

Works in Progress:

WYG were requested to visit the site to carry out sampling of a stockpile of soil that was excavated from an area adjacent to the proposed car park for future re-use as a liner to a storm water catchment area at the site. The soil samples would be sent off to the laboratory for testing. Approximately 500m^3 of soil was present within the stockpile.

At the time of the site visit, the car park had been installed and construction of the custody facility was underway.

Discussions:

In line with the WYG Remediation Strategy dated November 2016, a total of 3 no. composite samples were collected and submitted for laboratory analysis.

A photographic record of the soil and sample locations is provided below.

In-line with the validation testing suite specified within the WYG Remediation Strategy Report, the soil samples were submitted for laboratory testing of fraction organic carbon, arsenic, water soluble boron, cadmium, total chromium, hexavalent chromium, copper, free/total cyanide, lead, mercury, nickel, selenium, zinc, pH, TPH CWG, speciated PAHs, VOCs plus TICs and asbestos screen.

The validation assessment of the chemical results is given below. The laboratory certificates of which are appended to this report (certificate 17/11344).

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SITE REPORT

Site Visit Photographic Record:

Overall the soil within the stockpile comprised brown slightly sandy gravelly CLAY with gravel of mixed lithologies and woody debris.

SP11 – Composite environmental sample retrieved



SP12 – Composite environmental sample retrieved



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SITE REPORT

SP13



Overall stockpile

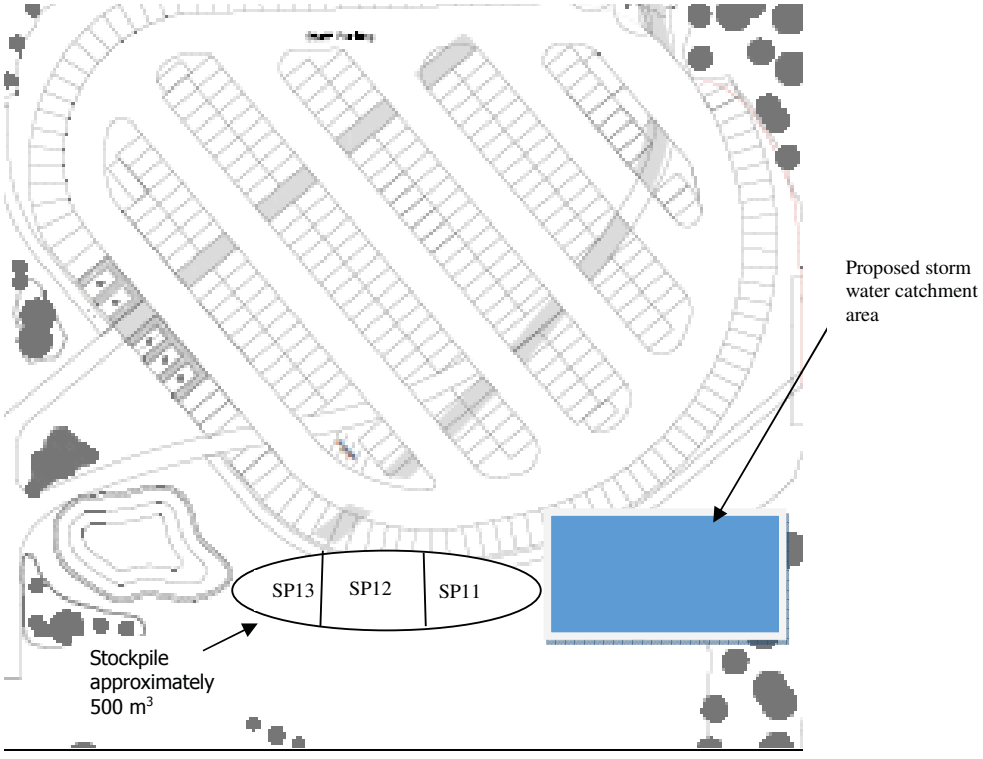


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SITE REPORT



Sampling Location Plan:



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SITE REPORT

Chemical Testing Results:

Chemical results were assessed by comparison with the validation criteria outlined in the remediation strategy. A Tier 1 Screening Assessment has been attached to this report. No chemicals of potential concern were reported following the sampling and chemical analysis of the stockpile at the site for a commercial end use. A copy of the chemical results is appended to this report. A copy of this report was submitted to the CLO and they confirmed that they were satisfied with the information provided and that the material could be re-used as a liner to the pond on-site. A copy of the email from the CLO is appended to this report.

Other Requirements:

Information on the chemical status of the imported soil from Holywell was communicated with the Wrexham County Borough Council Contaminated Land Officer. As details of the source of the material could not be provided, it was requested that the material was removed from site under a duty of care and must not remain on site for future use. This was relayed back to the site manager at Wrexham Custody Facility and they agreed to remove the material. WYG are currently waiting for certification of the material movement.

Exova Jones Environmental

Registered Address : Exova (UK) Ltd, Lochend Industrial Estate, Newbridge, Midlothian, EH28 8PL

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Trafford Wharf Road
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Attention :	Sara Hegewald
Date :	10th July, 2017
Your reference :	A098075
Our reference :	Test Report 17/11334 Batch 1
Location :	Wrexham Custody Facility
Date samples received :	1st July, 2017
Status :	Final report
Issue :	1

Three samples were received for analysis on 1st July, 2017 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Phil Sommerton BSc
Project Manager

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald
JE Job No.: 17/11334

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-2	3-4	5-6										
Sample ID	SP11	SP12	SP13										
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J	V J	V J										
Sample Date	30/06/2017	30/06/2017	30/06/2017										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1								LOD/LOR	Units	Method No.
Date of Receipt	01/07/2017	01/07/2017	01/07/2017										
Arsenic #M	6.8	6.8	7.6								<0.5	mg/kg	TM30/PM15
Beryllium	1.0	0.9	1.1								<0.5	mg/kg	TM30/PM15
Cadmium #M	0.2	0.2	0.1								<0.1	mg/kg	TM30/PM15
Chromium #M	46.4	41.5	52.6								<0.5	mg/kg	TM30/PM15
Copper #M	18	17	18								<1	mg/kg	TM30/PM15
Lead #M	25	25	29								<5	mg/kg	TM30/PM15
Mercury #M	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel #M	23.3	25.2	26.3								<0.7	mg/kg	TM30/PM15
Selenium #M	<1	<1	<1								<1	mg/kg	TM30/PM15
Vanadium	26	25	31								<1	mg/kg	TM30/PM15
Water Soluble Boron #M	0.6	0.6	0.7								<0.1	mg/kg	TM74/PM32
Zinc #M	54	66	64								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #M	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Acenaphthene #M	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene #M	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene #M	0.05	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene #M	0.04	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene #M	0.02	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	<0.07	<0.07	<0.07								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	<0.6	<0.6								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	103	103	107								<0	%	TM4/PM8
VOC TICs	ND	ND	ND									None	TM15/PM10
Methyl Tertiary Butyl Ether #M	<6	<6	<6								<6	ug/kg	TM15/PM10
Benzene #M	<5	<5	<5								<5	ug/kg	TM15/PM10
Toluene #M	<3	<3	<3								<3	ug/kg	TM15/PM10
Ethylbenzene #M	<3	<3	<3								<3	ug/kg	TM15/PM10
p/m-Xylene #M	<4	<4	<4								<4	ug/kg	TM15/PM10
o-Xylene #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	97	95	97								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	89	82	86								<0	%	TM15/PM10

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald
JE Job No.: 17/11334

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-2	3-4	5-6										
Sample ID	SP11	SP12	SP13										
Depth											Please see attached notes for all abbreviations and acronyms		
COC No / misc													
Containers	V J	V J	V J										
Sample Date	30/06/2017	30/06/2017	30/06/2017										
Sample Type	Soil	Soil	Soil										
Batch Number	1	1	1								LOD/LOR	Units	Method No.
Date of Receipt	01/07/2017	01/07/2017	01/07/2017										
TPH CWG													
Aliphatics													
>C5-C6 #M	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C6-C8 #M	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C10-C12 #M	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM16
>C12-C16 #M	<4	<4	<4								<4	mg/kg	TM5/PM16
>C16-C21 #M	<7	<7	<7								<7	mg/kg	TM5/PM16
>C21-C35 #M	<7	<7	<7								<7	mg/kg	TM5/PM16
>C35-C44	<7	<7	<7								<7	mg/kg	TM5/PM16
Total aliphatics C5-44	<26	<26	<26								<26	mg/kg	TM5/TM36/PM12/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC8-EC10 #M	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM16
>EC12-EC16 #	<4	<4	<4								<4	mg/kg	TM5/PM16
>EC16-EC21 #	<7	<7	<7								<7	mg/kg	TM5/PM16
>EC21-EC35 #	<7	<7	<7								<7	mg/kg	TM5/PM16
>EC35-EC44	<7	<7	<7								<7	mg/kg	TM5/PM16
Total aromatics C5-44	<26	<26	<26								<26	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-44)	<52	<52	<52								<52	mg/kg	TM5/TM36/PM12/PM16
Phenol #M	<0.01	<0.01	<0.01								<0.01	mg/kg	TM26/PM21
Natural Moisture Content	15.1	16.3	18.3								<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #M	329	111	82								<3	mg/kg	TM38/PM20
Free Cyanide	<0.5	<0.5	<0.5								<0.5	mg/kg	TM89/PM45
Fraction Organic Carbon	0.011	0.010	0.013								<0.001	None	TM21/PM24
pH #M	8.10	8.03	7.94								<0.01	pH units	TM73/PM11
Sample Type	Clay	Clay	Clay									None	PM13/PM0
Sample Colour	Medium Brown	Medium Brown	Medium Brown									None	PM13/PM0
Other Items	stones	stones	stones									None	PM13/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald
JE Job No.: 17/11334

VOC Report : **Solid**

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-2	3-4	5-6									
Sample ID	SP11	SP12	SP13									
Depth												
COC No / misc												
Containers	V J	V J	V J									
Sample Date	30/06/2017	30/06/2017	30/06/2017									
Sample Type	Soil	Soil	Soil									
Batch Number	1	1	1									
Date of Receipt	01/07/2017	01/07/2017	01/07/2017									
VOC MS												
Dichlorodifluoromethane	<2	<2	<2								<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #M	<6	<6	<6								<6	ug/kg	TM15/PM10
Chloromethane #	<3	<3	<3								<3	ug/kg	TM15/PM10
Vinyl Chloride	<2	<2	<2								<2	ug/kg	TM15_A/PM10
Bromomethane	<1	<1	<1								<1	ug/kg	TM15/PM10
Chloroethane #M	<6	<6	<6								<6	ug/kg	TM15/PM10
Trichlorofluoromethane #M	<3	<3	<3								<3	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #M	<6	<6	<6								<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<30	<30	<30								<30	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3								<3	ug/kg	TM15/PM10
1,1-Dichloroethane #M	<6	<6	<6								<6	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #M	<7	<7	<7								<7	ug/kg	TM15/PM10
2,2-Dichloropropane	<4	<4	<4								<4	ug/kg	TM15/PM10
Bromochloromethane #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Chloroform #M	<5	<5	<5								<5	ug/kg	TM15/PM10
1,1,1-Trichloroethane #M	<5	<5	<5								<5	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3								<3	ug/kg	TM15/PM10
Carbon tetrachloride #M	<4	<4	<4								<4	ug/kg	TM15/PM10
1,2-Dichloroethane #M	<5	<5	<5								<5	ug/kg	TM15/PM10
Benzene #M	<5	<5	<5								<5	ug/kg	TM15/PM10
Trichloroethene (TCE) #M	<5	<5	<5								<5	ug/kg	TM15/PM10
1,2-Dichloropropane #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Dibromomethane #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Bromodichloromethane #M	<4	<4	<4								<4	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4	<4	<4								<4	ug/kg	TM15/PM10
Toluene #M	<3	<3	<3								<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3	<3	<3								<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3								<3	ug/kg	TM15/PM10
1,3-Dichloropropane #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Dibromochloromethane #M	<5	<5	<5								<5	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3	<3	<3								<3	ug/kg	TM15/PM10
Chlorobenzene #M	<4	<4	<4								<4	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #M	<5	<5	<5								<5	ug/kg	TM15/PM10
Ethylbenzene #M	<3	<3	<3								<3	ug/kg	TM15/PM10
p/m-Xylene #M	<4	<4	<4								<4	ug/kg	TM15/PM10
o-Xylene #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Styrene	<3	<3	<3								<3	ug/kg	TM15_A/PM10
Bromoform	<4	<4	<4								<4	ug/kg	TM15/PM10
Isopropylbenzene #	<3	<3	<3								<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #M	<3	<3	<3								<3	ug/kg	TM15/PM10
Bromobenzene	<2	<2	<2								<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #M	<4	<4	<4								<4	ug/kg	TM15/PM10
Propylbenzene #	<4	<4	<4								<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3	<3	<3								<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3								<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3	<3	<3								<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5	<5	<5								<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6	<6	<6								<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4	<4	<4								<4	ug/kg	TM15/PM10
4-Isopropyltoluene #	<4	<4	<4								<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #M	<4	<4	<4								<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4	<4	<4								<4	ug/kg	TM15/PM10
n-Butylbenzene #	<4	<4	<4								<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #M	<4	<4	<4								<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane #	<4	<4	<4								<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene #	<7	<7	<7								<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4	<4	<4								<4	ug/kg	TM15/PM10
Naphthalene	<27	<27	<27								<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene #	<7	<7	<7								<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	97	95	97								<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	89	82	86								<0	%	TM15/PM10

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:

Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/11334	1	SP11		2	04/07/2017	**General Description (Bulk Analysis)**	soil/stones
					04/07/2017	**Asbestos Fibres**	NAD
					04/07/2017	**Asbestos Fibres (2)**	NAD
					04/07/2017	**Asbestos ACM**	NAD
					04/07/2017	**Asbestos ACM (2)**	NAD
					04/07/2017	**Asbestos Type**	NAD
					04/07/2017	**Asbestos Type (2)**	NAD
					04/07/2017	**Asbestos Level Screen**	NAD
17/11334	1	SP12		4	04/07/2017	**General Description (Bulk Analysis)**	soil/stones
					04/07/2017	**Asbestos Fibres**	NAD
					04/07/2017	**Asbestos Fibres (2)**	NAD
					04/07/2017	**Asbestos ACM**	NAD
					04/07/2017	**Asbestos ACM (2)**	NAD
					04/07/2017	**Asbestos Type**	NAD
					04/07/2017	**Asbestos Type (2)**	NAD
					04/07/2017	**Asbestos Level Screen**	NAD
17/11334	1	SP13		6	04/07/2017	**General Description (Bulk Analysis)**	soil/stones
					04/07/2017	**Asbestos Fibres**	NAD
					04/07/2017	**Asbestos Fibres (2)**	NAD
					04/07/2017	**Asbestos ACM**	NAD
					04/07/2017	**Asbestos ACM (2)**	NAD
					04/07/2017	**Asbestos Type**	NAD
					04/07/2017	**Asbestos Type (2)**	NAD
					04/07/2017	**Asbestos Level Screen**	NAD

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
No deviating sample report results for job 17/11334						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/11334

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
SA	ISO17025 (SANAS) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

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All solid results are expressed on a dry weight basis unless stated otherwise.

JE Job No: 17/11334

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

JE Job No: 17/11334

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.	Yes	Yes	AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes	Yes	AD	Yes

JE Job No: 17/11334

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes	Yes	AD	Yes
TM89	Modified USEPA method OIA-1667. Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide and Thiocyanate analysis.			AR	Yes
TM15_A	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

A098075 Wrexham Custody Facility
Soil Screening Data

			Sample ID	SP11	SP12	SP13
			Depth	0	0	0
Test	**Units**	**LOD**	**TSV**			
Natural Moisture Content	%	<0.1		15.1	16.3	18.3
Abestos Screen	-	-	Presence	NAD	NAD	NAD
Fraction Organic Carbon	-	<0.001	-	0.011	0.01	0.013
Free Cyanide	mg/kg	<0.5	40	<0.5	<0.5	<0.5
Phenol	mg/kg	<0.01	440	<0.01	<0.01	<0.01
Sulphate as SO4 (2:1 ext)	mg/kg	<3	-	329	111	82
pH	-	<0.01	-	8.1	8.03	7.94
Metals						
Arsenic ᴹᴹ	mg/kg	<0.5	640	6.8	6.8	7.6
Beryllium	mg/kg	<0.5	12	1	0.9	1.1
Cadmium ᴹᴹ	mg/kg	<0.1	410	0.2	0.2	0.1
Chromium ᴹᴹ	mg/kg	<0.5	8600	46.4	41.5	52.6
Hexavalent Chromium #	mg/kg	<0.3	49	<0.3	<0.3	<0.3
Copper ᴹᴹ	mg/kg	<1	68000	18	17	18
Lead ᴹᴹ	mg/kg	<5	2300	25	25	29
Mercury ᴹᴹ	mg/kg	<0.1	1100	<0.1	<0.1	<0.1
Nickel ᴹᴹ	mg/kg	<0.7	980	23.3	25.2	26.3
Selenium ᴹᴹ	mg/kg	<1	12000	<1	<1	<1
Vanadium	mg/kg	<1	9000	26	25	31
Water Soluble Boron ᴹᴹ	mg/kg	<0.1	240000	0.6	0.6	0.7
Zinc ᴹᴹ	mg/kg	<5	730000	54	66	64
PAHs						
Acenaphthene ᴹᴹ	mg/kg	<0.05		<0.05	<0.05	<0.05
Acenaphthylene	mg/kg	<0.03		<0.03	<0.03	<0.03
Anthracene #	mg/kg	<0.04		<0.04	<0.04	<0.04
Benzo(a)anthracene #	mg/kg	<0.06		<0.06	<0.06	<0.06
Benzo(a)pyrene #	mg/kg	<0.04	77	<0.04	<0.04	<0.04
Benzo(b)fluoranthene	mg/kg	<0.05		<0.05	<0.05	<0.05
Benzo(ghi)perylene #	mg/kg	<0.04		<0.04	<0.04	<0.04
Benzo(k)fluoranthene	mg/kg	<0.02		<0.02	<0.02	<0.02
Chrysene ᴹᴹ	mg/kg	<0.02		0.02	<0.02	<0.02
Dibenzo(ah)anthracene #	mg/kg	<0.04		<0.04	<0.04	<0.04
Fluoranthene ᴹᴹ	mg/kg	<0.03		0.04	<0.03	<0.03
Fluorene ᴹᴹ	mg/kg	<0.04		<0.04	<0.04	<0.04
Indeno(123cd)pyrene ᴹᴹ	mg/kg	<0.04		<0.04	<0.04	<0.04
Naphthalene ᴹᴹ	mg/kg	<0.04	190	<0.04	<0.04	<0.04
Phenanthrene ᴹᴹ	mg/kg	<0.03		0.05	<0.03	<0.03
Pyrene #	mg/kg	<0.03		<0.03	<0.03	<0.03
PAH 16 Total	mg/kg	<0.6		<0.6	<0.6	<0.6
TPH CWG						
Aliphatics						
>C5-C6	mg/kg	<0.1	3200	<0.1	<0.1	<0.1
>C6-C8	mg/kg	<0.1	7800	<0.1	<0.1	<0.1
>C8-C10	mg/kg	<0.1	2000	<0.1	<0.1	<0.1
>C10-C12	mg/kg	<0.2	9700	<0.2	<0.2	<0.2
>C12-C16	mg/kg	<4	59000	<4	<4	<4
>C16-C35	mg/kg	<7	1000000	<14	<14	<14
>C35-C44	mg/kg	<7	1000000	<7	<7	<7
Total Aliphatics C5-C44	mg/kg	<7	1000000	<7	<7	<7
Aromatics						
>C5-EC7	mg/kg	<0.1	27	<0.1	<0.1	<0.1
>EC7-EC8	mg/kg	<0.1	56000	<0.1	<0.1	<0.1
>EC8-EC10	mg/kg	<0.1	3500	<0.1	<0.1	<0.1
>EC10-EC12	mg/kg	<0.2	16000	<0.2	<0.2	<0.2
>EC12-EC16	mg/kg	<4	36000	<4	<4	<4
>EC16-EC21	mg/kg	<7	28000	<7	<7	<7
>EC21-EC35	mg/kg	<7	28000	<7	<7	<7
>EC35-EC44	mg/kg	<7	28000	<7	<7	<7
Total Aromatics C5-C44	mg/kg	<26	28000	<26	<26	<26
VOC MS						
Dichlorodifluoromethane	ug/kg	<2		<2	<2	<2
Methyl Tertiary Butyl Ether #M	ug/kg	<6		<6	<6	<6
Chloromethane #	ug/kg	<3		<3	<3	<3
Vinyl Chloride	ug/kg	<2		<2	<2	<2
Bromomethane	ug/kg	<1		<1	<1	<1
Chloroethane #M	ug/kg	<6		<6	<6	<6
Trichlorofluoromethane #M	ug/kg	<3		<3	<3	<3
1,1-Dichloroethene (1,1 DCE) #M	ug/kg	<6		<6	<6	<6
Dichloromethane (DCM) #	ug/kg	<7		<30	<30	<30
trans-1-2-Dichloroethene #	ug/kg	<3		<3	<3	<3
1,1-Dichloroethane #M	ug/kg	<6		<6	<6	<6
cis-1-2-Dichloroethene #M	ug/kg	<7		<7	<7	<7
2,2-Dichloropropane	ug/kg	<4		<4	<4	<4
Bromochloromethane #M	ug/kg	<4		<4	<4	<4
Chloroform #M	ug/kg	<5		<5	<5	<5
1,1,1-Trichloroethane #M	ug/kg	<5		<5	<5	<5
1,1-Dichloropropene #	ug/kg	<3		<3	<3	<3
Carbon tetrachloride #M	ug/kg	<4		<4	<4	<4
1,2-Dichloroethane #M	ug/kg	<5		<5	<5	<5
Benzene #M	ug/kg	<5		<5	<5	<5
Trichloroethene (TCE) #M	ug/kg	<5		<5	<5	<5
1,2-Dichloropropane #M	ug/kg	<4		<4	<4	<4
Dibromomethane #M	ug/kg	<4		<4	<4	<4
Bromodichloromethane #M	ug/kg	<4		<4	<4	<4
cis-1-3-Dichloropropene	ug/kg	<4		<4	<4	<4
Toluene #M	ug/kg	<3		<3	<3	<3
trans-1-3-Dichloropropene	ug/kg	<3		<3	<3	<3
1,1,2-Trichloroethane #M	ug/kg	<4		<4	<4	<4
Tetrachloroethene (PCE) #	ug/kg	<3		<3	<3	<3
1,3-Dichloropropane #M	ug/kg	<4		<4	<4	<4
Dibromochloromethane #M	ug/kg	<5		<5	<5	<5
1,2-Dibromoethane #	ug/kg	<3		<3	<3	<3
Chlorobenzene #M	ug/kg	<4		<4	<4	<4
1,1,1,2-Tetrachloroethane #M	ug/kg	<5		<5	<5	<5
Ethylbenzene #M	ug/kg	<3		<3	<3	<3
p/m-Xylene #M	ug/kg	<4		<4	<4	<4

A098075 Wrexham Custody Facility
Soil Screening Data

			Sample ID	SP11	SP12	SP13
			Depth	0	0	0
Test	**Units**	**LOD**	**TSV**			
o-Xylene #M	ug/kg	<4		<4	<4	<4
Styrene	ug/kg	<3		<3	<3	<3
Bromoform	ug/kg	<4		<4	<4	<4
Isopropylbenzene #	ug/kg	<3		<3	<3	<3
1,1,2,2-Tetrachloroethane #M	ug/kg	<3		<3	<3	<3
Bromobenzene	ug/kg	<2		<2	<2	<2
1,2,3-Trichloropropane #M	ug/kg	<4		<4	<4	<4
Propylbenzene #	ug/kg	<4		<4	<4	<4
2-Chlorotoluene	ug/kg	<3		<3	<3	<3
1,3,5-Trimethylbenzene #	ug/kg	<3		<3	<3	<3
4-Chlorotoluene	ug/kg	<3		<3	<3	<3
tert-Butylbenzene #	ug/kg	<5		<5	<5	<5
1,2,4-Trimethylbenzene #	ug/kg	<6		<6	<6	<6
sec-Butylbenzene #	ug/kg	<4		<4	<4	<4
4-Isopropyltoluene #	ug/kg	<4		<4	<4	<4
1,3-Dichlorobenzene #M	ug/kg	<4		<4	<4	<4
1,4-Dichlorobenzene #	ug/kg	<4		<4	<4	<4
n-Butylbenzene #	ug/kg	<4		<4	<4	<4
1,2-Dichlorobenzene #M	ug/kg	<4		<4	<4	<4
1,2-Dibromo-3-chloropropane #	ug/kg	<4		<4	<4	<4
1,2,4-Trichlorobenzene #	ug/kg	<7		<7	<7	<7
Hexachlorobutadiene	ug/kg	<4		<4	<4	<4
Naphthalene	ug/kg	<27		<27	<27	<27
1,2,3-Trichlorobenzene #	ug/kg	<7		<7	<7	<7
VOC TICs						
Methyl Tertiary Butyl Ether #M	ug/kg	<6		<6	<6	<6
Benzene #M	ug/kg	<5		<5	<5	<5
Toluene #M	ug/kg	<3		<3	<3	<3
Ethylbenzene #M	ug/kg	<3		<3	<3	<3
p/m-Xylene #M	ug/kg	<4		<4	<4	<4
o-Xylene #M	ug/kg	<4		<4	<4	<4

Key:
TSV - Based on Appendix I.1 Remediation Strategy, WYG, November 2016
Exceeds TSV
Where VOCs/SVOCs are below LOD, screening value not used

A098075 Wrexham Custody Facility

Culp Study

Results	SP11	SP12	SP13
Benzo(a)anthracene	0.06	0.06	0.06
Chrysene	0.02	0.02	0.02
Benzo(b)fluoranthene	0.05	0.05	0.05
Benzo(k)fluoranthene	0.02	0.02	0.02
Dibenzo(ah)anthracene	0.04	0.04	0.04
Indeno(123cd)pyrene	0.04	0.04	0.04
Benzo(ghi)perylene	0.04	0.04	0.04
Benzo(a)pyrene	0.04	0.04	0.04

Ratio to BaP				Min	Max	Culp study limits	
						Lower Limit	Upper Limit
Benzo(a)anthracene	1.50	1.50	1.50	1.50	1.50	0.12	12.43
Chrysene	0.50	0.50	0.50	0.50	0.50	0.12	11.61
Benzo(b)fluoranthene	1.25	1.25	1.25	1.25	1.25	0.11	10.85
Benzo(k)fluoranthene	0.50	0.50	0.50	0.50	0.50	0.04	3.72
Dibenzo(ah)anthracene	1.00	1.00	1.00	1.00	1.00	0.01	1.38
Indeno(123cd)pyrene	1.00	1.00	1.00	1.00	1.00	0.07	7.27
Benzo(ghi)perylene	1.00	1.00	1.00	1.00	1.00	0.08	8.22

sara.hegewald

From: Angela Guy <Angela.Guy@wrexham.gov.uk>
Sent: 21 July 2017 16:11
To: sara.hegewald
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Apologies for the delay in responding to your email. Thank you for providing your Site Report dated 30 June 2017 regarding the sampling of the stockpile of material to be used for a liner for the storm water catchment area. I can confirm that the report is satisfactory and have no further comments to make on this matter. I look forward to receiving the remaining verification documents in due course.

Kind regards Angela

Ms Angela Guy
Contaminated Land Officer
Swyddog Tir wedi ei Halogi

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Environment and Planning Department, 16 Lord Street, Wrexham LL11 1LG
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From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 12 July 2017 13:44
To: Angela Guy
Subject: RE: Wrexham Custody Facility (2015/0583)

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Click here if the original attachments are required (justification needed).

Angela

Please find attached a site report following the sampling of the stockpile of material to be re-used as a liner to a pond at Wrexham Custody Facility. I am currently chasing the contractor for certificates for the material from Holywell being taken off site.

Please confirm that you are happy with the report attached. If you require any further information, please do not hesitate to contact me.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 19 June 2017 10:17
To: sara.hegewald <sara.hegewald@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)

Sara

Thanks for clarifying, provided the works are fully documented and verified this is fine.

Regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 19 June 2017 10:16
To: Angela Guy
Cc: kathryn.ellis
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

Our MMP which has been written for the Wrexham Custody site only covers the re-use of material for a bund on site and not the re-use of material for the pond areas. This work would be outside of the MMP. The material is however, being dug out and is being re-used in practically the same area as a liner to the pond. The clay is undisturbed natural ground in this area.

Kind Regards

Sara

Sara Hegewald
Senior Geo-Environmental Consultant

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From: Angela Guy [mailto:Angela.Guy@wrexham.gov.uk]
Sent: 19 June 2017 09:57
To: sara.hegewald <sara.hegewald@wyg.com>
Subject: RE: Wrexham Custody Facility (2015/0583)
Importance: Low

Sara
Your Remediation Strategy has proposals to use the CL:AIRE Code of Practice and a Materials Management Plan for re-use of materials on site, therefore this will be acceptable (I am assuming the clay undisturbed natural ground?)
Kind regards Angela

From: sara.hegewald [mailto:sara.hegewald@wyg.com]
Sent: 16 June 2017 15:18
To: Angela Guy
Subject: RE: Wrexham Custody Facility (2015/0583)

Angela

The client has asked if they can re-use approximately 500m^3 of stiff Clay excavated from an area adjacent to the proposed car park on site as a liner for a couple of pond features on site. I have advised them that additional chemical testing is required (3 no. samples) in line with the WYG Remediation Strategy for re-use of soils. Are you happy with us to proceed with the sampling as I don't want to visit site if you are not happy with them to re-use the soil on site in this manner. I have attached a copy of our remediation strategy report for your reference.

Kind Regards

Sara Hegewald
Senior Geo-Environmental Consultant

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We welcome correspondence in Welsh. We will respond to any correspondence in Welsh and this will not lead to any delay.

Take a look - you can pay, report, request, have your say and find information online at www.wrexham.gov.uk. Save paper - think before you print!

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Trafford Wharf Road,
Trafford Park,
Manchester, M17 1HH

SITE REPORT

Site: Wrexham Custody Facility
Date: 31/05/18 & 14/06/18
Name of WYG Engineer: Claire Harrison & Alex Lamb
Job No: A098075
Weather: Slight breeze, dry and sunny spells, windy and dry
Visiting: Jon Reynolds – site manager

Works in Progress:

WYG were requested to visit the site on 31st May 2018 and 14th June 2018 to carry out sampling of imported topsoil to determine the chemical status prior to using it for landscape purposes on site. Approximately 630m^3 of material was imported to site.

Discussions:

In line with the WYG Remediation Strategy dated November 2016 and the sampling and testing requirements provided in Welsh Land Contamination Working Group Document, May 2013 i.e. 4 no. samples per 250m^3 of material for commercial developments with landscaping, a total of 10 no. samples were collected and submitted for laboratory analysis over the two sampling periods. The material had generally been placed in situ prior to sampling.

WYG received a copy of the BS:3882 certificate which proved that the soil was suitable for landscaping purposes. A copy of this certificate is appended to this report.

A photographic record of the soil and sample locations is provided below.

In-line with the validation testing suite specified within the WYG Remediation Strategy Report and that recommended within the Welsh Land Contamination Working Group Document dated May 2013, the soil samples were submitted for laboratory testing of TPH CWG, phenols, asbestos screen, speciated PAHs, arsenic, cadmium, total chromium, lead, mercury, selenium, water soluble boron, copper, nickel and zinc.

Chemical results and conclusions are also given below. The chemical results of which are appended to this report.

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SITE REPORT

Site Visit Photographic Record:

Overall the material comprised of brown slightly gravelly slightly silty sandy Topsoil with occasional woody fragments. Gravel is sub-angular to sub-rounded fine to medium sandstone, mudstone and quartz.

HP101



HP102



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SITE REPORT

HP103



HP104



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SITE REPORT

HP105



HP106



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SITE REPORT

HP107



HP108



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SITE REPORT

HP109



HP110



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SITE REPORT

HP111



HP112



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SITE REPORT

HP113



HP114



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SITE REPORT

General – Area 1 (HP101 to HP103)



General – Area 2 (HP104 to HP108)



SITE REPORT

General – Area 3 (HP109 to HP110)



General – Area 4 (HP111 to HP112)



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SITE REPORT

General – Area 5 (HP113 to HP114)



Sampling Location Plan:

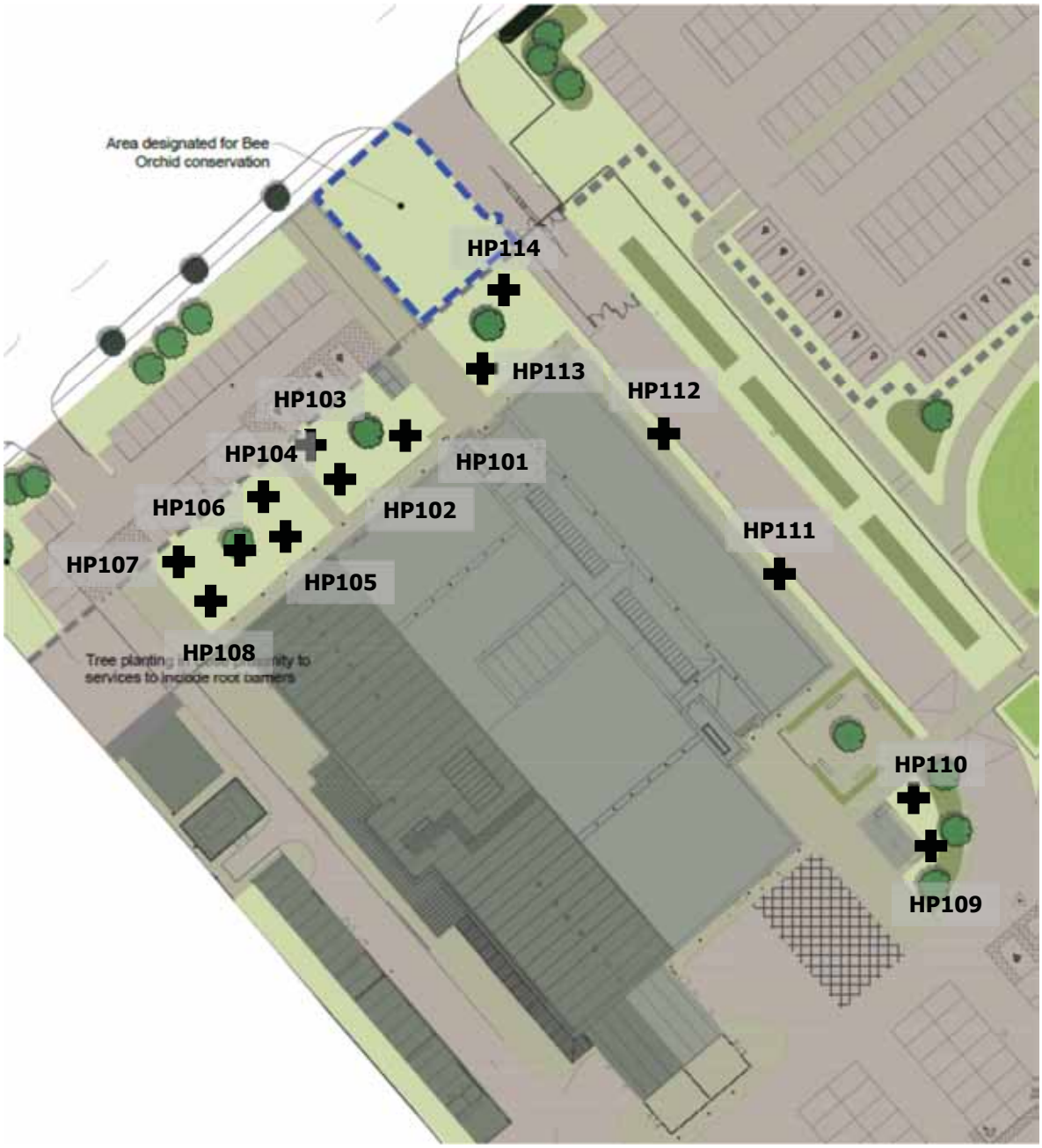
The sample location plan is appended to this report.

Chemical Testing Results:

Chemical results were assessed by comparison with the validation criteria outlined in the remediation strategy. A Tier 1 Screening Assessment has been attached to this report. No chemicals of potential concern were reported following the sampling and chemical analysis of the topsoil at the site for a commercial end use.

Conclusions:

The imported topsoil material is deemed suitable to remain onsite as part of the soft landscaped areas.



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Environmental Consultancy
Ground Technologies & Investigation

Project: Wrexham Custody Facility

Client : Galliford Try Building North West

Figure 1 – Topsoil Sample Location Plan

Project No.: A098075	Date: July 2018

			Sample ID	HP101	HP103	HP104	HP107	HP109	HP110	HP111	HP112	HP113	HP114
			Depth	0.10-0.12	0.10-0.12	0.10-0.12	0.10-0.12	0.10-0.12	0.10-0.12	0.10	0.10	0.10	0.10
Test	**Units**	**LOD**	**TSV**										
Natural Moisture Content	%	<0.1		13	14	17	14	14	13	13	14	14	15
Abestos Screen	-	-	Presence	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD
Free Cyanide	mg/kg	<1	40	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Total cyanide	mg/kg	<1	40	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phenol	mg/kg	<0.01	440	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cresols	mg/kg	<0.01	-	<0.01	0.0117	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Xylenols	mg/kg	<0.015	-	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Monohydric Phenols	mg/kg	<0.035	440	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035
pH	-		-	7.93	8.11	8.44	8	8.17	7.89	8.71	8.64	8.82	8.54
Metals													
Arsenic[M]	mg/kg	<0.6	640	4.98	5.93	5.78	5.3	5	5.53	4.96	4.44	5.96	5.36
Cadmium[M]	mg/kg	<0.02	410	0.243	0.252	0.26	0.289	0.209	0.269	0.211	0.288	0.259	0.216
Chromium[M]	mg/kg	<0.9	8600	4.71	5.25	6.98	5.31	4.32	4.36	4.37	4.99	7.33	6.79
Copper[M]	mg/kg	<1.4	68000	18.1	16.4	22.1	17.3	16.4	16.4	15.4	18.1	18.5	18
Lead[M]	mg/kg	<0.7	2300	18.1	19.6	25.7	22	21.7	23.9	21.9	22.6	22.7	23.8
Mercury[M]	mg/kg	<0.14	1100	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14	<0.14
Nickel[M]	mg/kg	<0.2	980	10.6	12.1	13	11.4	10.9	11.1	9.29	9.92	11	12
Selenium[M]	mg/kg	<1	12000	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Water Soluble Boron[M]	mg/kg	<1	240000	2.09	1.52	1.35	1.2	1.23	1.99	1.31	1.3	1.03	1.09
Zinc[M]	mg/kg	<1.9	730000	47.7	43.2	58.3	51.5	48.3	48.9	49.7	50.2	54.6	58.1
PAHs													
Acenaphthene[M]	ug/kg	<8	-	<8	<8	<8	<8	<8	<8	<8	<8	14.2	<8
Acenaphthylene	ug/kg	<12	-	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
Anthracene#	ug/kg	<16	-	<16	19.7	<16	<16	21.8	<16	<16	<16	19	<16
Benzo(a)anthracene#	ug/kg	<14	-	63	154	62.4	46	61	42.3	41.5	29.2	80.6	50.7
Benzo(a)pyrene#	ug/kg	<15	77000	34	188	58.2	27.5	50	33.4	38.9	23.5	65	35.3
Benzo(b)fluoranthene	ug/kg	<15	-	94.4	254	116	71.9	100	81.5	79.7	63.6	115	83.7
Benzo(ghi)perylene#	ug/kg	<24	-	49.7	119	64.9	42.4	51.8	47.4	41.9	34.5	60.7	49.7
Benzo(k)fluoranthene	ug/kg	<14	-	30.2	107	51.2	27.1	23.5	21.5	26.5	19.8	47	21.5
Chrysene[M]	ug/kg	<10	-	90.7	160	81.7	56.3	80.7	68.2	49.7	49.8	96.9	71.2
Dibenzo(ah)anthracene#	ug/kg	<23	-	<23	<23	<23	<23	<23	<23	<23	<23	<23	<23
Fluoranthene[M]	ug/kg	<17	-	176	169	141	148	171	120	95	62.8	169	109
Fluorene[M]	ug/kg	<10	-	<10	<10	<10	<10	13.7	<10	<10	<10	<10	<10
Indeno(123cd)pyrene[M]	ug/kg	<18	-	36	123	71.1	35	44.5	37.1	40.9	31.4	53	37.2
Naphthalene[M]	ug/kg	<9	190000	<9	11.4	<9	<9	<9	<9	<9	<9	22.1	<9
Phenanthrene[M]	ug/kg	<15	-	40.4	64	25.7	39.1	89.9	29.5	19.7	<15	91.2	20.7
Pyrene#	ug/kg	<15	-	137	132	119	120	133	92.9	84	53.3	141	87.8
PAH 16 Total	ug/kg	<118	-	751	1500	792	614	841	574	525	368	974	566
TPH CWG													
Aliphatics													
>C5-C6	ug/kg	<10	3200000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C6-C8	ug/kg	<10	7800000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C8-C10	ug/kg	<10	2000000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C10-C12	ug/kg	<10	9700000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>C12-C16	ug/kg	<100	59000000	662	673	430	454	675	498	578	937	<100	3500
>C16-C35	ug/kg	<200	1000000000	20800	16250	19490	22790	17840	17440	24490	36670	31400	32050
>C35-C44	ug/kg	<100	-	2520	3570	2070	3530	3490	2190	5050	16000	11600	4090
Total Aliphatics C12-C44	ug/kg	<100	-	24000	20500	22000	26800	22000	20200	30100	53600	43000	39700
Aromatics													
>C5-EC7	ug/kg	<10	27000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>EC7-EC8	ug/kg	<10	56000000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>EC8-EC10	ug/kg	<10	3500000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>EC10-EC12	ug/kg	<10	16000000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
>EC12-EC16	ug/kg	<100	36000000	526	442	475	<100	327	366	148	706	<100	<100
>EC16-EC21	ug/kg	<100	28000000	3260	2950	3310	3140	3060	2870	2650	330	1420	8100
>EC21-EC35	ug/kg	<100	28000000	36800	32000	38400	42900	34200	33400	35500	57700	28500	54400
>EC35-EC44	ug/kg	<100	-	10900	9450	9500	14600	11300	9280	17500	5200	13500	23800
>EC40-EC44	ug/kg	<100	-	3410	3180	2780	4280	3700	3150	6480	18700	4070	5630
Total Aromatics >EC12-C44	ug/kg	<100	-	51500	44800	51700	60600	48900	45900	55900	107000	43400	89200
Total Aliphatics & Aromatics >C5-C44	ug/kg	<100	-	75500	65300	73700	87400	70900	66100	86000	161000	86400	129000
BTEX													
Methyl Tertiary Butyl Ether[M]	ug/kg	<200	-	<200	<200	<200	<100	<100	<200	<100	<100	<200	<100
Benzene[M]	ug/kg	<180	-	<180	<180	<180	<90	<90	<180	<90	<90	<180	<90
Toluene[M]	ug/kg	<140	-	<140	<140	<140	<70	<70	<140	<70	<70	<140	<70
Ethylbenzene[M]	ug/kg	<80	-	<80	<80	<80	<40	<40	<80	<40	<40	<80	<40
p/m-Xylene[M]	ug/kg	<200	-	<200	<200	<200	<100	<100	<200	<200	<200	<200	<100
o-Xylene[M]	ug/kg	<200	-	<200	<200	<200	<100	<100	<200	<100	<100	<200	<100

Key:
TSV - Based on Appendix I.1 Remediation Strategy, WYG, November 2016
Exceeds TSV

A098075 Wrexham Custody Facility
Culp Study - Topsoil

Results	HP101	HP103	HP104	HP107	HP109	HP110	HP111	HP112	HP113	HP114
Benzo(a)anthracene	63	154	62.4	46	61	42.3	41.5	29.2	80.6	50.7
Chrysene	90.7	160	81.7	56.3	80.7	68.2	49.7	49.8	96.9	71.2
Benzo(b)fluoranthene	94.4	254	116	71.9	100	81.5	79.7	63.6	115	83.7
Benzo(k)fluoranthene	30.2	107	51.2	27.1	23.5	21.5	26.5	19.8	47	21.5
Dibenzo(ah)anthracene	23	23	23	23	23	23	23	23	23	23
Indeno(123cd)pyrene	36	123	71.1	35	44.5	37.1	40.9	31.4	53	37.2
Benzo(ghi)perylene	49.7	119	64.9	42.4	51.8	47.4	41.9	34.5	60.7	49.7
Benzo(a)pyrene	34	188	58.2	27.5	50	33.4	38.9	23.5	65	35.3

Ratio to BaP											Min	Max	Culp study limits	
													Lower Limit	Upper Limit
Benzo(a)anthracene	1.85	0.82	1.07	1.67	1.22	1.27	1.07	1.24	1.24	1.44	0.82	1.85	0.12	12.43
Chrysene	2.67	0.85	1.40	2.05	1.61	2.04	1.28	2.12	1.49	2.02	0.85	2.67	0.12	11.61
Benzo(b)fluoranthene	2.78	1.35	1.99	2.61	2.00	2.44	2.05	2.71	1.77	2.37	1.35	2.78	0.11	10.85
Benzo(k)fluoranthene	0.89	0.57	0.88	0.99	0.47	0.64	0.68	0.84	0.72	0.61	0.47	0.99	0.04	3.72
Dibenzo(ah)anthracene	0.68	0.12	0.40	0.84	0.46	0.69	0.59	0.98	0.35	0.65	0.12	0.98	0.01	1.38
Indeno(123cd)pyrene	1.06	0.65	1.22	1.27	0.89	1.11	1.05	1.34	0.82	1.05	0.65	1.34	0.07	7.27
Benzo(ghi)perylene	1.46	0.63	1.12	1.54	1.04	1.42	1.08	1.47	0.93	1.41	0.63	1.54	0.08	8.22

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Attention: Sara Brennan

CERTIFICATE OF ANALYSIS

Date:	18 June 2018
Customer:	H_WYG_MAN
Sample Delivery Group (SDG):	180601-26
Your Reference:	A098075
Location:	Wrexham Custody Centre, Wrexham
Report No:	460641

This report has been revised and directly supersedes 459874 in its entirety.

We received 9 samples on Friday June 01, 2018 and 6 of these samples were scheduled for analysis which was completed on Monday June 18, 2018. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager

ALS Life Sciences Limited. Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
17659757	HP101		0.10 - 0.12	31/05/2018
17659756	HP102		0.10 - 0.12	31/05/2018
17659761	HP103		0.10 - 0.12	31/05/2018
17659753	HP104		0.10 - 0.12	31/05/2018
17659755	HP106		0.10 - 0.12	31/05/2018
17659754	HP107		0.10 - 0.12	31/05/2018
17659760	HP108		0.10 - 0.12	31/05/2018
17659758	HP109		0.10 - 0.12	31/05/2018
17659759	HP110		0.10 - 0.12	31/05/2018

Maximum Sample/Coolbox Temperature (°C) : **20.2**

ISO5667-3 Water quality - Sampling - Part3 -

During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			17659757			17659761			17659753			17659754			17659758			17659759		
Customer Sample Reference			HP101			HP103			HP104			HP107			HP109			HP110		
AGS Reference																				
Depth (m)			0.10 - 0.12			0.10 - 0.12			0.10 - 0.12			0.10 - 0.12			0.10 - 0.12			0.10 - 0.12		
Container			1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type			S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 6	X			X			X			X			X			X		
Boron Water Soluble	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
GRO by GC-FID (S)	All	NDPs: 0 Tests: 6			X			X			X			X			X			X
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
Metals in solid samples by OES	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
PAH by GCMS	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
pH	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
Phenols by HPLC (S)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
Sample description	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 6		X			X			X			X			X			X	
VOC MS (S)	All	NDPs: 0 Tests: 6			X			X			X			X			X			X

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
17659757	HP101	0.10 - 0.12	Dark Brown	Sandy Loam	Stones	None
17659761	HP103	0.10 - 0.12	Dark Brown	Sandy Loam	Stones	None
17659753	HP104	0.10 - 0.12	Dark Brown	Sandy Loam	Vegetation	None
17659754	HP107	0.10 - 0.12	Dark Brown	Loamy Sand	Stones	Vegetation
17659758	HP109	0.10 - 0.12	Dark Brown	Sandy Loam	Stones	None
17659759	HP110	0.10 - 0.12	Dark Brown	Sandy Loam	Stones	Vegetation

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Results Legend

#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	HP101	HP103	HP104	HP107	HP109	HP110
			Depth (m)	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018
			Sample Time	.	.	.	.	.	.
			Date Received	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
			SDG Ref	180601-26	180601-26	180601-26	180601-26	180601-26	180601-26
			Lab Sample No.(s)	17659757	17659761	17659753	17659754	17659758	17659759
			AGS Reference						
Moisture Content Ratio (% of as received sample)	%	PM024		13	14	17	14	14	13
Phenol	<0.01 mg/kg	TM062 (S)		<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M
Cresols	<0.01 mg/kg	TM062 (S)		<0.01 M	0.0117 M	<0.01 M	<0.01 M	<0.01 M	<0.01 M
Xylenols	<0.015 mg/kg	TM062 (S)		<0.015 M	<0.015 M	<0.015 M	<0.015 M	<0.015 M	<0.015 M
Phenols, Total Detected monohydric	<0.035 mg/kg	TM062 (S)		<0.035 M	<0.035 M	<0.035 M	<0.035 M	<0.035 M	<0.035 M
pH	1 pH Units	TM133		7.93 M	8.11 M	8.44 M	8 M	8.17 M	7.89 M
Chromium, Hexavalent	<0.6 mg/kg	TM151		<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #	<0.6 #
Cyanide, Total	<1 mg/kg	TM153		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
Cyanide, Free	<1 mg/kg	TM153		<1 M	<1 M	<1 M	<1 M	<1 M	<1 M
Arsenic	<0.6 mg/kg	TM181		4.98 M	5.93 M	5.78 M	5.3 M	5 M	5.53 M
Cadmium	<0.02 mg/kg	TM181		0.243 M	0.252 M	0.26 M	0.289 M	0.209 M	0.269 M
Chromium	<0.9 mg/kg	TM181		4.71 M	5.25 M	6.98 M	5.31 M	4.32 M	4.36 M
Copper	<1.4 mg/kg	TM181		18.1 M	16.4 M	22.1 M	17.3 M	16.4 M	16.4 M
Lead	<0.7 mg/kg	TM181		18.1 M	19.6 M	25.7 M	22 M	21.7 M	23.9 M
Mercury	<0.14 mg/kg	TM181		<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M	<0.14 M
Nickel	<0.2 mg/kg	TM181		10.6 M	12.1 M	13 M	11.4 M	10.9 M	11.1 M
Selenium	<1 mg/kg	TM181		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Zinc	<1.9 mg/kg	TM181		47.7 M	43.2 M	58.3 M	51.5 M	48.3 M	48.9 M
Boron, water soluble	<1 mg/kg	TM222		2.09 M	1.52 M	1.35 M	1.2 M	1.23 M	1.99 M

Validated

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	HP101	HP103	HP104	HP107	HP109	HP110
			Depth (m)	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018
			Sample Time	.	.	.	.	.	.
			Date Received	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
			SDG Ref	180601-26	180601-26	180601-26	180601-26	180601-26	180601-26
			Lab Sample No.(s)	17659757	17659761	17659753	17659754	17659758	17659759
			AGS Reference						
Naphthalene-d8 % recovery**	%	TM218		94.6	99.4	104	99.4	98.9	96.1
Acenaphthene-d10 % recovery**	%	TM218		90.7	88.1	95.1	94.9	85.8	88.4
Phenanthrene-d10 % recovery**	%	TM218		100	92.2	95.5	100	86.8	94.3
Chrysene-d12 % recovery**	%	TM218		91.5	96.3	90.5	92.7	87.5	90.4
Perylene-d12 % recovery**	%	TM218		84.7	92.5	89.2	90.7	83.2	85.7
Naphthalene	<9 µg/kg	TM218		<9 M	11.4 M	<9 M	<9 M	<9 M	<9 M
Acenaphthylene	<12 µg/kg	TM218		<12 M	<12 M	<12 M	<12 M	<12 M	<12 M
Acenaphthene	<8 µg/kg	TM218		<8 M	<8 M	<8 M	<8 M	<8 M	<8 M
Fluorene	<10 µg/kg	TM218		<10 M	<10 M	<10 M	<10 M	13.7 M	<10 M
Phenanthrene	<15 µg/kg	TM218		40.4 M	64 M	25.7 M	39.1 M	89.9 M	29.5 M
Anthracene	<16 µg/kg	TM218		<16 M	19.7 M	<16 M	<16 M	21.8 M	<16 M
Fluoranthene	<17 µg/kg	TM218		176 M	169 M	141 M	148 M	171 M	120 M
Pyrene	<15 µg/kg	TM218		137 M	132 M	119 M	120 M	133 M	92.9 M
Benz(a)anthracene	<14 µg/kg	TM218		63 M	154 M	62.4 M	46 M	61 M	42.3 M
Chrysene	<10 µg/kg	TM218		90.7 M	160 M	81.7 M	56.3 M	80.7 M	68.2 M
Benzo(b)fluoranthene	<15 µg/kg	TM218		94.4 M	254 M	116 M	71.9 M	100 M	81.5 M
Benzo(k)fluoranthene	<14 µg/kg	TM218		30.2 M	107 M	51.2 M	27.1 M	23.5 M	21.5 M
Benzo(a)pyrene	<15 µg/kg	TM218		34 M	188 M	58.2 M	27.5 M	50 M	33.4 M
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218		36 M	123 M	71.1 M	35 M	44.5 M	37.1 M
Dibenzo(a,h)anthracene	<23 µg/kg	TM218		<23 M	<23 M	<23 M	<23 M	<23 M	<23 M
Benzo(g,h,i)perylene	<24 µg/kg	TM218		49.7 M	119 M	64.9 M	42.4 M	51.8 M	47.4 M
PAH, Total Detected USEPA 16	<118 µg/kg	TM218		751	1500	792	614	841	574

Validated

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

TPH CWG (S)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	HP101	HP103	HP104	HP107	HP109	HP110
			Depth (m)	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018
			Sample Time	.	.	.	.	.	.
			Date Received	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
			SDG Ref	180601-26	180601-26	180601-26	180601-26	180601-26	180601-26
			Lab Sample No.(s)	17659757	17659761	17659753	17659754	17659758	17659759
			AGS Reference						
GRO Surrogate % recovery**	%	TM089		66	61	62	125	70	55
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089		<44	<44	<44	<44	<44	<44
Aliphatics >C5-C6	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C8-C10	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C10-C12	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aliphatics >C12-C16	<100 µg/kg	TM173		662	673	430	454	675	498
Aliphatics >C16-C21	<100 µg/kg	TM173		2400	1450	2390	1890	2040	1640
Aliphatics >C21-C35	<100 µg/kg	TM173		18400	14800	17100	20900	15800	15800
Aliphatics >C35-C44	<100 µg/kg	TM173		2520	3570	2070	3530	3490	2190
Total Aliphatics >C12-C44	<100 µg/kg	TM173		24000	20500	22000	26800	22000	20200
Aromatics >EC5-EC7	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC10-EC12	<10 µg/kg	TM089		<10	<10	<10	<10	<10	<10
Aromatics >EC12-EC16	<100 µg/kg	TM173		526	442	475	<100	327	366
Aromatics >EC16-EC21	<100 µg/kg	TM173		3260	2950	3310	3140	3060	2870
Aromatics >EC21-EC35	<100 µg/kg	TM173		36800	32000	38400	42900	34200	33400
Aromatics >EC35-EC44	<100 µg/kg	TM173		10900	9450	9500	14600	11300	9280
Aromatics >EC40-EC44	<100 µg/kg	TM173		3410	3180	2780	4280	3700	3150
Total Aromatics >EC12-EC44	<100 µg/kg	TM173		51500	44800	51700	60600	48900	45900
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173		75500	65300	73700	87400	70900	66100

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

VOC MS (S)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	HP101	HP103	HP104	HP107	HP109	HP110
			Depth (m)	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12
			Sample Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
			Date Sampled	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018	31/05/2018
			Sample Time	.	.	.	.	.	.
			Date Received	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018	01/06/2018
			SDG Ref	180601-26	180601-26	180601-26	180601-26	180601-26	180601-26
			Lab Sample No.(s)	17659757	17659761	17659753	17659754	17659758	17659759
			AGS Reference						
Dibromofluoromethane**	%	TM116		108	111	109	110	109	112
Toluene-d8**	%	TM116		96.5	98.8	96.5	94.9	94.5	99
4-Bromofluorobenzene**	%	TM116		91.1	86.1	94.7	87.1	86.5	89.2
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116		<200 M	<200 M	<200 M	<100 M	<100 M	<200 M
Benzene	<9 µg/kg	TM116		<180 M	<180 M	<180 M	<90 M	<90 M	<180 M
Toluene	<7 µg/kg	TM116		<140 M	<140 M	<140 M	<70 M	<70 M	<140 M
Ethylbenzene	<4 µg/kg	TM116		<80 M	<80 M	<80 M	<40 M	<40 M	<80 M
p/m-Xylene	<10 µg/kg	TM116		<200 #	<200 #	<200 #	<100 #	<100 #	<200 #
o-Xylene	<10 µg/kg	TM116		<200 M	<200 M	<200 M	<100 M	<100 M	<200 M
Sum of Detected Xylenes	<0.02 mg/kg	TM116		<0.4	<0.4	<0.4	<0.2	<0.2	<0.4
Sum of BTEX	<40 µg/kg	TM116		<800	<800	<800	<400	<400	<800

Validated

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP101 0.10 - 0.12 SOLID 31/05/2018 00:00:00 06/06/2018 14:22:29 180601-26 17659757 TM048	07/06/2018	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP103 0.10 - 0.12 SOLID 31/05/2018 00:00:00 06/06/2018 14:23:54 180601-26 17659761 TM048	08/06/2018	Andrzej Ferfecki	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Trace
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP104 0.10 - 0.12 SOLID 31/05/2018 00:00:00 06/06/2018 14:13:35 180601-26 17659753 TM048	07/06/2018	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP107 0.10 - 0.12 SOLID 31/05/2018 00:00:00 07/06/2018 10:25:49 180601-26 17659754 TM048	11/06/2018	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP109 0.10 - 0.12 SOLID 31/05/2018 00:00:00 06/06/2018 14:14:54 180601-26 17659758 TM048	07/06/2018	James Richards	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP110 0.10 - 0.12 SOLID 31/05/2018 00:00:00 06/06/2018 14:16:32 180601-26 17659759 TM048	08/06/2018	Andrzej Ferfecki	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Table of Results - Appendix

Method No	Reference	Description
PM001		Preparation of Samples for Metals Analysis
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Test Completion Dates

Lab Sample No(s)	17659757	17659761	17659753	17659754	17659758	17659759
Customer Sample Ref.	HP101	HP103	HP104	HP107	HP109	HP110
AGS Ref.						
Depth	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12	0.10 - 0.12
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Asbestos ID in Solid Samples	07-Jun-2018	08-Jun-2018	07-Jun-2018	11-Jun-2018	07-Jun-2018	08-Jun-2018
Boron Water Soluble	08-Jun-2018	08-Jun-2018	12-Jun-2018	08-Jun-2018	12-Jun-2018	08-Jun-2018
Cyanide Comp/Free/Total/Thiocyanate	14-Jun-2018	14-Jun-2018	15-Jun-2018	14-Jun-2018	15-Jun-2018	14-Jun-2018
EPH CWG (Aliphatic) GC (S)	08-Jun-2018	08-Jun-2018	08-Jun-2018	11-Jun-2018	08-Jun-2018	08-Jun-2018
EPH CWG (Aromatic) GC (S)	08-Jun-2018	08-Jun-2018	08-Jun-2018	11-Jun-2018	08-Jun-2018	08-Jun-2018
GRO by GC-FID (S)	11-Jun-2018	11-Jun-2018	11-Jun-2018	11-Jun-2018	11-Jun-2018	11-Jun-2018
Hexavalent Chromium (s)	15-Jun-2018	15-Jun-2018	15-Jun-2018	18-Jun-2018	15-Jun-2018	15-Jun-2018
Metals in solid samples by OES	11-Jun-2018	08-Jun-2018	12-Jun-2018	11-Jun-2018	12-Jun-2018	11-Jun-2018
PAH by GCMS	08-Jun-2018	08-Jun-2018	08-Jun-2018	08-Jun-2018	08-Jun-2018	08-Jun-2018
pH	15-Jun-2018	15-Jun-2018	13-Jun-2018	15-Jun-2018	12-Jun-2018	15-Jun-2018
Phenols by HPLC (S)	08-Jun-2018	08-Jun-2018	08-Jun-2018	11-Jun-2018	08-Jun-2018	11-Jun-2018
Sample description	06-Jun-2018	06-Jun-2018	06-Jun-2018	07-Jun-2018	06-Jun-2018	06-Jun-2018
TPH CWG GC (S)	11-Jun-2018	11-Jun-2018	11-Jun-2018	11-Jun-2018	11-Jun-2018	11-Jun-2018
VOC MS (S)				08-Jun-2018	08-Jun-2018	

ASSOCIATED AQC DATA

Boron Water Soluble

Component	Method Code	QC 1789	QC 1709	QC 1750
Water Soluble Boron	TM222	**95.0** 84.27 : 109.96	**92.5** 84.27 : 109.96	**98.0** 84.27 : 109.96

Cyanide Comp/Free/Total/Thiocyanate

Component	Method Code	QC 1798	QC 1749	QC 1771
Free Cyanide	TM153	**99.3** 88.40 : 103.40	**94.5** 88.40 : 103.40	**94.0** 88.40 : 103.40
Thiocyanate	TM153	**94.61** 86.25 : 96.29	**91.62** 86.25 : 96.29	**92.81** 86.25 : 96.29
Total Cyanide	TM153	**105.0** 87.00 : 103.00	**102.14** 87.00 : 103.00	**100.71** 87.00 : 103.00

EPH CWG (Aliphatic) GC (S)

Component	Method Code	QC 1752	QC 1707
Total Aliphatics >C12-C35	TM173	**87.92** 66.17 : 105.28	**87.71** 66.17 : 105.28

EPH CWG (Aromatic) GC (S)

Component	Method Code	QC 1752	QC 1707
Total Aromatics >EC12-EC35	TM173	**82.67** 65.78 : 102.90	**86.67** 65.78 : 102.90

GRO by GC-FID (S)

Component	Method Code	QC 1718	QC 1712
Benzene by GC (Moisture Corrected)	TM089	**105.0** 83.15 : 118.53	**96.0** 80.70 : 121.69
Ethylbenzene by GC (Moisture Corrected)	TM089	**103.5** 81.56 : 117.75	**95.0** 76.65 : 121.92
m & p Xylene by GC (Moisture Corrected)	TM089	**103.25** 80.40 : 118.80	**96.75** 76.25 : 122.54
MTBE GC-FID (Moisture Corrected)	TM089	**103.0** 83.25 : 126.67	**94.5** 77.67 : 125.50
o Xylene by GC (Moisture Corrected)	TM089	**104.0** 80.82 : 119.41	**98.5** 76.37 : 122.94
QC	TM089	**104.4** 59.19 : 127.47	**91.76** 69.58 : 112.76
Toluene by GC (Moisture Corrected)	TM089	**102.5** 83.39 : 118.40	**95.5** 75.95 : 122.88

Hexavalent Chromium (s)

Component	Method Code	QC 1737	QC 1798
Hexavalent Chromium	TM151	**100.0** 90.20 : 107.00	**98.0** 90.20 : 107.00

Metals in solid samples by OES

Component	Method Code	QC 1759	QC 1757	QC 1713	QC 1780
Aluminium	TM181	**97.04** 75.13 : 109.48	**96.3** 75.13 : 109.48	**89.63** 75.13 : 109.48	**103.7** 75.13 : 109.48
Antimony	TM181	**97.68** 84.48 : 110.90	**94.59** 84.48 : 110.90	**94.98** 84.48 : 110.90	**95.75** 84.48 : 110.90
Arsenic	TM181	**98.2** 83.14 : 108.73	**96.66** 83.14 : 108.73	**93.83** 83.14 : 108.73	**95.12** 83.14 : 108.73
Barium	TM181	**98.44** 82.23 : 104.30	**95.31** 82.23 : 104.30	**93.75** 82.23 : 104.30	**100.0** 82.23 : 104.30
Beryllium	TM181	**95.55** 84.19 : 106.77	**95.55** 84.19 : 106.77	**93.84** 84.19 : 106.77	**97.26** 84.19 : 106.77
Boron	TM181	**94.35** 76.55 : 106.69	**93.79** 76.55 : 106.69	**90.96** 76.55 : 106.69	**98.59** 76.55 : 106.69
Cadmium	TM181	**95.21** 86.37 : 111.59	**98.4** 86.37 : 111.59	**97.87** 86.37 : 111.59	**101.6** 86.37 : 111.59
Chromium	TM181	**96.84** 81.29 : 118.71	**97.47** 81.29 : 118.71	**96.84** 81.29 : 118.71	**101.48** 81.29 : 118.71
Cobalt	TM181	**98.75** 85.45 : 109.14	**97.49** 85.45 : 109.14	**97.18** 85.45 : 109.14	**98.12** 85.45 : 109.14
Copper	TM181	**96.8** 81.33 : 103.33	**93.74** 81.33 : 103.33	**90.68** 81.33 : 103.33	**94.47** 81.33 : 103.33
Iron	TM181	**98.61** 82.44 : 111.71	**102.78** 82.44 : 111.71	**94.44** 82.44 : 111.71	**104.86** 82.44 : 111.71
Lead	TM181	**97.66** 83.33 : 106.95	**92.34** 83.33 : 106.95	**93.19** 83.33 : 106.95	**95.32** 83.33 : 106.95
Manganese	TM181	**89.9** 80.56 : 102.33	**91.52** 80.56 : 102.33	**88.08** 80.56 : 102.33	**91.31** 80.56 : 102.33
Mercury	TM181	**99.22** 84.13 : 111.85	**98.82** 84.13 : 111.85	**98.43** 84.13 : 111.85	**98.04** 84.13 : 111.85
Molybdenum	TM181	**91.51** 84.19 : 110.39	**95.37** 84.19 : 110.39	**93.82** 84.19 : 110.39	**98.07** 84.19 : 110.39
Nickel	TM181	**93.24** 84.19 : 109.77	**96.74** 84.19 : 109.77	**94.87** 84.19 : 109.77	**100.0** 84.19 : 109.77
Phosphorus	TM181	**94.61** 73.47 : 116.86	**94.31** 73.47 : 116.86	**92.51** 73.47 : 116.86	**92.22** 73.47 : 116.86
Selenium	TM181	**92.88** 81.32 : 108.59	**96.44** 81.32 : 108.59	**93.18** 81.32 : 108.59	**96.74** 81.32 : 108.59
Strontium	TM181	**96.41** 84.70 : 105.87	**92.81** 84.70 : 105.87	**93.87** 84.70 : 105.87	**99.58** 84.70 : 105.87
Thallium	TM181	**94.92** 81.19 : 105.37	**57.42** 81.19 : 105.37	**97.27** 81.19 : 105.37	**100.39** 81.19 : 105.37
Tin	TM181	**93.62** 85.92 : 110.00	**97.87** 85.92 : 110.00	**94.68** 85.92 : 110.00	**100.71** 85.92 : 110.00
Titanium	TM181	**90.77** 73.44 : 113.17	**90.77** 73.44 : 113.17	**89.23** 73.44 : 113.17	**96.15** 73.44 : 113.17

CERTIFICATE OF ANALYSIS

SDG:	180601-26	**Client Reference:**	A098075	**Report Number:**	460641
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	459874

Metals in solid samples by OES

		QC 1759	QC 1757	QC 1713	QC 1780
Vanadium	TM181	**92.02** 78.62 : 101.47	**91.72** 78.62 : 101.47	**90.49** 78.62 : 101.47	**95.4** 78.62 : 101.47
Zinc	TM181	**99.13** 85.64 : 110.14	**99.13** 85.64 : 110.14	**95.11** 85.64 : 110.14	**98.78** 85.64 : 110.14

PAH by GCMS

Component	Method Code	QC 1702	QC 1721	QC 1702
Acenaphthene	TM218	**92.5** 82.09 : 110.18	**103.5** 77.34 : 118.20	**103.5** 77.34 : 118.20
Acenaphthylene	TM218	**90.5** 77.92 : 100.70	**103.5** 70.75 : 110.05	**104.0** 70.75 : 110.05
Anthracene	TM218	**88.5** 79.96 : 103.02	**99.0** 71.15 : 111.65	**101.0** 71.15 : 111.65
Benz(a)anthracene	TM218	**98.0** 80.00 : 122.30	**102.5** 79.95 : 125.85	**104.0** 79.95 : 125.85
Benzo(a)pyrene	TM218	**102.0** 86.92 : 126.33	**96.0** 80.75 : 127.25	**93.5** 80.75 : 127.25
Benzo(b)fluoranthene	TM218	**102.0** 84.53 : 122.14	**102.0** 82.15 : 125.35	**104.0** 82.15 : 125.35
Benzo(ghi)perylene	TM218	**102.0** 77.49 : 119.12	**91.5** 80.85 : 121.65	**96.5** 80.85 : 121.65
Benzo(k)fluoranthene	TM218	**103.5** 88.94 : 117.08	**101.0** 80.00 : 125.00	**104.5** 80.00 : 125.00
Chrysene	TM218	**99.5** 80.53 : 114.72	**102.0** 77.24 : 120.84	**103.0** 77.24 : 120.84
Dibenzo(ah)anthracene	TM218	**99.0** 85.66 : 119.61	**99.0** 81.95 : 124.85	**99.0** 81.95 : 124.85
Fluoranthene	TM218	**95.0** 75.88 : 112.84	**102.0** 78.65 : 113.45	**102.5** 78.65 : 113.45
Fluorene	TM218	**96.5** 84.28 : 107.54	**104.0** 76.95 : 117.18	**105.0** 76.95 : 117.18
Indeno(123cd)pyrene	TM218	**97.5** 86.46 : 120.70	**100.5** 75.34 : 127.46	**100.0** 75.34 : 127.46
Naphthalene	TM218	**99.5** 82.88 : 115.56	**107.5** 78.80 : 115.10	**106.5** 78.80 : 115.10
Phenanthrene	TM218	**92.0** 81.59 : 110.61	**101.5** 76.49 : 119.30	**104.0** 76.49 : 119.30
Pyrene	TM218	**94.5** 78.74 : 112.56	**103.5** 76.20 : 119.96	**103.5** 76.20 : 119.96

pH

Component	Method Code	QC 1733	QC 1739	QC 1777
pH	TM133	**100.39** 99.25 : 102.83	**100.65** 100.19 : 103.19	**101.43** 98.83 : 103.77

Phenols by HPLC (S)

Phenols by HPLC (S)

Component	Method Code	QC 1724	QC 1735	QC 1772
2.3.5 Trimethyl-Phenol by HPLC (S)	TM062 (S)	**105.19** 70.10 : 89.90	**102.6** 66.00 : 84.00	**106.49** 66.00 : 84.00
2-Isopropyl Phenol by HPLC (S)	TM062 (S)	**96.49** 75.06 : 96.65	**92.4** 69.50 : 87.50	**93.57** 69.50 : 87.50
Catechol by HPLC (S)	TM062 (S)	**88.57** 47.70 : 158.70	**78.1** 29.25 : 204.75	**118.1** 29.25 : 204.75
Cresols by HPLC (S)	TM062 (S)	**96.45** 83.51 : 99.28	**97.91** 79.40 : 99.80	**101.88** 79.40 : 99.80
Napthol by HPLC (S)	TM062 (S)	**112.86** 71.00 : 98.00	**107.86** 91.99 : 139.23	**122.14** 91.99 : 139.23
Phenol by HPLC (S)	TM062 (S)	**105.96** 82.23 : 110.76	**106.62** 70.50 : 94.50	**109.93** 70.50 : 94.50
Resorcinol HPLC (S)	TM062 (S)	**114.47** 61.95 : 145.05	**106.92** 80.50 : 122.50	**111.95** 80.50 : 122.50
Xylenols by HPLC (S)	TM062 (S)	**99.17** 89.94 : 102.55	**98.96** 87.30 : 103.50	**102.81** 87.30 : 103.50

VOC MS (S)

Component	Method Code	QC 1733
1,1,1,2-tetrachloroethane	TM116	**101.6** 79.10 : 119.66
1,1,1-Trichloroethane	TM116	**103.8** 88.88 : 119.66
1,1,2-Trichloroethane	TM116	**93.8** 75.16 : 112.70
1,1-Dichloroethane	TM116	**102.2** 77.84 : 124.12
1,2-Dichloroethane	TM116	**109.2** 86.58 : 129.62
1,4-Dichlorobenzene	TM116	**99.0** 71.61 : 124.63
2-Chlorotoluene	TM116	**94.6** 66.81 : 118.43
4-Chlorotoluene	TM116	**91.2** 65.88 : 114.76
Benzene	TM116	**104.8** 93.16 : 123.63
Carbon Disulphide	TM116	**102.2** 75.11 : 124.81
Carbontetrachloride	TM116	**100.8** 82.35 : 126.46
Chlorobenzene	TM116	**107.6** 82.88 : 122.42
Chloroform	TM116	**104.2** 82.52 : 123.25
Chloromethane	TM116	**85.4** 54.51 : 115.47
Cis-1,2-Dichloroethene	TM116	**97.8** 78.27 : 128.90
Dibromomethane	TM116	**91.2** 71.69 : 119.43
Dichloromethane	TM116	**105.8** 81.68 : 125.21

VOC MS (S)

		QC 1733
Ethylbenzene	TM116	**105.8** 87.56 : 123.20
Hexachlorobutadiene	TM116	**115.0** 9.27 : 160.19
Isopropylbenzene	TM116	**102.4** 52.15 : 132.52
Naphthalene	TM116	**112.0** 76.79 : 127.18
o-Xylene	TM116	**90.0** 68.16 : 107.61
p/m-Xylene	TM116	**99.5** 77.41 : 112.71
Sec-Butylbenzene	TM116	**106.0** 44.71 : 117.87
Tetrachloroethene	TM116	**110.8** 81.43 : 126.65
Toluene	TM116	**100.8** 87.82 : 116.21
Trichloroethene	TM116	**97.2** 79.80 : 112.33
Trichlorofluoromethane	TM116	**109.0** 72.76 : 118.80
Vinyl Chloride	TM116	**94.2** 64.90 : 133.10

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis.
The figure detailed is the percentage recovery result for the AQC.
The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control.

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Holding time exceeded before sample received**
5	**Samples exceeded holding time before presevation was performed**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to sampled on date**
&	**Sample Holding Time exceeded - Late arrival of instructions.**

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

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Attention: Sara Brennan

CERTIFICATE OF ANALYSIS

Date:	22 June 2018
Customer:	H_WYG_MAN
Sample Delivery Group (SDG):	180616-37
Your Reference:	A098075
Location:	Wrexham Custody Centre, Wrexham
Report No:	461424

We received 4 samples on Saturday June 16, 2018 and 4 of these samples were scheduled for analysis which was completed on Friday June 22, 2018. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:



Sonia McWhan

Operations Manager

ALS Life Sciences Limited. Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
17754850	HP111		0.10 - 0.10	14/06/2018
17754851	HP112		0.10 - 0.10	14/06/2018
17754852	HP113		0.10 - 0.10	14/06/2018
17754853	HP114		0.10 - 0.10	14/06/2018

Maximum Sample/Coolbox Temperature (°C) : **14.6**

ISO5667-3 Water quality - Sampling - Part3 -
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			17754850			17754851			17754852			17754853	
Customer Sample Reference			HP111			HP112			HP113			HP114	
AGS Reference													
Depth (m)			0.10 - 0.10			0.10 - 0.10			0.10 - 0.10			0.10 - 0.10	
Container			1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type			S	S	S	S	S	S	S	S	S	S	S	S
Asbestos Identification in Soil	Ass	T6 Bind/Dry/Crush		X			X			X			X	
Aliphatic Diog6d/dN: sFdNehdsli	Ass	T6 Bind/Dry/Crush	X			X			X			X		
c: E/d-HeDEGN: sGnsi	Ass	T6 Bind/Dry/Crush		X			X			X			X	
l Se/tFldi: hd() El (u: DesuRt: OSe/eD	Ass	T6 Bind/Dry/Crush		X			X			X			X	
pB-d Hxd-AsdReDOOxl dN0	Ass	T6 Bind/Dry/Crush		X			X			X			X	
pB-d Hxd-AE heDOOxl dN0	Ass	T6 Bind/Dry/Crush		X			X			X			X	
xvmonSoxl ajy6dN0	Ass	T6 Bind/Dry/Crush			X			X			X			X
-lMeLesi/Di RE htGhdP0	Ass	T6 Bind/Dry/Crush		X			X			X			X	
lDesid/di: sFoehdsionSompN	Ass	T6 Bind/Dry/Crush		X			X			X			X	
BA-onSoxl N	Ass	T6 Bind/Dry/Crush		X			X			X			X	
d-	Ass	T6 Bind/Dry/Crush		X			X			X			X	
BRl/:sionSo-BVl dN0	Ass	T6 Bind/Dry/Crush		X			X			X			X	
Nehdsl-Fli Oldd1/	Ass	T6 Bind/Dry/Crush		X			X			X			X	
uB-d Hxoxl dN0	Ass	T6 Bind/Dry/Crush		X			X			X			X	
1mlo NdN0	Ass	T6 Bind/Dry/Crush			X			X			X			X

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	**fine**	0.063mm - 0.1mm	**medium**	0.1mm - 2mm	**coarse**	2mm - 10mm	**very coarse**	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
7559C.9W	- B777	W7WaW7W	6eEbcEk/	Ne/FSdseS	1lwlDd/	T:/l
7559C.97	- B773	W7WaW7W	6eEbcEk/	Ne/FSdseS	1lwlDd/	ND/li
7559C.93	- B774	W7WaW7W	6eEbcEk/	Ne/FSdseS	1lwlDd/	ND/li
7559C.94	- B77C	W7WaW7W	6eEbcEk/	Ne/FSdseS	1lwlDd/	ND/li

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	- B777	- B773	- B774	- B77C		
			Depth (m)	W2VwavW2VW	W2VwavW2VW	W2VwavW2VW	W2VwavW2VW		
			Sample Type	N: ts(N: sFdRN0	N: ts(N: sFdRN0	N: ts(N: sFdRN0	N: ts(N: sFdRN0		
			Date Sampled	7Q(Vg(3W7.	7Q(Vg(3W7.	7Q(Vg(3W7.	7Q(Vg(3W7.		
			Sample Time	7W79rWW	7W79rWW	7W79rWW	7W79rWW		
			Date Received	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.		
			SDG Ref	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45		
			Lab Sample No.(s)	7559C. 9W	7559C. 97	7559C. 93	7559C. 94		
			AGS Reference						
: ti DEEH d : / DI / Dav eDt dR8 o %ei o EHCI tLI Foi eh ds 0	a8	B V8C		74 o	7C o	7C o	79 o		
BRI / : s	af V2W7dh w(bw	u Vg3dRN0		f V2W7 o	f V2W7 o	f V2W7 o	f V2W7 o		
I EEi : si	af V2W7dh w(bw	u Vg3dRN0		f V2W7 o	f V2W7 o	f V2W7 o	f V2W7 o		
<Sdi / : si	af V2W79o h w(bw	u Vg3dRN0		f V2W79 o	f V2W79 o	f V2W79 o	f V2W79 o		
BRI / : si Xu: Dasd6 I DI CDI Fo h : / : RSFEHO	af V2W49o h w(bw	u Vg3dRN0		f V2W49 o	f V2W49 o	f V2W49 o	f V2W49 o		
d-	a07ad- q / tDI	u 744		. 257 o	. 2gC o	. 2 3 o	. 29C o		
I REh tGh Xs I MeLesi / D	af V2gdh w(bw	u 797		f V2g dJ	f V2g dJ	f V2g dJ	f V2g dJ		
I Se/ tFI Xu: Das	af 7dh w(bw	u 794		f 7 o	f 7 o	f 7 o	f 7 o		
I Se/ tFI Xj EI I	af 7dh w(bw	u 794		f 7 o	f 7 o	f 7 o	f 7 o		
AEEI / tO	af V2gdh w(bw	u 7. 7		C2#g o	C2CC o	92#g o	924g o		
I eFh tGh	af V2W8dh w(bw	u 7. 7		W2877 o	W283. o	W289# o	W287g o		
I REh tGh	af V2#dh w(bw	u 7. 7		C245 o	C2## o	5214 o	g25# o		
I : ddI E	af 72Cdh w(bw	u 7. 7		792C o	7. 27 o	7. 29 o	7. o		
VI eF	af V25dh w(bw	u 7. 7		372# o	332g o	3325 o	342 o		
TtObI s	af V28dh w(bw	u 7. 7		#23# o	#2#3 o	77 o	73 o		
NI si / tGh	af 7dh w(bw	u 7. 7		f 7 dJ	f 7 dJ	f 7 dJ	f 7 dJ		
Zt/ O	af 72#dh w(bw	u 7. 7		C#25 o	9W28 o	9C2g o	9. 27 o		
c: E / Xk eDEi : sGhsi	af 7dh w(bw	u 333		7247 o	724 o	72M4 o	72M# o		
ew/ I i tGh	af . dh w(bw	u 33C		3WCW o	7. . W o	7#VWV o	33VWV o		

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	- B777	- B773	- B774	- B77C		
			Depth (m)	W2'VeaVW	W2'VeaVW	W2'VeaVW	W2'VeaVW		
			Sample Type	N: ts(N: sF<RN0	N: ts(N: sF<RN0	N: ts(N: sF<RN0	N: ts(N: sF<RN0		
			Date Sampled	7C(Vg(3W7.	7C(Vg(3W7.	7C(Vg(3W7.	7C(Vg(3W7.		
			Sample Time	7W79rWW	7W79rWW	7W79rWW	7W79rWW		
			Date Received	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.		
			SDG Ref	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45		
			Lab Sample No.(s)	7559C. 9W	7559C. 97	7559C. 93	7559C. 94		
			AGS Reference						
TedRDRes / l aF. o8 oE O LIES**	o8	u 37.		#424 o	#425 o	#g24 o	#C2# o		
AO / edRDR / l aF7W8 o E O LIES**	o8	u 37.		#C2g o	#729 o	#W2g o	. C29 o		
BR / e/ DRE / l aF7W8 oE O LIES**	o8	u 37.		7W5 o	#C23 o	#729 o	. . 25 o		
l RES l / l aF73o8 oE O LIES**	o8	u 37.		. #29 o	#92 o	7W o	7W7 o		
Bl ESs / l aF73o8 oE O LIES**	o8	u 37.		#724 o	#925 o	7WC o	#929 o		
TedRDRes / l	of #quw(bw	u 37.		f # o	f # o	3323 o	f # o		
AO / edRDRSs / l	of 73quw(bw	u 37.		f 73 o	f 73 o	f 73 o	f 73 o		
AO / edRDR / l	of . quw(bw	u 37.		f . o	f . o	7C23 o	f . o		
) sG E / l	of 7Wquw(bw	u 37.		f 7W o	f 7W o	f 7W o	f 7W o		
BR / e/ DRE / l	of 79quw(bw	u 37.		7#25 o	f 79 o	#723 o	3W25 o		
A/ DREeO / l	of 7gquw(bw	u 37.		f 7g o	f 7g o	7# o	f 7g o		
) sG Ee/ DR / l	of 75quw(bw	u 37.		#9 o	g32 o	7g# o	7W# o		
BSE / l	of 79quw(bw	u 37.		. C o	942 o	7C7 o	. 52 o		
c l / zRe0e/ DREeO / l	of 7Cquw(bw	u 37.		C729 o	3#23 o	. W2g o	9W25 o		
l RES l / l	of 7Wquw(bw	u 37.		C#25 o	C#2 o	#g2# o	5723 o		
c l / z: Rh0%G Ee/ DR / l	of 79quw(bw	u 37.		5#25 o	g42g o	779 o	. 425 o		
c l / z: Rb0%G Ee/ DR / l	of 7Cquw(bw	u 37.		3g29 o	7#2 o	C5 o	3729 o		
c l / z: Re0dSE / l	of 79quw(bw	u 37.		4. 2# o	3429 o	g9 o	4924 o		
y/ Fl / : F7X8X4aCF0dSE / l	of 7. quw(bw	u 37.		CW2# o	472C o	94 o	4523 o		
6 tnl / z: ReXR0e/ DREeO / l	of 34quw(bw	u 37.		f 34 o	f 34 o	f 34 o	f 34 o		
c l / z: RwXRX0dl ESs / l	of 3Cquw(bw	u 37.		C#27 o	4C29 o	gW25 o	C#25 o		
BA- Xu: Deas6 l D(OD Fq NpBAo7g	of 77. quw(bw	u 37.		939 o	4g. o	#5C o	9gg o		

Validated

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

TPH CWG (S)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	- B777	- B773	- B774	- B77C		
			Depth (m)	W2'VwavW2'W	W2'VwavW2'W	W2'VwavW2'W	W2'VwavW2'W		
			Sample Type	N: ts(N: sF<RN0	N: ts(N: sF<RN0	N: ts(N: sF<RN0	N: ts(N: sF<RN0		
			Date Sampled	7C(Vg(3W7.	7C(Vg(3W7.	7C(Vg(3W7.	7C(Vg(3W7.		
			Sample Time	7W79rWW	7W79rWW	7W79rWW	7W79rWW		
			Date Received	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.		
			SDG Ref	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45		
			Lab Sample No.(s)	7559C. 9W	7559C. 97	7559C. 93	7559C. 94		
			AGS Reference						
x v mdNGEE weDd8 dE O LI ES**	ad8	u W#		g9 o	g5 o	9. o	gW o		
x v mou.mudP : ti D0EEd : EEH CDF0	ad CCquw(bw	u W#		f CC o	f CC o	f CC o	f CC o		
AsdReD0Oc>l 9al g	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AsdReD0Oc>l gal .	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AsdReD0Oc>l . al 7W	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AsdReD0Oc>l 7Wal 73	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AsdReD0Oc>l 73al 7g	ad 7WWquw(bw	u 754		95. o	#45 o	f 7VWV o	49VWV o		
AsdReD0Oc>l 7gal 37	ad 7WWquw(bw	u 754		34#W o	395W o	44VWV o	C59W o		
AsdReD0Oc>l 37al 49	ad 7WWquw(bw	u 754		337VWV o	4C7VWV o	3. 7VWV o	354VWV o		
AsdReD0Oc>l 49al CC	ad 7WWquw(bw	u 754		9V8W o	7gVWWV o	77gVWV o	CV#W o		
u: DesAsdReD0Oc>l 73al CC	ad 7WWquw(bw	u 754		4V7VWV o	94gVWV o	C4VWWV o	4#5VWV o		
AE h eD0Oc>pl 9apl 5	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AE h eD0Oc>pl 5apl .	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AE h eD0Oc>pl . apl 7W	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AE h eD0Oc>pl 7Wapl 73	ad 7Wquw(bw	u W#		f 7W o	f 7W o	f 7W o	f 7W o		
AE h eD0Oc>pl 73apl 7g	ad 7WWquw(bw	u 754		7C. o	5Vg o	f 7VWV o	4V8W o		
AE h eD0Oc>pl 7gapl 37	ad 7WWquw(bw	u 754		3g9W o	449W o	7C3W o	. 7VWV o		
AE h eD0Oc>pl 37apl 49	ad 7WWquw(bw	u 754		499VWV o	955VWV o	3. 9VWV o	9CCVWV o		
AE h eD0Oc>pl 49apl CC	ad 7WWquw(bw	u 754		759VWV o	C93VWV o	749VWV o	34. VWV o		
AE h eD0Oc>pl CVapl CC	ad 7WWquw(bw	u 754		gC. W o	7. 5VWV o	CV65W o	9g4W o		
u: DesAE h eD0Oc>pl 73apl CC	ad 7WWquw(bw	u 754		99#VWV o	7V65VWWV o	C4CVWV o	. #3VWV o		
u: DesAsdReD0Od&cAE h eD0Oc>l 9al CC	ad 7WWquw(bw	u 754		. gVWWV o	7g7VWWV o	. gCVWV o	73#VWWV o		

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

VOC MS (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	- B777	- B773	- B774	- B77C		
			Depth (m)	W2'VwavW2'W	W2'VwavW2'W	W2'VwavW2'W	W2'VwavW2'W		
			Sample Type	N: ts(N: sF<RN0	N: ts(N: sF<RN0	N: ts(N: sF<RN0	N: ts(N: sF<RN0		
			Date Sampled	7Q(Vg(3W7.	7Q(Vg(3W7.	7Q(Vg(3W7.	7Q(Vg(3W7.		
			Sample Time	7W79rWW	7W79rWW	7W79rWW	7W79rWW		
			Date Received	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.	7g(Vg(3W7.		
			SDG Ref	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45	7. Vg7ga45		
			Lab Sample No.(s)	7559C. 9W	7559C. 97	7559C. 93	7559C. 94		
			AGS Reference						
6 tnE h : %G E h l DRe/ l **	ad8	u 77g		7W o	7V9 o	7V9 o	7VC o		
u: sGl / l aF. **	ad8	u 77g		#7 o	#42C o	#425 o	#C27 o		
Cac E h : %G E nl / zl / l **	ad8	u 77g		. #29 o	#72g o	#32 o	#3 o		
l DRSsu l EBeEScc GlSxp DRl E	ad 7Vdquw(bw	u 77g		f 7VWV o	f 7VWV o	f 3VWV o	f 7VWV o		
c l / zl / l	ad #quw(bw	u 77g		f #W o	f #W o	f 7. W o	f #W o		
u: sGl / l	ad 5quw(bw	u 77g		f 5W o	f 5W o	f 7CW o	f 5W o		
p DRSsnl / zl / l	ad Cquw(bw	u 77g		f CW o	f CW o	f . W o	f CW o		
d(h a<Sd / l	ad 7Vdquw(bw	u 77g		f 7VWV dJ	f 7VWV dJ	f 3VWV dJ	f 7VWV dJ		
: a<Sd / l	ad 7Vdquw(bw	u 77g		f 7VWV o	f 7VWV o	f 3VWV o	f 7VWV o		
NGh o %6 l D CDD Fc<Sd / l i	ad V2V8dh w(bw	u 77g		f V28 o	f V28 o	f V2C o	f V28 o		
NGh o %c up<	ad CVdquw(bw	u 77g		f CVWV o	f CVWV o	f . VWV o	f CVWV o		

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP111 0.10 - 0.10 SOLID 14/06/2018 00:00:00 16/06/2018 16:10:29 180616-37 17754850 TM048	21/06/2018	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP112 0.10 - 0.10 SOLID 14/06/2018 00:00:00 16/06/2018 16:05:31 180616-37 17754851 TM048	21/06/2018	Andrzej Ferfecki	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP113 0.10 - 0.10 SOLID 14/06/2018 00:00:00 16/06/2018 16:12:26 180616-37 17754852 TM048	21/06/2018	Marcin Magdziarek	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	HP114 0.10 - 0.10 SOLID 14/06/2018 00:00:00 16/06/2018 16:13:46 180616-37 17754853 TM048	21/06/2018	Lucy Caroe	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
PM001		BEIdeEeDt/o%Nehdsid%Eo IDesioA/esSiti
PM024	:Ft%FocNo7455	N:tsodEideEeDt/d/OGFt/wdRh:wl/tieDt/Xh:tiDDEHoiOEIl/io%:tsid%EoAinIiDio I:/Det/t/woeDEes
TM048	-Nxc3C.XAinIiDirouRIoe/esSiD'owGFId%Eoiehds/wXo e/esSitioe/FdOsIeEe/OIodEOiFGEHi	yFl/D%OeDt/o%AinIiDid/occGsboeDEes
TM062 (S)	TeDt/esxEFcBEdIESSo:sFt/wioo IDR:Fid%EdRid:sIOt/o &oA/esSitio%Nehdsid%hoTeDt/esxEFdNtDidLEt:/o7o NIOe42#	6IDEht/eDt/o%BRl/:sid/dN:tsionSo BVI
TM089	:Ft%FrqNqpBAoIDR:FioV8Wd&gW8	6IDEht/eDt/o%xei:s/love/wlo-SFEOeEn:/idPxvm0oe/Focup<dPucp0oOhd:G/FionSo -IeFideOIoxIajy6dP?Cal730
TM116	:Ft%FrqNqpBAoIDR:Fo3gW%73W%V8W%g3Cxg7Wd&o gV8	6IDEht/eDt/o%l:seDsIomEve/tOb:hd:G/FionSo-IeFideOIq(oxIaN
TM133	cNo7455rdBeED4o7##WycNqgVg.a829	6IDEht/eDt/o%d-d/dN:tsoe/FdHeDDEdGt/wdRIoxVd-od-oIDE
TM151	IDR:Fo49WW6XAHHA(AB-AX8WRqpF2x7###	6IDEht/eDt/o%lMeLesl/DdREhtGhdGt/wdK:/Ioe/esSIE
TM153	IDR:FoC9WWAXcXXx%oAHHA(AB-AX8WRqpF2x7###	6IDEht/eDt/o%u:DesdSe/tFlXqEIdPeitsSdVtnIEeDensIOdSe/tFloe/FouRt:OSe/eDIdGt/wo DRIdNbeseEdNATN+dNSIDhdNlwhl/DFqskoA/esSIE
TM173	A/esSitio%BIDEsIGho-SFEOeEn:/id/qp/LtE/hl/Deso IFteo-u:DesBIDEsIGho-SFEOeEn:/d-EIDEe	6IDEht/eDt/o%NdlOeDFqpMDeODensIoBIDEsIGho-SFEOeEn:/id/dN:tsionSoxIajy6
TM181	,NqpBAoIDR:FqgW7Wc	6IDEht/eDt/o%v:GDVlo IDesid/dN:tsonSdledqg9WW6GgyBampN
TM218	NRebIEdMDeODt/oqpBAdhIDR:Fo49Cg2	uRIdFlDEht/eDt/o%BA-d/o:tsieh dsionSoxIaN
TM222	ya:GIo IDR:F	6IDEht/eDt/o%e:DHeDEdN:sOnsIoc:E/d/dN:tsid?W7dHeDEi:tsOnSoyvNqphtiit:/o NdlODEhIDE
TM224	,NqpBAoIDR:FqgV7Wc	6IDEht/eDt/o%Asbes/Io IDesionSdledqg9WW6GgyBampN

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	7559C. 9W	7559C. 97	7559C. 93	7559C. 94
Customer Sample Ref.	- B777	- B773	- B774	- B77C
AGS Ref.				
Depth	W27WaaVW	W27WaaVW	W27WaaVW	W27WaaVW
Type	N: ts(N: sFdN0	N: ts(N: sFdN0	N: ts(N: sFdN0	N: ts(N: sFdN0
Asbestos Identification Stained dampN: ts0	7#aG a3W7.	7#aG a3W7.	7#aG a3W7.	7#aG a3W7.
Aliphatic Diog6d/dN: sFdNehdsli	37aG a3W7.	37aG a3W7.	37aG a3W7.	37aG a3W7.
c: E / dHeDEdN: sGnsi	37aG a3W7.	37aG a3W7.	37aG a3W7.	37aG a3W7.
l Se/ tFl d : h d() El l (u: Ides[uRt: OSe/ eD	37aG a3W7.	33aG a3W7.	37aG a3W7.	37aG a3W7.
pB- d Hx dAstdReDDDbx l dN0	37aG a3W7.	37aG a3W7.	37aG a3W7.	37aG a3W7.
pB- d Hx dAE h eDDDbx l dN0	37aG a3W7.	37aG a3W7.	37aG a3W7.	37aG a3W7.
x v monSox l ajy6 dN0	37aG a3W7.	37aG a3W7.	37aG a3W7.	37aG a3W7.
- l MeLesi / Dd RE h tGh dP 0	37aG a3W7.	33aG a3W7.	33aG a3W7.	33aG a3W7.
l Ides d/ d : sFd eh dsi onSomp N	7#aG a3W7.	7#aG a3W7.	7#aG a3W7.	7#aG a3W7.
BA- onSox l N	3WaG a3W7.	7#aG a3W7.	7#aG a3W7.	7#aG a3W7.
d-	75aG a3W7.	75aG a3W7.	75aG a3W7.	75aG a3W7.
BRl / : si onSo BVl dN0	37aG a3W7.	37aG a3W7.	7#aG a3W7.	3WaG a3W7.
Neh dsl dFl i CEEdDt /	7gaG a3W7.	7gaG a3W7.	7gaG a3W7.	7gaG a3W7.
uB- d Hx ox l dN0	37aG a3W7.	37aG a3W7.	37aG a3W7.	37aG a3W7.
1 ml o NdN0	37aG a3W7.	37aG a3W7.	37aG a3W7.	37aG a3W7.

ASSOCIATED AQC DATA

Alkali Metals by iCap-OES (Soil)

Component	Method Code	QI o753W
I esQIGh	u 33C	**85.71** 5#24. oo7732#9
ew/ I i tGh	u 33C	**84.09** 5. 2#9oo7W#2/W#
B: Dei i tGh	u 33C	**94.15** 532 9oo7792D4
N: FtGh	u 33C	**87.6** 5C2/Wgoo7Wg2D9

Boron Water Soluble

Component	Method Code	QI o755#
H eDEN: sGhsl oc: E/	u 333	**87.5** . C2#5oo7W#2#g

Cyanide Comp/Free/Total/Thiocyanate

Component	Method Code	QI o759C	QI o75OW	QI o7597	QI o757W
) El d Se/ tFl	u 794	**93.2** . . 2DWoo7W42DW	**94.7** . . 2DWoo7W42DW	**96.0** . . 2DWoo7W42DW	**94.3** . . 2DWoo7W42DW
uRt: OSe/ eD	u 794	**91.02** . g2#9oo#g2#3#	**91.62** . g2#9oo#g2#3#	**94.01** . g2#9oo#g2#3#	**90.42** . g2#9oo#g2#3#
u: Desd Se/ tFl	u 794	**98.57** . 52/WWoo7W42/WV	**99.29** . 52/WWoo7W42/WV	**102.14** . 52/WWoo7W42/WV	**102.86** . 52/WWoo7W42/WV

EPH CWG (Aliphatic) GC (S)

Component	Method Code	QI o7539	QI o75g7
u: DesAsdReDO o>l 73al 49	u 754	**88.96** 5W257oo7Wg23g	**82.5** 5W2g7oo7Wg27g

EPH CWG (Aromatic) GC (S)

Component	Method Code	QI o7539	QI o75g7
u: DesAE h eDO o>pl 73apl 49	u 754	**78.67** g92 3oo7W#2/WV	**71.33** g52Z9oo7WC2/WC

GRO by GC-FID (S)

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

GRO by GC-FID (S)

Component	Method Code	QI o7537
cl / zl / l omSox l oP : ti DOEH o l : EH ODF0	u W#	**97.0** . 72 #oo77. 2/WV
pDRSsnl / zl / l omSox l oP : ti DOEH o l : EH ODF0	u W#	**99.5** 5. 29goo73729 3
h o&odo<Ssl / l omSox l oP : ti DOEH o l : EH ODF0	u W#	**99.75** 5. 24Coo7332gW
ucpox l ayy6oP : ti DOEH o l : EH ODF0	u W#	**96.5** . 72/V oo7372/Vg
: o<Ssl / l omSox l oP : ti DOEH o l : EH ODF0	u W#	**101.0** . W2#Woo77525 5
QI	u W#	**93.03** g52ggoo73g25C
u: sGl / l omSox l oP : ti DOEH o l : EH ODF0	u W#	**97.0** . 72 3oo775239

Hexavalent Chromium (s)

Component	Method Code	QI o75#5	QI o759C
- l MeLesl / Dl RE h tGh	u 797	**98.0** #V23Woo7V52/WV	**98.0** #V23Voo7V52/WV

Metals in solid samples by OES

Component	Method Code	QI o753W
AsGh t/ tGh	u 7. 7	**99.26** 5927 4oo7W#2C.
A/ Dh : / S	u 7. 7	**95.37** . C2C. oo77W2#W
AEl / tO	u 7. 7	**93.32** . 427Coo7W 254
ceEGh	u 7. 7	**96.09** . 324oo7WC24W
cl ESstGh	u 7. 7	**93.84** . C27#oo7Vg255
c: E /	u 7. 7	**98.31** 5g29oo7Vg2g#
l eFh tGh	u 7. 7	**97.34** . g245oo7772g#
l RE h tGh	u 7. 7	**98.73** . 723#oo77. 257
l : nesD	u 7. 7	**96.24** . 92C9oo7W#27C
l : ddl E	u 7. 7	**89.37** . 7214oo7W4214
yE /	u 7. 7	**98.61** . 32COoo777257
Vl eF	u 7. 7	**91.06** . 4214oo7Vg2#9
e/ we/ l i l	u 7. 7	**86.87** . W29goo7V82 4

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

Metals in solid samples by OES

		Ql o753W
l EOGES	u 7.7	**97.25** . C274 ơơ7772 9
: sSnFl / Gh	u 7.7	**95.37** . C27# ơơ7 VW4#
TtObl s	u 7.7	**96.97** . C27# ơơ7 W#255
BR i dR EGl	u 7.7	**92.22** 542Ω5 ơơ7 g2 g
Nl sl / tGh	u 7.7	**95.85** . 7243 ơơ7 W 29#
NDE / DtGh	u 7.7	**93.23** . C25 Wơơ7 W92 5
uRestGh	u 7.7	**98.83** . 727# ơơ7 W9245
ut/	u 7.7	**96.81** . 92#3 ơơ7 W2/W
utDe/ tGh	u 7.7	**97.69** 542Ω Cơơ7 7427 5
1 e/ eFtGh	u 7.7	**92.33** 5. 2g3 ơơ7 W72Ω5
Zt/ O	u 7.7	**94.94** . 92g Cơơ7 W27C

PAH by GCMS

Component	Method Code	Ql o75W9	Ql o7533	Ql o75C7
AOl / edRDRl / l	u 37.	**94.0** 5g2 3 ơơ7 7425 3	**89.5** . 32/W# ơơ7 VW27.	**95.0** 5524 Cơơ7 7. 23 W
AOl / edRDRSsl / l	u 37.	**91.5** 572 4 ơơ7 W62g4	**88.5** 542g4 ơơ7 7327 W	**91.0** 5W259 ơơ7 W2/W9
A/ DREeOl / l	u 37.	**96.0** 5g2## ơơ7 W425C	**91.5** 5. 2 # ơơ7 732#3	**91.5** 572 79 ơơ7 772g9
c l / zFeOe/ DREeOl / l	u 37.	**87.5** 5. 2g. ơơ7 7. 24C	**107.0** . W2/W ơơ7 3324 W	**85.0** 5#2#9 ơơ7 392 9
c l / z: PeOdSEl / l	u 37.	**88.0** 5. 29 Wơơ7 3425 7	**100.0** . g2#3 ơơ7 3g244	**86.0** . W259 ơơ7 3523 9
c l / z: PhO%G Ee/ DRl / l	u 37.	**94.5** . 32g4 ơơ7 7. 25 W	**97.5** . C294 ơơ7 3327 C	**88.0** . 327 9 ơơ7 3924 9
c l / z: PWRQdl ESsl / l	u 37.	**89.0** . 7243 ơơ7 7g27g	**111.5** 552C#ơơ7 7#273	**88.5** . W2 9 ơơ7 372g9
c l / z: Pb0%G Ee/ DRl / l	u 37.	**91.0** . 72C4 ơơ7 7927 5	**105.5** . . 2#C ơơ7 752 W	**88.5** . W2/W ơơ7 392/W
l RESl l / l	u 37.	**88.5** . 329 Wơơ7 7429 7	**100.5** . W294 ơơ7 7C253	**81.5** 5523 Cơơ7 3W2 C
6 tnl / z: PeROe/ DREeOl / l	u 37.	**95.5** . C2C3 ơơ7 7g24C	**106.5** . 92gg ơơ7 7#2g7	**84.0** . 72#9 ơơ7 3C2 9
) sG Ee/ DRl / l	u 37.	**101.5** 552#3 ơơ7 742g#	**92.5** 592 . ơơ7 732 C	**88.5** 5. 2g9 ơơ7 742C9
) sG El / l	u 37.	**98.0** . 32/8 ơơ7 W 24C	**92.5** . 32 g ơơ7 7g23W	**97.5** 5g2#9 ơơ7 752 7.
y Fl / : P734 OF0dSEl / l	u 37.	**89.0** 592 9. ơơ73C2#4	**112.0** . g2Cg ơơ73W5W	**103.0** 5924 Cơơ7 352Cg
TedRDRes l / l	u 37.	**87.5** 552 75 ơơ7 732 99	**92.0** . 32 . ơơ7 792 2g	**95.0** 5. 2 Wơơ7 792 7W

CERTIFICATE OF ANALYSIS

SDG:	180616-37	**Client Reference:**	A098075	**Report Number:**	461424
Location:	Wrexham Custody Centre, W	**Order Number:**	A098075/8116/4683	**Superseded Report:**	

PAH by GCMS

		QI o75V0	QI o7533	QI o75C7
BRI / e/ DRE I / I	u 37.	**99.5** 5. 28gro77428 3	**92.5** . 427 3ro7792 5.	**90.0** 5g2C#ro77#24W
BSE I / I	u 37.	**100.5** 5. 2 9ro77V29.	**95.5** 5. 25Cro7732 g	**89.0** 5g28Wdo77#2#g

pH

Component	Method Code	QI o75V8	QI o7543
d-	u 744	**101.95** #. 2 4ro7W425 5	**102.21** #. 2 4ro7W425 5

Phenols by HPLC (S)

Component	Method Code	QI o753#	QI o75V0
32429ou Eh I DRSaBRI / : smSo - BVI dRN0	u Vg3dRN0	**99.35** gg2/Wdo C2/W	**100.0** . 4284ro7V#257
3aj : dE dSaBRI / : smSo BVI o RN0	u Vg3dRN0	**87.72** g#29Wdo 529W	**87.72** 5g24Cro7WC277
I eD OR smSo BVI dRN0	u Vg3dRN0	**100.95** 3#289ro83WC259	**109.52** C42CCro7Cg253
I Ei : simSo BVI dRN0	u Vg3dRN0	**94.99** 5#2CWdd##2 W	**96.03** . 4293ro7WC2 3
TedDR smSo BVI dRN0	u Vg3dRN0	**109.29** #72##ro74#284	**115.0** 592g3ro73C24.
BRI / : smSo BVI dRN0	u Vg3dRN0	**101.99** 5V29Wdd#C29W	**107.95** 5#294ro73W2C5
v l i : EO/ : so BVI dRN0	u Vg3dRN0	**103.14** . W29Wdo7332 9W	**105.03** 5929Wdo7C529W
<Sd / : simSo BVI dRN0	u Vg3dRN0	**95.94** . 524Wdo7W429W	**97.4** #425 4ro7V#24.

VOC MS (S)

Component	Method Code	QI o75. 4
7XXX8aD DEeORs E I DRe/ I	u 77g	**106.6** 552 gro7792 9
7XX7auEOORs E I DRe/ I	u 77g	**94.8** 542 54ro77. 2/0
7XX8auEOORs E I DRe/ I	u 77g	**99.2** 552 3ro77g2/C
7X7a6 tOORs E I DRe/ I	u 77g	**96.4** 5C2Cgro73#279
7X8a6 tOORs E I DRe/ I	u 77g	**115.6** #32 5ro73. 25.
7XCa6 tOORs E nI / zI / I	u 77g	**101.8** 532 gro73g24C
3aI RsE DsGI / I	u 77g	**88.8** g#254ro77C274
CaI RsE DsGI / I	u 77g	**87.8** gg2#Wdo7732Cg
cI / zI / I	u 77g	**103.4** . 72/0ro7752 3.

VOC MS (S)

		QI o75. 4
I eEn: / o6 ti GadRfFl	u 77g	**88.4** 5C2#7 ono7 33 27C
I eEn: / DIDEeORs EFFl	u 77g	**105.0** . W247 ono7 3C29W
I Rs E nI / zI / I	u 77g	**105.8** 592/Wno7 792 94
I Rs E %Eh	u 77g	**102.0** . 52DWno7 33 2C#
I Rs E h I DRe/ I	u 77g	**81.2** 9. 27 7 ono7 4g 23W
I ti a7X8o6 tORs E I DRI / I	u 77g	**100.6** . W2g5 ono7 3g 253
6 tnE h : h I DRe/ I	u 77g	**102.8** g52 Wno7 37259
6 tORs E h I DRe/ I	u 77g	**105.4** . 727 7 ono7 44239
p DRSsnI / zI / I	u 77g	**100.2** 5329 4 ono7 W#2 C
- I MeORs E nGaeFtI / I	u 77g	**49.2** 732 3 ono7 93254
yi : dE dSsnI / zI / I	u 77g	**78.8** 9929 9 ono7 7W28.
TedRDRes I / I	u 77g	**113.6** . W2 g ono7 3. 2 7
: a< Ssi / I	u 77g	**94.2** g52Cg ono7 W8283
d(h a< Ssi / I	u 77g	**96.3** g. 243 ono7 W 2#7
NI Oac GSsnI / zI / I	u 77g	**61.6** Cg2/W#ono7 37229 7
ul DEeORs E I DRI / I	u 77g	**110.8** 5g2#9 ono7 372/W8
u: sGI / I	u 77g	**97.0** 5C28Cono7 W62C3
uEtORs E I DRI / I	u 77g	**101.6** 552g7 ono7 7729C
uEtORs E %G E h I DRe/ I	u 77g	**94.6** 572 47 ono7 3. 2C7
1 t/ Ssd Rs EFFl	u 77g	**83.2** g. 28g ono7 44229

The above information details the reference name of the analytical quality control sample (AQC) that has been run with the samples contained in this report for the different methods of analysis.
The figure detailed is the percentage recovery result for the AQC.
The subscript numbers below are the percentage recovery lower control limit (LCL) and the upper control limit (UCL). The percentage recovery result for the AQC should be between these limits to be statistically in control.

9ppendix

1. Results are expressed on a dry weight basis (dried at 25ºC) for all soil analyses except for the following: NR9 and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

3. Samples will be run in duplicate upon request, but an additional charge may be incurred.

2. If sufficient sample is received a sub sample will be retained free of charge for 20 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. 9ll bulk samples will be retained for a period of 6 months after the analysis date. 9ll samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. 9LS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UK9S/MCERTS 9ccredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UK9S/MCERTS 9ccredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 348 (3005), which is accredited to ISO1A035. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

A. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

7. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

13. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

12. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. 9 % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are A0-120%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (3-Methylphenol, 2-Methylphenol and 4-Methylphenol) and Xylenols (3,2 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol, 3,6 Dimethylphenol, 2,4 Dimethyphenol, 2,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 3,2,5-Trimethyl Phenol, 3-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

1A. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

17. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

30. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

General

31. For the BSEN 1345A-2 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

33. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

32. 9nalysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C13 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. 9lthough this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

34. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. 9ll non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >A5% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <A5% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UK9S accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Holding time exceeded before sample received**
5	**Samples exceeded holding time before presevation was performed**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to sampled on date**
&	**Sample Holding Time exceeded - Late arrival of instructions.**

9sbestos

Identification of 9sbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using 9LS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 348 (3005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using 9LS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 348 (3005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UK9S accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

WYG ENVIRONMENT
Quay West at MediaCityUK,
Trafford Wharf Road,
Trafford Park,
Manchester, M17 1HH

SITE REPORT

Site: Wrexham Custody Facility
Date: 17/11/2017
Name of WYG Engineer: Natalie Stephens
Job No: A098075
Weather: Slight breeze, dry
Visiting: Michael Smith – site manager

Works in Progress:

WYG were requested to visit the site on 24th April 2017 to carry out sampling of imported material from a stockpile for laboratory submission. The material is to be placed beneath the proposed car park on site. The soil was imported from a site called Strand Walk, Holywell which was recycled to meet engineering specification '6F2'. Approximately 125m^3 was imported from this location. At the time of the site visit, the footings and car park area was being installed.

Discussions:

In line with the WYG Remediation Strategy dated November 2016 and the sampling and testing requirements provided in Welsh Land Contamination Working Group Document, May 2013 i.e. 4 no. samples per 250m^3 of material for commercial developments beneath hardstanding, a total of 4 no. samples were collected and submitted for laboratory analysis. The stockpile of material was subdivided up into 10 sections for detailed soil logging. The 4 no. samples submitted to the laboratory for analysis was deemed representative of the stockpile as a whole based on a composite sampling regime.

The WYG engineer asked for certification of the imported material which was provided to her. Details of the source of the material were also requested by WYG which were not provided at the time.

A photographic record of the soil and sample locations is provided below.

In-line with the validation testing suite specified within the WYG Remediation Strategy Report and that recommended within the Welsh Land Contamination Working Group Document dated May 2013, the soil samples were submitted for laboratory testing of TPH CWG, phenols, asbestos screen, VOCs plus TICs and Waste Acceptance Criteria (WAC) testing.

Chemical results and conclusions are also given below. The chemical results of which are appended to this report (certificate 17/7442).

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SITE REPORT

Site Visit Photographic Record:

Overall the material within the stockpile comprised Made Ground of light brown to brown gravelly fine to medium SAND with abundant cobbles and occasional sub-angular boulders of concrete and asphalt. Gravel is angular to sub-rounded fine to coarse brick, asphalt, clinker, rebar, wood, ceramic, plastic, limestone, slate, metal, textile, rubber, glass and concrete.

SP1 – Composite environmental sample retrieved



SP2



SITE REPORT

SP3



SP4 – Composite environmental sample retrieved



SITE REPORT

SP5



SP6



SITE REPORT

SP7- Composite environmental sample retrieved



SP8



SITE REPORT

SP9



SP10- Composite environmental sample retrieved



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Trafford Park,
Manchester, M17 1HH

SITE REPORT

Overall stockpile





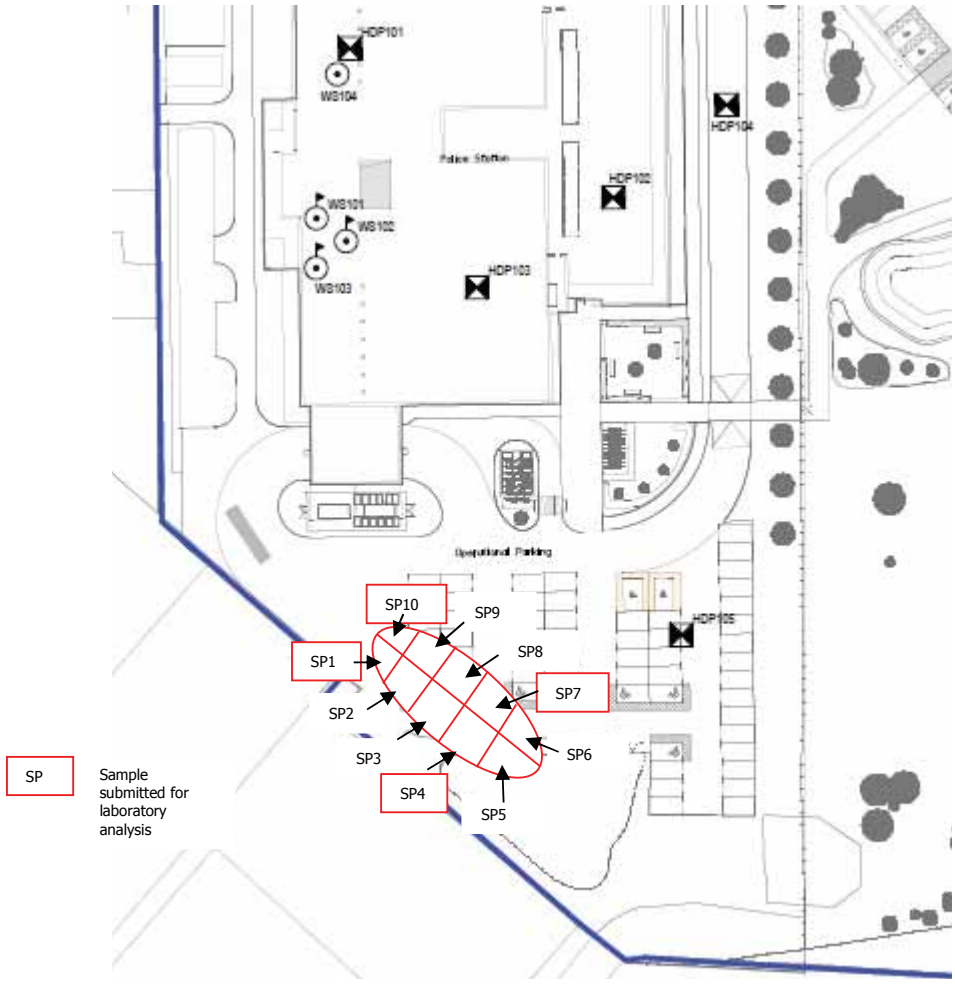
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Trafford Wharf Road,
Trafford Park,
Manchester, M17 1HH

SITE REPORT

Chemical Testing Results:

Chemical results were assessed by comparison with the validation criteria outlined in the remediation strategy. A Tier 1 Screening Assessment has been attached to this report. No chemicals of potential concern were reported following the sampling and chemical analysis of the stockpile at the site for a commercial end use. Slightly elevated TPH C16-C35 concentrations were reported within the stockpile, particularly in SP1. If the material is placed beneath hardstanding for a commercial end-use the soil currently does not pose a risk to human health. Should the subsequent end-use alter of the material be placed elsewhere on site, further risk assessment of the soil is required. WAC testing of the four samples reported that the material was non-hazardous, as sulphate as SO4 and Total Dissolved Solids concentrations exceeded inert classification levels. A copy of the chemical results is appended to this report.

Sampling Location Plan:



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Trafford Park,
Manchester, M17 1HH

SITE REPORT

Conclusions:

Information on the chemical status of the imported soil from Holywell was communicated with the Wrexham County Borough Council Contaminated Land Officer. As details of the source of the material could not be provided, it was requested that the material was removed from site under a duty of care and must not remain on site for future use. This was relayed back to the site manager at Wrexham Custody Facility and they agreed to remove the material. WYG received documentary evidence on 17th November 2017 to show that the material had been exported from site. This has now been included as an appendix to this report.

Exova Jones Environmental

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WYG
Quay West at MediaCityUK
Trafford Wharf Road
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Attention :	Sara Hegewald
Date :	30th May, 2017
Your reference :	A098075
Our reference :	Test Report 17/7442 Batch 1
Location :	Wrexham Custody Facility
Date samples received :	25th April, 2017
Status :	Final report
Issue :	2

Ten samples were received for analysis on 25th April, 2017 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Bruce Leslie
Project Co-ordinator

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald
JE Job No.: 17/7442

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-2	7-8	13-14	19-20							LOD/LOR	Units	Method No.
Sample ID	SP1	SP4	SP7	SP10									
Depth	0.00	0.00	0.00	0.00									
COC No / misc													
Containers	V J	V J	V J	V J									
Sample Date	24/04/2017	24/04/2017	24/04/2017	24/04/2017									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	25/04/2017	25/04/2017	25/04/2017	25/04/2017									
PAH MS													
Naphthalene #M	0.12	1.36	0.09	0.12							<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.15	0.54	0.12	0.17							<0.03	mg/kg	TM4/PM8
Acenaphthene #M	1.00	4.80	0.15	0.23							<0.05	mg/kg	TM4/PM8
Fluorene #M	0.70	3.87	0.14	0.22							<0.04	mg/kg	TM4/PM8
Phenanthrene #M	6.29	23.79 ++	1.33	1.91							<0.03	mg/kg	TM4/PM8
Anthracene #	2.83	7.88	0.48	0.79							<0.04	mg/kg	TM4/PM8
Fluoranthene #M	13.71	25.32 ++	2.49	3.65							<0.03	mg/kg	TM4/PM8
Pyrene #	10.50	19.97	2.12	3.00							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	5.40	8.30	0.95	1.82							<0.06	mg/kg	TM4/PM8
Chrysene #M	4.31	8.06	1.09	1.72							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #M	6.73	12.42	2.12	3.30							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	4.10	7.72	1.36	2.08							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #M	2.62	4.95	0.86	1.31							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.52	1.02	0.20	0.34							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	2.22	4.39	0.82	1.38							<0.04	mg/kg	TM4/PM8
Coronene	0.60	1.25	0.19	0.32							<0.04	mg/kg	TM4/PM8
PAH 17 Total	61.80	135.64	14.51	22.36							<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	4.85	8.94	1.53	2.38							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	1.88	3.48	0.59	0.92							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	112	98	101	99							<0	%	TM4/PM8
VOC TICs	ND	ND	ND	ND								None	TM15/PM10
Methyl Tertiary Butyl Ether #M	<6	<6	<6	<6							<6	ug/kg	TM15/PM10
Benzene #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
Toluene #M	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Ethylbenzene #M	<3	<3	4	<3							<3	ug/kg	TM15/PM10
p/m-Xylene #M	6	<4	11	6							<4	ug/kg	TM15/PM10
o-Xylene #M	<4	<4	4	<4							<4	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	90	86	85	85							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	84	82	79	78							<0	%	TM15/PM10
Mineral Oil (C10-C40)	2408	141	387	549							<30	mg/kg	TM5/PM16

Please see attached notes for all abbreviations and acronyms

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald
JE Job No.: 17/7442

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-2	7-8	13-14	19-20							LOD/LOR	Units	Method No.
Sample ID	SP1	SP4	SP7	SP10									
Depth	0.00	0.00	0.00	0.00									
COC No / misc													
Containers	V J	V J	V J	V J									
Sample Date	24/04/2017	24/04/2017	24/04/2017	24/04/2017									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	25/04/2017	25/04/2017	25/04/2017	25/04/2017									
TPH CWG													
Aliphatics													
>C5-C6 #M	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C6-C8 #M	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>C10-C12 #M	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM16
>C12-C16 #M	17	<4	8	15							<4	mg/kg	TM5/PM16
>C16-C21 #M	144	<7	27	29							<7	mg/kg	TM5/PM16
>C21-C35 #M	1902	104	229	387							<7	mg/kg	TM5/PM16
Total aliphatics C5-35	2063	104	264	431							<19	mg/kg	TM5/TM36/PM12/PM16
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC8-EC10 #M	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.2							<0.2	mg/kg	TM5/PM16
>EC12-EC16 #	15	<4	11	<4							<4	mg/kg	TM5/PM16
>EC16-EC21 #	164	33	80	53							<7	mg/kg	TM5/PM16
>EC21-EC35 #	2173	261	634	717							<7	mg/kg	TM5/PM16
Total aromatics C5-35 #	2352	294	725	770							<19	mg/kg	TM5/TM36/PM12/PM16
Total aliphatics and aromatics(C5-35)	4415	398	989	1201							<38	mg/kg	TM5/TM36/PM12/PM16
PCB 28 #	<5	<25 AA	<25 AA	<25 AA							<5	ug/kg	TM17/PM8
PCB 52 #	<5	<25 AA	<25 AA	<25 AA							<5	ug/kg	TM17/PM8
PCB 101 #	<5	<25 AA	<25 AA	<25 AA							<5	ug/kg	TM17/PM8
PCB 118 #	<5	<25 AA	<25 AA	<25 AA							<5	ug/kg	TM17/PM8
PCB 138 #	<5	<25 AA	<25 AA	<25 AA							<5	ug/kg	TM17/PM8
PCB 153 #	<5	<25 AA	<25 AA	<25 AA							<5	ug/kg	TM17/PM8
PCB 180 #	<5	<25 AA	<25 AA	<25 AA							<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<175 AA	<175 AA	<175 AA							<35	ug/kg	TM17/PM8
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15							<0.15	mg/kg	TM26/PM21
Natural Moisture Content	6.8	8.7	6.1	7.4							<0.1	%	PM4/PM0
Total Organic Carbon #	0.54	0.42	2.00	0.58							<0.02	%	TM21/PM24
ANC at pH4	1.69	1.37	1.78	1.65							<0.03	mol/kg	TM77/PM0
ANC at pH7	0.44	0.17	0.20	0.67							<0.03	mol/kg	TM77/PM0
Loss on Ignition #	2.2	3.0	3.9	4.6							<1.0	%	TM22/PM0
pH #M	9.97	8.88	10.90	10.01							<0.01	pH units	TM73/PM11
Sample Type	Loam	Loam	Loam	Loam								None	PM13/PM0
Sample Colour	Medium Brown	Medium Brown	Medium Brown	Medium Brown								None	PM13/PM0
Other Items	silt, stones	silt, stones, brick, plastic, tile	stones, silt, roots, tile, sellotape	stones, silt, brick, tile								None	PM13/PM0

Please see attached notes for all abbreviations and acronyms

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Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald
JE Job No.: 17/7442

VOC Report : **Solid**

J E Sample No.	1-2	7-8	13-14	19-20							LOD/LOR	Units	Method No.
Sample ID	SP1	SP4	SP7	SP10									
Depth	0.00	0.00	0.00	0.00									
COC No / misc													
Containers	V J	V J	V J	V J									
Sample Date	24/04/2017	24/04/2017	24/04/2017	24/04/2017									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	25/04/2017	25/04/2017	25/04/2017	25/04/2017									
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2							<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #M	<6	<6	<6	<6							<6	ug/kg	TM15/PM10
Chloromethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Vinyl Chloride	<2	<2	<2	<2							<2	ug/kg	TM15_A/PM10
Bromomethane	<1	<1	<1	<1							<1	ug/kg	TM15/PM10
Chloroethane #M	<6	<6	<6	<6							<6	ug/kg	TM15/PM10
Trichlorofluoromethane #M	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #M	<6	<6	<6	<6							<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<30	<30	<30	<30							<30	ug/kg	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1-Dichloroethane #M	<6	<6	<6	<6							<6	ug/kg	TM15/PM10
cis-1-2-Dichloroethene #M	<7	<7	<7	<7							<7	ug/kg	TM15/PM10
2,2-Dichloropropane	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Bromochloromethane #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Chloroform #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
1,1,1-Trichloroethane #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Carbon tetrachloride #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2-Dichloroethane #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
Benzene #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
Trichloroethene (TCE) #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
1,2-Dichloropropane #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Dibromomethane #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Bromodichloromethane #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
cis-1-3-Dichloropropene	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Toluene #M	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
trans-1-3-Dichloropropene	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,3-Dichloropropane #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Dibromochloromethane #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Chlorobenzene #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #M	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
Ethylbenzene #M	<3	<3	4	<3							<3	ug/kg	TM15/PM10
p/m-Xylene #M	6	<4	11	6							<4	ug/kg	TM15/PM10
o-Xylene #M	<4	<4	4	<4							<4	ug/kg	TM15/PM10
Styrene	4	3	6	11							<3	ug/kg	TM15_A/PM10
Bromoform	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #M	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
Bromobenzene	<2	<2	<2	<2							<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Propylbenzene #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3	<3	<3	<3							<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5	<5	<5	<5							<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	<6	16	<6	<6							<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
4-Isopropyltoluene #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
n-Butylbenzene #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #M	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane #	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene #	<7	<7	<7	<7							<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4	<4	<4	<4							<4	ug/kg	TM15/PM10
Naphthalene	63	40	<27	<27							<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene #	<7	<7	<7	<7							<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	90	86	85	85							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	84	82	79	78							<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Mass of sample taken (kg) =	0.190	Moisture Content Ratio (%) =	8.8
Mass of dry sample (kg) =	0.175	Dry Matter Content Ratio (%) =	91.9
Particle Size <4mm =	>95%		

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**17/7442**			
Sample No	**8**			
Client Sample No	**SP4**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**0.00**			
Sample Date	**24/04/2017**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.42	3	5	6
Loss on Ignition (%)	3.0	-	-	10
Sum of BTEX (mg/kg)	<0.017	6	-	-
Sum of 7 PCBs (mg/kg)	<0.175	1	-	-
Mineral Oil (mg/kg)	141	500	-	-
PAH Sum of 17(mg/kg)	135.64	100	-	-
pH (pH Units)	8.88	-	>6	-
ANC to pH 7 (mol/kg)	0.17	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	1.37	-	to be evaluated	to be evaluated

Eluate Analysis	**Conc^{n} in 2:1 eluate**	**Conc^{n} in 8:1 eluate**	**2:1 conc^{n} leached**	**Cumulative 10:1 conc^{n} leached**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	C_2	**C_8**	**A_2**	**A_{2-10}**			
	mg/l		**mg/kg**		**mg/kg**		
Arsenic	<0.0025	<0.0025	<0.005	<0.025	0.5	2	25
Barium	0.046	0.028	0.092	0.31	20	100	300
Cadmium	<0.0005	<0.0005	<0.001	<0.005	0.04	1	5
Chromium	0.0833	0.0145	0.167	0.257	0.5	10	70
Copper	0.071	0.018	0.142	0.27	2	50	100
Mercury	<0.0006	<0.0006	<0.0012	<0.006	0.01	0.2	2
Molybdenum	0.059	0.011	0.118	0.19	0.5	10	30
Nickel	0.004	<0.002	0.008	<0.02	0.4	10	40
Lead	<0.005	<0.005	<0.01	<0.05	0.5	10	50
Antimony	<0.002	0.003	<0.004	0.03	0.06	0.7	5
Selenium	<0.003	<0.003	<0.006	<0.03	0.1	0.5	7
Zinc	0.004	<0.003	0.008	<0.03	4	50	200
Chloride	57.3	4.1	114.7	128	800	15000	25000
Fluoride	<0.3	<0.3	<0.6	<3	10	150	500
Sulphate as SO4	1481.34	231.89	2966.1	4354.2	1000	20000	50000
Total Dissolved Solids	2663	566	5332	9076	4000	60000	100000
Phenol	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	31	8	62	117	500	800	1000

Leachate Information		
Date Prepared	24/05/2017	25/05/2017
pH (pH Units)	11.51	11.38
Conductivity (µS/cm)	2719	911
Temperature (°C)	18.4	17.3
Volume Leachant (Litres)	0.335	1.4
Volume of Eluate VE1 (Litres)	0.285	

Mass of sample taken (kg) =	0.191	Moisture Content Ratio (%) =	9.7
Mass of dry sample (kg) =	0.175	Dry Matter Content Ratio (%) =	91.2
Particle Size <4mm =	>95%		

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**17/7442**			
Sample No	**20**			
Client Sample No	**SP10**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**0.00**			
Sample Date	**24/04/2017**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.58	3	5	6
Loss on Ignition (%)	4.6	-	-	10
Sum of BTEX (mg/kg)	<0.017	6	-	-
Sum of 7 PCBs (mg/kg)	<0.175	1	-	-
Mineral Oil (mg/kg)	549	500	-	-
PAH Sum of 17(mg/kg)	22.36	100	-	-
pH (pH Units)	10.01	-	>6	-
ANC to pH 7 (mol/kg)	0.67	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	1.65	-	to be evaluated	to be evaluated

Eluate Analysis	**Conc^{n} in 2:1 eluate**	**Conc^{n} in 8:1 eluate**	**2:1 conc^{n} leached**	**Cumulative 10:1 conc^{n} leached**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg**		
	C_2	**C_8**	**A_2**	**A_{2-10}**			
	mg/l		**mg/kg**		**mg/kg**		
Arsenic	<0.0025	<0.0025	<0.005	<0.025	0.5	2	25
Barium	0.039	0.035	0.078	0.36	20	100	300
Cadmium	<0.0005	<0.0005	<0.001	<0.005	0.04	1	5
Chromium	0.0480	0.0127	0.096	0.183	0.5	10	70
Copper	0.018	<0.007	0.036	<0.07	2	50	100
Mercury	<0.0006	<0.0006	<0.0012	<0.006	0.01	0.2	2
Molybdenum	0.029	0.004	0.058	0.08	0.5	10	30
Nickel	0.005	<0.002	0.010	<0.02	0.4	10	40
Lead	<0.005	<0.005	<0.01	<0.05	0.5	10	50
Antimony	<0.002	<0.002	<0.004	<0.02	0.06	0.7	5
Selenium	<0.003	<0.003	<0.006	<0.03	0.1	0.5	7
Zinc	<0.003	<0.003	<0.006	<0.03	4	50	200
Chloride	95.9	5.3	191.8	198	800	15000	25000
Fluoride	<0.3	<0.3	<0.6	<3	10	150	500
Sulphate as SO4	1707.73	1243.63	3415.2	13178.7	1000	20000	50000
Total Dissolved Solids	2897	1924	5794	20797	4000	60000	100000
Phenol	<0.01	<0.01	<0.02	<0.1	1	-	-
Dissolved Organic Carbon	23	5	46	79	500	800	1000

Leachate Information		
Date Prepared	24/05/2017	25/05/2017
pH (pH Units)	10.70	10.58
Conductivity (µS/cm)	2712	1933
Temperature (°C)	17.9	17.3
Volume Leachant (Litres)	0.333	1.4
Volume of Eluate VE1 (Litres)	0.280	

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	16.1
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	86.2
Particle Size <4mm =	>95%		

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**17/7442**			
Sample No	**2**			
Client Sample No	**SP1**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**0.00**			
Sample Date	**24/04/2017**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.54	3	5	6
Loss on Ignition (%)	2.2	-	-	10
Sum of BTEX (mg/kg)	<0.017	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg)	2408	500	-	-
PAH Sum of 17(mg/kg)	61.80	100	-	-
pH (pH Units)	9.97	-	>6	-
ANC to pH 7 (mol/kg)	0.44	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	1.69	-	to be evaluated	to be evaluated

Eluate Analysis	**10:1 conc^{n} leached**		**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	C_{10}	**A_{10}**			
	mg/l	**mg/kg**	**mg/kg**		
Arsenic	<0.0025	<0.025	0.5	2	25
Barium	0.019	0.19	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	0.0074	0.074	0.5	10	70
Copper	<0.007	<0.07	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	0.005	0.05	0.5	10	30
Nickel	<0.002	<0.02	0.4	10	40
Lead	<0.005	<0.05	0.5	10	50
Antimony	<0.002	<0.02	0.06	0.7	5
Selenium	<0.003	<0.03	0.1	0.5	7
Zinc	<0.003	<0.03	4	50	200
Chloride	13.6	136	800	15000	25000
Fluoride	<0.3	<3	10	150	500
Sulphate as SO4	356.89	3570.8	1000	20000	50000
Total Dissolved Solids	753	7534	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	17	170	500	800	1000

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	18.0
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	84.8
Particle Size <4mm =	>95%		

		Landfill Waste Acceptance Criteria Limits		
JEFL Job No	**17/7442**			
Sample No	**14**			
Client Sample No	**SP7**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**0.00**			
Sample Date	**24/04/2017**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	2.00	3	5	6
Loss on Ignition (%)	3.9	-	-	10
Sum of BTEX (mg/kg)	0.019	6	-	-
Sum of 7 PCBs (mg/kg)	<0.175	1	-	-
Mineral Oil (mg/kg)	387	500	-	-
PAH Sum of 17(mg/kg)	14.51	100	-	-
pH (pH Units)	10.90	-	>6	-
ANC to pH 7 (mol/kg)	0.20	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	1.78	-	to be evaluated	to be evaluated

Eluate Analysis	**10:1 conc^{n} leached**		**Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg**		
	C_{10}	**A_{10}**			
	mg/l	**mg/kg**	**mg/kg**		
Arsenic	<0.0025	<0.025	0.5	2	25
Barium	0.038	0.38	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	0.0213	0.213	0.5	10	70
Copper	<0.007	<0.07	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	0.007	0.07	0.5	10	30
Nickel	<0.002	<0.02	0.4	10	40
Lead	<0.005	<0.05	0.5	10	50
Antimony	<0.002	<0.02	0.06	0.7	5
Selenium	<0.003	<0.03	0.1	0.5	7
Zinc	<0.003	<0.03	4	50	200
Chloride	20.7	207	800	15000	25000
Fluoride	<0.3	<3	10	150	500
Sulphate as SO4	966.19	9664.0	1000	20000	50000
Total Dissolved Solids	1819	18194	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	19	190	500	800	1000

Client Name: WYG
Reference: A098075
Location: Wrexham Custody Facility
Contact: Sara Hegewald

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
17/7442	1	SP1	0.00	2	02/05/2017	**General Description (Bulk Analysis)**	Soil/Stones/Cement
					02/05/2017	**Asbestos Fibres**	NAD
					02/05/2017	**Asbestos Fibres (2)**	NAD
					02/05/2017	**Asbestos ACM**	NAD
					02/05/2017	**Asbestos ACM (2)**	NAD
					02/05/2017	**Asbestos Type**	NAD
					02/05/2017	**Asbestos Type (2)**	NAD
					02/05/2017	**Asbestos Level Screen**	NAD
17/7442	1	SP4	0.00	8	02/05/2017	**General Description (Bulk Analysis)**	Soil/Stones
					02/05/2017	**Asbestos Fibres**	NAD
					02/05/2017	**Asbestos Fibres (2)**	NAD
					02/05/2017	**Asbestos ACM**	NAD
					02/05/2017	**Asbestos ACM (2)**	NAD
					02/05/2017	**Asbestos Type**	NAD
					02/05/2017	**Asbestos Type (2)**	NAD
					02/05/2017	**Asbestos Level Screen**	NAD
17/7442	1	SP7	0.00	14	02/05/2017	**General Description (Bulk Analysis)**	Soil/Stones/Cement/Tile
					02/05/2017	**Asbestos Fibres**	NAD
					02/05/2017	**Asbestos Fibres (2)**	NAD
					02/05/2017	**Asbestos ACM**	NAD
					02/05/2017	**Asbestos ACM (2)**	NAD
					02/05/2017	**Asbestos Type**	NAD
					02/05/2017	**Asbestos Type (2)**	NAD
					02/05/2017	**Asbestos Level Screen**	NAD
17/7442	1	SP10	0.00	20	02/05/2017	**General Description (Bulk Analysis)**	Soil/Stones/Tile/Cement
					02/05/2017	**Asbestos Fibres**	NAD
					02/05/2017	**Asbestos Fibres (2)**	NAD
					02/05/2017	**Asbestos ACM**	NAD
					02/05/2017	**Asbestos ACM (2)**	NAD
					02/05/2017	**Asbestos Type**	NAD
					02/05/2017	**Asbestos Type (2)**	NAD
					02/05/2017	**Asbestos Level Screen**	NAD

Client Name: WYG

Reference: A098075

Location: Wrexham Custody Facility

Contact: Sara Hegewald

Matrix : Solid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
17/7442	1	SP1	0.00	1-2	LOI, PAH, PCB, pH, TOC	Sample holding time exceeded
17/7442	1	SP4	0.00	7-8	LOI, PAH, PCB, pH, TOC	Sample holding time exceeded
17/7442	1	SP7	0.00	13-14	LOI, PAH, PCB, pH, TOC	Sample holding time exceeded
17/7442	1	SP10	0.00	19-20	LOI, PAH, PCB, pH, TOC	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 17/7442

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.
Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
SA	ISO17025 (SANAS) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

JE Job No: 17/7442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of	PM12/PM16	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis./Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes

JE Job No: 17/7442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes
TM22	Modified USEPA 160.4. Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (450°C)	PM0	No preparation is required.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21	As received solid or water samples are extracted in Methanol: Sodium Hydroxide (0.1M NaOH) (60:40) by orbital shaker.			AR	Yes

JE Job No: 17/7442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.			AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes		AR	Yes
TM60	Modified USEPA 9060. Determination of TOC by calculation from Total Carbon and Inorganic Carbon using a TOC analyser, the carbon in the sample is converted to CO2 and then passed through a non-dispersive infrared gas analyser (NDIR).	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

JE Job No: 17/7442

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
TM77	Modified DDCEN/TS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	PM18	Modified method EN 12457-3. As received solid samples are leached with water in a 2:1 water to solid ratio for 6 hours, the same aliquot of solid is then re-leached with water in an 8:1 water to solid ratio for 18 hours, the moisture content of the sample is included in the ratio. This preparation produces two eluates.			AR	Yes
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	
TM15_A	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

A098075 Wrexham Custody Facility
Soil Screening Data

			Sample ID	SP1	SP4	SP7	SP10
			Depth	0	0	0	0
Test	**Units**	**LOD**	**TSV**				
Natural Moisture Content	%	<0.1		6.8	8.7	6.1	7.4
Abestos Screen	-	-	Presence	NAD	NAD	NAD	NAD
TPH CWG							
Aliphatics							
>C5-C6	mg/kg	<0.1	3200	<0.1	<0.1	<0.1	<0.1
>C6-C8	mg/kg	<0.1	7800	<0.1	<0.1	<0.1	<0.1
>C8-C10	mg/kg	<0.1	2000	<0.1	<0.1	<0.1	<0.1
>C10-C12	mg/kg	<0.2	9700	<0.2	<0.2	<0.2	<0.2
>C12-C16	mg/kg	<4	59000	**17**	<4	**8**	**15**
>C16-C35	mg/kg	<7	1000000	**2046**	<111	**256**	**416**
Total Aliphatics C5-C35	mg/kg	<19	1000000	**2063**	**104**	**264**	**431**
Aromatics							
>C5-EC7	mg/kg	<0.1	27	<0.1	<0.1	<0.1	<0.1
>EC7-EC8	mg/kg	<0.1	56000	<0.1	<0.1	<0.1	<0.1
>EC8-EC10	mg/kg	<0.1	3500	<0.1	<0.1	<0.1	<0.1
>EC10-EC12	mg/kg	<0.2	16000	<0.2	<0.2	<0.2	<0.2
>EC12-EC16	mg/kg	<4	36000	**15**	<4	**11**	<4
>EC16-EC21	mg/kg	<7	28000	**164**	**33**	**80**	**53**
>EC21-EC35	mg/kg	<7	28000	**2173**	**261**	**634**	**717**
Total Aromatics C5-C35	mg/kg	<19	28000	**2352**	**294**	**725**	**770**
VOC MS							
Dichlorodifluoromethane	ug/kg	<2		<2	<2	<2	<2
Methyl Tertiary Butyl Ether #M	ug/kg	<6		<6	<6	<6	<6
Chloromethane #	ug/kg	<3		<3	<3	<3	<3
Vinyl Chloride	ug/kg	<2		<2	<2	<2	<2
Bromomethane	ug/kg	<1		<1	<1	<1	<1
Chloroethane #M	ug/kg	<6		<6	<6	<6	<6
Trichlorofluoromethane #M	ug/kg	<3		<3	<3	<3	<3
1,1-Dichloroethene (1,1 DCE) #M	ug/kg	<6		<6	<6	<6	<6
Dichloromethane (DCM) #	ug/kg	<7		<30	<30	<30	<30
trans-1-2-Dichloroethene #	ug/kg	<3		<3	<3	<3	<3
1,1-Dichloroethane #M	ug/kg	<6		<6	<6	<6	<6
cis-1-2-Dichloroethene #M	ug/kg	<7		<7	<7	<7	<7
2,2-Dichloropropane	ug/kg	<4		<4	<4	<4	<4
Bromochloromethane #M	ug/kg	<4		<4	<4	<4	<4
Chloroform #M	ug/kg	<5		<5	<5	<5	<5
1,1,1-Trichloroethane #M	ug/kg	<5		<5	<5	<5	<5
1,1-Dichloropropene #	ug/kg	<3		<3	<3	<3	<3
Carbon tetrachloride #M	ug/kg	<4		<4	<4	<4	<4
1,2-Dichloroethane #M	ug/kg	<5		<5	<5	<5	<5
Benzene #M	ug/kg	<5		<5	<5	<5	<5
Trichloroethene (TCE) #M	ug/kg	<5	1200	<5	<5	<5	<5
1,2-Dichloropropane #M	ug/kg	<4		<4	<4	<4	<4
Dibromomethane #M	ug/kg	<4		<4	<4	<4	<4
Bromodichloromethane #M	ug/kg	<4		<4	<4	<4	<4
cis-1-3-Dichloropropene	ug/kg	<4		<4	<4	<4	<4
Toluene #M	ug/kg	<3		<3	<3	<3	<3
trans-1-3-Dichloropropene	ug/kg	<3		<3	<3	<3	<3
1,1,2-Trichloroethane #M	ug/kg	<4		<4	<4	<4	<4
Tetrachloroethene (PCE) #	ug/kg	<3		<3	<3	<3	<3
1,3-Dichloropropane #M	ug/kg	<4		<4	<4	<4	<4
Dibromochloromethane #M	ug/kg	<5		<5	<5	<5	<5
1,2-Dibromoethane #	ug/kg	<3		<3	<3	<3	<3
Chlorobenzene #M	ug/kg	<4		<4	<4	<4	<4
1,1,1,2-Tetrachloroethane #M	ug/kg	<5		<5	<5	<5	<5
Ethylbenzene #M	ug/kg	<3		<3	<3	**4**	<3
p/m-Xylene #M	ug/kg	<4		**6**	<4	**11**	**6**
o-Xylene #M	ug/kg	<4		<4	<4	**4**	<4
Styrene	ug/kg	<3		**4**	**3**	**6**	**11**
Bromoform	ug/kg	<4		<4	<4	<4	<4
Isopropylbenzene #	ug/kg	<3		<3	<3	<3	<3
1,1,2,2-Tetrachloroethane #M	ug/kg	<3		<3	<3	<3	<3
Bromobenzene	ug/kg	<2		<2	<2	<2	<2
1,2,3-Trichloropropane #M	ug/kg	<4		<4	<4	<4	<4
Propylbenzene #	ug/kg	<4		<4	<4	<4	<4
2-Chlorotoluene	ug/kg	<3		<3	<3	<3	<3
1,3,5-Trimethylbenzene #	ug/kg	<3		<3	<3	<3	<3
4-Chlorotoluene	ug/kg	<3		<3	<3	<3	<3
tert-Butylbenzene #	ug/kg	<5		<5	<5	<5	<5
1,2,4-Trimethylbenzene #	ug/kg	<6		<6	**16**	<6	<6
sec-Butylbenzene #	ug/kg	<4		<4	<4	<4	<4
4-Isopropyltoluene #	ug/kg	<4		<4	<4	<4	<4
1,3-Dichlorobenzene #M	ug/kg	<4		<4	<4	<4	<4
1,4-Dichlorobenzene #	ug/kg	<4		<4	<4	<4	<4
n-Butylbenzene #	ug/kg	<4		<4	<4	<4	<4
1,2-Dichlorobenzene #M	ug/kg	<4		<4	<4	<4	<4
1,2-Dibromo-3-chloropropane #	ug/kg	<4		<4	<4	<4	<4
1,2,4-Trichlorobenzene #	ug/kg	<7		<7	<7	<7	<7
Hexachlorobutadiene	ug/kg	<4		<4	<4	<4	<4
Naphthalene	ug/kg	<27		**63**	**40**	<27	<27
1,2,3-Trichlorobenzene #	ug/kg	<7		<7	<7	<7	<7
VOC TICs							
Methyl Tertiary Butyl Ether#M	ug/kg	<6		<6	<6	<6	<6
Benzene#M	ug/kg	<5		<5	<5	<5	<5
Toluene#M	ug/kg	<3		<3	<3	<3	<3
Ethylbenzene#M	ug/kg	<3		<3	<3	**4**	<3
p/m-Xylene#M	ug/kg	<4		**6**	<4	**11**	**6**
o-Xylene#M	ug/kg	<4		<4	<4	**4**	<4

Key:
TSV - Based on Appendix I.1 Remediation Strategy, WYG, November 2016
Exceeds TSV

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Conveyance Note

Thames Trading Estate, Woodrow Way
Irlam, Manchester M44 6NN

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Nº 36016

Waste Carriers Licence Number CBDU101751	Contract No:
Customers Name: GALLY FORD TRY	
Drivers Name: John H	Vehicle Registration: MK64 MFE
Signature:	
Delivery/Collection Address: Davy way wrexham	Date and Time: 20.4.17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	

Imported Materials	
Material	Description
Recycled Aggregate	
Quarried Aggregate	
Other State	6F2

Weight	Tonne
GROSS WEIGHT OF VEHICLE	32
TARE WEIGHT OF VEHICLE	12100
NETT WEIGHT	19900

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE	PRINT NAME
	M Hughes

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Nº 042024

Waste Carriers Licence Number CBDU101751	Contract No:	
Customers Name:	GALLIFORD TRY	
Drivers Name	Vehicle Registration	Signature
RAJ	MK64 UKA	RAJ
Delivery/Collection Address		Date and Time
STEANO WALK HOLYWELL TO DAVY WAY LLAY WREXHAM		20.4.0

Off Site Material Category		Weight	Tonne
Spoil - inert		GROSS WEIGHT OF VEHICLE	32.00
Spoil – Non Hazardous			
Spoil – Hazardous		TARE WEIGHT OF VEHICLE	12.00
Other - State	6F2		
Imported Materials		NETT WEIGHT	20.0
Material	**Description**		
Recycled Aggregate			
Quarried Aggregate			
Other State			

TIME ON SITE		STATE REASON FOR WAITING TIME
TIME OFF SITE		
WAITING TIME		
DAYWORK		
CUSTOMERS SIGNATURE		PRINT NAME M HUGHES

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№ 41459

Waste Carriers Licence Number CBDU101751	Contract No:
Customers Name: GALLIFORDTRY STRAND WALK HOLYWELL	

Drivers Name	Vehicle Registration	Signature
LEO	MD16 LWG	

Delivery/Collection Address	Date and Time
GALLIFORDTRY DAVY WAY LLAY WREXHAM	20/4/17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	

Weight	Tonne
GROSS WEIGHT OF VEHICLE	32T
TARE WEIGHT OF VEHICLE	12T
NETT WEIGHT	20T

Imported Materials	
Material	**Description**
Recycled Aggregate	6F2
Quarried Aggregate	
Other State	

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE	PRINT NAME
	M HUGHES

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№ 042074

Waste Carriers Licence Number CBDU101751	Contract No:
Customers Name: GALLIFORD	

Drivers Name	Vehicle Registration	Signature
LEE NOLAN	MIC64 MVO	L. Nolan

Delivery/Collection Address	Date and Time
DAVY WAY LLAY WREXHAM	20/4/17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	

Imported Materials	
Material	Description
Recycled Aggregate	
Quarried Aggregate	
Other State	6F2

Weight	Tonne
GROSS WEIGHT OF VEHICLE	32000
TARE WEIGHT OF VEHICLE	12100
NETT WEIGHT	19900

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE	PRINT NAME
	M NUGENT

Conditions of Sale: It is essential that all of the written particulars entered above should be checked by the consignee note once signed by the consignee represents formal acceptance of the materials in good order and condition, and/or the removal off site of the waste produced, and subsequent complaints and or claims cannot be accepted by P.P. O'Connor. All complaints, whatever in nature must be made to the driver of the vehicle and be confirmed in writing to P.P. O'Connor immediate.

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Nº 042072

Waste Carriers Licence Number CBDU101751	Contract No:
Customers Name: GALLIFORD	

Drivers Name	Vehicle Registration	Signature
LEE NOLAN	MK66 MVO	L. Nolan

Delivery/Collection Address	Date and Time
~~GRAND WALK~~ DAVY WAY ~~HOLYWELL~~ LLAY, WREXHAM	20/4/17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	~~EC~~

Weight	Tonne
GROSS WEIGHT OF VEHICLE	32000
TARE WEIGHT OF VEHICLE	12100
NETT WEIGHT	19900

Imported Materials	
Material	**Description**
Recycled Aggregate	
Quarried Aggregate	
Other State	6 of 2

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE	PRINT NAME M HUGHES

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Conveyance Note

№ 37654

Waste Carriers Licence Number CBDU101751	Contract No:
Customers Name: GALLIFORD TRY	

Drivers Name	Vehicle Registration	Signature
S. PATTEN	MD16 LWA	

Delivery/Collection Address	Date and Time
STRAND WALK HOLYWELL — LLAY	20.4.17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	

Imported Materials	
Material	Description
Recycled Aggregate	
Quarried Aggregate	6F2 HAULAGE ONLY
Other State	

Weight	Tonne
GROSS WEIGHT OF VEHICLE	31940
TARE WEIGHT OF VEHICLE	12500
NETT WEIGHT	19440

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE	PRINT NAME
	M HUGHES

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Nº 042023

Waste Carriers Licence Number CBDU101751		Contract No:
Customers Name:	GALLIFORD TRY	
Drivers Name	Vehicle Registration	Signature
RAS	MK64 MKA	RAS
Delivery/Collection Address		Date and Time
STRANDWALK HOLYHEAD TO DARY MAY LLAY WREXHAM		20.4.17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	6F2

Imported Materials	
Material	Description
Recycled Aggregate	
Quarried Aggregate	
Other State	

Weight	Tonne
GROSS WEIGHT OF VEHICLE	32-0
TARE WEIGHT OF VEHICLE	12-0
NETT WEIGHT	20-0

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE

PRINT NAME M JUGGET

Conditions of Sale: It is essential that all of the written particulars entered above should be checked by the consignee note once signed by the consignee represents formal acceptance of the materials in good order and condition, and/or the removal off site of the waste produced, and subsequent complaints and or claims cannot be accepted by P.P. O'Connor. All complaints, whatever in nature must be made to the driver of the vehicle and be confirmed in writing to P.P. O'Connor immediate.

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Nº 41458

Thames Trading Estate, Woodrow Way
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Waste Carriers Licence Number CBDU101751	Contract No:
Customers Name: GALLIFORD TRY STAMP WORK HOLYWELL	

Drivers Name	Vehicle Registration	Signature
LEO	MD16 LWG	

Delivery/Collection Address	Date and Time
GALIFORD TRY DAVY WAY LLAY WREXHAM	20 / 4 / 17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	

Imported Materials	
Material	**Description**
Recycled Aggregate	6F2
Quarried Aggregate	
Other State	

Weight	Tonne
GROSS WEIGHT OF VEHICLE	32 T
TARE WEIGHT OF VEHICLE	12 T
NETT WEIGHT	20 T

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE	PRINT NAME
M HUGHES	M

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№ 042073

Waste Carriers Licence Number CBDU101751	Contract No:
Customers Name: GALLIFORD	

Drivers Name	Vehicle Registration	Signature
LEE NOLAN	MK66 MVO	L Le

Delivery/Collection Address	Date and Time
DAVY WAY LLAY WREXHAM	20/4/17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	

Imported Materials	
Material	**Description**
Recycled Aggregate	
Quarried Aggregate	
Other State	6F2

Weight	Tonne
GROSS WEIGHT OF VEHICLE	32000
TARE WEIGHT OF VEHICLE	12100
NETT WEIGHT	19900

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE

PRINT NAME M HUGHES

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№ 36015

Waste Carriers Licence Number CBDU101751		Contract No:
Customers Name: GALLY/FOSO TIRY		
Drivers Name	Vehicle Registration	Signature
John H	MK64 MFE	
Delivery/Collection Address		Date and Time
DAVY Way Wrexham		4.17

Off Site Material Category	
Spoil - inert	
Spoil – Non Hazardous	
Spoil – Hazardous	
Other - State	[redacted]

Imported Materials	
Material	Description
Recycled Aggregate	
Quarried Aggregate	
Other State	DF2

Weight	Tonne
GROSS WEIGHT OF VEHICLE	31990
TARE WEIGHT OF VEHICLE	12100
NETT WEIGHT	19890

TIME ON SITE	
TIME OFF SITE	
WAITING TIME	
DAYWORK	

STATE REASON FOR WAITING TIME

CUSTOMERS SIGNATURE	PRINT NAME
X [signature]	X M HUGHES

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