GROUND INVESTIGATION REPORT SYMMETRY PARK, OXFORD

TE1585-TE-00-RP-GE-004-V04

VERSION 4

21 JANUARY 2022

FINAL

Prepared for:

Tritax Symmetry Ltd

Prepared by: S Millar

Tier Environmental Ltd

DOCUMENT CONTROL

Report No. :	TE1585-TE-00-RP-GE-004-V04
Report Status:	FINAL
Version No.:	4
Project Engineer:	S Millar
Date of Issue:	21/01/2022

This report has been prepared by Tier with all reasonable skill, care and diligence, within the best practice and guidance current at the time of issue within the scope of works which have been agreed with the client. This report is confidential to the client and Tier accepts no responsibility whatsoever to third parties to whom this report, or any part thereof is made presented, unless this is formally agreed in writing by a Director of Tier Environmental Ltd before any reliance is made. Any such party relies upon the report at their own risk. Tier disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Version No.	Description of Issue / Revision	Date of Issue	Author	Reviewed By	Approved By
1	Draft	25.10.2021	S Millar	A Read	S Lee
2	Draft – Foundations amended	10.11.2021	S Lee	A Read	A Read
3	Final – Updated geotechnical, ground gas and groundwater results	19.01.2022	E Rowland	S Lee	S Lee
4	Final – Updated comments on asbestos	21.01.22	E Rowland	A Read	A Read

CONTENTS

TABLES

FIGURES

APPENDICES

EXECUTIVE SUMMARY

Introduction	Tier Environmental was commissioned by Tritax Symmetry Ltd to undertake a Ground Investigation of the land between the M40 Junction 9 and A41, Little Chesterton, Bicester, Oxfordshire, OX25 3PD. The purpose of the investigation was to determine the nature and extent of soil, bedrock and groundwater beneath the Site for the purposes of environmental and geotechnical assessment.
Proposed land use	It is proposed that the site will be developed as first unit within Symmetry Park, Oxford commercial development. Areas of proposed soft landscaping are located in the in corridors across Site as per drawing presented in Appendix A.
Site location and surrounding land uses	The site is located at land between M40 junction 9 and A41, Grange Farm, Little Chesterton, Bicester, Oxfordshire OX25 3PD. The site is currently a mixture of arable and pastural agricultural land. There is a brook that runs offsite to the west and traverses the site from west to east towards the southern central part of the site. There is a track that runs from the farm offsite north to the northern part of site. There are several outbuildings belonging to Grange Farm to the north of the site. There is an area of localised hardstanding extending from an access gate along the southern boundary with the A41. Across the site is a number of hedgerows and trees defining the widespread site boundary and internal field boundaries. To the northeast is Grange farm, a pond/Ancient Woodland to the west, the M40 Junction 9 to the west and A41 to the south. The site topography trends towards the brook from circa 67m AOD to the south to 66m AOD to the brook and circa 70m AOD from the north to the brook. There are no nearby significant current land uses in the vicinity of the Site.
Site history	The site has been agricultural land for well over 120 years. There has been little change on site except for recent outbuildings to the north of the site adjacent to Grange Farm circa 2009. An area of Made Ground/Access Road to the south off the A41.
Potential contaminative features	There is only the potential for Made Ground (including bunds/mounds) and potential contaminants of concern around the access road to the south of the site off the A41 and the outbuildings to the north of the site adjacent to Grange Farm.
Mining and quarrying	The Site is not located within a mining area or an area subject to historic quarrying.
Previous investigations	Tier Environmental produced the Preliminary Risk Assessment Report Unit 1, Symmetry Park, Oxford, Oxfordshire (Ref TE1585-TE-00-XX-RP-001-V01, dated 18th June 2021).
Fieldwork	The following fieldwork was undertaken: • 4 No. cable percussive boreholes. • 6 No. window sample boreholes. • 27 No. machine excavated trial pits. • 6 No. soakaway infiltration test pits. • 6 No. plate bearing tests. • 2 No. service trenches (trench 1 for rising main and trench 2 for water main).
Laboratory testing	Samples of soil, soil leachate and groundwater were submitted for analysis of a range of metal, other inorganic and organic components including asbestos. Geotechnical testing was scheduled on selected samples. All testing was undertaken at accredited laboratories.
Ground conditions	The Site has deposits consistent with the BGS maps, with depths recorded between ground level and circa 5.00mbgl with a typical profile being as follows a topsoil over a subsoil/alluvium and extremely weathered Peterborough Mudstone Member recovered as a soft to firm CLAY (between 3.00 and 5.40mbgl). There are localised differences to the west of the site with Kellaways Clay and Sand Member being present above the Peterborough Member (not proven in all locations) and to the northwest possible River Terrace Deposits. There are two mounds, large one to the north, which is approximately 8m tall, 115m long by 45m wide and one smaller one in the Southern field. Additionally in the eastern part of the site is an area of hardstanding being used as parking for local industry a small bund to the northern boundary.
Ground stability	The ground is generally stable with localised instability within the Made Ground and Alluvial deposits.
Foundations and floor slabs	The optimum foundation solution is Vibro Stone Columns (VSCs) to the intact Peterborough Member Mudstone at depths of between 3.00 and 5.00mbgl. Conditionally/treatment (e.g. lime stabilisation) of soft soil arisings will be required prior to placement and compaction within the proposed regrading works.

	It is recommended that the exploratory hole logs, proposed regrading works, proposed design loads and settlement criteria be submitted to specialist ground improvement contractors, along with proposed bearing capacities of 75kPa for the floor slab and 175kPa for the foundations.
Sulphate class	It is considered that a Design Sulphate Class of DS-1 and ACEC Class AC-1 for all strata is appropriate for buried concrete at the site.
Contamination – Human Health	No measured soil concentrations of potential contaminants of concern have been reported in excess of Generic Assessment Criteria (GACs) protective of human health appropriate to the proposed land use. On this basis , it is not considered that the site represents a potential risk to end-users. A single recorded instance of trace (<0.001% w/w) asbestos was recorded in TP21 at 1.00mbgl in the northern mound with chrysotile fibre bundles. It should be noted that no asbestos containing materials (ACMs) were observed during the site works and this mound is to be reused within the proposed landscape mound adjacent to the M40 (outside of the Siemens demise) as shown on drawing 'TE1585-TE-XX-00-DR-GE-008-V01' included within appendix A.
Contamination – Controlled Waters	Results of groundwater sampling displayed 1 No. marginal exceedance of nickel, however qualitative analysis has determined that this minor exceedance does not pose a risk to the controlled waters environment.
Gas protection	Assessment of the gas monitoring data and the CSM places the site in a Characteristic Situation 1 – very low risk scenario in accordance with CIRIA C665 for which **ground gas protection measures are not required**.
Radon Requirements	Basic radon protection measures are not currently required for the proposed development on this site.
Soakaways	Ground conditions beneath the site are unlikely to be suitable for soakaways due to the low permeability geology encountered.
Service Trenches	Further investigations are required in the south-eastern area to determine the presence of a rising main and water main as part of Thames Water assets. It is noted that the geophysical survey did not indicate any evidence of historical trenching in the routes of the assets and preliminary trenching conducted during the October 2021 phase of works did not indicate any evidence of Made Ground associated with trenching.
Waste Soils Classification	Basic waste characterisation has determined that Made Ground soils are non-hazardous for all soils on site. The results of WAC tests have confirmed that Made Ground in the vicinity of TP06, TP12 and TP24 is suitable to be disposed to an inert landfill if required. It is anticipated that natural soils will be suitable for disposal to an inert landfill if required.
Materials re-use	It is considered that all the Made Ground and all the natural soil materials encountered during the investigations to date are chemically suitable for re-use without remediation in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). Suitability for re-use would also be subject to confirmation of the geotechnical suitability depending on whether the materials are to be re-used in load bearing areas. This would need to be detailed in a Materials Management Plan in accordance with DoWCoP. The Made Ground within TP21 at 0.50m (within the northern mound) was reported to contain trace (<0.001% w/w) chrysotile fibre bundles. The presence of the low-level asbestos does not preclude re-use in areas of lower sensitivity. It should be noted that no asbestos containing materials (ACMs) were observed during the site works and this mound is to be reused within the proposed landscape mounds adjacent to the M40 (outside of the Siemens demise) as shown on drawing 'TE1585-TE-XX-00-DR-GE-008-V01' included within appendix A.
Outline Remediation Strategy	**No remedial measures are required based on the findings of this ground investigation.**

1. INTRODUCTION

Tier Environmental Ltd was commissioned by Tritax Symmetry Ltd to undertake a Land Contamination Risk Management (LCRM) Ground Investigation for an area of land referred to as Unit 1, Symmetry Park, Oxford located at land between M40 Junction 9 and the A41, Little Chesterton, Bicester, Oxfordshire, OX25 3PD (the "site").

The title of this report is in accordance with that described in the Land Contamination Risk Management guidance (available at https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm) which has superseded CLR 11:

Stage 1:

- LCRM Tier 1 Preliminary Risk Assessment Report
- LCRM Tier 2 Generic Quantitative Risk Assessment Report
- LCRM Tier 3 Detailed Quantitative Risk Assessment Report

1.1. Proposed Development

The proposed development is the erection of a new high quality combined research, development and production facility comprising of Class B2 floorspace and ancillary office floorspace with associated infrastructure including: formation of signal-controlled vehicular access to the A41 and repositioning of existing bus stops; ancillary workshops; staff gym and canteen; security gate house; a building for use as an energy centre (details of the energy generation reserved for future approval); loading bays; service yard; waste management area; external plant; vehicle parking; landscaping including permanent landscaped mounds; sustainable drainage details; together with the demolition of existing agricultural buildings within the red line boundary; and the realignment of an existing watercourse.

The proposed development layout is presented in Appendix A. As such, in accordance with the *'Updated technical background to the CLEA model'* (Environment Agency, 2009) and *'Suitable 4 Use Levels'* (LQM / CIEH 2015) the proposed generic land use for this development is commercial/industrial site end use.

1.2. Previous Reports

Tier Environmental has previously produced the following report for the development:

- Preliminary Risk Assessment Report Unit 1, Symmetry Park, Oxford, Oxfordshire Ref TE1585-TE-00-XX-RP-001-V01 June 2021

Additional third party reports or documents were made available to Tier Environmental, these are listed below:

- Phase 1 Habitats Drawing for Junction 9 M40, Bicester by EDP Ref edp2425_d001 January 2021
- Ecological Constraints Drawing for Junction 9 M40, Bicester by EDP Ref edp2425_d012a August 2021
- Archaeological and Heritage Assessment for Land at Junction 9 M40, Bicester, Oxfordshire by EDP Ref edp2425_r009 September 2021

1.3. Objectives

Taking into account the proposed development of the site, the objectives of this appraisal were:

- To determine the historical and current land use.
- To establish the environmental setting of the site.
- To evaluate whether past mining or other extractive industries could have an influence on the site.
- Review previous pertinent third party reports in respect to restrictions on areas for ground investigation due to ecological or archaeological constraints;
- To determine current ground and groundwater conditions.
- To determine the potential risks to human health and the wider environment.
- To provide a preliminary waste soils classification.
- To determine potential risks posed to the site from hazardous ground gases and / or vapours.
- Provide preliminary outline remedial measures to manage any identified risks.
- To provide preliminary geotechnical parameters to inform floor slab and foundation recommendations.
- To provide preliminary infiltration testing results for SuDs design.
- To provide preliminary *in situ* geotechnical parameters to inform floor slab and foundation recommendations.

1.4. Assumptions

The following assumptions are made in this report:

- It is assumed that ground levels will not change significantly from those described in this report or a shown on proposed development drawings. If this is not the case, then amendments to the recommendations made in this report may be required.
- The ground investigation has been designed with due consideration of known or suspected constraints (including underground services and access constraints).
- Any references to observations of suspected asbestos-containing materials are for information only and should be verified by a suitably qualified asbestos specialist and/or confirmed by laboratory analysis.
- The use of the term 'Topsoil' within this report is based on a visual identification only and that these materials have not been classified in accordance with BS3882:2015.
- The use of the terms ‘shallow’ and ‘deep’ within this report assume *typically* between ground level to circa 5.00m below ground level (bgl) for ‘shallow’ and greater than 5.00m bgl regarded as ‘deep’;
- The comments and opinions presented in this report are based on the findings of the Preliminary Risk Assessment performed by Tier Environmental and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report.
- Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of the findings is conjectural and given for guidance only. Confirmation of intermediate ground conditions should be undertaken if deemed necessary.

This report has been prepared for the sole use of Tritax Symmetry Ltd. No other third party may rely upon or reproduce the contents of this report without the written approval of Tier Environmental. If any unauthorised third party comes into possession of this report, they rely on it entirely at their own risk and the authors do not owe them any Duty of Care or Skill.

1.5. Archaeological Constraints

Due to the archaeological survey several areas to the west were not investigated in order to allow the archaeological survey to be undertaken and determine the items highlighted within their report. It is noted that these areas are primarily outside the main development of the building and infrastructure areas.

2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview.

Site name	Symmetry Park, Oxford
Site address	Land between M40 Junction 9 and A41, Grange Farm, Little Chesterton, Bicester, Oxfordshire, OX25 3PD. A site location plan is included as Drawing No. TE1585-TE-00-XX-DR-GE-001-V01 within Appendix A.
National Grid Reference (NGR)	455415, 219774
Approximate Site area	19.26Ha / 47.59 acres
Site shape	The site is rectangular in shape centrally with corridors of land extending to the north, west and east.
Current land use on the Site	The majority of the site is currently a mixture of arable and pastural agricultural land. There is a brook that runs offsite to the west and traverses the site from west to east towards the southern central part of the site. There is a track that runs from the farm offsite north to the northern part of site. There is an area of hardstanding extending from an access gate along the southern boundary with the A41. There is also an area of hardstanding/stone in the north-eastern part of the site that is used for lorry parking by Oxford Commercials Ltd. Across the site is a number of hedgerows and trees defining the site boundary and internal field boundaries.
Surrounding land uses	The site is primarily agricultural land with Grange Farm along the northern/northeast border with associated farm buildings. The western boundary is defined by agricultural land, a brook, woods with a pond and the M40 motorway beyond. The southern boundary is defined by the A41 road with agricultural land and the village of Wendlebury beyond. A graveyard is approximately 60-80 metres beyond the southern (eastern end) boundary. The eastern boundary is defined by hedgerows, Grange Farm, agricultural fields and the hamlet of Little Chesterton. The northern boundary is defined by agricultural fields.
General topography and ground levels	The site is lower than the A41 (68m AOD) by approximately 1m at 67m AOD to the south. The site slopes gently centrally to the stream from the north (circa 71m AOD) and south to approximately 66m AOD. Access to the Site is via the A41 to the south or Grange Farm to the north.

An aerial photograph (from the Groundsure report) of the site and site boundary is shown below.

Figure 2.1 Recent Aerial Photograph from Groundsure

3. PRELIMINARY CONCEPTUAL SITE MODEL

Based on the information provided in the Preliminary Risk Assessment report, a combined preliminary conceptual site model and conceptual exposure model was developed for the proposed future land use. This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors. In assessing the likely contaminants of concern present at the site, reference has also been made to Defra and Environment Agency supporting documentation. A preliminary qualitative risk assessment has also been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.

The preliminary conceptual model is presented in schematic form in Appendix A, Drawing No. TE1585-TE-00-XX-DR-GE-002-V01. The potential pollutant linkages identified and the qualitative risk assessment for these are presented in Table 3.1 below. The terms used in the preliminary qualitative risk assessment are defined in Appendix I.

3.1. Uncertainties

The following uncertainties exist in the preliminary conceptual model:

- The presence of any features unrecorded by the historic maps.
- Any unrecorded geological features.
- Any unrecorded pollution events during the site’s history.
- Any possible recorded farm waste that has been deposited on site at gate way entrances or other areas of land within the redline boundary.
- Any unrecorded animal burials.

Table 3.1 Preliminary Assessment of Potential Pollutant Linkages.

Justification / Comments	Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
• The site is currently agricultural land for grazing and crops. • The site has been agricultural land for over 120 years. There is some evidence of potential Made Ground in the southern field with an access road being constructed circa 2009 from the A41 into the centre of the site for some unknown reason. •The site is situated between the M40 Junction 9 (west) and the A41 (south). The northern boundary is Green Lane and to the east agricultural land. • There is limited Alluvial Deposits within the central southern half of the site, according to the BGS borehole records these are primarily clay, silt, sand and gravel. The BGS logs show these deposits to be around 1.00 to 1.50m thick. This follows the direction of the existing brook. Additionally, in the centre of the northern part of the site there is a deposit of sand and gravel River Terrace Deposits. Everywhere else the site comprises of bedrock deposits, anticipated to be weathering towards a soil of sand or clay. The extreme northern end of the site there is possible dissolution features are depth due to the Cornbrash Limestone (1-4m thick). • The majority of the site is an unproductive aquifer with the Kellaway Sand Member, the River Terrace Deposits and Alluvial Deposits classified as Secondary A Aquifer. There are no SPZ or potable/non potable water abstractions within 500m of site. • No recorded landfills within 500m of site and the radon risk is less than 1%. There are no other potential sources of ground gas identified within the site walkover or within the site's boundaries. • There is a small brook that runs parallel to the M40 and then cuts west to east through the southern end of the site. There is a wooded area with a large pond along the southern edge of the site adjacent to the M40 Junction 9 southbound slip road. At this stage there is no ecology report signifying any risks to protected species.	Potential localised Made Ground in southern field from access road construction and in the northern part of site where barns/outbuildings were constructed in circa 2009-2015. Everywhere else on site is considered low risk.	Asbestos, Heavy Metals, PAHs, TPHs	Dust migration and inhalation	Future site Users/Construction Workers	Medium	Low Likelihood	Moderate / low risk
			Vapour inhalation		Medium	Low Likelihood	Moderate / low risk
			Lateral and vertical migration of mobile contaminants	Secondary A Aquifers and Unnamed Brook onsite	Medium	Unlikely	Low risk
			Leaching and migration via groundwater		Medium	Unlikely	Low risk
	No significant ground gas sources identified	Ground Gases	Lateral / vertical migration via preferential pathway	Future site Users/Construction Workers	Medium	Unlikely	Low risk
			Vapour inhalation		Medium	Unlikely	Low risk

For definition of the terms used in the qualitative risk assessment, please see Appendix I.

4. FIELDWORK

The information contained in this report is limited to areas of land accessible during the ground investigation within the site boundary, as indicated on the site plan, presented in Appendix A as Drawing No. TE-1585-TE-00-XX-DR-GE-006-V05.

Tier Environmental scoped the intrusive ground investigation using guidance presented in:

- BS 10175:2011+A2:2017;
- Land Contamination Risk Management (LCRM) - https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm;
- BS 5930:2015+A1:2020;
- BS EN 1997:2004 and 2007.

Tier Environmental's standard strata description criteria are compliant with the above guidance.

4.1. Scope of Ground Investigation

The ground investigation has been conducted to date in phases between the 16th and 20th September 2021 and 29th September to 1st October 2021 and was supervised by a suitably qualified Tier Environmental engineer. Table 4.1 below provides a summary of the exploratory holes completed and rationale. Exploratory hole locations are presented on Drawing No. TE-1585-TE-00-XX-DR-GE-006-V05.

Table 4.1 Scope of Ground Investigation and Rationale

Exploratory Hole Type	Exploratory Hole Reference	Exploratory Hole Depths (m bgl)	Rationale
Machine Excavated Trial Pits	TP01, TP04 to TP20, TP23 to TP27	0.70 to 3.10	To confirm the shallow ground conditions across the site, presence of relatively shallow groundwater and rate of inflow, stability of excavations, and to enable shallow soil sampling for geotechnical and geo-environmental parameters.
Machine Excavated Trial Pits (Bunds/Mounds)	TP02, TP03, TP21, TP22	0.30 to 0.80	To enable shallow soil sampling for geo-environmental parameters.
Machine Excavated Trial Trenches for Services	Trench 1, Trench 2	3.50 and 4.00	To confirm the possible presence of rising main foul sewer and water supply as per Thames Water service plans.
Window Sample Boreholes	WS01 to WS06, WS06A	0.80 to 5.00	To confirm the shallow ground conditions across the site, conduct in situ geotechnical tests, facilitate soil sampling for geotechnical and geo-environmental parameters. and installation of ground gas and groundwater monitoring wells.
Cable Percussion Boreholes	BH01 to BH04	2.70 to 5.40	To confirm the shallow ground conditions across the site, conduct in situ geotechnical tests, facilitate soil sampling for geotechnical and geo-environmental parameters. and installation of ground gas and groundwater monitoring wells.
Hand Dug Pit	HDP01	0.40	To enable shallow soil sampling for geo-environmental parameters.
Soakaway Trial Pits	SA01 to SA06	1.50 to 2.00	To enable testing for infiltration rates for drainage design.
Plate Bearing Tests	PBT01 to PTB05, PBT01A		To derive parameters to help design highways, areas of hardstanding, floor slabs and working platforms in accordance with BR470.

The following constraints were identified during the ground investigation works:

- Areas off limits due to archaeological interest (for full details consult the Archaeological and Heritage Assessment for Land at Junction 9 M40, Bicester, Oxfordshire by EDP Ref edp2425_r009 September 2021)
- Restrictions from ecology in proximity to hedgerows, watercourse and pond
- Access to the southern field was via the A41, no direct vehicular access across the watercourse

Table 4.2 Scope of Monitoring Installations

Exploratory Hole Location	Strata Targeted	Slotted Response Zone (m bgl)	Rationale
BH01	Extremely Weathered Peterborough Member	3.00 to 4.00	Target potential shallow groundwater and ground gas
BH02	Extremely Weathered Peterborough Member	3.00 to 4.00	
BH03	Peterborough Member Bedrock	1.20 to 2.70	
BH04	Extremely Weathered Peterborough Member	4.40 to 5.40	
WS01	Possible River Terrace Deposits	1.00 to 3.00	
WS05	Alluvium and Extremely Weathered Peterborough Member	1.00 to 3.00	

Trial pits were backfilled with arisings in approximate reverse order and left slightly mounded to allow for future settlement; these are likely to settle below existing ground level with time and be unsuitable for trafficking over

Depths and accurate descriptions of strata and groundwater observations made during investigation works, together with details of the samples recovered, are presented on the Engineer's exploratory hole records in Appendix B.

4.2. Geo-Environmental Testing

Sampling and QA/QC protocols are presented in Appendix M. Tier Environmental's schedule of chemical laboratory testing is presented in Table 4.3 and Table 4.4.The testing was carried out by Element Materials Technology, a UKAS and MCerts accredited laboratory.

Human Health and Preliminary Waste Classification Laboratory Testing

Based upon the conclusions of the preliminary risk assessment, Tier Environmental scheduled chemical laboratory testing on selected soil samples. The purpose of the testing was to:

- Determine the concentration of any potential contaminants of concern in the mound and bund to the north and one in southern field;
- Determine the concentration and spatial distribution of potential contaminants of concern in the Made Ground; and,
- Determine the chemical composition and properties of the shallow natural soils.
- Undertake a *preliminary* soils waste classification and waste disposal route determination

Table 4.3 Schedule of Chemical Testing for Human Health Risk Assessment and Preliminary Waste Soils Assessment.

Laboratory analysis	Made Ground Bunds and Mounds	Made Ground South	Topsoil	Subsoil	Alluvium	Natural
Tier Environmental soil suite*	4	2	4	1	3	1
Asbestos screen	5	2	5	1	2	

Laboratory analysis	Made Ground Bunds and Mounds	Made Ground South	Topsoil	Subsoil	Alluvium	Natural
Speciated TPH / BTEX / MTBE	4	2	1			
Waste Acceptance Criteria (WAC)	1			2		
Coal tar suite		1				

*For definition of Tier Environmental analytical suites, please see Appendix M. NA - not applicable.

Controlled Waters Laboratory Testing

Based upon the conclusions of the preliminary risk assessment, Tier Environmental scheduled chemical laboratory testing on selected 3 No soil samples and 3 No groundwater samples; however, the laboratory analysis of the groundwater analysis were awaited at the time of writing. The purpose of the testing was to:

- Determine the concentration and spatial distribution of potential leachable contaminants of concern in the Made Ground;
- Determine the dissolved phase concentrations of potential contaminants of concern within groundwater beneath the site;

Table 4.4 Schedule of Chemical Testing for Controlled Waters Risk Assessment.

Laboratory analysis	Made Ground Mound North	Made Ground Mound South	Made Ground South Field	Groundwater
Tier Environmental groundwater suite*				2
Tier Environmental leachate suite*	1	1	1	

*For definition of Tier Environmental analytical suites, please see Appendix M. NA - not applicable.

4.3. Geotechnical Testing

Geotechnical laboratory testing was scheduled by Tier Environmental on selected samples as presented in Table 4.5 below. The testing was performed by Murray Rix who are a UKAS accredited laboratory. Test certificates including details of appropriate testing standards are presented in Appendix E and discussed in Section 6, below.

Table 4.5 Geotechnical Laboratory Testing Schedule.

Test	Stratum type	Number of tests	Rationale
1. General			
Moisture content	Peterborough Member	4	a) Assist with the determination of consistency of soil with depth. b) Assess desiccation of soils. c) Suitability of materials for reuse within earthworks.
	Kellaways Sand Member	1	
	Alluvium	2	
	River Terrace Deposits	1	
2. Classification			
Atterberg limit	Peterborough Member	1	a) Volume change potential. b) Plasticity assessment (comply with Eurocode 7 description) c) Consistency Index. d) Determine soil type (e.g., clay/silt). e) Use as an empirical guide to soil shear strength
	Kellaways Clay Member	1	
Particle size distribution (wet/dry sieve)	Peterborough Member	2	a) Classify soils for earthworks purposes. b) Establish type of soil (comply with Eurocode 7 description).
	Kellaways Clay Member	1	
	Made Ground	1	
3. Chemical tests			
pH (soil and groundwater)		6	Determine correct class of concrete for both natural and made ground with specific tests for sites potentially containing sulphides (e.g., pyrites) or at low pH.
4. Compaction			
2.5 kg rammer dry density/moisture content relationship test	Peterborough Member	1	Establish maximum dry density and optimum moisture content of materials to assess suitability for reuse within earthworks
	Kellaways Clay Member	1	
	Made Ground	1	
5 .Compressibility			
One-dimensional consolidation	Peterborough Member	1	Determine the long term consolidation behaviour of cohesive soils.
	Alluvium	1	
6. Shear strength (total stress)			
Unconsolidated undrained triaxial (“quick undrained triaxial”)	Peterborough Member	3	Quantitative means of determining undrained shear strength of soils for: a) use in bearing capacity calculations; b) modelling the short term behaviour of slopes and retaining structures; c) pile design; d) determining suitability of cohesive materials for vibro-replacement ground improvement techniques.
	Alluvium	2	

5. GROUND CONDITIONS

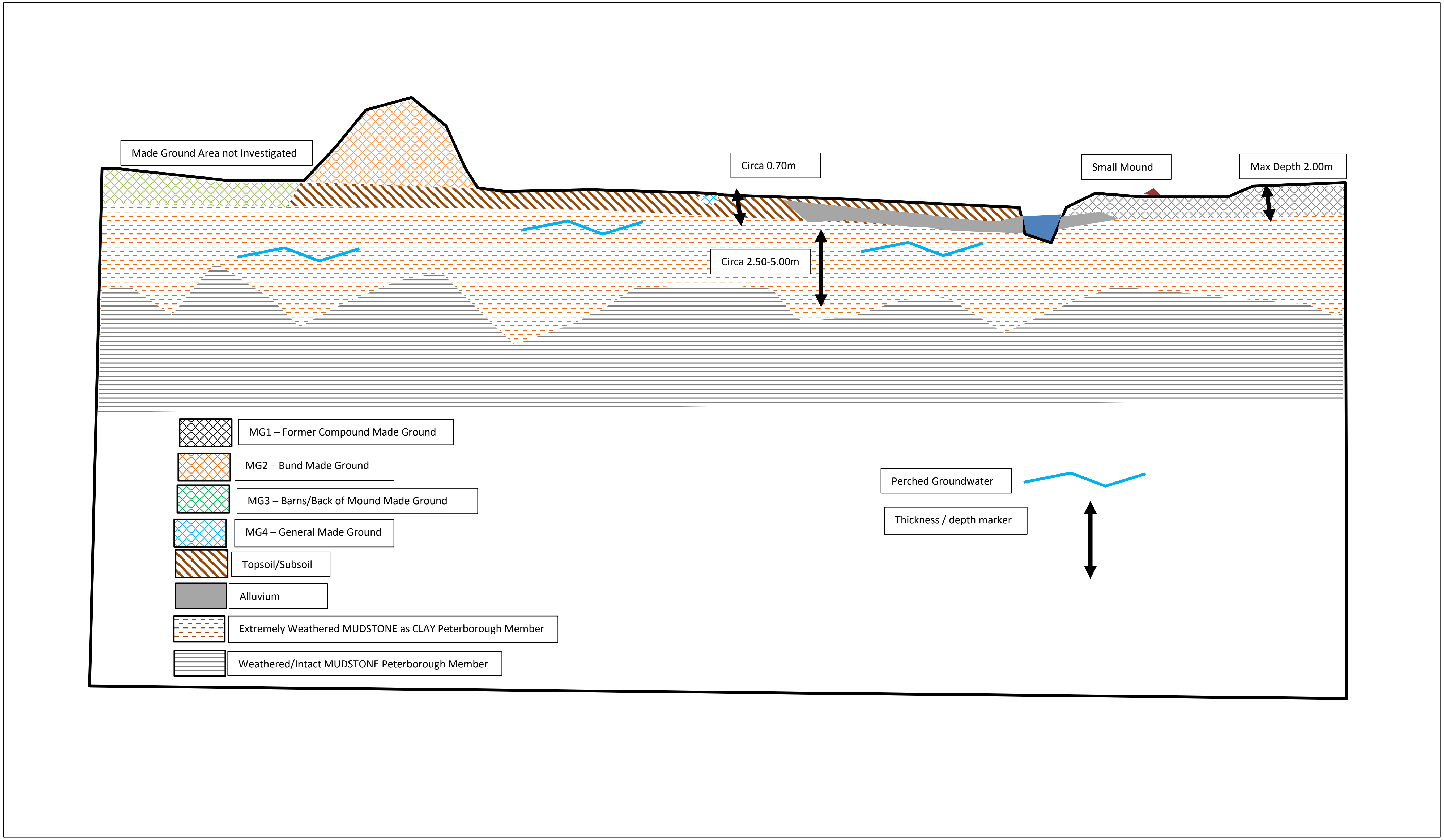
The following section provides a summary of the ground conditions encountered during the ground investigation including strata profile, obstructions and visual / olfactory evidence of contamination. Exploratory hole logs are provided in Appendix B.

Photographs of ground investigation works are provided in Appendix H.

5.1. Strata Profile

Figure 5.1 presented below provides a schematic summary of the ground conditions beneath the site. Please note that this schematic does not represent the subtle changes in the Made Ground to the North and the change in geology as you progress west and southwest. The distinct populations of strata identified have been numbered and correspond with the more detailed descriptions below.

Figure 5.1 Schematic Drawing of Ground Conditions



NOTE - based on the north south alignment through the centre of the proposed building – please note that further east the Kellaways Sand Member is above the Peterborough Member and Localised River Terrace Deposits towards the southwest of the barns.

5.2. Strata Descriptions

Topsoil

Topsoil	
Locations encountered	All locations except TP01, TP02, TP03, TP21 to TP24, TP27
Depths encountered from top of stratum (range)	Ground Level
Depths encountered to base of stratum (range)	0.20m to 0.60m bgl
Thickness (range)	0.20m to 0.50m
Spatial location on site	Every location except the recent car park in northeast and where mounds/bunds were located.

Made Ground - Tarmac

Tarmac	
Locations encountered	TP20 and TP25
Depths encountered from top of stratum (range)	0.60 and 0.90m bgl
Depths encountered to base of stratum (range)	0.90 and 1.00m bgl
Thickness (range)	0.10m
Spatial location on site	Southern end of the south field

Made Ground – MG1

Locations encountered	BH04, SA06, TP18 to TP20, TP25, Trench 1, Trench 2, WS06, WS06A
Depths encountered from top of stratum (range)	0.20 and 0.50m bgl
Depths encountered to base of stratum (range)	0.60 and 2.00m bgl
Thickness (range)	0.30 and 1.70m
Spatial location on site	Southern field centrally and easterly
General description	Soft to firm slightly gravelly CLAY with concrete gravel. and Clayey GRAVEL of concrete. Occasional to numerous concrete cobbles.

Made Ground – MG 2 The Large Mound Near Farm/Barns

Locations encountered	TP21, TP22, TP23, TP24
Depths encountered from top of stratum (range)	N/A
Depths encountered to base of stratum (range)	N/A
Thickness (range)	N/A
Spatial location on site	Northern area large mound with height circa 76.00m AOD (circa 8m tall)
General description	Soft dark brown mottled white/brown slightly gravelly CLAY with subangular boulders of medium strong concrete. Cobbles of tarmac, brick and concrete

Made Ground – MG3 General

Locations encountered	TP01, TP03, TP27
Depths encountered from top of stratum (range)	Ground Level
Depths encountered to base of stratum (range)	0.50 and 0.60m bgl
Thickness (range)	0.50 and 0.60m
Spatial location on site	Eastern car park area and northern track from farm
General description	Soft grey gravelly CLAY. Gravel is subangular of concrete and brick. Frequent cobbles and boulders.

Drift Deposits – Subsoil

Locations encountered	BH01 to BH03, HDP1, SA01 to SA04, TP06, TP12, TP15, TP26, TP27, WS01, WS04, WS05
Depths encountered from top of stratum (range)	0.12 and 0.50m bgl
Depths encountered to base of stratum (range)	0.30 and 1.50m bgl
Thickness (range)	0.10 and 1.20m
Spatial location on site	Generally wide spread in the northern fields and beyond alluvium
General description	Soft to firm, dark brown and grey slightly sandy CLAY. Sand is fine. Rare rootlets.

Drift Deposits – Alluvium

Locations encountered	BH03, BH04, SA01, SA05, TP01, TP04, TP07 to TP09, TP11, TP13, TP17, WS02, WS03
Depths encountered from top of stratum (range)	0.20 and 1.90m bgl
Depths encountered to base of stratum (range)	0.70 and 3.50m bgl
Thickness (range)	0.50 and 1.80m
Spatial location on site	Predominantly close to watercourse, centrally and eastern parts of site
General description	Very soft to soft locally firm greyish brown/ brownish grey slightly sandy slightly silty gravelly CLAY.

Drift Deposits – River Terrace Deposits

Locations encountered	WS01
Depths encountered from top of stratum (range)	0.30m bgl
Depths encountered to base of stratum (range)	2.40m bgl
Thickness (range)	2.10m
Spatial location on site	Northwest corner
General description	Medium dense greyish brown silty fine SAND and firm greyish brown mottled grey sandy, slightly silty CLAY. Sand is fine.

Extremely Weathered Bedrock – Peterborough Member

Locations encountered	BH01 to BH04, SA01, SA02, TP01, TP04 to TP06, TP10 to TP14, TP17 to TP19, TP25, TP26, Trench 1, Trench 2, WS01 to WS05
Depths encountered from top of stratum (range)	0.60 and 3.50m bgl
Depths encountered to base of stratum (range)	1.60 and 5.40m bgl
Thickness (range)	Up to 4.10m proven for example WS04
Spatial location on site	All locations with exception of far west of the site due to archaeological restrictions and being deeper than exploratory holes excavated.
General description	Extremely weathered MUDSTONE recovered as firm to stiff grey mottled brown CLAY.

Extremely Weathered Bedrock – Kellaways Sand Member

Locations encountered	TP07, TP10, TP15, TP16, TP18, WS04
Depths encountered from top of stratum (range)	0.30 and 2.10m bgl
Depths encountered to base of stratum (range)	1.80 and 2.90m bgl
Thickness (range)	0.80 and 1.80m
Spatial location on site	Predominantly the western part of the site with southwest corner.
General description	Firm yellowish brown mottled grey slightly sandy, slightly silty CLAY. Sand is fine.

Extremely Weathered Bedrock – Kellaways Clay Member

Locations encountered	SA03, TP06 to TP09, TP14
Depths encountered from top of stratum (range)	0.40 and 1.30m bgl
Depths encountered to base of stratum (range)	1.80 and 2.90m bgl base not encountered on most locations
Thickness (range)	0.40 and 1.90m base not encountered on most locations
Spatial location on site	Extreme west and north of the redline boundary
General description	Soft to firm yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine.

Bedrock – Peterborough Member Mudstone

Locations encountered	BH01, BH03, BH04, TP01, Trench 1, Trench 2, WS02, WS03, WS04
Depths encountered from top of stratum (range)	1.30 and 5.40m bgl
Depths encountered to base of stratum (range)	Base not encountered
Thickness (range)	Base not encountered
Spatial location on site	Encountered in deeper excavations beyond 3m typically, expected to be encountered in all locations across site but at depths beyond 3-5m in the west beneath the Kellaways Members.
General description	Extremely weak to very weak grey MUDSTONE recovered as angular to subangular, fine to coarse of mudstone

5.3. Obstructions

The following potential obstructions were encountered during the ground investigation works that was not bedrock or natural.

Table 5.1 Obstructions Summary Table

Exploratory Hole Location	Location on site	Depths recorded from (m bgl)	Depth of Base of Feature (m bgl)	General description and comments
TP20	Southern Field	0.70	Base not encountered	Tarmac/Concrete
TP27	Extreme North	0.70		Car park restrictions in excavating to depth
WS06	Southern Field	0.70		Possible Concrete
WS06A	Southern Field	0.70		Possible Concrete

5.4. Visual and Olfactory Evidence of Contamination

No visual and olfactory evidence of contamination were observed during the ground investigation.

5.5. Groundwater Observations During Fieldwork

Table 5.2 below provides a summary of the groundwater observations during the fieldworks. Further information of groundwater observed is presented in the exploratory hole logs in Appendix B.

Table 5.2 Field Observations of Groundwater.

Exploratory hole	Strike (m bgl)	Rise in groundwater after 20 mins. (m bgl)	Formation	Observations
SA4	1.50	Not recorded	Subsoil	Groundwater encountered as slow seepage at the bottom of the trial pit.
TP01	1.60	Not recorded	Peterborough Member	Groundwater encountered as fast seepage at the bottom of the trial pit.
TP05	2.10	Not recorded	Peterborough Member	Groundwater encountered as slow seepage at the bottom of the trial pit.
TP11	1.90	Not recorded	Possibly Peterborough Member	Groundwater encountered as slow seepage at the bottom of the trial pit.
TP12	2.30	Not recorded	Peterborough Member	Groundwater encountered as slow seepage at the bottom of the trial pit.
TP15	2.20	Not recorded	Possibly Kellaways Sand Member	Groundwater encountered as slow seepage at the bottom of the trial pit.
TP17	2.00	Not recorded	Peterborough Member	Groundwater encountered as fast seepage.
TP19	2.00	1.90	Peterborough Member	Groundwater encountered due to land drain strike.

5.6. Groundwater Monitoring

Table 5.3 below provides a summary of the groundwater monitoring results conducted to date. In total, 2 No, visits have been carried out between 8th and 18th October 2021

Table 5.3 Groundwater Monitoring Results Summary

Exploratory hole	Response Zone	Depth range (m bgl)	Formation	Observations
BH1	3.00m to 4.00m bgl	3.68	Peterborough Member	None
BH2	3.00m to 4.00m bgl	3.80	Peterborough Member	None
BH3	1.70m to 2.70m bgl	1.13	Alluvium and Peterborough Member	None
BH4	4.40m to 5.40m bgl	Dry	Peterborough Member	None
WS1	1.00m to 3.00m bgl	1.38	Possible River Terrace Deposits	None
WS5	1.00m to 4.00m bgl	0.72	Peterborough Member	None

5.7. Soakaway Infiltration Testing

A total of 6 No. trial pits were excavated between 1.50 and 2.00m bgl to test infiltration rates for SuDs design. None of the soakaway tests demonstrated sufficient reduction in water height to be considered viable. The results are location in Appendix D.

During the first monitoring visit the monitoring wells were checked for groundwater and only WS1 and WS5 had sufficient groundwater in to undertake rising head tests. BH03 did not recharge and remained dry after 60 minutes. Upon completion of the well development, additional rising head tests were undertaken in each monitoring well the results are in Appendix D and summarised below:

- **WS01 -** At 0 min 3.89m bgl and after 60 minutes the water level was 1.54m bgl
- **WS05 -** At 0 min 3.93m bgl and after 60 minutes the water level was 3.71m bgl

6. PRELIMINARY GEOTECHNICAL ASSESSMENT

6.1. Mining and Quarrying

The site is not considered to be at risk from shallow mining. Historical plans do not indicate any quarries, clay pits or other extractive industries in the vicinity of the site. Localised workings of shallow strata cannot be wholly discounted but given the historical use of the site this is considered unlikely.

6.2. Determination of pH and Water-Soluble Sulphate

Representative samples of the soils encountered during the Tier Environmental ground investigations, were tested to determine their pH and concentrations of water-soluble sulphate (SO42-). The results are presented in Appendix C and summarised in the Table 6.1 below. It is assumed that the site is a Natural Ground for majority of the site with the exception of the southern field which is Brownfield, and the groundwater is static in accordance with BRE SD1.

The conclusion of the assessment is summarised below for and assigns the appropriate classification for buried concrete design purposes.

Table 6.1 Results of Soil pH Testing and Water-Soluble Sulphate Determination.

Exploratory Hole Location	Depth (m bgl)	Avg pH	Avg Water-soluble sulphate (mg/l)	Design sulphate class	ACEC sulphate class
Topsoil					
TP10, TP18, TP19, TP20, TP25	0.10	7.69	4.7	AC-1s	DS-1
Subsoil					
HDP1	0.40	7.53	47.9	AC-1s	DS-1
Alluvium					
TP13	0.50	7.82	229.1	AC-1s	DS-1
Natural					
TP11, TP18. TP19	1.60-2.00	7.53	126	AC-1s	DS-1
Made Ground North Mound					
TP21-TP24	0.00-2.50	8.53	109.4	AC-1s	DS-1
Made Ground South Field (Former Compound)					
BH04, TP20	0.20-0.70	8.30	23.6	AC-1s	DS-1

ACEC - Aggressive Chemical Environment for Concrete (see BRE, 2005).

6.3. Geotechnical Parameters

The data obtained during the ground investigation has been assessed for the recorded strata in order to provide characteristic values in order to aid the final foundation design.

Soil Classification

Table 6.2 Soil Classification Test Results for weathered Peterborough Member.

Exploratory hole	Depth (m bgl)	Stratum	MC (%)	LL (%)	PL (%)	PI (%) (Modified)	Class	Volume Change Potential
WS1	2.50	Peterborough Member	25	52	20	32	Stiff grey silty clay	Medium
WS5	3.80	Peterborough Member	28	51	21	30	Stiff grey silty clay	Medium
TP06	2.20	Peterborough Member	30	54	19	35	Stiff grey silty clay	Medium
BH2	4.00	Peterborough Member	26	49	18	31	Stiff grey silty clay	Medium
BH4	4.60	Peterborough Member	29	51	21	30	Stiff grey silty clay	Medium

ND - Not determined; MC - Moisture content, LL - Liquid limit, PL - Plastic limit, PI - Plasticity index.

Cohesive Soils

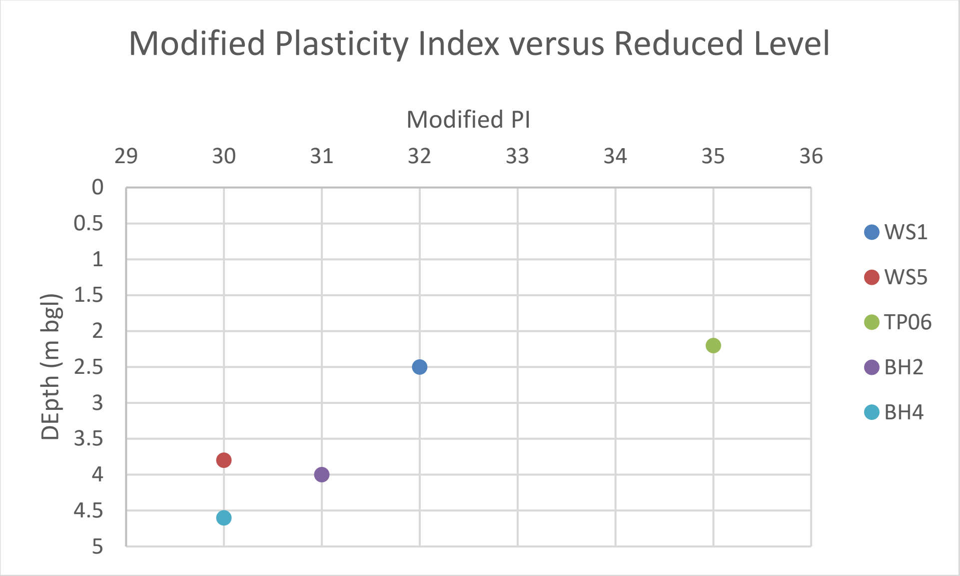
Moisture content and Atterberg Limit testing was undertaken on samples from cohesive superficial material at the site. A summary of the results is shown in Table 6.3 below

Table 6.3 Summary of Natural Moisture Content and Atterberg Limits

Parameter	No. Tests	Minimum	Maximum	Average
Natural MC %	5	25	30	27.6
Plastic Limit %	5	18	21	19.8
Liquid Limit %	5	49	54	51.4
Plasticity Index	5	30	35	31.6

5 No. Atterberg Limit Tests were performed on samples of identified cohesive soil. A plot of plasticity index against reduced level is presented in the figure below and shows

Figure 6.1 Plot of Modified Plasticity Index against reduced level



Granular Soils

4 No. samples of were submitted for Particle Size Distribution tests. The tests show slight distinction between the stratum types outlined below, however all soils have been classified as a firm to stiff clay:

- 1 No. sample of the Peterborough Member classified as firm, dark brown, silty, sandy clay.
- 1 No sample of the Alluvium classified as stiff, brown, silty, sandy clay with occasional gravel.
- 1 No. sample of Made Ground classified as stiff, brown, silty, sandy clay with rare gravel.
- 1 No. sample of the Kellaways Clay Member classified as stiff, brown, silty, sandy clay.

A total of 5 No. total stress undrained triaxial tests were performed on the natural clay strata encountered within the exploratory holes. Single stage tests were performed and these yielded value of undrained shear strength (Cu). A summary of the test results obtained for the natural clay strata is given in Table 6.4 below.

Table 6.4 Summary of undrained shear strength values for natural clay strata

Material Type	Minimum Shear Strength Cu (kPa)	Maximum Shear Strength Cu (kPa)	Average Shear Strength Cu (kPa)
Clay – Peterborough Member	35	161	66

The test results show a reasonable variation but also some increase with depth and from the triaxial test data, a moderately conservative undrained shear strength of 35kPa at 2.00m bgl, increasing to 70kPa at 5.00m bgl is assessed for the natural clay strata.

A total of 4 No. natural clay deposits were submitted for consolidation testing. The test results indicate moderate variability in the coefficient of volume compressibility (m_v) and coefficient of consolidation (C_v).

Table 6.5 Summary results from Oedometer Testing

Location	Depth (m bgl)	Pressure range from (kPa)	Pressure range to (kPa)	M_v (m^2/MN)	C_v (m^2/yr)
BH1	1.20	15	120	0.69	4.55
BH2	2.00	25	200	0.42	1.39
BH3	1.20	10	80	0.61	1.28
BH4	2.5	15	120	0.95	0.89

A total of 3 No. samples were submitted for compaction testing. The results of which are outlined in the table below:

Table 6.6 Summary of compaction results

Sample	Stratum	Natural MC (%)	Maximum Dry Density (mg/m^3)	Optimum Moisture Content (%)	95% Maximm Dry Density (mg/m^3)	Moisture Content at 95% Maximum Dry Density (%)
TP06 at 1.50m	Kellaways Clay Member	10.6	1.89	13	1.753	17
TP13 at 2.40m	Peterborough Member	13.8	1.78	17	1.672	21
TP18 at 0.60m	Made Ground 1	10	1.82	14	1.727	14

A total of 32 No. standard penetration tests have been undertaken across the site and summarised below:

- Extremely Weathered Peterborough Member 20 No. SPT ranging from N = 2 to N = 40 with an average of N = 10.5
- Intact Peterborough Member Bedrock recorded 8 No. SPT tests all recorded N = 50
- Alluvial Deposits had recorded 2 No SPT tests N = 2 and N= 6
- Made Ground Southern Field Recorded 1 No SPT test N =13
- Possible River Terrace Deposits Recorded 2 No SPT tests N = 12 and N =30
- Kellaways Sand Member Recorded 1 No SPT test N = 7

Shear Strength Parameters

Standard Penetration Tests (SPT) were carried out in all of the boreholes. The undrained shear strength of the natural clay strata tested has been estimated using the relationship developed by Stroud, where:

Cu = f1 x SPT N60 value

Preliminary results from the SPT are summarised in the following bullet points:

- 20 No. SPT N values in the extremely weathered Peterborough Member strata suggest that the majority of the material is the is low shear strength with the average of 50kPa using a pretesting f1 value of 5.
- 8 No. SPT N values in the intact bedrock of the Peterborough Member strata suggest that the majority of the material is the is very high shear strength with the average of 250kPa using a pretesting f1 value of 5.
- 2 No. SPT N values in the Alluvium strata suggest that the majority of the material is the is very low shear strength with the average of 20kPa using a pretesting f1 value of 5.
- 1 No. SPT N values in the Made Ground South Field strata suggest that the majority of the material is the is medium shear strength with the average of 65kPa using a pretesting f1 value of 5.
- 2 No. SPT N values in the River Terrace Deposits strata suggest that the majority of the material is the is high shear strength with the average of 110kPa using a pretesting f1 value of 5.
- 1 No. SPT N values in the Kellaways Sand Member strata suggest that the majority of the material is the is low shear strength with the average of 35kPa using a pretesting f1 value of 5.

6.4. Foundation Recommendations

The proposed development is the erection of a new high quality combined research, development and production facility comprising of Class B2 floorspace and ancillary office floorspace with associated infrastructure including landscaping (including permanent landscaped mounds), sustainable drainage details and the realignment of the existing watercourse. The existing agricultural buildings within the red line boundary will be demolished.

Summary of Ground Conditions

Below is the summary of the ground conditions and suitability as a founding strata.

Made Ground Southern Field

The Made Ground due to variability and composition is not considered suitable founding strata.

Alluvium

The Alluvium was encountered in 2 No. window samples and resulted in very low shear strength of 20kPa. Given the shallow thickness 1.00 to 1.50m and very low shear strength, this stratum is not considered a suitable founding strata.

Extremely Weathered Peterborough Member - Site Wide

The majority of the building footprint has Extremely Weathered Peterborough Member that generally comprised dark brown/grey clay with a low to medium shear strength at depths between 0.90 and 5.00m bgl to the north of the watercourse and below circa 1.20-2.00m in the southern field, with BH04 recording it beneath Alluvial deposits at 3.50m bgl.

This stratum is not considered a suitable founding strata without considerable ground improvement to increase the average shear strength from 50kPa.

Intact Bedrock of the Peterborough Member - Site Wide

The majority of the building footprint has intact Peterborough Member Mudstone at a depth of between 2.50 and 5.40m bgl (base not encountered, but BGS records show its 23-26m thick) with a very high shear strength based on the SPTs of at least 250kPa.

Given the proposed high design loads this stratum is the most suitable foundation solution given the varying composition and thickness of the extremely weathered Peterborough Member .

Foundation Summary

Given the preliminary earthworks drawing (Ref T/21/2407 60-03 P4) presented in Appendix A and the variability and depth of the low strength shallow strata, shallow spread foundations are not considered suitable for the proposed development. This is further supported by the preliminary geotechnical data, the extremely weathered Peterborough Member, the Alluvial deposits and sections of the western part of the building having Kellways Sand Member and River Terrace Deposits all have a generally low shear strength which are not suitable for founding on without ground improvement to increase the suitability and safe bearing capacity.

Based on the preliminary cut/fill, there is a potential risk of unacceptable total and differential settlements within the underlying soils (includes soft and very soft soils and raising levels by up to 2m to 4m) where levels are to be raised.

The preferred foundation solution is therefore considered to be Vibro Stone Columns (VSCs). It is also considered that the soft clays beneath the areas of fill (and any soft clays excavated and compacted during the regrading works) are likely to require lime stabilisation or similar technique to improve the bearing capacity and to minimise the risk of potential unacceptable total and/or differential settlements. The ground improvement works may need to include the excavation and lime stabilisation of the soft clays within areas of proposed fill/where ground levels are proposed to be significantly raised.

It is recommended that the exploratory hole logs, proposed regrading works, proposed design loads and settlement criteria be submitted to specialist ground improvement contractors to confirm that the required bearing capacities of 75kPa for the floor slab and 175kPa for the foundations can be achieved.

It is understood that the existing watercourse is to be realigned away from the proposed structures.

If VSCs and/or ground improvement are not viable/suitable in localised highly loaded areas, a piled solution should be considered. The construction of a piled foundation is a specialist job and the advice of a reputable contractor familiar with the type of ground and groundwater conditions encountered on this site should be sought prior to finalising the design. The actual working load for proposed piles will depend on the particular type of pile and method of installation adopted. If it is necessary to take the piles below the base of the boreholes, the pilling contractor should undertake testing to confirm that strata of equal or greater strength are present below.

6.5. Floors

With regard to the design and construction of normal ground bearing floor slabs, it must be noted at the outset, that due to the variability of strata across the footprint of the building, the proposed regrading works and low shear strengths, a ground bearing slab is not appropriate without some form of ground improvement. Consideration is also required for the watercourse diversion.

A ground bearing slab should be suitable if appropriate measures are taken to reduce the risk of unacceptable total and differential settlements, such as the installation of vibro stone columns (VSCs) and/or lime stabilisation during the proposed regrading works. The use of lime stabilisation should also be considered for external areas of hardstanding where soft clays are to be retained/reused.

6.6. Earthworks

Construction plant should be provided with an adequate working platform in line with the requirements of BRE report, “BR 470: Working Platforms for Tracked Plant”. Again, further advice should be sought from the temporary works designer.

6.7. Groundworks, Excavation Stability and Groundwater Dewatering

In our opinion, there should be no particular difficulties in excavating the strata indicated in the boreholes utilising an appropriate and suitably sized mechanical excavator. Excavations into existing Made Ground and the underlying natural soils should be assumed to be unstable. No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 097 (1983) should be made to establish suitable means of support or battering of excavation sides.

It is recommended that all excavations to greater than 1.20 metres depth, or for shallower excavations where groundwater is encountered above this level are closely supported, especially where man entry is required. Alternatively, where space permits, the excavations might be battered back to an appropriate angle. Fast seepages were encountered in several locations groundwater levels of between circa 1.00m and 3.00m were encountered in BH03, WS01 and WS05, indicating localised perched groundwater. The majority of the site showed no significant groundwater when excavated or drilled. Should groundwater seepages occur, and water accumulate in shallow excavations it should be able to be removed by pumping from a filtered sump. However, groundwater control by more robust means, such as well pointing, may be required locally.

It should be noted that should deep basements be constructed as part of the development then we would recommend that the standpipes are monitored for groundwater levels for an extended period of time and take into consideration seasonal variations and periods of very wet weather to measure the fluctuation of the standing water levels. It should be noted that groundwater inflows and levels are likely to be subject to seasonal and climatic variations.

Great care will need to be taken if reducing groundwater levels to ensure that adjoining nearby buildings, structures and services are not affected.

6.8. Pavements and Highways

A total of 4. No. preliminary plate load bearing tests were undertaken in areas of vehicle parking and roads areas on site to provide preliminary design CBR values from plate load tests:

- PBT1 – 7.2% (Made Ground Southern Field)
- PBT2 – 5.2% (Made Ground Southern Field)
- PBT3 – 4.4% (Made Ground Southern Field)
- PBT4 – 6.1% (Subsoil Northern End of site)

The full results are contained within Appendix E.

Please note the PBTs were concentrated in the southern field as this area was marked out for fill in the preliminary earthworks.

The design of pavements and roadways should be discussed with the relevant local authority if highways are to be subject to Section 38 agreement.

Once the design layout is known and earthworks are completed, then *in situ* testing should be carried out to confirm CBR values.

7. HUMAN HEALTH RISK ASSESSMENT

A range of sampling was taken from differing strata to gain an understanding of the chemical nature of the soils with targeted sampling on manmade bunds and mounds.

Results of chemical analysis are presented in full in Appendix C.

7.1. Data Interpretation Approach

The analytical data obtained were reviewed for completeness and consistency. The data for each sample type was then compiled, screened against the Generic Assessment Criteria (GACs) for a commercial/industrial land use and those potential contaminants of concern which were found to exceed the GACs were then subjected to detailed analysis as described below.

Previously, it was possible for results from soil (and leachate) samples to be subject to statistical assessment in accordance with a 2008 guidance document (CL:AIRE / CIEH Guidance on Comparing Soil Contamination Data with a Critical Concentration). This guidance has now been withdrawn and replaced with the following document:

- Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration (CL:AIRE 2020)

The purpose behind statistical assessment is ultimately to determine whether concentrations of contaminants are at levels that present potential risk to the future site users (and the wider environment if the statistical assessment is conducted on leachate test results).

The new guidance places even greater emphasis and reliance on the desk study being carried out first, appropriately detailed sampling strategies, collection and testing of samples for contamination and use of appropriate screening criteria.

The guidance requires an increased number of criteria to be met before a robust statistical assessment can be conducted and introduces the principal of the Central Limit Theorem (CLT); a key tool of statistics that is used in the comparison of confidence intervals with the critical concentration. A common ‘rule of thumb’ is that the CLT will apply provided your sample size is between 20 and 50.

On this basis, Tier Environmental considers that statistical assessment in accordance with the CL:AIRE 2020 guidance may not be applied in this instance given that the number of samples obtained is below 20 No. for any given identified soil population.

Due consideration of the ground conditions, distinct identifiable populations of soil and proposed development layout has been undertaken and, where appropriate, laboratory results associated with discrete populations or ‘hotspots’ have been assessed separately.

7.2. Selection of Generic Assessment Criteria (GAC)

In short, for the majority of the contaminants of concern, LQM/CIEH Suitable 4 Use Levels (S4ULs) published recently in 2015 have been adopted as GACs for a commercial/industrial land use; however, further details on the hierarchal approach for the selection of the GACs used as screening criteria for this assessment is provided in Appendix J.

These values are considered as appropriate screening criteria as they incorporate updated assumption exposures derived for the production of C4SLs but within the context of deriving screening criteria above which assessment of the risks or remedial action may be needed (i.e. within the context of the planning regime rather than Part 2A context for which C4SLs were derived).

For those potential contaminants of concern where the selected GAC is dependent on Soil Organic Matter content (SOM), an assumed SOM of 6% has been selected based on the reported Total Organic Carbon (TOC) concentrations (which have been converted to SOM by dividing by a conversion factor of 0.58). It should be noted; however, that for any soil samples where the TOC may be artificially driven by the presence of petroleum hydrocarbons, that these TOC results have been removed from the data set when determining an appropriate characteristic SOM. For this purpose, Tier Environmental have notionally considered that any TOC results from soil samples where the measured total TPH concentration exceeds 500mg/kg should be removed.

7.3. Human Health Risk Assessment

No measured concentrations of potential contaminants of concern have been reported in excess of the respective GACs protective of human health for a commercial/industrial land use.

Asbestos

Asbestos can be present in soil as fragments of bulk Asbestos Containing Materials (ACMs) (e.g. asbestos cement sheeting) and also as discrete asbestos fibres within the soil matrix. This investigation has carried out assessments to determine whether both bulk fragments and / or fibres are present in the soil at the site. The asbestos assessment commenced on site with inspection of the Made Ground by our suitably qualified supervising engineer for the presence of bulk ACMs.

During the fieldwork no suspected ACMs were identified.

Of the 15 No. of Made Ground samples submitted for asbestos screening, 1 No. were reported to contain asbestos. Those positive identifications are summarised in Table 7.1, below.

Table 7.1 Summary of Asbestos Assessment

Exploratory Hole Location	Depth (m bgl)	Location on Site Description	Soil Population	Asbestos Type	Quantification (% w/w)
Asbestos in Soil Samples					
TP21	0.50	Mound North	MADE GROUND	Chrysotile Fibre Bundles	<0.001

Coal Tar

In total, 1 No. sample was taken for Coal Tar analysis in the Southern Field TP20 and the result came back with <0.01mg/kg Benzo(a)pyrene and <0.1% coal tar. It is considered that the asphalt encountered is not coal tar containing and confirmatory testing during earthworks should be undertaken before offsite disposal.

7.4. Utilities

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection.

7.5. Construction and Maintenance Workers

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

Whilst asbestos has been reported during the ground investigation works, the measured concentrations have been reported <0.001% w/w i.e. at ‘trace’ levels which are unlikely to trigger requirements during earthworks / construction works in accordance Control of Asbestos Regulations 2012. A summary of complying with CAR: risk assessments, licensing and training is therefore provided in Appendix N.

8. CONTROLLED WATERS RISK ASSESSMENT

8.1. Introduction

In order to assess whether there is a potentially unacceptable risk of pollution of controlled waters, samples of soil leachate and groundwater have been submitted for laboratory chemical analysis as per the summary presented in Table 4.4 within this report. Analytical data from soil leachate and groundwater sample testing undertaken by Tier Environmental have been evaluated against Water Quality Standard (WQS) values appropriate to the Conceptual Site Model.

In accordance with Part 2A of the Environmental Protection Act 1990, Tier Environmental has made regard to all of the WQS values that are relevant to the site and a judgment has been made against the most stringent of those relevant standards. Further details are provided, along with the approach for selection of TPH / BTEX WQS values, in Appendix K.

In some instances, the laboratory method detection limit is greater than the appropriate WQS value. In these instances, only measured concentrations in excess of the laboratory method detection limit have been considered likely to potentially represent a possible significant risk to controlled waters.

For those potential contaminants of concern for which the WQS values are dependent on hardness (e.g. cadmium EQS values), a hardness of 225mg $CaCO_3$/l has been selected based on the reported values in the groundwater beneath the site. This will be updated upon receipt of the groundwater results.

8.2. Controlled Waters Environment Conceptual Site Model Summary

From a conceptual site model perspective, the Alluvium and River Terrace Deposits are classed as a Secondary A Aquifer, the Kellaway Sand Member is classified as a Secondary A Aquifer and the Peterborough Member/Kellaway Clay Member bedrock are classified as Unproductive Strata above a deeper Secondary A Aquifer of the Cornbrash Limestone. Groundwater flow direction beneath the site is towards the watercourse central south. The site is not within a Source Protection Zone and there are three historical non-potable groundwater abstraction located hydraulically upgradient of the site between 113m SE, 478m SE and 570m NE. There are no potable groundwater abstractions within 1,000m. The nearest surface water receptor is the watercourse (tertiary) and pond on site.

The BGS Lexicon indicate the Peterborough Member to be 23m to 26m thick above the Kellaway Sand and Clay Member with the Cornbrash Member beneath as part of the Great Oolite Sequence. The low permeability Peterborough weathered Mudstone and Mudstone will offer protection from the vertical migration of any shallow impacts not identified in the PRA or subsequent GIR. The site is set within an area of significant wider historical farming area. On this basis the controlled waters sensitivity for the Secondary A Aquifer is regarded as being low. The surface water sensitivity is moderate to low.

8.3. Soil Leachate Testing

No measured soil leachate concentrations of potential contaminants of concern have been reported in excess of the respective WQS values considered protective of the controlled waters environment. As such, it is not considered that that soil materials on site present a potential risk to the controlled waters environment.

8.4. Groundwater Testing

Table 8.1 below summarises the measured concentrations of contaminants of concern from groundwater samples at the site that have been reported in excess of the respective WQS values.

Table 8.1 Summary of Measured Concentrations of Dissolved Phase Groundwater Potential Contaminants of Concern in Excess of WQS Values

Potential Contaminant of Concern	Units	LoD*	WQS	Maximum Concentration	No. samples >WQS	Monitoring Well Location
Nickel	µg/l	0.2	4	20.8	1 of 2	BH03

* LOD= Laboratory Method Limit of Detection

Measured groundwater concentrations of Nickel have been reported in excess of the WQS protective of the controlled waters environment by either the same order of magnitude or one order of magnitude. Given the marginal nature of these exceedances, and;

- The exceedance is within one order of magnitude of the EQS standard, and only marginally exceeds the UK drinking water standard (20).
- The alluvium deposits and the Peterborough Member deposits are cohesive, with low permeability rates.
- The Peterborough Member being classed as an unproductive aquifer.
- The site is not located within a source protection zone.
- There are no abstraction (non-potable or potable) located within the vicinity of the site.
- There is potential for significant dilution between the 1 No. exceedance and the tertiary watercourse located approx. 150m south of the locality.
- The absence of a continuous groundwater body on site, with no water strikes observed during site investigation works in the surrounding borehole/trial pits.
- The site will incorporate buildings / hardstanding and a dedicated drainage system that shall reduce infiltration rates through the soils.

9. GROUND GAS RISK ASSESSMENT

9.1. Introduction

The ground gas risk assessment has been undertaken in accordance with the following guidance:

- BS 8485:2015+A1:2019;
- CIRIA C665, 2007;
- Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide Are Present, NHBC, 2007;
- A Pragmatic Approach to Ground Gas Risk Assessment RB17. CL:AIRE, 2012; and,
- Ground Gas Monitoring and 'Worst-Case' Conditions TB17, CL:AIRE, 2018.

The ground gas risk assessment has been conducted with full consideration of the viable sources, pathways and receptors included within the Preliminary Conceptual Site Model presented in Section 3.

Ground gas monitoring was conducted in conjunction with groundwater monitoring (and sampling); however, it should be noted during the gas monitoring was conducted first, prior to any groundwater monitoring / sampling works. The monitoring well locations and construction were designed with due consideration of the proposed development layout and preliminary conceptual site model. Further information pertaining to monitoring wells is provided in Table 4.2.

9.2. Ground Gas Monitoring Results

The ground gas monitoring results from the installations are presented in Appendix F.

Table 9.1 Ground Gas Monitoring Results Summary

Strata targeted by response zone	Monitoring well reference	Maximum peak CO_2 (%v/v)	Maximum steady state CO_2 (%v/v)	Maximum peak CH_4 (%v/v)	Maximum steady state CH_4 (%v/v)	Lowest O_2 recorded (%v/v)	Maximum peak gas flow rate (l/h)	Maximum steady state gas flow (l/h)	Depth to Base of Well (m bgl)	Depth to Top of Water (m bgl)
Peterborough Member	BH1	3.8	3.8	ND	ND	9.0	16.3	-0.1 (0.0)	4.00	1.32
Peterborough Member	BH2	2.0	2.0	ND	ND	9.1	-21.5	-9.1	4.09	1.52
Alluvium	BH3	2.5	2.5	ND	ND	17.9	0.9	0.2	2.78	0.98
Peterborough Member	BH4	4.6	4.4	ND	ND	8.8	0.0	0.0	5.41	2.30
River Terrace Deposits	WS1	4.8	4.8	ND	ND	9.0	0.8	0.1	3.07	1.31
Peterborough Member	WS5	3.3	3.3	ND	ND	17.8	1.2	0.0	3.93	0.56

Bold = maximum value reported across all visits.

9.3. Ground Gas Risk Assessment

Table 9.2 and Table 9.3 demonstrate how, in accordance with CIRIA C665, the periods and frequency of monitoring have been selected for the site.

Table 9.2 From Table 5.5a CIRIA C665 - Typical/idealised periods of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
	2	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
Sensitivity of development	**Low (commercial)**	1 month	[✓ 2 months]	3 months	6 months	12 months
	Moderate (flats)	2 months	3 months	6 months	12 months	24 months
	High (residential with gardens)	3 months^{1}	6 months	6 months	12 months^{1}	24 months

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over “high”, “medium” or “low” generation potential of source.

Table 9.3 From Table 5.5b CIRIA C665 - Typical/idealised frequency of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
	2	**Very Low**	**Low**	**Moderate**	**High**	**Very High**
Sensitivity of development	**Low (commercial)**	[✓ 4]	6	6	12	12
	Moderate (flats)	6	6	9	12	24
	High (residential with gardens)	6^{1}	9	12	24^{1}	24

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over “high”, “medium” or “low” generation potential of source.

The total atmospheric pressure range of the ground gas monitoring data included in this report was between 994mbar and 1021mbar. This range covers low and high atmospheric pressures. Monitoring events included periods of falling and steady pressure trends.

Consideration of Groundwater Effects

An assessment has been made to determine whether groundwater levels beneath the site lie at a shallow depth at, or above, the plain section of the monitoring well. In those instances where shallow groundwater is located within the plain section of the monitoring well pipe, this can result in ‘groundwater pumping’ where the measured peak (and in some cases steady) flow rates reported at these monitoring well locations are significantly (and artificially) influenced by the pressures formed in the void above the groundwater in the plain section of the pipe, as opposed to being truly representative of the ground gas flow rates. A similar ‘groundwater pumping’ effect can also occur in low permeability cohesive strata as encountered within this site. In such instances, these scenarios can create 'artificial' negative and /or relatively high peak positive readings depending on whether the groundwater levels have increased or decreased in between monitoring events or since installation of the monitoring wells.

The gas monitoring results have indicated the following instances where groundwater pumping is likely to have influenced the measured ground gas flow rates and that BH01 and BH02 have shown evidence of 'vacuums' and 'piston effect' with elevated negative flows and as such they may be reasonably discounted from the Gas Screening Value (GSV) calculation. Evidence of groundwater levels affected flow rates is event in all monitoring wells with flow rates quickly stabilising to 'not detected'.

The results of the ground gas monitoring have been assessed in accordance with the criteria specified for this site, which were derived as described in Appendix L.

Initial 'Worst-Case' GSV Calculation – Carbon Dioxide and Methane

An initial conservative assessment has been made by calculating a 'worst-case' Gas Screening Value (GSV) for the site by using:

- the maximum reported methane or carbon dioxide concentration (whichever is highest) from any monitoring well and during any ground gas monitoring visit; and,
- the remaining maximum peak positive flow rate (after any negative flow rates or 'artificially' high flow rates have been discounted as described above) from any monitoring well and during any ground gas monitoring visit.

Table 9.4 Initial Worst-Case GSV Calculation

Ground Gas	Maximum Reported Peak Concentration (% v/v)		Selected Concentration used in GSV Calculation (% v/v)		Maximum Appropriately Selected Gas Flow Rate (l/hr)		'Worst case' GSV (l/hr)
Methane (CH_4)	0.0	→	4.8	3.8	1.2	=	0.0576
Carbon dioxide (CO_2)	4.8						

CIRIA C665 provides two separate methods to 'characterise' a site that firstly requires the assessor to distinguish between two fundamental development 'situations':

- **Situation A** - Any development other than Situation B (e.g. factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements, etc) for which the **Modified Wilson and Card 'Characteristic Situation' classification system** is applied; and,
- **Situation B** - Low rise building with minimum ventilated under floor void (min 150 mm) for which the **NHBC Traffic light classification system** is applied

In this instance, as the site is due to be developed as factory/office industrial/commercial building, it shall be regarded as a Situation A scenario for the purposes of the ground gas risk assessment.

Table 9.4 demonstrates that the site is placed in a Characteristic Situation 1 – Very Low Risk scenario on the basis of the 'worst case' GSV which means ground gas protection measures are not required.

Carbon Monoxide and Hydrogen Sulphide

There is no current UK risk assessment guidance available for carbon monoxide and hydrogen sulphide derived from ground gases.

A maximum peak carbon monoxide concentration of 5ppm (BH04) has been reported which is below the workplace long term exposure limit (30ppm) and the workplace short term exposure limit (200ppm) published by the Health and Safety Executive (EH40/2005 Workplace Exposure Limits) and below the WHO long term (24 hours) indoor exposure guideline value (5.68ppm).

A maximum peak hydrogen sulphide concentration of 0ppm has been reported which is below the workplace long term exposure limit (5ppm) and the workplace short term exposure limit (10ppm) published by the Health and Safety Executive (EH40/2005 Workplace Exposure Limits).

9.4. Radon Gas

Less than 1% of properties are affected by Radon therefore no ground gas protection measures are required.

9.5. Ground Gas Protection Measure Requirements

No ground gas protection measures are anticipated based on the Preliminary Risk Assessment Conceptual Site Model and the preliminary ground gas monitoring results; however, this will be updated upon completion of the remaining ground gas monitoring visits.

10.REVISED CONCEPTUAL MODEL AND GENERIC QUANTITATIVE RISK ASSESSMENT OF POLLUTANT LINKAGES

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 3, has been revised in light of the ground investigation and the chemical analysis results presented above in Table 10.1, below.

The revised conceptual site model is presented in schematic form in Appendix A, Drawing No. TE1585-TE-00-DR-GE-007-V01.

A revised qualitative risk assessment has also been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.

Table 10.1 Revised Assessment of Pollutant Linkages.

Justification / Comments	Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
• The site is currently agricultural land for grazing and crops. • The site has been agricultural land for over 120 years. There is some evidence of Made Ground in the southern field which is associated with former compound for M40 construction (Archaeology Aerial photograph confirmed it). •The site is situated between the M40 Junction 9 (west) and the A41 (south). The northern boundary is Green Lane and to the east agricultural land. • There are Alluvial Deposits within the centre, along watercourse and to the east/northeast and these are primarily silty sandy gravelly CLAY. The exploratory logs show these deposits to be around 0.50-1.60m thick which correlate with the BGS logs of 1.00-1.50m thick. • Additionally in the north western part of the proposed building (WS01) River Terrace Deposits were possibly identified with evidence of SAND. Beneath the majority of the development plot is extremely weathered MUDSTONE recovered as dark grey CLAY. With evidence of Kellaways Sand Member to the west of the development and Kellaways Clay Member to the extreme north and west (toward M40). • Little groundwater was encountered; it was sporadic and perched in various formations as mainly seepages. • The majority of the site is classed as an unproductive aquifer with the Kellaway Sand Member, the River Terrace Deposits and Alluvial Deposits classified as Secondary A Aquifer. There are no SPZ or potable/non potable water abstractions within 500m of site. • No recorded landfills within 500m of site and the radon risk is less than 1%. There are no other potential sources of ground gas identified within the site walkover or within the site's boundaries. • There is a small brook that runs parallel to the M40 and then cuts west to east through the southern end of the site. There is a wooded area with a large pond along the southern edge of the site adjacent to the M40 Junction 9 southbound slip road. At this stage there is no ecology report signifying any risks to protected species. • Localised within TP21 (mound in northern area) <0.001% Chrysotile asbestos identified. This mound will be removed from the Siemens demise and reused to construct the landscaped bunds adjacent to the M40 as shown on drawing 'TE1585-TE-XX-00-DR-GE-008-V01' included within appendix A.	Made Ground in southern field as part of former compound and in the northern part of site where barns/outbuildings were constructed in circa 2009-2015.	Heavy Metals, PAHs, TPHs	Dust migration and inhalation	Future Site Users/Construction Workers	Medium	Unlikely	**Low risk**
			Vapour inhalation		Medium	Unlikely	**Low risk**
			Lateral and vertical migration of mobile contaminants	Secondary A Aquifers and Unnamed Brook onsite	Medium	Unlikely	**Low risk**
			Leaching and migration via groundwater		Medium	Unlikely	**Low risk**
	Made Ground In Mound to North of site Boundary	Asbestos	Dust migration and inhalation	Future Site Users/Construction Workers	Medium	Low Likelihood	**Low risk**
	No significant ground gas sources identified	Ground Gases	Lateral / vertical migration via preferential pathway	Future Site Users/Construction Workers	Severe	Negligible	**Very Low Risk**
			Vapour inhalation		Severe	Negligible	**Very Low Risk**

For definition of the terms used in the qualitative risk assessment, please see Appendix I.

11.PRELIMINARY WASTE SOILS CLASSIFICATION AND WASTE DISPOSAL ROUTE DETERMINATION

If the site is to be redeveloped and materials are disposed offsite, the material exported from the site to Landfill should be hauled by a register waste character in accordance with Duty of Care Regulations 1991 and the Hazardous Waste Regulations 2005.

It will be necessary to register the site in advance of the intended reclamation works with the Environment Agency before disposal to landfill can take place. There will be requirement for the waste producer to provide appropriate Waste Acceptance Criteria (WAC) testing of the Soils for disposal to ensure that the soils are appropriately classified and that the landfill is licensed to receive such soils. A consignment note shall be completed, signed and retained by all parties involved. The consignment note shall state the volume of waste, a physical description of the material and statement of its chemical composition. The waste consignment notes shall be kept by the contractor for a period of at least two years.

Tier Environmental have assessed the chemical results in terms of basic characterisation of soils for waste. This provides a preliminary assessment of whether a material is potentially inert/non-hazardous or hazardous waste, with the final outcome being determined by WAC testing.

Basic waste characterisation has demonstrated that 1 No. of the samples of the material tested have been classified as potentially hazardous waste:

- TP23 at 1.00m bgl – Toluene – given the lack of TPH within the trial pit, no visual or olfactory contamination / free product it is considered that this should be classed as non-hazardous as the rest of the site.

All other results using HazWasteOnline demonstrated all the tested soils to come back as non-hazardous.

Natural soils are likely to be suitable for disposal to an inert waste landfill.

WAC testing was carried out on 3 No. samples and all three are suitable for inert landfill if required

- TP24 0.50m
- TP12 0.40m
- TP06 0.40m

12.CONCLUSIONS AND RECOMMENDATIONS

12.1. Conclusions

Human Health Risk Assessment

There were no recorded exceedances of contaminants of concern in respect to the GACs for commercial/industrial developments.

The Made Ground sample from TP21 at 0.50m was reported to contain trace (<0.001% w/w) chrysotile fibre bundles. The presence of the low-level asbestos does not preclude re-use in areas of lower sensitivity (such as beneath buildings / hardstanding). It should be noted that no asbestos containing materials (ACMs) were observed during the site works and this mound is to be reused within the proposed landscape bunds adjacent to the M40 (outside of the Siemens demise) as shown on drawing 'TE1585-TE-XX-00-DR-GE-008-V01' included within appendix A.

Ground Gas

Based on the Preliminary Risk Assessment Conceptual Site Model and the initial gas monitoring there are no elevated levels of ground gas and a Characteristic Situation 1 – very low risk is determined.

Infiltration Test Results

The infiltration tests show the Peterborough Member, recovered as CLAY and MUDSTONE, is not a suitable strata for soakaways/infiltration drainage.

Coal Tar

The one sample of Made Ground asphalt sampled demonstrated <0.01mg/kg of Benzo(a)pyrene and <0.1% of coal tar. It is therefore considered that the asphalt is not coal tar bearing.

12.2. Recommendations

Based upon the findings of this ground investigation, the following enabling works are recommended in order to make the site safe and suitable for redevelopment:

- Lime stabilisation of soft clays in areas of cut and fill and the installation of vibro stone columns (VSCs) beneath proposed foundations and floor slabs.
- General site clearance including areas of hardstanding, obstructions around WS06, separation of Made Ground from the mounds to the north, car park area and Southern Field, separation of the subsoil and topsoil for reuse across the wider development;
- Register 2 No. Material Management Plans, one for the Specific Site Planning Boundary and one for the proposed future phases of development;
- Bulk earthworks to achieve the proposed development levels, with soft cohesive materials lime stabilised and all fill compacted in accordance with a recognised specification, such as Specification for Highways Works Series 600; and,
- Laboratory chemical testing and risk assessment of all imported materials to confirm suitability for use (if required).

13.REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other organisations for their comment and approval prior to undertaking any works on site.

It is recommended that conditions placed on any planning permission are discharged prior to commencement of site works.

14.REFERENCES

BRE BR211 (2015). Radon: Guidance on Protective Measures for New Dwellings. IHS BRE Press, Bracknell.

BRE SD1 (2005). Concrete in Aggressive Ground. Special Digest 1 (revised edition). IHS BRE Press, Bracknell.

BRE 414 (2001) Protective measures for housing on gas-contaminated land. BRE.

BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites - Code of Practice. British Standards Institution, London.

BS EN 1997-1:2004 Eurocode 7. Geotechnical Design. General Rules. British Standards Institution, London.

BS EN 1997-2:2007 Eurocode 7. Geotechnical Design. Ground Investigation and Testing. British Standards Institution, London.

BS5930:2015+A12020 Code of practice for ground investigations BSI

BS EN ISO 17892-1-12:2018 Geotechnical investigation and testing BSI

BS EN ISO 14688-1:2018 Geotechnical Investigation and Testing. Identification and Classification of Soil. Identification and Description. British Standards Institution, London.

BS EN ISO 14688-2:2018 Geotechnical Investigation and Testing. Identification and Classification of Soil. Principles for a Classification. British Standards Institution, London.

BS EN ISO 14689-1:2018 Geotechnical Investigation and Testing. Identification and Classification of Rock. Identification and Description. British Standards Institution, London.

BS8485 2015 Code of Practice for the design of protective measures for methane and carbon dioxide ground gases in new buildings. British Standards

BS85762013 Guidance on investigations for ground gas – permanent gases and volatile organic compounds (VOCs). BSI,

CIRIA Rep R 97 (2001) Trenching Practice. Report 097, 2nd edition, CIRIA, London.

CIRIA Rep R 149 (1995a) Protecting Development from Methane. Report 149, CIRIA, London.

CIRIA Rep R 150 (1995b) Methane Investigation Strategies. Report 150, CIRIA, London.

CIRIA Rep R 151 (1995c) Interpreting Measurement of Gas in the Ground Report 151, CIRIA, London.

CIRIA Rep R 152 (1995d) Risk Assessment for Methane and Other Gases from the Ground. Report 152, CIRIA, London.

CIRIA Rep R 132 (1996) A Guide for Safe Working on Contaminated Sites. Report 132, CIRIA, London.

CIRIA C552 (2001) Contaminated land risk assessment. A guide to good practice (report no. C552).

CIRIA C665 (2007) Assessing the risks posed by hazardous gases to buildings CIRIA, London

CIRIA C748 (2014) Guidance on the use of plastic membranes as VOC barriers, CIRIA, London

CIRIA C735 (2014) Good practice on the testing and verification of protection systems for buildings against hazardous ground gases. CIRIA.

CIRIA C681 (2009) Unexploded ordnance (UXO) A guide for the construction industry (C681)

CIRIA C785 (2019) Unexploded ordnance (UXO) risk management guide for land-based projects (C785)

CIRIA C758D (2019) Abandoned mine workings manual (C758D)

Contaminated Land: Applications in Real Environments (CL:AIRE) (2011) Definition of Waste Code of Practice (version 2).

Department of Environment Food and Rural Affairs (DEFRA) (2012) Environmental Protection Act 1990:Part 2A Contaminated Land Statutory Guidance (report no. PB13735).

Environment Agency (2000) Technical Aspects of Site Investigation. Report P5-065/TR, Environment Agency, Bristol.

Environment Agency (2002) Guidance on Monitoring Landfill Leachate, Groundwater and Surface Water. Report LFTGN02, Environment Agency, Bristol.

Environment Agency (2007) Evaluation of Models for Predicting Plant Uptake of Chemicals from Soil. Report SC050021/SR, Environment Agency, Bristol.

Environment Agency (2006) Remedial Targets Methodology - Hydrogeological Risk Assessment for Land Contamination (report no.ea/br/e/std/vr10thanni).

Environment Agency (2008) Science Report SC050021/SR7 Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values.

Environment agency, 2007. Inter-laboratory comparison of in vitro bioaccessibility measurements for arsenic lead and nickel in soil, Science Report SC040060/SR2.

Environment Agency, 2009 Human health toxicological assessment of contaminants in soil (Science Report Final SC050021/SR2)

Environment Agency (2015) Guidance on the Classification and Assessment of Waste Technical Guidance WM3 (1st edition).European Union (1998) Drinking Water Directive (Council Directive 98/83/EC).

Gibbons, R. (1994) Statistical Methods for Groundwater Monitoring. Wiley, New York.

Groundsure Report 2021 GSIP-2021-10752-4061

Highways Agency (2006) Design of Pavement Foundations. Document HD 25/IAN 73/06.

HSE (1991) Protection of Workers and the General Public During the Development of Contaminated Land. HMSO, London.

HSE (2005) Occupational Exposure Limits. HSE report EH40/2005, HMSO, London.

ICRCL (1986) Notes on the Fire Hazards of Contaminated Land. Guidance Note 61/84, 2nd Edition, Interdepartmental Committee on the Redevelopment of Contaminated Land, London.

Jeffries, J.(2009). A review of body weight and height data used within the Contaminated Land Exposure Assessment model (CLEA). Project SC050021/ Technical Review 1. Bristol: Environment Agency

Land Contamination Risk Management (LCRM) Environment Agency October 2020 https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm .

LQM/CIEH Ltd (2015) S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham.

NHBC (2007) Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present (report no .04).

NRA (1994) Protocol for a Leaching Test to Assess the Leaching Potential for Soils from Contaminated Sites. R&D Note 181.

SoBRA (2017) Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater – Version 1.0.

The Water Framework Directive, (Standards and Classification) Directions (England and Wales).

UK Water Industry Research (2010) Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (report no. 10/WM/03/21)

WHO (2000) Air Quality Guidelines for Europe. 2nd edition, WHO Regional Office for Europe, Copenhagen.

World Health Organisation (2017) Guidelines for Drinking Water Quality (4th edition).

Britain From Above - https://britainfromabove.org.uk/en/image/WPW060399

http://www.warstateandsociety.com/Bombing-Britain

https://www.epa.gov/pfas/basic-information-pfas

UK Maps of Radon, http://www.ukradon.org/information/ukmaps

Health and Safety Executive (2015) Construction (Design and Management) Regulations.

Coal Authority Interactive Map Viewer, http://mapapps2.bgs.ac.uk/coalauthority/home.html

BGS Geology of Britain Viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html

15.GLOSSARY OF TERMS

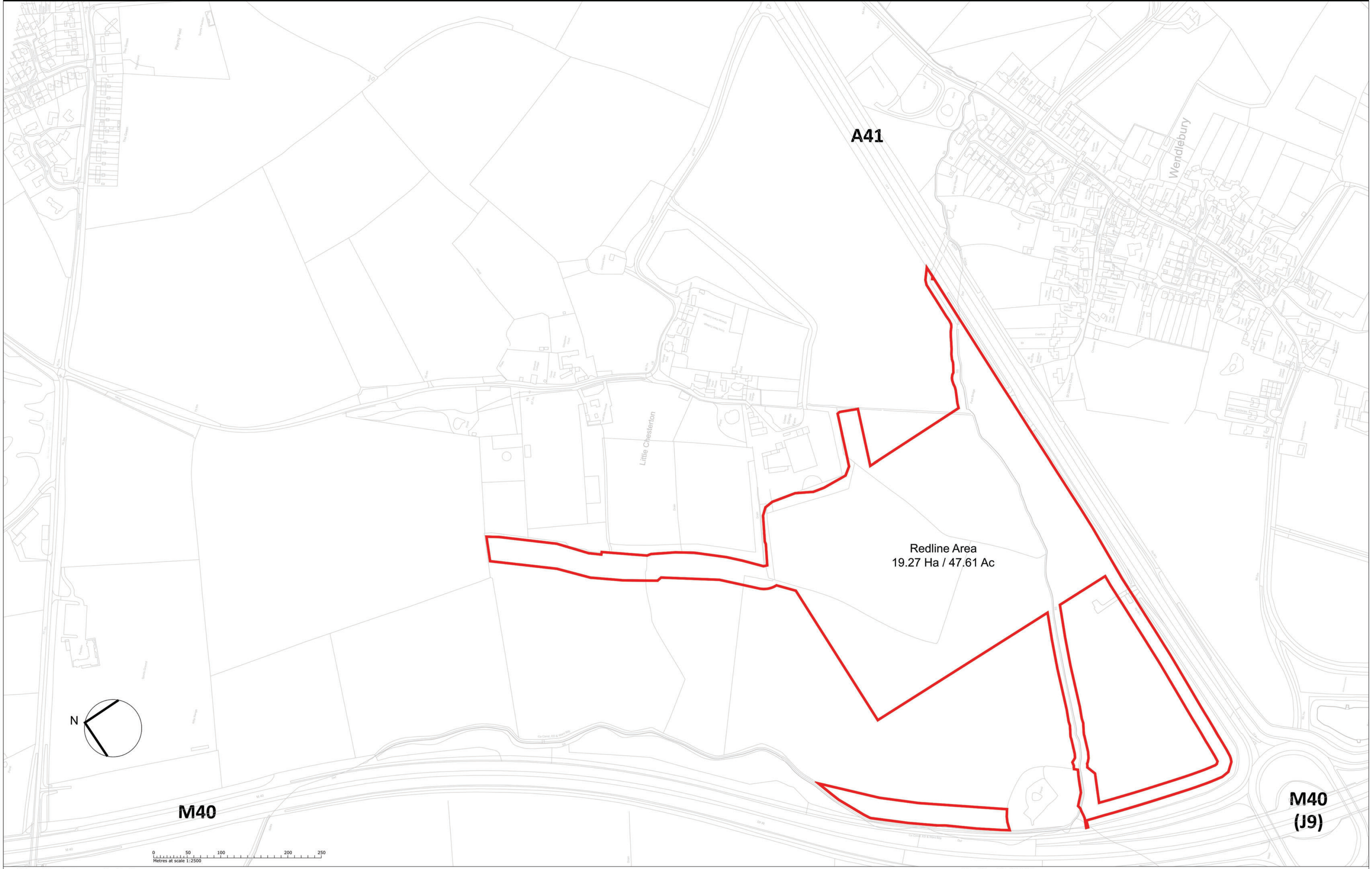
ACEC	Aggressive Chemical Environment for Concrete (classification)
aOD	Above Ordnance Datum
bgl	Below ground level
BGS	British Geological Survey
BRE	Building Research Establishment
CBR	California Bearing Ratio (test)
COMAH	Control of Major Accident Hazards (regulations)
Designated location	Site (and the ecosystem on that site) protected under national of international legislation. A potential ecological receptor to be considered as part of the assessment of land contamination. Example designated locations include SSSIs (q.v.), SACs (q.v.), national nature reserves, Ramsar sites and bird special protection areas.
DQA	Data Quality Assessment
DQO	Data Quality Objective
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standard
EQS	Environmental Quality Standard
GAC	Generic Assessment Criterion
GQA	General Quality Assessment (Environment Agency)
GSV	Gas Screening Value
HCV	Health Criteria Value
IPPC	Integrated Pollution Prevention and Control (regulations)
K_{ow}	Octanol-water partition coefficient
LEL	Lower Explosive Limit
LL	Liquid Limit
LoD	Limit of Detection (analytical)
LoQ	Limit of Quantification (analytical)
Mean Value Test	Statistical test (described in the CIEH Guidance) to estimate the mean value of a normally distributed population of data at a given level of confidence. Normally for contaminated land assessment, the 95th percentile (referred to as the 95%UCL or US95) is applied as a reasonable but conservative estimate of the mean concentration for comparison with the relevant assessment criteria.
Maximum Value Test	Statistical test (described in the CIEH Guidance) to identify whether an elevated concentration within a normally distributed data set forms part of the underlying population from which it has been sampled or whether it is an outlier (such as a localised area of contamination) that merits further consideration.
MC	Moisture Content
NGR	National Grid Reference
NIHHS	Notification of Installations Handling Hazardous Substances (regulations)
OS	Ordnance Survey
PI	Plasticity Index
PID	Photoionisation Detector
PL	Plastic Limit
ppm	Parts per million
ppmv	Parts per million by volume
QA	Quality Assurance
QC	Quality Control
SAC	Special Area of Conservation
SOM	Soil Organic Matter

SPT	Standard Penetration Test
SPZ	Source Protection Zone (see Appendix K)
SSAC	Site-Specific Assessment Criterion
SSSI	Site of Special Scientific Interest
SVOC	Semi-Volatile Organic Compound
TEF	Toxicity Equivalent Factor
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average
US95	95th percentile estimate of the true mean value of a data population (also known as 95%UCL).
VOC	Volatile Organic Compound

APPENDIX A - DRAWINGS

Symmetry Park, Oxford North

Location Plan



SGP
Architects + Masterplanners

Waterfront House,
2a Smith Way, Grove Park,
Enderby, Leicester,
LE19 1SX
t: +44 (0)116 247 0557
www.stephengeorge.co.uk

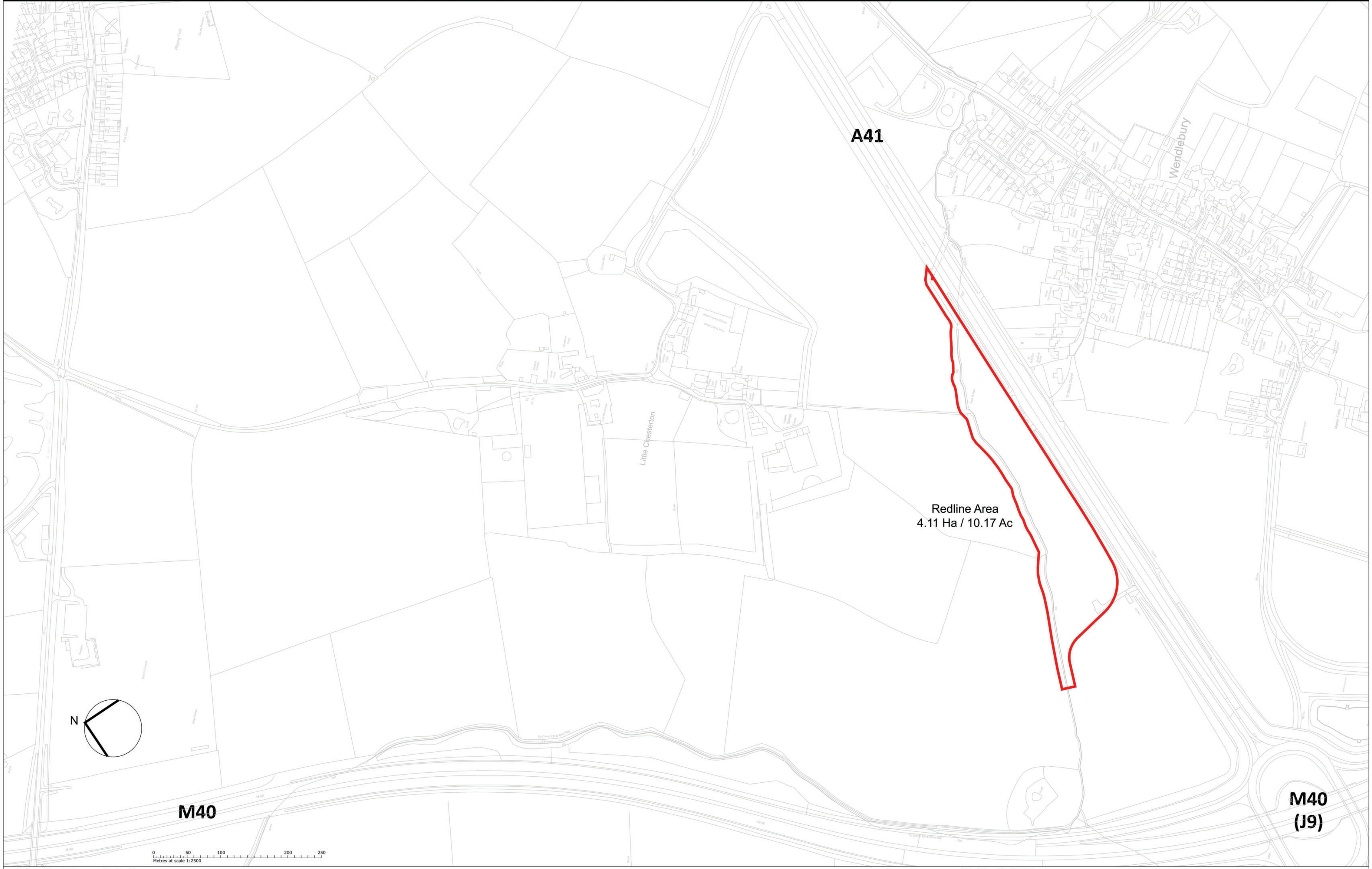
SGP File Ref: 13-222
Project No: 13-222
Drawn By: MMS
Date: 09/2021

Drawing No: 13-222-SGP-STE-00-DR-A-131002
Rev: P4
Scale: 1:2500 @A1

Rev	Date	By	Description

TRITAX SYMMETRY
A TRITAX BIG BOX COMPANY

Symmetry Park, Oxford North | **Location Plan**



SGP
Architects + Masterplanners

Waterfront House,
2a Smith Way, Grove Park,
Enderby, Leicester,
LE19 1SX
t: +44 (0)116 247 0557
www.stephengeorge.co.uk

SGP File Ref: 13-222
Project No: 13-222
Drawn By: MMS
Date: 09/2021

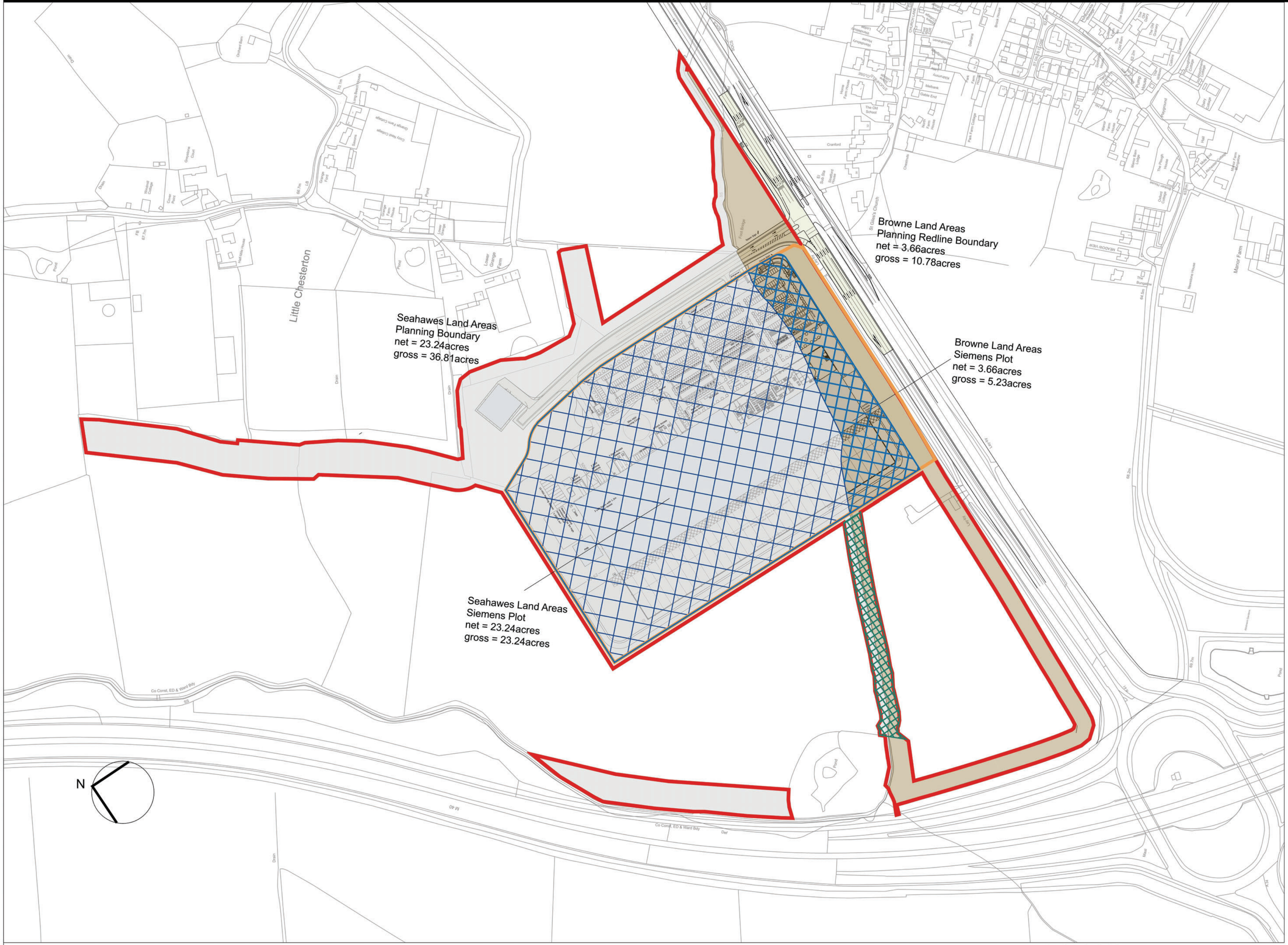
Drawing No: 13-222-SGP-STE-00-DR-A-131007
Rev: **P1**
Scale: 1:2500 @A1

Rev	Date	By	Description

TRITAX SYMMETRY
A TRITAX BIG BOX COMPANY

Symmetry Park, Oxford North

Land Ownership Plan



Key

- ▨ Gross site Area not purchased by the developer: 1.22Ac
- — Planning Application Boundary
- ▭ Seahawes Land Ownership within Planning Boundary 36.81Ac
- ▭ Browne Land Ownership within Planning Boundary 10.78Ac
- ▭ Seahawes Land Siemens Gross Site Area 23.24Ac
- ▭ Browne Land Siemens Gross Site Area 5.23Ac
- ▨ Seahawes Land Siemens Net Site Area 23.24Ac
- ▨ Browne Land Siemens Net Site Area 3.66Ac

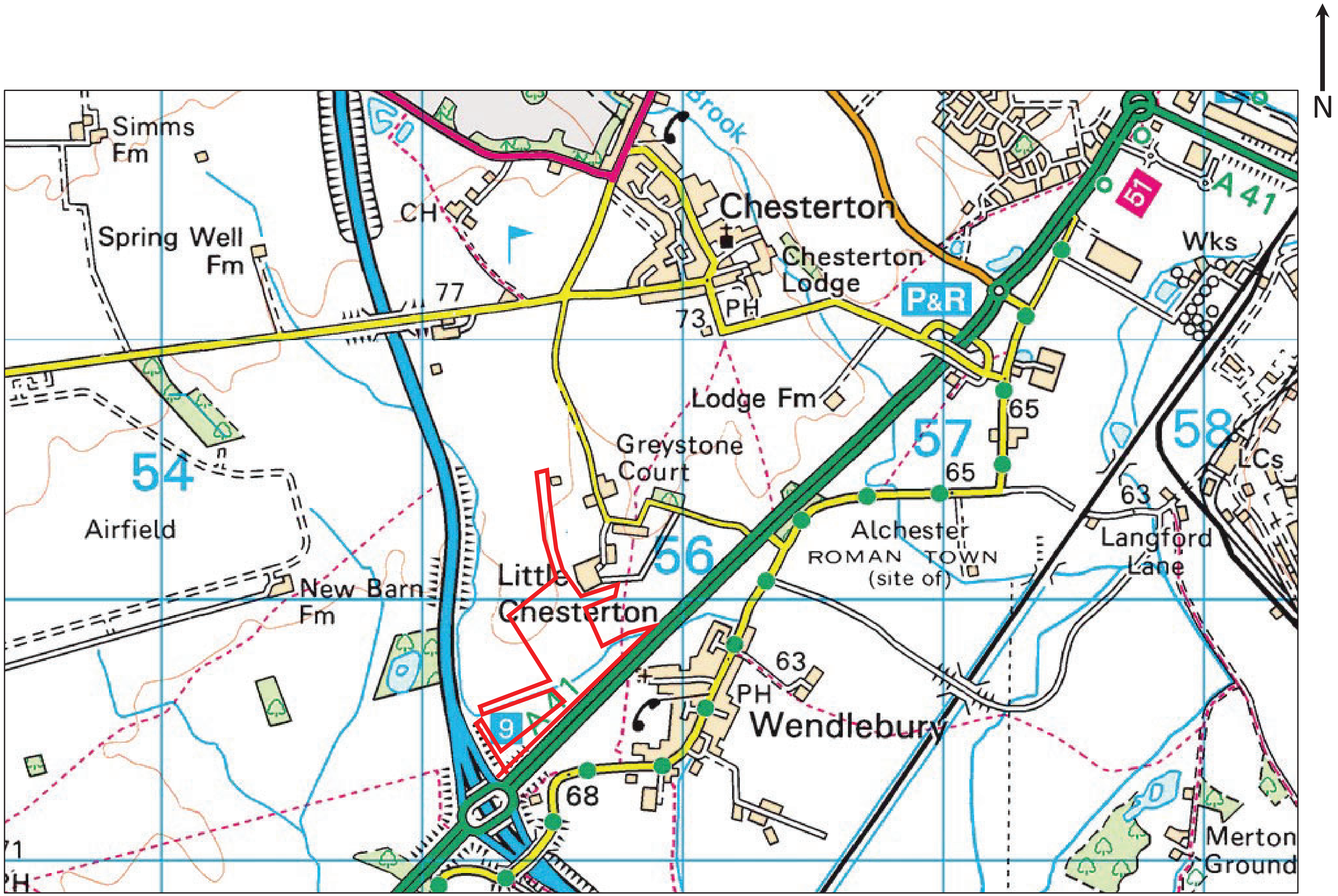
SGP
Architects + Masterplanners

Waterfront House,
2a Smith Way, Grove Park,
Enderby, Leicester,
LE19 1SX
t: +44 (0)116 247 0557
www.stephengeorge.co.uk

SGP File Ref:	13-222-A016	**Drawing No:**	13-222-A016
Project No:	13-222	**Rev:**	C
Drawn By:	JMS	**Scale:**	1:2000 @A1
Date:	09/2021		

Rev	Date	By	Description

TRITAX SYMMETRY
A TRITAX BIG BOX COMPANY



Legend:

🟥 Site Boundary

Tier Environmental Ltd,
Suite 513, Chadwick House,
Warrington Road,
Birchwood, WA3 6AE

CLIENT: Tritax Symmetry Ltd

PROJECT TITLE:
Oxford North, Symmetry Park, Oxfordshire

DRAWING TITLE:
Site Location Plan

DRAWING REF: TE1585-TE-00-XX-DR-GE-001-V01

AUTHOR: SDM
REVIEWER: SDM
SCALE: NTS

DRAWING DATE:
June 2021

DRAWING STATUS:
FINAL

Notes:

LEGEND

PROPOSED CABLE PERCUSSION BOREHOLE -	◕
PROPOSED TRIAL PIT -	▚
PROPOSED WINDOW SAMPLE -	◕
Plate Bearing Tests with Excavator CBR	◩
A mixture of hand pits and excavated pits to determine location of water main and foul rising main	▚
Rotary Borehole	◕
Machine Excavated Trial Hole	▚
Trial Trench For Services	🟧
Areas of Archaeology	🟨
Hand Dug Pit	🟩

Issue	Date	By	Chk'd	App'd

Richmond House, Sandpiper Court, Chester Business Park, Chester, CH4 9QZ
T: 01244 684 900 E: info@tieruk.com www.tierconsult.co.uk

Client: TRITAX SYMMETRY

Project Title:
OXFORD NORTH

Drawing Title:
ACTUAL AND PROPOSED EXPLORATY HOLE LOCATIONS PLAN

Scale at A0:	Drawn By:	Start Date:
NOT TO SCALE	SDM	Oct 2021

Project No: TE1585

Drawing Status: INFORMATION

Drawing No: TE1585-TE-00-XX-DR-GE-006

Issue: V05

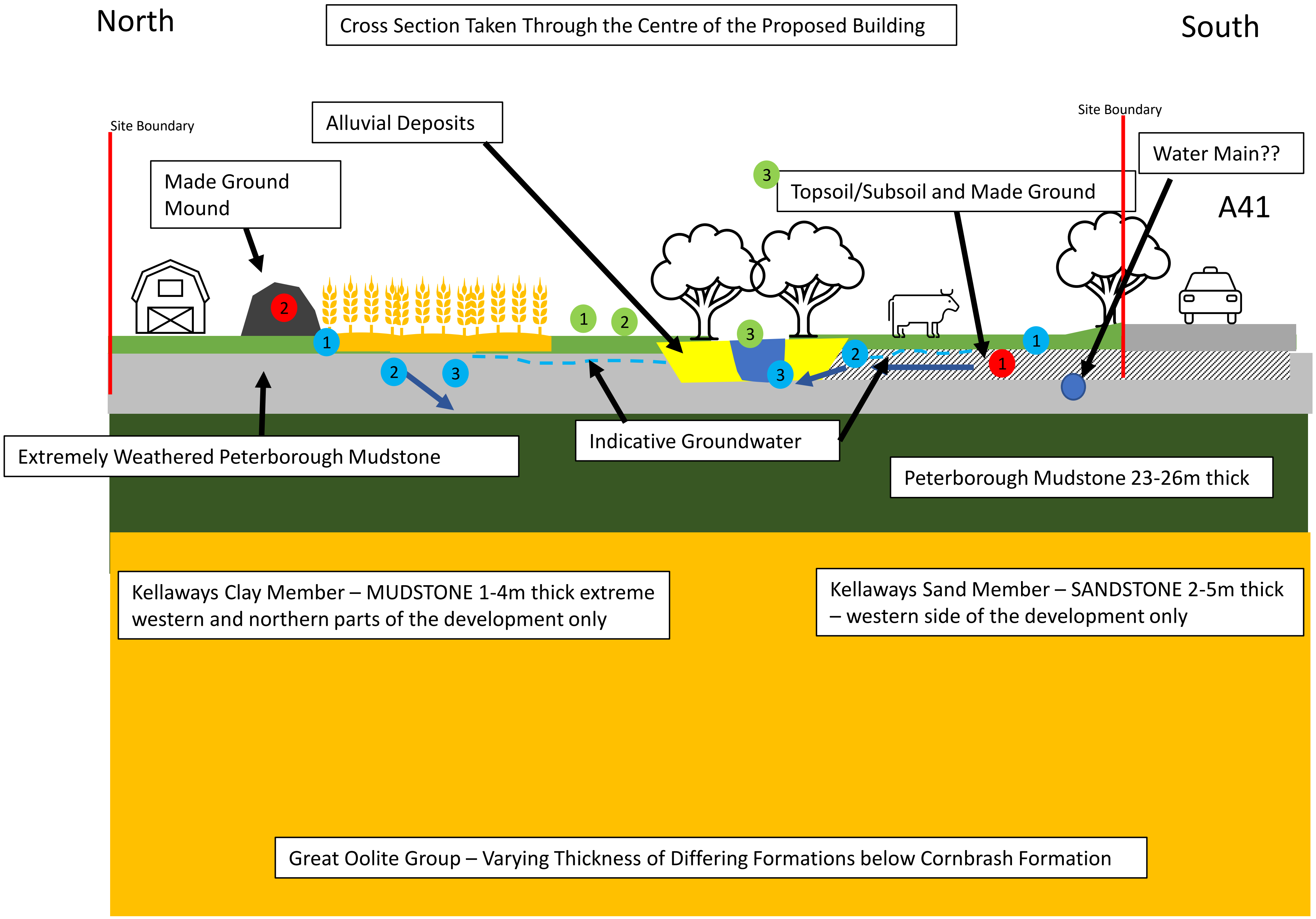
TP21: Trace amounts (<0.001%) of chrysotile fibre bundle asbestos identified

TP21 material is to be reused within the proposed landscape mound adjacent to the M40 (outside of the Siemens demise).

TIER
CONSULT

Drawing: Asbestos relocation Plan
Drawing No: TE1585-TE-XX-00-DR-GE-008-V01
Drawn: ER
Reviewed: AR
Approved: SL
Date: 21.01.22

Cross Section Taken Through the Centre of the Proposed Building



Sources

- ① Former Compound Made Ground
- ② Made Ground in Mound

Pathways

- ① Direct Contact, ingestion or inhalation
- ② Leaching and Migration Via Groundwater
- ③ Lateral and/or Vertical Migration of Mobile Contaminants

Receptors

- ① Future Site Users
- ② Construction Workers
- ③ Surface Water and/or Groundwater

Tier Environmental Ltd,
Suite 513, Chadwick House,
Warrington Road,
Birchwood, WA3 6AE

CLIENT: Tritax Symmetry Ltd

PROJECT TITLE:
Oxford North, Symmetry Park, Oxfordshire

DRAWING TITLE:
Post Fieldwork Conceptual Site Model

DRAWING REF: TE1585-TE-00-XX-DR-GE-007-V02

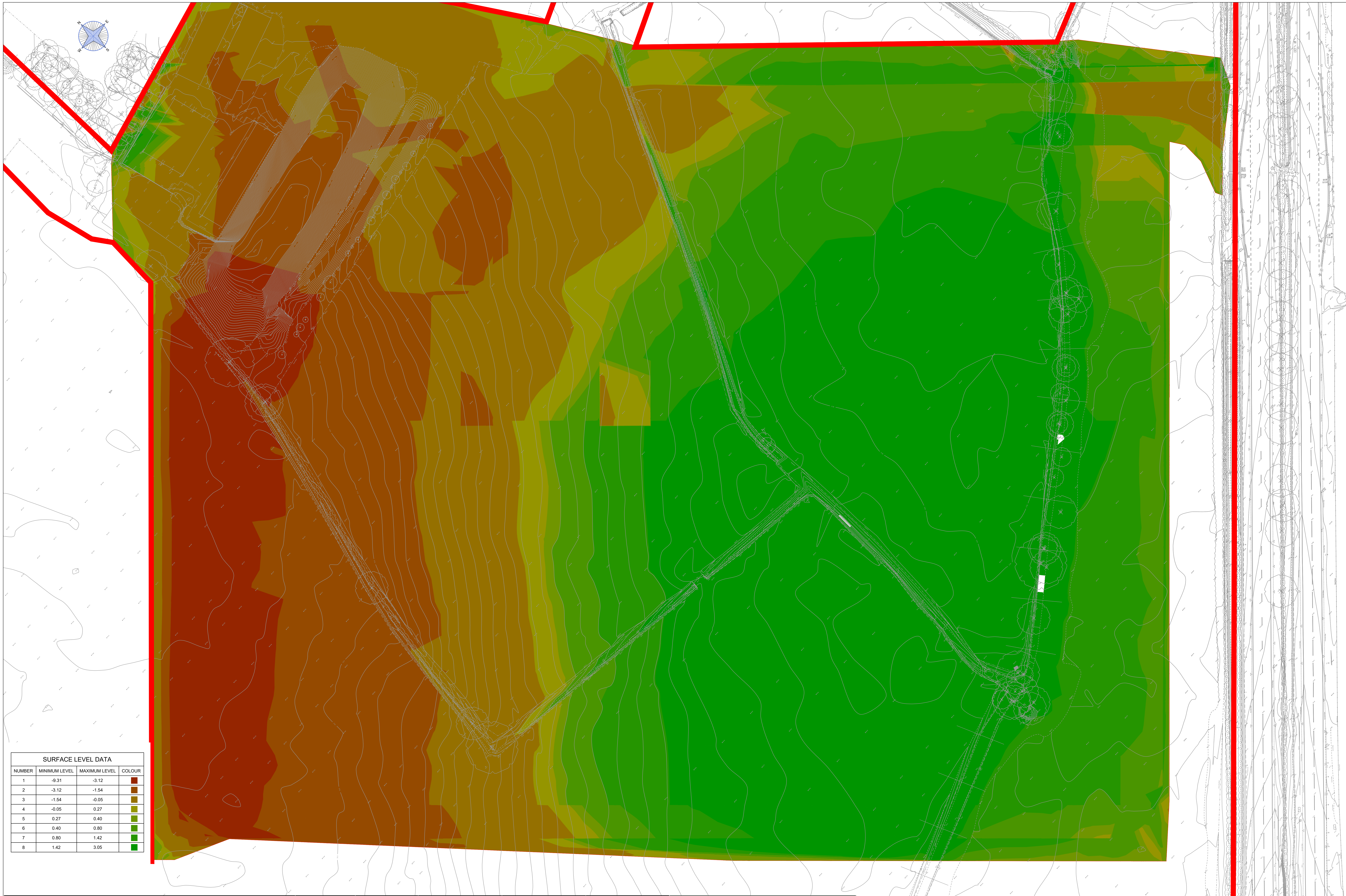
AUTHOR: SDM

REVIEWER: AR

SCALE: NTS

DRAWING DATE:
Nov 2021

DRAWING STATUS:
FINAL



SURFACE LEVEL DATA

NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR
1	-9.31	-3.12	🟥
2	-3.12	-1.54	🟫
3	-1.54	-0.05	🟫
4	-0.05	0.27	🟨
5	0.27	0.40	🟩
6	0.40	0.80	🟩
7	0.80	1.42	🟩
8	1.42	3.05	🟩

Component	Area (m2)	Depth (m)	Volume of Excavation (m3)	Volume of Infil (m3)	Total Volume (m3)	Description
Topsoil Strip	134,107	0.300	40,232	0	40,232	Topsoil be formed into bunds
Material from Exiting Mound			18,885		18,885	
Bulk Earthworks Volumes	134,107		101,432	109,910	-8,478	Imported Material
Volme of Water course diversion			3,964		3,964	
Approx Drainage and arisings	134,107	0.175	23,469		23,469	
Total Earthworks Volumes	**111,561**				**70**	Excess Material

Notes

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS TOGETHER WITH THE APPROPRIATE SPECIFICATIONS.
- IT IS THE CONTRACTORS RESPONSIBILITY TO CHECK ALL DIMENSIONS ON SITE. DIMENSIONS MUST NOT BE SCALED FROM THIS DRAWING. ANY DISCREPANCIES TO BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT IN WRITING.
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- ALL LEVELS ARE IN METRES, UNLESS NOTED OTHERWISE
- ROAD LEVEL TAKEN FROM STANTEC DRAWING XC_CONTOURS

Rev	Date	By	Description	Appd
P4	28.10.21	JCB	Updated with new site levels	PJB
P3	26.07.21	JCB	Issued for Information	PJB
P2	23.07.21	JCB	Issued for Information	PJB
P1	19.07.21	JCB	Issued for Information	PJB

Revisions

Status

PRELIMINARY

Tier Consult Ltd.
Richmond House
Sandpiper Court
Chester Business Park
Chester | CH4 9QZ
t: 01244 684900

Client

TRITAX SYMMETRY

Project

SYMMETRY PARK,
OXFORD NORTH

Title

PROPOSED EARTWORKS

Scale
1:500@A0

Drawn
JCB

Revision
P4

Date
JUL'21

Checked
WNL

Drawing Ref :
Project no|Originator|Volume|Level|Type|Role|Number

T/21/2407 60-03

APPENDIX B - EXPLORATORY HOLE LOGS

Borehole Log

Borehole No.	**BH1**	Sheet 1 of 1	
Project Name:	Oxford North Symmetry Park	Project No.	TE1585
Co-ords:	455484.67 - 219784.14	Hole Type	CP
Location:	Little Chesterton, Bicester	Level:	66.61
Scale	1:50	Client:	Tritax Symmetry
Dates:	29/09/2021 - 29/09/2021	Logged By	ST

Samples and In Situ Testing Depth (m)	Type	Results
0.30	D	
1.00	D	
1.20	D	
1.20	SPTL	
1.20	S	N=2 (1,1/0,1,0,1)
1.20 - 1.70	B	
2.00	D	
2.00	SPTL	
2.00	S	N=7 (1,2/1,2,2,2)
2.50	D	
3.00	B	
3.00	D	
3.00	SPTL	
3.00	S	N=10 (1,2/2,2,3,3)
4.00	D	
4.00	SPTL	
4.00	S	50 (25 for 0mm/50 for 0mm)

Depth (m)	Level (m)	Stratum Description
0.30	66.31	TOPSOIL: Grass over soft to firm dark brown CLAY. Numerous rootlets. TOPSOIL
1.00	65.61	Soft dark brown mottled grey slightly silty clay. Rare rootlets. SUBSOIL
2.40	64.21	Extremely weathered MUDSTONE recovered as soft dark grey mottled greyish brown CLAY PETERBOROUGH MEMBER
4.00	62.61	Extremely weathered MUDSTONE recovered as soft becoming firm dark grey CLAY. PETERBOROUGH MEMBER
4.10	62.51	Extremely weak to very weak MUDSTONE recovered as SAND and GRAVEL. Sand is fine to coarse. Gravel is subangular, fine to coarse of mudstone. PETERBOROUGH MEMBER

End of borehole at 4.10 m

Remarks

1) Dando 2000. 2) No groundwater encountered. 3) Drilling terminated due to hard strata encountered. 4) Terminated at 4.10m bgl.

Borehole Log

			Borehole No. **BH2** Sheet 1 of 1
Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455452.22 - 219815.56	Hole Type CP
Location: Little Chesterton, Bicester		Level: 68.00	Scale 1:50
Client: Tritax Symmetry		Dates: 29/09/2021 - 29/09/2021	Logged By ST

Well	Water Strikes	**Samples and In Situ Testing**			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.30	67.70		TOPSOIL: Grass over dark brown CLAY. Numerous rootlets. TOPSOIL	
								Soft dark brown mottled grey slightly silty CLAY. Rare rootlets. SUBSOIL	
		1.00 1.20	D UT		1.00	67.00		Soft dark grey mottled greyish brown slightly silty CLAY PETERBOROUGH MEMBER	1
		1.70 - 2.00	B						
		2.00 2.00 2.00 2.00 - 2.50	D SPTL S B	N=6 (1,1/1,1,2,2)	2.00	66.00		Soft dark grey locally mottled brown CLAY. PETERBOROUGH MEMBER	2
					2.90	65.10		Extremely weathered MUDSTONE recovered as soft to firm dark grey clay PETERBOROUGH MEMBER *Becoming soft to firm between 2.90mbgl to 3.40mbgl.* *Rare shells encountered between 3.40mbgl to 3.90m bgl.* *Frequent shells encountered between 3.90mbgl and 4.50mbgl.*	3
		4.00 4.00	SPTL S	N=40 (3,6/7,9,10,14)					4
		4.50		50 (25 for 0mm/50 for 0mm)	4.50	63.50		End of borehole at 4.50 m	
									5
									6
									7
									8
									9
									10

Remarks
1) Dando 2000. 2) No groundwater encountered. 3) Drilling terminated due to hard strata encountered. 4) Terminated at 4.50m bgl.

Borehole Log

Borehole No.
BH3
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455597.89 - 219801.43	Hole Type CP
Location: Little Chesterton, Bicester		Level: 65.44	Scale 1:50
Client: Tritax Symmetry		Dates: 29/09/2021 -	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.30	D		0.30	65.14		TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
								Soft dark brown CLAY. Rare roots and rootlets. SUBSOIL
		1.00	D		1.00	64.44		Soft yellowish brown and dark grey mottled slightly gravelly slightly silty CLAY. Gravel is subangular fine to medium of mudstone. ALLUVIUM
		1.20	D					
		1.20	SPTL					
		1.20	S	N=6 (1,1/1,2,2,1)				
		1.20 - 1.70	B					
					1.90	63.54		Extremely weathered MUDSTONE recovered as firm to stiff grey clay. PETERBOROUGH MEMBER
		2.00	UT					
		2.50	D		2.50	62.94		Extremely weak to very weak grey MUDSTONE recovered as angular to subangular, fine to coarse of mudstone. PETERBOROUGH MEMBER
		2.70	D		2.70	62.74		End of borehole at 2.70 m
		2.70		50 (25 for 0mm/50 for 0mm)				

Remarks
1) Dando 2000. 2) No groundwater encountered. 3) Drilling terminated due to hard strata encountered. 4) Terminated at 2.70m bgl.

Borehole Log

Borehole No.	**BH4**
Sheet 1 of 1	
Project Name:	Oxford North Symmetry Park
Project No.	TE1585
Co-ords:	455625.25 - 219651.61
Hole Type	CP
Location:	Little Chesterton, Bicester
Level:	66.43
Scale	1:50
Client:	Tritax Symmetry
Dates:	29/09/2021 -
Logged By	ST

Samples and In Situ Testing

Depth (m)	Type	Results
0.20	D	
0.20	ES	
0.70	D	
0.80	ES	
1.20	D	
1.20		N=13 (2,2/3,3,3,4)
1.20 - 1.70	B	
2.00	UT	
2.50 - 3.00	B	
3.00	D	
3.00		N=2 (1,0/0,1,1,0)
3.50	D	
4.00	D	
4.00		N=13 (2,2/2,3,4,4)
4.50	D	
5.00	UT	
5.40	D	
5.40		50 (25 for 0mm/50 for 0mm)

Depth (m)	Level (m)	Stratum Description
0.20	66.23	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets and rare roots. TOPSOIL
0.70	65.73	MADE GROUND: Soft dark brown CLAY. Rare gravel of chalk. MADE GROUND
0.90	65.53	MADE GROUND: Boulder of concrete recovered as clayey subangular medium gravel of concrete. MADE GROUND
1.90	64.53	MADE GROUND: Firm greyish brown slightly gravelly CLAY. Gravel is subangular, fine of concrete. MADE GROUND
3.50	62.93	Very soft locally firm and soft greyish brown/ brownish grey slightly sandy slightly silty CLAY. ALLUVIUM
5.40	61.03	Extremely weathered MUDSTONE recovered as firm becoming stiff to very stiff dark grey CLAY. PETERBOROUGH MEMBER *Rare shell fragments encountered between 4.20m bgl and 4.90m bgl.*
5.50	60.93	Extremely weak to very weak dark grey MUDSTONE recovered as subangular cobbles of mudstone. PETERBOROUGH MEMBER

End of borehole at 5.50 m

Remarks
1) Dando 2000. 2) No groundwater encountered. 3) Drilling terminated due to hard strata encountered 4) Terminated at 5.40m bgl.

TIER CONSULT

Trial Pit Log

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: - Level: 66.00		Trialpit No **HDP1** Sheet 1 of 1 Date 30/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): Depth 0.40		Scale 1:25
Client: Tritax Symmetry				Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30	65.70	▨	TOPSOIL: Grass over soft dark brown CLAY with frequent rootlets. TOPSOIL
	0.40	ES		0.40	65.60	┄	Soft to firm dark brown CLAY. SUBSOIL
							End of pit at 0.40 m

Remarks: 1) Hand pit excavated for Geo-environmental sample. 2) Terminated at 0.40m bgl.

Stability: Stable.

AGS

Trial Pit Log

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455399.30 - 219856.93 Level: 69.94	Trialpit No **SA1** Sheet 1 of 1 Date 29/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.3 × 0.3 Depth 1.60	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30	69.64	▨	TOPSOIL: Grass over soft dark brown CLAY. Frequent rootlets. TOPSOIL
				0.90	69.04	▨	Firm dark brown slightly sandy slightly silty CLAY. Sand is fine. SUBSOIL
				1.40	68.54	▨	Soft yellowish brown slightly sandy slightly gravelly CLAY. Sand is medium to coarse. Gravel is subangular, fine to medium of flint. ALLUVIUM
				1.60	68.34	▨	Soft to firm dark grey CLAY. POSSIBLE PETERBOROUGH MEMBER
							End of pit at 1.60 m

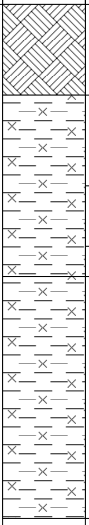
Remarks:
1) JCB 360 excavator.
2) No groundwater was encountered.
3) Terminated at 1.60 m bgl for soakaway testing.

Stability: Stable.

Trial Pit Log

Trialpit No
SA2
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455528.49 - 219739.19 Level: 65.53	Date 29/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.3 × 0.4 Depth 1.70	Scale 1:25
Client: Tritax Symmetry			Logged ST



Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Stratum Description
	Depth	Type	Results			
				0.30	65.23	TOPSOIL: Grass over soft dark brown CLAY. Frequent rootlets. TOPSOIL
				0.90	64.63	Firm brown mottled brownish grey slightly silty CLAY. SUBSOIL *Slightly sandy. Sand is fine to medium.*
				1.70	63.83	Firm to stiff grey mottled brown silty CLAY. POSSIBLE PETERBOROUGH MEMBER
						End of pit at 1.70 m

Remarks:
1) JCB 360 excavator.
2) No groundwater was encountered.
3) Terminated at 1.70m bgl for soakaway testing.

Stability: Stable.

Trial Pit Log

Trialpit No	**SA3**
Sheet 1 of 1	
Project Name:	Oxford North Symmetry Park
Project No.	TE1585
Co-ords:	455566.16 - 219757.81
Level:	65.31
Date	29/09/2021
Location:	Little Chesterton, Bicester
Dimensions (m):	2.5 × 0.4
Depth	1.70
Scale	1:25
Client:	Tritax Symmetry
Logged	ST

Water Strike	**Samples and In Situ Testing**			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30	65.01	▨	TOPSOIL: Grass over soft dark brown CLAY. Frequent rootlets. TOPSOIL
				1.30	64.01	▒	Firm dark brown mottled grey slightly micaceous slightly silty CLAY. SUBSOIL
				1.70	63.61	☰	Stiff dark grey CLAY with locally frequent selenite crystals/gypsum. POSSIBLE KELLAWAYS CLAY MEMBER
							End of pit at 1.70 m

Remarks:
1) JCB 360 excavator.
2) No groundwater was encountered.
3) Terminated at 1.70m bgl for soakaway testing.

Stability: Stable.

Trial Pit Log

Trialpit No
SA4
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455734.06 - 219872.33 Level: 64.75	Date 29/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.5 × 0.4 Depth 1.50	Scale 1:25
Client: Tritax Symmetry			Logged TP

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30	64.45	▨	TOPSOIL: Grass over dark brown CLAY. Frequent rootlets. TOPSOIL
▼				1.50	63.25	▤	Firm brownish grey mottled brown CLAY. SUBSOIL
							End of pit at 1.50 m

Remarks:
1) JCB 360 excavator.
2) No groundwater was encountered.
3) Terminated at 1.50m bgl for soakaway testing.

Stability: Stable.

Trial Pit Log

Trialpit No
SA5
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455679.29 - 219834.41 Level: 64.87	Date 29/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.3 0.4 Depth 1.60	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
						▨	TOPSOIL: Grass over dark brown CLAY. Frequent rootlets. TOPSOIL
				0.30	64.56	☰	Firm grey mottled greyish brown CLAY. ALLUVIUM *Soft yellow slightly sandy, slightly gravelly CLAY. Sand is medium to coarse. Gravel is fine to medium of subangular flint.*
				1.60	63.26		End of pit at 1.60 m

Remarks: 1) JCB 360 excavator.
2) No groundwater was encountered.
3) Terminated at 1.60m bgl for soakaway testing.

Stability: Stable.

Trial Pit Log

Trialpit No **SA6**

Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455549.35 - 219621.73 Level: 66.68	Date 30/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.3 × 0.4 Depth 2.00	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30	66.38		TOPSOIL: Grass over soft brown CLAY. Frequent rootlets. TOPSOIL
				1.20	65.48		MADE GROUND: Firm greyish brown slightly sandy, slightly gravelly CLAY. High cobble content. Cobbles are subangular of medium to strong concrete. Sand is fine to medium. Gravel is subangular, medium to coarse of concrete. MADE GROUND
				2.00	64.68		Firm dark brown slightly sandy, slightly gravelly CLAY. Gravel is subangular, medium to coarse of concrete. Sand is medium to coarse. ALLUVIUM
							End of pit at 2.00 m

Remarks:
1) JCB 360 excavator.
2) No groundwater was encountered.
3) Terminated at 2.00m bgl for soakaway testing.

Stability: Stable.

Trial Pit Log

Trialpit No
TP01
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455717.54 - 220008.16 Level: 65.68	Date 16/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 1.8 × 0.6 Depth 1.60	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00	ES				▨	MADE GROUND: Soft brownish grey CLAY. Numerous subangular cobbles of limestone. High cobble content. MADE GROUND
				0.60	65.08	┄	Soft to firm greyish brown mottled brownish grey CLAY. ALLUVIUM
	0.70	ES					
				1.30	64.38	≡	Slightly weathered MUDSTONE recovered as angular to subangular cobbles of mudstone. PETERBOROUGH MEMBER
▼				1.60	64.08		End of pit at 1.60 m

Remarks:
1) JCB wheeled excavator.
2) Groundwater encountered as fast seepage at the base of the pit.
3) Termination depth 1.60m bgl due to hard strata.

Stability: Stable

Trial Pit Log

Trialpit No
TP02
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455717.32 - 220011.14 Level: 66.12	Date 16/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 1 × 0.6 Depth 0.80	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00	ES				▨	MADE GROUND: Soft dark brown CLAY. Numerous rootlets, rare roots and rare cobbles of concrete. MADE GROUND
				0.80	65.32		End of pit at 0.80 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 0.80m bgl into a mound.

Stability: Stable

Trial Pit Log

Trialpit No **TP03**
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455681.35 - 219969.13 Level: 65.66	Date 16/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 0.8 × 0.6 Depth 0.20	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00	ES		0.20	65.46	▨	MADE GROUND: Brownish grey slightly clayey subangular COBBLES AND BOULDERS of concrete. MADE GROUND
							End of pit at 0.20 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 0.20m bgl into a bund.

Stability: Stable

Trial Pit Log

Trialpit No
TP04
Sheet 1 of 1

Project Name:	Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455509.23 - 219926.36 Level: 68.98		Date 16/09/2021
Location:	Little Chesterton, Bicester		Dimensions (m): 1.8 × 0.7		Scale 1:25
Client:	Tritax Symmetry		Depth 2.90		Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	ES					TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL *Soft brown CLAY.*
				0.60	68.38		
	0.70	ES					Soft brown mottled grey slightly sandy slightly clayey, slightly silty CLAY. Sand is fine. ALLUVIUM
				1.10	67.88		
	1.20	ES					Firm reddish brown mottled grey CLAY. POSSIBLE PETERBOROUGH MEMBER
	1.50	ES					
				1.70	67.28		
	2.00	D					Extremely weathered MUDSTONE stiff dark grey CLAY. PETERBOROUGH MEMBER *Becoming Stiff to very stiff slightly micaceous CLAY with rare pockets of silty clay between 2.10mbgl and 2.90mbgl.*
	2.80	D					
				2.90	66.08		End of pit at 2.90 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 2.90m bgl.

Stability: Stable

Trial Pit Log

Trialpit No	**TP05**
Sheet 1 of 1	

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455727.80 - 219919.16 Level: 65.04	Date 16/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 1.3 × 0.7 Depth 2.10	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES					TOPSOIL: Grass over soft brown CLAY. Numerous rootlets. TOPSOIL
				0.40	64.64		Soft to firm dark brown CLAY. ALLUVIUM
	0.50 0.50 - 1.00	ES B					
				1.50	63.54		Extremely weak MUDSTONE recovered as stiff grey mottled brown CLAY. PETERBOROUGH MEMBER
▼				2.10	62.94		End of pit at 2.10 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 2.10m bgl. due to hard strata.

Stability: Stable

Trial Pit Log

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455408.71 - 219788.61 Level: 68.37	Trialpit No **TP06** Sheet 1 of 1
Location: Little Chesterton, Bicester		Dimensions (m): 1.7 × 0.6 Depth 3.00	Date 16/09/2021
Client: Tritax Symmetry			Scale 1:25
			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Soft dark brown CLAY. TOPSOIL
	0.40 0.40 - 0.60	ES B		0.30	68.07	▤	Soft dark brown CLAY. SUBSOIL
				0.70	67.67	▦	Soft greyish brown slightly sandy, slightly silty CLAY. Sand is fine. KELLAWAYS CLAY MEMBER
	1.50 - 2.00	B		1.10	67.27	▦	Firm Yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine. KELLAWAYS CLAY MEMBER
	2.20	D		2.10	66.27	▤	Extremely weathered MUDSTONE recovered as stiff dark grey CLAY. POSSIBLE PETERBOROUGH MEMBER
				3.00	65.37		End of pit at 3.00 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 3.00m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP07
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455207.23 - 219928.82 Level: 68.54	Date 16/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 1.9 0.7 Depth 2.90	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES					TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
				0.30	68.24		Soft dark brown CLAY. ALLUVIUM
	0.40	ES					
				1.00	67.54		Soft greyish brown slightly sandy, slightly silty CLAY. Sand is fine. KELLAWAYS CLAY MEMBER
	1.50 - 2.00	B					
				2.10	66.44		Firm yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine. KELLAWAYS SAND MEMBER
	2.20 - 2.50	B					
				2.90	65.64		End of pit at 2.90 m

Remarks: 1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 2.90m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP08
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455176.51 - 219827.08 Level: 68.13	Date 16/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2 × 0.7 Depth 2.90	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.50	ES		0.40	67.73	☰	Soft to firm dark brown mottled greyish brown CLAY. POSSIBLE ALLUVIUM
				1.00	67.13	⊠	Firm yellowish brown mottled grey slightly sandy silty CLAY. Sand is fine. KELLAWAYS CLAY MEMBER *Numerous shell fragments encountered between 2.00mbgl and 2.90mbgl.*
				2.90	65.23		End of pit at 2.90 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 2.90m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP09
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455181.02 - 219743.73 Level: 68.96	Date 16/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2 × 0.7 Depth 2.90	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Grass over soft dark brown CLAY. Frequent rootlets. TOPSOIL
	0.50	ES		0.40	68.56	▤	Soft dark brown mottled yellowish brown CLAY. POSSIBLE ALLUVIUM
				1.00	67.96	▩	Soft to firm yellowish brown slightly sandy silty CLAY. Sand is fine. KELLAWAYS CLAY MEMBER
	1.50 - 2.00	B					
							Numerous shell fragments encountered between 2.20mbgl and 2.90mbgl.
	2.50 - 2.90	B					
				2.90	66.06		End of pit at 2.90 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 2.90m bgl.

Stability: Stable

Trial Pit Log

Trialpit No	**TP10**	Sheet 1 of 1	
Project Name:	Oxford North Symmetry Park	Project No.	TE1585
Co-ords:	455469.39 - 219661.35	Level:	65.67
Date	17/09/2021		
Location:	Little Chesterton, Bicester		
Dimensions (m):	2.1 × 0.7	Depth	3.00
Scale	1:25	Logged	ST
Client:	Tritax Symmetry		

Water Strike	**Samples and In Situ Testing**			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.30	65.37		TOPSOIL: Grass over soft brown CLAY. Frequent rootlets. TOPSOIL
	0.50 0.70	ES ES		1.80	63.87		Firm to stiff orangish brown CLAY. KELLAWAYS SAND MEMBER *At 0.40m bgl to 0.60m bgl pockets of orangish brown slightly gravelly CLAY. Gravel is subangular of flint and chert.*
	2.00 - 2.50	B		3.00	62.67		Stiff dark grey CLAY. PETERBOROUGH MEMBER
							End of pit at 3.00 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 3.00m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP11
Sheet 1 of 1

Project Name: Oxford North Symmetry Park
Project No. TE1585
Co-ords: 455736.69 - 219844.97
Level: 64.56
Date 17/09/2021

Location: Little Chesterton, Bicester
Dimensions (m): 2.2 × 0.7
Depth 1.90
Scale 1:25

Client: Tritax Symmetry
Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.40	ES		0.30	64.26	▤	Firm dark brown mottled yellowish brown locally slightly gravelly CLAY. Gravel is subangular fine of flint and chert. ALLUVIUM
	1.60	ES		1.50	63.06	▤	Extremely weathered MUDSTONE recovered as stiff dark grey locally sandy CLAY. Sand is fine. POSSIBLE PETERBOROUGH MEMBER
▼				1.90	62.66		End of pit at 1.90 m

Remarks:
1) JCB wheeled excavator.
2) Groundwater encountered as slow seepage at the base of the pit.
3) Terminated at 1.90m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP12
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: - Level:	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.3 × 0.7 Depth 2.30	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.30		▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.40	ES		0.90		▤	Soft to firm dark brown mottled yellowish brown CLAY. SUBSOIL
▼	1.00	ES		2.30		▦	Extremely weathered MUDSTONE recovered as stiff grey CLAY with frequent pockets of grey sandy silt. Sand is fine. PETERBOROUGH MEMBER

End of pit at 2.30 m

Remarks:
1) JCB wheeled excavator.
2) Groundwater encountered as slow seepage at the base of the pit.
3) Terminated at 2.30m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP13
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455736.69 - 219844.88 Level: 64.55	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.2 × 0.7 Depth 2.60	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
	0.10	ES				▨	TOPSOIL: Soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.50	ES		0.40	64.15	░	Soft yellowish brown slightly gravelly CLAY. Gravel is subangular, fine to medium of flint. ALLUVIUM
	1.50	D		1.00	63.55	▤	Stiff grey CLAY. PETERBOROUGH MEMBER
	2.40 - 2.60	B		2.30	62.25	▤	Extremely weathered MUDSTONE recovered as stiff dark grey CLAY with rare angular to subangular fine to medium gravel of mudstone. PETERBOROUGH MEMBER
				2.60	61.95		End of pit at 2.60 m

Remarks:
1) JCB wheeled excavator.
2) No ground water was encountered.
3) Terminated at 2.60m bgl.

Stability: Stable

Trial Pit Log

Trialpit No	**TP14**	Sheet 1 of 1	
Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455334.96 - 219373.53 Level: 68.81	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.3 × 0.7 Depth 2.40	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Soft dark brown CLAY. Frequent rootlets. TOPSOIL
				0.40	68.41	▤	Firm to stiff yellowish brown mottled brownish grey CLAY. POSSIBLE KELLAWAYS CLAY MEMBER
	0.60	ES					
	1.00	D					
				1.80	67.01	☰	Extremely weathered MUDSTONE recovered as stiff dark grey slightly gravelly CLAY. Gravel is subangular fine to medium of mudstone. PETERBOROUGH MEMBER
	1.90 - 2.20	B					
				2.40	66.41		End of pit at 2.40 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater was encountered.
3) Terminated at 2.40m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP15
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455439.37 - 219471.26 Level: 67.59	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.3 × 0.7 Depth 2.20	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.30	67.29	▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.40	ES		0.90	66.69	▨	Soft yellowish brown slightly gravelly CLAY. Gravel is subangular, fine to medium of flint and chert. SUBSOIL
	1.20 - 1.60	B				▨	Firm yellowish brown mottled grey slightly sandy, slightly silty CLAY. Sand is fine. KELLAWAYS SAND MEMBER
▼	2.00 - 2.20	B		2.20	65.39		End of pit at 2.20 m

Remarks:
1) JCB wheeled excavator.
2) Groundwater was encountered as a slow seepage at base of pit.
3) Terminated at 2.20m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP16
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455360.87 - 219511.18 Level: 66.98	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.1 × 0.7 Depth 2.00	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
				0.40	66.58	▤	Soft to firm yellowish brown mottled grey slightly sandy, slightly silty CLAY. Sand is fine. KELLAWAYS SAND MEMBER
	0.50	ES				▤	
	1.00	D				▤	
	1.80	D				▤	
				2.00	64.98		End of pit at 2.00 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater was encountered.
3) Terminated at 2.00m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP17
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455351.78 - 219551.06 Level: 66.65	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.1 × 0.7 Depth 3.00	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.30	66.35	▨	TOPSOIL: Soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.40	ES				⊠	Soft to firm brown slightly sandy, silty CLAY. Sand is fine. ALLUVIUM
	1.50	D		1.60	65.05	⊠	
▼						☰	Extremely weathered MUDSTONE recovered as firm to stiff grey clay with rare subangular fine to medium gravel of mudstone. PETERBOROUGH MEMBER
	2.50 - 3.00	B		3.00	63.65	☰	
							End of pit at 3.00 m

Remarks:
1) JCB wheeled excavator.
2) Groundwater encountered as fast seepage at 2.00m bgl.
3) Terminated at 3.00m bgl.

Stability: Stable

AGS

Trial Pit Log

Trialpit No
TP18
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455446.88 - 219552.90 Level: 67.13	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.1 × 0.7 Depth 3.10	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.50	66.63	▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.60 0.60 - 1.00 1.00	ES B ES		1.10	66.03	▩	MADE GROUND: Brownish grey slightly clayey subangular medium to coarse GRAVEL of concrete with numerous cobbles. Cobbles are subangular of concrete. MADE GROUND
	1.20 1.20	D ES		1.80	65.33	▤	Soft to firm, yellowish brown mottled grey. slightly sandy, slightly silty CLAY. Sand is fine. POSSIBLE KELLAWAYS SAND MEMBER
	1.90 2.50 - 3.00	ES B		3.10	64.03	▤	Stiff dark grey CLAY. PETERBOROUGH MEMBER
							End of pit at 3.10 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater was encountered.
3) Terminated at 3.10m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP19
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455574.81 - 219630.47 Level: 66.70	Date 17/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.2 × 0.7 Depth 2.60	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES				▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
				0.20	66.50		
	0.30	ES				▨	MADE GROUND: Soft to firm slightly gravelly CLAY. Gravel is subangular, medium to coarse of concrete and flint. MADE GROUND
	1.00	ES				▨	
				1.80	64.90		
▼ ▽	2.00	ES				▤	Stiff grey CLAY. PETERBOROUGH MEMBER
				2.60	64.10		End of pit at 2.60 m

Remarks:
1) JCB wheeled excavator.
2) Groundwater was encountered at 2.00mbgl rising to 1.90mbgl after 20 minutes.
3) Terminated at 2.60m bgl due to land drain strike.

Stability: Unstable

Trial Pit Log

Trialpit No
TP20
Sheet 1 of 1

Project Name:	Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455603.28 - 219615.26 Level: 66.67	Date 17/09/2021
Location:	Little Chesterton, Bicester		Dimensions (m): 2.1 × 0.7 Depth 0.70	Scale 1:25
Client:	Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.30	66.37	▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
	0.40 0.40 - 0.50	ES B		0.60	66.07	▩	MADE GROUND: Soft to firm dark brown slightly gravelly CLAY. Gravel is subangular, fine to medium of concrete. MADE GROUND
	0.70	ES		0.70	65.97	▩	MADE GROUND: TARMAC recovered as black clayey GRAVEL. Gravel is subangular medium to coarse of possibly flint. MADE GROUND

End of pit at 0.70 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 0.70m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP21
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455603.29 - 219615.26 Level: 66.65	Date 29/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 0.6 × 0.5 Depth 0.80	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00	ES				▨	MADE GROUND: Soft dark brown slightly gravelly CLAY. Gravel is subangular, fine to medium of concrete and brick. MADE GROUND
	0.50	ES				▨	
				0.80	65.85		End of pit at 0.80 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 0.80m bgl into a bund.

Stability: Stable.

Trial Pit Log

Trialpit No
TP22
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455485.20 - 220016.77 Level: 72.75	Date 29/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 0.6 × 0.5 Depth 0.80	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.00	ES				▨	MADE GROUND: Soft dark brown slightly gravelly CLAY. Gravel is fine to medium, subangular of concrete and brick. MADE GROUND	
	0.50	ES				▨		
				0.80	71.95		End of pit at 0.80 m	
								1
								2
								3
								4
								5

Remarks: 1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 0.80m bgl into a bund.

Stability: Stable.

Trial Pit Log

Trialpit No
TP23
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455549.93 - 220016.14 Level: 76.18	Date 29/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): 2.5 × 0.8 Depth 2.80	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
						▨	MADE GROUND: Soft dark brown slightly gravelly CLAY with subangular boulders of medium strong concrete. MADE GROUND
	1.00	ES				▨	
				1.50	74.68	▨	MADE GROUND: Soft dark brown mottled white slightly gravelly CLAY with subangular boulders of medium strong concrete. Cobbles of tarmac. MADE GROUND
	2.50	ES				▨	
				2.80	73.38		End of pit at 2.80 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 2.80m bgl.

Stability: Stable.

Trial Pit Log

Trialpit No
TP24
Sheet 1 of 1

Project Name:	Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455509.71 - 220003.25 Level: 76.27	Date 29/09/2021
Location:	Little Chesterton, Bicester		Dimensions (m): 3.9 × 0.5 Depth 3.40	Scale 1:25
Client:	Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	ES				▨	MADE GROUND: Soft brown slightly gravelly CLAY with rare subangular boulders of brick and concrete. Gravel is subangular, medium to coarse of concrete and brick. MADE GROUND
	2.00	ES		1.80	74.47	▨	MADE GROUND: Soft to firm brown mottled dark brown CLAY with frequent cobles of concrete. MADE GROUND
				3.40	72.87		End of pit at 3.40 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 3.40m bgl.

Stability: Stable

Trial Pit Log

Trialpit No	**TP25**
Sheet 1 of 1	
Project Name:	Oxford North Symmetry Park
Project No.	TE1585
Co-ords:	455575.30 - 219630.68
Level:	66.88
Date	30/09/2021
Location:	Little Chesterton, Bicester
Dimensions (m):	2.9 × 0.7
Depth	2.80
Scale	1:25
Client:	Tritax Symmetry
Logged	ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.30	66.58		TOPSOIL: Grass over soft brown slightly silty CLAY. Frequent rootlets. TOPSOIL
				0.90	65.98		MADE GROUND: Soft brown gravelly CLAY. Gravel is subangular. MADE GROUND
				1.00	65.88		MADE GROUND: TARMAC recovered as dark grey subangular medium to coarse gravel of possibly flint. MADE GROUND
	1.10	ES		1.20	65.68		MADE GROUND: Grey subangular COBBLES of concrete. MADE GROUND
				1.80	65.08		Extremely weathered MUDSTONE recovered as Firm to stiff greyish brown mottled grey slightly silty CLAY. PETERBOROUGH MEMBER
				2.80	64.08		Extremely weathered MUDSTONE recovered as soft brown mottled grey silty CLAY. PETERBOROUGH MEMBER

End of pit at 2.80 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 2.80m bgl.

Stability: Stable.

Trial Pit Log

Trialpit No
TP26
Sheet 1 of 1

Project Name:	Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455430.45 - 219700.87 Level: 66.37	Date 30/09/2021
Location:	Little Chesterton, Bicester		Dimensions (m): 2.8 0.7 Depth 1.80	Scale 1:25
Client:	Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES					TOPSOIL: Grass over soft dark brown CLAY. Frequent rootlets. TOPSOIL
				0.30	66.07		Soft to firm dark brown CLAY. SUBSOIL
				0.60	65.77		Extremely weathered MUDSTONE recovered as firm to stiff dark grey slightly gravelly CLAY. Gravel is subangular fine of mudstone.
	1.00	ES					
				1.80	64.57		End of pit at 1.80 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 1.80m bgl.

Stability: Stable

Trial Pit Log

Trialpit No
TP27
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455490.14 - 220059.72 Level: 70.43	Date 30/09/2021
Location: Little Chesterton, Bicester		Dimensions (m): Depth 0.70	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10	ES		0.50	69.93	▩	MADE GROUND: Soft grey gravelly CLAY. Gravel is subangular of concrete and brick. Frequent cobbles and boulders. MADE GROUND
				0.70	69.73	▤	Very stiff dark brown CLAY. SUBSOIL
							End of pit at 0.70 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 0.70m bgl due to being in parking area.

Stability: Stable.

Trial Pit Log

Trialpit No
TRENCH 1
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455811.38 - 219782.02 Level: 65.63	Date 01/10/2021
Location: Little Chesterton, Bicester		Dimensions (m): 16.5 × 0.7 Depth 4.00	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30	65.33	▨	TOPSOIL: Grass over soft brown CLAY. Frequent rootlets. TOPSOIL
				1.20	64.43	▨	MADE GROUND: Firm slightly gravelly CLAY. Low boulder and cobble content of subangular strong concrete. Gravel is subangular, medium to coarse of concrete. MADE GROUND
				2.00	63.63	▨	Firm grey mottled brown slightly sandy CLAY. Sand is fine. PETERBOROUGH MEMBER
				3.20	62.43	▨	Extremely weathered MUDSTONE recovered as stiff dark grey mottled yellowish brown CLAY. PETERBOROUGH MEMBER
				4.00	61.63	▨	MUDSTONE recovered as stiff fissured dark grey CLAY. Fissures are randomly orientated, planar undulating and open. PETERBOROUGH MEMBER
							End of pit at 4.00 m

Remarks:
1) Trial Trench was excavated to investigate possible rising main sewer, no evidence of service found.
2) No groundwater encountered.
3) Terminated at 4.00m bgl due to pit collapsing.

Stability: Unstable.

Trial Pit Log

Trialpit No
TRENCH 2
Sheet 1 of 1

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455798.36 - 219778.23 Level: 65.58	Date 01/10/2021
Location: Little Chesterton, Bicester		Dimensions (m): 9.1 × 0.7 Depth 3.50	Scale 1:25
Client: Tritax Symmetry			Logged ST

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
							TOPSOIL: Grass over soft dark brown CLAY. Frequent rootlets. TOPSOIL
				0.30	65.28		MADE GROUND: Soft to firm dark brown CLAY. MADE GROUND
				0.70	64.88		MADE GROUND: Soft to firm grey mottled brownish grey slightly sandy CLAY. Rare subangular cobbles of concrete. MADE GROUND
				1.20	64.38		MADE GROUND: Firm grey mottled yellowish brown slightly sandy CLAY. Sand is fine. MADE GROUND
				1.90	63.68		Extremely weathered MUDSTONE recovered as stiff dark grey mottled yellowish brown CLAY. PETERBOROUGH MEMBER
				3.20	62.38		MUDSTONE recovered as stiff fissured dark grey CLAY. Fissures are randomly orientated, planar undulating and open. PETERBOROUGH MEMBER
				3.50	62.08		End of pit at 3.50 m

Remarks:
1) JCB wheeled excavator.
2) No groundwater encountered.
3) Terminated at 3.50m bgl.

Stability: Stable

Borehole Log

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455399.30 - 219856.93	Borehole No. **WS1** Sheet 1 of 1
			Hole Type WS
Location: Little Chesterton, Bicester		Level: 69.94	Scale 1:50
Client: Tritax Symmetry		Dates: 20/09/2021 -	Logged By ST

Samples and In Situ Testing

Well	Water Strikes	Depth (m)	Type	Results
		0.10	ES	
		0.40	ES	
		0.90	D	
		1.20	SPTL	
		1.20	S	N=12 (2,2/3,3,3,3)
		1.90	D	
		2.00	SPTL	
		2.00	S	N=30 (2,5/7,7,7,9)
		2.50	D	
		3.00	D	
		3.00	ES	
		3.00	SPTL	
		3.00	S	N=11 (1,1/2,2,3,4)
		4.00	SPTL	
		4.00	S	N=13 (2,2/2,3,3,5)
		4.50	D	
		5.00	SPTL	
		5.00	S	N=14 (2,2/3,3,3,5)

Depth (m)	Level (m)	Legend	Stratum Description
0.12	69.82		TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
0.30	69.64		Soft to firm dark brown mottled brownish grey CLAY. SUBSOIL
1.70	68.24		Firm greyish brown mottled grey sandy, slightly silty CLAY. Sand is fine. POSSIBLE RIVER TERRACE DEPOSITS
2.40	67.54		Medium dense greyish brown silty fine SAND. POSSIBLE RIVER TERRACE DEPOSITS
2.90	67.04		Extremely weathered MUDSTONE recovered as firm grey sandy CLAY. Sand is fine. PETERBOROUGH MEMBER
3.90	66.04		Extremely weathered MUDSTONE recovered as firm greyish brown slightly silty CLAY PETERBOROUGH MEMBER
5.00	64.94		Extremely weathered MUDSTONE recovered as firm dark grey CLAY. PETERBOROUGH MEMBER *Pocket of soft brownish grey sandy clay.*
			End of borehole at 5.00 m

Remarks
1) Rig: Competitor. 2) No groundwater encountered. 3) Terminated at 5.00m bgl.

Borehole Log

Borehole No.	**WS2**	Sheet 1 of 1
Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455528.49 - 219739.19
Hole Type	WS	
Location: Little Chesterton, Bicester	Level: 65.53	Scale 1:50
Client: Tritax Symmetry	Dates: 20/09/2021 -	Logged By ST

Well	Water Strikes	Samples and In Situ Testing Depth (m)	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
		0.10 0.30	ES ES		0.20	65.33		TOPSOIL: Soft dark brown CLAY. Frequent rootlets. TOPSOIL
		0.80	D		0.70	64.83		Firm greyish brown mottled dark grey sandy CLAY. Sand is fine. POSSIBLE ALLUVIUM
		1.20 1.20 1.80 2.00 2.00 2.20	SPTLS D SPTLS D	N=8 (1,1/2,2,2,2) N=6 (1,1/1,1,2,2)	2.20	63.33		Extremely weathered MUDSTONE recovered as firm grey mottled brown slightly gravelly CLAY. Gravel is subangular fine to medium of mudstone. PETERBOROUGH MEMBER
					3.00	62.53		Extremely weathered MUDSTONE recovered as stiff grey slightly silty CLAY. PETERBOROUGH MEMBER
		3.00 3.00	SPTLS	50 (12,13/50 for 85mm)	3.10	62.43		MUDSTONE. PETERBOROUGH MEMBER
								End of borehole at 3.00 m

Remarks

1) Rig: Competitor. 2) No water encountered. 3) Terminated at 3.00m bgl due to refusal on bedrock.

Borehole Log

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455566.16 - 219757.81		Borehole No. **WS3** Sheet 1 of 1
Location: Little Chesterton, Bicester		Level: 65.31		Hole Type WS
Client: Tritax Symmetry		Dates: 20/09/2021 -		Scale 1:50
				Logged By ST

Well	Water Strikes	**Samples and In Situ Testing**			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES					TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
					0.40	64.91		
		0.50	ES					Soft locally firm dark brown CLAY. POSSIBLE ALLUVIUM
					0.70	64.61		
		0.80	D					Soft dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular to rounded, fine to medium of flint. POSSIBLE ALLUVIUM
					1.00	64.31		
		1.10	ES					Extremely weathered MUDSTONE recovered as greyish brown mottled brownish grey, slightly silty CLAY. PETERBOROUGH MEMBER
		1.20	SPTL					
		1.20	S	N=6 (1,1/1,1,2,2)				
		1.50	D		1.50	63.81		
		2.00	SPTL					Extremely weathered MUDSTONE recovered as firm grey mottled brown CLAY. PETERBOROUGH MEMBER *Numerous shell fragments encountered at 2.30m bgl.*
		2.00	S	N=10 (2,2/2,2,3,3)				
		2.50	D					
		2.80	ES		2.80	62.51		
		2.80		50 (25,/50 for 80mm)	2.90	62.41		MUDSTONE. PETERBOROUGH MEMBER
								End of borehole at 2.80 m

Remarks

1) Rig: Competitor. 2) No groundwater encountered. 3) Terminated at 2.80m bgl due to refusal on bedrock.

Borehole Log

Borehole No.	**WS4**	Sheet 1 of 1	
Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455477.05 - 219837.21	Hole Type WS
Location: Little Chesterton, Bicester		Level: 67.75	Scale 1:50
Client: Tritax Symmetry		Dates: 20/09/2021 -	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.30	67.45		TOPSOIL: Soft dark brown CLAY. Numerous rootlets. TOPSOIL
		0.40	ES		0.90	66.85		Soft dark brown mottled brown slightly sandy CLAY. Sand is fine to medium. SUBSOIL
		1.00	D		1.90	65.85		Soft grey mottled brown slightly sandy silty CLAY. Sand is fine. POSSIBLE KELLAWAYS SAND MEMBER
		1.20	SPTL					
		1.20	S	N=7 (1,1/2,2,1,2)				
		2.00	D		2.90	64.85		Extremely weathered MUDSTONE recovered as firm brownish grey mottled brown CLAY. PETERBOROUGH MEMBER
		2.00	SPTL					
		2.00	S	N=8 (2,2/2,2,2,2)				
		3.00	D		4.70	63.05		Extremely weathered MUDSTONE recovered as firm to stiff brownish grey CLAY. PETERBOROUGH MEMBER
		3.00	SPTL					
		3.00	S	N=15 (2,2/3,4,4,4)				
		4.00	D					
		4.00	SPTL					
		4.00	S	N=15 (3,3/3,3,4,5)				
		4.80	D		5.00	62.75		Extremely weathered MUDSTONE recovered as stiff to very stiff dark grey CLAY. PETERBOROUGH MEMBER
		5.00	SPTL					
		5.00	S	50 (25 for 10mm/50 for 10mm)				

End of borehole at 5.00 m

Remarks

1) Rig: Competitor. 2) No groundwater encountered. 3) Terminated at 5.00m bgl.

Borehole Log

Borehole No.	**WS5**	Sheet 1 of 1	
Project Name:	Oxford North Symmetry Park	Project No. TE1585	
Co-ords:	455520.71 - 219890.01	Hole Type	WS
Location:	Little Chesterton, Bicester		
Level:	68.00	Scale	1:50
Client:	Tritax Symmetry		
Dates:	20/09/2021 -	Logged By	ST

Samples and In Situ Testing

Depth (m)	Type	Results
0.10	ES	
0.40	ES	
0.80	D	
1.20	SPTL	
1.20	S	N=7 (1,1/1,2,2,2)
1.70	ES	
2.00	SPTL	
2.00	S	N=8 (1,1/2,2,2,2)
2.80	D	
2.80	D	
3.00	SPTL	
3.00	S	N=9 (2,2/2,2,2,3)
3.80	D	
4.00	SPTL	
4.00	S	50 (2,2/50 for 95mm)

Depth (m)	Level (m)	Stratum Description
0.30	67.70	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets. TOPSOIL
0.70	67.30	Soft to firm, dark brown and grey slightly sandy CLAY. Sand is fine. SUBSOIL
1.60	66.40	Extremely weathered MUDSTONE recovered as soft to firm grey mottled brown slightly sandy silty clay. Sand is fine. PETERBOROUGH MEMBER
2.70	65.30	Extremely weathered MUDSTONE recovered as firm grey mottled brown CLAY. PETERBOROUGH MEMBER
4.25	63.75	Extremely weathered MUDSTONE recovered as firm becoming stiff brown CLAY. PETERBOROUGH MEMBER
4.35	63.65	MUDSTONE. PETERBOROUGH MEMBER

End of borehole at 4.25 m

Remarks
1) Rig: Competitor. 2) No groundwater encountered. 3) Terminated 4.25m bgl due to refusal on bedrock.

Borehole Log

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455744.59 - 219761.96	Borehole No. **WS6** Sheet 1 of 1 Hole Type WS
Location: Little Chesterton, Bicester		Level: 65.69	Scale 1:50
Client: Tritax Symmetry		Dates: 20/09/2021 -	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10	ES		0.30	65.39	▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets and rare roots. TOPSOIL
		0.40 0.50	ES D		0.70	64.99	▨	MADE GROUND: Brownish grey mottled brown slightly gravelly CLAY. Gravel is subangular, fine to coarse of flint and chert. MADE GROUND
					0.80	64.89	▨	MADE GROUND: Hard obstruction possible concrete. MADE GROUND
								End of borehole at 0.70 m

Remarks
1) No groundwater encountered. 2) Terminated at 0.70m bgl due to hard obstruction. 3) Hole was excavated with hand tools.

Borehole Log

Project Name: Oxford North Symmetry Park	Project No. TE1585	Co-ords: 455741.74 - 219766.11	Borehole No. **WS6A** Sheet 1 of 1
			Hole Type WS
Location: Little Chesterton, Bicester		Level: 65.82	Scale 1:50
Client: Tritax Symmetry		Dates: 20/09/2021 -	Logged By ST

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
▨		0.10	ES		0.30	65.52	▨	TOPSOIL: Grass over soft dark brown CLAY. Numerous rootlets and rare roots. TOPSOIL
▨		0.40 0.50	ES D		0.70	65.12	▨	MADE GROUND: Brownish grey mottled brown slightly gravelly CLAY. Gravel is subangular, fine to coarse of flint and chert. MADE GROUND
					0.80	65.02	▨	MADE GROUND: Hard obstruction possible concrete. MADE GROUND
								End of borehole at 0.70 m

Remarks
1) No groundwater encountered. 2) Terminated at 0.70m bgl due to hard obstruction. 3) Hole was excavated with hand tools.

APPENDIX C - GEOENVIRONMENTAL SOIL LABORATORY RESULTS

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

Tier Environmental
Suite 513, Chadwick House
Warrington Rd
Birchwood
Warrington
WA3 6AE

4225

Attention :	Steven Millar
Date :	18th October, 2021
Your reference :	TE1585
Our reference :	Test Report 21/14639 Batch 1
Location :	Oxford North
Date samples received :	18th September, 2021
Status :	Final Report
Issue :	2

Fifty one samples were received for analysis on 18th September, 2021 of which nineteen 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.

Authorised By:

[redacted]

Phil Sommerton BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	11-13	19-21	22-24	28-30	49-51	64-66	70-71	79-80	106-108	LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP04	TP04	TP06	TP10	TP11	TP12	TP13	TP18			
Depth	0.00	0.00-0.20	1.20	1.50	0.10	0.10	1.60	0.40	0.50	0.10			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V T	J T	V J T			
Sample Date	16/09/2021	16/09/2021	16/09/2021	16/09/2021	16/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021			
Arsenic #	8.8	6.0	7.3	-	7.8	12.9	21.9	-	21.1	26.4	<0.5	mg/kg	TM30/PM15
Cadmium #	0.1	0.2	<0.1	-	0.1	0.1	<0.1	-	0.1	<0.1	<0.1	mg/kg	TM30/PM15
Chromium #	12.7	25.7	39.8	-	43.2	50.8	76.7	-	33.1	61.9	<0.5	mg/kg	TM30/PM15
Copper #	6	15	22	-	15	18	20	-	13	21	<1	mg/kg	TM30/PM15
Lead #	7	8	15	-	20	20	14	-	8	33	<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	0.3	-	0.2	0.4	<0.1	-	0.1	0.1	<0.1	mg/kg	TM30/PM15
Nickel #	7.0	10.0	22.4	-	10.6	21.4	30.5	-	36.3	30.8	<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	2	-	<1	2	<1	-	1	1	<1	mg/kg	TM30/PM15
Sulphur as S	-	-	-	0.04	-	-	-	-	-	-	<0.01	%	TM30/PM15
Total Sulphate as SO4 #	1556	752	1122	-	686	1045	3345	-	835	713	<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	-	-	-	0.07	-	-	-	-	-	-	<0.01	%	TM50/PM29
Zinc #	22	80	94	-	52	93	48	-	55	111	<5	mg/kg	TM30/PM15
Magnesium	-	-	-	0.0015	-	-	-	-	-	-	<0.0001	g/l	TM30/PM20
Magnesium	-	-	-	-	-	-	-	-	-	-	<0.0001	g/l	TM30/PM60
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	0.06	<0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	0.07	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	0.20	<0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	0.21	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	0.27	<0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	0.19	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	0.11	<0.06	-	<0.06	<0.06	<0.06	<0.06	<0.06	0.14	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	0.18	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.13	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	0.27	<0.07	-	<0.07	<0.07	<0.07	<0.07	<0.07	0.24	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	0.14	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	0.13	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	<0.04	0.11	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	0.09	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	0.22	<0.04	-	<0.04	<0.04	<0.04	<0.04	<0.04	0.10	<0.04	mg/kg	TM4/PM8
Coronene	-	-	-	-	-	-	-	<0.04	-	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	<0.6	1.6	<0.6	-	<0.6	<0.6	<0.6	-	<0.6	1.3	<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	-	-	-	-	-	-	<0.64	-	-	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	0.19	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	0.17	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	0.08	<0.02	-	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	88	87	88	-	89	91	84	90	89	92	<0	%	TM4/PM8
Naphthalene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM6
Acenaphthylene	-	-	-	-	-	-	-	-	-	-	<0.03	mg/kg	TM4/PM6
Acenaphthene	-	-	-	-	-	-	-	-	-	-	<0.05	mg/kg	TM4/PM6
Fluorene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM6
Phenanthrene	-	-	-	-	-	-	-	-	-	-	<0.03	mg/kg	TM4/PM6
Anthracene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM6

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	11-13	19-21	22-24	28-30	49-51	64-66	70-71	79-80	106-108	LOD/LOR	Units	Method No.
Sample ID	TP01	TP03	TP04	TP04	TP06	TP10	TP11	TP12	TP13	TP18			
Depth	0.00	0.00-0.20	1.20	1.50	0.10	0.10	1.60	0.40	0.50	0.10			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V T	J T	V J T			
Sample Date	16/09/2021	16/09/2021	16/09/2021	16/09/2021	16/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021			
PAH MS Continued													
Fluoranthene	-	-	-	-	-	-	-	-	-	-	<0.03	mg/kg	TM4/PM6
Pyrene	-	-	-	-	-	-	-	-	-	-	<0.03	mg/kg	TM4/PM6
Benzo(a)anthracene	-	-	-	-	-	-	-	-	-	-	<0.06	mg/kg	TM4/PM6
Chrysene	-	-	-	-	-	-	-	-	-	-	<0.02	mg/kg	TM4/PM6
Benzo(bk)fluoranthene	-	-	-	-	-	-	-	-	-	-	<0.07	mg/kg	TM4/PM6
Benzo(a)pyrene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM6
Indeno(123cd)pyrene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM6
Dibenzo(ah)anthracene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM6
Benzo(ghi)perylene	-	-	-	-	-	-	-	-	-	-	<0.04	mg/kg	TM4/PM6
PAH 16 Total	-	-	-	-	-	-	-	-	-	-	<0.6	mg/kg	TM4/PM6
Benzo(b)fluoranthene	-	-	-	-	-	-	-	-	-	-	<0.05	mg/kg	TM4/PM6
Benzo(k)fluoranthene	-	-	-	-	-	-	-	-	-	-	<0.02	mg/kg	TM4/PM6
Mineral Oil (C10-C40) (EH_CU_1D_AL)	-	-	-	-	-	-	-	<30	-	-	<30	mg/kg	TM5/PM8/PM16
MTBE $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM36/PM12
Benzene $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM36/PM12
Toluene $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM36/PM12
Ethylbenzene $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM36/PM12
m/p-Xylene $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM36/PM12
o-Xylene $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM36/PM12
PCB 28 $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM17/PM8
PCB 52 $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM17/PM8
PCB 101 $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM17/PM8
PCB 118 $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM17/PM8
PCB 138 $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM17/PM8
PCB 153 $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM17/PM8
PCB 180 $^{\#}$	-	-	-	-	-	-	-	<5	-	-	<5	ug/kg	TM17/PM8
Total 7 PCBs $^{\#}$	-	-	-	-	-	-	-	<35	-	-	<35	ug/kg	TM17/PM8
Total Phenols HPLC	<0.15	<0.15	<0.15	-	<0.15	<0.15	<0.15	-	<0.15	<0.15	<0.15	mg/kg	TM26/PM21B
SEM $^{\#}$	-	-	-	-	-	-	-	-	-	-	<110	mg/kg	TM7/PM6
Saturates (Aliphatics)	-	-	-	-	-	-	-	-	-	-	<0.01	%	TM13/PM6
Aromatics	-	-	-	-	-	-	-	-	-	-	<0.01	%	TM13/PM6
Resins (Heterocyclics)	-	-	-	-	-	-	-	-	-	-	<0.01	%	TM13/PM6
Asphaltenes	-	-	-	-	-	-	-	-	-	-	<0.01	%	TM13/PM6
Natural Moisture Content	12.4	5.7	27.3	23.9	20.0	29.4	27.7	14.2	12.7	14.5	<0.1	%	PM4/PM0
Triterpanes 191m/z	-	-	-	-	-	-	-	-	-	-		None	TM16/PM6
Triaromatic Steranes 231m/z	-	-	-	-	-	-	-	-	-	-		None	TM16/PM6

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: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-3	11-13	19-21	22-24	28-30	49-51	64-66	70-71	79-80	106-108			
Sample ID	TP01	TP03	TP04	TP04	TP06	TP10	TP11	TP12	TP13	TP18			
Depth	0.00	0.00-0.20	1.20	1.50	0.10	0.10	1.60	0.40	0.50	0.10			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V T	J T	V J T			
Sample Date	16/09/2021	16/09/2021	16/09/2021	16/09/2021	16/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021			
Coal Tar	-	-	-	-	-	-	-	-	-	-	<0.1	%	TM16/PM6
Ammoniacal Nitrogen as NH4	-	-	-	<0.6	-	-	-	-	-	-	<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE) #	-	-	-	0.003	-	-	-	-	-	-	<0.002	g/l	TM38/PM20
Hexavalent Chromium #	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	-	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	-	-	-	0.0038	-	-	-	-	-	-	<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.3733	0.0896	0.0686	0.0972	0.0089	<0.0015	0.3193	-	0.2291	0.0071	<0.0015	g/l	TM38/PM20
Total Organic Carbon #	0.31	2.12	0.60	-	1.89	2.65	0.89	0.26	0.10	1.93	<0.02	%	TM21/PM24
ANC at pH4	-	-	-	-	-	-	-	<0.03	-	-	<0.03	mol/kg	TM77/PM0
ANC at pH7	-	-	-	-	-	-	-	NDP	-	-	<0.03	mol/kg	TM77/PM0
Loss on Ignition #	-	-	-	-	-	-	-	3.9	-	-	<1.0	%	TM22/PM0
pH #	7.72	8.45	7.65	7.40	7.02	7.72	7.72	7.82	8.15	7.58	<0.01	pH units	TM73/PM11

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	118-120	121-123	130-132	133-135	139-141	147-149							
Sample ID	TP18	TP19	TP19	TP20	TP20	TP6							
Depth	1.90	0.10	2.00	0.10	0.70	0.40							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	17/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021	16/09/2021							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1							
Date of Receipt	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021					LOD/LOR	Units	Method No.
Arsenic$^{\#}$	-	-	11.3	17.5	-	-					<0.5	mg/kg	TM30/PM15
Cadmium$^{\#}$	-	-	<0.1	<0.1	-	-					<0.1	mg/kg	TM30/PM15
Chromium$^{\#}$	-	-	64.7	48.4	-	-					<0.5	mg/kg	TM30/PM15
Copper$^{\#}$	-	-	13	17	-	-					<1	mg/kg	TM30/PM15
Lead$^{\#}$	-	-	16	24	-	-					<5	mg/kg	TM30/PM15
Mercury$^{\#}$	-	-	<0.1	0.4	-	-					<0.1	mg/kg	TM30/PM15
Nickel$^{\#}$	-	-	24.6	25.7	-	-					<0.7	mg/kg	TM30/PM15
Selenium$^{\#}$	-	-	1	1	-	-					<1	mg/kg	TM30/PM15
Sulphur as S	0.11	0.03	-	-	0.05	-					<0.01	%	TM30/PM15
Total Sulphate as SO4$^{\#}$	-	-	470	686	-	-					<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	0.22	0.05	-	-	0.02	-					<0.01	%	TM50/PM29
Zinc$^{\#}$	-	-	88	91	-	-					<5	mg/kg	TM30/PM15
Magnesium	NDP	0.0007	-	-	0.0018	-					<0.0001	g/l	TM30/PM20
Magnesium	NDP	-	-	-	-	-					<0.0001	g/l	TM30/PM60
PAH MS													
Naphthalene$^{\#}$	-	-	<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$^{\#}$	-	-	<0.05	<0.05	-	<0.05					<0.05	mg/kg	TM4/PM8
Fluorene$^{\#}$	-	-	<0.04	<0.04	-	<0.04					<0.04	mg/kg	TM4/PM8
Phenanthrene$^{\#}$	-	-	<0.03	<0.03	-	<0.03					<0.03	mg/kg	TM4/PM8
Anthracene$^{\#}$	-	-	<0.04	<0.04	-	<0.04					<0.04	mg/kg	TM4/PM8
Fluoranthene$^{\#}$	-	-	<0.03	0.15	-	<0.03					<0.03	mg/kg	TM4/PM8
Pyrene$^{\#}$	-	-	<0.03	0.13	-	<0.03					<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene$^{\#}$	-	-	<0.06	0.09	-	<0.06					<0.06	mg/kg	TM4/PM8
Chrysene$^{\#}$	-	-	<0.02	0.07	-	<0.02					<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene$^{\#}$	-	-	<0.07	0.15	-	<0.07					<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene$^{\#}$	-	-	<0.04	0.08	-	<0.04					<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene$^{\#}$	-	-	<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	0.05	-	<0.04					<0.04	mg/kg	TM4/PM8
Coronene	-	-	-	-	-	<0.04					<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	<0.6	0.7	-	-					<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	-	-	-	-	<0.64					<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	<0.05	0.11	-	<0.05					<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	<0.02	0.04	-	<0.02					<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	94	99	-	90					<0	%	TM4/PM8
Naphthalene	-	-	-	-	0.46$_{AA}$	-					<0.04	mg/kg	TM4/PM6
Acenaphthylene	-	-	-	-	<0.30$_{AA}$	-					<0.03	mg/kg	TM4/PM6
Acenaphthene	-	-	-	-	0.56$_{AA}$	-					<0.05	mg/kg	TM4/PM6
Fluorene	-	-	-	-	1.06$_{AA}$	-					<0.04	mg/kg	TM4/PM6
Phenanthrene	-	-	-	-	8.37$_{AA}$	-					<0.03	mg/kg	TM4/PM6
Anthracene	-	-	-	-	3.84$_{AA}$	-					<0.04	mg/kg	TM4/PM6

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: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	118-120	121-123	130-132	133-135	139-141	147-149							
Sample ID	TP18	TP19	TP19	TP20	TP20	TP6							
Depth	1.90	0.10	2.00	0.10	0.70	0.40							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	17/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021	16/09/2021							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021							
PAH MS Continued													
Fluoranthene	-	-	-	-	2.47$_{AA}$	-					<0.03	mg/kg	TM4/PM6
Pyrene	-	-	-	-	1.75$_{AA}$	-					<0.03	mg/kg	TM4/PM6
Benzo(a)anthracene	-	-	-	-	<0.60$_{AA}$	-					<0.06	mg/kg	TM4/PM6
Chrysene	-	-	-	-	0.73$_{AA}$	-					<0.02	mg/kg	TM4/PM6
Benzo(bk)fluoranthene	-	-	-	-	<0.70$_{AA}$	-					<0.07	mg/kg	TM4/PM6
Benzo(a)pyrene	-	-	-	-	<0.40$_{AA}$	-					<0.04	mg/kg	TM4/PM6
Indeno(123cd)pyrene	-	-	-	-	<0.40$_{AA}$	-					<0.04	mg/kg	TM4/PM6
Dibenzo(ah)anthracene	-	-	-	-	<0.40$_{AA}$	-					<0.04	mg/kg	TM4/PM6
Benzo(ghi)perylene	-	-	-	-	<0.40$_{AA}$	-					<0.04	mg/kg	TM4/PM6
PAH 16 Total	-	-	-	-	19.2$_{AA}$	-					<0.6	mg/kg	TM4/PM6
Benzo(b)fluoranthene	-	-	-	-	<0.50$_{AA}$	-					<0.05	mg/kg	TM4/PM6
Benzo(k)fluoranthene	-	-	-	-	<0.20$_{AA}$	-					<0.02	mg/kg	TM4/PM6
Mineral Oil (C10-C40) (EH_CU_1D_AL)	-	-	-	-	-	<30					<30	mg/kg	TM5/PM8/PM16
MTBE$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM36/PM12
Benzene$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM36/PM12
Toluene$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM36/PM12
Ethylbenzene$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM36/PM12
m/p-Xylene$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM36/PM12
o-Xylene$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM36/PM12
PCB 28$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM17/PM8
PCB 52$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM17/PM8
PCB 101$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM17/PM8
PCB 118$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM17/PM8
PCB 138$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM17/PM8
PCB 153$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM17/PM8
PCB 180$^{\#}$	-	-	-	-	-	<5					<5	ug/kg	TM17/PM8
Total 7 PCBs$^{\#}$	-	-	-	-	-	<35					<35	ug/kg	TM17/PM8
Total Phenols HPLC	-	-	<0.15	<0.15	-	-					<0.15	mg/kg	TM26/PM21B
SEM$^{\#}$	-	-	-	-	43396	-					<110	mg/kg	TM7/PM6
Saturates (Aliphatics)	-	-	-	-	11.06	-					<0.01	%	TM13/PM6
Aromatics	-	-	-	-	16.26	-					<0.01	%	TM13/PM6
Resins (Heterocyclics)	-	-	-	-	50.66	-					<0.01	%	TM13/PM6
Asphaltenes	-	-	-	-	22.02	-					<0.01	%	TM13/PM6
Natural Moisture Content	24.6	13.9	20.2	18.6	5.3	15.2					<0.1	%	PM4/PM0
Triterpanes 191m/z	-	-	-	-	Present	-						None	TM16/PM6
Triaromatic Steranes 231m/z	-	-	-	-	Present	-						None	TM16/PM6

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	118-120	121-123	130-132	133-135	139-141	147-149							
Sample ID	TP18	TP19	TP19	TP20	TP20	TP6							
Depth	1.90	0.10	2.00	0.10	0.70	0.40							
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T							
Sample Date	17/09/2021	17/09/2021	17/09/2021	17/09/2021	17/09/2021	16/09/2021							
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021	18/09/2021							
Coal Tar	-	-	-	-	<0.1	-					<0.1	%	TM16/PM6
Ammoniacal Nitrogen as NH4	<0.6	<0.6	-	-	<0.6	-					<0.6	mg/kg	TM38/PM20
Chloride (2:1 Ext BRE) #	0.003	0.004	-	-	0.006	-					<0.002	g/l	TM38/PM20
Hexavalent Chromium #	-	-	<0.3	<0.3	-	-					<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	<0.0025	<0.0025	-	-	<0.0025	-					<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0375	0.0068	0.0213	<0.0015	0.0157	-					<0.0015	g/l	TM38/PM20
Total Organic Carbon #	-	-	0.90	2.11	-	1.46					<0.02	%	TM21/PM24
ANC at pH4	-	-	-	-	-	<0.03					<0.03	mol/kg	TM77/PM0
ANC at pH7	-	-	-	-	-	NDP					<0.03	mol/kg	TM77/PM0
Loss on Ignition #	-	-	-	-	-	6.0					<1.0	%	TM22/PM0
pH #	7.73	7.85	7.13	7.39	8.31	7.30					<0.01	pH units	TM73/PM11

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **NRA Leachate**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	109-111	136-138											
Sample ID	TP18	TP20											
Depth	0.60	0.40											
COC No / misc													
Containers	V J T	V J T											
Sample Date	17/09/2021	17/09/2021											
Sample Type	Soil	Soil											
Batch Number	1	1											
Date of Receipt	18/09/2021	18/09/2021									LOD/LOR	Units	Method No.
Dissolved Arsenic	<2.5	<2.5									<2.5	ug/l	TM30/PM14
Dissolved Boron	<12	36									<12	ug/l	TM30/PM14
Dissolved Cadmium	<0.5	<0.5									<0.5	ug/l	TM30/PM14
Dissolved Chromium	<1.5	<1.5									<1.5	ug/l	TM30/PM14
Dissolved Copper	<7	<7									<7	ug/l	TM30/PM14
Dissolved Lead	<5	<5									<5	ug/l	TM30/PM14
Dissolved Mercury	<1	<1									<1	ug/l	TM30/PM14
Dissolved Nickel	<2	2									<2	ug/l	TM30/PM14
Dissolved Selenium	<3	<3									<3	ug/l	TM30/PM14
Dissolved Zinc	<3	4									<3	ug/l	TM30/PM14
PAH MS													
Naphthalene	0.5	0.3									<0.1	ug/l	TM4/PM30
Acenaphthylene	2.56	0.03									<0.01	ug/l	TM4/PM30
Acenaphthene	0.22	0.02									<0.01	ug/l	TM4/PM30
Fluorene	0.93	<0.01									<0.01	ug/l	TM4/PM30
Phenanthrene	0.88	0.02									<0.01	ug/l	TM4/PM30
Anthracene	0.07	<0.01									<0.01	ug/l	TM4/PM30
Fluoranthene	0.09	<0.01									<0.01	ug/l	TM4/PM30
Pyrene	0.05	<0.01									<0.01	ug/l	TM4/PM30
Benzo(a)anthracene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Chrysene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(a)pyrene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
PAH 16 Total	5.3	0.4									<0.1	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	74	77									<0	%	TM4/PM30
Total Phenols HPLC	<0.1	<0.1									<0.1	mg/l	TM26/PM0
pH	7.08	7.77									<0.01	pH units	TM73/PM0

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

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 less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/14639	1	TP01	0.00	3	27/09/2021	**General Description (Bulk Analysis)**	Soil/Stones
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP03	0.00-0.20	13	27/09/2021	**General Description (Bulk Analysis)**	Soil/Stones
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP04	1.20	21	27/09/2021	**General Description (Bulk Analysis)**	Soil/Stones
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP06	0.10	30	27/09/2021	**General Description (Bulk Analysis)**	soil
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP10	0.10	51	27/09/2021	**General Description (Bulk Analysis)**	soil
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP12	0.10	69	27/09/2021	**General Description (Bulk Analysis)**	soil
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP13	0.50	80	27/09/2021	**General Description (Bulk Analysis)**	soil
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/14639	1	TP13	0.50	80	27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP18	0.60	111	27/09/2021	**General Description (Bulk Analysis)**	soil
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD
21/14639	1	TP20	0.10	135	27/09/2021	**General Description (Bulk Analysis)**	soil
					27/09/2021	**Asbestos Fibres**	NAD
					27/09/2021	**Asbestos ACM**	NAD
					27/09/2021	**Asbestos Type**	NAD
					27/09/2021	**Asbestos Level Screen**	NAD

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
21/14639	1	TP12	0.40	70-71	TM77/PM0	Sample received is below pH7
21/14639	1	TP18	1.90	118-120	TM30/PM20	Sample too absorbent for this test
21/14639	1	TP18	1.90	118-120	TM30/PM60	Sample too absorbent for this test
21/14639	1	TP6	0.40	147-149	TM77/PM0	Sample received is below pH7

Notification of Deviating Samples

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/14639						

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

EMT Job No.: 21/14639

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) 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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology 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	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/14639

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 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	No
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM6	Samples are extracted using Soxtec apparatus and solvent.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of 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 8270D v5:2014 method for the solvent extraction and determination of 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
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM7	Modified USEPA 3540C:1996 and 9071B:1998 for oily wastes. In house method for the gravimetric determination of a sample following solvent extraction.	PM6	Samples are extracted using Soxtec apparatus and solvent.	Yes		AR	Yes
TM13	Determination of Saturates, Aromatics, Resins and Asphaltenes by Thin Layer Chromatography with Flame Ionisation Detection.	PM6	Samples are extracted using Soxtec apparatus and solvent.			AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM6	Samples are extracted using Soxtec apparatus and solvent.			AR	Yes

EMT Job No: 21/14639

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
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM6	Samples are extracted using Soxtec apparatus and solvent.			AR	
TM17	Modified US EPA method 8270D v5:2014. 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 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 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. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	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 BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	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.	PM0	No preparation is required.			AR	No
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified			AR	No
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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

EMT Job No: 21/14639

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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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.			AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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.			AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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

EMT Job No: 21/14639

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
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.			AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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		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
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified			AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			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 11465:1993(E) and BS1377-2:1990.			AR	

element

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

Tier Environmental
Suite 513, Chadwick House
Warrington Rd
Birchwood
Warrington
WA3 6AE

4225

Attention : Steven Millar

Date : 14th October, 2021

Your reference : TE1585

Our reference : Test Report 21/14639 Batch 3

Location : Oxford North

Date samples received : 30th September, 2021

Status : Final Report

Issue : 1

Eight samples were received for analysis on 30th September, 2021 of which eight 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.

Authorised By:

[redacted]

Bruce Leslie
Project Manager

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	197-199	200-202	203-205	206-208	209-211	212-214	215-217	218-220					
Sample ID	TP21 ES1	TP21 ES2	TP22 ES1	TP22 ES2	TP23 ES1	TP23 ES2	TP24 ES1	TP24 ES2					
Depth	0.00	0.50	0.00	0.50	1.00	2.50	0.50	2.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	3	3	3	3	3	3	3	3			LOD/LOR	Units	Method No.
Date of Receipt	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021					
Arsenic#	8.0	104.2	25.6	44.8	9.0	5.4	11.8	9.9			<0.5	mg/kg	TM30/PM15
Cadmium#	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM30/PM15
Chromium#	22.0	66.6	68.3	22.8	65.9	34.0	48.2	36.9			<0.5	mg/kg	TM30/PM15
Copper#	14	32	15	12	19	17	12	12			<1	mg/kg	TM30/PM15
Lead#	28	21	50	62	44	39	34	23			<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			<0.1	mg/kg	TM30/PM15
Nickel#	9.4	32.9	31.7	11.0	20.2	11.4	23.2	12.3			<0.7	mg/kg	TM30/PM15
Selenium#	<1	<1	<1	<1	<1	1	<1	<1			<1	mg/kg	TM30/PM15
Sulphur as S	-	-	-	-	-	-	-	0.03			<0.01	%	TM30/PM15
Total Sulphate as SO4#	1104	6733	906	747	356	656	585	437			<50	mg/kg	TM50/PM29
Total Sulphate as SO4 BRE	-	-	-	-	-	-	-	0.08			<0.01	%	TM50/PM29
Zinc#	47	79	140	61	72	75	61	46			<5	mg/kg	TM30/PM15
Magnesium	-	-	-	-	-	-	-	0.0020			<0.0001	g/l	TM30/PM20
PAH MS													
Naphthalene#	<0.04	<0.04	0.06	0.04	<0.04	0.09	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.22	0.10	0.18	0.15	<0.03	<0.03	<0.03	<0.03			<0.03	mg/kg	TM4/PM8
Acenaphthene#	<0.05	<0.05	0.14	<0.05	<0.05	0.34	<0.05	<0.05			<0.05	mg/kg	TM4/PM8
Fluorene#	0.06	0.04	0.21	0.05	<0.04	0.28	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Phenanthrene#	1.08	0.56	0.48	0.79	0.10	1.88	<0.03	0.06			<0.03	mg/kg	TM4/PM8
Anthracene#	0.81	0.26	0.35	0.32	0.08	0.29	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Fluoranthene#	4.04	1.29	1.44	2.78	0.80	1.47	0.13	0.17			<0.03	mg/kg	TM4/PM8
Pyrene#	3.53	1.14	1.35	2.45	0.88	1.00	0.11	0.16			<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	2.03	0.70	0.92	1.48	0.72	0.43	0.10	0.15			<0.06	mg/kg	TM4/PM8
Chrysene#	2.21	0.71	0.95	1.45	0.78	0.46	0.08	0.13			<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	4.98	1.53	1.95	2.89	1.79	0.65	0.11	0.27			<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene#	2.79	0.91	1.05	1.61	0.81	0.34	0.06	0.14			<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	2.25	0.65	0.83	0.99	0.63	0.23	<0.04	0.12			<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene#	0.36	0.11	0.28	0.19	0.14	0.06	<0.04	<0.04			<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene#	2.00	0.65	0.73	0.99	0.54	0.23	<0.04	0.12			<0.04	mg/kg	TM4/PM8
Coronene	-	-	-	-	-	-	<0.04	-			<0.04	mg/kg	TM4/PM8
PAH 16 Total	26.4	8.7	10.9	16.2	7.3	7.8	<0.6	1.3			<0.6	mg/kg	TM4/PM8
PAH 17 Total	-	-	-	-	-	-	<0.64	-			<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	3.59	1.10	1.40	2.08	1.29	0.47	0.08	0.19			<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	1.39	0.43	0.55	0.81	0.50	0.18	0.03	0.08			<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	94	99	102	97	93	89	90	92			<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	-	-	-	-	-	-	<30	-			<30	mg/kg	TM5/PM8/PM16

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:	Tier Environmental
Reference:	TE1585
Location:	Oxford North
Contact:	Steven Millar
EMT Job No:	21/14639

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	197-199	200-202	203-205	206-208	209-211	212-214	215-217	218-220					
Sample ID	TP21 ES1	TP21 ES2	TP22 ES1	TP22 ES2	TP23 ES1	TP23 ES2	TP24 ES1	TP24 ES2					
Depth	0.00	0.50	0.00	0.50	1.00	2.50	0.50	2.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	3	3	3	3	3	3	3	3			LOD/LOR	Units	Method No.
Date of Receipt	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021					
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	-	-	<0.1	<0.1	-	-	<0.1			<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	-	-	<0.1	0.1	-	-	<0.1			<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	-	-	<0.1	<0.1	-	-	<0.1			<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	-	-	<0.2	<0.2	-	-	<0.2			<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	-	-	<4	<4	-	-	<4			<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	-	-	<7	29	-	-	<7			<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	75	-	-	<7	87	-	-	<7			<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	10	-	-	<7	<7	-	-	<7			<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	85	-	-	<26	116	-	-	<26			<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Aromatics													
>C5-EC7 (HS_1D_AR)#	<0.1	-	-	<0.1	<0.1	-	-	<0.1			<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)#	<0.1	-	-	<0.1	<0.1	-	-	<0.1			<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)#	<0.1	-	-	<0.1	<0.1	-	-	<0.1			<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)#	<0.2	-	-	<0.2	<0.2	-	-	<0.2			<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)#	<4	-	-	<4	<4	-	-	<4			<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)#	<7	-	-	19	40	-	-	<7			<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)#	125	-	-	115	175	-	-	<7			<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	22	-	-	16	19	-	-	<7			<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	147	-	-	150	234	-	-	<26			<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	232	-	-	150	350	-	-	<52			<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE#	<5	-	-	<5	<5	-	<5	<5			<5	ug/kg	TM36/PM12
Benzene#	<5	-	-	<5	<5	-	<5	<5			<5	ug/kg	TM36/PM12
Toluene#	<5	-	-	<5	10	-	<5	<5			<5	ug/kg	TM36/PM12
Ethylbenzene#	<5	-	-	<5	<5	-	<5	<5			<5	ug/kg	TM36/PM12
m/p-Xylene#	<5	-	-	<5	<5	-	<5	<5			<5	ug/kg	TM36/PM12
o-Xylene#	<5	-	-	<5	<5	-	<5	<5			<5	ug/kg	TM36/PM12
PCB 28#	-	-	-	-	-	-	<5	-			<5	ug/kg	TM17/PM8
PCB 52#	-	-	-	-	-	-	<5	-			<5	ug/kg	TM17/PM8
PCB 101#	-	-	-	-	-	-	<5	-			<5	ug/kg	TM17/PM8
PCB 118#	-	-	-	-	-	-	<5	-			<5	ug/kg	TM17/PM8
PCB 138#	-	-	-	-	-	-	<5	-			<5	ug/kg	TM17/PM8
PCB 153#	-	-	-	-	-	-	<5	-			<5	ug/kg	TM17/PM8
PCB 180#	-	-	-	-	-	-	<5	-			<5	ug/kg	TM17/PM8
Total 7 PCBs#	-	-	-	-	-	-	<35	-			<35	ug/kg	TM17/PM8
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15	0.18	<0.15	<0.15			<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	5.8	5.8	12.6	8.9	14.2	16.7	13.9	16.4			<0.1	%	PM4/PM0
Ammoniacal Nitrogen as NH4	-	-	-	-	-	-	-	1.5			<0.6	mg/kg	TM38/PM20

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: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	197-199	200-202	203-205	206-208	209-211	212-214	215-217	218-220					
Sample ID	TP21 ES1	TP21 ES2	TP22 ES1	TP22 ES2	TP23 ES1	TP23 ES2	TP24 ES1	TP24 ES2					
Depth	0.00	0.50	0.00	0.50	1.00	2.50	0.50	2.00					
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T					
Sample Date	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021	29/09/2021					
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil					
Batch Number	3	3	3	3	3	3	3	3			LOD/LOR	Units	Method No.
Date of Receipt	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021	30/09/2021					
Chloride (2:1 Ext BRE)#	-	-	-	-	-	-	-	0.023			<0.002	g/l	TM38/PM20
Hexavalent Chromium#	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3			<0.3	mg/kg	TM38/PM20
Nitrate as NO3 (2:1 Ext BRE)	-	-	-	-	-	-	-	0.0044			<0.0025	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.1670	0.3017	0.0487	0.0330	0.0592	0.0814	0.0793	0.1049			<0.0015	g/l	TM38/PM20
Total Organic Carbon#	0.60	0.53	1.50	0.82	0.69	1.11	0.75	0.42			<0.02	%	TM21/PM24
ANC at pH4	-	-	-	-	-	-	0.16	-			<0.03	mol/kg	TM77/PM0
ANC at pH7	-	-	-	-	-	-	NDP	-			<0.03	mol/kg	TM77/PM0
Loss on Ignition#	-	-	-	-	-	-	4.6	-			<1.0	%	TM22/PM0
pH#	8.49	8.74	8.41	8.45	8.39	8.84	8.52	8.42			<0.01	pH units	TM73/PM11

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **NRA Leachate**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	209-211												
Sample ID	TP23 ES1												
Depth	1.00												
COC No / misc													
Containers	V J T												
Sample Date	29/09/2021												
Sample Type	Soil												
Batch Number	3										LOD/LOR	Units	Method No.
Date of Receipt	30/09/2021												
Dissolved Arsenic	<2.5										<2.5	ug/l	TM30/PM14
Dissolved Boron	30										<12	ug/l	TM30/PM14
Dissolved Cadmium	<0.5										<0.5	ug/l	TM30/PM14
Dissolved Chromium	<1.5										<1.5	ug/l	TM30/PM14
Dissolved Copper	<7										<7	ug/l	TM30/PM14
Dissolved Lead	<5										<5	ug/l	TM30/PM14
Dissolved Mercury	<1										<1	ug/l	TM30/PM14
Dissolved Nickel	<2										<2	ug/l	TM30/PM14
Dissolved Selenium	<3										<3	ug/l	TM30/PM14
Dissolved Zinc	4										<3	ug/l	TM30/PM14
PAH MS													
Naphthalene	0.1^{SV}										<0.1	ug/l	TM4/PM30
Acenaphthylene	0.02^{SV}										<0.01	ug/l	TM4/PM30
Acenaphthene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Fluorene	0.01^{SV}										<0.01	ug/l	TM4/PM30
Phenanthrene	0.02^{SV}										<0.01	ug/l	TM4/PM30
Anthracene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Fluoranthene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Pyrene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Benzo(a)anthracene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Chrysene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Benzo(a)pyrene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.01^{SV}										<0.01	ug/l	TM4/PM30
PAH 16 Total	0.2										<0.1	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01										<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01										<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	63^{SV}										<0	%	TM4/PM30
Total Phenols HPLC	<0.1										<0.1	mg/l	TM26/PM0
pH	8.37										<0.01	pH units	TM73/PM0

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

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 less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/14639	3	TP21 ES1	0.00	199	08/10/2021	**General Description (Bulk Analysis)**	Soil
					08/10/2021	**Asbestos Fibres**	Fibre Bundles
					08/10/2021	**Asbestos ACM**	NAD
					08/10/2021	**Asbestos Type**	Chrysotile
					08/10/2021	**Asbestos Level Screen**	less than 0.1%
					11/10/2021	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					11/10/2021	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					11/10/2021	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
					12/10/2021	**Asbestos PCOM Quantification (Fibres)**	<0.001 (mass %)
					12/10/2021	**Asbestos Gravimetric & PCOM Total**	<0.001 (mass %)
21/14639	3	TP22 ES2	0.50	208	08/10/2021	**General Description (Bulk Analysis)**	soil
					08/10/2021	**Asbestos Fibres**	NAD
					08/10/2021	**Asbestos ACM**	NAD
					08/10/2021	**Asbestos Type**	NAD
					08/10/2021	**Asbestos Level Screen**	NAD
21/14639	3	TP23 ES1	1.00	210	08/10/2021	**General Description (Bulk Analysis)**	soil
					08/10/2021	**Asbestos Fibres**	NAD
					08/10/2021	**Asbestos ACM**	NAD
					08/10/2021	**Asbestos Type**	NAD
					08/10/2021	**Asbestos Level Screen**	NAD
21/14639	3	TP23 ES2	2.50	214	08/10/2021	**General Description (Bulk Analysis)**	soil
					08/10/2021	**Asbestos Fibres**	NAD
					08/10/2021	**Asbestos ACM**	NAD
					08/10/2021	**Asbestos Type**	NAD
					08/10/2021	**Asbestos Level Screen**	NAD
21/14639	3	TP24 ES2	2.00	220	08/10/2021	**General Description (Bulk Analysis)**	soil
					08/10/2021	**Asbestos Fibres**	NAD
					08/10/2021	**Asbestos ACM**	NAD
					08/10/2021	**Asbestos Type**	NAD
					08/10/2021	**Asbestos Level Screen**	NAD

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
21/14639	3	TP24 ES1	0.50	215-217	TM77/PM0	Sample received is below pH7

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/14639						

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

EMT Job No.: 21/14639

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) 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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology 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

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/14639

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 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	No
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of 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 8270D v5:2014 method for the solvent extraction and determination of 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
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. 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 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes

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
TM21	Modified BS 7755-3:1995, ISO10694:1995 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. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	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 BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	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.	PM0	No preparation is required.			AR	No
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified			AR	No
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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 Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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.			AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

EMT Job No: 21/14639

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
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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.			AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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.			AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.			AD	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	

EMT Job No: 21/14639

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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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		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
TM131	Quantification of Asbestos Fibres and ACM based on HSG248 First edition:2006, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified			AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			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 11465:1993(E) and BS1377-2:1990.			AR	

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

Tier Environmental
Suite 513, Chadwick House
Warrington Rd
Birchwood
Warrington
WA3 6AE

Attention :	Steven Millar
Date :	12th October, 2021
Your reference :	TE1585
Our reference :	Test Report 21/14639 Batch 4
Location :	Oxford North
Date samples received :	5th October, 2021
Status :	Final Report
Issue :	1

Eight samples were received for analysis on 5th October, 2021 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.

Authorised By:

[redacted]

Bruce Leslie
Project Manager

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	221-223	227-229	230-232										
Sample ID	TP25	HDP1	BH4										
Depth	0.10	0.40	0.20										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	30/09/2021	30/09/2021	30/09/2021										
Sample Type	Soil	Soil	Soil										
Batch Number	4	4	4								LOD/LOR	Units	Method No.
Date of Receipt	05/10/2021	05/10/2021	05/10/2021										
Arsenic#	23.7	9.7	12.4								<0.5	mg/kg	TM30/PM15
Cadmium#	<0.1	0.2	0.1								<0.1	mg/kg	TM30/PM15
Chromium#	51.2	43.3	54.8								<0.5	mg/kg	TM30/PM15
Copper#	20	11	15								<1	mg/kg	TM30/PM15
Lead#	31	12	24								<5	mg/kg	TM30/PM15
Mercury#	<0.1	<0.1	<0.1								<0.1	mg/kg	TM30/PM15
Nickel#	31.1	33.8	21.8								<0.7	mg/kg	TM30/PM15
Selenium#	<1	2	1								<1	mg/kg	TM30/PM15
Total Sulphate as SO4#	442	296	428								<50	mg/kg	TM50/PM29
Zinc#	102	100	82								<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene#	<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#	<0.05	<0.05	<0.05								<0.05	mg/kg	TM4/PM8
Fluorene#	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Phenanthrene#	0.03	<0.03	<0.03								<0.03	mg/kg	TM4/PM8
Anthracene#	<0.04	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
Fluoranthene#	0.12	<0.03	0.07								<0.03	mg/kg	TM4/PM8
Pyrene#	0.11	<0.03	0.07								<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene#	0.10	<0.06	<0.06								<0.06	mg/kg	TM4/PM8
Chrysene#	0.08	<0.02	0.03								<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene#	0.14	<0.07	0.10								<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene#	0.08	<0.04	0.06								<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene#	0.06	<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#	0.05	<0.04	<0.04								<0.04	mg/kg	TM4/PM8
PAH 16 Total	0.8	<0.6	<0.6								<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.10	<0.05	0.07								<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.04	<0.02	0.03								<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	122	139	116								<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL)#	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL)#	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL)#	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL)#	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL)#	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL)#	<7	<7	20								<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_1D_AL)	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_1D_AL)	<26	<26	<26								<26	mg/kg	TM5/TM36/PM8/PM12/PM16

Client Name:	Tier Environmental	**Report :**	**Solid**
Reference:	TE1585		
Location:	Oxford North	**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub	
Contact:	Steven Millar		
EMT Job No:	21/14639		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	221-223	227-229	230-232										
Sample ID	TP25	HDP1	BH4										
Depth	0.10	0.40	0.20										
COC No / misc													
Containers	V J T	V J T	V J T										
Sample Date	30/09/2021	30/09/2021	30/09/2021										
Sample Type	Soil	Soil	Soil										
Batch Number	4	4	4										
Date of Receipt	05/10/2021	05/10/2021	05/10/2021								LOD/LOR	Units	Method No.
TPH CWG													
Aromatics													
>C5-EC7 (HS_1D_AR)$^{\#}$	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR)$^{\#}$	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR)$^{\#}$	<0.1	<0.1	<0.1								<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR)$^{\#}$	<0.2	<0.2	<0.2								<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR)$^{\#}$	<4	<4	<4								<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR)$^{\#}$	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR)$^{\#}$	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_1D_AR)	<7	<7	<7								<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_1D_AR)	<26	<26	<26								<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40) (EH+HS_CU_1D_Total)	<52	<52	<52								<52	mg/kg	TM5/TM36/PM8/PM12/PM16
MTBE$^{\#}$	<5	<5	<5								<5	ug/kg	TM36/PM12
Benzene$^{\#}$	<5	<5	<5								<5	ug/kg	TM36/PM12
Toluene$^{\#}$	<5	<5	<5								<5	ug/kg	TM36/PM12
Ethylbenzene$^{\#}$	<5	<5	<5								<5	ug/kg	TM36/PM12
m/p-Xylene$^{\#}$	<5	<5	<5								<5	ug/kg	TM36/PM12
o-Xylene$^{\#}$	<5	<5	<5								<5	ug/kg	TM36/PM12
Total Phenols HPLC	<0.15	<0.15	<0.15								<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	13.3	21.1	13.4								<0.1	%	PM4/PM0
Hexavalent Chromium$^{\#}$	<0.3	<0.3	<0.3								<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext)$^{\#}$	0.0068	0.0479	0.0315								<0.0015	g/l	TM38/PM20
Total Organic Carbon$^{\#}$	1.50	0.45	1.27								<0.02	%	TM21/PM24
pH$^{\#}$	7.89	7.53	8.28								<0.01	pH units	TM73/PM11

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:	Tier Environmental
Reference:	TE1585
Location:	Oxford North
Contact:	Steven Millar

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 less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
21/14639	4	HDP1	0.40	229	08/10/2021	**General Description (Bulk Analysis)**	Soil
					08/10/2021	**Asbestos Fibres**	NAD
					08/10/2021	**Asbestos ACM**	NAD
					08/10/2021	**Asbestos Type**	NAD
					08/10/2021	**Asbestos Level Screen**	NAD

Notification of Deviating Samples

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/14639						

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

EMT Job No.: 21/14639

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) 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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology 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

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/14639

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 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of 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 8270D v5:2014 method for the solvent extraction and determination of 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
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 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. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	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
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	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		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

EMT Job No: 21/14639

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
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	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
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 First edition (2006)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. 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 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. 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		AR	No

APPENDIX D - GEOENVIRONMENTAL GROUNDWATER LABORATORY RESULTS

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

Tier Environmental
Suite 513, Chadwick House
Warrington Rd
Birchwood
Warrington
WA3 6AE

Attention :	Steven Millar
Date :	12th November, 2021
Your reference :	TE1585
Our reference :	Test Report 21/14639 Batch 5
Location :	Oxford North
Date samples received :	23rd October, 2021
Status :	Final Report
Issue :	1

Two samples were received for analysis on 23rd October, 2021 of which two 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.

Authorised By:

[redacted]

Hayley Prowse
Project Manager

Please include all sections of this report if it is reproduced

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	245-249	250-254									LOD/LOR	Units	Method No.
Sample ID	BH03	WSO1											
Depth		1.38											
COC No / misc													
Containers	V HNUF P G	V HNUF P G											
Sample Date	18/10/2021	18/10/2021											
Sample Type	Liquid	Liquid											
Batch Number	5	5											
Date of Receipt	23/10/2021	23/10/2021											
Dissolved Arsenic	1.0	<0.9									<0.9	ug/l	TM170/PM14
Dissolved Cadmium	0.07	<0.03									<0.03	ug/l	TM170/PM14
Total Dissolved Chromium	0.2	0.4									<0.2	ug/l	TM170/PM14
Dissolved Copper	1	1									<1	ug/l	TM170/PM14
Dissolved Lead	<0.4	<0.4									<0.4	ug/l	TM170/PM14
Dissolved Mercury	<0.5	<0.5									<0.5	ug/l	TM170/PM14
Dissolved Nickel	20.8	1.7									<0.2	ug/l	TM170/PM14
Dissolved Selenium	<1.2	1.3									<1.2	ug/l	TM170/PM14
Dissolved Zinc	7.1	4.2									<1.5	ug/l	TM170/PM14
Total Hardness Dissolved (as CaCO3)	1021	225									<1	mg/l	TM30/PM14
PAH MS													
Naphthalene	<0.1	<0.1									<0.1	ug/l	TM4/PM30
Acenaphthylene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Acenaphthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Fluorene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Phenanthrene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Anthracene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Fluoranthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Pyrene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(a)anthracene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Chrysene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(bk)fluoranthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(a)pyrene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Indeno(123cd)pyrene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Dibenzo(ah)anthracene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
PAH 16 Total	<0.1	<0.1									<0.1	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01	<0.01									<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	76	74									<0	%	TM4/PM30
MTBE	<5	<5									<5	ug/l	TM36/PM12
Benzene	<5	<5									<5	ug/l	TM36/PM12
Toluene	<5	<5									<5	ug/l	TM36/PM12
Ethylbenzene	<5	<5									<5	ug/l	TM36/PM12
m/p-Xylene	<5	<5									<5	ug/l	TM36/PM12
o-Xylene	<5	<5									<5	ug/l	TM36/PM12

Client Name: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar
EMT Job No: 21/14639

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
$H=H_2SO_4$, Z=ZnAc, N=NaOH, $HN=HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	245-249	250-254									LOD/LOR	Units	Method No.
Sample ID	BH03	WSO1											
Depth		1.38											
COC No / misc													
Containers	V HNUF P G	V HNUF P G											
Sample Date	18/10/2021	18/10/2021											
Sample Type	Liquid	Liquid											
Batch Number	5	5											
Date of Receipt	23/10/2021	23/10/2021											
TPH CWG													
Aliphatics													
>C5-C6	<10	<10									<10	ug/l	TM36/PM12
>C6-C8	<10	<10									<10	ug/l	TM36/PM12
>C8-C10	<10	<10									<10	ug/l	TM36/PM12
>C10-C12	<5	<5									<5	ug/l	TM5/PM16/PM30
>C12-C16	<10	<10									<10	ug/l	TM5/PM16/PM30
>C16-C21	<10	<10									<10	ug/l	TM5/PM16/PM30
>C21-C35	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Aromatics													
>C5-EC7	<10	<10									<10	ug/l	TM36/PM12
>EC7-EC8	<10	<10									<10	ug/l	TM36/PM12
>EC8-EC10	<10	<10									<10	ug/l	TM36/PM12
>EC10-EC12	<5	<5									<5	ug/l	TM5/PM16/PM30
>EC12-EC16	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC16-EC21	<10	<10									<10	ug/l	TM5/PM16/PM30
>EC21-EC35	<10	<10									<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35)	<10	<10									<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total Phenols HPLC	<0.15	<0.15									<0.15	mg/l	TM26/PM0
Sulphate as SO4	631.6	44.5									<0.5	mg/l	TM38/PM0
Total Ammonia as N	0.06	0.09									<0.03	mg/l	TM38/PM0
Electrical Conductivity @25C	1653	489									<2	uS/cm	TM76/PM0
pH	7.29	7.46									<0.01	pH units	TM73/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: Tier Environmental
Reference: TE1585
Location: Oxford North
Contact: Steven Millar

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 21/14639						

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

EMT Job No.: 21/14639

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. Limits of detection for analyses carried out on as received samples are not moisture content corrected. 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.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

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.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) 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.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology 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

HWOL ACRONYMS AND OPERATORS USED

HS	Headspace Analysis.
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent.
CU	Clean-up - e.g. by florisil, silica gel.
1D	GC - Single coil gas chromatography.
Total	Aliphatics & Aromatics.
AL	Aliphatics only.
AR	Aromatics only.
2D	GC-GC - Double coil gas chromatography.
#1	EH_Total but with humics mathematically subtracted
#2	EU_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +).
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry.

EMT Job No: 21/14639

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
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013l	PM0	No preparation is required.				
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.				
TM170	Determination of Trace Metals by ICP-MS (Inductively Coupled Plasma – Mass Spectrometry): Modified USEPA Method 200.8, Rev. 5.4, 1994; Modified EPA Method 6020A, Rev.1, Feb 2007; Modified BS EN ISO 17294-2:2016	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				

APPENDIX E - GEOTECHNICAL IN SITU FIELDWORK AND LABORATORY RESULTS

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client Tier Environmental Ltd

Address
Suite 513
Chadwick House
Warrington Road
Birchwood
WA3 6AE

Contract TE1585 -
Oxford North

Job Number MRN 4144/54
Date of Issue 17 November 2021
Pages 1 of 16

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.

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

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

UKAS TESTING
1580

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

MOISTURE CONTENT DETERMINATION

BS 1377 : Part 2 : 1990
(OVEN DRY)

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

DATE SAMPLED	Not advised	DATE RECEIVED	04-Oct-21
DATE TESTED	13-Oct-21	SAMPLED BY	Client

Laboratory Sample Number	Site Reference	Material	Sample Location	Moisture Content (%)
105126	BH1 4 D9	Stiff grey brown silty CLAY	BH1	27
105138	BH3 1.2 D3	Stiff grey brown silty CLAY	BH3	31
105149	BH4 3.5 D8	Stiff grey brown silty CLAY	BH4	32

COMMENT / ANOMALIES

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED [redacted]

DATE 17-Nov-21

MURRAY RIX

Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS TESTING
1580

TEST CERTIFICATE

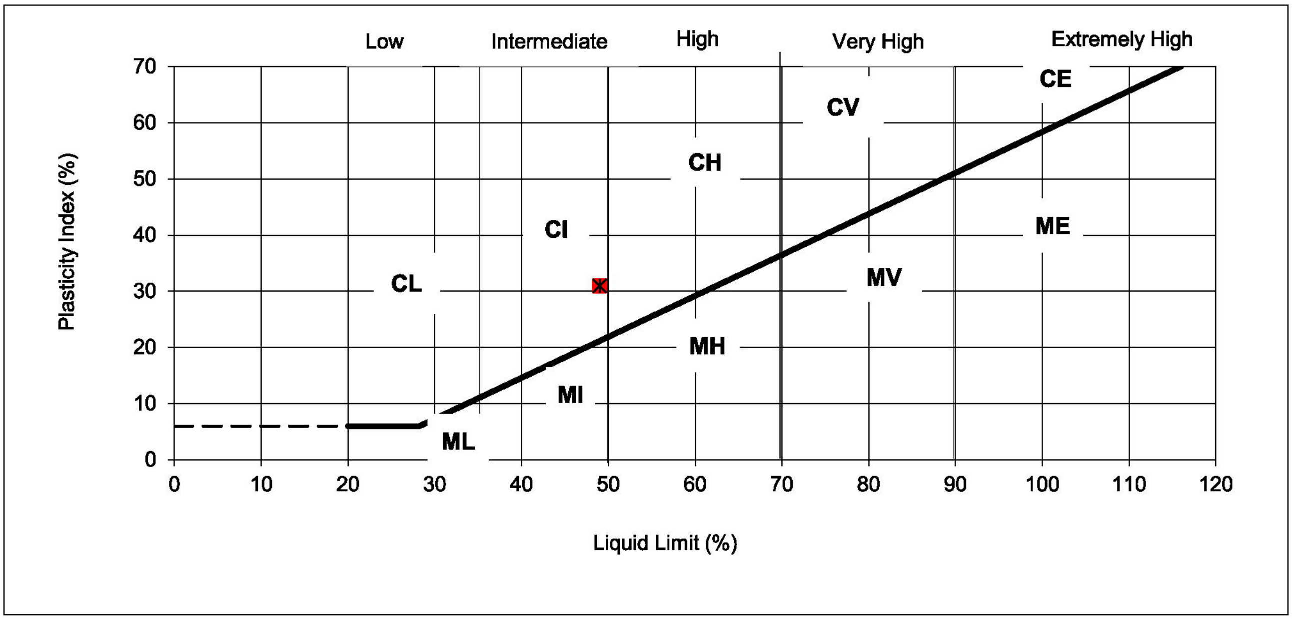
LIQUID AND PLASTIC LIMIT
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH2 4 D10	DATE SAMPLED	Not advised
SAMPLE No.	105135	DATE RECEIVED	04-Oct-21
DATE TESTED	13-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff grey silty CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
26	49	18	31	100



REMARKS
Sample tested in natural condition

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

MURRAY RIX
Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

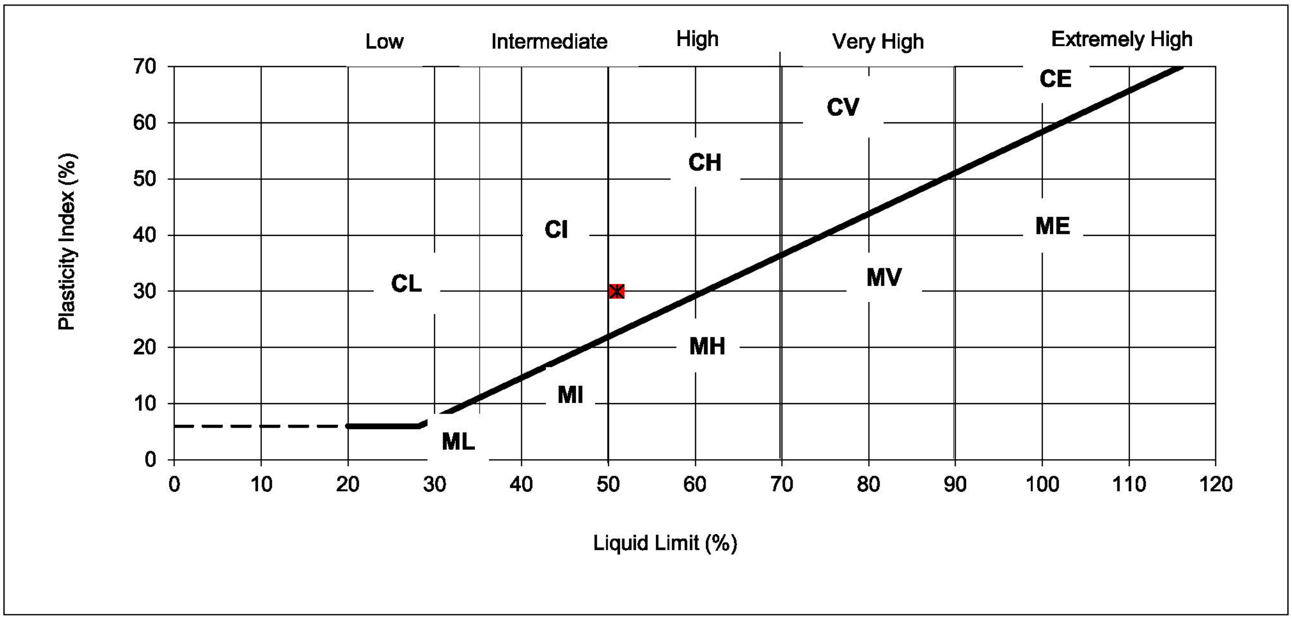
LIQUID AND PLASTIC LIMIT
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH4 4.6 D10	DATE SAMPLED	Not advised
SAMPLE No.	105151	DATE RECEIVED	04-Oct-21
DATE TESTED	13-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff grey brown silty CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
29	51	21	30	100



REMARKS
Sample tested in natural condition

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

MURRAY RIX
Andrew House, Hadfield Street
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

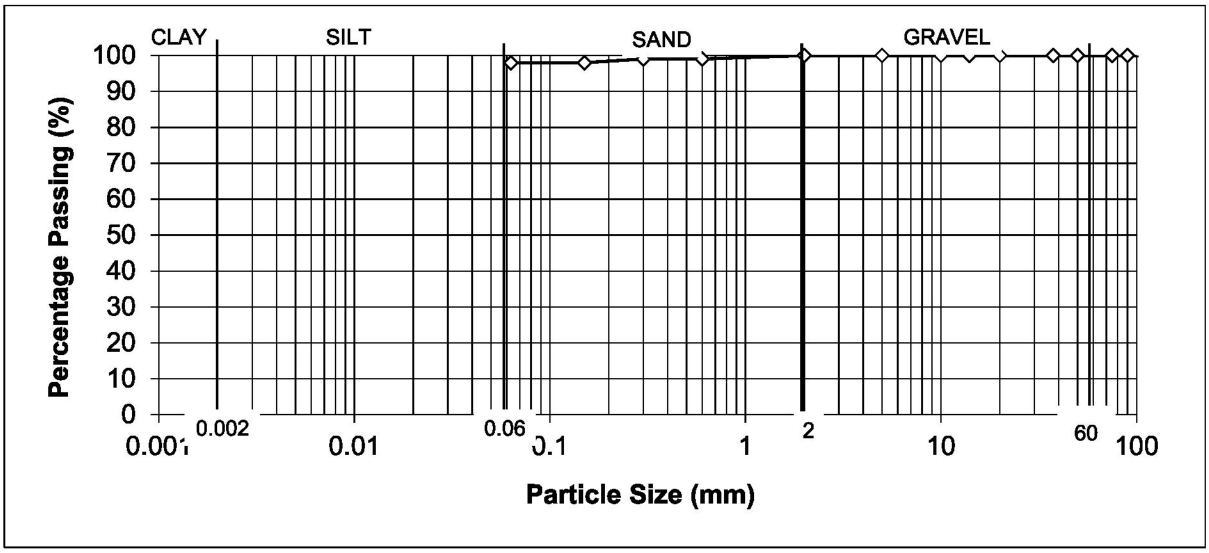
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH1 1.2-1.7 B4	DATE SAMPLED	Not advised
LAB SAMPLE No	105121	DATE RECEIVED	04-Oct-21
DATE TESTED	13-Oct-21	SAMPLED BY	Client

MATERIAL	Firm dark brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	100	
90	100		5	100	
75	100		2	100	
50	100		0.6	99	
37.5	100		0.3	99	
20	100		0.15	98	
14	100		0.063	98	



REMARKS
As received moisture content = 22%

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

MURRAY RIX
Andrew House, Hadfield Street
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

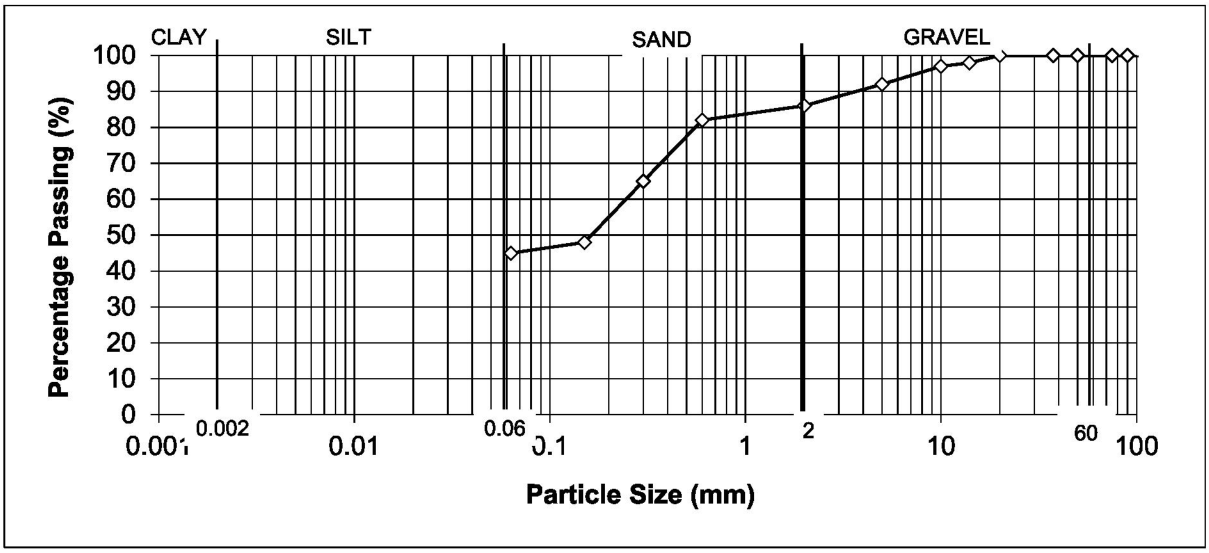
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH3 1.2-1.7 B4	DATE SAMPLED	Not advised
LAB SAMPLE No	105121	DATE RECEIVED	04-Oct-21
DATE TESTED	09-Nov-87	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with occasional gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	97	
90	100		5	92	
75	100		2	86	
50	100		0.6	82	
37.5	100		0.3	65	
20	100		0.15	48	
14	98		0.063	45	



REMARKS
As received moisture content = 22%

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

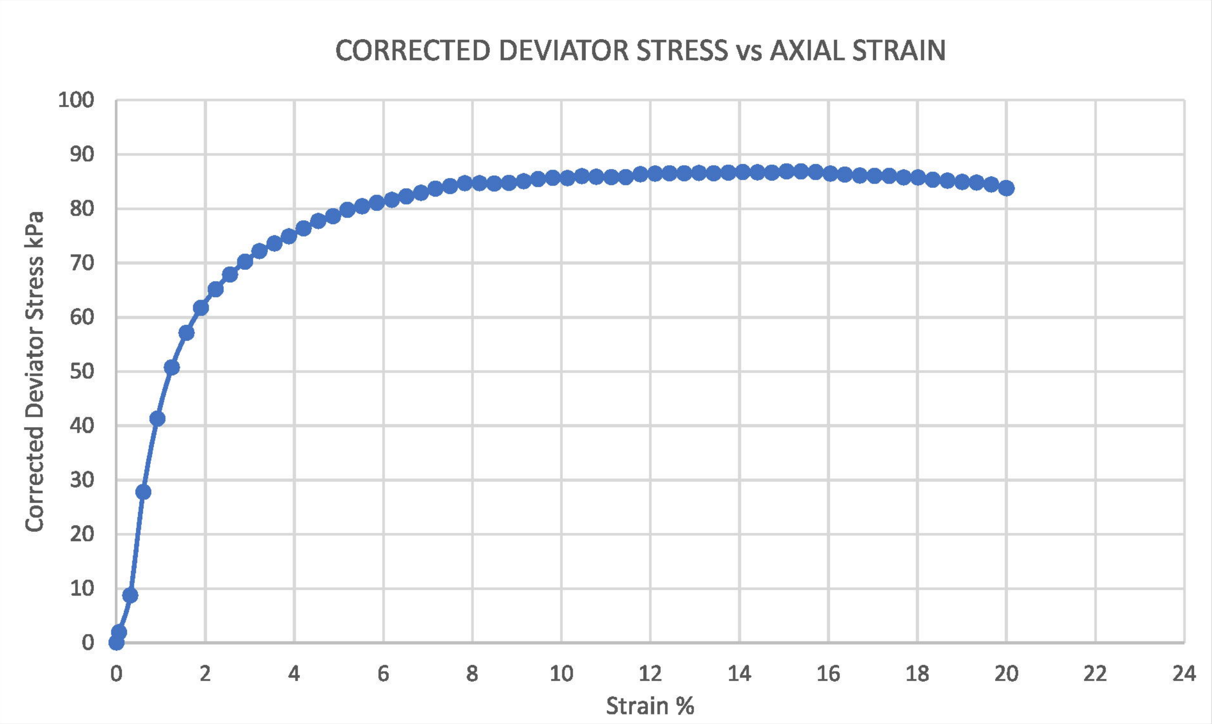
UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH2 1.2 UT3	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105129	**DATE RECEIVED**	04-Oct-21
DATE TESTED	09-Nov-21	**SAMPLED BY**	Client
MATERIAL	Firm brown silty sandy CLAY with occasional gravel		
ADVISED SOURCE	Site Investigation Sample		

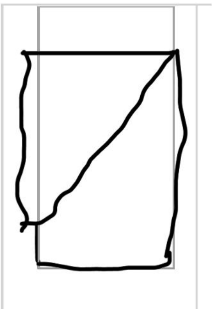
INITIAL CONDITIONS

Specimen Location		Sample Length (mm)	440	Specimen depth from top of Sample (mm)	150
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	203	Specimen Moisture Content (%)	23
		Specimen Diameter (mm)	102	Specimen Bulk Density (Mg/m3)	1.93
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.56
		Membrane Correction	1.48		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
30	15	2	87	43

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

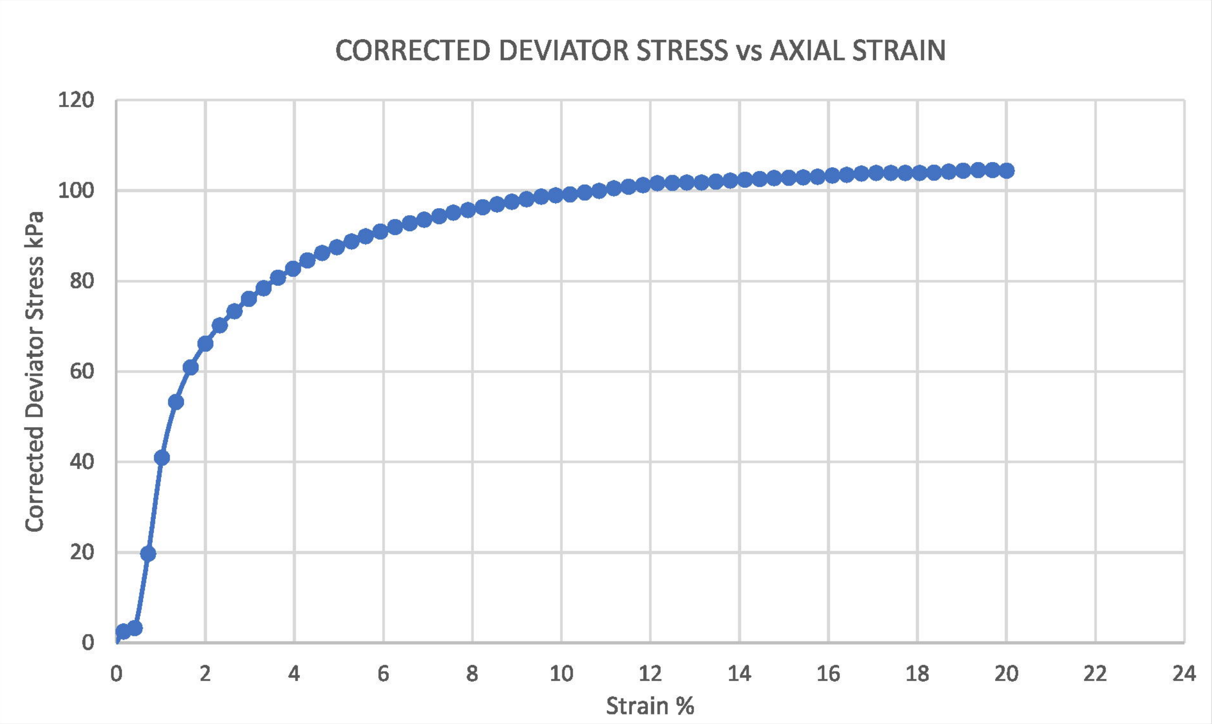
UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH2 3 UT8	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105133	**DATE RECEIVED**	04-Oct-21
DATE TESTED	09-Nov-21	**SAMPLED BY**	Client
MATERIAL	Firm grey silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

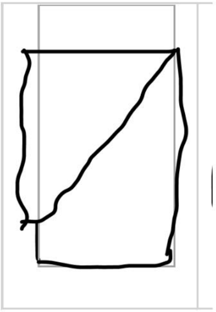
INITIAL CONDITIONS

Specimen Location 	Sample Length (mm)	440	Specimen depth from top of Sample (mm)	150
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	203	Specimen Moisture Content (%)	26
	Specimen Diameter (mm)	104	Specimen Bulk Density (Mg/m3)	1.94
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.54
	Membrane Correction	1.46		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



SIMPLE_SHEAR

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
60	19	2	105	52

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

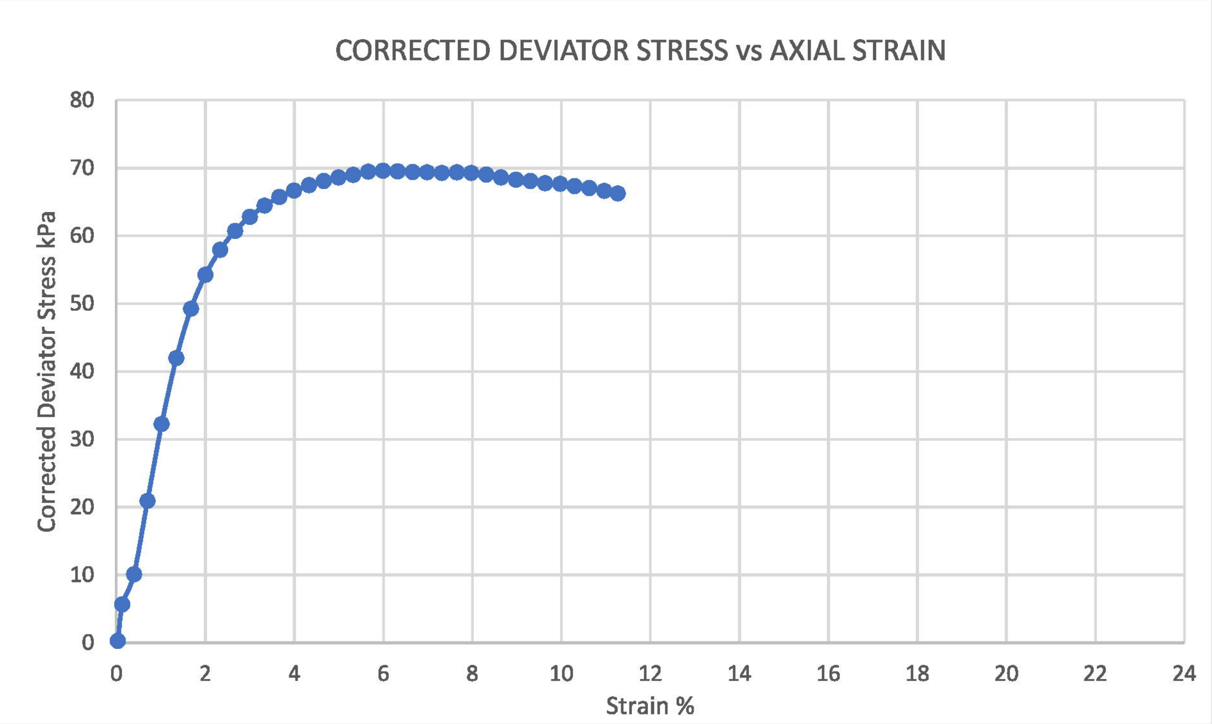
UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH3 2 UT5	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105140	**DATE RECEIVED**	04-Oct-21
DATE TESTED	09-Nov-21	**SAMPLED BY**	Client
MATERIAL	Soft brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

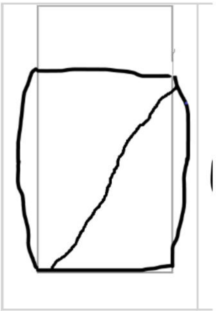
INITIAL CONDITIONS

Specimen Location 	Sample Length (mm)	450	Specimen depth from top of Sample (mm)	110
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	201	Specimen Moisture Content (%)	32
	Specimen Diameter (mm)	103	Specimen Bulk Density (Mg/m3)	1.83
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.39
	Membrane Correction	0.97		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



COMBINED

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
40	6	2	70	35

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

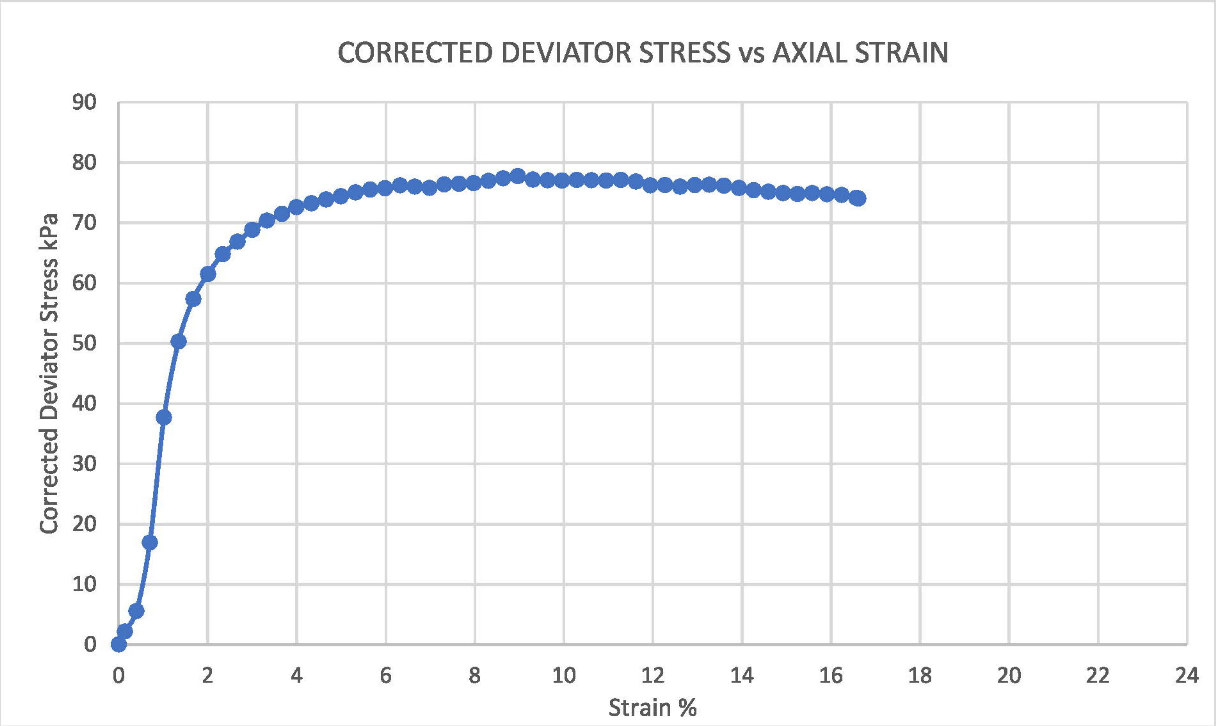
UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH4 2 UT5	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105147	**DATE RECEIVED**	04-Oct-21
DATE TESTED	09-Nov-21	**SAMPLED BY**	Client
MATERIAL	Soft to firm brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

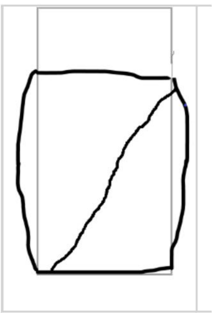
INITIAL CONDITIONS

Specimen Location		Sample Length (mm)	450	Specimen depth from top of Sample (mm)	130
		Sample Orientation	Vertical	Specimen Condition	Undisturbed
		Specimen Length (mm)	201	Specimen Moisture Content (%)	24
		Specimen Diameter (mm)	102	Specimen Bulk Density (Mg/m3)	1.95
		Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.58
		Membrane Correction	1.29		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



COMBINED

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
40	9	2	78	39

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

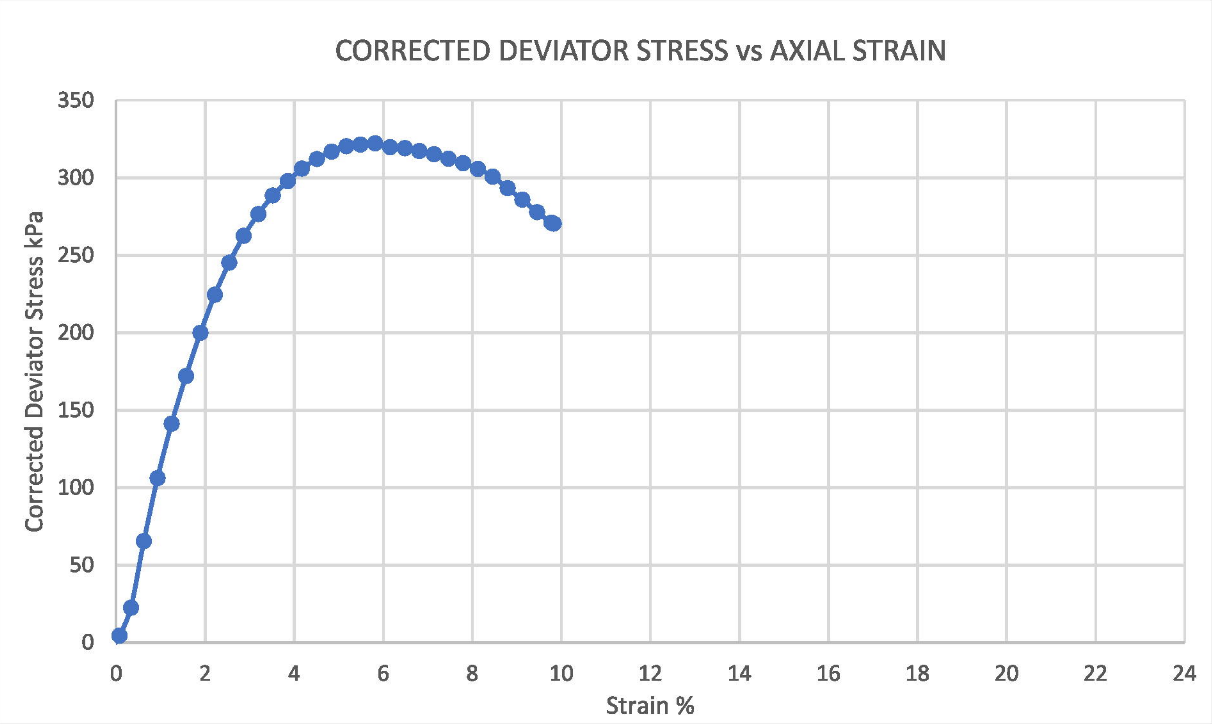
UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION
BS 1377 : PART 7: Clause 8 Single Stage

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH4 5 UT11	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105152	**DATE RECEIVED**	04-Oct-21
DATE TESTED	09-Nov-21	**SAMPLED BY**	Client
MATERIAL	Stiff grey silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

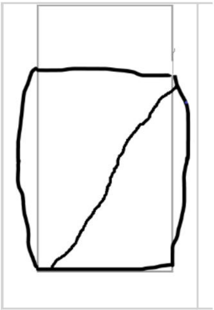
INITIAL CONDITIONS

Specimen Location 	Sample Length (mm)	280	Specimen depth from top of Sample (mm)	40
	Sample Orientation	Vertical	Specimen Condition	Undisturbed
	Specimen Length (mm)	203	Specimen Moisture Content (%)	18
	Specimen Diameter (mm)	101	Specimen Bulk Density (Mg/m3)	2.03
	Membrane Thickness (mm)	0.4	Specimen Dry Density (Mg/m3)	1.73
	Membrane Correction	0.89		



TEST TYPE
SINGLE STAGE

SKETCH OF SPECIMEN AT FAILURE



COMBINED

Cell Pressure (kPa)	Failure Strain (%)	Rate of Strain (%/min)	Corrected Deviator Stress (kPa)	Shear Strength Cu (kPa)
100	6	2	322	161

Remarks/Abnormalities

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

form omcram

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

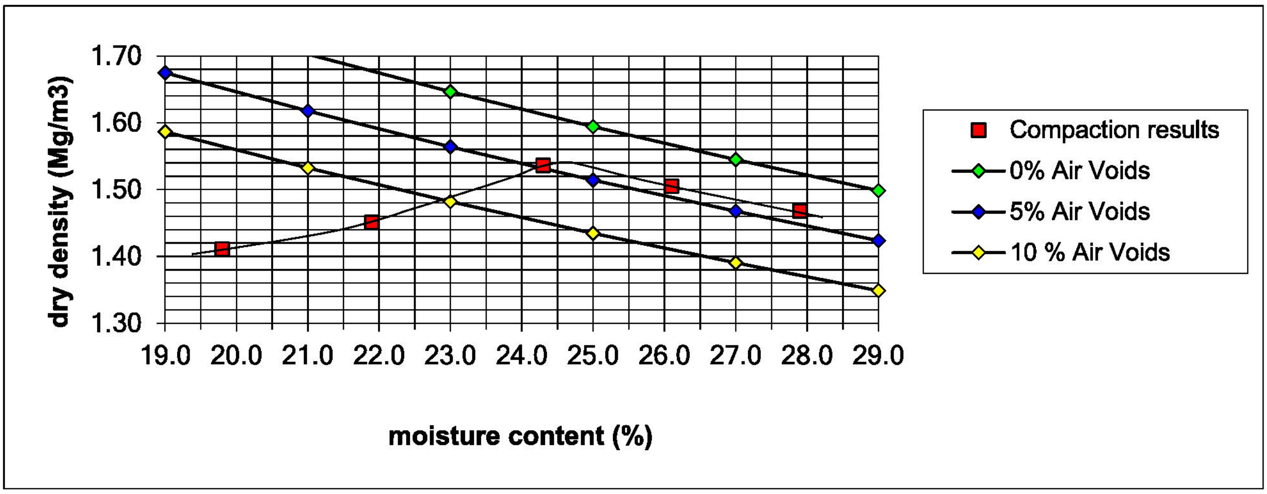
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377: PART 4: 1990
PARTICLE DENSITY METHOD BS 1377: PART 2: 1990 Clause 8.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

SAMPLE LABEL	BH1 3 B8	DATE SAMPLED	Not advised
LAB SAMPLE No	105125	DATE RECEIVED	04-Oct-21
DATE TESTED	14-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried/Separate Batches

Point Number		Moisture Content (%)	Dry Density (Mg/m3)
1		19.8	1.411
2		21.9	1.451
3		24.3	1.536
4		26.1	1.505
5		27.9	1.468
	Optimum	25.0	
	Maximum		1.54
	Particle Density	2.65 (Assumed)	



REMARKS/ABNORMALITIES
Percentage of material retained on 37.5mm sieve = 0%
Percentage of material retained on 20mm sieve = 0%
As received moisture content = 28%

SIGNED [redacted]

NAME O.P Davies BA (Hons) DATE 17-Nov-21
(Laboratory Manager)

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES
BS 1377 : PART 5 : Clause 3 : 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

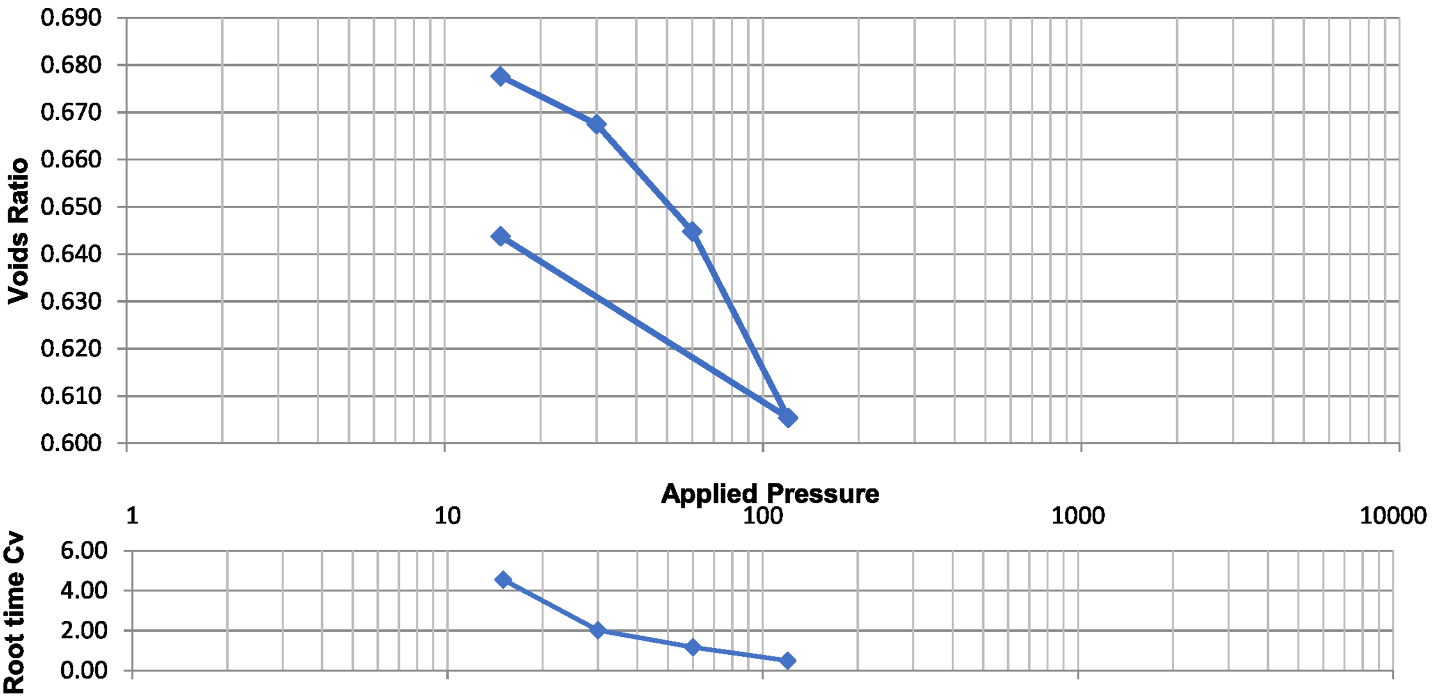
SAMPLE LABEL	BH1 1.2-1.7 B4	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105121	**DATE RECEIVED**	04-Oct-21
DATE TESTED	13-Oct-21	**SAMPLED BY**	Client
MATERIAL	Firm dark brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

Specimen Location	Sample Length (mm)	N/A	Specimen depth from top of Sample (mm)	N/A
	Sample Orientation	N/A	Specimen Condition	Recompacted*

INITIAL CONDITIONS

Height	20.1	mm	Particle density	2.65	Ass
Diameter	74.9	mm	Initial void ratio	0.69	
Weight wet	167.8	g	Deg. of sat.	82	%
Moist. cont.	22	%	Swell. press.	5	kN/m2
Bulk Density	1.90	Mg/m3	Dry density	1.56	Mg/m3

Load No.	Applied Pressure kPa	Sample Height mm	Void Ratio	Mv m2/MN	Temp °C	Cv t90 root m2/yr	Cv t50 log m2/yr
1	15	19.85	0.678	0.69	20	4.55	4.49
2	30	19.73	0.667	0.41	20	2.02	1.66
3	60	19.46	0.645	0.46	20	1.16	1.16
4	120	18.99	0.605	0.41	20	0.50	0.21
5	15	19.45	0.644	0.23	20		
6							
7							



Remarks/Abnormalities
*Recompacted at as received moisture content using the 2.5kg rammer

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES
BS 1377 : PART 5 : Clause 3 : 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

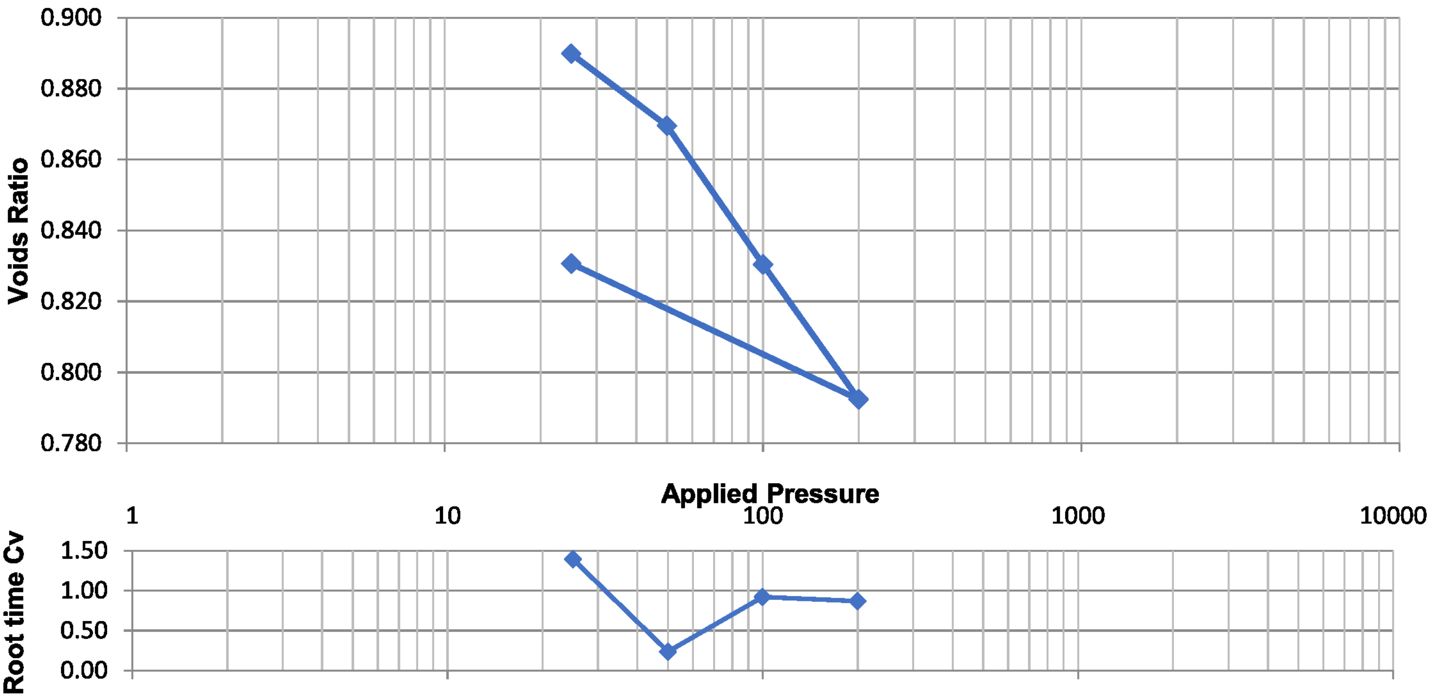
SAMPLE LABEL	BH2 2-2.5	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105131	**DATE RECEIVED**	04-Oct-21
DATE TESTED	21-Oct-21	**SAMPLED BY**	Client
MATERIAL	Firm grey silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

Specimen Location	Sample Length (mm)	N/A	Specimen depth from top of Sample (mm)	N/A
	Sample Orientation	N/A	Specimen Condition	Recompacted*

INITIAL CONDITIONS

Height	20.0	mm	Particle density	2.65	Ass
Diameter	74.9	mm	Initial void ratio	0.91	
Weight wet	164.1	g	Deg. of sat.	100	%
Moist. cont.	34	%	Swell. press.	5	kN/m2
Bulk Density	1.87	Mg/m3	Dry density	1.39	Mg/m3

Load No.	Applied Pressure kPa	Sample Height mm	Void Ratio	Mv m2/MN	Temp °C	Cv t90 root m2/yr	Cv t50 log m2/yr
1	25	19.75	0.890	0.42	20	1.39	1.02
2	50	19.53	0.870	0.44	20	0.24	0.16
3	100	19.13	0.830	0.42	20	0.92	1.23
4	200	18.73	0.792	0.21	20	0.87	0.80
5	25	19.13	0.831	0.12	20		
6							
7							



Remarks/Abnormalities
*Recompacted at as received moisture content using the 2.5kg rammer

Name O.P Davies BA (Hons) (Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES
BS 1377 : PART 5 : Clause 3 : 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

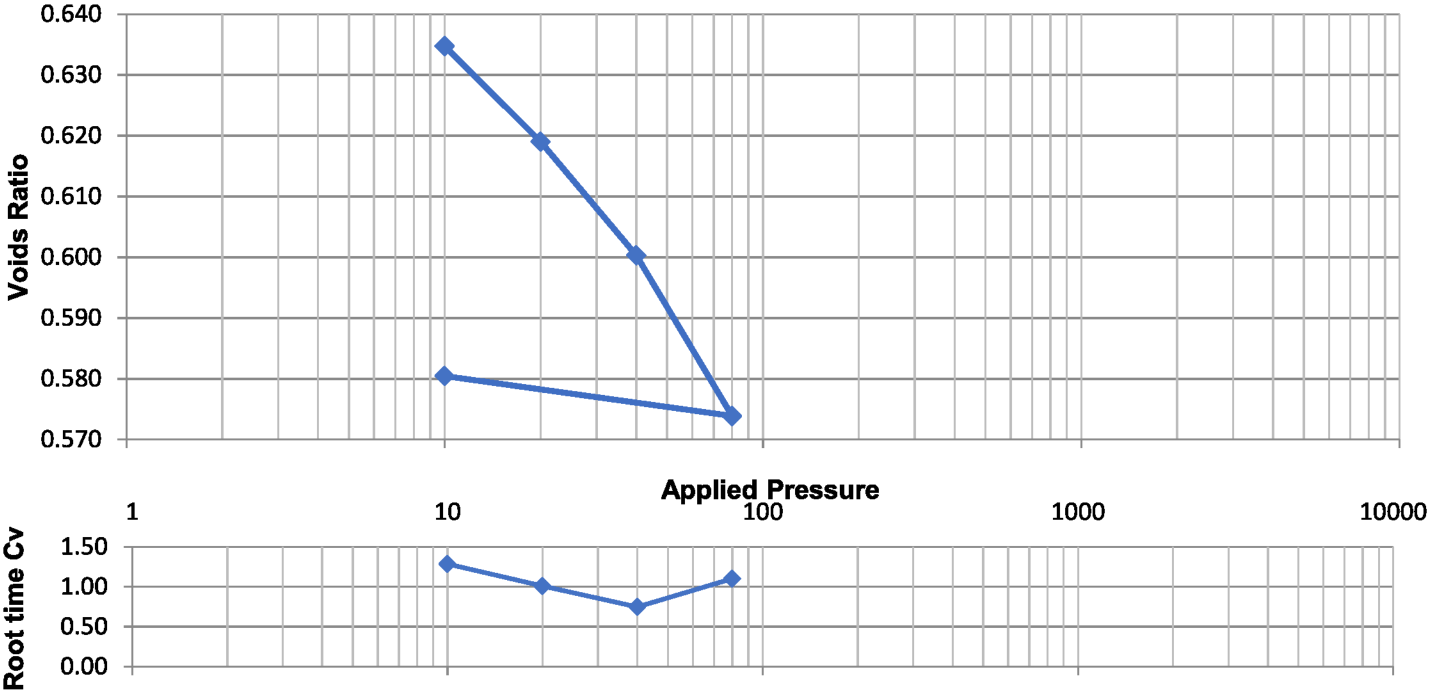
SAMPLE LABEL	BH3 1.2-1.7 B4	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105139	**DATE RECEIVED**	04-Oct-21
DATE TESTED	21-Oct-21	**SAMPLED BY**	Client
MATERIAL	Stiff brown silty sandy CLAY with occasional gravel		
ADVISED SOURCE	Site Investigation Sample		

Specimen Location	Sample Length (mm)	N/A	Specimen depth from top of Sample (mm)	N/A
	Sample Orientation	N/A	Specimen Condition	Recompacted*

INITIAL CONDITIONS

Height	20.0	mm	Particle density	2.65	Ass
Diameter	75.1	mm	Initial void ratio	0.64	
Weight wet	173.9	g	Deg. of sat.	89	%
Moist. cont.	22	%	Swell. press.	5	kN/m2
Bulk Density	1.96	Mg/m3	Dry density	1.61	Mg/m3

Load No.	Applied Pressure kPa	Sample Height mm	Void Ratio	Mv m2/MN	Temp °C	Cv t90 root m2/yr	Cv t50 log m2/yr
1	10	19.92	0.635	0.61	20	1.28	1.28
2	20	19.73	0.619	0.98	20	1.01	1.06
3	40	19.50	0.600	0.59	20	0.75	0.73
4	80	19.18	0.574	0.42	20	1.10	1.05
5	10	19.26	0.580	0.06	20		
6							
7							



Remarks/Abnormalities
*Recompacted at as received moisture content using the 2.5kg rammer

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES
BS 1377 : PART 5 : Clause 3 : 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/54

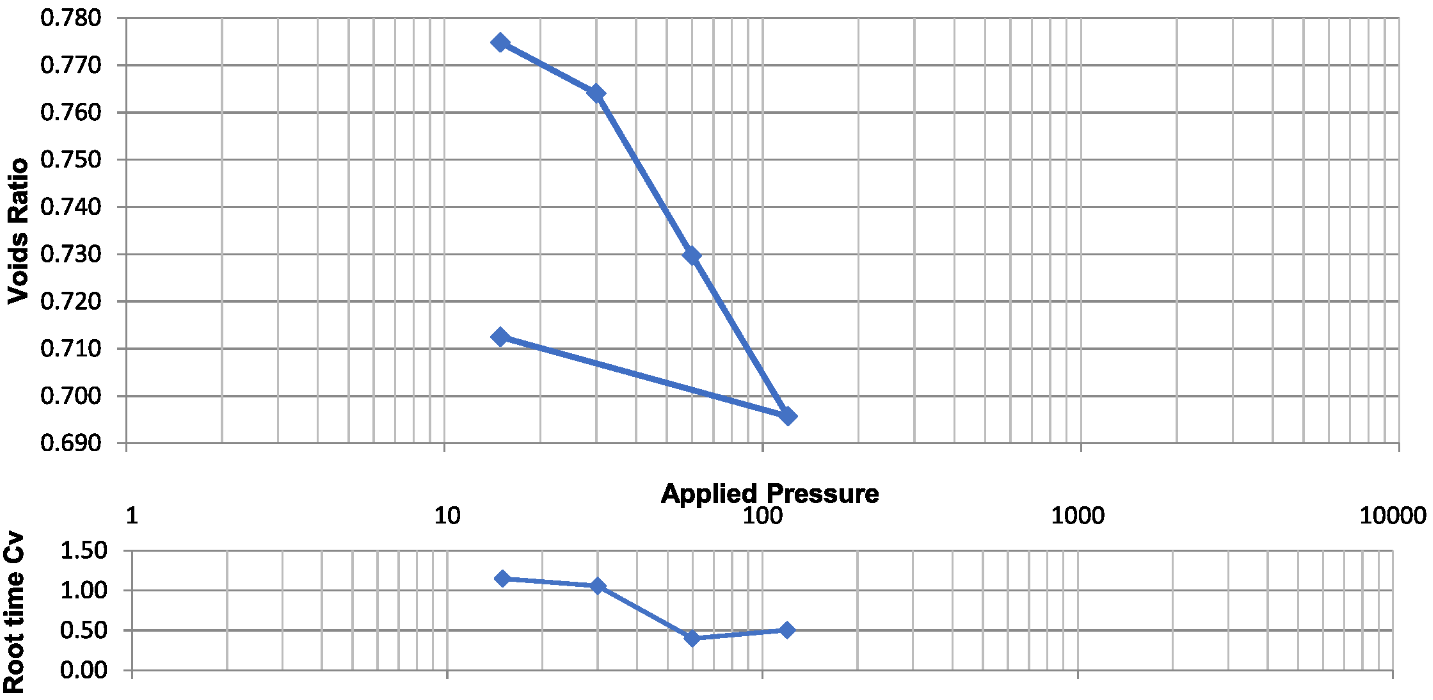
SAMPLE LABEL	BH4 2.5-3 B6	**DATE SAMPLED**	Not advised
LAB SAMPLE No.	105155	**DATE RECEIVED**	04-Oct-21
DATE TESTED	01-Nov-21	**SAMPLED BY**	Client
MATERIAL	Soft dark brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample		

Specimen Location	Sample Length (mm)	N/A	Specimen depth from top of Sample (mm)	N/A
	Sample Orientation	N/A	Specimen Condition	Recompacted*

INITIAL CONDITIONS

Height	20.1	mm	Particle density	2.65	Ass
Diameter	74.9	mm	Initial void ratio	0.80	
Weight wet	165.2	g	Deg. of sat.	88	%
Moist. cont.	27	%	Swell. press.	5	kN/m2
Bulk Density	1.86	Mg/m3	Dry density	1.47	Mg/m3

Load No.	Applied Pressure kPa	Sample Height mm	Void Ratio	Mv m2/MN	Temp °C	Cv t90 root m2/yr	Cv t50 log m2/yr
1	15	19.83	0.775	0.95	20	1.15	0.89
2	30	19.71	0.764	0.41	20	1.06	0.77
3	60	19.32	0.730	0.66	20	0.40	0.24
4	120	18.94	0.696	0.33	20	0.50	0.59
5	15	19.13	0.713	0.10	20		
6							
7							



Remarks/Abnormalities
*Recompacted at as received moisture content using the 2.5kg rammer

Name O.P Davies BA (Hons)
(Laboratory Manager)

Signed [redacted]

Date 17 November 2021

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client	Tier Environmental Ltd
Address	Suite 513 Chadwick House Warrington Road Birchwood WA3 6AE
Contract	TE1585 - Oxford North
Job Number	MRN 4144/55
Date of Issue	17 November 2021
Total Pages	1 of 16

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.

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

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

UKAS
TESTING
1580

M U R R A Y R I X

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

MOISTURE CONTENT DETERMINATION

BS 1377 : Part 2 : 1990
(OVEN DRY)

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

DATE SAMPLED	Not advised	DATE RECEIVED	24-Sep-21
DATE TESTED	11-Oct-21	SAMPLED BY	Client

Laboratory Sample Number	Site Reference	Material	Sample Location	Moisture Content (%)
104723	WS1 1.9 D9	Grey SAND	WS1	21
104734	WS5 2.8 D5	Stiff grey silty CLAY	WS5	30
104696	TP04 2.8 D6	Stiff grey silty CLAY	TP04	30
104706	TP13 1.5 D4	Stiff grey silty CLAY	TP13	29
104712	TP16 1 D3	Stiff grey brown silty CLAY	TP16	20

COMMENT / ANOMALIES

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

SIGNED [redacted]

DATE 17-Nov-21

MURRAY RIX

Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

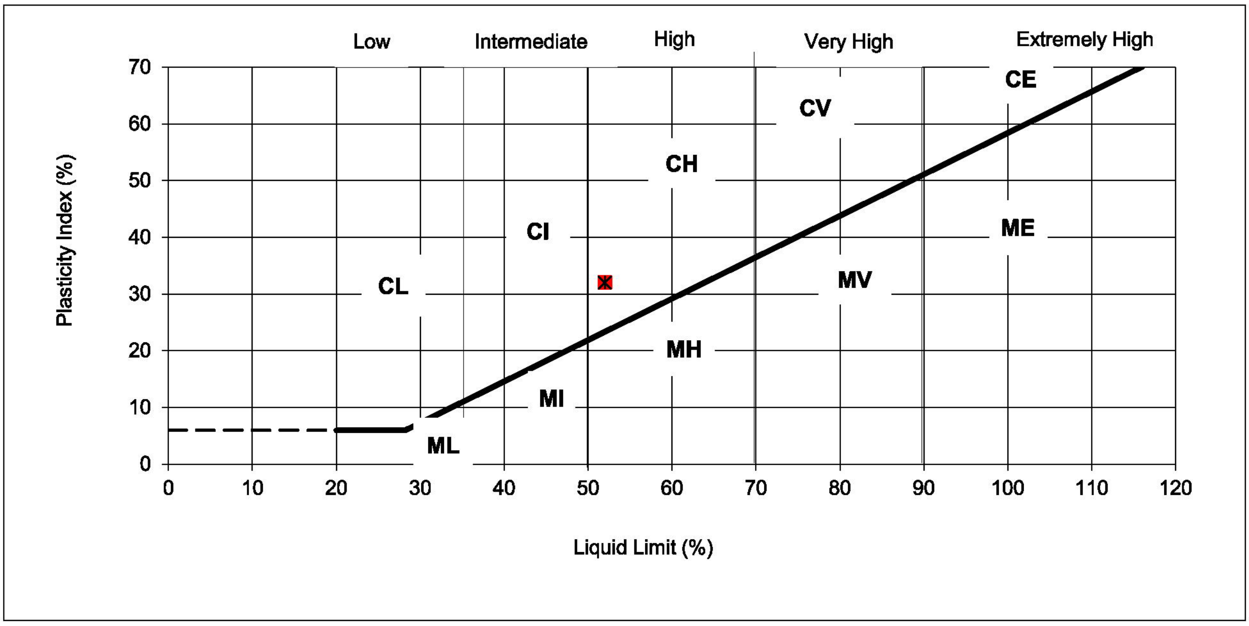
LIQUID AND PLASTIC LIMIT
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS1 2.5 D5	DATE SAMPLED	Not advised
SAMPLE No.	104720	DATE RECEIVED	24-Sep-21
DATE TESTED	11-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff grey silty CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
25	52	20	32	100



REMARKS
Sample tested in natural condition

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

MURRAY RIX

Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

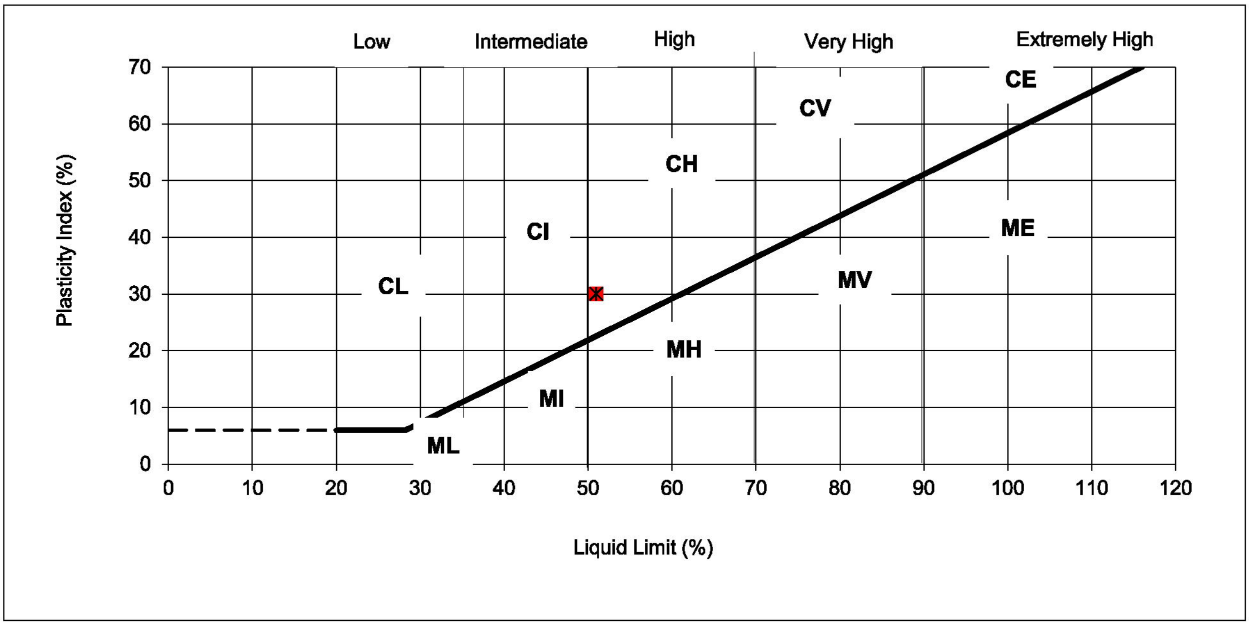
LIQUID AND PLASTIC LIMIT
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS5 4.8 D7	DATE SAMPLED	Not advised
SAMPLE No.	104738	DATE RECEIVED	24-Sep-21
DATE TESTED	11-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff grey silty CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
28	51	21	30	100



REMARKS
Sample tested in natural condition

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

MURRAY RIX
Andrew House, Hadfield Street,
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

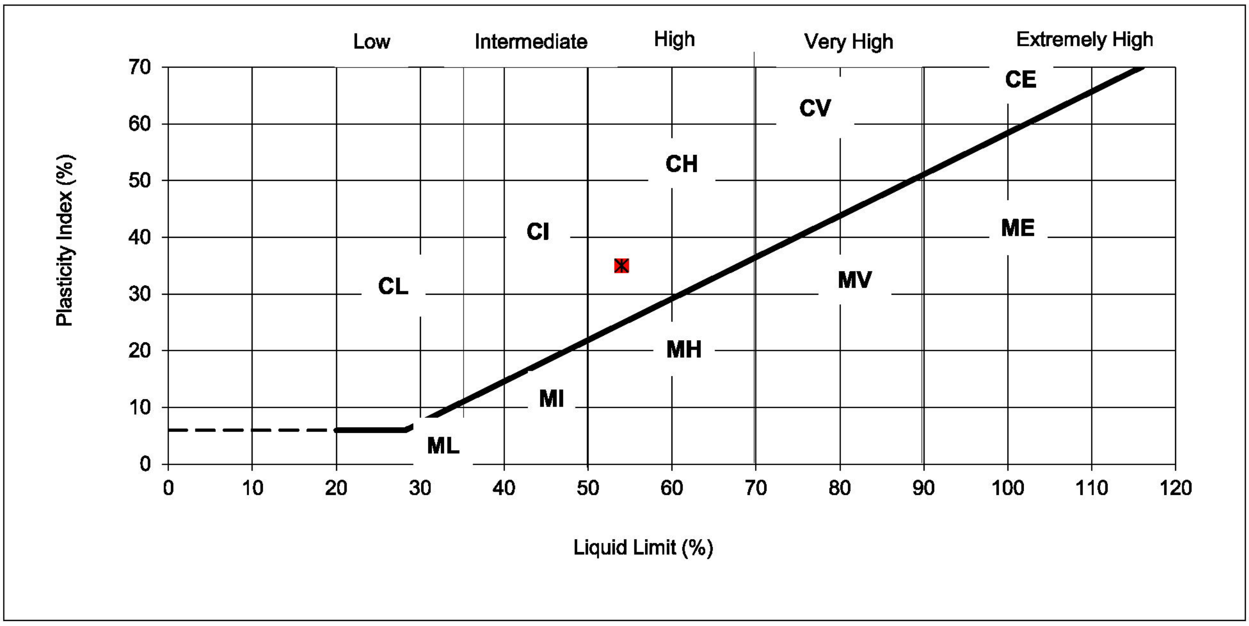
LIQUID AND PLASTIC LIMIT
BS 1377: PART 2: 1990 Clause 4.4 ONE POINT METHOD & Clause 5.3
MOISTURE CONTENT METHOD BS 1377: PART 2: 1990 Clause 3.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	TP06 2.2 D4	DATE SAMPLED	Not advised
SAMPLE No.	104701	DATE RECEIVED	24-Sep-21
DATE TESTED	11-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff grey silty CLAY
ADVISED SOURCE	Site Investigation Sample

Moisture Content (Natural) (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
30	54	19	35	100



REMARKS
Sample tested in natural condition

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

MURRAY RIX
Andrew House, Hadfield Street
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

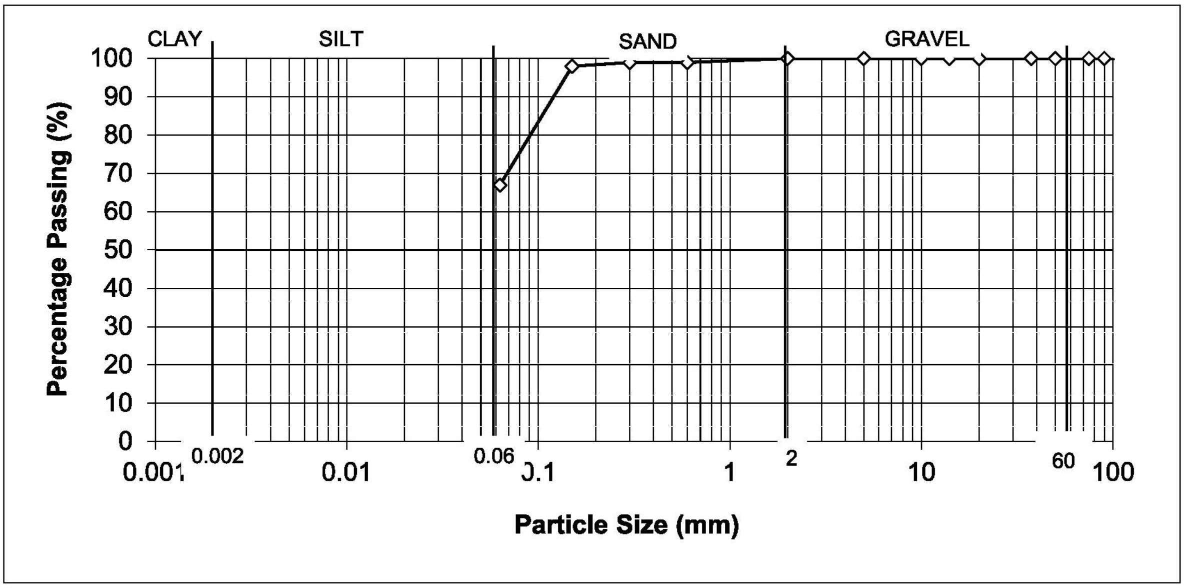
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	TP06 1.5-2 B5	DATE SAMPLED	Not advised
LAB SAMPLE No	104700	DATE RECEIVED	24-Sep-21
DATE TESTED	12-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	100	
90	100		5	100	
75	100		2	100	
50	100		0.6	99	
37.5	100		0.3	99	
20	100		0.15	98	
14	100		0.063	67	



REMARKS
As received moisture content = 18%

SIGNED [redacted]

NAME O.P. Davies BA (Hons) DATE 17-Nov-21
(Laboratory Manager)

MURRAY RIX

Andrew House, Hadfield Street
Dukinfield, Cheshire SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

PARTICLE SIZE DISTRIBUTION

BS 1377: PART 2: Clause 9.2: 1990

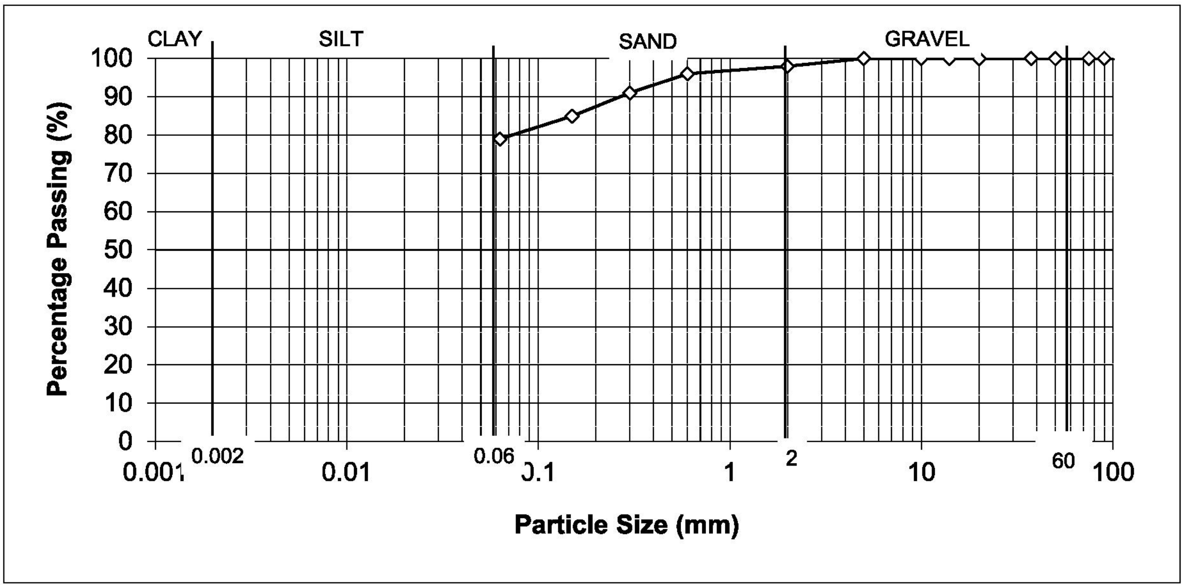
Determination of Moisture Content in accordance with BS 1377: PART 2: Clause 3: 1990 (Oven Dry)

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	TP18 0.6-1.0 B3	DATE SAMPLED	Not advised
LAB SAMPLE No	104716	DATE RECEIVED	24-Sep-21
DATE TESTED	12-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample

Sieve Size (mm)	% Passing (%)	Specification (%)	Sieve Size (mm)	% Passing (%)	Specification (%)
125	100		10	100	
90	100		5	100	
75	100		2	98	
50	100		0.6	96	
37.5	100		0.3	91	
20	100		0.15	85	
14	100		0.063	79	



REMARKS
As received moisture content = 18%

SIGNED [redacted]

NAME O.P. Davies BA (Hons) DATE 17-Nov-21
(Laboratory Manager)

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

pH and Sulphate as SO4
BS 1377: PART 3: 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS1 2.5 D5	DATE SAMPLED	Not advised
LAB SAMPLE No	104720	DATE RECEIVED	24 September 2021
DATE TESTED	12 October 2021	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.1	
Sulphate as SO_4 (2:1 Water Extract)	0.08	g/l

REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

pH and Sulphate as SO4
BS 1377: PART 3: 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS1 4.5 D8	DATE SAMPLED	Not advised
LAB SAMPLE No	104722	DATE RECEIVED	24 September 2021
DATE TESTED	12 October 2021	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.0	
Sulphate as SO_4 (2:1 Water Extract)	0.11	g/l

REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

pH and Sulphate as SO4
BS 1377: PART 3: 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS3 0.6 D3	DATE SAMPLED	Not advised
LAB SAMPLE No	104727	DATE RECEIVED	24 September 2021
DATE TESTED	12 October 2021	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.1	
Sulphate as SO_4 (2:1 Water Extract)	0.20	g/l

REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17 November 2021

MURRAY RIX
ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

pH and Sulphate as SO_4
BS 1377: PART 3: 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS4 2 D4	DATE SAMPLED	Not advised
LAB SAMPLE No	104730	DATE RECEIVED	24 September 2021
DATE TESTED	12 October 2021	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.0	
Sulphate as SO_4 (2:1 Water Extract)	0.10	g/l

REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

pH and Sulphate as SO4
BS 1377: PART 3: 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS5 3.8 D7	DATE SAMPLED	Not advised
LAB SAMPLE No	104736	DATE RECEIVED	24 September 2021
DATE TESTED	12 October 2021	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.0	
Sulphate as SO_4 (2:1 Water Extract)	0.09	g/l

REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17 November 2021

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

pH and Sulphate as SO4
BS 1377: PART 3: 1990

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	WS6 0.5 D3	DATE SAMPLED	Not advised
LAB SAMPLE No	104737	DATE RECEIVED	24 September 2021
DATE TESTED	12 October 2021	SAMPLED BY	Client

ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried

PH Value	7.0	
Sulphate as SO_4 (2:1 Water Extract)	0.14	g/l

REMARKS

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17 November 2021

form omcram

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 2.5kg RAMMER

BS 1377: PART 4: 1990

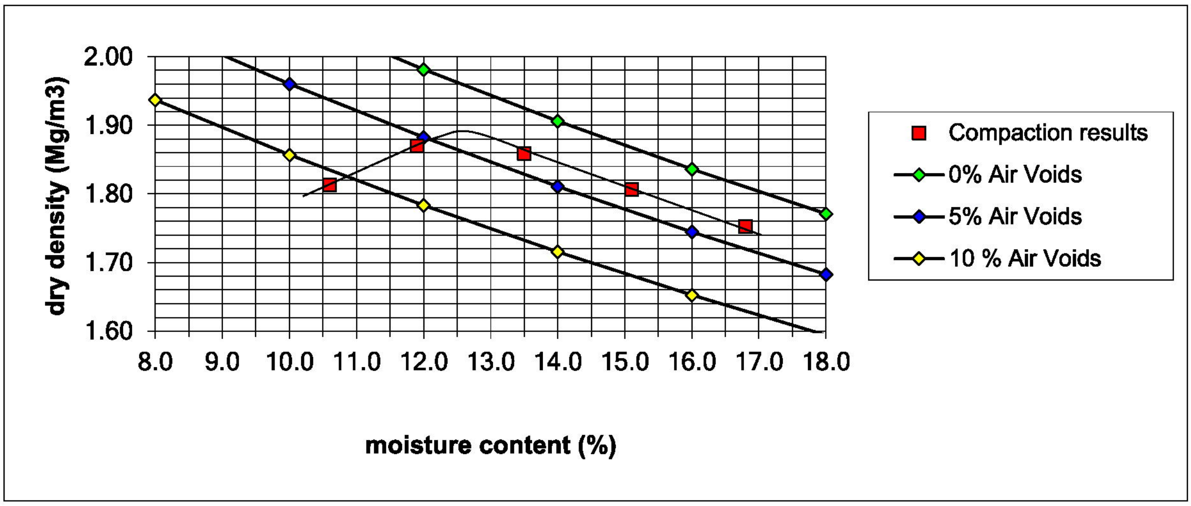
PARTICLE DENSITY METHOD BS 1377: PART 2: 1990 Clause 8.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	TP06 1.5-2 B5	DATE SAMPLED	Not advised
LAB SAMPLE No	104700	DATE RECEIVED	24-Sep-21
DATE TESTED	12-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried/Separate Batches

Point Number		Moisture Content (%)	Dry Density (Mg/m3)
1		10.6	1.813
2		11.9	1.870
3		13.5	1.859
4		15.1	1.807
5		16.8	1.753
	Optimum	13.0	
	Maximum		1.89
	Particle Density	2.6 (Assumed)	



REMARKS/ABNORMALITIES
Percentage of material retained on 37.5mm sieve = 0%
Percentage of material retained on 20mm sieve = 0%

SIGNED [redacted]

NAME O.P. Davies BA (Hons)
(Laboratory Manager)

DATE 17-Nov-21

form omcram

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS
TESTING
1580

TEST CERTIFICATE

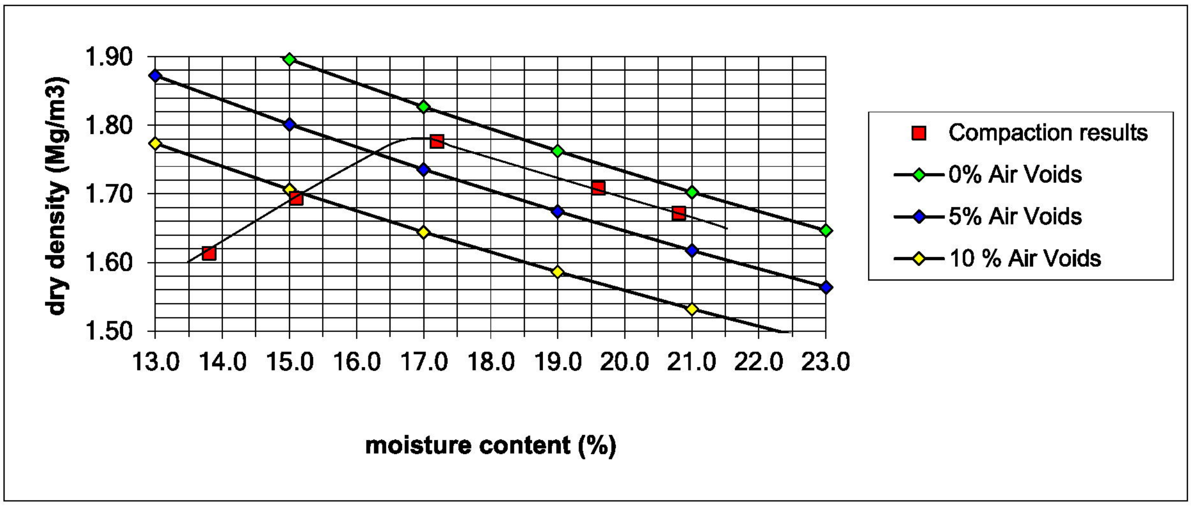
DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 2.5kg RAMMER
BS 1377: PART 4: 1990
PARTICLE DENSITY METHOD BS 1377: PART 2: 1990 Clause 8.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	TP13 2.4-2.6 B4	DATE SAMPLED	Not advised
LAB SAMPLE No	104707	DATE RECEIVED	24-Sep-21
DATE TESTED	12-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff grey silty sandy CLAY
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried/Separate Batches

Point Number		Moisture Content (%)	Dry Density (Mg/m3)
1		13.8	1.614
2		15.1	1.694
3		17.2	1.777
4		19.6	1.708
5		20.8	1.672
	Optimum	17.0	
	Maximum		1.78
	Particle Density	2.65 (Assumed)	



REMARKS/ABNORMALITIES
Percentage of material retained on 37.5mm sieve = 0%
Percentage of material retained on 20mm sieve = 0%

SIGNED [redacted]

NAME O.P. Davies BA (Hons) DATE 17-Nov-21
(Laboratory Manager)

form omcram

MURRAY RIX
ANDREW HOUSE, HADFIELD STREET
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

UKAS TESTING 1580

TEST CERTIFICATE

DRY DENSITY/MOISTURE CONTENT RELATIONSHIP 2.5kg RAMMER

BS 1377: PART 4: 1990

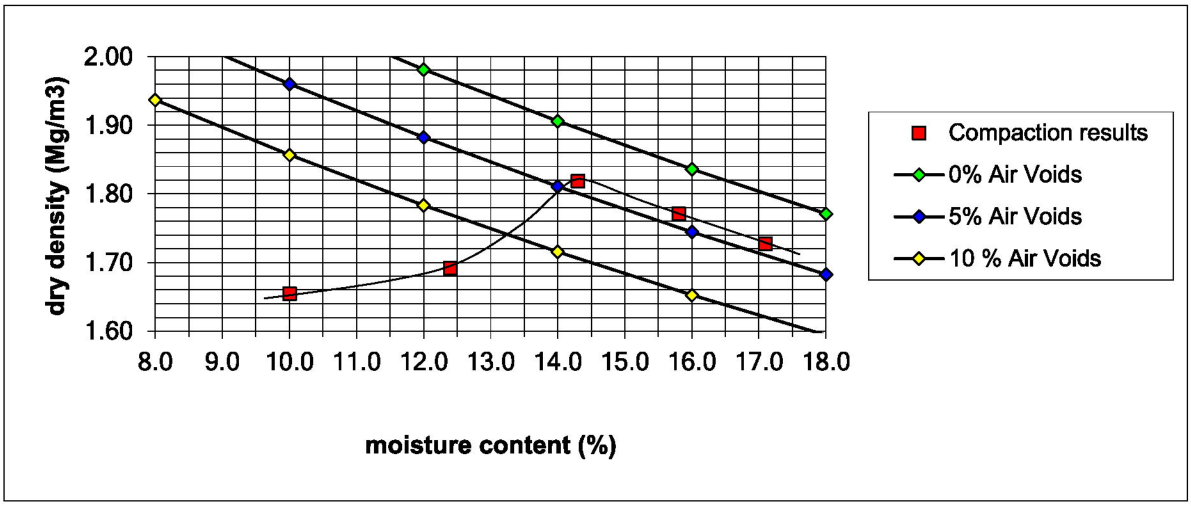
PARTICLE DENSITY METHOD BS 1377: PART 2: 1990 Clause 8.2

CLIENT	Tier Environmental Ltd
SITE	TE1585 - Oxford North
JOB NUMBER	MRN 4144/55

SAMPLE LABEL	TP18 0.6-1.0 B3	DATE SAMPLED	Not advised
LAB SAMPLE No	104716	DATE RECEIVED	24-Sep-21
DATE TESTED	12-Oct-21	SAMPLED BY	Client

MATERIAL	Stiff brown silty sandy CLAY with rare gravel
ADVISED SOURCE	Site Investigation Sample
PRE TREATMENT	Air Dried/Separate Batches

Point Number		Moisture Content (%)	Dry Density (Mg/m3)
1		10.0	1.655
2		12.4	1.692
3		14.3	1.819
4		15.8	1.771
5		17.1	1.727
	Optimum	14.0	
	Maximum		1.82
	Particle Density	2.6 (Assumed)	



REMARKS/ABNORMALITIES
Percentage of material retained on 37.5mm sieve = 0%
Percentage of material retained on 20mm sieve = 0%

SIGNED [redacted]

NAME O.P. Davies BA (Hons) DATE 17-Nov-21
(Laboratory Manager)

APPENDIX F - GROUNDWATER AND GAS MONITORING RESULTS

GAS MONITORING ACROSS BOREHOLE LOCATIONS

JOB DETAILS:		**Job No:**	TE1585		
Client:	Trtax Symmetry	**Visit No:**	1	of	4
Site:	Oxford North	**Operator:**	ST and JM		
Date:	08/10/2021	**Project Manager:**	SMILLAR		

Monitoring Point	**GAS CONCENTRATIONS**												**FLOW DATA**		**WELL AND WATER DATA**					**Comments**
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		Flow rate (l/hr)		Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady						
BH01	0.0	0.0	0.0	0.0	1.7	0.3	0	0	0	0	16.4	20.4	-13.1	-0.1	3.68	4.00	66.61	62.93		
BH02	0.0	0.0	0.0	0.0	1.1	1.1	0	0	0	0	14.3	14.3	-21.5	-9.1	3.80	4.09	68.00	64.20		
BH03	0.0	0.0	0.0	0.0	0.1	0.0	0	0	0	0	20.9	21.0	0.0	0.0	1.13	2.78	65.44	64.31		
BH04	0.0	0.0	0.0	0.0	0.7	0.7	5	3	0	0	16.4	16.4	0.0	0.0		5.41	66.43			Well recorded dry
WS01	0.0	0.0	0.0	0.0	2.8	2.8	0	0	0	0	17.1	17.1	0.0	0.0	1.38	3.07	69.94	68.56		
WS05	0.0	0.0	0.0	0.0	1.4	1.4	0	0	0	0	20.1	20.1	0.0	0.0	0.72	3.93	68.00	67.28		
Max	**0.1**	**0.1**	**0.1**	**0.1**	**2.8**	**2.8**	**5.0**	**3.0**	ND	ND	**20.9**	**21.0**	**0.1**	**0.1**	**3.80**	**5.41**	**69.94**	**68.56**		
Min	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**14.3**	**14.3**	**-21.5**	**-9.1**	**0.72**	**2.78**	**65.44**	**62.93**		

METEOROLOGICAL AND SITE INFORMATION:										
State of ground:	x	Dry		Moist		Wet		Snow		Frozen
Wind:	x	Calm		Light		Moderate		Strong		
Cloud cover:		None		Slight		Cloudy	x	Overcast		
Preciptation:	x	None		Slight		Moderate		Heavy		
Barometric pressure (mbar):			1021	Before				After		
Pressure trend:				Falling		Steady	x	Rising		
Ground gas meter: **GA2000**										
Ambient Gas concentration:	CH_4	0.0%	CO_2	0.0%	O_2	21.0%				

GAS MONITORING ACROSS BOREHOLE LOCATIONS

JOB DETAILS:		**Job No:**	TE1585		
Client:	Trtax Symmetry	**Visit No:**	2	of	4
Site:	Oxford North	**Operator:**	Paul Hogg		
Date:	18/10/2020	**Project Manager:**	SMILLAR		

Monitoring Point	**GAS CONCENTRATIONS**												**FLOW DATA**		**WELL AND WATER DATA**					**Comments**
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		Flow rate (l/hr)		Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady						
BH01	ND	ND	ND	ND	3.3	3.3	ND	ND	ND	ND	10.2	10.2	ND	ND	3.09	3.99	66.61	63.52		
BH02																	68			
BH03	ND	ND	ND	ND	0.1	0.1	ND	ND	ND	ND	20.3	20.3	ND	ND	1.06	2.78	65.44	64.38		
BH04																	66.43			
WS01	ND	ND	ND	ND	3.8	3.7	ND	ND	ND	ND	14.9	14.9	0.2	0.1	1.38	3.11	69.94	68.56		
WS05																	68			
Max	**0.1**	**0.1**	**0.1**	**0.1**	**3.8**	**3.7**	ND	ND	ND	ND	**20.3**	**20.3**	**0.2**	**0.1**	**3.09**	**3.99**	**69.94**	**68.56**		
Min	**0.1**	**0.1**	**0.0**	**0.0**	**0.1**	**0.1**	ND	ND	ND	ND	**10.2**	**10.2**	**0.1**	**0.1**	**1.06**	**2.78**	**65.44**	**63.52**		

METEOROLOGICAL AND SITE INFORMATION:										
State of ground:		Dry	x	Moist		Wet		Snow		Frozen
Wind:		Calm		Light		Moderate	x	Strong		
Cloud cover:		None		Slight		Cloudy	x	Overcast		
Preciptation:		None	x	Slight		Moderate		Heavy		
Barometric pressure (mbar):			1001	Before			1001	After		
Pressure trend:			x	Falling		Steady		Rising		
Ground gas meter: **GA2000**										
Ambient Gas concentration:	CH_4	ND	CO_2	ND	O_2	20.3%				

GAS MONITORING ACROSS BOREHOLE LOCATIONS

JOB DETAILS:		**Job No:**	TE1585		
Client:	Trtax Symmetry	**Visit No:**		of	4
Site:	Oxford North	**Operator:**	Lee Hogg		
Date:		**Project Manager:**	SMILLAR		

Monitoring Point	**GAS CONCENTRATIONS**												**FLOW DATA**		**WELL AND WATER DATA**					**Comments**
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		Flow rate (l/hr)		Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady						
BH01	ND	ND	ND	ND	3.8	3.8	ND	ND	ND	ND	9.0	9.7	16.3	ND	3.00	4.00	66.61	63.61		
BH02	ND	ND	ND	ND	2.0	2.0	ND	ND	ND	ND	9.1	9.8	2.5	ND	2.06	4.10	68	65.94		
BH03	ND	ND	ND	ND	2.5	2.5	1	ND	ND	ND	18.0	17.9	1.2	0.1	1.08	2.77	65.44	64.36		
BH04	ND	ND	ND	ND	4.6	4.4	ND	ND	ND	ND	8.8	9.6	ND	ND	3.00	5.40	66.43	63.43		
WS01	ND	ND	ND	ND	4.8	4.8	ND	ND	ND	ND	9.0	9.0	3.8	ND	1.31	3.08	69.94	68.63		
WS05	ND	ND	ND	ND	1.5	1.4	ND	ND	ND	ND	19.0	18.9	1.2	ND	0.57	3.94	68	67.43		
Max	**0.1**	**0.1**	**0.1**	**0.1**	**4.8**	**4.8**	**1.0**	ND	ND	ND	**19.0**	**18.9**	**16.3**	**0.1**	**3.00**	**5.40**	**69.94**	**68.63**		
Min	**0.1**	**0.1**	**0.0**	**0.0**	**1.5**	**1.4**	ND	ND	ND	ND	**8.8**	**9.0**	**0.1**	**0.1**	**0.57**	**2.77**	**65.44**	**63.43**		

METEOROLOGICAL AND SITE INFORMATION:					
State of ground:	☐ Dry	☐ Moist	☐ Wet	☐ Snow	☐ Frozen
Wind:	☐ Calm	☐ Light	☐ Moderate	☐ Strong	
Cloud cover:	☐ None	☐ Slight	☐ Cloudy	☐ Overcast	
Preciptation:	☐ None	☐ Slight	☐ Moderate	☐ Heavy	
Barometric pressure (mbar):		☐ Before		☐ After	
Pressure trend:		☐ Falling	☐ Steady	☐ Rising	
Ground gas meter: **GA2000**					
Ambient Gas concentration:	CH_4 ☐	CO_2 ☐	O_2 ☐		

GAS MONITORING ACROSS BOREHOLE LOCATIONS

JOB DETAILS:		**Job No:**	TE1585		
Client:	Trtax Symmetry	**Visit No:**	4	of	4
Site:	Oxford North	**Operator:**	Paul Hogg		
Date:	10/11/2021	**Project Manager:**	SMILLAR		

Monitoring Point	**GAS CONCENTRATIONS**												**FLOW DATA**		**WELL AND WATER DATA**					**Comments**
	Methane (%v/v)		%LEL		Carbon dioxide (%v/v)		Carbon monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		Flow rate (l/hr)		Water Depth (mbgl)	Depth of Well (mbgl)	Ground Level (mAOD)	Water Level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Lowest	Steady	Peak	Steady						
BH01	ND	ND	ND	ND	3.2	3.1	1	1	ND	ND	10.8	10.8	ND	ND	1.32	4.06	66.61	65.29		
BH02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.7	12.7	ND	ND	1.52	4.16	68	66.48		
BH03	ND	ND	ND	ND	1.5	1.5	ND	ND	ND	ND	18.2	18.3	0.2	0.2	0.98	2.77	65.44	64.46		
BH04	ND	ND	ND	ND	4.0	4.0	ND	ND	ND	ND	11.2	14.1	ND	ND	2.30	5.55	66.43	64.13		
WS01	ND	ND	ND	ND	4.8	4.8	ND	ND	ND	ND	10.0	10.0	ND	ND	ND	3.07	69.94	DRY		
WS05	ND	ND	ND	ND	3.3	3.3	ND	ND	ND	ND	17.8	17.8	ND	ND	0.56	3.93	68	67.44		
Max	**0.1**	**0.1**	**0.1**	**0.1**	**4.8**	**4.8**	**1.0**	**1.0**	ND	ND	**18.2**	**18.3**	**0.2**	**0.2**	**2.30**	**5.55**	**69.94**	**67.44**		
Min	**0.1**	**0.1**	**0.0**	**0.0**	**0.1**	**0.1**	ND	ND	ND	ND	**10.0**	**10.0**	**0.1**	**0.1**	**0.56**	**2.77**	**65.44**	**64.13**		

METEOROLOGICAL AND SITE INFORMATION:

State of ground: ☐ Dry ☒ Moist ☐ Wet ☐ Snow ☐ Frozen

Wind: ☒ Calm ☐ Light ☐ Moderate ☐ Strong

Cloud cover: ☐ None ☐ Slight ☒ Cloudy ☐ Overcast

Preciptation: ☒ None ☐ Slight ☐ Moderate ☐ Heavy

Barometric pressure (mbar): 1000 Before 1000 After

Pressure trend: ☒ Falling ☐ Steady ☐ Rising

Ground gas meter: **GA2000**

Ambient Gas concentration: CH_4 ND CO_2 ND O_2 20.1%

APPENDIX G – WAC TESTING AND HAZWASTE RESULTS

CEN 10:1 LEACHATE RESULTS BS EN 12547-2

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	10.8
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	90.2
Particle Size <4mm =	>95%		

EMT Job No	**21/14639**
Sample No	**71**
Client Sample No	**TP12**
Depth/Other	**0.40**
Sample Date	**17/09/2021**
Batch No	**1**

Solid Waste Analysis		**Landfill Waste Acceptance Criteria Limits**		
		Inert Waste Landfill	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon (%)	0.26	3	5	6
Loss on Ignition (%)	3.9	-	-	10
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-	-
PAH Sum of 17(mg/kg)	<0.64	100	-	-
pH (pH Units)	7.82	-	>6	-
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	<0.03	-	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	<0.003	<0.03	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	<0.0015	<0.015	0.5	10	70
Copper	<0.007	<0.07	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	<0.002	<0.02	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	0.4	4	800	15000	25000
Fluoride	0.4	4	10	150	500
Sulphate as SO4	24.4	244	1000	20000	50000
Total Dissolved Solids	77	770	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	3	30	500	800	1000

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	8.1
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	92.5
Particle Size <4mm =	>95%		

EMT Job No	**21/14639**	**Landfill Waste Acceptance Criteria Limits**		
Sample No	**149**			
Client Sample No	**TP6**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**0.40**			
Sample Date	**16/09/2021**			
Batch No	**1**			
Solid Waste Analysis				
Total Organic Carbon (%)	1.46	3	5	6
Loss on Ignition (%)	6.0	-	-	10
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-	-
PAH Sum of 17(mg/kg)	<0.64	100	-	-
pH (pH Units)	7.30	-	>6	-
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	<0.03	-	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	0.005	0.05	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	0.0025	0.025	0.5	10	70
Copper	<0.007	<0.07	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	<0.002	<0.02	0.5	10	30
Nickel	0.005	0.05	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	0.007	0.07	4	50	200
Chloride	1.1	11	800	15000	25000
Fluoride	<0.3	<3	10	150	500
Sulphate as SO4	1.8	18	1000	20000	50000
Total Dissolved Solids	48	480	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	7	70	500	800	1000

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	24.0
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	80.6
Particle Size <4mm =	>95%		

EMT Job No	**21/14639**	**Landfill Waste Acceptance Criteria Limits**		
Sample No	**217**			
Client Sample No	**TP24 ES1**	**Inert Waste Landfill**	**Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill**	**Hazardous Waste Landfill**
Depth/Other	**0.50**			
Sample Date	**29/09/2021**			
Batch No	**3**			
Solid Waste Analysis				
Total Organic Carbon (%)	0.75	3	5	6
Loss on Ignition (%)	4.6	-	-	10
Sum of BTEX (mg/kg)	<0.025	6	-	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-	-
PAH Sum of 17(mg/kg)	<0.64	100	-	-
pH (pH Units)	8.52	-	>6	-
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	0.16	-	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	0.008	0.08	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	0.0019	0.019	0.5	10	70
Copper	0.025	0.25	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	0.009	0.09	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	0.017	0.17	4	50	200
Chloride	1.5	15	800	15000	25000
Fluoride	0.8	8	10	150	500
Sulphate as SO4	17.8	178	1000	20000	50000
Total Dissolved Solids	104	1040	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	7	70	500	800	1000

HazWasteOnline™

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

2T3R7-PRAOP-BNOSS

Job name

EMT-21-14639-Batch-1-202110181355

Description/Comments

Project

TE1585

Site

Oxford North, Symmetry Park

Classified by

Name:
Adrian Read
Date:
22 Oct 2021 07:00 GMT
Telephone:
01925 818388

Company:
Tier Environmental
Chadwick house
Warrington Road,

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	**Date**
Hazardous Waste Classification	03 Dec 2020

Next 3 year Refresher due by Dec 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP01-16/09/2021-0.00m		Non Hazardous		3
2	TP03-16/09/2021-0.00-0.20m		Non Hazardous		5
3	TP04-16/09/2021-1.20m		Non Hazardous		7
4	TP04-16/09/2021-1.50m		Non Hazardous		9
5	TP06-16/09/2021-0.10m		Non Hazardous		10
6	TP10-17/09/2021-0.10m		Non Hazardous		12
7	TP11-17/09/2021-1.60m		Non Hazardous		14
8	TP12-17/09/2021-0.40m		Non Hazardous		16
9	TP13-17/09/2021-0.50m		Non Hazardous		18
10	TP18-17/09/2021-0.10m		Non Hazardous		20
11	TP18-17/09/2021-1.90m		Non Hazardous		22
12	TP19-17/09/2021-0.10m		Non Hazardous		23
13	TP19-17/09/2021-2.00m		Non Hazardous		24
14	TP20-17/09/2021-0.10m		Non Hazardous		26
15	TP20-17/09/2021-0.70m		Non Hazardous		28
16	TP6-16/09/2021-0.40m		Non Hazardous		30

Related documents

#	Name	Description
1	EMT-21-14639-Batch-1-202110181355.HWOL	.hwol file used to create the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read

Created date: 22 Oct 2021 07:00 GMT

Classification of sample: TP01-16/09/2021-0.00m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP01-16/09/2021-0.00m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
12.4% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.4% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				8.8	mg/kg	1.32	10.337	mg/kg	0.00103 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				0.1	mg/kg	1.142	0.102	mg/kg	0.0000102 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }				12.7	mg/kg	1.462	16.514	mg/kg	0.00165 %	✓	
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
		024-017-00-8											
5		copper { dicopper oxide; copper (I) oxide }				6	mg/kg	1.126	6.01	mg/kg	0.000601 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	7	mg/kg	1.56	9.714	mg/kg	0.000623 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				7	mg/kg	2.976	18.535	mg/kg	0.00185 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5									
10		zinc { zinc chromate }				22	mg/kg	2.774	54.298	mg/kg	0.00543 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
11	●	pH				7.72	pH		7.72	pH	7.72 pH		
				PH									
12		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
13	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
14	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
15	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
16	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
17	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
18	●	fluoranthene		205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
19	●	pyrene		204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
20		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		**<LOD**
21		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
22		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
23		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
24		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
25	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
26		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
27	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
									Total:	0.0116 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP03-16/09/2021-0.00-0.20m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP03-16/09/2021-0.00-0.20m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
5.7% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.7% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		6	mg/kg	1.32	7.495	mg/kg	0.000749 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2	mg/kg	1.142	0.216	mg/kg	0.0000216 %	✓	
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		25.7	mg/kg	1.462	35.536	mg/kg	0.00355 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15	mg/kg	1.126	15.978	mg/kg	0.0016 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	8	mg/kg	1.56	11.806	mg/kg	0.000757 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		10	mg/kg	2.976	28.158	mg/kg	0.00282 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		80	mg/kg	2.774	209.964	mg/kg	0.021 %	✓	
11	●	pH			PH		8.45	pH		8.45	pH	8.45 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16	●	phenanthrene		201-581-5	85-01-8		0.06	mg/kg		0.0568	mg/kg	0.00000568 %	✓	
17	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
18	●	fluoranthene				0.2 mg/kg		0.189 mg/kg	0.0000189 %	✓	
			205-912-4	206-44-0							
19	●	pyrene				0.27 mg/kg		0.255 mg/kg	0.0000255 %	✓	
			204-927-3	129-00-0							
20		benzo[a]anthracene				0.11 mg/kg		0.104 mg/kg	0.0000104 %	✓	
		601-033-00-9	200-280-6	56-55-3							
21		chrysene				0.18 mg/kg		0.17 mg/kg	0.000017 %	✓	
		601-048-00-0	205-923-4	218-01-9							
22		benzo[b]fluoranthene				0.19 mg/kg		0.18 mg/kg	0.000018 %	✓	
		601-034-00-4	205-911-9	205-99-2							
23		benzo[k]fluoranthene				0.08 mg/kg		0.0757 mg/kg	0.00000757 %	✓	
		601-036-00-5	205-916-6	207-08-9							
24		benzo[a]pyrene; benzo[def]chrysene				0.14 mg/kg		0.132 mg/kg	0.0000132 %	✓	
		601-032-00-3	200-028-5	50-32-8							
25	●	indeno[123-cd]pyrene				0.11 mg/kg		0.104 mg/kg	0.0000104 %	✓	
			205-893-2	193-39-5							
26		dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3							
27	●	benzo[ghi]perylene				0.22 mg/kg		0.208 mg/kg	0.0000208 %	✓	
			205-883-8	191-24-2							
								Total:	0.031 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP04-16/09/2021-1.20m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP04-16/09/2021-1.20m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
27.3% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 27.3% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7.3	mg/kg	1.32	7.571	mg/kg	0.000757 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		39.8	mg/kg	1.462	45.695	mg/kg	0.00457 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		22	mg/kg	1.126	19.458	mg/kg	0.00195 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	15	mg/kg	1.56	18.38	mg/kg	0.00118 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.3	mg/kg	1.353	0.319	mg/kg	0.0000319 %	✓	
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22.4	mg/kg	2.976	52.371	mg/kg	0.00524 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		2	mg/kg	2.554	4.012	mg/kg	0.000401 %	✓	
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		94	mg/kg	2.774	204.847	mg/kg	0.0205 %	✓	
11	●	pH			PH		7.65	pH		7.65	pH	7.65 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
17	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
18	●	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0							
19	●	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0							
20		benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3							
21		chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9							
22		benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2							
23		benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9							
24		benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8							
25	●	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5							
26		dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3							
27	●	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2							
								Total:	0.0347 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP04-16/09/2021-1.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP04-16/09/2021-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
23.9% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 23.9% Dry Weight Moisture Correction applied (MC)

#		Determinand CLP index number	 EC Number	 CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
1	●	pH 	 	 PH		7.4	pH		7.4	pH	7.4 pH		
2	⚛	sulfur { sulfur } 016-094-00-1	 231-722-6	 7704-34-9		400	mg/kg		322.841	mg/kg	0.0323 %	✓	
										Total:	0.0323 %		

Key

🟨	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration

Classification of sample: TP06-16/09/2021-0.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP06-16/09/2021-0.10m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
20% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				7.8	mg/kg	1.32	8.582	mg/kg	0.000858 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				0.1	mg/kg	1.142	0.0952	mg/kg	0.00000952 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }				43.2	mg/kg	1.462	52.616	mg/kg	0.00526 %	✓	
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
		024-017-00-8											
5		copper { dicopper oxide; copper (I) oxide }				15	mg/kg	1.126	14.074	mg/kg	0.00141 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	20	mg/kg	1.56	25.997	mg/kg	0.00167 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				0.2	mg/kg	1.353	0.226	mg/kg	0.0000226 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				10.6	mg/kg	2.976	26.29	mg/kg	0.00263 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5									
10		zinc { zinc chromate }				52	mg/kg	2.774	120.213	mg/kg	0.012 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
11	●	pH				7.02	pH		7.02	pH	7.02 pH		
				PH									
12		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
13	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
14	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
15	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
16	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
17	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0									
19	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0243 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP10-17/09/2021-0.10m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP10-17/09/2021-0.10m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
29.4% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 29.4% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		12.9	mg/kg	1.32	13.162	mg/kg	0.00132 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.1	mg/kg	1.142	0.0883	mg/kg	0.00000883 %	✓	
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		50.8	mg/kg	1.462	57.378	mg/kg	0.00574 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		18	mg/kg	1.126	15.662	mg/kg	0.00157 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	20	mg/kg	1.56	24.108	mg/kg	0.00155 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.4	mg/kg	1.353	0.418	mg/kg	0.0000418 %	✓	
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		21.4	mg/kg	2.976	49.221	mg/kg	0.00492 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		2	mg/kg	2.554	3.947	mg/kg	0.000395 %	✓	
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		93	mg/kg	2.774	199.378	mg/kg	0.0199 %	✓	
11	●	pH			PH		7.72	pH		7.72	pH	7.72 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
17	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
18	●	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0							
19	●	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0							
20		benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3							
21		chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9							
22		benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2							
23		benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9							
24		benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8							
25	●	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5							
26		dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3							
27	●	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2							
								Total:	0.0356 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP11-17/09/2021-1.60m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:		
TP11-17/09/2021-1.60m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)	
Moisture content:			
27.7% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)	

Hazard properties

None identified

Determinands

Moisture content: 27.7% Dry Weight Moisture Correction applied (MC)

#		Determinand				CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		21.9	mg/kg	1.32	22.643	mg/kg	0.00226 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		76.7	mg/kg	1.462	87.785	mg/kg	0.00878 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		20	mg/kg	1.126	17.633	mg/kg	0.00176 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	14	mg/kg	1.56	17.101	mg/kg	0.0011 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		30.5	mg/kg	2.976	71.085	mg/kg	0.00711 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		48	mg/kg	2.774	104.275	mg/kg	0.0104 %	✓	
11	●	pH			PH		7.72	pH		7.72	pH	7.72 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
17	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0									
19	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0318 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP12-17/09/2021-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP12-17/09/2021-0.40m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
14.2% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14.2% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4							
2		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
3		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
4	●	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
5		xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
6	●	pH				7.82 pH		7.82 pH	7.82 pH		
				PH							
7		naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3							
8	●	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8							
9	●	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9							
10	●	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7							
11	●	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8							
12	●	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7							
13	●	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0							
14	●	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0							
15		benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3							
16		chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9							
17		benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
19		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
20	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
21		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
22	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
23	●	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3									
24	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-881-7	191-07-1									
										Total:	0.00007 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: TP13-17/09/2021-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP13-17/09/2021-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
12.7% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.7% Dry Weight Moisture Correction applied (MC)

#	Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		21.1	mg/kg	1.32	24.719	mg/kg	0.00247 %	✓	
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.1	mg/kg	1.142	0.101	mg/kg	0.0000101 %	✓	
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		33.1	mg/kg	1.462	42.926	mg/kg	0.00429 %	✓	
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		13	mg/kg	1.126	12.987	mg/kg	0.0013 %	✓	
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	8	mg/kg	1.56	11.072	mg/kg	0.00071 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.12	mg/kg	0.000012 %	✓	
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		36.3	mg/kg	2.976	95.864	mg/kg	0.00959 %	✓	
9	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		1	mg/kg	2.554	2.266	mg/kg	0.000227 %	✓	
10	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		55	mg/kg	2.774	135.384	mg/kg	0.0135 %	✓	
11	pH			PH		8.15	pH		8.15	pH	8.15 pH		
12	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
17	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0									
19	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0323 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP18-17/09/2021-0.10m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP18-17/09/2021-0.10m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
14.5% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14.5% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		26.4	mg/kg	1.32	30.442	mg/kg	0.00304 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		61.9	mg/kg	1.462	79.013	mg/kg	0.0079 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		21	mg/kg	1.126	20.649	mg/kg	0.00206 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	33	mg/kg	1.56	44.955	mg/kg	0.00288 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		0.1	mg/kg	1.353	0.118	mg/kg	0.0000118 %	✓	
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		30.8	mg/kg	2.976	80.06	mg/kg	0.00801 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		1	mg/kg	2.554	2.23	mg/kg	0.000223 %	✓	
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		111	mg/kg	2.774	268.935	mg/kg	0.0269 %	✓	
11	●	pH			PH		7.58	pH		7.58	pH	7.58 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
16	●	phenanthrene		201-581-5	85-01-8		0.07	mg/kg		0.0611	mg/kg	0.00000611 %	✓	
17	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene				0.21	mg/kg		0.183	mg/kg	0.0000183 %	✓	
			205-912-4	206-44-0									
19	●	pyrene				0.19	mg/kg		0.166	mg/kg	0.0000166 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.14	mg/kg		0.122	mg/kg	0.0000122 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.13	mg/kg		0.114	mg/kg	0.0000114 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.17	mg/kg		0.148	mg/kg	0.0000148 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.07	mg/kg		0.0611	mg/kg	0.00000611 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.13	mg/kg		0.114	mg/kg	0.0000114 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				0.09	mg/kg		0.0786	mg/kg	0.00000786 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				0.1	mg/kg		0.0873	mg/kg	0.00000873 %	✓	
			205-883-8	191-24-2									
										Total:	0.0512 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP18-17/09/2021-1.90m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP18-17/09/2021-1.90m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
24.6% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 24.6% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1	●	pH				7.73	pH		7.73	pH	7.73 pH		
				PH									
2	⚛	sulfur { sulfur }				1100	mg/kg		882.825	mg/kg	0.0883 %	✓	
		016-094-00-1	231-722-6	7704-34-9									
										Total:	0.0883 %		

Key

🟨	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration

Classification of sample: TP19-17/09/2021-0.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP19-17/09/2021-0.10m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
13.9% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.9% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1	●	pH				7.85	pH		7.85	pH	7.85 pH		
				PH									
2	⚛	sulfur { sulfur }				300	mg/kg		263.389	mg/kg	0.0263 %	✓	
		016-094-00-1	231-722-6	7704-34-9									
										Total:	0.0263 %		

Key

🟨	User supplied data
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration

Classification of sample: TP19-17/09/2021-2.00m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP19-17/09/2021-2.00m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
20.2% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20.2% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				11.3 mg/kg	1.32	12.412 mg/kg	0.00124 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0							
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }				64.7 mg/kg	1.462	78.671 mg/kg	0.00787 %	✓	
			215-160-9	1308-38-9							
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		<LOD
		024-017-00-8									
5		copper { dicopper oxide; copper (I) oxide }				13 mg/kg	1.126	12.177 mg/kg	0.00122 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
6		lead { lead chromate }			1	16 mg/kg	1.56	20.763 mg/kg	0.00133 %	✓	
		082-004-00-2	231-846-0	7758-97-6							
7		mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7							
8		nickel { nickel chromate }				24.6 mg/kg	2.976	60.912 mg/kg	0.00609 %	✓	
		028-035-00-7	238-766-5	14721-18-7							
9		selenium { nickel selenate }				1 mg/kg	2.554	2.125 mg/kg	0.000212 %	✓	
		028-031-00-5	239-125-2	15060-62-5							
10		zinc { zinc chromate }				88 mg/kg	2.774	203.099 mg/kg	0.0203 %	✓	
		024-007-00-3	236-878-9	13530-65-9							
11	●	pH				7.13 pH		7.13 pH	7.13 pH		
				PH							
12		naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3							
13	●	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8							
14	●	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9							
15	●	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7							
16	●	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8							
17	●	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0									
19	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
										Total:	0.0384 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP20-17/09/2021-0.10m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:		
TP20-17/09/2021-0.10m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)	
Moisture content:			
18.6% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)	

Hazard properties

None identified

Determinands

Moisture content: 18.6% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				17.5	mg/kg	1.32	19.482	mg/kg	0.00195 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }				48.4	mg/kg	1.462	59.645	mg/kg	0.00596 %	✓	
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
		024-017-00-8											
5		copper { dicopper oxide; copper (I) oxide }				17	mg/kg	1.126	16.138	mg/kg	0.00161 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	24	mg/kg	1.56	31.565	mg/kg	0.00202 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				0.4	mg/kg	1.353	0.456	mg/kg	0.0000456 %	✓	
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				25.7	mg/kg	2.976	64.494	mg/kg	0.00645 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { nickel selenate }				1	mg/kg	2.554	2.153	mg/kg	0.000215 %	✓	
		028-031-00-5	239-125-2	15060-62-5									
10		zinc { zinc chromate }				91	mg/kg	2.774	212.856	mg/kg	0.0213 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
11	●	pH				7.39	pH		7.39	pH	7.39 pH		
				PH									
12		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
13	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
14	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
15	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
16	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
17	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									

#		Determinand CLP index number	 EC Number	 CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
18	●	fluoranthene	205-912-4	206-44-0		0.15	mg/kg		0.126	mg/kg	0.0000126 %	✓	
19	●	pyrene	204-927-3	129-00-0		0.13	mg/kg		0.11	mg/kg	0.000011 %	✓	
20		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.09	mg/kg		0.0759	mg/kg	0.00000759 %	✓	
21		chrysene 601-048-00-0	205-923-4	218-01-9		0.07	mg/kg		0.059	mg/kg	0.0000059 %	✓	
22		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.11	mg/kg		0.0927	mg/kg	0.00000927 %	✓	
23		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.04	mg/kg		0.0337	mg/kg	0.00000337 %	✓	
24		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.08	mg/kg		0.0675	mg/kg	0.00000675 %	✓	
25	●	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
26		dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
27	●	benzo[ghi]perylene	205-883-8	191-24-2		0.05	mg/kg		0.0422	mg/kg	0.00000422 %	✓	
										Total:	0.0397 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP20-17/09/2021-0.70m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP20-17/09/2021-0.70m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
5.3% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.3% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1	●	pH		PH		8.31	pH		8.31	pH	8.31 pH		
2		naphthalene 601-052-00-2	202-049-5	91-20-3		0.46	mg/kg		0.437	mg/kg	0.0000437 %	✓	
3	●	acenaphthylene	205-917-1	208-96-8		<0.3	mg/kg		<0.3	mg/kg	<0.00003 %		**<LOD**
4	●	acenaphthene	201-469-6	83-32-9		0.56	mg/kg		0.532	mg/kg	0.0000532 %	✓	
5	●	fluorene	201-695-5	86-73-7		1.06	mg/kg		1.007	mg/kg	0.000101 %	✓	
6	●	phenanthrene	201-581-5	85-01-8		8.37	mg/kg		7.949	mg/kg	0.000795 %	✓	
7	●	anthracene	204-371-1	120-12-7		3.84	mg/kg		3.647	mg/kg	0.000365 %	✓	
8	●	fluoranthene	205-912-4	206-44-0		2.47	mg/kg		2.346	mg/kg	0.000235 %	✓	
9	●	pyrene	204-927-3	129-00-0		1.75	mg/kg		1.662	mg/kg	0.000166 %	✓	
10		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.6	mg/kg		<0.6	mg/kg	<0.00006 %		**<LOD**
11		chrysene 601-048-00-0	205-923-4	218-01-9		0.73	mg/kg		0.693	mg/kg	0.0000693 %	✓	
12		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.5	mg/kg		<0.5	mg/kg	<0.00005 %		**<LOD**
13		benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		<0.2	mg/kg		<0.2	mg/kg	<0.00002 %		**<LOD**
14		benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
15	●	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
16		dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
17	●	benzo[ghi]perylene	205-883-8	191-24-2		<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
18		sulfur { sulfur } 016-094-00-1	231-722-6	7704-34-9		500	mg/kg		474.834	mg/kg	0.0475 %	✓	

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
19		Tar, coal; Coal tar; [The by-product from the destructive distillation of coal. Almost black semisolid. A complex combination of aromatic hydro-carbons, phenolic compounds, nitrogen bases and thiophene.]			H	<1000 mg/kg		<1000 mg/kg	<0.1 %		**<LOD**
		648-081-00-7	232-361-7	8007-45-2							
								Total:	0.15 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note H	Known incomplete entry, should not be used as is

Classification of sample: TP6-16/09/2021-0.40m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP6-16/09/2021-0.40m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
15.2% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15.2% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
2		benzene 601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
3		toluene 601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
4	●	ethylbenzene 601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
5		xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
6	●	pH		PH		7.3	pH		7.3	pH	7.3 pH		
7		naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
8	●	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
9	●	acenaphthene	201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10	●	fluorene	201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
11	●	phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
12	●	anthracene	204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	●	fluoranthene	205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	●	pyrene	204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
15		benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
16		chrysene 601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
17		benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
18		benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9							
19		benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8							
20	●	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5							
21		dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3							
22	●	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2							
23	●	polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		**<LOD**
		602-039-00-4	215-648-1	1336-36-3							
24	●	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-881-7	191-07-1							
								Total:	0.00007 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

● **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

● **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

● **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

● **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

sulfur {sulfur}

Worst case compound.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.293.4891.9295 (20 Oct 2021)
HazWasteOnline Database: 2021.293.4891.9295 (20 Oct 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

G35YJ-NPXOA-950S1

Job name

EMT-21-14639-Batch-3-202110141416

Description/Comments

Project

TE1585

Site

Oxford North, Symmetry Park

Classified by

Name:
Adrian Read
Date:
22 Oct 2021 07:01 GMT
Telephone:
01925 818388

Company:
Tier Environmental
Chadwick house
Warrington Road,

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	**Date**
Hazardous Waste Classification	03 Dec 2020

Next 3 year Refresher due by Dec 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP21 ES1-29/09/2021-0.00m		Non Hazardous		2
2	TP21 ES2-29/09/2021-0.50m		Non Hazardous		4
3	TP22 ES1-29/09/2021-0.00m		Non Hazardous		6
4	TP22 ES2-29/09/2021-0.50m		Non Hazardous		8
5	TP23 ES1-29/09/2021-1.00m		Potentially Hazardous	HP 3(i)	10
6	TP23 ES2-29/09/2021-2.50m		Non Hazardous		12
7	TP24 ES1-29/09/2021-0.50m		Non Hazardous		14
8	TP24 ES2-29/09/2021-2.00m		Non Hazardous		16

Related documents

#	Name	Description
1	EMT-21-14639-Batch-3-202110141416.HWOL	.hwol file used to create the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read

Created date: 22 Oct 2021 07:01 GMT

Classification of sample: TP21 ES1-29/09/2021-0.00m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP21 ES1-29/09/2021-0.00m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
5.8% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.8% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8	mg/kg	1.32	9.984	mg/kg	0.000998 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2	mg/kg	1.142	0.216	mg/kg	0.0000216 %	✓	
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22	mg/kg	1.462	30.392	mg/kg	0.00304 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		14	mg/kg	1.126	14.898	mg/kg	0.00149 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	28	mg/kg	1.56	41.281	mg/kg	0.00265 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		9.4	mg/kg	2.976	26.443	mg/kg	0.00264 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		47	mg/kg	2.774	123.237	mg/kg	0.0123 %	✓	
11		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
16	●	pH				8.49	pH		8.49	pH	8.49 pH		
				PH									
17		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
18	●	acenaphthylene				0.22	mg/kg		0.208	mg/kg	0.0000208 %	✓	
			205-917-1	208-96-8									
19	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
20	●	fluorene				0.06	mg/kg		0.0567	mg/kg	0.00000567 %	✓	
			201-695-5	86-73-7									
21	●	phenanthrene				1.08	mg/kg		1.021	mg/kg	0.000102 %	✓	
			201-581-5	85-01-8									
22	●	anthracene				0.81	mg/kg		0.766	mg/kg	0.0000766 %	✓	
			204-371-1	120-12-7									
23	●	fluoranthene				4.04	mg/kg		3.819	mg/kg	0.000382 %	✓	
			205-912-4	206-44-0									
24	●	pyrene				3.53	mg/kg		3.336	mg/kg	0.000334 %	✓	
			204-927-3	129-00-0									
25		benzo[a]anthracene				2.03	mg/kg		1.919	mg/kg	0.000192 %	✓	
		601-033-00-9	200-280-6	56-55-3									
26		chrysene				2.21	mg/kg		2.089	mg/kg	0.000209 %	✓	
		601-048-00-0	205-923-4	218-01-9									
27		benzo[b]fluoranthene				3.59	mg/kg		3.393	mg/kg	0.000339 %	✓	
		601-034-00-4	205-911-9	205-99-2									
28		benzo[k]fluoranthene				1.39	mg/kg		1.314	mg/kg	0.000131 %	✓	
		601-036-00-5	205-916-6	207-08-9									
29		benzo[a]pyrene; benzo[def]chrysene				2.79	mg/kg		2.637	mg/kg	0.000264 %	✓	
		601-032-00-3	200-028-5	50-32-8									
30	●	indeno[123-cd]pyrene				2.25	mg/kg		2.127	mg/kg	0.000213 %	✓	
			205-893-2	193-39-5									
31		dibenz[a,h]anthracene				0.36	mg/kg		0.34	mg/kg	0.000034 %	✓	
		601-041-00-2	200-181-8	53-70-3									
32	●	benzo[ghi]perylene				2	mg/kg		1.89	mg/kg	0.000189 %	✓	
			205-883-8	191-24-2									
33	👤	Total TPH				232	mg/kg		219.282	mg/kg	0.0219 %	✓	
				GTC05C40ALAR									
34		asbestos				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5									
										Total:	0.0489 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
👤	Determinand defined by classifier (see Appendix A)
🧪	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP21 ES2-29/09/2021-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP21 ES2-29/09/2021-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
5.8% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.8% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		104.2	mg/kg	1.32	130.036	mg/kg	0.013 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		66.6	mg/kg	1.462	92.003	mg/kg	0.0092 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		32	mg/kg	1.126	34.053	mg/kg	0.00341 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	21	mg/kg	1.56	30.96	mg/kg	0.00198 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		32.9	mg/kg	2.976	92.551	mg/kg	0.00926 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		79	mg/kg	2.774	207.143	mg/kg	0.0207 %	✓	
11	●	pH			PH		8.74	pH		8.74	pH	8.74 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
13	●	acenaphthylene		205-917-1	208-96-8		0.1	mg/kg		0.0945	mg/kg	0.00000945 %	✓	
14	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	●	fluorene		201-695-5	86-73-7		0.04	mg/kg		0.0378	mg/kg	0.00000378 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		0.56	mg/kg		0.529	mg/kg	0.0000529 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.26	mg/kg		0.246	mg/kg	0.0000246 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene											
			205-912-4	206-44-0		1.29	mg/kg		1.219	mg/kg	0.000122 %	✓	
19	●	pyrene											
			204-927-3	129-00-0		1.14	mg/kg		1.078	mg/kg	0.000108 %	✓	
20		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		0.7	mg/kg		0.662	mg/kg	0.0000662 %	✓	
21		chrysene											
		601-048-00-0	205-923-4	218-01-9		0.71	mg/kg		0.671	mg/kg	0.0000671 %	✓	
22		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		1.1	mg/kg		1.04	mg/kg	0.000104 %	✓	
23		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		0.43	mg/kg		0.406	mg/kg	0.0000406 %	✓	
24		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		0.91	mg/kg		0.86	mg/kg	0.000086 %	✓	
25	●	indeno[123-cd]pyrene											
			205-893-2	193-39-5		0.65	mg/kg		0.614	mg/kg	0.0000614 %	✓	
26		dibenz[a,h]anthracene											
		601-041-00-2	200-181-8	53-70-3		0.11	mg/kg		0.104	mg/kg	0.0000104 %	✓	
27	●	benzo[ghi]perylene											
			205-883-8	191-24-2		0.65	mg/kg		0.614	mg/kg	0.0000614 %	✓	
										Total:	0.0587 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP22 ES1-29/09/2021-0.00m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP22 ES1-29/09/2021-0.00m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
12.6% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.6% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		25.6	mg/kg	1.32	30.018	mg/kg	0.003 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		68.3	mg/kg	1.462	88.654	mg/kg	0.00887 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		15	mg/kg	1.126	14.999	mg/kg	0.0015 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	50	mg/kg	1.56	69.264	mg/kg	0.00444 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		31.7	mg/kg	2.976	83.79	mg/kg	0.00838 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		140	mg/kg	2.774	344.921	mg/kg	0.0345 %	✓	
11	●	pH			PH		8.41	pH		8.41	pH	8.41 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.06	mg/kg		0.0533	mg/kg	0.00000533 %	✓	
13	●	acenaphthylene		205-917-1	208-96-8		0.18	mg/kg		0.16	mg/kg	0.000016 %	✓	
14	●	acenaphthene		201-469-6	83-32-9		0.14	mg/kg		0.124	mg/kg	0.0000124 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.21	mg/kg		0.187	mg/kg	0.0000187 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		0.48	mg/kg		0.426	mg/kg	0.0000426 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.35	mg/kg		0.311	mg/kg	0.0000311 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene				1.44	mg/kg		1.279	mg/kg	0.000128 %	✓	
			205-912-4	206-44-0									
19	●	pyrene				1.35	mg/kg		1.199	mg/kg	0.00012 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.92	mg/kg		0.817	mg/kg	0.0000817 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.95	mg/kg		0.844	mg/kg	0.0000844 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				1.4	mg/kg		1.243	mg/kg	0.000124 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.55	mg/kg		0.488	mg/kg	0.0000488 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				1.05	mg/kg		0.933	mg/kg	0.0000933 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				0.83	mg/kg		0.737	mg/kg	0.0000737 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.28	mg/kg		0.249	mg/kg	0.0000249 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				0.73	mg/kg		0.648	mg/kg	0.0000648 %	✓	
			205-883-8	191-24-2									
										Total:	0.062 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP22 ES2-29/09/2021-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP22 ES2-29/09/2021-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
8.9% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.9% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		44.8	mg/kg	1.32	54.316	mg/kg	0.00543 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		22.8	mg/kg	1.462	30.6	mg/kg	0.00306 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<**LOD**
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12	mg/kg	1.126	12.406	mg/kg	0.00124 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	62	mg/kg	1.56	88.805	mg/kg	0.00569 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		11	mg/kg	2.976	30.063	mg/kg	0.00301 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		61	mg/kg	2.774	155.393	mg/kg	0.0155 %	✓	
11		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
12		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
13		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
16	●	pH			PH		8.45 pH		8.45 pH	8.45 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		0.04 mg/kg		0.0367 mg/kg	0.00000367 %	✓	
18	●	acenaphthylene		205-917-1	208-96-8		0.15 mg/kg		0.138 mg/kg	0.0000138 %	✓	
19	●	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		0.05 mg/kg		0.0459 mg/kg	0.00000459 %	✓	
21	●	phenanthrene		201-581-5	85-01-8		0.79 mg/kg		0.725 mg/kg	0.0000725 %	✓	
22	●	anthracene		204-371-1	120-12-7		0.32 mg/kg		0.294 mg/kg	0.0000294 %	✓	
23	●	fluoranthene		205-912-4	206-44-0		2.78 mg/kg		2.553 mg/kg	0.000255 %	✓	
24	●	pyrene		204-927-3	129-00-0		2.45 mg/kg		2.25 mg/kg	0.000225 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		1.48 mg/kg		1.359 mg/kg	0.000136 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		1.45 mg/kg		1.331 mg/kg	0.000133 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		2.08 mg/kg		1.91 mg/kg	0.000191 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.81 mg/kg		0.744 mg/kg	0.0000744 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		1.61 mg/kg		1.478 mg/kg	0.000148 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.99 mg/kg		0.909 mg/kg	0.0000909 %	✓	
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.19 mg/kg		0.174 mg/kg	0.0000174 %	✓	
32	●	benzo[ghi]perylene		205-883-8	191-24-2		0.99 mg/kg		0.909 mg/kg	0.0000909 %	✓	
33	👤	Total TPH			GTC05C40ALAR		150 mg/kg		137.741 mg/kg	0.0138 %	✓	
									Total:	0.0496 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
👤	Determinand defined by classifier (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP23 ES1-29/09/2021-1.00m

Potentially Hazardous Waste
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP23 ES1-29/09/2021-1.00m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
14.2% (dry weight correction)		Entry:	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 8.76e-07%)

Determinands

Moisture content: 14.2% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide } 033-003-00-0	215-481-4	1327-53-3		9	mg/kg	1.32	10.405	mg/kg	0.00104 %	✓	
2	cadmium { cadmium oxide } 048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3	chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }	215-160-9	1308-38-9		65.9	mg/kg	1.462	84.34	mg/kg	0.00843 %	✓	
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex } 024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5	copper { dicopper oxide; copper (I) oxide } 029-002-00-X	215-270-7	1317-39-1		19	mg/kg	1.126	18.732	mg/kg	0.00187 %	✓	
6	lead { lead chromate } 082-004-00-2	231-846-0	7758-97-6	1	44	mg/kg	1.56	60.098	mg/kg	0.00385 %	✓	
7	mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8	nickel { nickel chromate } 028-035-00-7	238-766-5	14721-18-7		20.2	mg/kg	2.976	52.645	mg/kg	0.00526 %	✓	
9	selenium { nickel selenate } 028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
10	zinc { zinc chromate } 024-007-00-3	236-878-9	13530-65-9		72	mg/kg	2.774	174.902	mg/kg	0.0175 %	✓	
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
12	benzene 601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
13	toluene 601-021-00-3	203-625-9	108-88-3		0.01	mg/kg		0.0087	mg/kg	0.000000876 %	✓	

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
14	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
15		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
16	●	pH			PH		8.39	pH		8.39	pH	8.39 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		0.1	mg/kg		0.0876	mg/kg	0.00000876 %	✓	
22	●	anthracene		204-371-1	120-12-7		0.08	mg/kg		0.0701	mg/kg	0.00000701 %	✓	
23	●	fluoranthene		205-912-4	206-44-0		0.8	mg/kg		0.701	mg/kg	0.0000701 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.88	mg/kg		0.771	mg/kg	0.0000771 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.72	mg/kg		0.63	mg/kg	0.000063 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.78	mg/kg		0.683	mg/kg	0.0000683 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		1.29	mg/kg		1.13	mg/kg	0.000113 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.5	mg/kg		0.438	mg/kg	0.0000438 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.81	mg/kg		0.709	mg/kg	0.0000709 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.63	mg/kg		0.552	mg/kg	0.0000552 %	✓	
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		0.14	mg/kg		0.123	mg/kg	0.0000123 %	✓	
32	●	benzo[ghi]perylene		205-883-8	191-24-2		0.54	mg/kg		0.473	mg/kg	0.0000473 %	✓	
33	👤	Total TPH			GTC05C40ALAR		350	mg/kg		306.48	mg/kg	0.0306 %	✓	
											Total:	0.0696 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
🟧	Potentially Hazardous result
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
👤	Determinand defined by classifier (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP23 ES2-29/09/2021-2.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP23 ES2-29/09/2021-2.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
16.7% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16.7% Dry Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		5.4	mg/kg	1.32	6.109	mg/kg	0.000611 %	✓	
2		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }		215-160-9	1308-38-9		34	mg/kg	1.462	42.582	mg/kg	0.00426 %	✓	
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
5		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		17	mg/kg	1.126	16.401	mg/kg	0.00164 %	✓	
6		lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	39	mg/kg	1.56	52.127	mg/kg	0.00334 %	✓	
7		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
8		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		11.4	mg/kg	2.976	29.074	mg/kg	0.00291 %	✓	
9		selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		1	mg/kg	2.554	2.188	mg/kg	0.000219 %	✓	
10		zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		75	mg/kg	2.774	178.287	mg/kg	0.0178 %	✓	
11	●	pH			PH		8.84	pH		8.84	pH	8.84 pH		
12		naphthalene	601-052-00-2	202-049-5	91-20-3		0.09	mg/kg		0.0771	mg/kg	0.00000771 %	✓	
13	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	●	acenaphthene		201-469-6	83-32-9		0.34	mg/kg		0.291	mg/kg	0.0000291 %	✓	
15	●	fluorene		201-695-5	86-73-7		0.28	mg/kg		0.24	mg/kg	0.000024 %	✓	
16	●	phenanthrene		201-581-5	85-01-8		1.88	mg/kg		1.611	mg/kg	0.000161 %	✓	
17	●	anthracene		204-371-1	120-12-7		0.29	mg/kg		0.249	mg/kg	0.0000249 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
18	●	fluoranthene				1.47	mg/kg		1.26	mg/kg	0.000126 %	✓	
			205-912-4	206-44-0									
19	●	pyrene				1	mg/kg		0.857	mg/kg	0.0000857 %	✓	
			204-927-3	129-00-0									
20		benzo[a]anthracene				0.43	mg/kg		0.368	mg/kg	0.0000368 %	✓	
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				0.46	mg/kg		0.394	mg/kg	0.0000394 %	✓	
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				0.47	mg/kg		0.403	mg/kg	0.0000403 %	✓	
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				0.18	mg/kg		0.154	mg/kg	0.0000154 %	✓	
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				0.34	mg/kg		0.291	mg/kg	0.0000291 %	✓	
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				0.23	mg/kg		0.197	mg/kg	0.0000197 %	✓	
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				0.06	mg/kg		0.0514	mg/kg	0.00000514 %	✓	
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				0.23	mg/kg		0.197	mg/kg	0.0000197 %	✓	
			205-883-8	191-24-2									
										Total:	0.0316 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP24 ES1-29/09/2021-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP24 ES1-29/09/2021-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
13.9% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.9% Dry Weight Moisture Correction applied (MC)

#	Determinand				CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		11.8	mg/kg	1.32	13.679	mg/kg	0.00137 %	✓	
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		48.2	mg/kg	1.462	61.85	mg/kg	0.00618 %	✓	
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<**LOD**
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12	mg/kg	1.126	11.862	mg/kg	0.00119 %	✓	
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	34	mg/kg	1.56	46.562	mg/kg	0.00299 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23.2	mg/kg	2.976	60.623	mg/kg	0.00606 %	✓	
9	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
10	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		61	mg/kg	2.774	148.571	mg/kg	0.0149 %	✓	
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
12	benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
13	toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
14	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
15	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16	●	pH			PH		8.52	pH		8.52	pH	8.52 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		0.13	mg/kg		0.114	mg/kg	0.0000114 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.11	mg/kg		0.0966	mg/kg	0.00000966 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.1	mg/kg		0.0878	mg/kg	0.00000878 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.08	mg/kg		0.0702	mg/kg	0.00000702 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.08	mg/kg		0.0702	mg/kg	0.00000702 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.03	mg/kg		0.0263	mg/kg	0.00000263 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.06	mg/kg		0.0527	mg/kg	0.00000527 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
33	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		**<LOD**
34	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
											Total:	0.0331 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP24 ES2-29/09/2021-2.00m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:		LoW Code:	
TP24 ES2-29/09/2021-2.00m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
16.4% (dry weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 16.4% Dry Weight Moisture Correction applied (MC)

#	Determinand				CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9.9 mg/kg	1.32	11.23 mg/kg	0.00112 %	✓	
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		**<LOD**
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	1308-38-9		36.9 mg/kg	1.462	46.333 mg/kg	0.00463 %	✓	
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }	024-017-00-8				<0.3 mg/kg	2.27	<0.681 mg/kg	<0.0000681 %		**<LOD**
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		12 mg/kg	1.126	11.607 mg/kg	0.00116 %	✓	
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	23 mg/kg	1.56	30.821 mg/kg	0.00198 %	✓	
7	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		**<LOD**
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		12.3 mg/kg	2.976	31.45 mg/kg	0.00315 %	✓	
9	selenium { nickel selenate }	028-031-00-5	239-125-2	15060-62-5		<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		**<LOD**
10	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9		46 mg/kg	2.774	109.631 mg/kg	0.011 %	✓	
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
12	benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
13	toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
14	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
15	xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16	●	pH			PH		8.42	pH		8.42	pH	8.42 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		0.06	mg/kg		0.0515	mg/kg	0.00000515 %	✓	
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		0.17	mg/kg		0.146	mg/kg	0.0000146 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.16	mg/kg		0.137	mg/kg	0.0000137 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.15	mg/kg		0.129	mg/kg	0.0000129 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.13	mg/kg		0.112	mg/kg	0.0000112 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.19	mg/kg		0.163	mg/kg	0.0000163 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.08	mg/kg		0.0687	mg/kg	0.00000687 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.14	mg/kg		0.12	mg/kg	0.000012 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.12	mg/kg		0.103	mg/kg	0.0000103 %	✓	
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		0.12	mg/kg		0.103	mg/kg	0.0000103 %	✓	
33	👤	Total TPH			GTC05C40ALAR		<52	mg/kg		<52	mg/kg	<0.0052 %		**<LOD**
34	⚗	sulfur { sulfur }	016-094-00-1	231-722-6	7704-34-9		300	mg/kg		257.732	mg/kg	0.0258 %	✓	
											Total:	0.0545 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
👤	Determinand defined by classifier (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

indeno[123-cd]pyrene (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

benzo[ghi]perylene (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

Total TPH (CAS Number: GTC05C40ALAR)

Description/Comments:
Data source: .
Data source date: 24 Feb 2021
Hazard Statements: None.

polychlorobiphenyls; PCB (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

coronene (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source: http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

sulfur {sulfur}

Worst case compound.

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.293.4891.9295 (20 Oct 2021)
HazWasteOnline Database: 2021.293.4891.9295 (20 Oct 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:
a) understand the origin of the waste
b) select the correct List of Waste code(s)
c) confirm that the list of determinands, results and sampling plan are fit for purpose
d) select and justify the chosen metal species (Appendix B)
e) correctly apply moisture correction and other available corrections
f) add the meta data for their user-defined substances (Appendix A)
g) check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

WP6AU-S3JNP-33009

Job name

EMT-21-14639-Batch-4-202110121348

Description/Comments

Project

TE1585

Site

Oxford North, Symmetry Park

Classified by

Name:
Adrian Read
Date:
22 Oct 2021 06:56 GMT
Telephone:
01925 818388

Company:
Tier Environmental
Chadwick house
Warrington Road,

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification: **CERTIFIED**

Course	**Date**
Hazardous Waste Classification	03 Dec 2020

Next 3 year Refresher due by Dec 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP25-30/09/2021-0.10m		Non Hazardous		2
2	HDP1-30/09/2021-0.40m		Non Hazardous		4
3	BH4-30/09/2021-0.20m		Non Hazardous		6

Related documents

#	Name	Description
1	EMT-21-14639-Batch-4-202110121348.HWOL	.hwol file used to create the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read

Created date: 22 Oct 2021 06:56 GMT

Classification of sample: TP25-30/09/2021-0.10m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
TP25-30/09/2021-0.10m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
13.3% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.3% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				23.7	mg/kg	1.32	27.618	mg/kg	0.00276 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<**LOD**
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { ● chromium(III) oxide (worst case) }				51.2	mg/kg	1.462	66.047	mg/kg	0.0066 %	✓	
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<**LOD**
		024-017-00-8											
5		copper { dicopper oxide; copper (I) oxide }				20	mg/kg	1.126	19.874	mg/kg	0.00199 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	31	mg/kg	1.56	42.678	mg/kg	0.00274 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<**LOD**
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				31.1	mg/kg	2.976	81.696	mg/kg	0.00817 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<**LOD**
		028-031-00-5	239-125-2	15060-62-5									
10		zinc { zinc chromate }				102	mg/kg	2.774	249.747	mg/kg	0.025 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
11		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		603-181-00-X	216-653-1	1634-04-4									
12		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-021-00-3	203-625-9	108-88-3									
14	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<**LOD**
		601-023-00-4	202-849-4	100-41-4									
15		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16	●	pH			PH		7.89	pH		7.89	pH	7.89 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		0.03	mg/kg		0.0265	mg/kg	0.00000265 %	✓	
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		0.12	mg/kg		0.106	mg/kg	0.0000106 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.11	mg/kg		0.0971	mg/kg	0.00000971 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		0.1	mg/kg		0.0883	mg/kg	0.00000883 %	✓	
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.08	mg/kg		0.0706	mg/kg	0.00000706 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.1	mg/kg		0.0883	mg/kg	0.00000883 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.04	mg/kg		0.0353	mg/kg	0.00000353 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.08	mg/kg		0.0706	mg/kg	0.00000706 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		0.06	mg/kg		0.053	mg/kg	0.0000053 %	✓	
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		0.05	mg/kg		0.0441	mg/kg	0.00000441 %	✓	
33	👤	Total TPH			GTC05C40ALAR		<52	mg/kg		<52	mg/kg	<0.0052 %		**<LOD**
											Total:	0.0529 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
👤	Determinand defined by classifier (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HDP1-30/09/2021-0.40m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
HDP1-30/09/2021-0.40m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
21.1% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21.1% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				9.7	mg/kg	1.32	10.576	mg/kg	0.00106 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.189	mg/kg	0.0000189 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				43.3	mg/kg	1.462	52.259	mg/kg	0.00523 %	✓	
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
		024-017-00-8											
5		copper { dicopper oxide; copper (I) oxide }				11	mg/kg	1.126	10.227	mg/kg	0.00102 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	12	mg/kg	1.56	15.456	mg/kg	0.000991 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				33.8	mg/kg	2.976	83.07	mg/kg	0.00831 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { nickel selenate }				2	mg/kg	2.554	4.218	mg/kg	0.000422 %	✓	
		028-031-00-5	239-125-2	15060-62-5									
10		zinc { zinc chromate }				100	mg/kg	2.774	229.079	mg/kg	0.0229 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
11		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
12		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
14		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
15		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
16	●	pH				7.53 pH		7.53 pH	7.53 pH		
				PH							
17		naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3							
18	●	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			205-917-1	208-96-8							
19	●	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
			201-469-6	83-32-9							
20	●	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7							
21	●	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			201-581-5	85-01-8							
22	●	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			204-371-1	120-12-7							
23	●	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0							
24	●	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0							
25		benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3							
26		chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9							
27		benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2							
28		benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9							
29		benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8							
30	●	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5							
31		dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3							
32	●	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2							
33	👤	Total TPH				<52 mg/kg		<52 mg/kg	<0.0052 %		**<LOD**
				GTC05C40ALAR							
								Total:	0.0453 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
👤	Determinand defined by classifier (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: BH4-30/09/2021-0.20m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:	
BH4-30/09/2021-0.20m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
13.4% (dry weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.4% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				12.4	mg/kg	1.32	14.437	mg/kg	0.00144 %	✓	
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				0.1	mg/kg	1.142	0.101	mg/kg	0.0000101 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				54.8	mg/kg	1.462	70.629	mg/kg	0.00706 %	✓	
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<0.3	mg/kg	2.27	<0.681	mg/kg	<0.0000681 %		<LOD
		024-017-00-8											
5		copper { dicopper oxide; copper (I) oxide }				15	mg/kg	1.126	14.893	mg/kg	0.00149 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	24	mg/kg	1.56	33.012	mg/kg	0.00212 %	✓	
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
8		nickel { nickel chromate }				21.8	mg/kg	2.976	57.216	mg/kg	0.00572 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { nickel selenate }				1	mg/kg	2.554	2.252	mg/kg	0.000225 %	✓	
		028-031-00-5	239-125-2	15060-62-5									
10		zinc { zinc chromate }				82	mg/kg	2.774	200.6	mg/kg	0.0201 %	✓	
		024-007-00-3	236-878-9	13530-65-9									
11		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
12		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
13		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
14		ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
15		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
16	●	pH			PH		8.28	pH		8.28	pH	8.28 pH		
17		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
18	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
19	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
20	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
21	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
23	●	fluoranthene		205-912-4	206-44-0		0.07	mg/kg		0.0617	mg/kg	0.00000617 %	✓	
24	●	pyrene		204-927-3	129-00-0		0.07	mg/kg		0.0617	mg/kg	0.00000617 %	✓	
25		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
26		chrysene	601-048-00-0	205-923-4	218-01-9		0.03	mg/kg		0.0265	mg/kg	0.00000265 %	✓	
27		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		0.07	mg/kg		0.0617	mg/kg	0.00000617 %	✓	
28		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		0.03	mg/kg		0.0265	mg/kg	0.00000265 %	✓	
29		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		0.06	mg/kg		0.0529	mg/kg	0.00000529 %	✓	
30	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
31		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
32	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
33	👤	Total TPH			GTC05C40ALAR		<52	mg/kg		<52	mg/kg	<0.0052 %		**<LOD**
											Total:	0.0435 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
👤	Determinand defined by classifier (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

anthracene (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

fluoranthene (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

● **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

● **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

Total TPH (CAS Number: GTC05C40ALAR)

Description/Comments:
Data source: .
Data source date: 24 Feb 2021
Hazard Statements: None.

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.293.4891.9295 (20 Oct 2021)
HazWasteOnline Database: 2021.293.4891.9295 (20 Oct 2021)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2019 - UK: 2019 No. 720 of 27th March 2019
The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020
The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020
POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

APPENDIX H – PHOTOGRAPHS

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP01

TP01 Spoil

Photographed By	ST	Date	16/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP02

TP02 Spoil

Photographed By	ST	Date	16/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP03

TP03 Spoil

Photographed By	ST	Date	26/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP04

TP04 Spoil

Photographed By	ST	Date	16/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP05

TP05 Spoil

Photographed By	ST	Date	16/09/2021

Project Name	Oxford North	Trial Pit Photographic Record
Project No.	TE1585	
Engineer	S Theodoridis	
Client	Tritax Symmetry	

TP06

Photographed By	ST	Date	16/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP07

TP07 Spoil

Photographed By	ST	Date	19/10/2021

Project Name	Oxford North
Project No.	TE1585
Engineer	S Theodoridis
Client	Tritax Symmetry

Trial Pit Photographic Record

TP08

TP08 Spoil

Photographed By	ST	Date	16/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP10

TP10 Spoil

Photographed By	ST	Date	17/10/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP11

TP11 Spoil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP12

TP12 Spoil

Photographed By	ST	Date	17/09/2021

Project Name Oxford North
Project No. TE1585
Engineer S Theodoridis
Client Tritax Symmetry

Trial Pit Photographic Record

TP13

TP13 Soil

Photographed By ST

Date 17/09/2021

TIER CONSULT

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP14

TP14 Soil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP15

TP15 Spoil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP16

TP16 Spoil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP17

TP17 Spoil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP18

TP18 Spoil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP19

TP19 Spoil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP20

TP20 Spoil

Photographed By	ST	Date	17/09/2021

Project Name	Oxford North	
Project No.	TE1585	
Engineer	S Theodoridis	
Client	Tritax Symmetry	

Trial Pit Photographic Record

TP21

Photographed By	ST	Date	29/09/2021

Project Name	Oxford North	Trial Pit Photographic Record
Project No.	TE1585	
Engineer	S Theodoridis	
Client	Tritax Symmetry	

TP22

Photographed By	ST	Date	29/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP23

TP23 Spoil

Photographed By	ST	Date	29/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP24

TP24 Spoil

Photographed By	ST	Date	29/092021

Project Name	Oxford North	Trial Pit Photographic Record
Project No.	TE1585	
Engineer	S Theodoridis	
Client	Tritax Symmetry	

TP26

TP26 Spoil

Photographed By	ST	Date	30/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

TP27

TP27 Spoil

Photographed By	ST	Date	30/09/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

Trial Trench 1

Trial Trench 1 Spoil

Photographed By	ST	Date	01/10/2021

Project Name	Oxford North	Trial Pit Photographic Record	
Project No.	TE1585		
Engineer	S Theodoridis		
Client	Tritax Symmetry		

Trial Trench 2

Trial Trench 2 Spoil

Photographed By	ST	Date	01/10/2021

APPENDIX I - DEFINITIONS OF TERMS USED IN QUALITATIVE AND QUANTITATIVE RISK ASSESSMENTS

CIRIA C552 Terminology

For the qualitative and quantitative assessment of risks posed by potential pollutant linkages have been undertaken using the risk matrix adapted from CIRIA C552 and outlined in the table below.

	Category	**Definition**
Potential severity	Severe	Acute (short term) risk to human health, Major pollution of sensitive controlled waters, ecosystems or habitat. Catastrophic damage to buildings or property or crops.
	Medium	Chronic (Medium / long term) risk to human health Pollution of sensitive controlled waters, ecosystems or species, Significant damage to crops, buildings or structures
	Mild	Easily preventable permanent health effects on humans. Pollution of non-sensitive controlled waters. Minor damage to buildings or structures.
	Minor	Easily preventable non-permanent health effects on humans, or no effects. Minor, low level and localised contamination of on-site soil. Easily repairable damage to buildings or structures.
Probability of risk	High Likelihood	Pollutant linkage may be present, and the risk is almost certain to occur , or there is evidence of harm already occurring.
	Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
	Low Likelihood	Pollutant linkages 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.

		Potential Severity			
		Severe	**Medium**	**Mild**	**Minor**
Probability of risk	**High Likelihood**	Very high risk	High risk	Moderate risk	Moderate / low risk
	Likely	High risk	Moderate risk	Moderate / low risk	Low risk
	Low Likelihood	Moderate risk	Moderate / low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	very low risk	Very low risk

APPENDIX J - HUMAN HEALTH ASSESSEMENT CRITERIA

HUMAN HEALTH ASSESSMENT CRITERIA

Context

Contaminated Land is defined under law through Part IIA of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995 and associated guidance ("Part IIA"). These specify that a "suitable for use" approach is to be applied in the assessment of potentially contaminated land, implemented through a phased programme of site investigation and risk assessment appropriate to the site under consideration.

The assessment of potential risks posed by contaminated land is based upon the assessment of plausible contaminant source - pathway - receptor linkages ("pollutant linkages") for the current and/or proposed future use of the site. The process for the assessment of contaminated land adopted in this report is in line with guidance issued by the Environment Agency Land contamination risk management (LCRM) - GOV.UK (www.gov.uk)

Land contamination can harm:

- human health
- drinking water supplies, groundwater and surface water
- soils
- ecosystems including wildlife, animals and wetlands
- property

It can also affect the current and future land use. Dealing with land contamination helps make the environment clean and safe. Through regeneration it can:

- enhance the health and wellbeing of all
- add to the economic, ecological and amenity value of the area

Use land contamination risk management (LCRM) to:

- identify and assess if there is an unacceptable risk
- assess what remediation options are suitable to manage the risk
- plan and carry out remediation
- verify that remediation has worked

You can use LCRM in a range of regulatory and management contexts. For example, voluntary remediation, planning, assessing liabilities or under the Part 2A contaminated land regime. The Environment Agency expects you to follow LCRM if you are managing the risks from land contamination.

We support the use of the National Quality Mark Scheme (NQMS). You can use it for any type of land contamination report.

Using the NQMS:

- will make sure all legislative requirements and necessary standards related to managing land contamination are met
- can provide increased confidence by submitting reports of the quality we expect
- can result in cost and time savings by 'getting it right first time'

LCRM is made up of 4 guides.

1. LCRM: Before you start.
2. LCRM: Risk assessment.
3. LCRM: Options appraisal.
4. LCRM: Remediation and verification.

We use a staged risk based approach. There are 3 stages, and each stage is broken down into tiers or steps.

Stage 1: Risk assessment

You will use a tiered approach to risk assessment. The 3 tiers are:

1. Preliminary risk assessment.
2. Generic quantitative risk assessment.
3. Detailed quantitative risk assessment.

Stage 1 includes information for intrusive site investigations.

Stage 2: Options appraisal

There are 3 steps to follow.

1. Identify feasible remediation options.
2. Do a detailed evaluation of options.
3. Select the final remediation option.

Stage 3: Remediation and verification

There are 4 steps to follow.

1. Develop a remediation strategy.
2. Remediate.
3. Produce a verification report.
4. Do long term monitoring and maintenance, if required

You must always start with a preliminary risk assessment.

The risk assessment stage is an iterative process. You can do the 3 tiers in order or progress from a preliminary risk assessment to a detailed quantitative risk assessment. As part of a generic or detailed quantitative risk assessment you will need to collect detailed information about the site. This is usually through an intrusive site investigation.

Depending on the level of risk or regulatory requirements, you can proceed from a preliminary risk assessment to the options appraisal stage. If you proceed direct to the options appraisal stage, you still need to collect the detailed site investigation information required by the generic and detailed quantitative risk assessments. This is to confirm that your approach is viable and acceptable.

Following the risk assessment stage, if you conclude that the risks are acceptable, with agreement from the relevant regulator, you can end the process.

If there are unacceptable risks, then remediation or mitigation is required. Follow stages 2 and 3 in order.

In stage 2 options appraisal, you will:

- look at the most feasible options
- produce a shortlist of options
- use evaluation criteria to assess them
- select which ones are the most suitable to take forward to stage 3

In stage 3 remediation and verification, you will produce a remediation strategy, do the remediation and then produce a verification report.

You will decide at the options appraisal stage if long term monitoring and maintenance is the remediation option. You may need to do post-remediation monitoring for further verification.

The risk assessment and subsequent investigation, remediation and verification must address all potential sources of pollutants that may be present on the site (the “hazards”), all receptors that may be harmed by these (e.g., human health, controlled waters, ecological receptors) and the pathways by which the contamination may be transported from the contaminant source(s) to the receptor(s). This is defined within the conceptual model for the site, which represents the characteristics of the site in a form that shows the possible pollutant linkages. As further information becomes available (for example, through site investigation), so the conceptual model will be refined.

Remedial action can be specified at any phase within this assessment process to break the identified pollutant linkage in determining whether or not to undertake further assessment or to undertake remediation, the potential cost-savings arising from a more thorough assessment of the pollutant linkages and more tightly defined remedial strategy must be considered against the direct costs involved in the work and the time that this will take to execute and gain regulatory approval.

A different approach to the statistical appraisal of data is required depending on whether the assessment is being undertaken to assess land as Contaminated Land in accordance with the regulations or whether the assessment is to assess whether the site is suitable for new development in accordance with the Planning regime. The statistical approach to assessment is discussed further in CL:AIRE:2020 “Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration”.

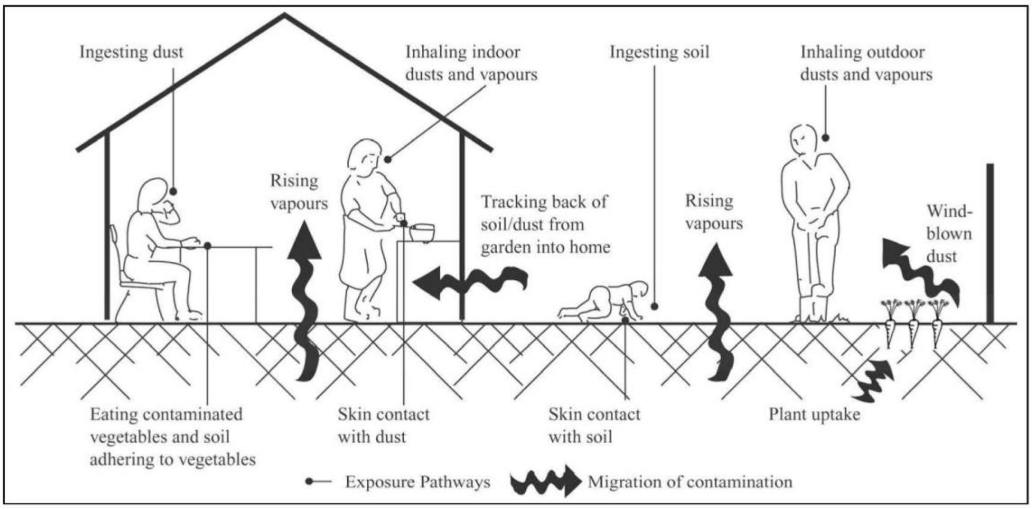
Some form of Detailed Quantitative Risk Assessment (DQRA) will be essential for those cases where appropriate GAC values cannot be established for the contaminant linkages under consideration.

Generic Assessment Criteria for Human Health Risk Assessment

In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency (EA) published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports and guidance. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. The initial documents (CLR7 – 10) were withdrawn and replaced with revised guidance issued by the Environment Agency including:

- “Using Soil Guideline Values”; EA,2009; Land contamination: using soil guideline values (SGVs) - GOV.UK (www.gov.uk)
- “Human Health toxicology assessment of contaminants in soil” EA;, 2009; https://www.gov.uk/government/publications/human-health-toxicological-assessment-of-contaminants-in-soil
- “Update technical background to the CLEA model” 2009; https://www.gov.uk/government/publications/updated-technical-background-to-the-clea-model
- CLEA Software (Version1.05) Handbook 2015; https://www.gov.uk/government/publications/contaminated-land-exposure-assessment-clea-tool
- Compilation of Data for priority Organic Contaminants for Derivation of Soil Guideline Values; Science Report SC050021/SR7, 2008; and,
- “Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration”. CL:AIRE:2020 https://www.claire.co.uk/component/phocadownload/category/9-other-cl-aire-documents?download=745:2020-stats-guidance

The CLEA model and associated guidance was developed to calculate an estimated tolerable daily intake (TDI) of contaminants for site users given a set of ‘typical’ human health exposure pathways which are detailed in “SR3: Updated technical background to the CLEA model” (Science Report SC050021/SR3, EA, 2009) and reproduced below.



Ingestion

- Outdoor soil;
- Indoor dust;
- Home grown produce;
- Soil attached to home grown produce.

Dermal Contact

- Outdoor soil;
- Indoor dust.

Inhalation

- Outdoor dust;
- Indoor dust;
- Outdoor vapour;
- Indoor vapour.

It should be noted that the CLEA model does not include an exhaustive list of potential exposure pathways, e.g. certain compounds can pass through plastic water pipes into drinking water supply.

The potential significance of each of the exposure pathways is dependent upon the type of land use and the nature of the contaminant being considered. The CLEA model considers principal 'default' land use scenarios and makes a series of assumptions with regards to building type (where applicable), identification of the critical human receptor group, exposure frequency and duration. The definitions of the principal land use types given in SR3 (EA, 2009) are:

Residential land use;

- A typical residential property consisting of a two-storey terraced house built on a ground-bearing slab of 0.15m thickness with a private garden consisting of lawn, flowerbeds, and a small fruit and vegetable patch. The occupants are assumed to be parents with young children, who make regular use of the garden. The critical receptor is a 0 – 6-year-old female.
- Active exposure pathways are ingestion of outdoor soil, ingestion of indoor dust, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and indoor dust and vapour

Allotments

- A plot of open space commonly made available by the Local Authority to tenants to grow fruit and vegetables for their own consumption. There are usually several plots to a site and the overall site area may cover more than one hectare. The tenants are assumed to be the parents or grandparents and that young children make occasional accompanied visits to the plots. The critical receptor is a 0 – 6-year-old female and there is no building present on Site.
- Active exposure pathways are ingestion of outdoor soil, ingestion of home grown produce and soil adhering to home grown produce; direct dermal contact with outdoor soil; inhalation of outdoor vapour.

Commercial and industrial land use.

- A typical commercial or light industrial property consisting of a three-story office building (pre-1970) with a ground bearing floor slab at which employees spend most time indoors and are involved in office based or related light physical work. The critical receptor is a working female adult aged 16 – 65 years.
- Active exposure pathway is ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor dust; inhalation of outdoor dust and vapour and inhalation of indoor dust and vapour.

Soil Guideline Values

Based on the assumption of each land use type, the EA and DEFRA developed and published Soil Guideline Value (SGV) using the CLEA model for a number of principal contaminants and 'default' end-use scenarios of residential, allotments and commercial/industrial use. The primary purpose of the SGVs is as trigger value for the tolerable daily intake (TDI), below which it can be assumed that the soil does not pose an unacceptable risk to the identified receptor. Where soils contamination is present above this level further assessment may be required. SGVs were developed for the following contaminants:

- Heavy metals and other inorganic compounds: arsenic, cadmium, chromium, cyanide, lead (now withdrawn), mercury, nickel and selenium.
- Benzene, ethylbenzene, toluene and xylenes.
- Phenol.
- Dioxins and dioxin-like polychlorinated biphenyls (PCBs)
- Polycyclic aromatic hydrocarbons (PAHs) – 11 substances

LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment

In addition, in 2009 CIEH through LQM and EIC published generic assessment criteria (GACs) for 82 substances including metals, petroleum hydrocarbons, PAHs and explosive substances for a variety of soil types and the three 'default' land uses – (residential, allotments and commercial end-uses) as described in SR3 (EA, 2009). These have been superseded as described below.

Category 4 Screening Values

In 2013 "SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination" (CL:AIRE 2013) was issued which detailed findings of a research project undertaken by CL:AIRE to set out the framework by which potential Category 4 Screening Levels (pC4SL) may be derived for 6 contaminants of concern, Arsenic, Benzene, Benzo(a)pyrene, Cadmium, Chromium VI and Lead.

This was supplemented in 2014 by "SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination – Policy Companion Document" (DEFRA, 2014). SP1010 proposed several updated toxicology information relating to contaminant behaviour updated assumptions relating to the modelling of human exposure to soil contaminants, derivation of separate C4SLs for residential <u>with</u> the consumption of home grown produce, residential <u>without</u> the consumption of home grown produce, and two new land uses: public open spaces near residential housing (POS resi) and public parks (POS park).

Public Open Space: Residential

- For public open space in close proximity to residential housing and the central green area around which houses are located, as on many housing estates from the 1930s to 1970s. It is also applicable for smaller areas commonly incorporated in newer developments as informal grassed areas or more formal landscaped areas with a mixture of open space and covered soil with planting. It is considered to be a generally grassed area up to 0.5ha with up to 50% bare soil. The land use is an important resource

for children and the area is near the homes. The critical receptor is a female child age >3 - <9 years old (CLEA age class 4 – 9) as younger children are unlikely to play outdoors unsupervised.
- Active exposure pathways are ingestion of outdoor soil, ingestion of indoor dust; direct dermal contact with outdoor soil and indoor soil derived dust; inhalation of outdoor and indoor dust and inhalation of outdoor vapour.

Public Open Space: Park

- A public park is defined as an area of open space provided for recreational use and usually owned and maintained by the Local Authority. It is anticipated the park could be used for a wide range of activities, including the following:
    - Family visits and picnics;
    - Children's play area;
    - Sporting activities such as football on an informal basis (i.e. not a dedicated sports pitch); and
    - Dog walking.
- The park is modelled as an area >0.5 ha of predominantly grasses open space with no more than 25% of exposed soil.
- The critical receptor is a female child with CLEA age classes 1 – 6.
- Active exposure pathway are: ingestion of outdoor soil; direct dermal contact with outdoor soil; inhalation of outdoor dust and inhalation of outdoor vapour.

Furthermore, the C4SLs are based on a different toxicological benchmark, the 'low level of toxicological concern' (LLTC). This difference in approach was adopted because the C4SLs were primarily intended for use under Part2A of the EPA 1990 to quickly screen out Category 4 sites where there is "*no risk or that the level of risk posed is low*". SGVs and LQM GACs are based on the more conservative 'minimal or tolerable level of risk' as defined in SR2 (EA, 2009) and were derived for assessment of contamination for the Planning process.

LQM/CIEH Suitable 4 Use Levels (S4ULs)

The publication of the C4SLs resulted in considerable and inconclusive debate about the applicability of the lower level of protection of the C4SL, which are underlain by the LLTC, outside of the Part 2A context for which they were derived. In 2014 LQM/CIEH presented a Suitable 4 Use Levels (S4ULs), which incorporate the updated assumption exposure derived for the production of the C4SLs but within the context of deriving screening criteria above which further assessment of the risks or remedial action may be needed. The S4ULs replace the 82 substances, species and fractions and congeners contained in the previous LQM/CIEH GACs issued in 2009. Additionally, following changes and new land uses proposed in the C4SL research project, S4ULs have also been derived for the majority of substances for which the EA derived SGVs in 2009 with the exception of lead (see below).

Lead

The C4SL for lead provides a technically robust and conservative assessment tool using significantly updated toxicological modelling than the withdrawn SGV and derived in line with current science of lead toxicology.

EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (2010)

In some instances, EIC/AGC/CL:AIRE GACs for certain VOC / SVOC potential contaminants of concern have been used *in lieu* of available LQM / CIEH S4UL values.

Parameter	**Residential with homegrown produce**			**Residential without homegrown produce**			**Allotment**			**Commercial / Industrial**			**Public Open Space near Residential**			**Public Open Space - Park**			**Source**
	(mg/kg, unless otherwise stated)			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Metals/metalloids																			
Arsenic	37			40			43			640			79			170			LQM (2014)
Beryllium	1.7			1.7			35			12			2.2			63			LQM (2014)
Boron	290			11000			45			240000			21000			46000			LQM (2014)
Cadmium	11			85			1.9			190			120			532			LQM (2014)
Chromium III	910			910			18000			8600			1500			33000			LQM (2014)
Chromium VI	6			6			1.8			33			7.7			220			LQM (2014)
Copper	2400			7100			520			68000			12000			44000			LQM (2014)
Lead	200			310			80			2330			630			1300			C4SL
Mercury (elemental)	1.2			1.2			21			58 (25.8)			16			30 (25.8)			LQM (2014)
Mercury (Inorganic)	40			56			19			1100			120			240			LQM (2014)
Methylmercury	11			15			6			320			40			68			LQM (2014)
Nickel	180			180			230			980			230			3400			LQM (2014)
Selenium	250			430			88			12000			1100			1800			LQM (2014)
Vanadium	410			1200			91			9000			2000			5000			LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Zinc	3700			40000			620			730000			81000			170000			LQM (2014)
Other																			
Total Sulphate	2,400			2,400			2,400			2,400			2,400			2,400			BRE (2005)
Water Soluble Sulphate (g/l)	0.5			0.5			0.5			0.5			0.5			0.5			BRE (2005)
PAHs																			
Acenaphthene	210	510	1100	3000 (57)	4700(141)	6000 (336)	34	85	200	84000 (57)	97000 (141)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Acenaphthylene	170	420	920	2900 (86.1)	4600 (212)	6000 (506)	28	69	160	8300 (86.1)	97000 (212)	100000	15000	15000	15000	29000	30000	30000	LQM (2014)
Anthracene	2400	5400	11000	31000 (1.17)	35000	37000	380	950	2200	520000	540000	540000	74000	74000	74000	150000	150000	150000	LQM (2014)
Benzo(a)anthracene	7.2	11	13	11	14	15	2.9	6.5	13	170	170	180	29	29	29	49	56	62	LQM (2014)
Benzo(a)pyrene	2.2	2.7	3	3.2	3.2	3.2	0.97	2	3.5	35	35	36	5.7	5.7	5.7	11	12	13	LQM (2014)
Benzo(b)fluoranthene	2.6	3.3	3.7	3.9	4	4	0.99	2.1	3.9	44	44	45	7.1	7.1	7.1	13	15	16	LQM (2014)
Benzo(g,h,i)perylene	320	340	350	360	360	360	290	470	640	3900	4000	4000	640	640	640	1400	1500	1600	LQM (2014)
Benzo(k)fluoranthene	77	93	100	110	110	110	37	75	130	1200	1200	1200	190	190	190	370	410	440	LQM (2014)
Chrysene	15	22	27	30	31	32	4.1	9.4	19	350	350	350	57	57	57	93	110	120	LQM (2014)

Parameter	**Residential with homegrown produce**			**Residential without homegrown produce**			**Allotment**			**Commercial / Industrial**			**Public Open Space near Residential**			**Public Open Space - Park**			**Source**
	(mg/kg, unless otherwise stated)			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Dibenz(a,h)anthracene	0.24	0.28	0.3	0.31	0.32	0.32	0.14	0.27	0.61	3.5	3.6	3.6	0.57	0.57	0.58	1.1	1.3	1.4	LQM (2014)
Fluoranthene	280	560	890	1500	1600	1600	52	130	290	23000	23000	23000	3100	3100	3100	63	6300	6400	LQM (2014)
Fluorene	170	400	860	2800 (30.9)	3800 (76.5)	4500 (183)	27	67	160	63000 (30.9)	68000	71000	9900	9900	9900	20000	20000	20000	LQM (2014)
Indeno(1,2,3-cd)pyrene	27	36	41	45	46	46	9.5	21	39	500	510	510	82	82	82	150	170	180	LQM (2014)
Naphthalene	2.3	5.6	13	2.3	5.6	13	4.1	10	24	190 (76.4)	460 (183)	1100 (432)	4900	4900	4900	1200 (76.4)	1900 (183)	3000	LQM (2014)
Phenanthrene	95	220	440	1300 (36)	1500	1500	15	38	90	22000	22000	23000	3100	3100	3100	6200	6200	6300	LQM (2014)
Pyrene	620	1200	2000	3700	3800	3800	110	270	620	54000	54000	54000	7400	7400	7400	15000	15000	15000	LQM (2014)
Coal Tar (BaP as surrogate marker)	0.79	0.98	1.1	1.2	1.2	1.2	0.32	0.67	1.2	15	15	15	2.2	2.2	2.2	4.4	4.7	4.8	LQM (2014)
BTEX and TPH																			
Benzene	0.087	0.17	0.37	0.38	0.7	1.4	0.017	0.034	0.075	27	47	90	72	72	73	90	100	110	LQM (2014)
Toluene	130	290	660	880 vap (869)	1900	3900	22	51	120	56000 vap (869)	110000 vap (1920)	180000 vap (4360)	56000	56000	56000	87000 vap (869)	95000 vap (1920)	100000 vap (4360)	LQM (2014)
Ethylbenzene	47	110	260	83	190	440	16	39	91	5700 vap (518)	13000 vap (1220)	27000 vap (2840)	24000	24000	25000	17000 vap (518)	22000 vap (1220)	27000 vap (2840)	LQM (2014)
Xylene - o	60	140	330	88	210	480	28	67	160	6600 (478)	15000 (1120)	33000 (2620)	41000	42000	43000	17000 (478)	24000 (1120)	33000 (2620)	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Xylene - m	59	140	320	82	190	450	31	74	170	6200 (625)	14000 (1470)	31000 (3460)	41000	42000	43000	17000 (625)	24000 (1470)	32000 (3460)	LQM (2014)
Xylene - p	56	130	310	79	180	430	29	69	160	5900 (576)	14000 (1350)	30000 (3170)	41000	42000	43000	17000 (576)	23000 (1350)	31000 (3170)	LQM (2014)
Aliphatic EC 5-6	42	78	160	42	78	160	730	1700	3900	3200 (304)	5900 (558)	12000 (1150)	570000 (304)	590000	600000	95000 (304)	130000 (558)	180000 (1150)	LQM (2014)
Aliphatic EC >6-8	100	230	530	100	230	530	2300	5600	13000	7800 (144)	17000 (322)	40000 (736)	600000	610000	620000	150000 (144)	220000 (322)	320000 (736)	LQM (2014)
Aliphatic EC >8-10	27	65	150	27	65	150	320	770	1700	2000 (78)	4800 (190)	11000 (451)	13000	13000	13000	14000 (78)	18000 (190)	21000 (451)	LQM (2014)
Aliphatic EC >10-12	130 (48)	330 (118)	760 (283)	130 (48)	330 (118)	760 (283)	2200	4400	7300	9700 (48)	23000 (118)	47000 (283)	13000	13000	13000	21000 (48)	23000 (118)	24000(283)	LQM (2014)
Aliphatic EC >12-16	1100 (24)	2400 (59)	4300 (142)	1100 (24)	2400 (59)	4300 (142)	11000	13000	13000	59000 (24)	82000 (59)	90000 (142)	13000	13000	13000	25000 (24)	25000 (59)	26000 (142)	LQM (2014)
Aliphatic EC >16-35	65000 (8.48)	92000 (21)	110000	65000 (8.48)	92000 (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	LQM (2014)
Aliphatic EC >35-44	65000 (8.48)	92000 (21)	110000	65000 (8.48)	92000 (21)	110000	260000	270000	270000	1600000	1700000	1800000	250000	250000	250000	450000	480000	490000	LQM (2014)
Aromatic EC 5-7	70	140	300	370	690	1400	13	27	57	26000 (1220)	46000 (2260)	86000 (4710)	56000	56000	56000	76000 (1220)	84000 (2260)	92000 (4710)	LQM (2014)
Aromatic EC >7-8	130	290	660	860	1800	3900	22	51	120	56000 (869)	110000 (1920)	180000 (4360)	56000	56000	56000	87000 (869)	95000 (1920)	100000 (4360)	LQM (2014)
Aromatic EC >8-10	34	83	190	47	110	270	8.6	21	51	3500 (613)	8100 (1500)	17000 (3580)	5000	5000	5000	7200 (613)	8500 (1500)	9300 (3580)	LQM (2014)
Aromatic EC >10-12	74	180	380	250	590	1200	13	31	74	16000 (364)	28000 (899)	34000 (2150)	5000	5000	5000	9200 (364)	9700 (899)	10000	LQM (2014)

Parameter	Residential with homegrown produce (mg/kg, unless otherwise stated)			Residential without homegrown produce (mg/kg, unless otherwise stated)			Allotment (mg/kg, unless otherwise stated)			Commercial / Industrial (mg/kg, unless otherwise stated)			Public Open Space near Residential (mg/kg, unless otherwise stated)			Public Open Space - Park (mg/kg, unless otherwise stated)			Source
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Aromatic EC >12-16	140	330	660	1800	2300 (419)	2500	23	27	130	36000 (169)	37000	38000	5100	5100	5000	10000	10000	10000	LQM (2014)
Aromatic EC >16-21	260	540	930	1900	1900	1900	46	110	260	28000	28000	28000	3800	3800	3800	7600	7700	7800	LQM (2014)
Aromatic EC >21-35	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
Aromatic EC >35-44	1100	1500	1700	1900	1900	1900	370	820	1600	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
Aromatic EC >44-75	1600	1800	1900	1900	1900	1900	1200	2100	3000	28000	28000	28000	3800	3800	3800	7800	7800	7900	LQM (2014)
VOCs																			
1,2-dichloroethane (1,2-DCA)	0.0071	0.011	0.019	0.0092	0.013	0.023	0.0046	0.0083	0.016	0.67	0.97	1.7	29	29	29	21	24	28	LQM (2014)
1,1,1-trichloroethane	8.8	18	39	9	18	40	48	110	240	660	1300	3000	140000	140000	140000	57000 (1425)	76000 (2915)	100000 (6392)	LQM (2014)
1,1,2,2,tetrachloroethane	1.6	3.4	7.5	3.9	8	17	0.41	0.89	2	270	550	1100	1400	1400	1400	1800	2100	2300	LQM (2014)
tetrachloroethene	0.18	0.39	0.9	0.18	0.4	0.92	0.65	1.5	3.6	19	45	95	1400	1400	1400	810 (424)	1100 (951)	1500	LQM (2014)
tetrachloromethane (Carbon tetrachloride)	0.026	0.056	0.13	0.026	0.056	0.13	0.45	1	2.4	2.9	6.3	14	890	920	950	190	270	400	LQM (2014)
Trichloroethene	0.016	0.034	0.075	0.017	0.036	0.08	0.041	0.091	0.21	1.2	2.6	5.7	120	120	120	70	91	120	LQM (2014)
Trichloromethane (chloroform)	0.91	1.7	3.4	1.2	2.1	4.2	0.42	0.83	1.7	99	170	350	2500	2500	2500	2600	2800	3100	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			(mg/kg, unless otherwise stated)			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Chloroethene (Vinyl chloride)	0.00064	0.00087	0.0014	0.00077	0.001	0.0015	0.00055	0.001	0.0018	0.059	0.077	0.12	3.5	3.5	3.5	4.8	5	5.4	LQM (2014)
2,4,6 Trinitrotoluene (TNT)	1.6	3.7	8.1	65	66	66	0.24	0.58	1.4	1000	1000	1000	130	130	130	260	270	270	LQM (2014)
RDX	120	250	540	13000	13000	13000	17	38	85	210000	210000	210000	26000	26000	27000	49000 (18.7)	51000	53000	LQM (2014)
HMX	5.7	13	26	6700	6700	6700	0.86	1.9	3.9	110000	110000	110000	13000	13000	13000	23000 (0.35)	23000 (0.39)	24000 (0.48)	LQM (2014)
Aldrin	5.7	6.6	7.1	7.3	7.4	7.5	3.2	6.1	9.6	170	170	170	18	18	18	30	31	31	LQM (2014)
Dieldrin	0.97	2	3.5	7	7.3	7.4	0.17	0.41	0.96	170	170	170	18	18	18	30	30	31	LQM (2014)
Atrazine	3.3	7.6	17.4	610	620	620	0.5	1.2	2.7	9300	9400	9400	1200	1200	1200	2300	2400	2400	LQM (2014)
Dichlovos	0.032	0.066	0.014	6.4	6.5	6.6	0.0049	0.01	0.022	140	140	140	16	16	16	26	26	27	LQM (2014)
Alpha-Endosulfan	7.4	18	41	160 (0.003)	280 (0.007)	410 (0.016)	1.2	2.9	6.8	5600 (0.003)	7400 (0.007)	8400 (0.016)	1200	1200	1200	2400	2400	2500	LQM (2014)
alpha-Hexachlorocyclohexane	0.23	0.55	1.2	6.9	9.2	11	0.035	0.087	0.21	170	180	180	24	24	24	47	48	48	LQM (2014)
beta-hexachlorocyclohexanes	0.085	0.2	0.46	3.7	3.8	3.8	0.013	0.032	0.077	65	65	65	8.1	8.1	8.1	15	15	16	LQM (2014)
gamma-hexachlorocyclohexanes	0.06	0.14	0.33	2.9	3.3	3.5	0.0092	0.023	0.054	67	69	70	8.2	8.2	8.2	14	15	15	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Chlorobenzene	0.46	1	2.4	0.46	1	2.4	5.9	14	32	56	130	290	11000	13000	14000	1300 (675)	2000 (1520)	2900	LQM (2014)
1,2-Dichlorobenzene	23	55	130	24	57	130	94	230	540	2000 (571)	4800 (1370)	11000 (3240)	90000	95000	98000	24000 (571)	36000 (1370)	51000 (3240)	LQM (2014)
1,3-Dichlorobenzene	0.4	1	2.3	0.44	1.1	2.5	0.25	0.6	1.5	30	73	170	300	300	300	390	440	470	LQM (2014)
1,4-Dichlorobenzene	61	150	350	61	150	350	15	37	88	4400 (224)	10000 (540)	25000 (1280)	17000	17000	17000	36000 (224)	36000 (540)	36000 (1280)	LQM (2014)
VOCs Continued																			
1,2,3-Trichlorobenzene	1.5	3.6	8.6	1.5	3.7	8.8	4.7	12	28	102	250	590	1800	1800	1800	770 (134)	1100 (330)	1600 (789)	LQM (2014)
1,2,4-Trichlorobenzene	2.6	6.4	15	2.6	6.4	15	55	140	320	220	530	1300	15000	17000	19000	1700 (318)	2600 (786)	4000 (1880)	LQM (2014)
1,3,5-Trichlorobenzene	0.33	0.81	1.9	0.33	0.81	1.9	4.7	12	28	23	55	130	1700	1700	1800	380 (36.7)	580 (90.8)	860 (217)	LQM (2014)
1,2,3,4-Tetrachlorobenzene	15	36	78	24	56	120	4.4	11	26	1700 (122)	3080 (304)	4400 (728)	830	830	830	1500 (122)	1600	1600	LQM (2014)
1,2,3,5-Tetrachlorobenzene	0.66	1.6	3.7	0.75	1.9	4.3	0.38	0.9	2.2	49 (39.4)	120 (98.1)	240 (235)	78	79	79	110 (39)	120	130	LQM (2014)
1,2,4,5-Tetrachlorobenzene	0.33	0.77	1.6	0.73	1.7	3.5	0.06	0.16	0.37	42 (19.7)	72 (49.1)	96	13	13	13	25	26	26	LQM (2014)
Pentachlorobenzene	5.8	12	22	19	30	38	1.2	3.1	7	640 (43)	770 (107)	830	100	100	100	190	190	190	LQM (2014)

Parameter	Residential with homegrown produce			Residential without homegrown produce			Allotment			Commercial / Industrial			Public Open Space near Residential			Public Open Space - Park			Source
	(mg/kg, unless otherwise stated)			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			**(mg/kg, unless otherwise stated)**			
SOM	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	**1%**	**2.50%**	**6%**	
Hexachlorobenzene	1.8 (0.2)	3.3 (0.5)	4.9	4.1 (0.2)	5.7 (0.5)	6.7 (1.2)	0.47	1.1	2.5	110 (0.2)	120	120	16	16	16	30	30	30	LQM (2014)
Phenol	280	550	1100	750	1300	2300	66	140	280	760 $_{dir}$ (31000)	1500 $_{dir}$ (35000)	3200 $_{dir}$ (37000)	760 $_{dir}$ (31000)	1500 $_{dir}$ (35000)	3200 $_{dir}$ (37000)	760 $_{dir}$ (31000)	1500 $_{dir}$ (35000)	3200 $_{dir}$ (37000)	LQM (2014)
Chlorophenols (excluding pentachlorophenol)	0.87 (g)	2	4.5	94	150	210	0.13 (g)	0.3	0.7	3500	4000	4300	620	620	620	1100	1100	1100	LQM (2014)
Pentachlorophenol	0.22	0.52	1.2	27 (16.4)	29	31	0.03	0.08	0.19	400	400	400	60	60	60	110	120	120	LQM (2014)
Carbon Disulphide	0.14	0.29	0.62	0.14	0.29	0.62	4.8	10	23	11	22	47	11000	11000	12000	1300	1900	2700	LQM (2014)
Hexachlorobutadiene	0.29	0.7	1.6	0.32	0.78	1.8	0.25	0.61	1.4	31	66	120	25	25	25	48	50	51	LQM (2014)

(g) derived based on 2,3,4,6-tetrachlorophenol; dir - based on a threshold protective of direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only); (vap) calculated for vapour phase only. SOM – Soil Organic Matter; (4.5) solubility.

APPENDIX K - CONTROLLED WATERS RISK ASSESSMENT

CURRENT GUIDANCE FOR CONTROLLED WATERS RISK ASSESSMENT

Regulatory Context

Government policy is based upon a "suitable for use approach," which is relevant to both the current use of land and also to any proposed future use. When considering the current use of land, Part IIA of the Environment Protection Act 1990 (EPA 1990) provides the regulatory regime, which was introduced by Section 57 of the Environment Act 1995, which came into force in England on 1 April 2000. The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health, controlled waters or the wider environment given the current use and circumstances of the land. Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

> *"any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land, that:*
>
> *(a) Significant harm is being caused or there is a significant possibility of such harm being caused; or*
>
> *(b) Pollution of controlled waters is being, or is likely to be, caused."*

Part IIA provides a statutory definition of the pollution of controlled waters under Section 78A(9) as:

> *"the entry into controlled waters of any poisonous, noxious or polluting matter or any solid waste matter"*

Controlled Waters are defined Section 104 of the Water Resources Act 1991. In summary, the comprise relevant territorial waters which extend seaward for three miles from the low-tide limit from which the territorial sea adjacent to England and Wales is measured.

The Environment Agency has powers under Part 7 of The Water Resources Act (1991) to take action to prevent or remedy the pollution of controlled waters, including circumstances where the pollution arises from contamination in the land. This is reinforced in The Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, 2012) which came into force in early April 2012.

Part IIA introduces the concept of a contaminant linkage; where for potential harm to exist there must be a connection between the source of the hazard and the receptor via a pathway. Risk assessment in contaminated land is therefore directed towards identifying the contaminants, pathways and receptors that can provide contaminant linkages. This is known as the contaminant-pathway-receptor link (CPR or contaminant linkage).

Part IIA places contaminated land responsibility as a part of the planning and redevelopment process, rather than Local Authority or Environment Agency directly, except in cases of very high pollution risk or where harm is occurring. In the planning process, guidance is provided by National Planning Policy Framework (NPPF) of March 2012. The NPPF requires that a site which has been developed shall not be capable of being determined "contaminated land" under Part IIA. Therefore, appropriate risk-based investigation is required to identify the contaminant linkages that can then be assessed, and then mitigated using methods that can be agreed with the planners.

Source Protection Zones

Source Protection Zones (SPZs) are defined by the Environment Agency (for England and Wales), SEPA (Scotland) and the Environment and Heritage Service (Northern Ireland) for groundwater sources such as wells, boreholes and springs that are used for public drinking water supply. The zones show the risk of contamination from activities that might cause groundwater pollution in the area. The size and shape of a zone depends upon subsurface conditions, how the groundwater is removed, and other environmental factors.

SPZs are classified into four categories:

- **Zone 1 (Inner protection zone).** Any pollution that can travel to the abstraction point within 50 days from any point within the zone is classified as being inside Zone 1. This applies at and below the groundwater table. This zone also has a minimum 50 m protection radius around the abstraction point. These criteria are designed to protect against the transmission of toxic chemicals and water-borne disease.
- **Zone 2 (Outer protection zone).** The outer zone covers pollution that takes up to 400 days to travel to the abstraction point, or 25% of the total catchment area, whichever area is the largest. This travel time is the minimum period over which the Environment Agency considers that pollutants need to be diluted, reduced in strength or delayed by the time they reach the abstraction point.
- **Zone 3 (Total catchment).** This is the total area needed to support removal of water from the abstraction point, and to support any discharge from this.
- **Zone of special interest.** This may occasionally be defined as a special case. This is usually where local conditions mean that industrial sites and other potential sources of contamination could affect the groundwater source, even though they are outside the normal catchment area.

Groundwater Vulnerability Assessments

From 1 April 2010 The Environment Agency Groundwater Protection Policy began to use aquifer designations which are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems.

The aquifer designation data is based on geological mapping provided by the British Geological Survey. It is updated regularly to reflect their ongoing programme of improvements to these maps. The maps are split into two different type of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels.
- Bedrock -solid permeable formations e.g. sandstone, chalk and limestone.

The maps display the following aquifer designations:

Table 1. Aquifer Classification ("Geological Classification").

Classification	Definition
Principal Aquifers (Highly Permeable)	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.
Secondary A Aquifers	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
Secondary B Aquifers	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
Secondary Undifferentiated Aquifers	This has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Environment Agency Guidance

The Environment Agency's stance on groundwater resources is:

> *"to protect and manage groundwater resources for present and future generations in ways that are appropriate for the risks we identify"* (Groundwater Protection: Policy and Practice GP3, 2012).

At present, the legislation and guidance pertaining to the protection of controlled waters in the UK is complex; however, the core objectives seek to enforce the position given above.

In 1992, the National Rivers Authority published their Policy and Practice for the Protection of Groundwater (PPPG), this document introduced areas of focus for developments such as Source Protection Zones (SPZs) and Groundwater Vulnerability Maps. The Policy was revised in 1998, since which there have been substantial changes in legislation, driven by key European Directives relating to groundwater include the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). Aspects of these directives are controlled by primary UK legislation such as the Water Resources Act 1991 as amended by the Water Act 2003. Gaps in the 1998 PPPG that emerged as the result of further legislative changes were addressed in the Environment Agency Policy document Groundwater Protection: Policy and Practice (GP3), Version 1 of November 2012. The three main parts of GP3 were:

- Groundwater principals;
- Position statements and legislation; and
- Technical information.

The Environment Agency has a tiered risk based approach to drinking water protection as summarised below:

Increasing levels of protection ↑

Water Protection Zones

Safeguard Zones

Source Protection Zones

Principal Aquifers

Secondary Aquifers

Controlled Waters Risk Assessment

A number of tools are available (as detailed in GP3) in order for a developer of a potentially contaminated site to fulfil their obligations under the legislation. A site assessment would be required in order to identify any potential risks to controlled waters and to derive suitable clean up criteria, if required, to ensure the protection of controlled waters.

There are three main stages to any risk assessment of controlled waters:

1. Risk Screening (devise Conceptual Site Model, making reference to groundwater vulnerability maps, site setting, controlled waters context etc)
2. Generic Risk Assessment (EA Remedial Targets Methodology Tier 1 / Comparison of groundwater data with relevant standards)
3. Detailed Quantitative Risk Assessment (Consideration of aquifer properties and site specific parameters, EA Remedial Targets Methodology Tiers 2 & 3)

Risk Screening

Here, the Conceptual Site Model (CSM) is a critical tool to assessing any potentially contaminated site. The information from a robust CSM can be used to establish any pathways or receptors that do not require further assessment at an early stage. For example, it may be possible to confirm the absence of a particular sensitive controlled water receptor (such as a surface water feature) within the vicinity of the Site thereby breaking the associated source-pathway-receptor pollutant linkage. Information from subsequent tiers of risk assessment, such as following intrusive investigations, are used to update the CSM accordingly.

Generic Risk Assessment - England and Wales

When undertaking the Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Tier 1), comparison of chemical analytical results is made with those screening criteria.

In accordance with Part 2A of the Environmental Protection Act 1990, Tier Environmental has made regard to all of the Water Quality Standards (WQS) that are relevant to the specific site and a judgment has been made against the most stringent of those relevant standards:

- EQS Directive 2008/105/EC
- Priority Substances Directive 2013/39/EU
- Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015
- UK Drinking Water Standards (UK DWS)
- World Health Organisation (WHO Guidelines) for Drinking Water Quality
- Council Directive 98/83/EC on the quality of water intended for human consumption (Drinking water directive)

In some instances, the laboratory method detection limit is greater than the appropriate EQS/UKDWS value. In these instances, only measured concentrations in excess of the laboratory method detection limit have been considered likely to potentially represent a possible significant risk to controlled waters.

Please note that there is no quantitative criterion for total petroleum hydrocarbons (TPH), or speciated TPH fractions. Historically, standards provided for petroleum hydrocarbons ranges from 10µg/l (Private Water Supply Regulations 1991, removed from the 2009 regulations) to 50µg/l-1000µg/l (Surface Waters (Abstraction for Drinking Water) Regulations 1989) which related to the degree of treatment of water prior to use as drinking water. Over time, the legislative standards have been rescinded and no alternative standard provided, although the Environment Agency planned to release speciated TPH criteria (Fretwell et al., 2009).

In order to assess whether there is a potentially unacceptable risk of pollution of controlled waters, the results of the groundwater chemical analysis for TPH and BTEX were evaluated against Water Quality Standards (WQS) appropriate to the conceptual model for the site:

Table 2. Summary of Selected TPH and BTEX Water Quality Standards Selected for Tier 1 Screening

Determinand	Units	WQS Selected	Source of WQS
Aliphatics >C5-C6	µg/l	15000	Table 5.4 of CL:AIRE 2017#
Aliphatics >C6-C8	µg/l	15000	Table 5.4 of CL:AIRE 2017#
Aliphatics >C8-C10	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C10-C12	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C12-C16	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aliphatics >C16-C21	µg/l	-	Table 5.4 of CL:AIRE 2017#
Aliphatics >C21-C35	µg/l	-	Table 5.4 of CL:AIRE 2017#
Aromatics >C5-EC7	µg/l	10	Table 5.4 of CL:AIRE 2017#
Aromatics >EC7-EC8	µg/l	700	Table 5.4 of CL:AIRE 2017#
Aromatics >EC8-EC10	µg/l	300	Table 5.4 of CL:AIRE 2017#
Aromatics >EC10-EC12	µg/l	100	Table 5.4 of CL:AIRE 2017#

Aromatics >EC12-EC16	µg/l	100	Table 5.4 of CL:AIRE 2017#
Aromatics >EC16-EC21	µg/l	90	Table 5.4 of CL:AIRE 2017#
Aromatics >EC21-EC35	µg/l	90	Table 5.4 of CL:AIRE 2017#
Benzene	µg/l	10	Priority Substance Water Framework Directive 2015 and Table 5.3 of CL:AIRE 2017#
Toluene	µg/l	74	Table 1 Water Framework Directive 2015 and Table 5.3 of CL:AIRE 2017#
Ethylbenzene	µg/l	20	R&D Technical Report P2-115/TR4, 2002
Total xylenes	µg/l	30	DoE (1997c) Hedgecott S. and Lewis S, An update on proposed environmental quality standards for xylenes in water, final report to the Department of the Environment. Report No. DoE 4273/1. Medmenham: WRc; and; Table 5.3 of CL:AIRE 2017#

Notes - # = CL:AIRE document 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' (ISBN 978-1-905046-31-7, dated 2017),

Table 5.3 was referenced in the first instance from the CL:AIRE document 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies' (ISBN 978-1-905046-31-7, dated 2017), the to select appropriate Freshwater EQS values for benzene, toluene and total xylenes. The selected value for Ethylbenzene was derived from the proposed EQS value of 20µg/l from the Environment Agency R&D Technical Report P2-115/TR4, 2002. This represents a more conservative value than the 300µg/l value in Table 5.3.

With respect to speciated TPH CWG fractions, Table 5.3 states and refers the reader to 'See Table 5.4'. On this basis, Tier Environmental selected the World Health Organization (WHO) guide values for TPHCWG fractions in drinking water that are presented in Table 5.4 which may be considered appropriately protective of the controlled waters environment based on the conceptual site model.

Generic Risk Assessment is generally undertaken via comparison of reported leachate and/or groundwater concentrations against selected assessment criteria for the potential contaminants of concern identified for the Site from a preliminary desk based assessment.

The selected Generic Assessment Criteria (GAC) derived from a Water Quality Standard (WQS) for any specific substance may not necessarily be a simple number and can often be found to be expressed as:

- Annual mean concentration;
- Maximum allowable concentration;
- 95th percentile concentration for *n* samples;
- Total concentration;
- Dissolved concentration (applicable to filtered samples)

The values may sometimes be expressed for individual substances (e.g. arsenic or for groups of substances e.g. total xylenes or sums of certain PAHs).

Environmental Quality Standards (EQS) have been used where available for Priority Substances and Priority Hazardous Substances set at a European level:

- Priority Substances Directive 2013/39/EU;
- Amending 2008/105 and 2000/118/EC

In addition, EQS values derived for Specific Pollutants have been used as presented in The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

For assessing risks to potable water abstraction supplies, UK Drinking Water Standards presented in the Water Supply (Water Quality) Regulations 2000 (SI/2000/3184) (as amended) have been applied.

In selecting a GAC for a particular Site, Tier Environmental considers the following factors:

- Current use/function of the groundwater (e.g. drinking water, irrigation water, industrial use, base-flow to rivers and streams);
- Plausible, proposed or planned future uses of the water and nearby waters;
- Sensitivity of the critical receptor (e.g. human health, aquatic life); and,
- Requirements to trigger action under the legal context

In accordance with Part 2A:

> *"in deciding whether pollution of controlled waters is occurring, the assessor will have regard to all of the water quality standards that are relevant to the specific site and make a judgment against the most stringent of those relevant standards"*

Should the Level 1 or 2 assessments indicate threshold levels to be exceeded, then there are three alternative ways in which to proceed:

- To devise suitable remedial solutions;
- To carry out more investigation, sampling and analysis;
- To conduct a site-specific Detailed Quantitative Risk Assessment (DQRA) to whether or not the soil materials are suitable for their site-specific intended use or to devise a site-specific clean-up level.

Detailed Quantitative Risk Assessment (DQRA)

The decision to carry out a DQRA will be informed by the initial qualitative and generic assessment. The scope of any such assessment will be accurately defined by the outcomes of the former two stages. The robust CSM will be sufficiently refined by this stage that only certain contaminants of concern, certain pathways and certain receptors will require further assessment.

Additional site specific data is normally required for this stage of assessment, as explained above, more processes that are capable of affecting contaminant concentrations are considered (such as dilution and attenuation).

Remediation criteria derived will therefore be specific to each site and will be based on a detailed assessment of the potential impact at the identified receptor or compliance point. A greater level of confidence can be placed on the predicted impact on the compliance point following a DQRA.

Hazardous and Non Hazardous Substances

The Groundwater (England and Wales) Regulations 2009 control the disposal to the hydrogeological environment of potentially polluting substances which are divided into Hazardous Substances and Non-hazardous Contaminants (this roughly approximates to the former List 1 and List 2 substances).

Hazardous Substances are the most damaging and toxic and must be prevented from directly or indirectly entering the groundwater environment. Hazardous Substances include mineral oils and hydrocarbons, pesticides, biocides, herbicides, solvents and some metals. Discharge of Hazardous Substances to Controlled Waters must be prevented.

Non-hazardous Pollutants are any contaminants other than Hazardous Substances. Non-hazardous Pollutants are potentially toxic but are less harmful than Hazardous Substances, but their direct discharge to groundwater is generally not permitted and any indirect discharge to groundwater must be limited and be controlled by technical precautions in order to prevent pollution. Non-hazardous Pollutants include ammonia and nitrites, many metals and fluorides.

APPENDIX L - ASSESSMENT CRITERIA APPLIED FOR GROUND GAS

Ground Gas Monitoring Methodology

Monitoring for the following is generally performed as part of ground gas assessment:

- Methane (CH_4): an odourless, flammable gas. Mixtures of methane with air containing between 5 and 15% v/v methane are explosive.
- Carbon dioxide (CO_2): an asphyxiant at elevated concentrations. Denser than air, it can accumulate in excavations, and within low points inside buildings
- Oxygen (O_2): important in the assessment of the potential formation of explosive mixtures with methane. Monitoring normally measures both methane and oxygen concentrations in ground gas to derive an indication of the risk of explosive mixture formation, expressed as a percentage of the Lower Explosive Limit (LEL). Low concentrations of oxygen in ground gas can also exacerbate the risk of CO_2 asphyxiation.
- Hydrogen sulphide (H_2S): odorous and toxic, capable of forming flammable mixtures with air.

In addition, depending on the Conceptual Site Model, monitoring may also include for measurements of Volatile Organic Compounds (VOCs); present as chemical contaminants of soil and sometimes also biologically produced in low concentrations.

Assessment of methane (CH_4) and carbon dioxide (CO_2)

Methane and carbon dioxide can arise from natural geological sources, mine workings, rotting organic matter (peat, landfilled materials, etc.) and/or contaminant biodegradation. Assessment of ground gas composition and flows is therefore an essential part of site assessment. The need to adequately address potential risks from ground gas on development sites is therefore required under the planning regime.

In order to appropriately assess the site risks, the Construction Industry Research and Information Association (CIRIA) and others have issued several guidance documents on landfill and ground gas that are intended to provide advice on how to investigate and deal with gas contaminated ground with respect to development. These are:

- Report 149: 'Protecting Development from Methane' (CIRIA, 1995a)
- Report 150: 'Methane Investigation Strategies' (CIRIA, 1995b)
- Report 151: 'Interpreting Measurement of Gas in the Ground' (CIRIA, 1995c)
- Report 152: 'Risk Assessment for Methane and Other Gases from the Ground' (CIRIA, 1995d)

More recent guidance has been published to update the documents detailed above to collaborate and promote industry 'good practice'. These are:

- CIRIA Report 665: 'Assessing risks posed by hazardous ground gases to buildings (CIRIA, 2008)
- NHBC: 'Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present' (NHBC, 2007)
- BS8485:201+A1:2019: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings (BSI Group, 2019)
- BS8576:2013: Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs) (BSI Group, 2013)
- SoBRA Report Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater (Feb 2017)
- CL:AIRE Technical Bulletin TB17 Ground Gas Monitoring and 'Worst Case' Conditions (CL:AIRE Aug 2018)

The earlier CIRIA 149 approach is now considered to be too conservative. A more realistic measure of the risk posed by methane and CO2 in ground gas can be established by determining an appropriate Gas Screening Value (GSV), using the methods described in the NHBC and CIRIA 659 documents. These values are based upon earlier work undertaken by Wilson and Card (1999).

GSVs are calculated by multiplying the borehole flow rate (l/hr) by the percentage (% v/v) concentration in the gas stream of the specific component, i.e.:

GSV = (Concentration / 100) x Flow rate.

A risk-based methodology for deriving GSVs is defined for two situations (designated A and B), which are adequate for the great majority of site cases (as per CIRIA 665 Section 8.3):

- **Situation A**: Any development other than Situation B, e.g. factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements, etc
- **Situation B**: Low rise building with minimum ventilated under floor void (min 150 mm)

Under Situation A, classification of the scope of protection required is determined from the site GSV, summarised in Table 1. For Situation B, GSVs derived are used in a 'Traffic Light' classification (summarised in Table 2) which determines the required level and scope of protection measures. Tables 1 and 2 are summaries only: the details provided in the body text, footnotes and appendices of the above-referenced documents should be read in conjunction with the results to determine the appropriate level of protection.

For conservatism, Tier Environmental **initially** uses the maximum concentration and gas flow rate of methane detected in any borehole during all of the monitoring visits in deriving recommendations on appropriate protection measures. This represents the worst-case risk of forming an explosive mixtures. For carbon dioxide, steady state concentrations and flow data are applied, as these determine the development of an asphyxiating mixture. All values are selected whether or not they occurred in the same borehole or during the same monitoring event.

Exceedances of the maximum concentrations used in a Tier 1 Gas Risk Assessment can be tolerated, when the conceptual site model indicates that it is safe to do so. However, appropriately derived GSV values must never be exceeded - where site-specific circumstances permit the derivation of alternative GSVs according to the defined conceptual model, then the appropriate GSV values should be applied.

Table 1. GSV Categories Defined for Situation A (Summarised from CIRIA Report 665).

Risk classification	GSV (CH4 or CO2; l/hr)	Additional factors	Characteristic Situation
Very low	<0.07	Typically methane <=1% and/or CO_2 <=5%, otherwise consider increase to Low Risk.	1
Low	<0.7	Typically borehole ground gas flow rate <=70 l/hr; otherwise consider increase to Moderate Risk.	2
Moderate	<3.5	---	3
Moderate to high	<15	QRA required to evaluate scope of remediation measures.	4
High	<70	---	5
Very high	>70	---	6

Table 2. GSV Categories Defined for Situation B (Summarised from NHBC, 2007).

Methane		CO_2		"Traffic light" classification
Typical max. conc. (% v/v)	GSV (l/hr)	Typical max. conc. (% v/v)	GSV (l/hr)	
				Green
1	0.13	5	0.78	
				Amber 1
5	0.63	10	1.60	
				Amber 2
20	1.60	30	3.10	
				Red

Assessment of hydrogen sulphide (H2S)

H2S is toxic and highly odorous ("rotten eggs") gas. It is often a minor component within mine gases, in ground gas within or overlying strata rich in pyrites or other sulphide-rich ores, and in most natural gas fields.

H2S can be generated biologically in significant concentrations by the decomposition by sulphate-reducing bacteria of natural or anthropogenic organic matter under oxygen-free conditions. Its potential generation will be greater in environments containing elevated sulphate concentrations (including sea water). H2S is therefore common within the gas arising from estuarine and marine sediments, pond sediment, stagnant water bodies, bogs and marshlands and landfilled waste, for example.

It must be noted that H2S normally occurs together with other potentially hazardous ground gases. The measures adopted for protection against these will prove equally protective against H2S.

There are no standards by which H2S concentrations in ground gas can be assessed directly. Therefore, the significance of measured H2S concentrations in ground gas must be evaluated on a case-by-case basis, taking into account the measured concentrations of other components and the specific conceptual site and exposure models. To assist in this process, the following standards and guidance may be applied.

General protection of land users

There are no UK air quality standards for general exposure to H2S. The World Health Organisation has derived ambient air quality standards (WHO, 2000) for this gas, which may be used to inform risk assessment and decision-making:

The 24 hour average exposure guideline value for ambient air: 0.15 mg/m3 (0.1 ppmv, approx.; this was derived by the application of a 100x safety factor to the LOAEL for long-term exposure).

This is significantly above the odour threshold, which is typically around 0.01 mg/m3. To avoid substantial nuisance odour complaints, WHO (2000) recommends that the 30 minute average H2S concentration in ambient air should not exceed: 0.007 mg/m3 (0.005 ppmv, approx.).

Occupational exposures

For occupational exposure, the HSE (2005) limits for H2S are applicable:

- 8 hour time weighted average occupational exposure limit: 5 ppmv (7 mg/m3).
- Short-term exposure limit (15 minute reference period): 10 ppmv (14 mg/m3).

VOC Data Collection, Sampling and Assessment

BS8576 Guidance on investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs).

Volatile organic compounds (VOCs) include, for example, halogenated hydrocarbons such as trichloroethene, non-halogenated hydrocarbons such as benzene, and organosulfur compounds such as thiols (mercapatans). They can occur as a component of ground gas originating from historically contaminated ground, spills and leaks from industry, commercial or residential properties (e.g. from pipelines, storage facilities, and at the point of use or dispensing), land-filled wastes and from naturally occurring sources.

The migration of VOCs in ground gas can be via three primary mechanisms:

- diffusive flow (movement of constituent along a concentration gradient);
- advective flow (movement of constituent due to motion of a transporting fluid);
- dispersion (transport resulting from local variations in fluid flow, e.g. due to friction effects in the matrix).

The choice of sampling and monitoring techniques should be based upon the conceptual model and be designed to achieve the objectives of the investigation, bearing in mind the requirements of any subsequent analytical procedures and the need to provide relevant data of sufficient quantity and quality. Consideration should also be given to the nature of ground under investigation, as well as the nature and distribution of contamination, the geology and the hydrogeology. Every effort should be made to avoid cross-contamination and at no point should underlying aquifers be put at risk.

Where the response zone extends below the water table, gas present in the groundwater will tend to produce an equilibrium concentration in the well headspace. This applies to both permanent gases and VOCs but can be particularly misleading in the latter case. Testing for dissolved gases in groundwater is useful to help interpret monitoring results in such a situation. Similarly, any VOCs in a floating non-aqueous hydrocarbon layer will produce an equilibrium concentration in the well headspace.

The monitoring period and frequency of monitoring for VOCs in ground gases should be developed on a site-specific basis from the conceptual site model and investigation data quality objectives.

Ground gas samples can be collected from the unsaturated zone adjacent to, or above, the known or suspected source of VOCs in ground gas through installation of a ground gas monitoring point in the unsaturated zone (see 10.2), and from a near-surface location beneath hardstanding or a floor or foundation slab through installation of a near- or sub-slab monitoring point (see 10.3). For monitoring of VOCs in ground gas the monitoring well should be installed into unsaturated ground to allow sampling for VOCs to take place. The borehole should not be progressed below the groundwater table or the surface of any floating non-aqueous layer. The borehole should be progressed to the target sampling depth within the unsaturated zone. Full details can be found in BS8576 Section 10.2 onwards.

Assessment of VOC concentrations have been made for limited number of VOCs by SoBRA with the Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater in Feb 2017.

The assessment of VOC concentrations is not covered by above-referenced reports. These data can be used to inform the human health risk assessment for site occupants but should not be relied upon to assess human health risk due to uncertainties in the ground gas flow regime, variability in the (generally low) contaminant concentrations measured and inaccuracies in the concentrations measured by PID instruments.

Data on the VOC concentration in ground gas can also help inform potential occupational exposure risks to construction and similar workers. For this purpose, the measured values can be compared to the relevant occupational exposure limit (OEL) for the contaminant(s) of concern, as given in HSE (2005). In cases of doubt as to the identity of the organic contaminants within the ground gas or when these are present as a complex mixture, then the 8 hour time-weighted average (TWA) exposure limit for benzene (1 ppmv) will be applied for screening purposes. This is a reasonably conservative approach since the OEL for benzene is lower than that for the great majority of organic contaminants commonly encountered in soil and groundwater at contaminated sites

APPENDIX M - CHEMICAL AND GEOTECHNICAL TEST SAMPLING

Samples were selected by a representative of Tier Environmental during the site investigation works in accordance with the sampling approach described elsewhere in this report.

Samples for geotechnical and related testing

Bulk samples were placed within robust heavy duty plastic bags and sealed, together with small disturbed samples, within airtight 1 litre plastic containers.

100 mm diameter 'undisturbed' samples ("U100 samples") were obtained where possible from cable percussive and large diameter window sample boreholes within cohesive materials.

Samples for chemical analysis

All samples for chemical analysis were placed into clean new containers as summarised in Table 1. Unless explicitly stated elsewhere in this report, no preservatives were used to eliminate the risk that preservatives cause contaminant dissolution or analytical interference. Containers for VOC analysis were fully filled to exclude headspace.

Soil samples were dispensed as soon as possible after collection using reusable stainless steel spatulas, trowels or similar implements.

Ground water samples were collected from boreholes using single-use Teflon bailers or dedicated Waterra tubing with foot valves, except as otherwise noted within this report. Caution was taken to avoid excessive agitation during collection

New disposable gloves were used by the engineer for the collection of each sample.

Reusable equipment was washed down with distilled or deionised water between samples, except where tarry or similarly sticky materials were present. In such cases specific cleaning procedures were adopted as specifically described elsewhere in this report.

All sub-samples taken for chemical analysis were placed into refrigerators or cool boxes containing frozen ice packs immediately after aliquoting. All samples were transferred in cool boxes containing frozen ice packs to the relevant UKAS/MCERTS accredited laboratory as soon as possible. Recommended maximum holding times before analysis are summarised in Table 1.

Table 1. Sample containers and holding times.

Analysis	**Container/special requirements**	**Max. holding time at 4°C before analysis**
Soil and sediment samples		
VOCs	30-60 g brown or green glass jar with VOC-resistant cap and inert cap liner. Must be fully filled.	14 days
TPHCWG	30-60 g brown or green glass jar with VOC-resistant cap and inert cap liner **PLUS** 250-500 g brown or green glass jar with unwaxed cap liner.[1] The former must be fully filled.	14 days
All other organics	250-500 g brown or green glass jar with unwaxed cap liner.	7 days
Inorganics	Air-tight 0.5-2.0 kg plastic container (250-500 g brown or green glass jar may also be used).	14 days[2]
Water samples		
VOCs	40-50 ml glass vial with VOC resistant screw cap and inert liner. Must be fully filled.	14 days
TPHCWG	40-50 ml glass vial with VOC resistant screw cap and inert liner **PLUS** 500-1000 ml brown or green glass bottle with screw cap and unwaxed liner.[1] The former must be fully filled, the latter should be filled if possible.	14 days
All other organics	500-1000 ml brown or green glass bottle with screw cap. Fill if possible.	7 days
Inorganics	500-1000 ml translucent or opaque screw cap plastic *or* brown or green glass bottles. Fill if possible.	14 days[3]

1 The smaller vessel is used for analysis of the volatile components within the TPH mixture and the larger one is for the non-volatile components.

2 14 days is set as a reasonable limit for all routine analyses of soil for those inorganic components vulnerable to chemical and/or biological breakdown. Samples for sulphate analysis are vulnerable to biological sulphate-reduction but can be held for up to 28 days. For total metals, a holding period of up to 6 months is acceptable.

3 14 days applies for all routine analyses of most inorganic components that may be vulnerable to chemical and/or biological reactions. In the specific cases of sulphide, nitrite, nitrate and phosphate analyses, storage time must not exceed 48 hours. For total metals, a holding time of up to 6 months is acceptable.

Tier Environmental standard analytical suites

The analyses included with Tier Environmental's standard analytical suites for soil, soil leachate and water samples are presented in Table 2. Other individual analyses were specified as described within this report.

Table 2. Tier Environmental Standard Analytical Suites.

Parameter	**Sample type**					
	Soil		**Leachate**[1]		**Water**	
		LoD[2] **(mg/kg or as stated)**		**LoD (µg/l or as stated)**		**LoD (µg/l or as stated)**
Metals and metalloids						
Arsenic	✓	1	✓	10	✓	10
Cadmium	✓	1	✓	5	✓	5
Chromium	✓	1	✓	5	✓	5
Mercury	✓	1	✓	1	✓	1
Lead	✓	1	✓	4	✓	4
Selenium	✓	2	✓	10	✓	10
Copper	✓	1	✓	1	✓	1
Nickel	✓	1	✓	50	✓	50
Zinc	✓	1	✓	8	✓	8
Other inorganics						
Ammonia (as NH_4-N)					✓	15
Total sulphate	✓	100			✓	50 mg/l
Water-soluble sulphate	✓	0.1 g/l				
Hardness (as $CaCO_3$)					✓	1 mg/l
Organics						
Monohydric phenol	✓	1	✓	0.5	✓	0.5
Speciated PAHs (USEPA 16)	✓	0.1	✓	0.01	✓	0.01
Total Organic Carbon	✓	0.1 wt%				
Others						
Electrical conductivity					✓	NA
pH	✓	NA	✓	NA	✓	NA

NA - Not applicable

1 Leachate preparation according to NRA (1994), 10:1 liquid to solid ratio.

2 The table presents the desired limit of detection for the analysis. Higher LoDs may be reported on analytical data sheets due to interference between analytes within specific samples or if the laboratory needed to dilute samples to achieve results within the calibrated range for that instrument.

Analytical QA procedures

Introduction

Quality Assurance (QA) is a system of review and audit that assesses the effectiveness of that product and assures the producer and user that defined standards of quality have been met. If we consider site investigation and chemical analysis, QA is the management system that ensures these measures are in place and working as intended.

QA within the laboratory form part of relevant certification programmes (such as UKAS and MCERTS) and, indeed, will be undertaken in some form by any reputable analyst, whether for a certified technique or not. Laboratory QA/QC is beyond the control of Tier Environmental and will not be considered further in this document, although the relevant laboratory documentation can be obtained upon request. QA must also form part of the design and execution of a site investigation.

Two parameters often used to assess measurement quality objectives are bias and precision. Bias is a systematic deviation in the data. For example, a positive bias (concentrations higher than in reality) would be introduced if sampling bottles were a source of the analyte and this fact was unknown. Precision is the variation in the measurements around a central 'expected' value. This could be due both to real variability in the environmental medium being measured and random errors in the analytical process. Both precision and bias can be assessed by the use of appropriate blanks and replicates within the site investigation programme.

The objectives of the QA activities undertaken in this present site investigation were to recognise and quantify systematic bias within the analytical dataset and to obtain an indication of precision. In environmental samples, much of the observed variability is likely to result from heterogeneity in the sampled medium, particularly for soil and sediment samples.

Such QA practice within the sampling programme is required by current guidance (e.g., Environment Agency report P5-065/TR (2000); Environment Agency LFTGN02 (2002); BS 10175:2001).

Alternative QA procedures to the generic approach presented in this appendix may be specified for a project, provided case-specific justification is given.

QA checking procedure (data validation)

The responsible Engineer and Project Reviewer are required to undertake data validation and provide comment on data quality within the main body of the report(s) issued, when noteworthy matters arise. This QA checking should involve:

Confirming that data reported by the laboratory have achieved the standards specified by the certification scheme (MCERTS or UKAS). This will be indicated on the analytical certificates issued by the laboratory.

Checking that the limit of detection (LoD) and limit of quantification (LoQ) achieved by the laboratory for an individual analyte is appropriate for the purposes of the report. LoD and LoQ will vary dependent upon analyte concentrations, sample matrix properties and interference from co-contaminants.

A check that the reported range of concentrations are reasonable for the analyte. For example, the dissolved concentration of an analyte in a water sample should not exceed saturation. If it does, then this merits further consideration (e.g., was colloidal organic matter or other solid-phase material present or could there have been unobserved free-phase organic liquid?) and explicit comment. At its simplest, there may be a unit error.

Where analysis involves reporting of Tentatively Identified Compounds (TICs; normally by mass spectrometry), the reviewers should check that these might reasonably be expected at the site under consideration. The uncertainties in identification by MS mean that it is not uncommon that TICs are incorrectly assigned. In cases of doubt, the analytical laboratory can re-check the raw data and confirm.

A review of the analytical precision by comparing data obtained for duplicate samples. There is no absolute threshold - variability is entirely dependent upon the sample matrix and manner in which the contaminant has entered the sample. Variability that cannot reasonably be assigned to such factors (for example a very high apparent variability in data for sediment-free water samples) should be reviewed with the laboratory. Variability that is attributable to the sample matrix can nevertheless provide important pointers to improve understanding of contaminant transport pathways and the risks posed by pollutant linkages (e.g., soil heterogeneity, the association of contamination with particular soil fractions, the presence of residual NAPL within soil pores or the role of suspended sediments in contaminant transport).

Confirmation that no errors have been introduced by data transcription, unit conversion or corrections between preliminary and certificates issued by the laboratory. The reviewer should audit a proportion (typically 5-10%) of all data from the original (final) certificates of analysis through to the equivalent values in the report for those specific samples.

In is important to consult the analytical laboratory if apparent QA issues arise. Many apparent concerns can be adequately resolved on the basis of revisiting the raw analytical data or by obtaining a better understanding of the inherent limitations of the analysis for a particular matrix or sample type.

APPENDIX N - COMPLYING WITH CONTROL OF ASBESTOS REGULATIONS 2012

Complying with Control of Asbestos Regulations (CAR): Risk Assessments, Licensing and Training

This appendix outlines CAR risk assessments and where they should be applied in relation to assessing and remediating brownfield sites. The information below details the different classifications of work with asbestos under CAR, summarises the legal requirements for asbestos awareness training for all involved in the investigation and management of asbestos containing soil (ACS), and details the potential requirements for suitable proficiency training relating specifically to ACS.

CAR RISK ASSESSMENTS

A CAR Risk Assessment is required for any work which may expose employees to asbestos. It is recommended that a precautionary approach is adopted if there is any doubt about risks associated with asbestos.

There are three main activities for potential asbestos exposure during work on brownfield sites:

- Site reconnaissance visits;
- Site investigation works; and
- Site remediation.

CAR risk assessments are needed at each stage but may be incorporated during the site investigation stage into the overarching health and safety risk assessments.

The CAR risk assessment must:

- Identify the type of asbestos to which employees are liable to be exposed, where possible, or assume it is present in different forms;
- Determine the type and extent of exposures to asbestos that may occur during the work
- Identify the steps to be taken to prevent exposure or reduce it to the lowest level reasonably practicable; and,
- Consider the effects of control measures that have been or will be taken.

The CAR risk assessment should include any information used to inform the risk assessment such as asbestos reports or desk study information. In the event that this information is not available, the assessor should be assumed that all forms of asbestos may be present on Site.

For all investigation and remediation of ACSs, a detailed written work plan should he produced and followed as detailed on the HSE website and in the CAR.

The CAR risk assessments for specific investigations or remediation projects, will determine whether or not work is 'licensable work' (LW)**,** notifiable non-licensable work' (NNLW) or 'non-licensed work' (NLW). In addition, training requirements are also defined by the CAR risk assessment.

Some examples of control measures that apply during site reconnaissance, site investigation works, and site remediation are given below and should be applied depending on the asbestos risks identified for the Site at each stage of investigation:

- Avoiding stirring up dust;
- Cleaning footwear after site works;
- Removing and bagging any overalls for disposal/laundering;
- Respirators and hygiene facilities for high risk sites;
- Segregated welfare units;
- Wetting ground
- Minimising soil disturbances;
- Implementation or retention of capping/break layers;
- Implementation of awareness training;
- Air monitoring;
- Managing stockpiles;
- Area segregation;
- Wheel washing
- Road washing/cleaning

It is important to note that during Site reconnaissance visits, Site investigation works and Site remediation that asbestos should not be considered in isolation and control measures are likely to form part of a wider health and safety precautions.

Respiratory protective equipment (RPE)

RPE is the last line of defence and its requirement would be defined by the CAR risk assessment. HSE (2013b) advises that RPE should have an assigned protection factor of 20 or more for all work with asbestos. In certain instances, full face-piece, positive pressure respirators with a protection factor of 40 are necessary (to EN 12942:1998, TM3).

Suitable types of RPE for most ***short*** duration non-licensed asbestos work:

- Disposable respirator to standards EN149 (type FFP3) or EN1827 (type FMP3)
- Half mask respirator (to standard EN140) with P3 filter
- Semi-disposable respirator (to EN405) with P3 filter

These filters are not suitable for people with beards/stubble or for long or continuous use.

LICENSING

CAR defined certain types of activities involving asbestos as 'licensable work' (LW) or as 'notifiable non-licensable work' (NNLW). All other work would be 'non-licensable work' (NLW).

LW is defined as:

- work where exposure is not 'sporadic and low intensity'
- work where the risk assessment cannot demonstrate that the control limits (four hour and 10 minute limits) will not be exceeded
- work on asbestos coating
- work on AIB or insulation where risk assessment is either of first two points above or not of short duration (where short duration is defined for any work liable to disturb asbestos as taking less than two hours per week (including ancillary work) and no one person carries out that work for more than one hour').

NNLW includes work with:

- AIB or asbestos insulation of short duration that is not licensable
- fire-damaged asbestos cement or asbestos cement damaged so as to create significant dust and debris
- asbestos ropes, yarns, woven cloths in poor condition or handling cutting or breaking up the materials
- asbestos papers, felts and cardboard in poor condition, unencapsulated or not bound into another material.

Work with weathered asbestos cement, air monitoring and collecting samples of ACM in buildings would not normally be notifiable.

It is impossible to specify definitively what activities will and will not be licensable. This decision should be made as part of the CAR risk assessment. CAR is not primarily aimed at work with ACSs and there is little published information on airborne asbestos concentrations during work with ACSs. Nevertheless, CAR will require some remediation projects, and occasionally site investigations, to be LW. Investigations on other sites may involve NNLW. The decision as to whether work is LW or NNLW should be made during the CAR risk assessment by those in charge of the brownfield site investigations and remediation projects.

TRAINING REQUIREMENTS

Asbestos health and safety courses are offered by a number of providers in the UK. Training courses that include the problem of identifying ACMs in soil should be undertaken at regular intervals by those involved in the investigation, assessment and management of sites where ACs are known or suspected. It is the role of the employer to identify the level of training required for an employee based on their role, experience and duties. Reference to Regulation 10 of CAR should be referred to for more information on training requirements.

Recognising asbestos within soils is challenging due to the heterogeneity of such soils and the discolouration of asbestos by smeared soil. Specific training for ground workers should include understanding fibre release potential, potential control measures in the field, how to take representative ACSs safely, sample labelling and what analytical tests are available and when the y should be implemented.

Health and safety training required under CAR includes asbestos awareness, non-licensable work (including notifiable non-licensable work) and licensable work with asbestos.

In addition to health and safety training, some staff involved in the technical identification on site of ACMs, sampling and analysis may require technical proficiency training (competency training).

Training vs. Competence

HSE (2005) identifies that ‘training alone does not make people competent. Training must be consolidated by practical experience so that the person becomes confident, skilful and knowledgeable in practice on the job’. It is critical that ACS surveyors demonstrate competency with details of relevant field experience alongside training and examples of previous works/references.