Ground Conditions Assessment Report

Dove Valley Park

PREPARED BY:
Jubb Consulting Engineers Ltd.

FOR:
PGFI III

DATE:
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REFERENCE:
18298-GCA-01

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PROJECT INFORMATION

Project Information

Client	PGFI III

Project Details

Project Name	Dove Valley Park
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Jubb Project Number	18298
Title	Ground Conditions Assessment Report

Report Details

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Prepared By	**Job Title**	**Signature**
J Thomas	Geotechnical Engineer	
Approved By		
M Campbell	Head of Ground Engineering	

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1	28/05/19	First issue

EXECUTIVE SUMMARY

Site Information	
Client	PGFI III
Project	Dove Valley Park
OS Co-ordinates	SK 20148 32609
Site Size	Approximately 13 Ha
Proposals	Construction of a water bottling plant
Site Description	Site comprises two flat agricultural fields over the northern two thirds and farmhouse and field over the southern third. situated between Heath Top and Woodyard Lane.
Current and Historic Site Uses	Site is currently agricultural fields, which has been formerly used as an airfield as part of RAF Church Broughton. The eastern area of the site is indicated to have been a historic landfill which extended under the whole Dove Valley Park.
Ground Conditions	
Geology	• The site is shown to be directly underlain by Glaciofluvial Terrace Deposits consisting of clay, sand and gravel, which are underlain by the Mercia Mudstone Group
Hydrogeology and Hydrology	Hydrogeology: • Bedrock is identified as a Secondary B Aquifer • Superficial deposits are identified as a Secondary A aquifer Hydrology: • Nearest surface water feature is a small pond to the immediate north-west of the site • Site is indicated to be in an area at risk of groundwater flooding at the surface
Ground Conditions Encountered	▪ Made ground comprising reworked natural encountered to a maximum depth of 1.3m; ▪ Glaciofluvial deposits variable across site comprising clay, sand and gravel encountered to max. depth of 5.45m BGL; ▪ Residual soils of Mercia Mudstone Group comprising gravelly clay encountered at 1.6m to 5.45m BGL, becoming competent rock at 7.5m to 10.7m BGL.
Geo-environmental Assessment	
Contamination Assessment	Contamination testing recorded minor exceedances of lead, arsenic, and two PAH species; No asbestos was detected in the samples tested;

	Ground gas monitoring indicates CS-2; The site is in an area where 1% to 3% of homes are above the Action Level, therefore no radon protection measures are required for the site.
Waste Classification	Soils from the site have been assessed in accordance with WM3 and are generally classified as 'Non-hazardous' for disposal purposes.
Contamination Risk Classification	Contamination risk posed by the site is considered to be low.
Geotechnical Assessment	
Foundations and Floor Slabs	▪ Shallow foundations potentially viable on site, dependent on final structural loads; ▪ Piles or ground improvement, will be required if structural loads deemed too high for shallow pad foundations; ▪ Ground bearing floor slab may be viable with ground improvement as made ground comprises reworked natural material.
Excavations	▪ Excavations should be suitable with standard mechanical plant; ▪ Significant excavations are not anticipated on site; ▪ Temporary excavations should be battered back at an angle of 1:2 within clay deposits and 1:3 where gravel encountered. If insufficient space to carry out this then cutting should be supported by relevant shoring systems; ▪ Perched groundwater present within glaciofluvial deposits which will likely flood excvavartions without controls in place; ▪ Provision should be made for encountering boulders in glaciofluvial deposits.
Earthworks	▪ Significant earthworks are not anticipated to be required as site is relatively flat; ▪ Site soils likely classified as 1A-1C where granular, or 2C where cohesive.
Buried Concrete Classification	▪ BRE-SD1 testing indicates DS-1 AC-1 in all strata; ▪ Mercia Mudstone known high sulphate stratum, however results suggest no pyrite present.
Groundwater	▪ Variable groundwater levels recorded with multiple strikes within glaciofluvial deposits and Mercia Mudstone Group, particularly in siltstone bands; ▪ Perched groundwater in glciofluvial deposits could rapidly flood excavations if encountered. Specialist advice should be sought regarding this.
Geotechnical Risk Category	▪ Geotechnical Category 2.

1 Introduction

1.1 Commission

PGFI III are proposing to develop a parcel of land within the Dove Valley Park business park with a water bottling plant. To assist with the development of the site proposals, Jubb Consulting Engineers (Jubb) have been appointed to

undertake a preliminary geotechnical and geo-environmental assessment of the ground conditions to inform purchase of the site.

This report constitutes the Ground Conditions Assessment (GCA) for the proposed development and provides advice for the geotechnical and geo-environmental design of the development and associated ground contamination or geotechnical hazards.

The proposed ground investigation scope is intended to provide pre-purchase advice, and it is anticipated that additional ground investigation works will be required to facilitate detailed design of the proposed structure.

This report is for the private and confidential use of PGFI III (to whom alone is owed a duty of care) and their professional advisors and consultees; it may not be relied upon or reproduced by any third party for any use without the written agreement of Jubb.

1.2 Objectives

The objectives of this assessment are:

- to assess the geo-environmental ground conditions at the site with due regard to any previous investigation, remediation and validation works undertaken as part of the site enabling works. If necessary, to provide outline recommendations for risk mitigation based on the findings;

- to analyse the intrusive ground investigation results to determine ground conditions, obtain representative values for geotechnical analysis, and identify any geotechnical issues which may affect the proposed development;

- to make an evaluation of any potential environmental or geotechnical hazards, risks and liabilities to the planned development of the site on the basis of the foregoing studies, and to provide engineering and environmental recommendations for the site, in view of the potential development of the site.

1.3 Scope, Sources & Limitations

A Phase 1 Geo-environmental desk study report was carried out by Jubb in October 2018, with the information summarised in section 3.0.

This report has been carried out in accordance with the following UK legislation and regulatory guidance for site investigations: -

- BS EN 1997-1:2004 +A1:2013 Eurocode 7 Geotechnical design – Part 1 General rules;
- BS EN 1997-2 (2007) Eurocode 7 Geotechnical design – Part 2 Ground Investigation and testing;
- NA+A1:2014 to BS EN 1997-1:2004 +A1:2013 UK National Annex to Eurocode 7: Geotechnical design – Part 1: General rules,
- NA to BS EN 1997-2:2007 UK National Annex to Eurocode 7: Geotechnical design – Part 2: Ground investigation and testing;
- BS 5930 (2015) Code of Practice for site investigations;
- BS 8004 (2015) Code of Practice for Foundations;
- BS 10175 (2011) + A1: (2013) Investigation of Potentially Contaminated Sites – Code of Practice;
- CLR 11 (2004) Contaminated Land Research Report, Defra/EA - Model Procedures for the Management of land contamination;
- BS EN 14688 – 1 (2002) + A1 (2013) Geotechnical investigation and testing. Identification and classification of soil. Identification and description.
- BS EN 14688 – 2 (2004) + A1 (2013) Geotechnical investigation and testing. Identification and classification of soil. Principals for a classification.
- BS EN 14689 – 1 (2003) Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

It should be noted that any ground investigation provides only a small sampling of any site and that ground conditions may differ both laterally (across the site) and vertically (with depth) between sample points. Such differing conditions may thus remain undetected by fieldwork. Certain areas may not have been accessible to intrusive survey due to vegetation, live services or other obstructions.

2 Site Setting

2.1 Site Location

The site is located within the Dove Valley Park, which is a major 200 acre industrial/distribution development situated in the village of Foston, Derbyshire, approximately twelve miles to the south west of Derby city centre.

The site is located the north western corner of the park and is accessed off Woodyard Lane, which runs along the western boundary, with Heath Top lane running along the northern boundary. The outline of the site is shown in the below figure 1.

Figure 1: Site Location

The Ordnance Survey (Landranger) grid reference at the centre of the site is SK 2017 3252.

A site location plan and aerial photograph are reproduced in **Appendix A.**

2.2 Site Description

The site is a roughly rectangular parcel of land measuring approximately 320m x 370m in size and is relatively level, with ground levels at approximately 75m AOD.

At the time of the walkover, the majority of the site consisted of two open agricultural fields over the northern two thirds, with a farm house building and associated field over the southern third of the site. The northern fields were separated by wire fence boundaries, with several mature trees along the central boundary. A small publicly accessible fishing pond was located to the immediate north west of the site and was accessed from Heath Top. The pond was separated from the site and enclosed by mature trees and dense vegetation. The western site boundary was very densely vegetated, with mature deciduous trees present along the length of the boundary, beyond which was Woodyard Lane.

A large vegetated earth bund ran along the southern boundary of the north-eastern field and along the eastern side of the southern field, with a maximum height of approximately 3.5m. The bund separated the farmhouse from the adjacent Muller factory, and the north eastern field, with a smaller earth bund along the north west corner of the site.

The site was accessible from multiple points, with a vehicle access gate near the north east corner and one from Woodyard Lane in the south western corner, which led to the farmhouse building over the southern end of the site.

Piles of tyres and other waste building material were present on site along the farmhouse access road, with roofing panels present which were noted as possibly being a source of asbestos.

A low voltage overhead cable runs north-south approximately through the boundary between the two fields.

The site was surrounded by agricultural land to the north and north east, with a poultry farm to the west beyond Woodyard Lane. To the south of the site were two commercial/industrial units associated with the Dove Valley Park, one being a Muller factory which was located beyond the south eastern corner of the site and the other operated by Futaba International, which is a Japanese automotive manufacturer and was located to the south of the site.

2.3 Site Proposals

Site proposals are for construction of a c. 30,000m^2 water bottling plant.

A site proposal plan is included in **Appendix B.**

3 Summary of Desk Study Information

A phase 1 desk study was carried out by Jubb in October 2018. This section presents a summary of the findings. The full desk study assessment is found in report 18298-DTS-01.

3.1 Published Geology

The BGS 1:50,000 Solid and Drift Mapping (Burton Upon Tyne, Sheet 140) and the online BGS Geology of Britain Viewer identifies the site to be underlain by Glaciofluvial Terrace Deposits, with the solid geology comprising the Mercia Mudstone Group.

The Glaciofluvial Terrace Deposits are described as Mid-Pleistocene sand and gravel formed during the retreat of the glaciers.

The Mercia Mudstone Group is described as dominantly red, less commonly green-grey mudstone and silty mudstone with subordinate bands of pale brown to grey sandstone and grey green siltstone. Halite beds are also present within this formation.

3.2 Hydrogeology.

The Mercia Mudstone Group is classified by the Environment Agency as a Secondary B Aquifer.

The superficial deposits are identified as a Secondary A Aquifer.

3.3 Hydrology

The nearest surface water feature is a fishing pond located immediately north-west of the site, and publicly accessible from Woodyard Lane and Heathtop.

3.4 Radon Risks

The site is in an area where fewer than 1% of properties are above the Action Level. Therefore, no radon protection measures are required for the site.

3.5 Site History

The site was initially open agricultural fields, with the surrounding area also consisting of open fields in the earliest available maps from the late 19th century. The site and surrounding area to the south and east was covered by an airstrip which was part of RAF Church Broughton which operated between 1942 and 1946.

Following closure of the airfield, the site and surrounding area underwent relatively little change up until the 1990s. From this period, a depot was built to the south of the site in the area which is now Dove Valley Park which coincided with the construction of the A50-road just to the south. By 2005 Dove Valley Park had expanded to include numerous commercial/industrial units.

3.6 Unexploded Ordnance

A detailed UXO risk assessment was carried out by Applied Geology, which indicated the requirement for on-site supervision by a UXO specialist during site works

3.7 Preliminary Risk Assessment (Contamination)

The following section provides a Preliminary Risk Assessment (PRA) of contamination and develops an initial Conceptual Site Model (CSM) to establish whether there are any potentially unacceptable risks associated with proposed development at the site.

The CSM provides a method to characterise potential site risks, by outlining potential sources of contamination, identifying potential receptors that may be impacted, and determining potential pathways by which sources may affect receptors.

The Risk Assessment Methodology and Definitions are set out in **Appendix E** to this report.

3.7.1 Potential Sources of Contamination

The potential contaminants described below have been identified from the site history. The principal contaminative sources are as follows:

On-site

- Oils and fuels from historic airfield, agricultural vehicles;
- Organics and heavy metals in historic landfill;
- Asbestos in historic landfill and noted in farmland;
- Ground gas from historic landfill and made ground.

Off-site

- Oils and fuels from historic airfield
- Organics and heavy metals in historic landfill, nearby industrial processes;
- Asbestos in historic landfill;
- Ground gas from historic landfill and made ground.

3.7.2 Potential Receptors

The following potential receptors have been identified, based on the proposed development of the site for commercial purposes:

- Ground workers and construction workers;
- Future site users;
- Pond
- Groundwater (Secondary A Aquifer);
- Building materials

3.7.3 Preliminary Conceptual Site Model (CSM)

The potential key contaminative substances, potential receptors and possible pathways were set out by Hydrock in the desk study and are reproduced in the table below, assuming a worst-case scenario.

Table 1: Preliminary Conceptual Site Model

Preliminary Conceptual Site Model						
Sources	**Receptor**	**Pathway**	**Consequence**	**Probability**	**Risk**	**Recommended Action (to clarify level of risk and assess suitable mitigation measures or to mitigate the risk)**
Heavy metals from on-site and off-site sources (landfill and historic airfield)	Future Site Users;	Human uptake pathways	Medium	Low likelihood	Moderate/Low risk	Site Investigation will be required to determine contamination potential of site soils, presence of made ground etc. Future mitigation measures to protect human health may be required depending upon results (capping, soil treatment, etc.). Use of suitable PPE and good hygiene practice on the site to mitigate risk.
	Construction workers; Demolition workers.	Human uptake pathways	Medium	Low likelihood	Moderate/Low risk	
	Surface water/Groundwater	Percolation/ leaching/ migration to groundwater;	Mild	Low likelihood	Low risk	Soils have high leaching potential.
Organics/PAH/ Hydrocarbons from historic airfield and landfill	Future Site Users;	Human uptake pathways	Medium	Low likelihood	Moderate/Low risk	Site Investigation will be required to determine contamination potential of site soils, presence of made ground etc. Future mitigation measures to protect human health may be required depending upon results (capping, soil treatment, etc.). Use of suitable PPE and good hygiene practice on the site to mitigate risk.
	Construction workers; Demolition workers	Human uptake pathways	Medium	Low likelihood	Moderate/Low risk	
	Surface water/Groundwater	Percolation and leaching to groundwater/pond	Medium	Low likelihood	Moderate/Low risk	Soils have high leaching potential. Installation of monitoring wells required as part of any subsequent ground investigation.
	Building Materials	Contact with water pipes;	Mild	Low likelihood	Low risk	Provide suitable pipe material if necessary.
Sulphates and pH	Building Materials	Contact with subsoil or groundwater	Medium	Low likelihood	Moderate/Low risk	BRE SD1 testing to be carried out as part of GI. Mercia Mudstone not a known high sulphate stratum
Asbestos potentially in made ground and stockpiles	Future Site Users;	Inhalation	Severe	Low likelihood	Moderate risk	Potential for asbestos from historic site uses. Possible asbestos noted in mounds of rubble.

Preliminary Conceptual Site Model						
Sources	**Receptor**	**Pathway**	**Consequence**	**Probability**	**Risk**	**Recommended Action (to clarify level of risk and assess suitable mitigation measures or to mitigate the risk)**
	Construction workers; Demolition workers.	Inhalation	Medium	Likely	Moderate risk	
Ground Gases from made ground	Future Site Users;	Inhalation	Medium	Likely	Moderate risk	Possible gas from backfilled landfill sites. Ground gas monitoring to be undertaken as part of any ground investigation
	Construction workers.	Inhalation	Medium	Low likelihood	Moderate/Low risk	
Radon	Future Site Users	Inhalation	Severe	Unlikely	Low Risk	The site is in a low risk Radon affected area where less than 1% of homes are estimated to be at or above the Action Level, therefore no radon protective measures are necessary.

4 Ground Investigation Works

4.1 General

A ground investigation was undertaken by Applied Geology after being scoped by Jubb. The ground investigation comprised cable percussion and rotary follow-on drilling, and trial pitting. The site works were carried out between the 13th and 20th March 2019.

The site investigation works comprised:

- 5 no. cable percussion boreholes to a maximum 11.32m BGL;
- 3 no. rotary follow-on boreholes to a maximum25.05m BGL;
- 16 no. machine excavated trial pits to a maximum 3m BGL;
- 4 no. soakaway tests;
- 4 no. plate load tests.

The exploratory hole locations were decided by Jubb, based on the outline of the development proposal and following a site walkover inspection of potential constraints.

The exploratory hole locations were set out and checked for buried services prior to excavation using a ground penetrating radar (GPR) survey of the site.

Representative soil sampling of each stratum was undertaken to allow geotechnical and chemical testing.

The factual ground investigation works are detailed in the following report:

- Applied Geology Factual Ground Investigation Report, Report Ref: AG2941-18-AH74 dated May 2019.

4.1.1 Cable Percussion/Rotary Follow-On Boreholes

Five cable percussion holes (CP01 to CP05) were drilled to depths of up to 11.32m. SPT's were carried out at regular intervals during drilling to allow an assessment of in-situ density or stiffness of the ground.

Boreholes CP01, CP03, and CP05 were extended by rotary cored drilling to a maximum depth of 25.05m BGL. Where recovery was poor, additional SPT tests were carried out to ass the in situ- density of the rock.

4.1.2 Trial Pits

16 machine excavated trial pits (TP1 to TP16) were excavated to depths of up to 3m BGL using a tracked excavator. After detailed examination, measurement and sampling, the excavations were backfilled with arisings and compacted in layers using the machines bucket.

Four of these trial pits (TP5, and TP11-TP13) were positioned to sample material in the earth bunds located on site.

4.2 Exploration Sampling Strategy

A site walkover was undertaken by Jubb during the site investigation being undertaken, and the existing site conditions were inspected. This walkover, in combination with the review of site history and previous ground investigation that had taken place on the site previously, allowed the investigation to be targeted as follows:

Exploratory Hole	Notes/Rational
BH01-BH05	Boreholes were positioned for general site coverage and investigation of deep strata beneath proposed structural footprint.
TP1 toTP4, TP6 toTP10, TP14 to TP16	Trial pits were positioned for general site coverage and sampling of shallow strata.
TP5, TP11 to TP13	Trial pits were positioned for sampling of existing earth bunds on site.

Table 2: Sampling Strategy

The sampling strategy was based on obtaining sufficient samples from across the site. Relevant samples were submitted for a general 'brownfield' suite of testing, determinants as detailed below.

Suite	Determinants
General Contamination Suite	As, Cd, Cr, Cu, Pb, Ni, Se, V, Zn, Hg, pH, B, Cr(III), Cr(IV), PAH's and Speciated Hydrocarbons (C10-C40), TOC and Asbestos screening

Table 3: Contamination Suite

4.3 Geotechnical Testing

Geotechnical testing was not included for in the original scope of the ground investigation and therefore only a single Atterberg limits test was scheduled on a sample of the residual clay.

No. of Tests	Test	Test Method
Classification Tests		
15	Liquid and plastic (Atterberg) limits.	BS1377: Part 2.
15	Particle Size Distribution Sieving	BS1377: Part 2.
Compaction Tests		
10	Dry Density/OMC with 2.5kg rammer	BS1377: Part 4
Consolidation Tests		
3	One Dimensional Consolidation Tests	BS1377: Part 5
Effective Strength Testing		
3	Quick Undrained Tests	BS1377: Part 8
Chemical Test: Soil		
6	Water soluble sulphate, total (acid soluble) sulphate and total sulphur contents and pH value.	BRE SD 1
Rock Testing		
15	Point Load Testing	ISRM Suggested Method
9	Unconfined Compressive Strength	ISRM Suggested Method

Table 4: Geotechnical Testing Summary

4.4 Contamination Testing

The geo-environmental testing was carried out by Chemtest Ltd, a UKAS and MCERTS accredited laboratory. Sub-samples were taken from the exploratory holes and placed in appropriate environmental containers before being sent by courier to the laboratory in cool boxes. The number of soil and leachate samples tested are summarised in the table below:

Exploratory Hole	Depth (mbgl)	Analysis Undertaken
TP01	0.4	General Suite
TP02	0.15	General Suite
TP02	0.6	UKWIR
TP03	0.2	General Suite

TP04	0.3	WAC
TP04	0.7	General Suite
TP05	1.1	General Suite and WAC
TP06	0.6	UKWIR
TP07	0.2	General Suite
TP08	0.35	General Suite
TP08	0.5	General Suite
TP09	0.7	General Suite
TP10	0.5	WAC
TP11	1.0	General Suite
TP12	2.0	General Suite
TP13	1.0	General Suite and WAC
TP13	2.75	WAC
TP14	0.6	General Suite
TP15	0.1	General Suite
TP15	0.1	WAC
TP16	0.2	General Suite

Table 5: Soil Contamination Testing

5 Ground Conditions

5.1 Ground Conditions Encountered

The ground conditions encountered during the Applied Geology ground investigation are summarised in the table below:

Description	Stratum	Encountered in	Depth range to top of stratum (m bgl)	Depth range to base of stratum (m bgl)
Loose very sandy clayey fine to coarse subangular GRAVEL of brick, asphalt, and concrete with rare ceramics, tiles and wood. Firm to stiff orange brown slightly sandy slightly gravelly CLAY with gravels of medium to coarse angular siltstone and coal.	Made Ground/Topsoil	All Exploratory Holes	GL	0.6/1.3
Firm to stiff, orangeish or yellowish brown mottled grey slightly sandy slightly gravelly CLAY with gravels of fine to angular to sub-rounded quartzite, sandstone and flint. Occasional cobbles of rounded quartzite. Orange or yellowish brown slightly silty sandy GRAVEL with frequent cobbles. Gravel is fine to coarse subangular to rounded quartzite, flint and sandstone. Cobbles are rounded to sub-rounded quartzite.	Glaciofluvial Deposits	CP01 – CP05, TP01 – TP04 TP06-TP10, TP12–TP15	0.6/1.3	1.6/5.45
Firm to very stiff reddish brown or dark grey slightly gravelly silty CLAY. Gravel is fine to coarse angular lithorelicts of mudstone and occasional siltstone and quartzite.	Residual Mercia Mudstone Group	CP01–CP05, TP01–TP03, TP06-TP10, TP12-TP14	1.6/5.45	7.5/10.7
Extremely weak to weak reddish brown silty MUDSTONE with bands of extremely weak to weak light greenish grey SILTSTONE	Mercia Mudstone Group	CP01 – CP05	7.5/10.7	-

Table 6: Ground Conditions Summary

5.1.1 Made ground

Agricultural made ground comprising topsoil of reworked natural material was encountered across the site, typically consisting of a soft to firm light to dark brown gravelly CLAY with gravels of flint, quartzite and sandstone. Occasionally brick fragments were present within the made ground.

The three earth bunds sampled also appear to comprise natural material sourced from site. The material encountered was a dark brown gravelly clayey SAND or sandy clayey GRAVEL with occasional cobles. The gravel was typically fine to coarse angular to rounded quartzite, flint, sandstone and brick with occasional ceramics. Cobbles comprised sub-rounded to rounded quartzite. In TP12 the bund material was described as a slightly gravelly sandy CLAY with pockets of sand as described above.

5.1.2 Glaciofluvial Deposits

Superficial glaciofluvial deposits were encountered across the site, primarily as a firm to stiff clay with varying quantities of silt, sand and gravel with occasional cobbles, but also as a medium dense gravel, with varying quantities of silt, sand and clay and occasional cobbles. Gravels encountered were typically of fine to coarse subangular to rounded flint, quartzite and sandstone. Cobbles were typically of sub-rounded to rounded quartzite and sandstone.

In TP01, TP09, TP14 and TP15 the glaciofluvial deposits were also encountered as a light brown gravelly fine to coarse SAND with gravels of fine to coarse sub-rounded to rounded quartzite, sandstone and flint.

5.1.3 Residual Mercia Mudstone Group

Residual soils of the Mercia Mudstone Group were typically encountered as a firm to very stiff reddish brown or dark grey slightly gravelly silty CLAY. Gravel is fine to coarse angular lithorelicts of mudstone and occasional siltstone and quartzite.

The residual soils were encountered at depths of between 1.6m and 5.45m BGL.

5.1.4 Mercia Mudstone Group

Competent bedrocdk of the Mercia Mudstone Group was encountered at depths of between 7.6m and 10.7m BGL. The bedrock was typically an extremely weak to weak reddish brown friable mudstone, with bands of extremely weak to weak greenish grey siltstone which ranged from 0.2m thick to up to 2.8m thick. Confined groundwater was often encountered within the siltstone bands.

5.2 Groundwater

Groundwater was encountered in the following locations during the ground investigation works.

Exploratory Hole	Strike Depth (mBGL)	Rose to (mBGL)	Stratum
CP01	0.8	-	Made Ground
CP01	8.0	6.5	Mercia Mudstone Group - Mudstone
CP02	5.6	5.0	Mercia Mudstone Group - Siltstone band
CP02	8.4	7.0	Mercia Mudstone Group - Mudstone
CP03	7.0	7.0	Residual clay
CP04	3.0	2.5	Residual clay
CP04	9.5	8.5	Residual clay
CP05	9.0	7.5	Mercia Mudstone Group - Siltstone band
TP03	1.2	-	Glaciofluvial gravel
TP04	0.7	-	Glaciofluvial gravel
TP06	1.2	-	Glaciofluvial sand
TP08	0.3	-	Made Ground
TP10	2.2	-	Glaciofluvial clay

Table 7: Groundwater Strikes Summary

The boreholes were installed with a combination of 50mm standpipes and 19mm piezometers, with the installs summarised in Table 8 overleaf.

Exploratory Hole	Installation Type	Install depth	Response Zone
CP01	50mm	5.0	0.5 – 5.0
	19mm	8.3	8.0 – 8.3
CP02	50mm	6.0	0.5 – 6.0
	19mm	7.8	7.5 – 7.8
CP03	50mm	15.0	10.0 – 15.0
	19mm	3.8	3.5 – 3.8
CP04	50mm	11.0	4.0 – 11.0
CP05	50mm	12.0	6.0 – 12.0

Table 8: Standpipes summary

Four return groundwater monitoring visits were undertaken, with the results presented in Table 9 below.

Exploratory Hole	Groundwater Depth (mBGL)			
	19/03/2019	26/03/2019	05/04/2019	12/04/2019
CPO1 50mm	1.0	0.76	0.91	0.94
CP01 19mm	3.89	5.38	5.28	4.97
CP02 50mm	2.53	2.22	2.47	2.73
CP02 19mm	2.53	2.2	2.49	2.72
CP03 50mm	3.64	3.62	4.0	4.5
CP03 19mm	4.05	3.54	4.04	4.47
CP04	2.87	2.6	2.85	3.05
CP05	3.14	3.45	3.94	4.32

Table 9: Groundwater monitoring summary

6 Material Properties

6.1 Made Ground

6.1.1 Classification Properties

Three SPT tests were carried out within the made ground and returned SPT N values of 8 for the gravel and 11 for the clay, indicating the gravel to be loose in density and the clay to be firm in strength.

Four 2.5kg compaction tests were carried out on samples from the made ground, with the results summarised in Table 10 below.

Sample ID	Description	Maximum Dry Density (MG/m³)	Optimum Moisture Content (%)
TP04 – 0.3m	Sandy CLAY with gravel	1.80	15
TP05 – 1.1m	Very sandy CLAY with gravel	1.75	14.8
TP11 – 1.0m	Sandy CLAY with gravel	1.77	14.6
TP13 – 2.75m	Slightly sandy CLAY with gravel	1.40	29.2

Table 10: Made ground compaction results

Three particle size distribution tests were carried out on the made ground, both from the topsoil and the earth bunds. The results are presented in Figure 2 overleaf.

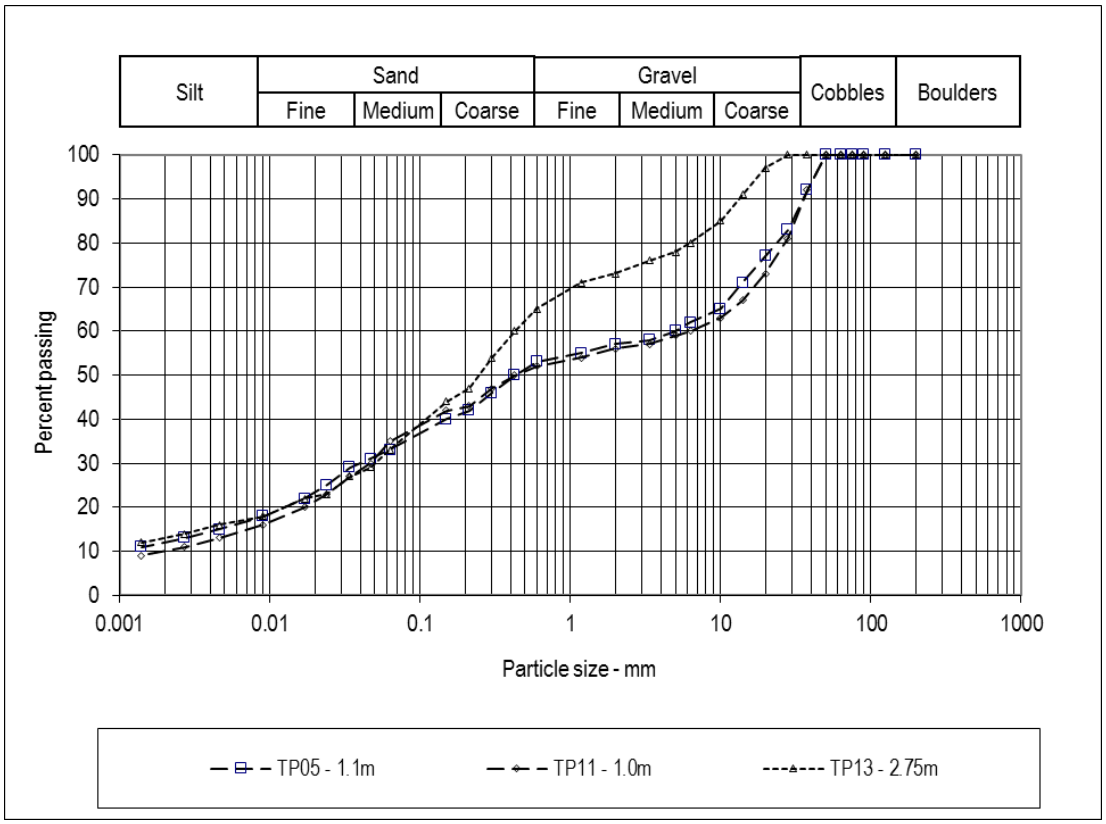

Figure 2: Made ground PSD results

The results indicate the reworked natural soils to comprise a slightly silty/clayey sandy GRAVEL/gravelly SAND.

6.2 Glaciofluvial Deposits

SPT N values in the residual clay ranged from 10 to 27, with an average value of 20 indicating a stiff clay or medium dense sand/gravel. The glaciofluvial deposits do not show a trend of increasing density with depth across the site as shown in Figure 7 below:

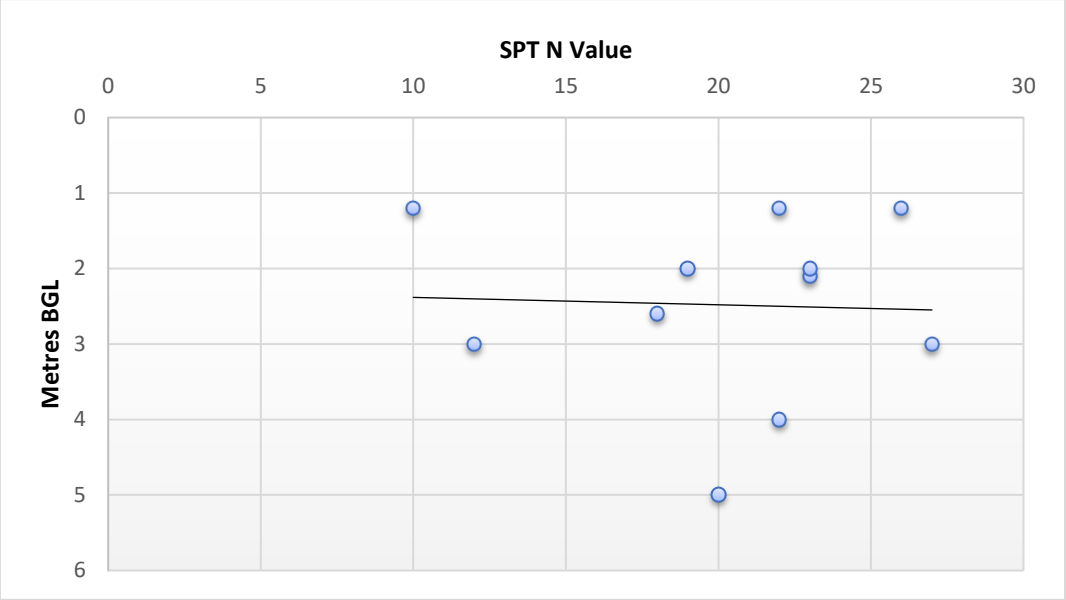

Figure 3: Glaciofluvial deposits SPT vs Depth plot

27 sets of hand shear vane readings were taken in the cohesive glaciofluvial deposits, with the undrained shear strength (Cu) results ranging from 92kPa to 208kpa. Figure 4 below shows a plot of measured Cu values, along with Cu values correlated from SPT N values, showing a range of values from 64kPa to 144kPa. The average Cu value across both data sets is 135kPa. The data does not indicate a trend of increasing strength with depth and highlights the differing strength in soils that may bew encountered laterally.

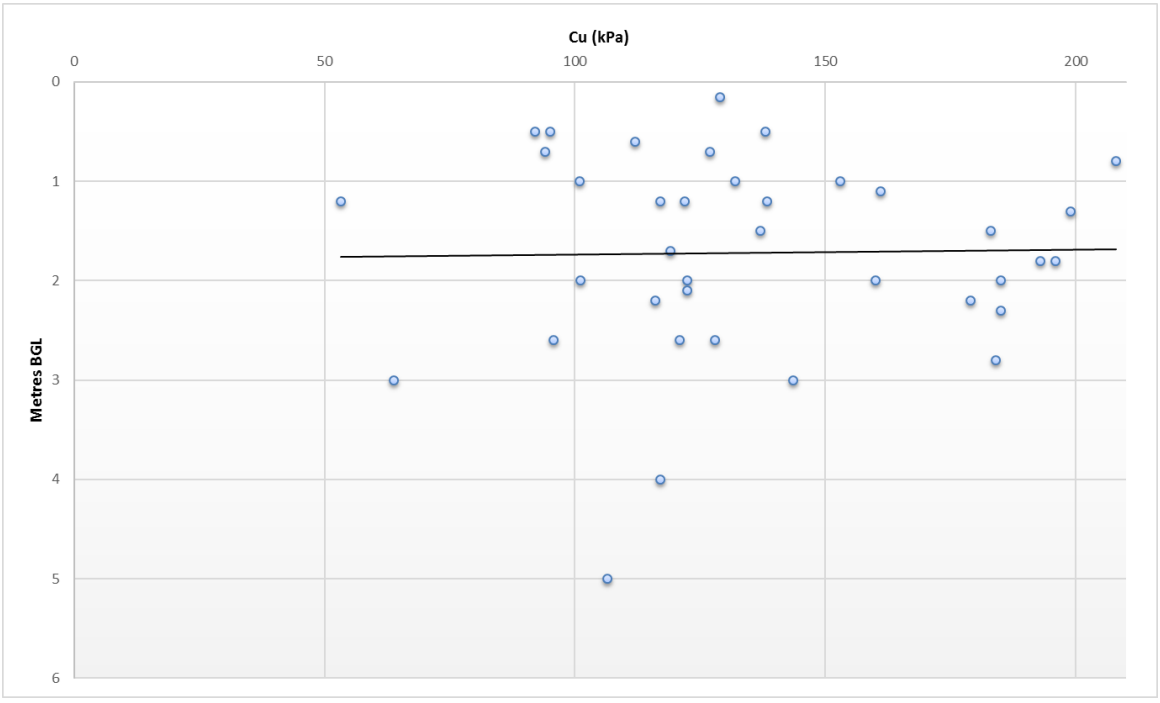

Figure 4: Glaciofluvial deposits Cu vs Depth plot

Ten plasticity index tests were scheduled on the clays from the glaciofluvial deposits, with the result shown in Figure 5 below. The samples are typically shown to be of intermediate plasticity, with three samples indicating high plasticity. The clays will typically have a moderate potential for volume change with variations in moisture content.

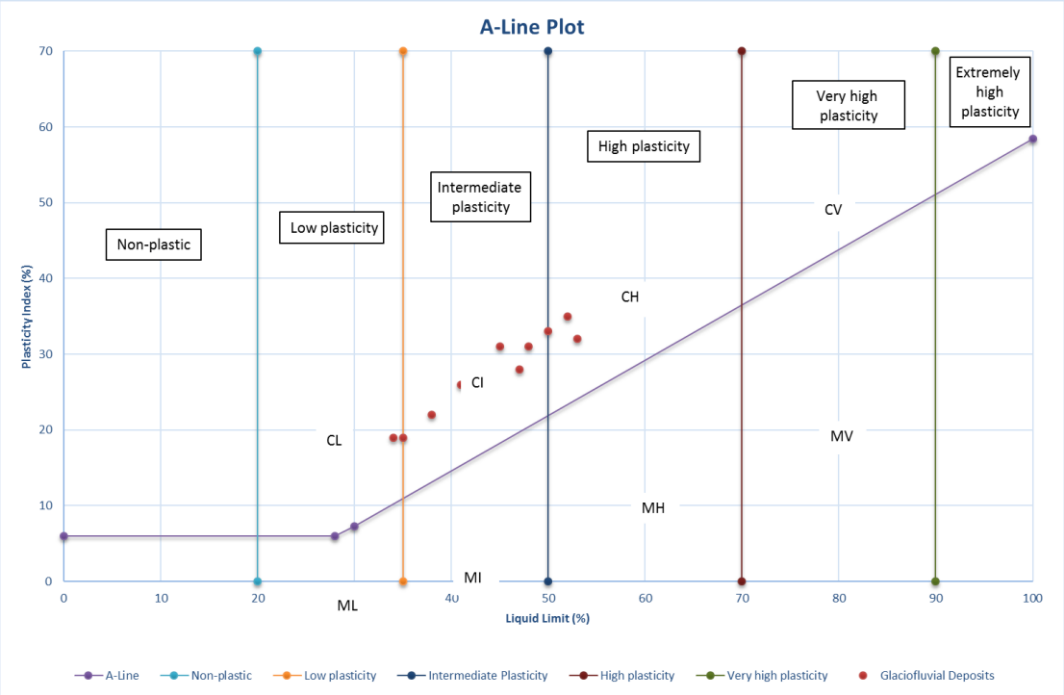

Figure 5: A-Line plot glaciofluvial deposits

Five 2.5kg compaction tests were carried out on samples from the glaciofluvial deposits, with the results summarised in Table 11 below. The natural moisture content tests carried out on the samples indicate this stratum is typically wet of optimum, and would require drying to achieve the maximum dry density.

Sample ID	Description	Maximum Dry Density (MG/m³)	Optimum Moisture Content (%)
CPO1 – 0.5m	Sandy CLAY with gravel	1.95	9.7
TP08 – 0.5m	Very sandy CLAY with gravel	1.75	14.8
TP09 – 0.7m	Sandy CLAY with gravel	2.00	10.8
TP10 – 1.6m	Mottled CLAY	1.73	18.6
TP15 – 1.4m	Sandy GRAVEL	2.08	8.2

Table 11: Glaciofluvial deposits compaction results

Ten particle size distribution tests were scheduled on samples from the glaciofluvial deposits, wit the results summarised in Figure 6 below.

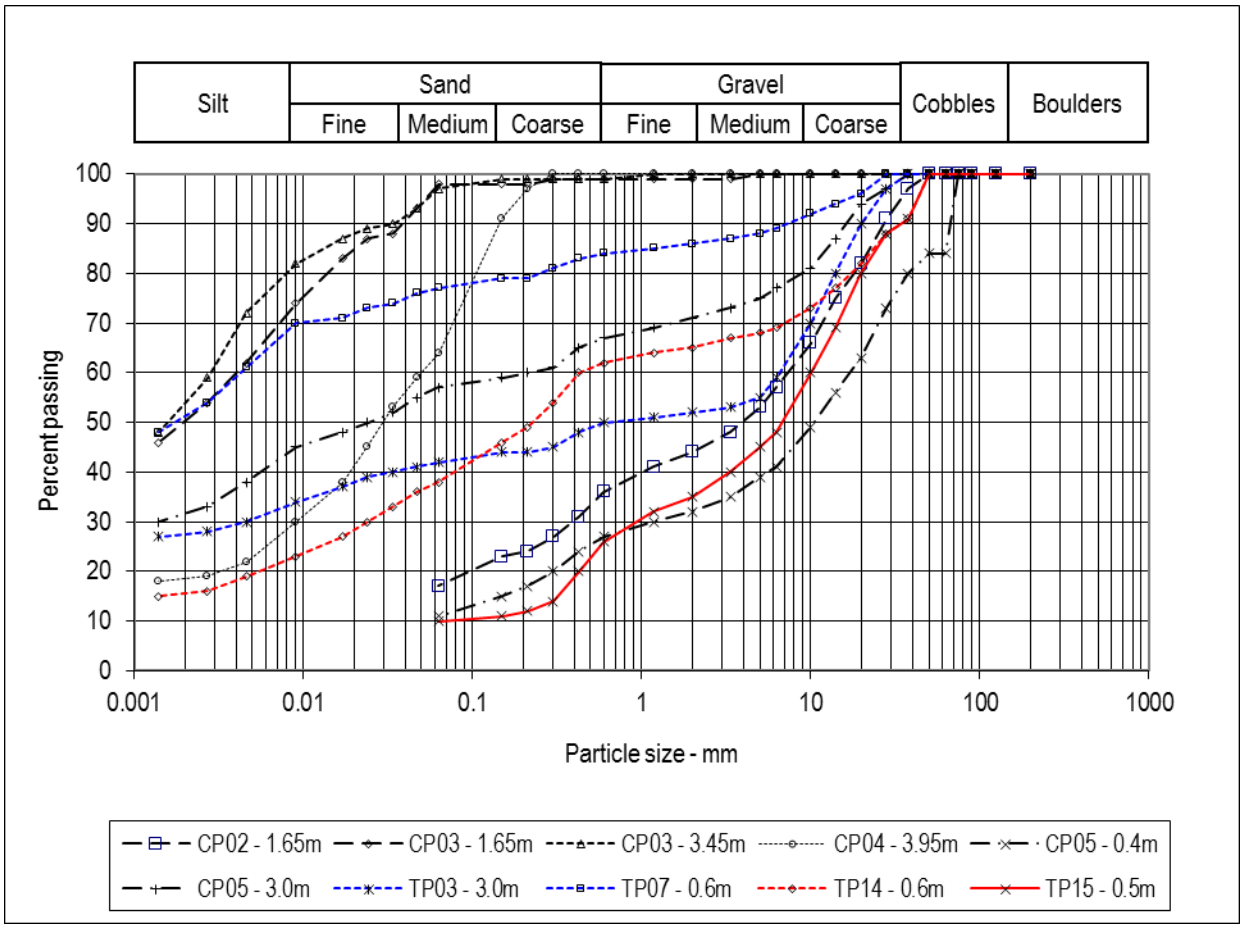

Figure 6: Residual soils PSD results

The results show the high degree of variability across the glaciofluvial deposits, with the soils broadly divided into a sandy GRAVEL or sandy gravelly CLAY.

Two one dimensional consolidation tests were carried out on samples of the glaciofluvial deposits, with the results summarised in Table 12 overleaf.

Sample ID	Pressure Range (kPa)	Mv (m^2/MN)	Cv (m^2/year)
CP02 – 2.8m	0 - 25	-	Sample swelled
	25 – 50	-	Sample swelled
	50 – 100	0.16	1.8
	100 – 200	0.14	0.72
	200 – 400	0.12	0.58
	400 - 800	0.075	0.57
	800 - 1600	0.045	0.58
CP04 – 1.2m	0 – 25	0.7	0.56
	25 - 50	0.32	0.76
	50 – 100	0.26	1.0

	100 – 200	0.16	1.3
	200 - 400	0.099	1.4

Table 12: Glaciofluvial deposits consolidation results

One clay sample from the glaciofluvial deposits was submitted for a quick undrained triaxial test.

6.2.1 Classification Properties

The below table recommends the characteristic geotechnical properties for the glaciofluvial deposits encountered across the site based on extrapolation from SPT N values.

Characteristic Property	Symbol	Units	Characteristic Values	Source
Unit Weight	γ	kN/m^3	18	4
Effective Angle of Shearing Resistance	Ø'	Degrees	27	3
Undrained shear strength	Cu	kPa	112	2
Modulus of Elasticity	*E*	*MPa*	4.76	5
Coefficient of Compressibility	M_v	M^2/MN	0.21	1

1 Lab testing
2 Lower quartile of hand vane readings & SPT correlation.
3 Peck, Hanson and Thornburn, Foundation Engineering, 2nd ed., 1974, John Wiley and Sons.
4 BS 8004:2015 for medium plasticity clay/medium dense sand or gravel;
5 E=1/mv

Table 13: Characteristic Properties of the Residual Clay

6.3 Residual Soils

Nine SPT tests were carried out within the residual soils of the Mercia Mudstone Group, which returned values of between 7 and 41, with an average N value of 24. The results are plotted in Figure 7 below and indicate a strong trend of increasing density with depth.

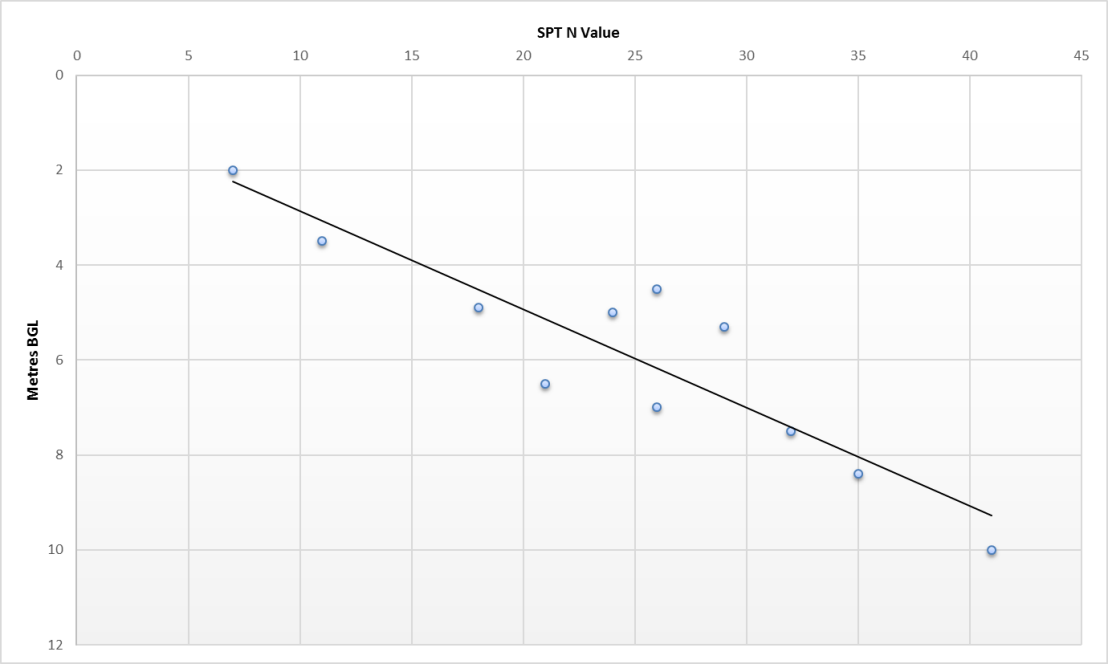

Figure 7: Residual soils SPT vs depth plot

18 sets of hand shear vane readings were taken within the residual clay, with the undrained shear strength (Cu) results ranging from 37kPa to 218kpa. Figure 8 below shows a plot of measured Cu values, along with Cu values correlated from SPT N values, showing a range of values from 47kPa to 236kPa. The average Cu value across both data sets is 130kPa, indicating a primarily stiff clay. The Cu results have been plotted in figure 8 below, and do not show a strong trend of increasing strength with depth.

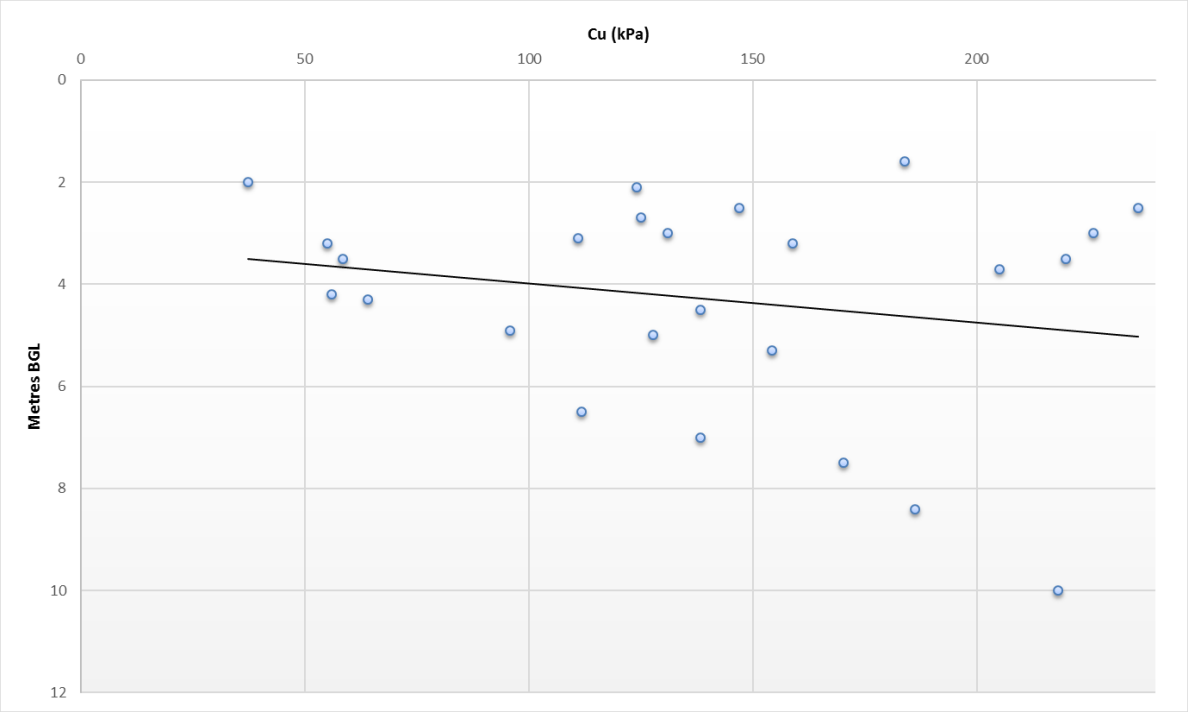

Figure 8: Residual soils Cu vs depth plot

Three quick undrained triaxial tests were also undertaken on samples from the residual soils, with the results summarised in Table 14 below.

Sample ID	Undrained Shear Strength (kPa)
CP02 – 5.0m	62
CP03 – 4.0m	146
CP03 – 6.5m	87
CP05 – 4.0m	65

Table 14: Triaxial results summary

Seven plasticity index tests were scheduled on the residual clays of the Mercia Mudstone Group, with the result shown in Figure 9 overleaf. The residual clay is typically shown to be of low plasticity, with one and two samples indicating intermediate and high plasticity respectively. Whilst the residual soils can generally be expected to show low volume change potential, encountering zones of high plasticity clay should be considered during detailed design.

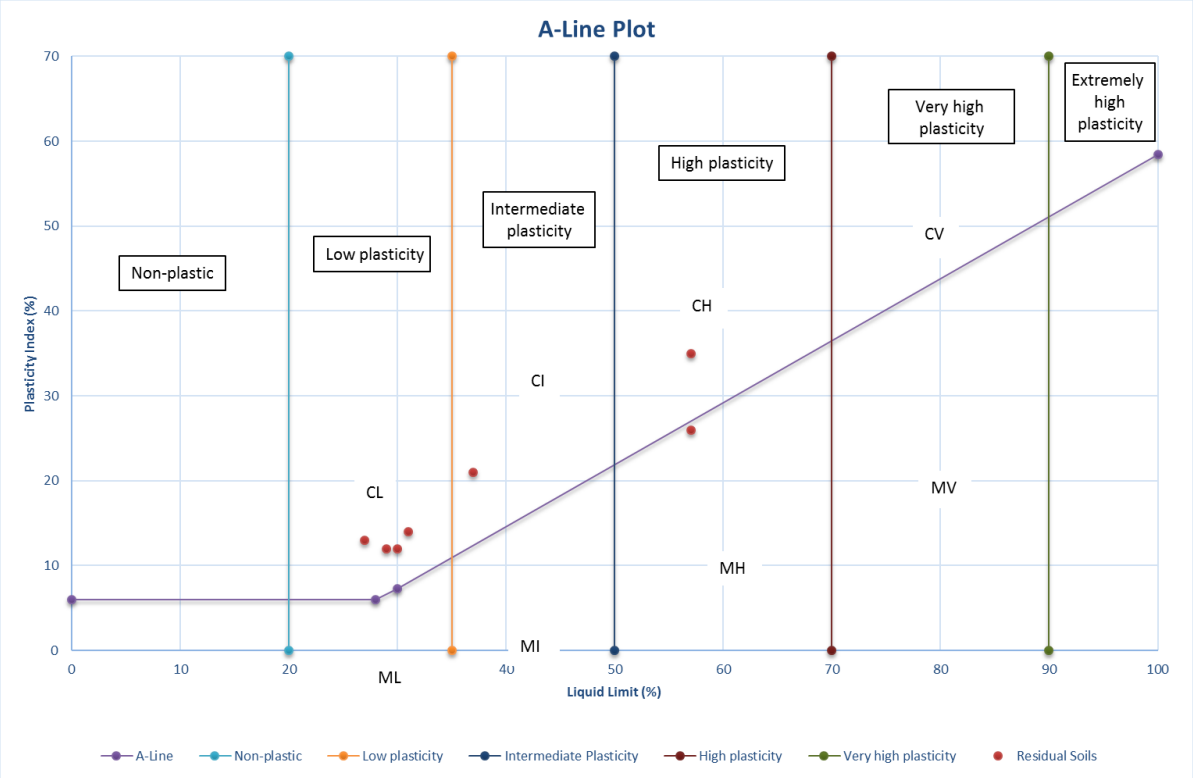

Figure 9: A-Line plot residual soils

One consolidation test was carried out on a sample from the residual soils, with the results summarised in Table 15 below.

Sample ID	Pressure Range (kPa)	Mv (m²/MN)	Cv (m²/year)
CP05 – 6.5m	0 - 25	0.96	1.2
	25 – 50	0.25	1.4
	50 – 100	0.22	2.4
	100 – 200	0.15	2.5
	200 – 400	0.094	4.0

Table 15: Residual soils consolidation results

6.3.1 Classification Properties

The below table recommends the characteristic geotechnical properties for the residual deposits encountered across the site.

Characteristic Property	Symbol	Units	Characteristic Values		Source
Unit Weight	γ	kN/m³	18		4
Effective Angle of Shearing Resistance	Ø'	Degrees	29		3
Undrained shear strength	Cu	kPa	81		2
Modulus of Elasticity	*E*	*MPa*	6.6		5
Coefficient of Compressibility	M_v	M^2/MN	50-100kPa	0.22	1
			100-200kPa	0.15	

1 Lab testing

2 Lower quartile of hand vane readings & SPT correlation.
3 Peck, Hanson and Thornburn, Foundation Engineering, 2nd ed., 1974, John Wiley and Sons.
4 BS 8004:2015 for low plasticity clay.
5 E=1/mv

6.4 Mercia Mudstone Group

SPT testing was only undertaken within the Mercia Mudstone Group where poor core recovery was encountered, and in all instances the SPT tests refused. The SPT N values are plotted below, and show results ranging from 38 to an extrapolated N_{60} value of 375. The results indicate a strong profile of increasing strength with depth for the competent Mercia Mudstone.

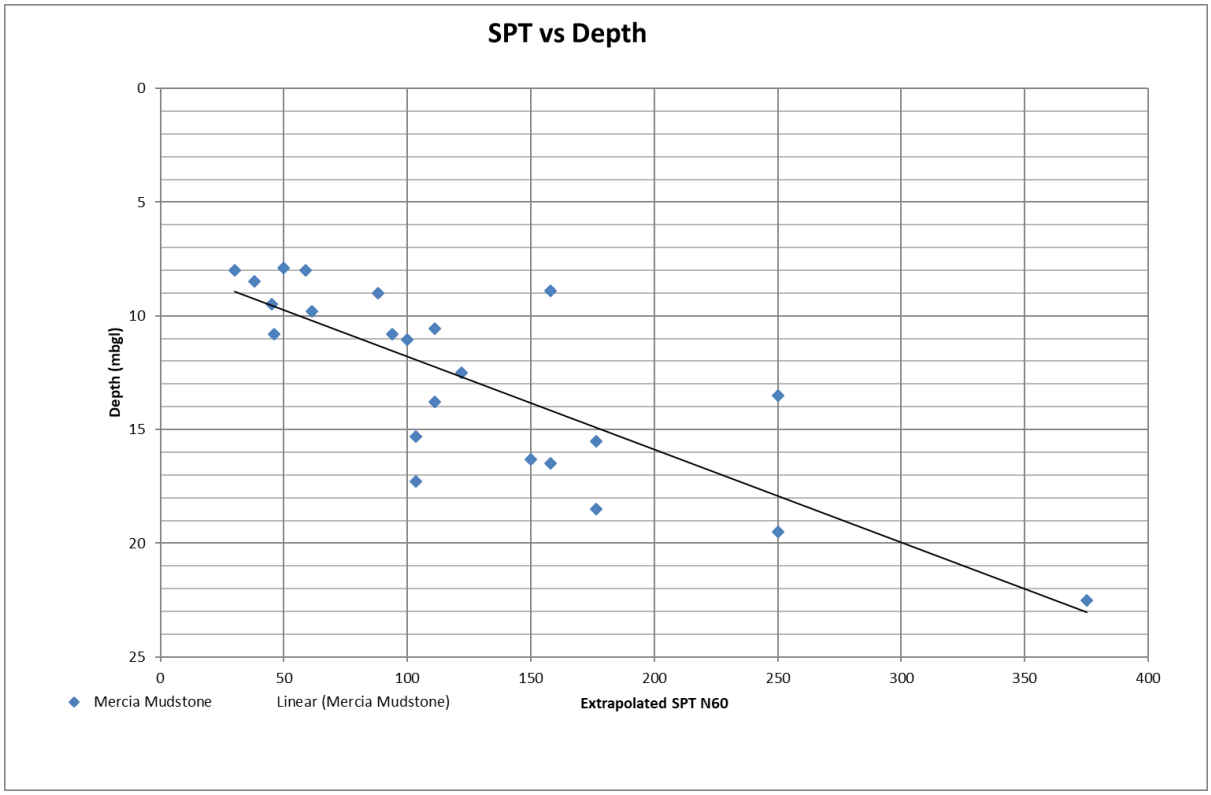

Figure 10: Mercia Mudstone SPT vs Depth

Eight Unconfined Compressive Strength (UCS) tests, and 16 pairs of axial and diametral point load tests were undertaken on samples of the Mercia Mudstone Group. Point load tests return an $I_{s(50)}$ value which is typically related to UCS in the following formula from Read et al (1980):

$$UCS = 16 \times I_{s(50)}.$$

The returned $I_{s(50)}$ values and calculated UCS values are shown in Table x below, with the results plotted in figures 11 and 12 alongside the UCS test results.

Sample ID	$I_{s(50)}$ (MPa)	UCS (MPa)
CP01 - 12.7	0.01	0.16
CP01 - 13.5	0.011	0.176
CP01 - 13.0	0.01	0.16
CP01 - 14.2	0.07	1.12
CP01 - 15.9	0.06	0.96

Sample ID	$I_{s(50)}$ (MPa)	UCS (MPa)
CP01 - 17.5	0.06	0.96
CP01 - 19.5	0.01	0.16
CP03 - 11.8	0.02	0.32
CP03 - 18.8	0	-
CP03 - 21.45	0.02	0.32
CP05 - 14.2	0.03	0.48
CP05 - 17.3	0.03	0.48
CP05 - 20.05	0.04	0.64
CP05 - 20.55	0.05	0.8
CP05 - 21.7	0.06	0.96
CP01 - 12.7	0.01	0.16
CP01 - 13.5	0	-
CP01 - 13.0	0.01	0.16
CP01 - 14.2	0.02	0.32
CP01 - 15.9	0.04	0.64
CP01 - 17.5	0.06	0.96
CP01 - 19.5	0.01	0.16
CP03 - 11.8	0.01	0.16
CP03 - 18.8	0	-
CP03 - 21.45	0.03	0.48
CP05 - 14.2	0.03	0.48
CP05 - 17.3	0.02	0.32
CP05 - 20.05	0.02	0.32
CP05 - 20.55	0.02	0.32
CP05 - 21.7	0.05	0.8

Table 16: Point load results

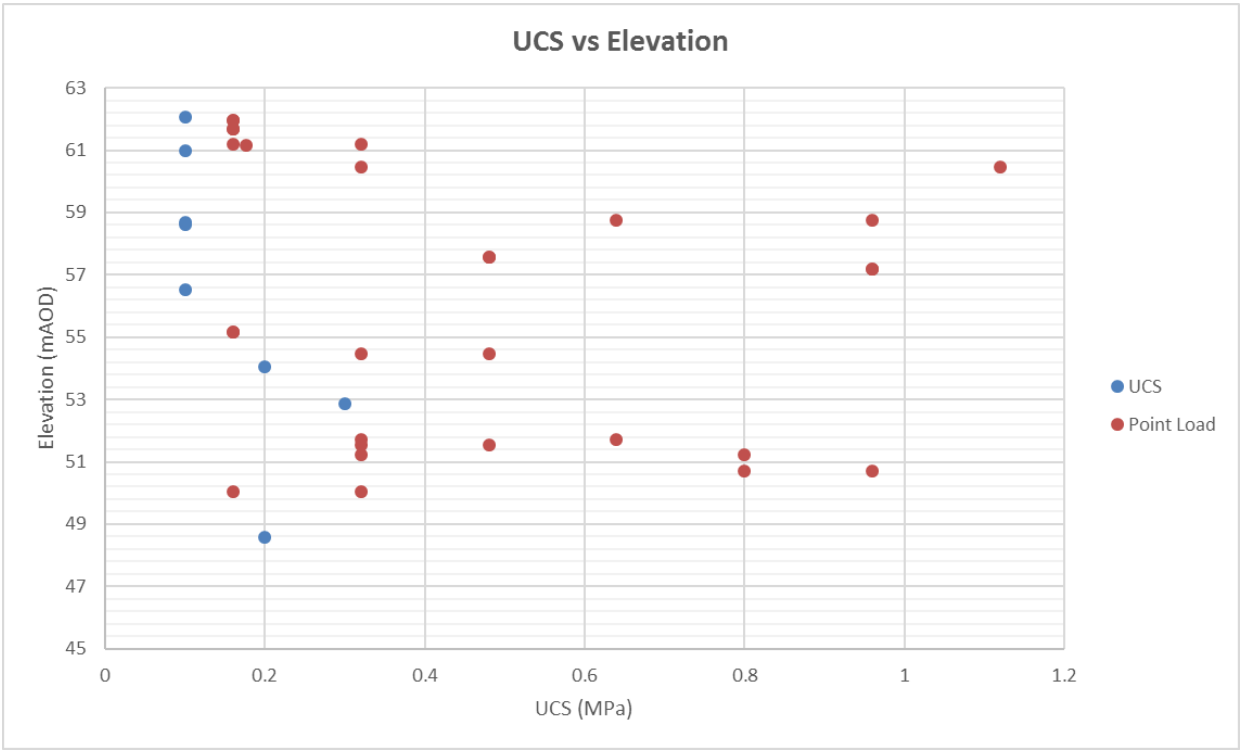

Figure 11: UCS vs Elevation Plot

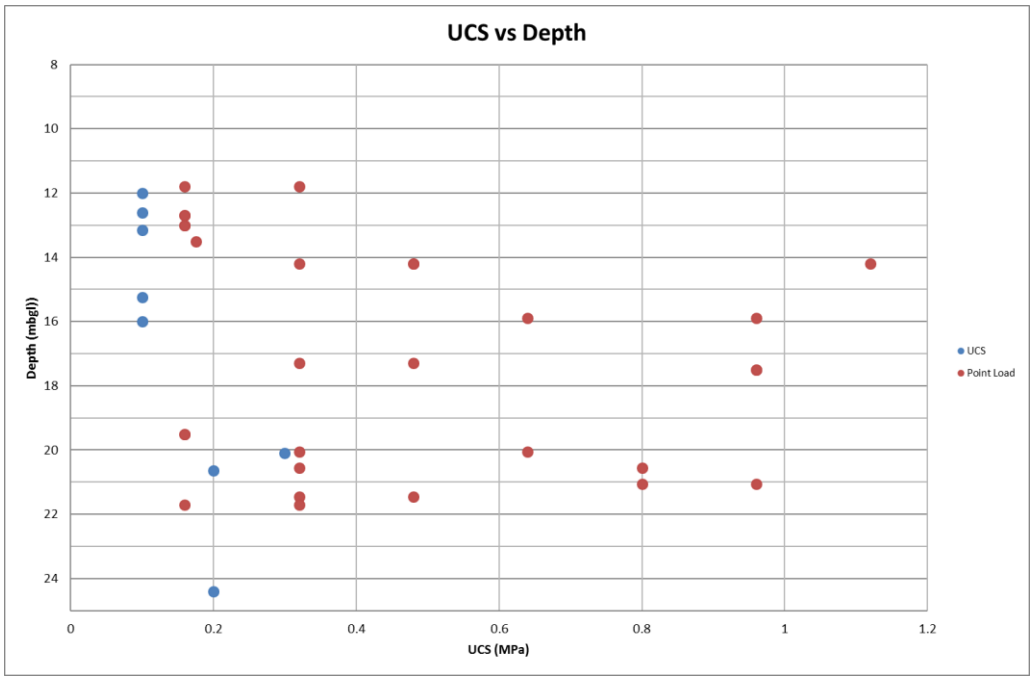

Figure 12: UCS vs Depth Plot

The results indicate the rock is very weak and does not show a strong trend of increasing strength with depth, or with changes in elevation.

7 Generic Quantitative Risk Assessment (Contamination)

7.1 General

The following comprises a Generic Quantitative Risk Assessment (GQRA) of contamination risk, in accordance with the methodology set out in **Appendix E**.

The following updated conceptual model information has been taken from the information obtained in **Section 4.0 - 5.0** and from the site walkover**.** Contamination testing carried out during the ground investigation has been used to supplement the preliminary conceptual model presented in **Section 4.0.**

7.2 Risks to Human Health

7.2.1 Soils

A summary of the chemical test results and a comparison against the relevant assessment criteria used in this case, are given in the tables below.

The generic assessment criteria used in this case are generally the LQM/CIEH Suitable 4 Use Levels (S4ULs), based on minimal or tolerable risk and are intended to be protective of human health. Different criteria are provided for a variety of land use, and the criteria for "Residential with plant uptake" has been adopted here.

The exception to this is use of the C4SL levels for Lead, as S4UL are not provided for this substance.

Both the C4SL and S4UL are based on current best practice and reflect the most up to date guidance and legislation.

In accordance with best practice, individual exceedances of the relevant assessment criteria have been identified and comment provided where necessary.

The table below summarises the chemical results for metals and semi-metals on site from both phases of investigation:

Table 17: Summary of Soil Contamination – Metals and Semi Metals

Contaminant	C4SL/ S4UL mg/kg	Source	Measured concentrations mg/kg		95% UCL***	Number of individual exceedances
			Minimum	Maximum		
Arsenic (mg/kg)	37	S4UL	4.6	72	27	2/15
Cadmium (mg/kg)	11	S4UL	<0.1	0.51	-	0/15
Chromium (mg/kg)	910	S4UL	10	37	-	0/15
Lead (mg/kg)	86	C4SL	10	110	59	3/15
Mercury (mg/kg)	40	S4UL	<0.05	0.09	-	0/15
Copper (mg/kg)	2400	S4UL	5.1	39	-	0/15
Nickel (mg/kg)	130	S4UL	8.8	31	-	0/15
Zinc (mg/kg)	3700	S4UL	13	69	-	0/15
Total PAH (mg/kg)	-	-	<2.0	56	-	-
Total Cyanide (mg/kg)	480	CLEA	<0.5	<0.5	-	0/15
Phenol (mg/kg)	3200	CLEA	<0.3	<0.3	-	0/15
Organic Matter (%)	-	-	<0.4	25	-	-
pH	-	-	6.7	8.3	-	-

- CLEA – Soil guideline values for commercial/industrial development
- CIEH – Chartered Institute of Environmental Health & Land Quality Management, Generic Assessment Criteria (based upon worse-case 1% SOM content) for commercial development
- GAC – generic assessment criteria
- *** 95% Upper Confidence Limit (UCL) statistical analysis not undertaken where there are no contaminant exceedances and/or insufficient number of samples
- A total of 15 representative soil samples were tested for these substances

Localised exceedances of lead and arsenic were recorded in two and three of the 15 samples tested respectively.

UCL 95 values have been calculated for each of these determinants, which combined with the low proportion of exceedances recorded, do not indicate a site wide contamination issue.

Table 18 below summarises the results for speciated PAHs on site.

Table 18: Summary of Soil Contamination – PAHs

Contaminant	SGV/ GAC (mg/kg)	Source	Measured concentrations (mg/kg)		95% UCL***	Number of individual exceedances
			Minimum	Maximum		
Acenaphthene	85000	CIEH	<0.01	0.82	-	0/15
Acenaphthylene	8210	CIEH	<0.01	0.41	-	0/15
Anthracene	2300	CIEH	<0.01	1.5	-	0/15
Benz[a]anthracene	3.1	CIEH	<0.01	4.0	-	1/15
Benzo[a]pyrene	0.83	CIEH	<0.01	3.9	-	1/15
Benzo[b]fluoranthene	5.6	CIEH	<0.01	2.4	-	0/15
Benzo[ghi]perylene	44	CIEH	<0.01	2.8	-	0/15
Benzo[k]fluoranthene	8.5	CIEH	<0.01	2.4	-	0/15
Chrysene	6	CIEH	<0.01	4.2	-	0/15
Dibenz[ah]anthracene	0.76	CIEH	<0.01	1.2	-	0/15
Fluoranthene	260	CIEH	<0.01	10	-	0/15
Fluorene	160	CIEH	<0.01	0.74	-	0/15
Indeno[123-cd]pyrene	3.2	CIEH	<0.01	2.8	-	0/15
Naphthalene	1.5	CIEH	<0.01	0.31	-	0/15
Phenathrene	92	CIEH	<0.01	7.5	-	0/15
Pyrene	54000	CIEH	<0.01	9.6	-	0/15

- CIEH – Chartered Institute of Environmental Health Land Quality Management Generic
- Assessment Criteria (based upon worse-case 1% SOM content)
- *** 95% Upper Confidence Limit (UCL) statistical analysis not undertaken where there are no contaminant exceedances and/or insufficient number of samples

A single exceedance each of Benz[a]anthracene and Benzo[a]pyrene was recorded. Given that 14 of 15 samples recorded values below GAC, these exceedances do not indicate a contamination risk for PAHs on site.

Total TPH and EPH testing was undertaken on all 15 samples, with no detections recorded.

7.2.2 Ground Gas

Four return ground gas monitoring visits were undertaken, with the results indicated in Table 19 below.

Date	Hole Position	Atmos. Press. (mb)	Max Gas Flow (l/hr)	Water Depth (mbgl)	Max Carbon Dioxide (%/vol)	Max Methane (%/vol)	Max Oxygen (%/vol)
19/03/2019	CP01 50mm	1019	21.3	1.0	1.2	0.5	18.5
	CP01 19mm	1019	0.1	3.89	0.7	0.5	19.5
	CP02 50mm	1019	0.1	2.53	1.5	0.4	16.2
	CP02 19mm	1019	<0.1	2.53	0.1	0.4	20
	CP03 50mm	1019	<0.1	3.54	0.7	0.4	19.3
	CP03 19mm	1019	<0.1	4.05	0.2	0.4	19.9
	CP04	1019	<0.1	2.87	0.3	0.4	20.1
	CP05	1019	<0.1	3.14	1.1	0.4	19.3
29/03/2019	CP01 50mm	1020	4.5	0.75	1.0	<0.1	19.2
	CP01 19mm	1020	2.9	5.38	0.4	<0.1	20.3

	CP02 50mm	1020	0.5	2.22	2.1	<0.1	9.8
	CP02 19mm	1020	<0.1	2.2	0.1	<0.1	20.9
	CP03 50mm	1020	<0.1	3.62	0.7	<0.1	19.9
	CP03 19mm	1020	<0.1	3.54	0.1	<0.1	20.5
	CP04	1020	<0.1	2.6	0.5	<0.1	18.6
	CP05	1020	<0.1	3.45	0.6	<0.1	19.6
05/04/2019	CP01 50mm	994	0.3	0.91	0.9	<0.1	20.5
	CP01 19mm	994	0.7	5.28	0.6	<0.1	20.6
	CP02 50mm	994	<0.1	2.47	2.2	<0.1	10.3
	CP02 19mm	994	*	2.49	*	*	*
	CP03 50mm	994	<0.1	4.0	0.8	<0.1	19.9
	CP03 19mm	994	-4.1	4.04	0.8	<0.1	20
	CP04	994	<0.1	2.85	0.6	<0.1	17.7
	CP05	994	<0.1	3.94	0.6	<0.1	20.2
05124/2019	CP01 50mm	1021	-0.1	0.94	1.1	<0.1	20.7
	CP01 19mm	1021	<0.1	4.97	0.7	<0.1	20.9
	CP02 50mm	1021	0.2	2.73	2.6	<0.1	8.2
	CP02 19mm	1021	*	2.72	*	*	*
	CP03 50mm	1021	<0.1	4.5	1.0	<0.1	19.5
	CP03 19mm	1021	0.1	4.47	0.5	<0.1	19.8
	CP04	1021	<0.1	3.05	0.6	<0.1	17.7
	CP05	1021	<0.1	4.32	1.7	<0.1	17.7

**Bung damaged during visit 3*

Table 19: Ground gas monitoring results

A maximum recorded flow rate of 21.3l/hr was identified in CP01 during the first monitoring visit. However, this result appears to represent a significant outlier when compared to the rest of the data. CP01 also sits outside of the building footprint, and as such this value has been ignored when calculating the maximum gas screening value (GSV) in accordance with CIRIA C665 *Assessing risks posed by hazardous ground gases to building.*

A maximum carbon dioxide concentration of 2.6% was recorded, with a maximum flow rate of 4.5l/hr (ignoring the outlying result). Based on these values, a maximum GSV of 0.117l/hr which indicates a characteristic situation 2 or **low risk.**

Based on this classification, CIRIA guidelines recommend utilising one to two of the following protective measures for a commercial structure:

- Reinforced concrete cast in-situ floor slab with minimum 1200 G DPM;
- Beam and block or pre-cast concrete floor slab, and minimum 2000g DPM/reinforced gas membrane;
- Underfloor venting in combination with one of the above;
- All joints and penetrations sealed.

7.2.3 Radon

Based on the Groundsure information contained within the Hydrock desk study, the site is indicated to be in an area where between 1% and 3% of properties are above the Action Level. Therefore, no radon protection measures are required for the site.

7.2.4 Asbestos

Asbestos testing was carried out on 15 samples from the shallow site soils, with no asbestos detected in any of the samples.

7.3 Risk to Controlled Waters

Groundwater was typically encountered within the glaciofluvial gravels, and the Mercia Mudstone Group.

No site wide contamination risks were identified in the soil samples tested and as such, the risk to controlled waters is considered to be low.

7.4 Risks to Flora and Fauna

No significant risk to flora or fauna, in terms of contamination, have been identified at the site.

Appropriate measures will need to be adopted to ensure any proposed soft landscaping areas are suitable for plant growth, including provision of a suitable topsoil layer, suitable importation and testing of topsoil (if required), and testing and validating of any site soils to be re-used to ensure they are fit for plant growth

7.5 Risk to Building Materials

The principal risk to building materials include the potential for corrosive conditions within the site soils, which could impact concrete and below ground structures.

BRE-SD1 was not carried out on six soils samples, and indicate a design sulphate class of DS-1 and an ACEC class of AS-1.

7.6 Risks to Adjacent Land and Third Parties

No significant risk to neighbouring occupiers has been identified.

7.7 Potential Geo-Environmental Liabilities

Potential geo-environmental liabilities under Part 2A of the Environmental Protection Act 1990 (as amended) and the Groundwater Regulations (GWR) 2009, relating to the site in its current condition is not considered likely based on the tests data available.

7.8 Off Site Disposal

It is not thought that significant quantities of material will need to be deposited off-site.

Five samples from the topsoil and earth bunds were tested and have been assessed in accordance with WM3. All samples are classified as ‘Non-hazardous’ should any of this type of material require disposal from site.

A copy of the Hazwaste classification reports are included in Appendix D.

Five samples from the top soil and earth bunds were submitted for a Waste Acceptance Criteria (WAC) suite of testing, as identified in Section 4.4. The results indicate all samples would be classified as inert waste, should off site disposal be required.

7.9 Updated Conceptual Site Model

Table 20 below shows the updated conceptual site model, which has been formulated based on the information obtained in the ground investigation and historic data.

Table 20 Updated Conceptual Site Model

Sources	Receptor	Pathway	Consequence	Probability	Risk	Recommended Action (to clarify level of risk and assess suitable mitigation measures or to mitigate the risk)
Made ground potential source of metals.	Human Health – Site ground workers	Human uptake pathways	Mild	Low	Low risk	Contamination testing indicates some minor lead and arsenic exceedances but UC95 values are below GCA.
	Human Health - Residents	Human uptake pathways	Mild	Low	Low risk	No asbestos identified in samples tested.
	Groundwater/Surface water	Surface runoff, lateral migration, infiltration	Mild	Low	Low risk	Use of suitable PPE and good hygiene practice on the site to mitigate risk
Organics/PAH/Hydrocarbons from made ground	Human Health – Site ground workers	Human uptake pathways	Mild	Low	Low risk	Contamination testing indicates two minor PAH exceedances but no site wide contamination identified
	Human Health - Residents	Human uptake pathways	Mild	Low	Low risk	Use of suitable PPE and good hygiene practice on the site to mitigate risk
	Groundwater/Surface water	Surface runoff, lateral migration, infiltration	Mild	Low	Low risk	Risk to controlled waters thought to be minimal given lack of soils contamination and lack of groundwater encountered on site.
Asbestos	Human Health	Inhalation	Medium	Unlikely	Low risk	No asbestos detected in any samples tested.
Sulphates	Buildings	Direct Contact	Medium	Low	Medium/Low risk	Testing indicates DS-1 AC-1
Ground gases associated with historic mining .	Future Site Users;	Human uptake pathways	Medium	Low risk	Medium/Low risk	Ground gas monitoring indicates CS-1

7.10 Contamination Risk Summary and Mitigation

Contamination testing of the made ground during this phase of the ground investigation did not indicate any elevated contamination that could pose a risk to human health, which concurs with the general findings of the Hydrock report for the wider area.

The contamination risk of the site is generally considered to be low.

A watching brief should be maintained during site strip and subsequent earthworks in order to identify any unforeseen contamination.

To protect against risks of short term contact with site soils, site construction workers will need to ensure an appropriate level of PPE is provided. Good hygiene and site management practices will be required (i.e. provision of hand washing and welfare facilities, tool box talks etc).

A suitable strategy for dealing with unexpected contamination will be employed, along with watch brief by a contamination specialist as outlined above.

8 GEOTECHNICAL ASSESSMENT

8.1 Introduction

It is understood that the site proposals are for a single storey steel frame water bottling plant.

8.2 Excavations

Any excavations should be readily achievable using standard mechanical plant with toothed buckets. As the site is typically quite level, significant earthworks are not anticipated. The primary excavations on site will be foundation and service pits. All excavations should have the appropriate health and safety procedures (shoring or battering to a stable angle) implemented if any personnel are required to enter the excavations.

Glaciofluvial deposits often have boulders present which could impact upon excavations. Allowances should be made for encounteringthese obstructions during exvacations.

Temporary excavations are likely to be primarily within the glaciofluvial deposits which comprises variable clay and gravel layers. These are likely to be stable in the short term, if the sides are battered back at an angle of 1:3 (19°) although this is likely to be reduced if water bearing pockets are encountered, which are likely to be numerous given the granular nature of much of this stratum. Any excavations primarily within the clay strata should be temporary stable with side batters at an angle of 1:2 (26°).

If there is insufficient space available on site to batter back excavations, then a suitable shoring system should be designed and implemented to support the sides of any excavations.

Groundwater was primarily encountered within the glaciofluvial gravel, and the residual clay of the Mercia Mudstone Group. Excavations may encounter shallow perched groundwater within the glaciofluvial deposits, which may impact upon their stability. There is potential for groundwater inflow from the glaciofluvial deposits to be rapid and localised, and as such it is advised that a specialist in groundwater management is consulted regarding this stage of the works.

8.3 Foundation Options

Structural loads have not yet been provided by the client, but any shallow foundations should extend through the made ground and be founded within the stiff clay or granular glaciofluvial deposits. Based on an undrained shear strength of 112kPa, an allowable bearing capacity in the order of 150kPa is likely to be achievable in this stratum for a pad foundation. Settlement in this strata is likely to be less than 25mm.

Moderate structural loads could be addressed by use of ground improvement to facilitate shallow pad foundations, likely in the form of vibro stone or concrete columns. The advice of a specialist ground improvement contractor should be sought, should this be deemed the most viable solution.

Should proposed loads be high and shallow foundations not be deemed viable, then a piled solution socketed into the underlying mudstone will be required. The length of pile will be determined by the depth to competent Mercia Mudstone strata.

Following provision of detailed structural loads by the client, a Foundation Options Report will follow this GCA with detailed assessment of potential foundation options.

8.4 Floor Slabs

Given the thickness of made ground identified across the site, a suspended floor slab may be required, as NHBC guidelines state that suspended floor slabs should be used in areas where made ground is greater in thickness than 0.6m.

However, as the made ground primarily comprises reworked natural material, there is the potential to undertake ground improvement that could facilitate the use of a ground bearing floor slab and mitigate the potential for differential settlement beneath any pad foundations. This could be achieved through vibro stone or vibro concrete columns.

Structural and floor loads have not yet been provided by the client.

8.5 Protection of Buried Concrete

Five BRE-SD1 testing suites were undertaken on samples from all strata encountered on site.

The results all indicate a design sulphate class of DS-1 and an ACEC class of AC-1.

The Mercia Mudstone Group is known to often present with high sulphates. However, based on the potential oxidisalble sulphate calculated from the worst case results, pyritic ground is not thought to be present.

8.6 Earthworks

The proposed finish levels are not known for the site, however as the site is typically flat a significant earthworks operation is not anticipated.

There are two primary sources of material which may require reuse on site; The glaciofluvial deposits, and the earth bunds on site which comprise reworked natural material.

The glaciofluvial deposits are highly variable, but typically consist of sandy gravelly CLAY or sandy GRAVEL. Based on the PSD results, the granular deposits are likely to be classified as a Class 1A, 1B or 1C under the Specification for Highways Works Series 600: Earthworks. All of these classes are suitable for use as general fill. The cohesive soils are likely to be classified as a class 2C 'Stony Cohesive material', used as a general fill.

The made ground primarily comprises reworked granular deposits, and as such will likely be classified as Class 1A to 1C.

The residual soils are shown to have an average natural moisture content of 23%. The compaction results for the residual soils and reworked material indicate a high range of optimum moisture contents from 8.2%, up to 29.2%. The average optimum moisture contents for the reworked soils and residual soils are 12.4% and 18.4% respectively, indicating the site soils are currently wet of optimum.

8.7 Soakaway Design

Three soakaway tests were undertaken on site, in the trial pits identified in Table x below.

Trial Pit	Depth (mBGL)	Strata	Result
TP04	4.4	Glaciofluvial deposits	TNC
TP06	2.7	Glaciofluvial deposits	TNC
TP16	0.88	Glaciofluvial deposits	TNC

Note: TNC – Test not completed

Table 21: Soakaway testing summary

Infiltration rates in each trial pit were sufficiently low as to not permit completion of a single test. As such, soakaways drainage will not be viable on site.

8.8 Pavement Design

Four plate load tests were carried out across the site to depths of up to 0.55mbgl. The results indicate a minimum CBR value of 1.1%, with an average CBR value of 2.48%. Based on the results, it is recommended that a CBR value of 2% is adopted for pavement design.

9 GEOTECHNICAL RISK REGISTER

A Geotechnical Risk Register is a method of identifying hazards which may arise during the construction phase of works based on the data currently obtained for the site. The register is a work in progress and as further information arises, it should be updated in order to quantify the risk. At this stage, the aspects covered by the register are attributed to Cost and Health and Safety, although as site works commence, programme may become a prominent factor.

The register is based on a matrix similar to the conceptual site model (CSM) for contamination in the sections above. The main constituents of the register are the Identified Hazard, Preconditioning and Consequence. They will govern the likelihood of the event occurring and impact resulting for event occurrence which are rated 1-5 with 1 being Very low and 5 being Very High. These will be multiplied together in order to inform a risk rating for each of the identified hazards.

Risk Rating (R) = Probability (P) x Impact (I)

Table 22: Risk Rating

Risk Rating	P x I
Severe	20-25
High	15-16
Moderate	9-12
Low	6-9
Negligible	1-4

		I	I	I	I	I
		5	4	3	2	1
P	5	25	20	15	10	5
P	4	20	16	12	8	4
P	3	15	12	9	6	3
P	2	10	8	6	4	2
P	1	5	4	3	2	1

Figure 13: Risk matrix

Table 23: Geotechnical Risk Register

Category	Hazard	Trigger	Consequence	Risk Rating			Remedial Action	Risk Rating		
				P	I	R		P	I	R
Excavations & Earthworks	Collapse/Instability	1. Excessive Groundwater/ Rainfall 2. Soft Ground Conditions 3. Cuttings too steep/insufficient support	1. Damage to Plant and Equipment 2. Death or Serious Injury	2	5	10	Review ground investigation report for specific locality excavated. Provide briefing and method of safe working practice Ensure pumping and slope support equipment are readily available Temporary 1:2 batter slopes in clay, 1:3 in granular deposits Appropriate designed retention systems.	1	5	5
	Surface Water flooding of excavations	1. Excessive Rainfall event 2. Prolonged periods of steady rainfall	1. Collapse/ instability of excavations 2. Delays to Programme 3. Unsuitable Materials	3	5	15	Forecast to be checked a week in advance and changes to works made to suit. Seasonal working Provision of pumping equipment	3	3	9
	Quality and compaction of imported fill soils	1. Cost implications mean that poor quality fill is imported	1. Settlement within any fill 2. Longer programme to ensure fill meets requirements (testing and verification) 3. Maintenance of structures constructed on poor fill	3	4	12	Significant quantities of fill not anticipated. Fill to be sourced from verified donor site and vendors if required	2	3	6
	Obstructions in ground	1. Difficulties in excavating ground 2. Historical obstructions and may be present. 3. Boulders within glaciofluvial deposits	1. Time delays increase cost.	5	3	15	Potential for oulders in glaciofluvial deposits. Allowance should be made for encountering obstructions in construction tender.	1	3	3
Contamination	Surface Soils	1. Elevated Contamination in site soils	1. Human Health Issues 2. Increased Disposal Costs	5	3	15	No site wide contamination identified in soils testing. Watching brief during siteworks to for any visible contamination. PPE for workers.	1	3	3

Category	Hazard	Trigger	Consequence	Risk Rating			Remedial Action	Risk Rating		
				P	I	R		P	I	R
	Aggressive Chemicals (Sulphates)	1. Sulphate Levels	1. Degradation of concrete used in the ground 2. Failure of foundations to meet required standards	3	4	12	Use identified classes for all concrete used in ground Check ground investigation report	1	5	5
	Ground Gases	1. Build-up of ground gasses in excavations from made ground.	1. Risk of explosion	3	5	15	Site classified as CS-2, low risk. Check ground gas section of geotechnical report and apply appropriate measures.	1	5	5
Foundations	Ultimate limit state failure (Bearing Capacity)	1. Unknown loadings 2. Degradation of concrete 3. Insufficient depth of foundations	1. Building collapse/ need to rebuild	2	5	10	Appropriate geotechnical design	1	5	5
	Serviceability limit state failure (settlement)	1. Soft made ground 2. Variable thickness and strength of glaciofluvial deposits	1. Cracking/deformation of slab	4	5	20	Foundations should extend through soft made ground. Excavation and replacement of soft made ground may be required to facilitate ground bearing slab	2	5	10
	Obstructions within glaciofluvial deposits	1. Boulders in glacial deposits	1 Slow excavation. 2 Increased costs for disposal and earthworks	5	3	15	Provisions should be made beforehand on how to deal with obstructions in ground. Inspect exploratory hole logs.	5	1	5

10 References

BS EN 14688 – 2 (2004) + A1 (2013) Geotechnical investigation and testing. Identification and classification of soil. Principals for a classification.

BS EN 14689 – 1 (2003) Geotechnical investigation and testing. Identification and classification of rock. Identification and description.

BS EN 14688 – 1 (2002)+ A1 (2013) Geotechnical investigation and testing. Identification and classification of soil. Identification and description.

BS EN. (2007). *1997-1 Eurocode 7 Geotechnical design – Part 1 General rules.* BSI Standards Limited.

BS EN. (2007). *1997-2 Eurocode 7 - Geotechnical Deisgn - Part 2: Ground Investigation and testing.* BSI Standard Ltd.

BSI. (2015). *BS5930 Code of Practice for Ground Investigations.*

BSI. (2015). *BS8004 Code of Practice for Foundations.*

Carter, M, and Bentley, S, P. (1991). *Correlations of soil properties.* Michigan: Pentech.

NA to BS EN. (n.d.). *1997-1:2004 UK National Annex to Eurocode 7: Geotechnical design - Part 1: General Rules.* BSI Standards Limited.

NA to BS EN. (n.d.). *1997-2:2004 UK National Annex to Eurocode 7: Geotechnical design - Part 2: Ground investigation and testing.* BSI Standards Limited.

Stroud, M. A. (1975). *The standard penetration test and the engineering properties of glacial materials.* Birgminham: Proceedings of the symposium of glacial materials.

APPENDIX A: SITE LOCATION PLAN

Appendix A: Site Location Plan

18298: Dove Valley Park

APPENDIX B: PROPOSED SITE DEVELOPMENT PLAN

0mm 50mm

PLOT P2-01

Plot 12.23ha
GIA 62,209spm
(669,612sq ft)

PLOT P2-02

Plot 4.34ha
GIA 17,753spm
(191,091sq ft)

Parking
Cars 179
(1 space per
100sqm)

Parking
Cars 274
(1 space per 63sqm)

PLOT P2-03

Plot 6.19ha
GIA 17,180spm
(184,923sq ft)

5000m³
Attenuation Pond

Plot 1.51ha

PLOT P2-04

Plot 2.26ha

Parking
Trucks: 82

NORTH

STATUS	REV	DATE	DESCRIPTION
S2	A	21/06/18	Plot P2-01 Updated

CLIENT
DOVE VALLEY PARK LTD.

REVISED BY
PT

CHECKED BY
DAS

ORIGINATOR NO
151947

CONSULTANT
STRIDE TREGLOWN

PROJECT
Dove Valley Park
Park Avenue, Foston, Derby, DE65 5BZ

DRAWING TITLE
Illustraive Masterplan

SUITABILITY STATUS
S2 : SUITABLE FOR INFORMATION

SCALE
1 : 2500 @ A3

PROJECT | ORIGINATOR | ZONE | LEVEL | TYPE | ROLE | CLASSIFICATION | NUMBER
151947-STL-00-ZZ-DR-A-XXXX-S8001

REVISION
A

APPENDIX C: EXPLORATORY HOLE LOCATION PLAN

Legend

- Site Boundary
- Proposed Trial Pits
- Proposed Boreholes

Notes:
Building footprint estimated from Dove Valley Park masterplan provided by client.

Hole ID	Easting	Northing
CP01	420057.57	332686.15
CP02	420246.8	332623.96
CP03	420152.18	332563.89
CP04	420028.33	332546.35
CP05	420178.23	332477.78
TP01	420121.88	332744.62
TP02	420116.57	332702.63
TP03	420226.6	332682.96
TP04	420318.56	332653.72
TP05	420021.42	332687.74
TP06	420122.42	332633.52
TP07	420051.19	332604.29
TP08	420124.54	332549.54
TP09	420232.45	332544.75
TP10	420076.7	332506.48
TP11	420149.53	332510.73
TP12	420246.27	332487.34
TP13	419994.31	332468.74
TP14	420068.2	332458.11
TP15	420152.72	332432.06
TP16	420248.93	332402.83

By:	JT	Date:	22/02/2019
Check:	JT	Date:	22/02/2019

Project
Dove Valley Park

Title
Ground Investigation Plan

Client
PGFI III

Scale at A3: 1:2500

Job No.	Drawing No.	Rev.
18298	GIS01	C

APPENDIX D: HAZWASTE CLASSIFICATION REPORT

Waste Classification Report

Q2E7K-27GLH-L7XVB

Job name

Dove Valley

Description/Comments

Project

Site

Related Documents

#	Name	Description
None		

Waste Stream Template

Waste Stream Template for Contaminated Soils

Classified by

Name:
Ian Squibbs
Date:
28 May 2019 09:52 GMT
Telephone:
07919 522 985

Company:
Jubb Consulting Engineers Ltd
Suite B, Ground Floor West
St James Court, St James Parade
Bristol
BS1 3LH

Report

Created by: Ian Squibbs
Created date: 28 May 2019 09:52 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP01	0.40	Non Hazardous		3
2	TP02	0.15	Non Hazardous		5
3	TP03	0.20	Non Hazardous		7
4	TP04	0.70	Non Hazardous		9
5	TP05	1.10	Non Hazardous		11
6	TP07	0.20	Non Hazardous		13
7	TP08	0.35	Non Hazardous		15
8	TP08[2]	0.50	Non Hazardous		17
9	TP09	0.70	Non Hazardous		19
10	TP11	1.00	Non Hazardous		21
11	TP12	2.00	Non Hazardous		23

Classification of sample: TP01

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP01
Sample Depth:
0.40 m
Moisture content:
15%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% No 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		72 mg/kg	1.32	95.063 mg/kg	0.00951 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.11 mg/kg	1.285	0.141 mg/kg	0.000011 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		37 mg/kg	1.462	54.078 mg/kg	0.00541 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		22 mg/kg	3.929	86.439 mg/kg	0.00864 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	34 mg/kg	1.56	53.034 mg/kg	0.0034 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		17 mg/kg	2.976	50.597 mg/kg	0.00506 %		
8	zinc { zinc chromate }	024-007-00-3				41 mg/kg	2.774	113.74 mg/kg	0.0114 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
14	anthracene		204-371-1	120-12-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
15	fluoranthene		205-912-4	206-44-0		0.5 mg/kg		0.5 mg/kg	0.00005 %		

#		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		pyrene				0.52	mg/kg		0.52	mg/kg	0.000052 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0446 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP02

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP02
Sample Depth:
0.15 m
Moisture content:
15%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% No 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		5.3 mg/kg	1.32	6.998 mg/kg	0.0007 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.26 mg/kg	1.285	0.334 mg/kg	0.000026 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		**<LOD**
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		14 mg/kg	3.929	55.007 mg/kg	0.0055 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	29 mg/kg	1.56	45.235 mg/kg	0.0029 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14 mg/kg	2.976	41.668 mg/kg	0.00417 %		
8	zinc { zinc chromate }	024-007-00-3				48 mg/kg	2.774	133.159 mg/kg	0.0133 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		0.01 mg/kg		0.01 mg/kg	0.000001 %		
10	acenaphthylene		205-917-1	208-96-8		0.03 mg/kg		0.03 mg/kg	0.000003 %		
11	acenaphthene		201-469-6	83-32-9		0.02 mg/kg		0.02 mg/kg	0.000002 %		
12	fluorene		201-695-5	86-73-7		0.01 mg/kg		0.01 mg/kg	0.000001 %		
13	phenanthrene		201-581-5	85-01-8		0.36 mg/kg		0.36 mg/kg	0.000036 %		
14	anthracene		204-371-1	120-12-7		0.08 mg/kg		0.08 mg/kg	0.000008 %		
15	fluoranthene		205-912-4	206-44-0		0.5 mg/kg		0.5 mg/kg	0.00005 %		

#		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		pyrene				0.46	mg/kg		0.46	mg/kg	0.000046 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0306 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP03

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP03
Sample Depth:
0.20 m
Moisture content:
13%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13% No 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		9.2 mg/kg	1.32	12.147 mg/kg	0.00121 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.23 mg/kg	1.285	0.296 mg/kg	0.000023 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		24 mg/kg	1.462	35.077 mg/kg	0.00351 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		23 mg/kg	3.929	90.368 mg/kg	0.00904 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	34 mg/kg	1.56	53.034 mg/kg	0.0034 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		18 mg/kg	2.976	53.573 mg/kg	0.00536 %		
8	zinc { zinc chromate }	024-007-00-3				53 mg/kg	2.774	147.03 mg/kg	0.0147 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		0.25 mg/kg		0.25 mg/kg	0.000025 %		
14	anthracene		204-371-1	120-12-7		0.07 mg/kg		0.07 mg/kg	0.000007 %		
15	fluoranthene		205-912-4	206-44-0		0.41 mg/kg		0.41 mg/kg	0.000041 %		

#		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	●	pyrene				0.42	mg/kg		0.42	mg/kg	0.000042 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23	●	benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24	●	indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25	●	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0385 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP04

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP04
Sample Depth:
0.70 m
Moisture content:
5.9%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 5.9% No 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		24 mg/kg	1.32	31.688 mg/kg	0.00317 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.1 mg/kg	1.285	<0.129 mg/kg	<0.00001 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		11 mg/kg	1.462	16.077 mg/kg	0.00161 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		5.1 mg/kg	3.929	20.038 mg/kg	0.002 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	10 mg/kg	1.56	15.598 mg/kg	0.001 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		8.8 mg/kg	2.976	26.191 mg/kg	0.00262 %		
8	zinc { zinc chromate }	024-007-00-3				13 mg/kg	2.774	36.064 mg/kg	0.00361 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
14	anthracene		204-371-1	120-12-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
15	fluoranthene		205-912-4	206-44-0		<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		pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
										Total:	0.0151 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP05

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP05
Sample Depth:
1.10 m
Moisture content:
13%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13% No 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		5.9 mg/kg	1.32	7.79 mg/kg	0.000779 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.3 mg/kg	1.285	0.386 mg/kg	0.00003 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		14 mg/kg	3.929	55.007 mg/kg	0.0055 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	33 mg/kg	1.56	51.474 mg/kg	0.0033 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		15 mg/kg	2.976	44.644 mg/kg	0.00446 %		
8	zinc { zinc chromate }	024-007-00-3				47 mg/kg	2.774	130.385 mg/kg	0.013 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		0.24 mg/kg		0.24 mg/kg	0.000024 %		
14	anthracene		204-371-1	120-12-7		0.05 mg/kg		0.05 mg/kg	0.000005 %		
15	fluoranthene		205-912-4	206-44-0		0.4 mg/kg		0.4 mg/kg	0.00004 %		

#		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		pyrene				0.4	mg/kg		0.4	mg/kg	0.00004 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				23	mg/kg		23	mg/kg	0.0023 %		
				TPH									
26		confirm TPH has NOT arisen from diesel or petrol				☑							
										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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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"

Force this Hazardous property to non hazardous because Moisture in soil unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0023%)

Classification of sample: TP07

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP07
Sample Depth:
0.20 m
Moisture content:
20%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 20% No 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		7.6 mg/kg	1.32	10.034 mg/kg	0.001 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.34 mg/kg	1.285	0.437 mg/kg	0.000034 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		22 mg/kg	1.462	32.154 mg/kg	0.00322 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		19 mg/kg	3.929	74.652 mg/kg	0.00747 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	110 mg/kg	1.56	171.58 mg/kg	0.011 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		17 mg/kg	2.976	50.597 mg/kg	0.00506 %		
8	zinc { zinc chromate }	024-007-00-3				69 mg/kg	2.774	191.416 mg/kg	0.0191 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
14	anthracene		204-371-1	120-12-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
15	fluoranthene		205-912-4	206-44-0		0.66 mg/kg		0.66 mg/kg	0.000066 %		

#		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	●	pyrene				0.81	mg/kg		0.81	mg/kg	0.000081 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				0.36	mg/kg		0.36	mg/kg	0.000036 %		
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				0.86	mg/kg		0.86	mg/kg	0.000086 %		
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				0.43	mg/kg		0.43	mg/kg	0.000043 %		
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				0.27	mg/kg		0.27	mg/kg	0.000027 %		
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				0.41	mg/kg		0.41	mg/kg	0.000041 %		
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23	●	benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24	●	indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25	●	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0484 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP08

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP08
Sample Depth:
0.35 m
Moisture content:
15%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% No 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		33 mg/kg	1.32	43.571 mg/kg	0.00436 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.51 mg/kg	1.285	0.655 mg/kg	0.000051 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		**<LOD**
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		39 mg/kg	3.929	153.233 mg/kg	0.0153 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	91 mg/kg	1.56	141.943 mg/kg	0.0091 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		31 mg/kg	2.976	92.264 mg/kg	0.00923 %		
8	zinc { zinc chromate }	024-007-00-3				49 mg/kg	2.774	135.933 mg/kg	0.0136 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		0.31 mg/kg		0.31 mg/kg	0.000031 %		
10	acenaphthylene		205-917-1	208-96-8		0.41 mg/kg		0.41 mg/kg	0.000041 %		
11	acenaphthene		201-469-6	83-32-9		0.82 mg/kg		0.82 mg/kg	0.000082 %		
12	fluorene		201-695-5	86-73-7		0.74 mg/kg		0.74 mg/kg	0.000074 %		
13	phenanthrene		201-581-5	85-01-8		7.5 mg/kg		7.5 mg/kg	0.00075 %		
14	anthracene		204-371-1	120-12-7		1.5 mg/kg		1.5 mg/kg	0.00015 %		
15	fluoranthene		205-912-4	206-44-0		10 mg/kg		10 mg/kg	0.001 %		

#		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		pyrene				9.6	mg/kg		9.6	mg/kg	0.00096 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				4	mg/kg		4	mg/kg	0.0004 %		
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				4.2	mg/kg		4.2	mg/kg	0.00042 %		
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				3.6	mg/kg		3.6	mg/kg	0.00036 %		
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				2.4	mg/kg		2.4	mg/kg	0.00024 %		
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				3.9	mg/kg		3.9	mg/kg	0.00039 %		
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				1.2	mg/kg		1.2	mg/kg	0.00012 %		
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				2.8	mg/kg		2.8	mg/kg	0.00028 %		
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				2.8	mg/kg		2.8	mg/kg	0.00028 %		
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				64	mg/kg		64	mg/kg	0.0064 %		
				TPH									
26		confirm TPH has NOT arisen from diesel or petrol				☑							
										Total:	0.0664 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

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"

Force this Hazardous property to non hazardous because Moisture in soil unlikely to be flammable

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0064%)

Classification of sample: TP08[2]

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP08[2]
Sample Depth:
0.50 m
Moisture content:
11%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% No 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		25 mg/kg	1.32	33.008 mg/kg	0.0033 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.1 mg/kg	1.285	<0.129 mg/kg	<0.00001 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		12 mg/kg	1.462	17.539 mg/kg	0.00175 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		7.5 mg/kg	3.929	29.468 mg/kg	0.00295 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	16 mg/kg	1.56	24.957 mg/kg	0.0016 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		11 mg/kg	2.976	32.739 mg/kg	0.00327 %		
8	zinc { zinc chromate }	024-007-00-3				20 mg/kg	2.774	55.483 mg/kg	0.00555 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		0.21 mg/kg		0.21 mg/kg	0.000021 %		
14	anthracene		204-371-1	120-12-7		0.07 mg/kg		0.07 mg/kg	0.000007 %		
15	fluoranthene		205-912-4	206-44-0		0.3 mg/kg		0.3 mg/kg	0.00003 %		

#		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		pyrene				0.38	mg/kg		0.38	mg/kg	0.000038 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				0.13	mg/kg		0.13	mg/kg	0.000013 %		
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0197 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP09

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP09
Sample Depth:
0.70 m
Moisture content:
10%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 10% No 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		40 mg/kg	1.32	52.813 mg/kg	0.00528 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	<0.1 mg/kg	1.285	<0.129 mg/kg	<0.00001 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		19 mg/kg	1.462	27.77 mg/kg	0.00278 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		9.8 mg/kg	3.929	38.505 mg/kg	0.00385 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	19 mg/kg	1.56	29.636 mg/kg	0.0019 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14 mg/kg	2.976	41.668 mg/kg	0.00417 %		
8	zinc { zinc chromate }	024-007-00-3				23 mg/kg	2.774	63.805 mg/kg	0.00638 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
14	anthracene		204-371-1	120-12-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
15	fluoranthene		205-912-4	206-44-0		<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		pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
										Total:	0.0255 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP11

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP11
Sample Depth:
1.00 m
Moisture content:
15%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% No 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		8 mg/kg	1.32	10.563 mg/kg	0.00106 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.25 mg/kg	1.285	0.321 mg/kg	0.000025 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		17 mg/kg	1.462	24.846 mg/kg	0.00248 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		17 mg/kg	3.929	66.794 mg/kg	0.00668 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	110 mg/kg	1.56	171.58 mg/kg	0.011 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14 mg/kg	2.976	41.668 mg/kg	0.00417 %		
8	zinc { zinc chromate }	024-007-00-3				42 mg/kg	2.774	116.514 mg/kg	0.0117 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		0.73 mg/kg		0.73 mg/kg	0.000073 %		
14	anthracene		204-371-1	120-12-7		0.17 mg/kg		0.17 mg/kg	0.000017 %		
15	fluoranthene		205-912-4	206-44-0		1.2 mg/kg		1.2 mg/kg	0.00012 %		

#		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		pyrene				1.2	mg/kg		1.2	mg/kg	0.00012 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				0.35	mg/kg		0.35	mg/kg	0.000035 %		
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				0.35	mg/kg		0.35	mg/kg	0.000035 %		
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				0.4	mg/kg		0.4	mg/kg	0.00004 %		
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				0.12	mg/kg		0.12	mg/kg	0.000012 %		
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				0.51	mg/kg		0.51	mg/kg	0.000051 %		
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				0.63	mg/kg		0.63	mg/kg	0.000063 %		
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				0.33	mg/kg		0.33	mg/kg	0.000033 %		
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0388 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP12

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP12
Sample Depth:
2.00 m
Moisture content:
7.9%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.9% No 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		4.6 mg/kg	1.32	6.073 mg/kg	0.000607 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.11 mg/kg	1.285	0.141 mg/kg	0.000011 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		10 mg/kg	1.462	14.616 mg/kg	0.00146 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		7.9 mg/kg	3.929	31.04 mg/kg	0.0031 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	16 mg/kg	1.56	24.957 mg/kg	0.0016 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		9.8 mg/kg	2.976	29.167 mg/kg	0.00292 %		
8	zinc { zinc chromate }	024-007-00-3				20 mg/kg	2.774	55.483 mg/kg	0.00555 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
14	anthracene		204-371-1	120-12-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
15	fluoranthene		205-912-4	206-44-0		<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	●	pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
23	●	benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-883-8	191-24-2									
24	●	indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-893-2	193-39-5									
25	●	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
										Total:	0.0164 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP13

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP13
Sample Depth:
1.00 m
Moisture content:
11%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11% No 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		12 mg/kg	1.32	15.844 mg/kg	0.00158 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.31 mg/kg	1.285	0.398 mg/kg	0.000031 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		20 mg/kg	1.462	29.231 mg/kg	0.00292 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		15 mg/kg	3.929	58.936 mg/kg	0.00589 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	24 mg/kg	1.56	37.436 mg/kg	0.0024 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		20 mg/kg	2.976	59.525 mg/kg	0.00595 %		
8	zinc { zinc chromate }	024-007-00-3				38 mg/kg	2.774	105.418 mg/kg	0.0105 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		0.13 mg/kg		0.13 mg/kg	0.000013 %		
14	anthracene		204-371-1	120-12-7		0.03 mg/kg		0.03 mg/kg	0.000003 %		
15	fluoranthene		205-912-4	206-44-0		0.15 mg/kg		0.15 mg/kg	0.000015 %		

#		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		pyrene				0.22	mg/kg		0.22	mg/kg	0.000022 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0305 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP14

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP14
Sample Depth:
0.60 m
Moisture content:
15%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 15% No 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		8.1 mg/kg	1.32	10.695 mg/kg	0.00107 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.16 mg/kg	1.285	0.206 mg/kg	0.000016 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		20 mg/kg	1.462	29.231 mg/kg	0.00292 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		9.7 mg/kg	3.929	38.112 mg/kg	0.00381 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	31 mg/kg	1.56	48.354 mg/kg	0.0031 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		13 mg/kg	2.976	38.691 mg/kg	0.00387 %		
8	zinc { zinc chromate }	024-007-00-3				30 mg/kg	2.774	83.224 mg/kg	0.00832 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
14	anthracene		204-371-1	120-12-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
15	fluoranthene		205-912-4	206-44-0		<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	●	pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
23	●	benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-883-8	191-24-2									
24	●	indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
			205-893-2	193-39-5									
25	●	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
				TPH									
										Total:	0.0242 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP15

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP15
Sample Depth:
0.10 m
Moisture content:
14%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% No 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		5.7 mg/kg	1.32	7.526 mg/kg	0.000753 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.25 mg/kg	1.285	0.321 mg/kg	0.000025 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		18 mg/kg	1.462	26.308 mg/kg	0.00263 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		12 mg/kg	3.929	47.149 mg/kg	0.00471 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	31 mg/kg	1.56	48.354 mg/kg	0.0031 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		11 mg/kg	2.976	32.739 mg/kg	0.00327 %		
8	zinc { zinc chromate }	024-007-00-3				42 mg/kg	2.774	116.514 mg/kg	0.0117 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		0.04 mg/kg		0.04 mg/kg	0.000004 %		
14	anthracene		204-371-1	120-12-7		0.01 mg/kg		0.01 mg/kg	0.000001 %		
15	fluoranthene		205-912-4	206-44-0		0.18 mg/kg		0.18 mg/kg	0.000018 %		

#		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		pyrene				0.23	mg/kg		0.23	mg/kg	0.000023 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0273 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP16

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP16
Sample Depth:
0.20 m
Moisture content:
21%
(no correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 21% No 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		6.3 mg/kg	1.32	8.318 mg/kg	0.000832 %		
2	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	1	0.27 mg/kg	1.285	0.347 mg/kg	0.000027 %		
3	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		22 mg/kg	1.462	32.154 mg/kg	0.00322 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.5 mg/kg	1.923	<0.962 mg/kg	<0.0000962 %		<LOD
5	copper { copper sulphate pentahydrate }	029-023-00-4	231-847-6	7758-99-8		20 mg/kg	3.929	78.581 mg/kg	0.00786 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	33 mg/kg	1.56	51.474 mg/kg	0.0033 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		13 mg/kg	2.976	38.691 mg/kg	0.00387 %		
8	zinc { zinc chromate }	024-007-00-3				44 mg/kg	2.774	122.062 mg/kg	0.0122 %		
9	naphthalene	601-052-00-2	202-049-5	91-20-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
10	acenaphthylene		205-917-1	208-96-8		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
11	acenaphthene		201-469-6	83-32-9		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
12	fluorene		201-695-5	86-73-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
13	phenanthrene		201-581-5	85-01-8		0.1 mg/kg		0.1 mg/kg	0.00001 %		
14	anthracene		204-371-1	120-12-7		0.02 mg/kg		0.02 mg/kg	0.000002 %		
15	fluoranthene		205-912-4	206-44-0		0.25 mg/kg		0.25 mg/kg	0.000025 %		

#		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		pyrene				0.3	mg/kg		0.3	mg/kg	0.00003 %		
			204-927-3	129-00-0									
17		benzo[a]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
18		chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
19		benz[e]acephenanthrylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
20		benzo[k]fluoranthene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
21		benzo[a]pyrene; benzo[def]chrysene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
22		dibenz[a,h]anthracene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
23		benzo[ghi]perylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-883-8	191-24-2									
24		indeno[123-cd]pyrene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<**LOD**
			205-893-2	193-39-5									
25		TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<**LOD**
				TPH									
										Total:	0.0325 %		

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
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Repr. 1B H360FD , Skin Sens. 1 H317 , Resp. Sens. 1 H334 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302 , Acute Tox. 4 H332

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: Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 1 H310 , Acute Tox. 1 H330 , Acute Tox. 4 H302

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: Aquatic Chronic 2 H411 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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 Chronic 1 H410 , Aquatic Acute 1 H400

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: Skin Irrit. 2 H315 , Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Carc. 2 H351 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Acute Tox. 4 H302

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Skin Sens. 1 H317 , Skin Irrit. 2 H315 , STOT SE 3 H335 , Eye Irrit. 2 H319

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , Acute Tox. 4 H302

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: Aquatic Chronic 1 H410 , Aquatic Acute 1 H400 , STOT SE 3 H335 , Eye Irrit. 2 H319 , Skin Irrit. 2 H315

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 Chronic 1 H410 , Aquatic Acute 1 H400

- **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

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Aquatic Chronic 2 H411 , Repr. 2 H361d , Carc. 1B H350 , Muta. 1B H340 , STOT RE 2 H373 , Asp. Tox. 1 H304 , Flam. Liq. 3 H226

- **confirm TPH has NOT arisen from diesel or petrol**

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

(enter justification for selecting this species)

cadmium {cadmium sulfide}

(enter justification for selecting this species)

chromium in chromium(III) compounds {chromium(III) oxide}

(enter justification for selecting this species)

chromium in chromium(VI) compounds {chromium(VI) oxide}

(enter justification for selecting this species)

copper {copper sulphate pentahydrate}

(enter justification for selecting this species)

lead {lead chromate}

(enter justification for selecting this species)

nickel {nickel chromate}

(enter justification for selecting this species)

zinc {zinc chromate}

(enter justification for selecting this species)

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2019.142.3866.7875 (22 May 2019)
HazWasteOnline Database: 2019.144.3872.7882 (24 May 2019)

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 Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

APPENDIX E: CONTAMINATION RISK ASSESSMENT METHODOLOGY AND DEFINITIONS

CONTAMINATION ASSESSMENT METHODOLOGY

The DEFRA and Environment Agency Contaminated Land Report 11 (CLR11) 'Model Procedures for the Management of Land Contamination' provides a technical framework for structured decision making about land contamination.

A1. Definition of Risk

CLR11 defines risk as "a combination of probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence".

A2. The Concept of the 'Pollutant Linkage'

In the context of contaminated land, there are three essential elements to any risk:

- a **contaminant (or source)** – a substance that is in, on or under land and has the potential to cause harm or cause pollution of controlled waters.
- a **receptor** - humans, ecological system, water body or property.
- a **pathway** – a route or means by which a receptor can be exposed to, or affected by, a contaminant.

Each of these elements can exist separately; however, they create a risk only where they are linked together forming a **pollutant linkage**.

A3. Conceptual Site Models

A conceptual site model represents the characteristics of the site in diagrammatic or written form that shows the possible relationships between contaminants, pathways and receptors (pollutant linkages).

For all potential pollutant linkages identified, the *consequence* and *probability* of occurrence is qualitatively assessed, and a *risk* assigned.

A4. The Tiered Risk Assessment Approach

CLR11 presents a tiered approach to risk:

Tier 1 *Preliminary risk assessment (PRA)*
The purpose of the preliminary risk assessment is to develop an initial conceptual model of the site and to establish whether there are potentially unacceptable risks. If potential risks are identified the initial conceptual model is developed in subsequent tiers of the risk assessment process.

Tier 2 *Generic quantitative risk assessment (GQRA)*
The purpose of the generic quantitative risk assessment is to establish whether generic assessment criteria and assumptions are appropriate for assessing the risks and, if so, to apply them to establish whether there are actual or potential unacceptable risks. It also determines whether further detailed quantitative risk assessment is required.

Tier 3 *Detailed quantitative risk assessment (DQRA)*
The purpose of the detailed quantitative risk assessment is to establish and use more detailed site-specific information and criteria to decide whether there are unacceptable risks. It may be used as the sole method of quantitative assessments of risks, or it may be used to refine earlier assessments using generic assessment criteria.

B. RISK ASSESSMENT DEFINITIONS

B1. General

The following classification and definition of risk assessment has been based on that set out in NHBC and EA Publication R&D 66 – Guidance on the Safe Development of Housing on Land Affected by Contamination (2008).

The key to the classification is that the designation of risk is based upon the consideration of both:

a) **the magnitude of the potential consequence (i.e. severity)**, which considers both the potential severity of the hazard, and the sensitivity of the receptor**.**

b) **the magnitude of probability (i.e. likelihood)**, which considers both the presence of the hazard, the receptor, and the integrity of the pathway.

B2. Classification of Consequence

Classification	Definition	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs. Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce. Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population. Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of List I and II substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs. Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce. Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population. Significant damage to crops, buildings or property.	Significant harm to humans is defined in circular 01/2006 as death, disease*, serious injury, genetic mutation, birth defects or the impairment of reproductive functions. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
Mild	Exposure to human health unlikely to lead to "significant harm". Equivalent to EA Category 3 pollution incident including minimal or short lived effect on water quality; marginal effect on amenity value, agriculture or commerce. Minor or short lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population. Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.
Minor	No measurable effect on humans. Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems. Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

** For these purposes, disease is to be taken to mean an unhealthy condition of the body or a part of it and can include, for example, cancer, liver dysfunction or extensive skin ailments. Mental dysfunction is included only insofar as it is attributable to the effects of a pollutant on the body of the person concerned.*

B3. Classification of Probability

Only applies if there is a possibility of a pollutant linkage being present.

Classification	Definition	Examples
High likelihood	There is pollutant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution.	a) *Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden.* b) *Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50*
Likely	There is pollutant linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) *Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space.* b) *Ground/groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.*
Low likelihood	There is pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	a) *Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space.* b) *Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.*
Unlikely	There is pollutant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) *Elevated concentrations of toxic contaminants are present below hard standing.* b) *Light industrial unit <10 yrs. old containing a double- skinned UST with annual integrity testing results available.*

Note: A pollution linkage must first be established before probability is classified. If there is no pollution linkage, then there is no potential risk. If there is no pollution linkage, then there is no need to apply tests for probability and consequence.

For example, if there is surface contamination and a major aquifer is present at depth, but this major aquifer is overlain by an aquiclude of significant thickness then there is no pollution linkage and the risks to the major aquifer are not assessed. The report should identify both the source and the receptor but state that because there is no linkage there are no potential risks.

B4. The Classification of Risk

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High likelihood**	Very high risk	High risk	Moderate risk	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

B5. Description of the Classified Risks

Very high risk
There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.

High risk
Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.

Moderate risk
It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.

Low risk
It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.

Very low risk
It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

No potential risk
There is no potential risk if no pollution linkage has been established.

B6. Definitions

Term	Definition
Hazard	A property or situation which in certain circumstances could lead to harm. The properties of different hazards must be assessed in relation to their potential to affect the various receptors.
Risk	A combination of the probability or frequency of the occurrences of a defined hazard AND the magnitude of the consequences of that occurrence.
Probability	The mathematical expression of the chance of a particular event in a given period of time [e.g. probability of 0.2 is equivalent to 20% or a 1 in 5 chance].
Impact	The adverse effects (or harm) arising from a defined hazard which impairs the quality of the environment or human health in the short or longer term.
Pollution linkage	An identified pathway is capable of exposing a receptor to a contaminant and that contaminant is capable of harming the receptor.

APPENDIX F: LIMITATIONS AND EXCEPTIONS

Limitations and Exceptions

1. The advice given in this report is based on the guidelines available at the time of writing.

2. This investigation was conducted so as to generally comply with the relevant principles and requirements of BS10175: 2011 "Investigation of potentially contaminated sites - Code of Practice" and BS 5930:2015 “Code of Practice for Site Investigations”.

3. The Client is advised that the conditions observed on site by Jubb Consulting Engineers Ltd (JCE) at the time of the investigation or assessment are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance or investigation and they may subsequently have become observable. Ground conditions, including geotechnical properties may vary between points of observation, sampling and testing.

4. Certain areas of site had restricted access or were inaccessible due to the presence of in-use buildings, facilities and live services, as identified in this report. These may require further investigation outside the scope of this present investigation.

5. Comments made relating to land gas or groundwater conditions are based on observations made at the time of an investigation unless otherwise stated. Land gas and groundwater conditions may vary as a result of seasonal or other effects.

6. Ground contamination often exists as small discrete areas of contamination and there can be no certainty that any or all such areas have been located, sampled and/or identified.

7. The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from previous site investigations and chemical and geotechnical testing laboratories, and which JCE has assumed are correct. Nevertheless, JCE cannot and does not guarantee the authenticity or reliability of the information it has used or cited. JCE can accept no responsibility for inaccuracies within the data supplied by other parties.

8. This report is written in the context of an agreed scope of work between JCE and the Client and should not be used in a different context. In the light of additional information becoming available, improved practices and changes in legislation, amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.

9. This report is provided for sole use by the Client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the Client.

10. This report is not a specification for works.

11. JCE believes that providing information about limitations is essential to help the Client identify and thereby manage risks.

12. JCE does not provide legal advice and the advice of the Clients’ legal advisors may also be required.

13. JCE retain the copyright in this report and all drawings reproduced in it.