



115 Chatham Street,
Reading

Remediation Strategy &
Verification Plan

For Oriel Housing Ltd

Date: 22 March 2022

Doc ref: 19411-HYD-XX-XX-RP-GE-3000

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited White Building 1-4 Cumberland Place Southampton Hampshire SO15 2NP	Tel: 02382 140907 www.hydrock.com
Client	Oriel Housing Ltd	
Project name	115 Chatham Street, Reading	
Title	Remediation Strategy & Verification Plan	
Doc ref	19411-HYD-XX-XX-RP-GE-3000	
Project no.	19411	
Status	S2	
Date	22/03/2022	

Document Production Record

Issue Number	P01	Name
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Document Revision Record

Issue Number	Status	Date	Revision Details
P01	S2	22/03/2022	First Issue

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EXECUTIVE SUMMARY

<i>SITE INFORMATION AND SETTING</i>	
Objectives	Additional Ground Investigation Report, Remediation Strategy and Verification Plan
Client	Oriel Housing Ltd
Site name and location	115 Chatham Street, Reading, RG1 7JX
Proposed development	It is understood that the proposed development is to comprise a residential apartment block between 3 and 5 storeys high.
<i>GROUND MODEL</i>	
Desk study summary	The site presently comprises commercial office space, split between two buildings, a square plan two storey building in the north west of the site, appearing to be of steel framed and glass construction and a further rectangular shaped two storey brick-built building in the south west of the site. The parking area has recently been used for car storage and there is minimal soft landscaping. Chatham Street runs along the north of the site and the surrounds are a mix of commercial and residential houses and apartments. Previous Desk Study and Ground Investigation undertaken by Enzygo Ltd (2020). Review of historical Ordnance Survey maps shows the site was recorded as residential properties from the earliest available records (1879), with unspecified “works” noted in the south from 1957 and houses absent from mapping from 1969. Map extracts from 1986 onward show the site in its current layout. The site is underlain by Made Ground overlying natural deposits of the Taplow Gravel Formation and Lewes Nodular Chalk.
Ground and groundwater conditions encountered by investigation	The ground conditions as proven by the investigations undertaken at the site comprise: • Made Ground – between 0.50-2.40m thick; over • Taplow Gravel Formation – between 1.40-3.60m thick; over • Lewes Nodular Chalk – >7.00m thick. Groundwater was encountered as a seepage at 8.0m depth during drilling of BH1.
<i>GEO-ENVIRONMENTAL CONCLUSIONS</i>	
Conclusions of contamination Generic risk assessment	Human health: • Pervasive metals and PAH in the Made Ground. • Localised TPH in the Made Ground. Plant growth: • Pervasive zinc in the Made Ground Controlled Waters: • Enzygo determined a low risk with the proviso that hydrocarbon impacted soils are removed through remediation. Ground gases or vapours: • Low risk from ground gases CS1 conditions apply. Radon: • The site is not in a Radon Affected Area. Water supply pipes: • Brownfield site with organic contamination and barrier pipe is considered suitable for this site. However, confirmation should be sought from the water supply company at the earliest opportunity.

Waste management	Excavated soils to be disposed of as waste, are likely to be classed as hazardous waste in the areas indicated on the Remediation Plan in Appendix A. Made Ground generally anticipated to comprise non-hazardous waste unless containing visible asbestos or >0.1% asbestos fibres which would determine it to be hazardous.
Remediation Strategy	The mitigation measures proposed to remove unacceptable risks include: • The excavation and replacement of the hydrocarbon hotspots noted as hazardous waste on the remediation plan. • The installation of a 450mm cover system in all soft landscaping (deeper for tree pits as required), comprising a geotextile marker membrane, subsoil and a minimum of 150mm of topsoil. • Installation of Protectaline pipework and clean service corridors. In addition, the production of a Materials Management Plan and its approval by a Qualified Person will be required to allow any reuse of suitable materials at the site (if required). Verification by a competent independent geo-environmental specialist will be required following completion of any remedial works.

This Executive Summary forms part of Hydrock Consultants Limited report number 19411-HYD-XX-XX-RP-GE-3000 and should not be used as a separate document.

1. INTRODUCTION

1.1 Background and Terms of Reference

Hydrock Consultants Limited (Hydrock) has been commissioned by Oriel Housing Ltd (the Client) to prepare a Remediation Strategy & Verification Plan (RSVP) for the proposed redevelopment at 115 Chatham Street, Reading, RG1 7JX.

It is understood that the proposed development is to comprise a residential apartment block between 3 and 5 storeys high, as presented in DHA Architecture Ltd design drawings ref: 022014-ARC-01-03, E1-2 and P1-P4 (Appendix A).

A Phase 1 desk study and Phase 2 ground investigation was completed in November 2020 by Enzygo Ltd. An additional ground investigation was undertaken by Hydrock in May 2021 to further assess identified risks at the site. The findings of the desk study and ground investigations are presented in Enzygo report CRM.1265.024.GE.R.001.B. Details and findings of the subsequent investigation completed by Hydrock is presented in Section 4.

The RSVP is intended to be submitted to address planning requirements for the proposed development and to support the construction delivery.

1.2 The Site

The site is located at 115 Chatham Street, Reading, RG1 7JX. The current land use consists of commercial office buildings and car parking area.

1.3 Objectives

Supplementary works have been undertaken to aid in refinement of the conceptual site model. The refined site model is intended to provide a greater level of confidence in the RSVP and associated remedial tasks.

The objective of this RSVP is to present details of the remedial objectives, undertake a remedial options appraisal; describe how the remediation of the site will be undertaken; and outline how the works will be validated. In addition, the strategy explains how the works will be permitted under the current regulatory regime.

The remedial works will ensure that upon completion, the ground conditions at the site can be shown to be appropriate for its intended use and that it will not pose an unacceptable contamination risk to identified receptors. This document therefore includes the protective measures required during the enabling works phase in preparing the site for a residential without plant uptake end use.

After completion of the remediation works, a verification report will be produced to demonstrate that remedial objectives and criteria have been met.

This is a working document and it may need to be updated, in agreement with the relevant regulatory bodies, at any stage during development dependent on the conditions encountered. This version therefore constitutes 19411-HYD-XX-XX-RP-GE-3000 Rev P01. This document is subject to the approval of the regulators.

This document does not cover any geotechnical requirements or materials management strategy for the development.

1.4 Scope

This report has been undertaken in general accordance with Land Contamination: Risk Management (LCRM) (Environment Agency, 2021). The scope of this Remedial Options Appraisal and Remediation Strategy comprises:

- a summary of background information and the conceptual model, including supplementary data;
- a summary of the results of risk assessment undertaken at the site;
- a remediation options assessment including selection of final remediation options; and
- methodology and verification requirement for remediation works.

1.5 Sources of Information

In addition to the data obtained during recent supplementary investigation works, in preparing the remediation strategy the following documents were consulted and should be read in conjunction with it:

- Enzygo Ltd, Geo-Environmental Report, ref: CRM.1265.024.GE.R.001.B, dated November 2020.

1.6 Limitations

The report has been prepared by Hydrock on the basis of available information obtained during the study period and supplementary works. Although every reasonable effort has been made to gather all relevant information, all potential environmental constraints or liabilities associated with the site may not have been revealed.

The report has been prepared for the exclusive benefit of Oriel Housing Ltd and those parties designated by them for the purpose of providing information on the remediation and validation works to be undertaken during the enabling works and construction phases of the development. The report contents should only be used in that context. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Hydrock has used reasonable skill, care and diligence in the design of the remediation of the site. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths of trial pits and boreholes at the time of the investigation. At intermediate locations, conditions can only be inferred. Information provided by third parties has been used in good faith and is taken at face value. However, Hydrock cannot guarantee the accuracy or completeness of any information provided by others.

The work has been carried out in general accordance with recognised best practice as detailed in guidance documents such as in the 'Land Contamination: Risk Management' (LCRM, 2021), BS5930:2015 +A1:2020 and BS10175: 2011+A2:2017.

2. CONCEPTUAL SITE MODEL

2.1 Context

This section presents a summary of the conceptual model which was developed in the Enzygo Geo-Environmental Report. This report is referenced in Section 1.5 and should be referred to for full details.

2.2 Site Location and Current Land Use

The site is located at 115 Chatham Street, Reading, RG1 7JX. The National Grid Reference of the approximate centre of the site is 470872E, 173490N. The site is approximately 0.16 ha.

The site presently comprises commercial office space, split between two buildings, a square plan two storey building in the north west of the site, appearing to be of steel framed and glass construction and a further rectangular shaped two storey brick-built building in the south west of the site. The parking area has recently been used for car storage and there is minimal soft landscaping.

Chatham Street runs along the north of the site and the surrounds are a mix of commercial and residential houses and apartments.

2.3 Site History

Review of historical Ordnance Survey maps (further details presented in the Enzygo Ltd, Geo-Environmental Report) shows the site was recorded as residential properties from the earliest available records (1879), with unspecified “works” noted in the south from 1957 and houses absent from mapping from 1969. Map extracts from 1986 onward show the site in its current layout. No tanks were identified in relation to the former works site, however their presence cannot be ruled out.

2.4 Geology and Physical Ground Conditions

The physical ground conditions as encountered by Enzygo 2020 are summarised in Table 2.1.

Table 2.1: Ground Conditions Encountered

Stratum	Thickness (m) (range)
Surface Cover – Asphalt	0.30
Surface Cover - Concrete	0.40
Made Ground - brick, limestone, concrete and ceramic	0.50 - 2.40
Taplow Gravel Member (cohesive)	0.20 - 3.0
Taplow Gravel Member (granular)	1.40 - 3.60
Lewes Nodular Chalk Formation (Grade Dm)	4.00
Lewes Nodular Chalk Formation (Grade Dm/Dc)	>7.00

Groundwater was encountered as a seepage at 8.0m depth at BH1 during drilling. No groundwater was encountered during monitoring visits within monitoring wells installed in window sample boreholes.

2.5 Hydrology and Hydrogeology

The nearest surface water feature is The River Kennet, a tributary to The River Thames, located at its closest point, approximately 650m to the south east of the site and no surface water abstractions are noted within 500m of the site.

A potable groundwater abstraction is noted 310m east of the site. The underlying chalk is noted to be a Principal Aquifer, however the site is not situated within a groundwater Source Protection Zone.

Groundwater was encountered as a seepage at 8.0m bgl during the Enzygo 2020 investigation.

2.6 Waste Management and Hazardous Substances

A civic amenity site is located 217m north of the site, there are no other current or historical waste management sites recorded within 250m of the site.

2.7 Radon

The radon risk has been assessed in the environmental data report. The site is set within an area where less than 1% of homes are estimated to be at or above the Action Level.

This indicates that on the basis of current guidance, radon protection measures are not required to be included in new buildings.

2.8 Unexploded ordnance (UXO)

In general accordance with CIRIA Report C681 (Stone et al 2009) a non-specialist UXO screening exercise has been undertaken for the purposes of ground investigation and is presented in Table 2.2.

Table 2.2: Non-specialist UXO screening (for the purposes of ground investigation)

Data	Comment	Further Assessment Required
Site History	There is no indication of former military use from the desk study.	No
Post War Development	There is no evidence of war time bomb damage at the site	No
Geology Type	The ground conditions over the period of the second world war would include Made Ground, Taplow Gravels and Lewes Nodular Chalk. It is likely aerial delivered ordnance would detonate upon impact.	No
Surface Cover during WWI	The surface cover during WWII comprised a significant proportion of surfacing and buildings. It is unlikely UXO would remain undetected	No
Indicator of Aerial Delivered UXO	Screening against the regional bomb risk map indicates the site to be in an area where the bomb risk is low.	No

The non-specialist UXO screening exercise has indicated no further assessment is required with regard to UXO in relation to ground investigation. Further assessment may be considered prudent for construction activities.

2.9 Evidence of Contamination

No visual or olfactory evidence of contamination was encountered during the Enzygo 2020 ground investigation works.

Screening of laboratory testing of soil data against CLEA generic assessment criteria (GAC) for residential use without plant uptake was undertaken as part of the Enzygo 2020 investigation, determining the presence of elevated concentrations of a range of hydrocarbons (PAH and TPH), exceeding the GAC in four windowless sampler borehole locations (WS2, WS3, WS8 and WS9 all at 0.3m depth in shallow Made Ground). Additionally, asbestos fibres were detected in a single sample obtained from 0.3m at WS8 (Chrysotile 0.003%). A number of samples were indicated as obtained from the same depth as change in strata, presenting ambiguity of source. This was of particular relevance where obtained at the interface between asphalt surfacing and underlying Made Ground materials, given the recorded presence of PAHs, which may reasonably be expected to be present in bituminous bound paving surfacing.

To further assess and aid in understanding the extent of potential contamination, Hydrock recommended further investigation by the progression of supplementary shallow excavations and collection of additional soil samples for laboratory testing.

3. EXPOSURE MODEL

3.1 Ground model

The preliminary ground model is presented in Section 2, and forms the understanding of the ground conditions that inform preliminary geo-environmental exposure model.

3.2 Geo-environmental exposure model

The preliminary exposure model is based on information presented in Section 2 and is used for geo-environmental hazard identification and establishing potential contaminant linkages based on the contaminant-pathway-receptor approach.

A pollutant linkage requires all the elements (S-P-R) to be present. If only one or two are present, there is no linkage and further assessment is not required.

3.2.1 *Potential contaminants*

For the purpose of this assessment the potential contaminants have been separated according to whether they are likely to have originated from on-site or off-site sources.

Potential on-site sources of contamination

- S1 - Made Ground likely to include asbestos, PAH, metals and petroleum hydrocarbons based on previous assessment.

Potential off-site sources of contamination

No significant sources considered present.

3.2.2 *Potential pathways*

The following potential pathways have been identified.

- P1 - Ingestion, skin contact, inhalation of dust and outdoor air.
- P2 – Vertical migration through unsaturated zone

3.2.3 *Potential receptors*

The following potential receptors in relation to the proposed land use have been identified.

- R1 - Humans (neighbours, site end users)
- R2 - Development end use (buildings and utilities)
- R3 - Plant Life: Existing vegetation and new planting
- R4 – Groundwater – underlying Principal Aquifer within the Lewes Nodular Chalk Formation

Health and safety risks to site Contractors and maintenance workers have not been assessed during these works and will need to be considered separately.

The above plausible sources, pathways and receptors have been carried forward for investigation and assessment. The investigation is presented in Section 4 and the assessment is presented in Section 5.

4. SUPPLEMENTARY INVESTIGATION

4.1 Investigation rationale

The ground investigation rationale was based on the findings of the preliminary risk assessment and is summarised in Table 4.1.

Table 4.1: Investigation rationale

Location	Purpose
HP201-210	To assess shallow ground conditions in readily accessible areas of the site (car park area, outside of building footprint). To allow collection of samples for contamination testing. Targeted delineation of contamination identified by Enzygo and areas of site not previously investigated.

4.2 Site works

The fieldwork took place on 26/05/2021. The ground investigation locations are shown on the Exploratory Hole Location Plan (Hydrock Drawing 19411-HYD-XX-XX-DR-GE-1004) in Appendix A.

The weather conditions during the Hydrock fieldwork and for the previous week were sunny with occasional showers.

4.3 Physical ground conditions

The following presents a summary of the properties of the ground and groundwater conditions encountered.

The preliminary logs, including details of ground conditions and soil sampling are presented in Appendix B.

4.3.1 Surface covering - asphalt cover

The site is generally covered by asphalt hardstanding to between 0.10-0.15m bgl at all locations except HP203 where varying layers of gravel were encountered.

4.3.2 Made Ground

Below the surface covering, Made Ground was recorded across the entire site. The Made Ground was variable in composition, typically comprising a pinkish brown slightly silty sandy GRAVEL of brick and aggregate or a dark brown slightly sandy gravelly CLAY with variable proportions of chalk, flint, brick, asphalt and ceramic.

Underlying natural soils were not encountered. The maximum depth of investigation was 1.0m.

4.4 Groundwater

Groundwater was not encountered during the investigation.

4.5 Geo-environmental testing

The chemical test certificates for testing undertaken by a specialist laboratory in behalf of Hydrock are provided in Appendix C. Wherever possible, UKAS and MCERTS accredited procedures have been used.

The geo-environmental analyses undertaken on soils (received to date) are summarised in Table 4.2.

Table 4.2: Geo-environmental analyses of soils received to date

Determinand Suite	Made Ground
Hydrock minimum suite of determinands for solids*	9
Speciated aliphatic and aromatic banding Total petroleum hydrocarbons by HS-GC/MS and GC/FID (Hydrock Tier 2 TPH Suite)	12
WAC Full Solid Suite	2
USEPA 16 PAH and Coal Tar screen	3
*Hydrock minimum soil suite comprises: As, B (water soluble), Be, Cd, Cr (total), Cr (VI), Cu, Hg, Ni, Pb, S (elemental), Se, V, Zn, cyanide (total), sulfide, pH, asbestos fibres, speciated polynuclear aromatic hydrocarbons (PAH, by GC-FID), total phenols and fraction of organic carbon	

5. GEO-ENVIRONMENTAL ASSESSMENT

5.1 Updated conceptual site model

5.1.1 *Updated ground model*

The preliminary conceptual ground model initially developed by the Enzygo desk study has been updated using the findings of the ground investigation. The ground model is used in the geo-environmental assessment presented in the following section.

5.1.2 *Updated exposure model*

Following the site investigation, the plausible contaminant sources, receptors and pathways identified in the preliminary geo-environmental exposure model (Section 3), have been updated or confirmed as follows.

Sources

No sources have been added to or removed from the exposure model.

Pathways

No pathways have been added to or removed from the exposure model.

Receptors

No receptors have been added to or removed from the exposure model.

With reference to the updated ground model and updated exposure model reported above, generic risk assessment is undertaken below.

5.2 Risk assessment approach

A number of generic risk assessments have been undertaken in accordance with the principles of LCRM 2021 using the CSM that has been updated following the ground investigation.

Firstly, the risks associated with the identified potential contaminant linkages have been estimated using standardised methods (typically involving comparison of site data with published 'screening values'. Secondly, where screening values are exceeded, the risks have been evaluated in an authoritative review of the findings with other pertinent information to determine if the exceedance may be acceptable in the particular circumstances.

The data sets used comprise the appropriate analytical results obtained by Hydrock and listed in Section 4 plus any suitable data from previous sources listed in Section 2.

In cases where unacceptable risks are indicated, mitigation measures such as more advanced stages of risk assessment or remediation are proposed in Sections 9 to 13.

5.3 Human health risk assessment

In line with the proposed development the residential without plant uptake scenario has been adopted.

The soil screening values used are generic assessment criteria (GAC). The Category 4 Screening Levels (C4SL) for lead have been used as there are no recognised GAC and the use of the term 'GAC' in this report includes these.

Statistical testing is used where data sets are suitable. For data sets with low sample numbers or where sampling is targeted at specific areas, individual sample test results are compared directly with the screening values.

The phrase 'further assessment required' is used to denote soil concentrations that are equal to, or exceed, a GAC. This does not necessarily mean that the soil is 'contaminated' or not fit for use. The assessment and any mitigation works required are to ensure the site does not pose an 'unacceptable risk'.

The results of the assessment are presented in Appendix C.

5.3.1 Risk estimation (without statistical testing)

Hydrock default list of determinands

Based on individual test results that exceed the GAC, the chemicals of potential concern which require further assessment are summarised in Table 5.1.

Table 5.1: Chemicals of potential concern for which further assessment is required (human health)

Chemical of potential concern	Generic criterion (mg/kg)	Basis for generic criterion	No. samples	Min. (mg/kg)	Max. (mg/kg)	No. samples exceeding generic criterion
Hydrock 2021						
Lead	310	C4SL	9	88	1600	4
Benz(a)anthracene	5.5	LQM/CIEH + CLEA 1.07	12	0.05	580	7
Benzo(a)pyrene	1.5		12	0.05	360	7
Benzo(b)flouranthene	11		12	0.05	590	6
Benzo(ghi)perylene	71		12	0.05	220	3
Benzo(k)fluoranthene	15		12	0.05	150	5
Chrysene	13		12	0.05	420	5
Dibenz(a,h)anthracene	1.3		12	0.05	69	6
Indeno(1,2,3,cd)pyrene	6.3		12	0.05	220	5
Enzygo 2020						
Benz(a)anthracene	5.5	LQM/CIEH + CLEA 1.07	8	0.05	530	4
Benzo(a)pyrene	1.5		8	0.05	330	5
Benzo(b)flouranthene	11		8	0.05	510	3
Benzo(ghi)perylene	71		8	0.05	190	1
Benzo(k)fluoranthene	15		8	0.05	150	2
Chrysene	13		8	0.05	420	2
Dibenz(a,h)anthracene	1.3		8	0.05	17	3
Indeno(1,2,3,cd)pyrene	6.3		8	0.05	190	2
Napthalene	2.3		8	0.05	77	2
Phenanthrene	1300		8	0.05	1400	1

Asbestos

Visible evidence of Asbestos Containing Materials (ACM) was recorded by Hydrock in HP207 and HP208 in the form of "ACM tiles", likely cement bound asbestos. Fibres of asbestos were not identified within soil samples submitted for laboratory testing by Hydrock.

No visual evidence for ACM was recorded by Enzygo. Laboratory testing included within Enzygo reporting has indicated the presence of discrete chrysotile asbestos fibres at 0.003% within the soils at the location of WS8 at 0.30m.

The presence of Asbestos Containing Materials and asbestos fibres in soil requires further consideration.

Petroleum hydrocarbons

Enzygo laboratory testing recorded concentrations of hydrocarbons that exceed the applicable GAC at two locations; WS2 at 0.3m bgl Aromatic fraction EC21-35 at 3000mg/kg and WS3 at 0.3m bgl Aromatic fractions EC16-21 at 5200mg/kg and EC21-35 at 4400mg/kg, compared to a GAC of 1900mg/kg for these fractions.

Samples obtained during supplementary works undertaken by Hydrock returned values exceeding the applicable GAC at a single location; HP207 at 0.2m bgl Aliphatic fraction EC12-16 at 69mg/kg, compared to a GAC of 24mg/kg and Aromatic fraction EC16-21 and EC21-35 at 2300mg/kg and 2900mg/kg respectively, compared to a GAC of 1900mg/kg for these fractions.

Coal Tar

Three samples of asphalt were screened for presence of coal tar. None of the samples were found to contain evidence of coal tar.

5.3.2 *Risk evaluation*

The screening exercise has identified asbestos and a range of PAHs in Made Ground. These are considered further here to assess if the exceedance may be acceptable with respect to the proposed development. The phrase 'further assessment' does not necessarily mean that the soil is 'contaminated' or not fit for use.

Metals

Exceedances of the GAC for Lead are noted within sub base material at 0.3m bgl at HP207 and within cohesive Made Ground at HP203 (0.50m bgl), HP204 (0.50m bgl) and HP209A (0.80m bgl). Whilst the GAC for Lead is exceeded in each of these instances, it is considered that during the course of construction soils impacted with lead will either be removed from site (sub-base soils and where removed by foundation or surface construction) or will be beneath the footprint of proposed building or surfacing, thereby breaking any viable contaminant linkage.

Asbestos

Visible evidence of Asbestos Containing Materials (ACM) was recorded by Hydrock in HP207 and HP208 in the form of "ACM tiles", likely cement bound asbestos. Fibres of asbestos were not identified within soil samples submitted for laboratory testing by Hydrock.

The Enzygo investigation recorded asbestos fibres of chrysotile in the Made Ground (WS3 at 0.3m 0.003%v/v, which requires further consideration.

Guidance on the assessment of risk associated with asbestos in soils was published by CIRIA C733 in 2014. This proposed a semi-quantitative risk assessment methodology for asbestos, based on potential for inhalation of airborne fibres. As many factors affect the potential magnitude of fibre inhalation in addition to concentration, it is not practicable to derive generic screening criteria for asbestos concentrations in soil. Risk factors applicable to the site are considered below:

- Likely ACM was recorded by Hydrock in HP207 and HP208 in the form of "ACM tiles", likely cement bound asbestos. Fibres of asbestos were not identified within soil samples submitted for laboratory testing by Hydrock.
- Where asbestos was identified by laboratory testing, the concentration was assessed as being 0.003%.
- Asbestos fibres were identified in a single sample out of a total of 17No samples submitted for asbestos screen from the Enzygo and Hydrock works.
- Only chrysotile (white) asbestos fibres were identified. Chrysotile is the least hazardous of the three principle asbestos forms, most commonly associated with asbestos cement products.
- Although the impacted soils might be excavated and disturbed, with consequent potential for fibre release during groundworks, future disturbance is likely to be minimal due to the requirement to import a clean topsoil/subsoil growing medium (proposed 450mm) or hardstanding cover.
- The material in which asbestos fibres were present is noted to be impacted by PAH and will need to be removed from site during the course of development and disposed of at a suitable receiving site.

Subject to regulatory approval, whilst Hydrock consider it plausible for asbestos to be present in any of the Made Ground soils, overall, the risk associated with the identified presence of asbestos is considered to be low. However, mitigation (in the form of a simple cover system) will be required to ensure risks to site users remains negligible.

PAHs

Polycyclic aromatic hydrocarbons are identified to be present, as follows:

- Pervasive impact within the sub-base Made Ground
- Hotspot impact within HP208 granular Made Ground to a depth of 0.9m bgl.
- Hotspot impact within HP209A cohesive Made Ground at depth of 0.8m bgl.

Impact noted within the sub-base was noted at Hydrock locations HP202, HP205, HP207 and HP208 (all sub-base material tested for PAH) and at depths of 0.3m at Enzygo locations WS5, WS8, WS9, WS2 and WS3. Whilst the distribution and concentration of these exceedances necessitates the removal of the impacted material, the additional works have been able to determine that the pervasive PAHs are limited to the sub-base material.

Hotspot impact noted within HP208 at 0.5m bgl includes a range of PAHs in exceedance of their respective GACs and will require mitigation.

Hotspot impact noted within HP209A includes Benz(a)anthracene at a concentration of 5.5mg/kg which is equal to the GAC of 5.5mg/kg, and Benzo(a)pyrene at a concentration of 4.5mg/kg exceeding the GAC of 1.5mg/kg. The Category 4 Screening Levels as derived from CLEA modelling is 5.3mg/kg for

residential without plan uptake. As such, the area of HP209A is not considered to pose a risk to human health in relation to PAHs.

Petroleum Hydrocarbons

Petroleum hydrocarbons are present at concentrations in excess of the respective GAC for a variety of Aliphatic and Aromatic fractions within the sub-base materials. Mitigation in the form of source removal will be required.

Table 5.2: Summary of human health exceedances

Chemical of potential concern	Affected locations	Depth	Notes
Hydrock 2021			
Metals	HP203	0.5	
	HP204	0.5	
	HP207	0.2	
	HP209A	0.8	
PAH	HP202	0.2	
	HP205	0.2	
	HP207	0.2	
	HP208	0.2	
	HP208	0.8	
	HP209A	0.5	
TPH	HP207	0.2	
Asbestos	HP207	0.15-0.4	Visual evidence in Made Ground – “ACM tile”
	HP208	0.25-0.7	
Enzygo 2020			
Metals	WS9	0.3	
PAH	WS2	0.3	WS5 - Minor exceedance of Benzo(a)pyrene only (1.6mg/kg vs GAC of 1.5mg/kg)
	WS3	0.3	
	WS5	0.3	
	WS8	0.3	
	WS9	0.3	
TPH	WS2	0.3	
	WS3	0.3	
Asbestos	WS8	0.3	Fibres of Chrysotile (0.003%)

5.4 Plant life risk assessment

5.4.1 Risk estimation

Priority phytotoxic chemical concentrations have been screened against published values to determine the likely risk to plant growth and the findings presented in Appendix C. As with human health, statistical testing is used where data sets are suitable, otherwise individual sample test results are compared directly with the screening values.

Table 5.3: Pervasive chemicals of potential concern for which further assessment is required (risk to plants)

Chemical of potential concern	Generic criterion (mg/kg)	Basis for generic criterion	No. samples	Min. (mg/kg)	Max. (mg/kg)	No. samples exceeding generic criterion
Hydrock 2021						
Zinc	300	BS3882 2015	9	90	620	7
Enzygo 2020						
Zinc	300	BS3882 2015	8	28	480	1

5.4.2 Risk evaluation

Within the Made Ground concentrations of Zinc are elevated when compared to the GAC. Whilst detriment to plant life is difficult to quantify as many of the GAC are based on agricultural crop yields rather than harm to particular plant species, the significant exceedance of the GAC indicates the probability of an unacceptable risk to plant life and mitigation may be required, such as the import of a clean growing medium.

The requirement for mitigation of risk to human health will also serve to mitigate risks to plant life.

Notwithstanding the above, the near surface soils at the site are not considered a suitable growing medium due to physical composition and import of clean physically suitable growing medium will be required for the construction of areas of soft landscaping.

5.5 Construction materials risk assessment

5.5.1 Water pipelines

A formal water pipe investigation and risk assessment is beyond the scope of this report. However, the findings of this investigation have been compared to the threshold values in Water UK HBF (2014), Table 1 as far as is practicable, to give an indication of the possible restrictions to the use of plastic pipes for water supply to the site.

The site is brownfield and organic contamination (PAH) has been identified in exceedance of the threshold values and Hydrock believes barrier pipe is required. However, confirmation should be sought from the water supply company at the earliest opportunity.

5.6 Contamination risks to ground workers

Whilst risks to construction workers are not discussed in detail, the following section discusses potential risks that should be considered.

Information presented in this document is provided to assist in managing the risk associated with contamination in soil and groundwater at the site but is not definitive. The Contractors are responsible for undertaking their own assessments and assessing what risks are present and what control measures are required.

Task specific risk assessments and method statements should be in place, and risks and required mitigation measures communicated to all relevant personnel prior to the works commencing. Appropriate PPE and, if required, RPE should be provided and utilised.

5.6.1 *Metals, metalloids, PAH and petroleum hydrocarbons*

The Made Ground soils contain loose asbestos fibres, elevated concentrations of metals, PAHs and hydrocarbons. Appropriate PPE and methodology will be required during the course of the construction works.

5.6.2 *Ground Gas*

The previous investigation by Enzygo included six monitoring visits for gas and groundwater. The report concluded that a risk from ground gas did not exist and no gas protection measures were required for the proposed development.

5.6.3 *Asbestos*

The ground investigations have identified two visible fragments of ACM (HP207 and HP208) and low concentrations of asbestos fibres (WS8, 0.003%) in the soils.

All site staff should be made aware of the possibility to encounter unidentified fragments of asbestos within the Made Ground soils anywhere on the site at any stage of the development. It is advised that the Contractor should consider supplying suitable and sufficient 'Asbestos Awareness' training (specific to asbestos in soils) to all site staff who could foreseeably encounter asbestos containing materials during the course of their work.

The Contractor for each stage of works must undertake a suitable and sufficient Risk Assessment in accordance the Regulation 6 of the Control of Asbestos Regulations 2012 (CAR2012). The results of the assessment should be used to compile a methodology in accordance with Regulation 7 of CAR2012, which limits the potential exposure and spread of asbestos fibre. Appropriate training should be provided to all site staff identified within the risk assessment as having the potential to be exposed or encounter asbestos during their work in accordance with Regulation 10 of CAR2012.

It is the responsibility of the Contractor to ensure that mitigation measures are suitable and sufficient to prevent exposure to airborne asbestos so far as is reasonably practicable in accordance with Regulation 11 of CAR2012. However, the asbestos fibres detected at the site are within a soil matrix, if the soils are kept damp and appropriate site hygiene measures are in place, this should assist in minimising the risk of the release of airborne fibres.

5.7 *Findings of the generic contamination risk assessments*

The potential sources, pathways and receptors identified in the preliminary conceptual site model (Section 3) have been investigated (Section 4) and assessed (Section 5). A Source-Pathway-Receptor linkage assessment has been undertaken and is presented in Appendix E (Table K.2).

A summary of the Source-Pathway-Receptor (S-P-R) contaminant linkages for which the risks may be unacceptable and require mitigation (those that are moderate or higher) are discussed in Table 5.4.

Table 5.4: Final conceptual model and residual risks following risk evaluation

Contaminant Linkage				Comments	
Pollutant Linkage	Sources	Pathways	Receptors	General	Mitigation
PL 1.	Metals and PAH within the Made Ground	Ingestion, inhalation or direct contact.	Human health.	Exceedance of the GACs.	Mitigation required, likely in the form of a cover system and source removal of pervasive impact within the sub-base materials
		Leaching through unsaturated zone	Groundwater		
		Direct contact	Water supply pipes		
PL 2.	Asbestos within the Made Ground	Inhalation of fugitive dust	Human health	Asbestos fibres proven to be present	Mitigation required, likely in the form of a cover system and source removal.
PL 3.	Petroleum hydrocarbons within the Made Ground	Inhalation, ingestion or direct contact	Human health	Exceedance of the GACs	Mitigation will be required in the form of source removal. Source is noted to be the sub-base material.
		Leaching through unsaturated zone	Groundwater		
		Direct contact	Water supply pipes		Direct contact with buried water supply pipes is likely and mitigation will be required.

The mitigation measures appropriate to the identified risks are discussed and presented in Section 9 to Section 16

6. WASTE AND MATERIALS MANAGEMENT

6.1 Waste

6.1.1 Introduction

Any material excavated on site may be classified as waste and it is the responsibility of the holder of a material to form their own view on whether or not it is waste.

Prior to removal from site, any waste material must be classified as being either hazardous or non-hazardous, using the characterisation assessment and analysis described by the WM3 technical guidance. Then, if a waste hierarchy assessment determines that disposal to landfill is the appropriate option for the waste, chemical WAC testing must be undertaken on the actual soils designated as waste and destined for inert, stable non-reactive hazardous or hazardous classes of landfill.

The following section is a preliminary classification of waste based on the site investigation data. However, the actual classification can only be undertaken by the receiving landfill as licence conditions vary from landfill to landfill. If material is to be removed from the site, prior to export, the data in this report should be presented to the proposed receiving landfill site for it to confirm that it is suitably licensed to accept them. Additional testing on the actual excavated soils to be disposed of, will be necessary at the time of disposal.

6.1.2 Preliminary waste classifications

Based on the site history, WAC testing and the HazWasteOnline™ assessment (see Appendix D), it is considered that:

- Hazardous waste identified at WS2 (0.3m), WS3 (0.3m), HP202 (0.2m), HP205 (0.2m) and HP207 (0.2m).
- the Made Ground below the remainder of the site is likely to be classified as non-hazardous waste and is likely to require disposal at a non-hazardous landfill.
- Any soils containing > 0.1% asbestos or visible asbestos containing materials would be considered as hazardous. NB isolated visible fragments of ACM identified in HP207 and HP208.

It should be noted that:

- The above preliminary assessment has been made on the basis of the soils tested as part of the ground investigation. Prior to disposal, the characteristics of the actual soils to be disposed of will need testing and classification in consultation with landfill sites and waste disposal Contractors. The receiving landfill will make the final decision on the classification and acceptability of the waste.
- Non-hazardous soils require pretreatment (separation, sorting and screening) prior to disposal.
- The costs for disposal of non-hazardous and hazardous soils are significant compared to disposal of inert material.
- In addition to disposal costs, landfill tax will be applicable. Non-hazardous and hazardous waste will generally be subject to the Standard Rate Landfill Tax (£96.70 per tonne since April 2021). Inert waste will generally be subject to the Lower Rate Landfill Tax £3.10 per tonne since April 2021).

6.2 Materials management

6.2.1 Introduction

From 1 April 2018, the scope of Landfill Tax has been extended to sites operating without the appropriate environmental disposal permit, and operators of illegal waste sites will now be liable for Landfill Tax. Full details are available at: <https://www.gov.uk/government/publications/landfill-tax-disposals-not-made-at-landfill-sites/landfill-tax-disposals-not-made-at-landfill-sites>.

HM Revenue and Customs (HMRC) will be charging landfill tax on illegal waste deposits on construction sites and HMRC also has the ability to prosecute for landfill tax evasion fines for any illegal deposits. However, where an operator can demonstrate they are compliant with a recognised waste exemption, Code of Practice, or Quality Protocol, they will remain outside the scope of the tax.

In summary, if non-natural or contaminated soils are excavated and reused on sites (or soils are moved to or from another site for reuse), without a MMP or appropriate Permit in place, anyone who knowingly facilitates the disposal may be jointly and severally liable to any assessment of tax, fines, or prosecution.

It is worth noting that the legislation covering waste management has not changed. However, the mechanism that the Environment Agency and HMRC will use to enforce it has changed.

However, provided that soils are managed in accordance with 'The Definition of Waste: Development Industry Code of Practice', Version 2 (CL:AIRE), known as the DowCoP, the soils will never become a waste.

6.2.2 Materials management scenarios

Naturally occurring, uncontaminated soils

Where soils are naturally occurring, uncontaminated and are reused on the site they are excavated (i.e. completely uncontaminated greenfield site, with no Made Ground), they will fall outside the Waste Framework Directive (WFD) (i.e. they will not be a waste when reused on the site of origin).

However, there needs to be certainty of that reuse, and evidence is necessary to support this strategy. As such, Hydrock would recommend that a Materials Management Strategy document is prepared to prove certainty.

Where soils are naturally occurring and uncontaminated, they only become a waste on leaving the site.

When moving uncontaminated, naturally occurring soils between sites, it must be ensured they are being transferred under a MMP.

Made Ground or contaminated soils

On sites where Made Ground or contaminated (including by naturally occurring chemicals) soils are present, any soils excavated may be a waste.

As such, for any site where Made Ground is present and soils are being moved and reused on, or off site, it could be deemed a waste, and subject to either:

- a Materials Management Plan (MMP), to prevent the material ever being classified as a waste; or
- an exemption (for limited volumes); or
- a permit, dependant on its status.

If Made Ground is being moved between sites, it must be ensured that appropriate permits are in place to ensure the soils are not classified as a waste.

All recycled materials (6F2 etc.) must be produced under the 2013 Aggregates Protocol, whether on site or off site. If it is not, then it will be deemed a waste and can only be used on site under a permit. More information can be found at <https://www.gov.uk/government/publications/quality-protocol-production-of-aggregates-from-inert-waste>.

If materials are not managed as above, all materials placed would be deemed a waste and subject to Landfill Tax at the Standard Rate (£84.40 per tonne as at 1 April 2018).

6.2.3 *Materials management plan*

Where required, to prevent soils being classified as waste, all materials / soils movements should be managed under the CLAIRE Definition of Waste: Development Industry Code of Practice (DoWCoP) and a Materials Management Plan (MMP).

Under DoWCoP, to prevent materials being classified as waste, the following factors need to be proven to ensure the soils to be excavated are not waste:

- Factor 1: Protection of human health and protection of the environment.
- Factor 2: Suitability for use, without further treatment.
- Factor 3: Certainty of Use.
- Factor 4: Quantity of Material.

Hydrock recommend that the reuse of soils at sites should be considered during the planning and development process.

Under the DoWCoP, all soils reused must be tested post-excavation to prove they are fit for use. Construction activities carried out on uncontaminated soils solely for the purpose of improving geotechnical properties e.g. lime / cement modification, are not generally regarded as waste treatment operations and do not require a permit. Should processing be needed (such as screening, treatment or improvement), that would constitute a waste activity and require a mobile treatment permit. This may be as simple as removing oversize material with an excavator bucket, to using a riddle bucket to remove hardcore to full mechanical screening.

Once the MMP is collated, it must be declared by a Qualified Person:

- before soils are placed (where soils are naturally occurring, uncontaminated and reused on the site of origin); or
- before excavation of soils is undertaken (on sites where Made Ground or contaminated soils are present, or soils are to be imported).

Once all material movements have been completed in accordance with the MMP a verification report must be produced, kept for 2 years and provided to the EA on request.

6.2.4 *Conclusions*

In summary, with regard to materials management:

- The reuse of soils at sites should be considered during the planning and development process.
- If uncontaminated, naturally occurring soils are being excavated and reused on the site of origin in the course of construction activities (i.e. the site is greenfield), a MMP is not required. However,

Hydrock would recommend that documentation is prepared that sets out the reasoning for why excavated soils considered not to be a waste.

- If non-natural or contaminated soils are excavated and reused on sites without a MMP, exemption, or appropriate Permit in place, anyone who knowingly facilitates the disposal may be jointly and severally liable to any assessment of tax, fines or prosecution.
- If soils are being moved from one site to another, they need to be uncontaminated, naturally occurring soils and a MMP needs to be in place; or, if Made Ground, appropriate permits must be in place to ensure the soils are not classified as a waste.
- If processing is being undertaken, an appropriate permit must be in place.
- The MMP must have a declaration by a Qualified Person, and verified to ensure it has been undertaken as planned.
- All recycled materials (6F2 etc.) must be produced under the 2013 Aggregates Protocol, whether on site or off site, certificates will be required to prove this.

6.2.5 *Site Specific*

It is presently understood that excavated soils will, following determination of suitability of soils, be disposed of to an appropriate facility or re-used where found to be naturally occurring, clean soils.

7. UNCERTAINTIES AND LIMITATIONS

7.1 Site-specific comments

Ground investigation to data has been limited to the accessible areas of the site. As much of the site is presently occupied by building structures investigations have been limited in the footprint of the buildings.

7.2 General comments

Hydrock Consultants Limited (Hydrock) has prepared this report in accordance with the instructions of Oriel Housing Ltd (the Client), under the terms of appointment for Hydrock. Hydrock shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared and provided.

This report details the findings of work carried out by Enzygo in 2020 and Hydrock in 2021. The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, all potential environmental constraints or liabilities associated with the site may not have been revealed.

Hydrock has used reasonable skill, care and diligence in the design of the investigation of the site. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths of trial pits and boreholes at the time of the investigation. At intermediate locations, conditions can only be inferred.

Groundwater findings described are only representative of the dates on which they were made and levels may vary.

Unless otherwise stated, the recommendations in this report assume that ground levels will remain as existing. If there is to be any reprofiling (e.g. to create development platforms or for flood alleviation) then the recommendations may not apply.

Information provided by third parties has been used in good faith and is taken at face value; however, Hydrock cannot guarantee its accuracy or completeness.

Where the existing reports prepared by others have been provided by the Client, it is assumed that these have been either commissioned by the Client, or can be assigned to the Client, and can be relied upon by Hydrock. Should this not be the case Hydrock should be informed immediately as additional work may be required. Hydrock is not responsible for any factual errors or omissions in the supplied data, or for the opinions and recommendations of others. It is possible that the conditions described may have since changed through natural processes or recent activities.

The work has been carried out in general accordance with recognised best practice. Unless otherwise stated, no assessment has been made for the presence of radioactive substances or unexploded ordnance. Where the phrase 'suitable for use' is used in this report, it is in keeping with the terminology used in planning control and does not imply any specific warranty or guarantee offered by Hydrock.

The chemical analyses reported were scheduled for the purposes of risk assessment with respect to human health, plant life and controlled waters as discussed in the report. Whilst the results may be useful in applying the Hazardous Waste Assessment Methodology given in Environment Agency

Technical Guidance WM3, they are not primarily intended for that purpose and additional analysis will be required at the time of disposal to fully classify waste.

Unless otherwise stated, at the time of this investigation the future routes of water supply pipes had not been established. This investigation and sampling strategy may not be fully compliant with UKWIR recommendations. Consequently, a targeted investigation and specific sampling and chemical testing may be required at a later date once the routes of the supply pipes are known. In addition, it is recommended that the relevant water supply company be contacted at an early stage to confirm its requirements for assessment, which may not necessarily be the same as those recommended by UKWIR.

Whilst the preliminary risk assessment process has identified potential risks to construction workers, consideration of occupational health and safety issues is beyond the scope of this report.

The non-specialist UXO screening has been undertaken for the purposes of site investigation only (i.e. low risk activity in accordance with CIRIA Report C681). Further assessment should be undertaken with regards to other higher risk activities e.g. construction.

Please note that notwithstanding any site observations concerning the presence or otherwise of archaeological sites, asbestos-containing materials or invasive weeds, this report does not constitute a formal survey of these potential hazards and specialist advice should be sought.

Any site boundary line depicted on plans does not imply legal ownership of land.

8. RECOMMENDATIONS FOR FURTHER WORK

Following the ground investigation works undertaken to date, the following further works will be required:

- discussion and agreement with service providers regarding the materials suitable for pipework;
- discussions with regulatory bodies regarding the conclusions of this report;
- formulation of a Remediation Strategy and Verification Plan – addressed in subsequent sections of this document (and agreement with the regulatory bodies);
- production of a Materials Management Plan relating to reuse of soils at the site and import of soils to the site (if re-use is proposed);
- remediation and mitigation works; and
- verification of the earthworks, remediation and mitigation works.

9. REMEDIAL STRATEGY

Remediation will be undertaken such that the site is suitable for its proposed new use (residential without plant uptake). The required standard of remediation will be achieved through a variety of techniques as outlined in the following sections.

The objectives of the remediation works are to:

- break the linkage between the contaminants in the Made Ground soils and future site users, potable water pipes of the new development and underlying groundwater; and
- minimise off-site disposal requirement.

The implementation of the remediation strategy will be in accordance with documented quality assurance procedures to be prepared by the remediation contractor. These will include the following:

- *Site Specific Remediation Method Statement* – Where necessary, this document will set out the contractor's site-specific methodology for delivering the works and requirements for gathering data to demonstrate the effectiveness of the remediation.
- *Verification Report* – A verification report provided by Hydrock will provide a complete record of the remediation activities undertaken at the site and the data collected as part of the verification plan to support compliance with remediation objectives and criteria. It will also include descriptions of the works with associated 'as built' drawings and details of any unforeseen conditions encountered during the works and how they were dealt with.

In addition to the above, the contractor (for all phases of works) will be required to secure all necessary permits and licences to allow remediation to be undertaken and prepare appropriate health and safety risk assessments and method statements.

9.1 Remediation Options Appraisal

The first step in the remediation strategy is to undertake a Remediations Options Appraisal, outlining a number of feasible remediation options. The suitability of these methods is assessed on the basis of their effectiveness, durability, environmental impact, cost, sustainability, operational time, and practicality.

A full remediation options appraisal has been undertaken for the site and is presented within Appendix H.

Based on the identified Source-Pathway-Receptor (S-P-R) contaminant linkages and the assessment of different remediation methods, it is recommended that;

- An engineered cover system is installed in any areas of landscaping or Public Open Space;
- A Material Management Strategy (MMS) is implemented to manage the excavation, processing, and reuse of suitable material;
- Off-site disposal of unsuitable material if it is not reusable.

9.2 Summary of Remediation Stages

Based upon the findings of the ground investigation and risk assessment and the Remediation Options Appraisal (presented in Appendix H), the following works will be undertaken to create a site which is suitable for its proposed end use.

It should be noted that if soils are to be reused on site, works will need to be completed in accordance with the 'CL:AIRE Definition of Waste Development Industry Code of Practice, 2nd Edition' and the Contractor will need to write an appropriate Material Management Plan and provide a 'Qualified Person (QP) Declaration'.

The following remedial activities will be required to deliver the site Suitable for Use (SFU) for the defined commercial end use and can be separated into Enablement Phase and Construction Phase.

The remediation works should aim to maximise the reuse of soils on site and minimise off-site disposal, whilst recognising the end goals of the various specifications.

9.2.1 Pre-Demolition Phase

- Task 1: Project setup and management including liaison with the Local Authority, Environment Agency and Health and Safety Executive, where necessary, with appropriate permits / licences / consents / approvals granted
- Task 2: Appointment of an appropriate contractor and appropriate permits / licences / consents / approvals

9.2.2 Demolition Phase

Where required a demolition to ground level is anticipated to be covered by a standalone demolition strategy. This should include removal of all identified and encountered asbestos within buildings and existing structures under controlled conditions in line with CAR 2012.

9.2.3 Enablement Phase

The following works are considered necessary during the Enablement Phase of works:

- Task 3: Demolition, break out of hardstanding and below-ground obstructions and below slab inspection
- Task 4: Removal of any below ground tanks, existing drainage system and associated pipework (if encountered)
- Task 5: Excavation and removal of sub-base impacted soils and any hydrocarbon contaminated soils as required
- Task 6: Removal and mitigation of asbestos (if encountered)
- Task 7: Excavation to the required formation level and materials management
- Task 8: Off-site disposal of waste material
- Mitigation measures during Enablement Works
- Validation during Enablement Works

It is anticipated the Enablement Phase of work will be undertaken by a single Contractor, referred to as the Enablement Contractor.

9.2.4 *Construction Phase*

The Construction Phase of works will either be undertaken by a separate Contractor, or the same Enablement Works Contractor. The Contractor shall undertake:

- Task 9: Installation of barrier pipework (requirement to be confirmed with water supply company)
- Task 10: Installation of a cover system (in areas of soft landscaping)
- Validation during Construction Works

9.2.5 *General Note*

All staff for all phases of work, should be made aware of the possible presence for asbestos within the Made Ground soils anywhere on the site at any stage of the development (Demolition, Enablement and Construction).

The Contractors for each stage of works must manage the risks in accordance with their legal requirements and will need to prepare appropriate health and safety documentation and obtain appropriate approvals, licences, consents and permits prior to commencement. In addition, appropriate working methods, monitoring and reassurance testing will need to be undertaken during the works.

All works on site during any phase of work will require the use of suitable air monitoring, personal protective equipment (PPE) and respiratory protective equipment (RPE) as required by current guidance, practice guidance and legislation.

All works need to be undertaken in accordance with the Remediation Method Statement (this document) and, if required, a Materials Management Strategy with a QP Declaration.

All remediation works are to be overseen by suitably experienced site staff and a site watching brief where periodic visits will be made by Hydrock Consultants to undertake the necessary verification.

10. REMEDIATION STRATEGY IMPLEMENTATION - PRE-DEMOLITION PHASE

10.1 Task 1: Project set-up

Prior to commencement of site activities, detailed planning of the project shall be undertaken including liaison with relevant stakeholders. This report, along with copies of previous environmental reports regarding the Site, should be submitted to the Local Authority, the Environment Agency where required, and the NHBC for comment.

The project is to be operated under the Construction, Design and Management (CDM) Regulations, (2015).

10.2 Task 2: Contractor appointment

Under the CDM regulations, a Principal Designer should be appointed, who would provide the Pre-construction Information Report (PCIR) and a Principal Contractor who would provide a site-specific Construction Phase Health and Safety Plan (CPHASP) prior to works commencing. If the client does not appoint a Principal Designer, they will assume the role.

The Principal Designer will review the CPHASP and notify the local office of the Health and Safety Executive (HSE) of the works prior to commencing (via form F10).

The Principal Contractor must manage the risks in accordance with the requirements outlined in this document and will need to prepare appropriate health and safety documentation and obtain appropriate approvals, licences, consents and permits prior to commencement.

The Principal Contractor will be responsible for implementing any Materials Management Strategy for the site developed by a suitably qualified and experienced consultant.

The Contractors will need to have suitable experience working in a similar setting, with similar ground conditions and with the Contaminants of Concern present at the site.

11. REMEDIAL STRATEGY IMPLEMENTATION - ENABLEMENT PHASE

The Enablement Contractor will undertake the following works.

11.1 Task 3: Demolition, breaking out of hardstanding and below ground obstructions and below slab inspection

The enabling works contractor shall demolish, break up and remove below ground structures in accordance with any agreed specification. These are likely to include, but are not limited to slabs, pits, drains, hardstanding, foundations, relict structures, service ducts, underground storage tanks and basements etc.

All broken up materials shall be segregated and stockpiled within the approved working area of the site. Material shall be stockpiled at locations to be agreed with the Client and after submission of the detailed method statements. Asphalt/Tarmacadam should be stockpiled separately.

Where below ground structures that may have been sources of contamination are removed (e.g. tanks) the contractor shall inform the Consultant after the soils are exposed so that they may attend and witness the excavation. The contractor shall survey to Ordnance Survey Grid (using Total Station survey equipment) the base and sides of all excavations and will provide a composite base of excavation drawing for reference during the works, and as built records.

During the excavation of slabs etc. the contractor will undertake additional visual investigation, with any additional plausible contamination sources (hotspots/tanks/drainage runs/visible ACM etc) to be added to the remedial requirements.

The contractor shall provide adequate protection against collapse of the excavations and suitable groundwater control measures shall be put in place until any voids are backfilled to a suitable geotechnical specification.

The contractor shall ensure that, where structures or services cross the site boundary and are to remain, the risk of any future contamination entering or leaving the site area through these pathways is negligible. The contractor shall state his methodology for ensuring this requirement.

All unsuitable material is to be removed from site to a suitably licensed facility.

11.2 Task 4: Removal of any below ground tanks, existing site drainage, and any residual pipework

The existing drainage system and any tanks (not presently anticipated) and associated pipework which are encountered are to be subject to controlled decommissioning, decontamination and removal in accordance with relevant guidance detailed within: 'Groundwater Protection Code: Petrol Stations and Other Fuel Dispensing Facilities Involving Underground Storage Tanks' (Defra, November 2002).

The contractor shall take care to assess the contents, construction material and insulation of any pipes or structures prior to any disturbance to avoid the uncontrolled release of contaminants (including, but not limited, to petroleum hydrocarbons and asbestos).

Any asbestos encountered should be dealt with in accordance with the Control of Asbestos Regulations 2012.

The contents of any tanks are to be investigated and tested by suitably qualified specialist subcontractors. Enabling activities should take care to prevent the spills and leaks of oils, chemicals etc. prior to decommissioning.

A watching brief should be kept during the works by the Consultant and if impacted material is present during excavation, these materials should be stockpiled separately (i.e. quarantined) for testing prior to reuse if suitable.

The excavation of buried tanks, if encountered, is to be witnessed by the Consultant (the enabling works contractor is to notify the Consultant when tanks are encountered and are to be removed) and the base of excavations are to be surveyed.

11.3 Task 5: Excavation and removal of hydrocarbon contaminated soils

Hydrocarbon impacted soil removal will be undertaken by excavation of soils from areas of contamination identified during the previous investigation works. Hydrock will undertake a watching brief on behalf of Oriel Housing Ltd and the Enablement Contractor is to inform Hydrock prior to hotspot excavation.

It is recommended that soils classified as hazardous waste is removed to a depth of 0.5m in a 5x5m area at each highlighted position shown on the Remediation Plan (ref: 19411-HYD-XX-XX-DR-G-0004). The excavations should be validated and further delineated as required, should evidence for further impact remain.

If previously undiscovered petroleum hydrocarbon impacted soils are encountered, delineation will be required by the Enablement Contractor during remediation to define the extents of all hotspots and contamination encountered. The Enablement Contractor will need to have an experienced Geo-environmental Engineer present during excavation to inspect for suspect material and oversee effective segregation, stockpiling and validation of soils. The contractor is to satisfy itself with regards to volumes of soil to be excavated, remediated or disposed of and replaced. Hydrock Consultants accept no liability with regards to volume estimates calculated.

The soils below/around all hotspots or areas of visual/olfactory evidence of hydrocarbon contamination uncovered during enablement works shall be inspected, tested and validated by chemical testing.

Validation of the removal of the hotspots is proposed by the chemical analysis of samples recovered from the sides and base of hotspot excavations. For large excavations in excess of 100m², a 5m validation grid (on all sides and base) is proposed.

Validation is to be undertaken by an experienced geo-environmental engineer (working on behalf of the contractor or the Client) in accordance with the remedial target values (RTVs) determined by the GAC for a residential without plant uptake end use (Table 7.1 in Section 12.2.4).

If hotspots for other contaminants of concern (CoC) are identified during further investigation works, RTVs will be developed for the relevant CoC.

Once the excavation has been validated, the excavations are to be backfilled in accordance with a geotechnical specification, where required.

11.4 Task 6: Removal and mitigation of asbestos (if encountered)

Loose chrysotile asbestos fibres (0.003%) were identified at WS8 (0.3m) by Enzygo and isolated visible fragments of “ACM tile” were encountered by Hydrock during ground investigation works. There is the potential to uncover further asbestos during any stage of the works.

All excavated soils and the formation level shall be inspected for incidental suspect visible ACM and, if encountered, any visible ACM will be handpicked and disposed of by a suitably qualified contractor in line with the mitigation measures detailed in Section 11.7 and all relevant legislation and best practice guidance.

If hotspots of visible ACM are found, these should be excavated under a watching brief by a suitably trained and experienced Geo-environmental Engineer, the sides and base of the excavation validated by visual inspection and if required, testing of the base and sides to confirm <0.1% w/w asbestos. For large excavations in excess of 100m², a 5m validation grid (base and sides) is proposed. The Contractor responsible for these works should have appropriately trained staff with respect to asbestos working.

11.5 Task 7: Excavation to the required formation level and materials management

Soils on site will be excavated to reach the required formation level as specified outside of this document. Excavated materials will be stockpiled and tested to determine their fate (on-site re-use or off-site disposal) in accordance with a Materials Tracking System which the contractor will be required to formulate.

Reuse of soils will need to be undertaken in accordance with the CL:AIRE ‘Development Industry Code of Practice - Definition of Waste’ i.e. in accordance with an approved Materials Management Strategy.

Segregation and stockpiling of soils will be based on the following suitability criteria:

- Soils potentially suitable for reuse on site (if proposed).
- Soils for removal off site due to volumes.
- Soils unsuitable for use (e.g. untreated petroleum hydrocarbon hotspots or soils containing gross ACM) to be disposed of off-site.

Soils that are to be reused on site will be tested, recorded in the Materials Management Strategy and accompanied with supporting excavation and placement logs.

All soils and chemical testing shall be carried out by a UKAS and MCERTS accredited laboratory, with accreditation for the specific analysis, to the approval of the Engineer / Hydrock.

The Contractor is to make available on site at all times a file containing all test data received for inspection by the Engineer / Hydrock.

Placement of soils and other materials should be in accordance with a geotechnical specification, where required.

11.6 Task 8: Off-site disposal of waste material

Any surplus (i.e. soils which cannot be reused on site due to volumes), or unsuitable soils (i.e. soils which cannot be reused in an appropriate location), or are not geotechnically suitable, shall be disposed of by the Contractor at the Contractors cost. If in the opinion of the Consultant the material is not suitable for use, the Contractor is to remove and dispose of it in accordance with the RS.

All arisings should be regarded as contaminated unless proven otherwise. Any soils to be removed from site are to be removed to a licensed waste management facility and the waste is to be transported by a registered waste carrier in accordance with applicable Waste Management Regulations.

All testing to allow disposal of waste is to be undertaken by the Contractor at the Contractors cost.

Waste consignment/transfer notices will be required and are to be retained by the Contractor. Copies of all waste consignment/transfer notices are to be provided to Hydrock Consultants for inclusion in a validation report.

A Site Waste Management Plan may be required and it is the responsibility of the Enablement Contractor to ensure one is in place if required.

11.7 Mitigation Measures during Enablement Works

11.7.1 Asbestos

The following mitigation measures should be put in place to mitigate the release of airborne fibres during excavation works and in case of encountering any gross visible Asbestos Containing Materials (ACM).

All excavated soils and the formation level shall be inspected for suspect material and, if encountered, any visible ACM will be handpicked and disposed of by a suitably qualified contractor. These works are to be undertaken under a Hydrock watching brief.

With regards to the excavation of soils and as far as reasonably practicable, the removal of gross ACM is required. It should be noted that:

- In accordance with CAR 2012 (Regulation 16) the Contractor has a duty to 'prevent or reduce the spread of asbestos anywhere where work is being carried out under their control'. Where complete prevention is not reasonably practicable (this would constitute such a case), the regulation requires the Contractor to reduce to the lowest level reasonably practicable the spread/potential for fibre release of asbestos from any place where work under the Contractor control is carried out.
- CAR 2012 notes that the Contractor should select and use work methods that will reduce the disturbance and release of asbestos fragments and fibres to minimise the risk of spread, e.g. by removing items intact or whole and by using dust suppression techniques. ACMs must never be left loose or in a state where they can be trampled on or spread. All asbestos waste should be bagged or wrapped promptly after removal and the waste should be removed from the work area regularly.
- Additionally, where enclosures are not used (and this is one of those instances, as it is not reasonably practicable to do so), the Contractors risk assessment should establish what will be required to make sure that, as far as is reasonably practicable:
 - » the spread of asbestos is prevented (airborne fibres and asbestos in soils);
 - » people not involved in the work are excluded from the area;
 - » the work area is totally cleaned after work is completed.
- For the proposed activities, there are two activities which could release fibres 1) excavation of soils containing gross ACM and 2) placement of soils containing gross ACM. It reasonably practicable for visible 'gross'/highly fibrous materials to be handpicked and doubled bagged at the point of

excavation. As this material has then been removed, and the potential to liberate fibre on the second activity (placement) has thus been alleviated or reduced to as low level as reasonably practicable.

- As such, in addition to a surface inspection and pick, hand picking of gross ACM is required during excavation and placement activities to ensure that as far as reasonably practicable all visible gross ACM has been removed.

Licensable asbestos lagging has not been detected during the site investigation. However, if during the enablement works it is encountered, all staff undertaking the hand picking must be suitably qualified to handle licenced unbound asbestos. The Contractor is to confirm with Hydrock the qualifications and the suitability of staff prior to commencement. It should be noted that in Hydrock's opinion, Asbestos Awareness is not an appropriate level of competency to pick licenced ACM/asbestos.

The working Detailed Remediation Method Statement (DRMS), including task specific risk assessments and method statements should be prepared by the Contractor and be in place, and risks and required mitigation measures communicated to all relevant personnel prior to the works commencing. Appropriate monitoring, PPE and RPE should be provided and utilised. The working method shall be provided to Hydrock for comment two weeks prior to commencement on site.

Visible fragments of suspected asbestos containing materials on the site surface shall be handpicked. In addition to the controls required under CAR 2012, there may be a requirement to deploy an Environmental Permit. The Contractor is to form their own opinion and either:

- deploy a permit; or
- in accordance with the Environment Agencies 'Remediation Position Statements', dated 7/11/2010, notify the Environment Agency of the activity a minimum of 5 days before start. The EA may then request deployment of a MPP.

All ACM shall be placed in a dedicated covered and lockable skip pending off-site disposal to a suitably licensed facility. Such remediation measures will be undertaken by suitably qualified contractors and in accordance with CAR 2012.

Air monitoring for asbestos is required on an ongoing basis during the enablement works (frequency to be set out in the Asbestos Working Plan) and the results shall be compared with acceptable maximum standards set by the HSE. These air monitoring procedures and limits are given in HSG 248 entitled 'Asbestos: The analysts' guide for sampling, analysis and clearance procedures' and CAR 2012. The monitoring should be undertaken by a UKAS accredited laboratory. The limit used is governed by the levels stated in the above guidance documents and the accuracy of the testing used. However, Hydrock recommends using the most stringent limit set by the HSE. Air monitoring results are acceptable only if they fall below this limit and are as low as reasonably practicable. Exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

11.7.2 *Control of risk from dust emissions*

Dust suppression

To reduce the potential for the generation of dust, it is recommended that double handling of soils is kept to a minimum and soils are disposed of by direct transfer to wagons and measures to minimise dust (e.g. wind or plant / vehicle movements) should be undertaken.

Appropriate risk assessment and mitigation measures should be in place throughout the development. As a minimum, this should include damping down of the site surface, excavations and stockpiles to prevent the generation of dust, additional measures may include:

- stockpiles (if any are created) should be kept to a minimum to reduce 'wind whip' causing potentially hazardous material to be blown from the pile;
- air quality and dust monitoring stations will be set up and monitored by the contractor to record the dust concentrations during the works;
- stockpiles shall be placed on a suitable and robust polythene membrane or hardstanding to prevent any cross contamination;
- care should be taken not to pierce the sheeting when placing the bulky elements of the material;
- stockpiles should be dampened down or covered to prevent dust - whilst the Contractor, based on site constraints, should make the final choice, the options may include covering with plastic/polythene membrane, or by a layer of clean soil material;
- plant will be appropriately loaded to prevent spillages;
- the drop distance from excavator bucket to stockpile/process plant will be kept as short as reasonably practicable to reduce dust; and
- appropriate signage should be displayed so that site workers/visitors are alerted to the potential hazards associated with the material to be stored on site, and roadways within the site will be kept moist by spraying from a water bowser.

Vehicle movements

Risks associated with the transport of soils that potentially contain asbestos fibres, such as dust emission, should be appropriately managed.

The works could create mud from vehicle movements and subsequent tracking off site on vehicle tyres. This will be managed during the works to prevent off site mud transfer. Measures to control these issues may include the provision of a wheel wash facility and when necessary a mechanical road sweeper to further ensure that the road is kept clean.

Personal monitoring

As a matter of good practice, construction workers and services personnel should follow guidance stated in 'HSG 66 Protection of Workers and the General Public during Redevelopment of Contaminated Land' during development works. Adequate standard personal protective equipment and the implementation of basic hygiene measures will be necessary.

Ground workers and sub-surface maintenance workers should be made aware of the possibility of encountering contaminants within soils or groundwater at the site through 'toolbox' talks.

Safe working procedures should be implemented in accordance with CIRIA132, good standards of personal hygiene should be observed, and appropriate levels of PPE provided and utilised.

Eating, drinking and smoking should be strictly prohibited in the development site other than in designated mess areas.

11.7.3 *Management of groundwater*

There will be a requirement to appropriately manage any accumulation of groundwater in excavations. The Contractor will be required to make arrangements for the treatment and disposal of accumulated groundwater during excavation works.

If treatment of groundwater is required it is the Contractor's responsibility to obtain all relevant licences and consents.

11.8 *Validation during enablement works*

The following sections detail validation criteria to be used during the enablement works.

11.8.1 *Testing*

All sampling, logging and testing of soils shall be undertaken in accordance with BS 5930:2015+A1:2020 'Code of Practice for Site Investigations' and BS 10175:2011+A2:2017 'Investigation of Potentially Contaminated Sites – Code of Practice'.

The Contractor shall undertake all testing at a laboratory which holds UKAS and MCERTS accreditation for the specific tests. Where it is not possible to obtain the testing of a material for a specific property to a UKAS or MCERTS accredited method, the Contractor shall obtain permission from the Consultant for the test to be completed at the proposed laboratory before the test is undertaken.

The results of all testing undertaken (and a copy of the test certificates), shall be submitted to the Consultant as soon as they are reported, and no more than one day after issue of the test certificate to the Contractor. It is recognised that different tests may take different time to complete. However, the Contractor shall advise the Consultant of any delay that they are aware of regarding the completion of any tests (e.g. a sample is being retested and the report will be delayed). The Consultant shall be given sufficient time to review the content of the testing and the associated test results.

The Contractor is to make available on site at all times a file containing all test certificates in addition to the testing summary, for inspection by the Consultant.

Test results are to be summarised in a single master spreadsheet (which contains all data) and is to be in a format agreed with the Consultant. Data that does not meet the specification shall be highlighted and include details of what works were undertaken to address the non-compliance. The master spreadsheet, results of chemical testing and drawings shall be maintained and kept up to date. Updated versions of these documents are to be provided to the Consultant by 10:00am every Monday morning throughout the Contract.

11.8.2 *Asbestos*

There is potential for asbestos to be encountered during all phases of development and it is important that the control measures in place are sufficiently robust to prevent release of airborne asbestos fibres into the surrounding environment.

If asbestos is detected during the works the Contractor must ensure they working in full compliance of all Health and Safety requirements (including, but not exclusively CAR 2012).

11.8.3 *Enablement Contractor's Validation Report*

The Contractor will provide a Remediation Validation Report.

All reports provided by the Enablement Contractor shall be available in Adobe pdf format which has been digitally bookmarked at each section heading. All chemical data is also required in Excel format.

The Enablement Contractor will maintain records of the works and a Validation Report shall be prepared by the Enablement Contractor on those aspects of the works it has completed and is responsible for.

The Validation Report will provide a complete record of the remediation activities undertaken at the site and the data collected to support compliance with remediation objectives and criteria. It will also include descriptions of the works with associated 'as built' drawings and details of any unforeseen conditions encountered during the works and how they were dealt with.

This Validation Report shall incorporate a summary of and commentary on:

- Site stripping and clearance activities.
- Asbestos clearance activities (if required) and an asbestos/hazardous material close out report.
- An outline of the remedial action taken to remove asbestos/hazardous materials.
- Details of retained services and obstructions encountered but not removed.
- Records of excavations, including:
 - a. Ordnance Datum survey of extents and depth;
 - b. Ordnance Datum survey of extents and depth of any residual features;
 - c. record of decisions for over-excavation;
 - d. photographic record of each excavation; and
 - e. records of inspection and final extents of validation.
- Records of laboratory analytical and *in situ* field test results, including:
 - a. laboratory results and location plan for each analytical test;
 - b. field test kit results and particulars of monitoring (e.g. date, location, personnel);
 - c. laboratory measurements of accuracy and precision;
 - d. calibration data for field measurement equipment in accord with manufacturers guidance; and
 - e. Chain of Custody forms.
- Waste classification and management documentation, including:
 - a. copies of all consignment notes, in particular those relating to the hazardous waste regulations; and
 - b. details of waste facilities where materials were disposed of.
- Stockpile plan of all stockpiles generated by the works and remaining on site.
- Copies of chemical testing of the stockpiles.
- Final as-built survey of the as excavated voids.
- Final as-built survey of the site (in AutoCAD format).
- Confirmation that site levels are as required by the structural design and GDR.

Information associated with regulatory health and safety, control of noise, nuisance, dust, and waste will be excluded from the technical validation reporting and will be submitted as separate

documentation. This separation is made to differentiate between technical remediation requirements stated herein and operational controls of work.

12. REMEDIAL STRATEGY IMPLEMENTATION - CONSTRUCTION PHASE

The following will be undertaken during the Construction Phase of Works by the Ground Works Contractor.

12.1 Task 9: Installation of barrier pipework (requirement to be confirmed by water supply company)

It is recommended the Contractor is to install Protectaline (or similar) pipework for potable water supply at the site. This is to be validated by the Contractor by the provision of delivery tickets showing Protectaline (or similar) has been delivered to site and by photographic proof provided by the Contractor to the Client and the Consultant that Protectaline pipework (or similar) has been installed.

12.2 Task 10: Installation of an engineered cover system

Where soft landscaping is proposed, i.e. grass or planting, a cover system will be required to mitigate against the risk from elevated concentrations of contaminants in the Made Ground. Areas of soft landscaping in the roof gardens etc will not require a cover system.

Hydrock proposes the following cover systems/excavation depths in these areas:

- Service trenches, over excavation (300mm both sides and 300mm below) and backfill with clean materials.
- Beneath soft landscaped areas, excavate to 450mm below final ground level (deeper where tree pits are required), and replace with an engineered cover system.

With reference to BRE document reference 465, 'Cover Systems for Land Regeneration, Thickness of Cover Systems for Contaminated Land', the installation of a cover system is required and is proposed to comprise (in order of placement):

- a high visibility geotextile marker layer; and
- 450mm of Subsoil and/or Topsoil (minimum 150mm Topsoil).

For areas of proposed trees, tree pits will need to be excavated and additional Subsoil provided above the break layer.

The cover system will be installed by the Contractor and verified by Hydrock Consultants.

The cover system installation should be undertaken in the following steps:

1. Establish the finished ground levels over the site and from this determine the required level of the underside of the cover system.
2. In areas where trees are planned as part of the landscaping the cover system should be increased to allow for the root ball. The dimensions of the tree pit (if required) are to be specified by a qualified arboriculturist in conjunction with the landscape architect.
3. Check the level of the ground surface to ensure that it is at the correct level for the underside of the cover system.
4. Any imported or site won subsoil and imported Topsoil should be stored on site in stockpiles on a geotextile break layer.
5. Install the high visibility geotextile layer.

6. Place the 450mm (minimum) of Subsoil and/or Topsoil, (of which a minimum 150 mm is to be Topsoil) and verify the thickness (Hydrock are to be called to validate – minimum 48 hour notice – as described in Section 13.4.1).

All soils moved and placed as a cover system need to be transported and stored with care to prevent cross contamination. This will include (but not be limited to):

- the stockpiling of soils on a geotextile separator layer;
- using dedicated plant to move the cover system soils, or washing plant thoroughly before use to move cover system soils;
- minimising tracking over contaminated soils;
- separating clean and dirty areas of the site; and
- placing the soils into the final position and not pushing soils across the surface.

12.2.1 *Sourcing of Material*

The criteria for site won material (subsoil) and imported subsoil and Topsoil is detailed in Sections 12.2.3 and 12.2.4. Any imported soils should be from a natural source not expected to be contaminated.

Prior to importation of Topsoil or Subsoil from a commercial supplier, certification should be obtained from the supplier detailing the source site, its previous and current land use and relevant test results. A copy of this should be forwarded to Hydrock Consultants for review and comparison against the import criteria.

If the proposed source is not from a commercial supplier, Hydrock recommend that the source is tested prior to import to confirm it is appropriate for use within the cover system and should be imported under a Materials Management Plan. Material which is imported and subsequently found to fail the criteria will need to be removed from site to an appropriate facility with all costs borne by the contractor.

Following import to site (regardless of the source), chemical testing of the imported soils will be required to confirm the soils imported are the same as those sampled at the donor site. See Section 7.2.4 for quantities of testing and testing schedules.

12.2.2 *Stockpiling of Materials for the Cover System*

On importation of Topsoil and other materials, the materials should be stockpiled at a suitable location on site. Copies of the carrier's consignment notes should be retained and a copy forwarded to Hydrock and be available on request.

Topsoil and Subsoil should be stockpiled separately and away from areas designated for storing other materials or potential sources of contamination. Soils should be stockpiled on geotextile separator layers to prevent cross contamination.

Separate stockpiles should also be created for each different source. Topsoil stockpiles to be kept below 2m in height at all times and traffic on the stockpile to be minimised.

All stockpiles should be identified with clear signs and each stockpile of imported material should be given a clear reference number and designated sheet recording the following:

- identification reference (e.g. Stockpile A, B, C etc.);
- material type (e.g. Topsoil);
- source site;
- the carrier's consignment notes reference numbers;
- the approximate volume (number of loads); and
- which plots the material is to be used on and where (i.e. Plot number and front or rear garden).

Each entry shall be signed and dated by the Site Manager or their Assistant. An example template form is provided in Appendix F. Other templates or documentation may be used. These sheets should be available for inspection by the Client, the Consultant, Local Authority staff and others involved with this development. A copy should also be given to the Consultant when verification visits are made.

12.2.3 *Physical Requirements of Cover System Soils*

Imported topsoil should conform to the requirements of BS 3882:2015 (Specification for Topsoil and requirements for use), or as detailed by the Landscape Architect.

The imported material is to be confirmed by visual inspection of the material by a suitably qualified Geo-environmental Engineer on behalf of the Consultant and if necessary, by laboratory Particle Size Distribution assessment in accordance with the Landscape Specification.

Imported soils should be free of asbestos, metal, plastic, wood, glass, tarmac, brick, paper, concrete or other potentially hazardous foreign material which could cause injury. In addition, all materials must be free from aggressive / invasive weeds (especially Japanese Knotweed and Giant Hogweed) and bulk vegetative growth, in order to ensure negligible risk of subsequent weed problems.

12.2.4 *Chemical Requirements of Cover System Soils*

For all imported soils as part of the cover system, certification from the commercial supplier should be reviewed prior to import, or if not a commercial supplier then the soils should be tested at source.

Chemical testing will then be required once the material arrives at site. Testing should be undertaken at a rate of one test per 250m³, with a minimum of four tests per import round. For any site won material used, this should be tested at a rate of one test per 100m³, with a minimum of four tests per testing round.

Depending on the source or variability of imported material, the Consultant may, at their discretion, request additional testing to be undertaken. If constant sources are used for the Topsoil and Subsoil and the results recorded are consistently acceptable, consideration may be given to reducing the number of samples tested.

The results of chemical testing of all material to be used in the cover system are to be compared with the cover system criteria presented in Table 12.1 below. If any of these thresholds are exceeded the material shall be considered to be unsuitable and disposed of off-site.

Testing should be carried out for the following general suite of contaminants and the results compared to Table 12.1 below:

- As, B (water soluble), Be, Cd, Cr (total), Cr(VI), Cu, Hg, Ni, Pb, S (elemental), Se, V, Zn, cyanide (free), sulfide, pH, asbestos screen, speciated polycyclic aromatic hydrocarbons (PAH, by GC-FID), total phenols and fraction of organic carbon; and
- total TPH.

If total TPH exceeds 100mg/kg, speciated aliphatic/aromatic split testing should be undertaken.

Table 12.1: Import and Re-use Criteria for Cover System (Residential without plant uptake – SOM 1%)

Contaminant	Proposed RTV mg/kg	Contaminant	Proposed RTV mg/kg
Arsenic	40	Acenaphthene	3,000
Beryllium	73	Acenaphthylene	2,900
Boron	11,000	Anthracene	31,000
Cadmium	87	Benz(a)anthracene	5.5
Chromium (total)	400	Benzo(a)pyrene	1.5
Copper	200	Benzo(b)fluoranthene	11
Lead	310	Benzo(ghi)perylene	71
Mercury, inorganic	240	Benzo(k)fluoranthene	15
Nickel	110	Chrysene	13
Selenium	600	Dibenz(a,h)anthracene	1.3
Vanadium	1,200	Fluoranthene	1,500
Zinc	300	Fluorene	2,800
Cyanide (free)	800	Indeno(1,2,3,cd)pyrene	6.3
Phenol (total)	750	Naphthalene	2.3
Total TPH	100	Phenanthrene	1,300
Asbestos	<0.001%	Pyrene	3,700
If Total TPH exceeds 100mg/kg:			
Aliphatics EC5-EC6	42	Aromatics EC5-EC7	370
Aliphatics >EC6-EC8	100	Aromatics >EC7-EC8	860
Aliphatics >EC8-EC10	27	Aromatics >EC8-EC10	47
Aliphatics >EC10-EC12	48	Aromatics >EC10-EC12	250
Aliphatics >EC12-EC16	24	Aromatics >EC12-EC16	1800
Aliphatics >EC16-EC35	15,000	Aromatics >EC16-EC21	1900
Aliphatics >EC35-EC44	15,000	Aromatics >EC21-EC35	1900
		Aromatics >EC35-EC44	1900

* Criteria justification provided in Section 15.3

13. SUPERVISION, VERIFICATION AND REPORTING

Necessary changes to the agreed Remediation Strategy, arising during the course of the works, are to be agreed in writing with the Local Authority prior to being undertaken on site.

It is advised (although not required by the regulators) that details of the environmental works undertaken, the rationale and design for the implementation of this strategy and verification details of the works undertaken are appended to the deeds for the property to ensure the site is sold with full knowledge of the works undertaken and the ground conditions present.

13.1 Site Supervision

Remediation works shall be undertaken with a site watching brief by Hydrock Consultants (The Consultant). The frequency of visits is to be determined relative to the findings during the groundworks/Enablement works.

The Enablement Contractor is to provide appropriate Geo-environmental Engineer supervision during any excavation and validation works.

13.2 Collection of Samples

All samples are to be taken in accordance with relevant guidance (e.g. BS 10175). Soils for inorganic analysis will be sealed in air-tight polythene tubs.

Soils for organic analysis will be sealed in amber glass jars with the minimal practicable headspace.

If required, groundwater samples will be collected in suitable containers and with the correct preservatives, as provided by the laboratory.

All samples shall be scheduled on Chain of Custody forms prior to being dispatched to the UKAS accredited laboratory for analysis. All testing will be MCERTS accredited where available.

On completion of the verification works the appropriate verification documentation will be forwarded to the client and the Local Authority.

13.3 Enablement Phase Verification

Upon the provision of a Validation Report from the Enablement Contractor (see Section 11.8.3), to demonstrate that all of the remediation works have been undertaken in accordance with the Remediation Method Statement, Hydrock Consultants will provide a Verification Report.

The report will be prepared by Hydrock Consultants and will provide a summary of the key elements of work and will be referenced to the agreed redevelopment strategy and planning requirements with supporting information presented within appendices.

This shall be based upon LCRM (Environment Agency, 2021) and will incorporate a summary and commentary of, where applicable:

- background information on the site;
- statutory and regulatory requirements;
- details of the remediation required;
- decision records covering agreements with regulators;

- records of works undertaken and associated validation and monitoring records obtained from the Contractor (specified above e.g. chemical testing data);
- specialist Contractors validation reports for particular elements of work;
- supporting data (e.g. as built drawings);
- final status of remediation and achievement of remedial objectives to satisfy the planning conditions; and
- additional risk assessments/non-scheduled reactive works undertaken.

On completion of the verification works the appropriate documentation will be forwarded to the client and the Local Authority.

13.4 Construction Phase Verification

13.4.1 *Engineered cover system*

Upon completion of the Engineered Cover System by the Contractor, verification pits shall be excavated by Hydrock Consultants in order to measure the thickness of Topsoil and Subsoil present and presence of the high visibility geotextile layer.

These pits should be excavated at a rate of one pit per landscaped area (areas of 5m² or greater), or if a larger area one pit per 625m² (25m x 25m grid).

If the Engineered Cover System is deemed to be insufficient, the Site Manager will be informed and advised on how much more material is needed for the Engineered Cover System to be adequate. In instances where the Engineered Cover System is measured to be inadequate, following the addition of further soil, the verification pits will be re-excavated to confirm that a sufficient thickness of soil is present.

Verification of the Engineered Cover System will only be carried out on areas where the Engineered Cover System has been completed. On completion of the verification works the appropriate verification documentation, detailing the works that have been completed in accordance with the agreed Implementation Plan, will be forwarded to the Client and the Local Authority.

The cover system verification report will include:

- confirmation of the source of imported material;
- confirmation of the capping thicknesses, including photographs of the verification pits with a scaled marker;
- confirmation of the physical suitability of the material in accordance with Section 12.2.3;
- the chemical test results for the samples taken from the stockpiles of soils and confirmation that the material is visually consistent with that tested, or the chemical test results for samples taken once the capping has been placed; and
- confirmation that the chemical test results pass when compared to the criteria in Table 12.1.

14. LONG TERM MONITORING AND MAINTENANCE

In accordance with LCRM, long term monitoring and maintenance may be required in order to verify that remediation objectives have been met.

Based on the identified S-P-R contaminants linkages and provided remediation is undertaken in accordance with the present RS, long term monitoring and maintenance is not considered to be necessary. This will be reviewed accordingly in the event that unforeseen contamination is encountered.

15. REUSE OF SOILS ON SITE AND MATERIALS MANAGEMENT

Any material excavated on site will be classified as waste as soon as it is excavated, unless there is a clear plan in place for the re-use of soils at the site. As noted previously, this requirement can be achieved by compliance with the Contaminated Land: Applications in Real Environments (CL:AIRE) document: The Definition of Waste: Development Industry Code of Practice (DoWCoP) (Version 2), dated March 2011. The handling, re-use or disposal of waste is regulated by the Environment Agency. The Agency will take into account the use of the DoWCoP in deciding whether to regulate materials as waste.

If materials are dealt with in accordance with the DoWCoP, the Environment Agency considers that those materials will not be a waste at the point when they are to be used for the purpose of land development.

The procedures to be followed for the production of the MMP will need to follow the protocols outlined for 'Route A' – Remediation Strategy (as outlined by CL:AIRE) for the re-use of materials on the site of origin (ref CL:AIRE Code of Practice, Appendix 1).

If re-use of materials is proposed, a Materials Management Plan (MMP) will be put in place signed off by a Qualified Person. This MMP will need to assess:

- material suitability, including chemical and geotechnical suitability;
- certainty of use;
- quantity of use;
- on site material management processes;
- validation procedures; and
- a contingency plan if additional materials or out of specification materials are identified.

As noted above, site works must not commence without the MMP in place (i.e. with a Declaration accepted by CL:AIRE); it is not possible to apply an MMP retrospectively.

15.1 Material Suitability

15.1.1 Chemical Suitability

The following section is a summary of chemical suitability based on the site investigation works undertaken at the site.

Made Ground

An engineered cover system is required for all landscaped areas where unremediated Made Ground is present at 450mm below final ground level.

Topsoil

Topsoil is not present on site and will be imported as a growing medium for planting as part of the Engineered Cover System.

Subsoil

Subsoil may be required for the following reasons:

- to backfill voids; and
- as Subsoil in the Engineered Cover System.

Granular Soil

Following demolition, screening and processing of the granular Class 1/Class 6F2 graded soils will be processed and stockpiled.

Careful stockpile management will be required to allow reuse of materials at the site. The use of Materials Management Plans should allow the reuse of soils at the site in accordance with the Code of Practice.

Any other materials not suitable for use, or not required during construction, will need to be disposed of to an appropriate waste disposal facility at the cost to the Contractor.

15.1.2 *Geotechnical Suitability*

The Contractor will be responsible for undertaking any geotechnical testing as required and placing any material to a suitable geotechnical specification.

15.2 Confirmatory Chemical Testing

Material for On Site Reuse – Excavated Material

Additional chemical testing will not be required for re-use of soils beneath hardstanding, buildings or beneath an engineered cover system, except where visual or olfactory evidence of contamination is identified during the works.

If soils are proposed for reuse within the cover system, they will be sampled at the rate set out in Section 12.2.4 and test results compared to the cover system criteria in Table 12.1.

Materials found to be out of specification are to remain on site in segregated stockpiles until such time that they can be disposed to a suitably licenced waste disposal facility.

At each phase of works a record should be maintained by the Contractor of the movement of the stockpiled material and the area within the excavation into which it is placed.

Material for Off-Site Disposal

Any material requiring disposal (during any phase of works) shall be disposed of in accordance with Task 8. It is the responsibility of the Contractor to ensure adequate and appropriate disposal, including testing to satisfy the proposed waste facility.

Records of the removal of stockpiles off site should be maintained by the Contractor including details of the disposal or treatment site to which they have been taken. These details are to be passed to Hydrock to form part of the verification report.

Appropriate precautions should be taken by the Contractor to ensure that the stockpiled material does not result in risks to neighbouring land users.

Imported Material

Imported material will be tested to determine it is suitable for use.

The Contractor importing the material is to provide laboratory analysis to Hydrock to prove the suitability of the material to be brought on to site.

Cover System

If imported material is to be used within the engineered cover system it should comply with the criteria in Sections 12.2.3 and 12.2.4 and the cover system criteria in Table 12.1.

Beneath buildings, hardstanding or cover system

No significant import of soils is anticipated.

If imported material is to be placed beneath hardstanding, buildings or an engineered cover system, it must not contain asbestos >0.01% w/w or visible asbestos (to be confirmed with the LPA).

For imported granular soils (Type 1/6F5/6F2 etc.) beneath hardstanding and buildings, Hydrock propose the following guidelines:

- no visual contamination (oil staining, asphalt, etc.) as confirmed by Hydrock Consultants watching brief;
- limited deleterious material (organics, wood, metal etc.);
- no visible asbestos containing material (ACM) as confirmed by Hydrock Consultants watching brief; and
- asbestos <0.01% (unless otherwise agreed with the LPA).

15.3 Import Criteria Justification

The above import criteria provided within Table 12.1 have been established based on the understanding that imported material is intended to be used for backfilling where required and landscaping.

The lowest value, based on the following hierarchy, has been taken:

- Generic Assessment Criteria protective of plant life (pH >7);
- Import criteria for aliphatic TPH based on an order of magnitude (10x) greater than the average concentration of contaminants encountered during site investigation works; and
- Generic Assessment Criteria protective of residential without plant uptake end use.

The use of the above values will ensure that soils imported will not significantly increase contaminant loading to the site.

A Detailed Quantitative Risk Assessment (DQRA) for Controlled Waters on the values within Table 12.1 has not been undertaken. Nevertheless, Hydrock consider these to be protective of the groundwater environment as they will not significantly increase the contaminant loading at the site which was not considered to pose a risk to Controlled Waters based on conclusions by Enzygo).

The import criteria are qualitatively derived to strike a balance between waste legislation, sustainability for the re-use of non-natural materials and protection of human health, Controlled Waters and plant life receptors and are subject to regulatory approval.

16. CONTINGENCY PLAN AND AREAS OF UNEXPECTED CONTAMINATION

There is potential for areas of unexpected contamination to be present, due to the former use of the site. Any significant quantities of suspected oily or odorous material, significant ashy soils and unusual brightly coloured or asbestos containing materials should be considered as possibly contaminated.

It is recommended that a watching brief be undertaken by Hydrock following demolition of buildings and removal of existing floor slabs to enable inspection of the underlying soils beneath the buildings.

The Discovery Strategy, included in Appendix G, must remain on site at all times during the Enablement and Groundworks Phases of works. This demonstrates a clear allocation of responsibility for reporting and dealing with contamination.

A copy of the Discovery Strategy must be placed on the Health & Safety Notice Board and/or displayed in a prominent area where all site staff are able to take note of and consult the document at any time. Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the requirement to follow the Discovery Strategy.

A report will be prepared by Hydrock and submitted to the regulatory parties, the Local Authority and the Environment Agency where groundwater may potentially have been impacted.

As it is proposed to excavate, screen, sort and where appropriate reuse the soils on site during a separate enablement phase of works, the Discovery strategy will be less relevant to the Construction Phase of works but will still apply.

If additional materials are identified these materials will be subject to the procedures stated in this RS.

17. REFERENCES

BRITISH STANDARDS INSTITUTION. 1999. Code of practice for Site Investigations. BS 5930 Incorporating Amendment No.2:2010. BSI, London.

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BRITISH STANDARDS INSTITUTION. 2003. Geotechnical investigation and testing - Identification and classification of rock - Part 1: Identification and description. BS EN ISO 14689-1 Incorporating Corrigendum No.1. BSI, London

BRITISH STANDARDS INSTITUTION. 2007. Code of practice for the characterization and remediation from ground gas in affected developments. BS 8485. BSI, London.

CL:AIRE. March 2011. The Definition of Waste: Development Industry Code of Practice, Version 2. Contaminated Land: Applications in the Real Environment (CL:AIRE), London.

DEFRA. April 2012. Contaminated Land Statutory Guidance. DEFRA, London.

ENVIRONMENT AGENCY. 2021. Land contamination: risk management.
<https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

HSG 248. 2006. Asbestos: The analysts' guide for sampling, analysis and clearance procedures.

MHCLG. July 2021. National Planning Policy Framework. MHCLG, London.

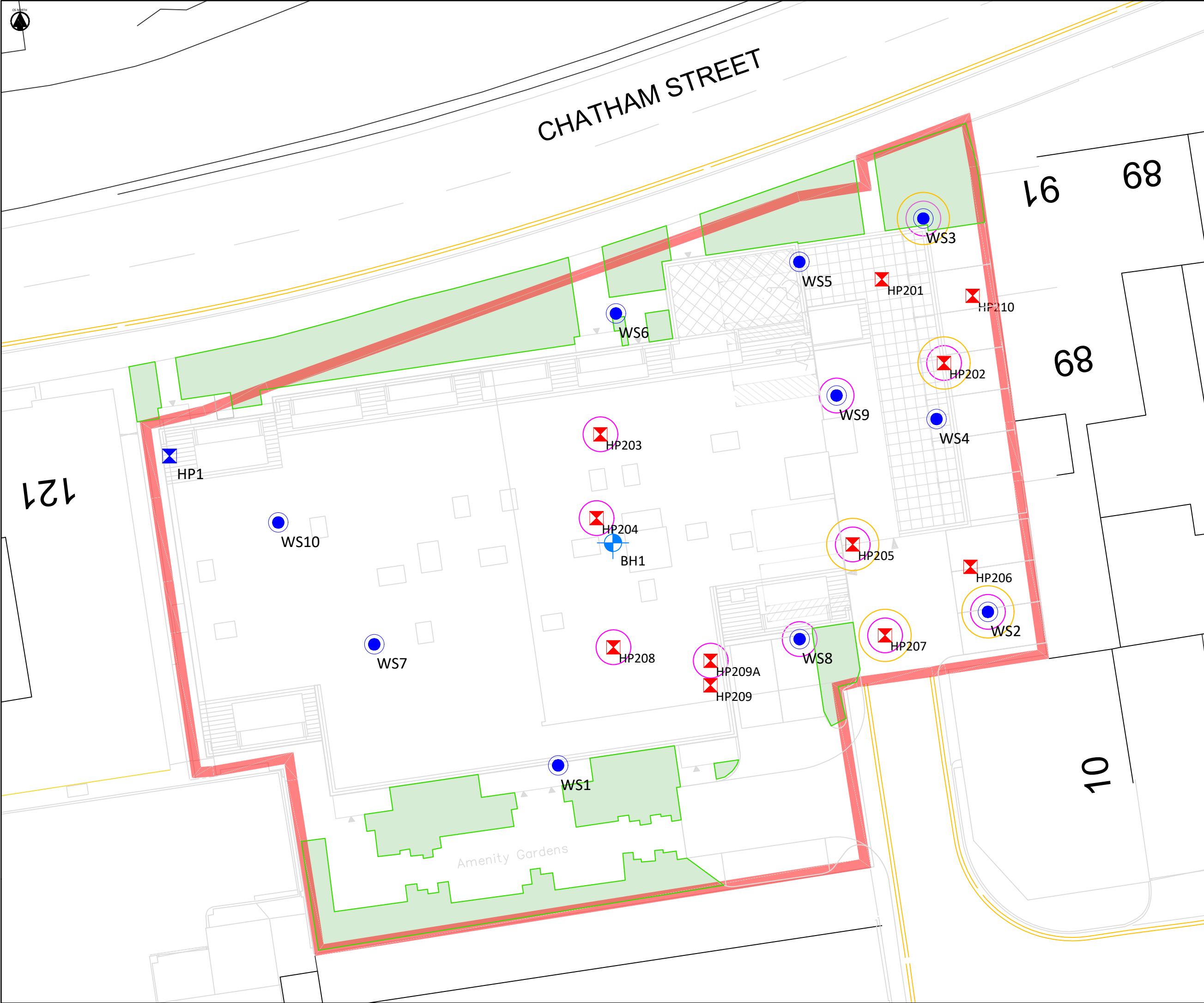
RUDLAND, D. J., LANCEFIELD, R. M. and MAYELL, P. N. 2001. Contaminated land risk assessment. A guide to good practice. CIRIA Report C552. CIRIA, London. 158 pp.

UK WATER INDUSTRY RESEARCH (UKWIR). 2010 re-issued. Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites. Report 10/WM/03/21.

WILSON, S., OLIVER, S., MALLETT, H., HUTCHINGS, H. and CARD, G. 2007. Assessing risks posed by hazardous ground gases to buildings. CIRIA Report C665. CIRIA, London. 182pp.

Hydrock Consultants Limited

Appendix A Drawings



Legend:

- Historical Borehole
- Historical Window Sample
- Historical Hand pit
- Soft Landscaping Area
- Hazardous Waste
- Human Health GAC Exceedance

- Notes:**
- Drawing based on Layout Plan 022014, dated Feb 2021
 - Soft landscaping areas based on Aspect Landscape Planning, Landscape Strategy Plan, ref: 7396/ASP3, dated Feb 2021
 - Historical exploratory locations based on Enzngo, Site Plan, ref: CRM.1265.024.GE.D.001.A, dated Dec 2020.

REVISIONS					
P02	22/03/22	Ammended to show human health exceedance and hazardous waste classification	DAP	AJ	AJ
P01	12/05/21	First Issue.	DAP	AJ	AJ

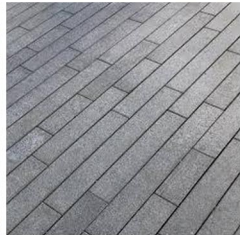
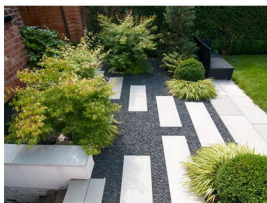
 WHITE BUILDING 1-4 CUMBERLAND PLACE SOUTHAMPTON SO15 2NP t: +44 (0) 2382 140 907 e: southampton@hydrock.com	
CLIENT ORIEL HOUSING LTD	
PROJECT 115 CHATHAM STREET, READING	
TITLE REMEDIATION PLAN	
HYDROCK PROJECT NO. C-19411-C	SCALE @ A3 1:200
STATUS DESCRIPTION INFORMATION	STATUS S2
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER) 19411-HYD-XX-XX-DR-G-1004	REVISION P02



Example of 2m x 2m metal planter proposed along road frontage



Examples of Ornamental Planting



Examples of hard standing

Proposed 2m square steel planters to be situated along the frontage to incorporate a variety of fastigate tree species such as Cherry and Maple

Proposed 0.5m high evergreen ornamental sweet box hedge frames the geometric blocks of ornamental shrub and herbaceous planting

Proposed decorative charcoal slate gravel with ornamental feature shrub planting incorporated to provide an attractive outlook for residents on the ground floor

Focal multi-stem Amelanchier trees provide vertical element within shrub planting beds and create a less overlooked space for residents to enjoy

Individual seating spaces are defined using a change of surface material and are surrounded by evergreen ornamental shrub and herbaceous planting to provide year round structure and seasonal interest

Proposed 3m high Hornbeam pleached trees sit along the southern boundary to create a green canopy to help screen from neighbouring properties. These pleached trees are under planted with formally clipped evergreen hedge and blocks of ornamental planting

Proposed linear paving set within gravel is used to provide a continuation of material through the space, connecting the driveway access to apartment frontages. A combination of charcoal and silver paving colours will be used within the development to help delineate spaces

NOTES:
Based upon the Ordnance Survey map with permission of The Controller of Her Majesty's Stationery Office. © Crown Copyright.
Aspect Landscape Planning Ltd, West Court, Hardwick Business Park, Noral Way, Banbury OX16 2AF
Licence 100065365
Copyright reserved



0m 2m 4m 8m

Key:



Proposed Tree Planting



Proposed Multi-stem Tree Planting



Proposed 3m high Pleached Tree with 2m clear stem



Proposed Ornamental Planting



Proposed Feature Shrubs



Proposed Slate Ground Cover (20-40mm chippings)



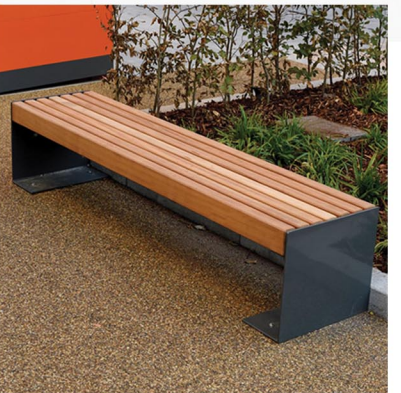
Proposed 0.5m high Formally Clipped Hedgerow



Proposed contemporary Benches



Proposed Linear block paving (Charcoal & Natural)



REV	DATE	NOTE	DRAWN	CHK'D
1				

aspect landscape planning

TITLE
Chatham, Reading
Landscape Strategy Plan

CLIENT
Boyer Planning

SCALE 1:200 @ A3	DATE FEB 2021	DRAWN SB	CHK'D CJ
DRAWING NUMBER 7396/ ASP3	REVISION		

Appendix B Exploratory Hole Logs

Method: Hand-dug Pit			Date(s): 26/05/2021		Logged By: MR		Checked By: AJ		
Client: Oriel Housing Ltd.			Co-ords: 470880.21, 173501.28		Stability: Stable		Dimensions: 0.30m		Scale: 1:10
Hydrock Project No: 19411-GELO			Ground Level: 43.46m OD		Plant: Hand dug pit		0.30m		
Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	
Depth (m)	Type	Results							
0.80	ES			Light grey asphalt. (MADE GROUND)	0.10	(0.10)	43.36		
				Pinkish brown slightly silty sandy GRAVEL of subrounded to angular fine to coarse of brick and gabbro. (MADE GROUND)	0.30	(0.20)	43.16		
				(Very soft) dark brown slightly sandy gravelly CLAY with common black discolouration. Gravel is subrounded to angular fine to coarse of asphalt, brick and flint. (MADE GROUND) ... Between 0.30m to 0.90m bgl soil recovered damp.	0.90	(0.60)	42.56		
				Reddish brown slightly sandy gravelly silty CLAY. Gravel is subrounded to angular fine to medium of flint. Occasional brick fragments. (MADE GROUND)	1.00	(0.10)	42.46		
				Base of Excavation at 1.00m					

General Remarks:
1. No groundwater encountered. 2. Backfilled with arisings. 3. Borehole location moved from original position due to underground services (electric).

Method: Hand-dug Pit	Date(s): 26/05/2021	Logged By: MR	Checked By: AJ
Client: Oriel Housing Ltd.	Co-ords: 470883.77, 173496.49	Stability: Stable	Dimensions: Scale:
Hydrock Project No: 19411-GELO	Ground Level: 43.79m OD	Plant: Hand dug pit	0.30m 1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Light grey asphalt. (MADE GROUND)	0.10	(0.10)	43.69	
				Pinkish brown slightly silty sandy GRAVEL of subrounded to angular fine to coarse of brick and gabbro. (MADE GROUND)	0.30	(0.20)	43.49	
0.60	ES			(Very soft) dark brown slightly sandy slightly gravelly CLAY with common black discolouration. Gravel is subrounded to angular fine to coarse of asphalt, brick and flint. (MADE GROUND)	0.90	(0.60)	42.89	
				Base of Excavation at 0.90m	1			
					2			

General Remarks:
1. No groundwater encountered. 2. Backfilled with arisings.

Method: Hand-dug Pit

Date(s): 26/05/2021

Logged By: MR

Checked By: AJ

Client: Oriel Housing Ltd.

Co-ords: 470864.06, 173492.40

Stability: Stable

Dimensions:

Scale:

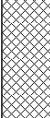
Hydrock Project No: 19411-GELO

Ground Level: 43.43m OD

Plant: Hand dug pit

0.30m 0.30m

1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Gravel over (soft) brown clayey slightly sandy slightly gravelly SILT with common roots and rootlets. Gravel is subrounded to angular fine to medium of flint. (MADE GROUND)	0.05	(0.05)	43.38	
				... At 0.03m bgl black geomembrane.	0.10	(0.05)	43.33	
				Yellow clayey sandy GRAVEL of flint. (MADE GROUND)	0.15	(0.05)	43.28	
				Pinkish brown slightly silty sandy GRAVEL of subrounded to angular fine to coarse of brick and gabbro. (MADE GROUND)	0.25	(0.10)	43.18	
				Light grey slightly clayey gravelly SAND. Gravel is subrounded to subangular fine to coarse of brick, flint and gabbro. (MADE GROUND)				
0.50	ES			(Soft) brown sandy gravelly CLAY with common brick cobbles. Gravel is subrounded to subangular fine to coarse of flint and bricks. (MADE GROUND)		(0.45)		
0.70	ES			(Soft) dark brown slightly sandy slightly gravelly CLAY with common brick cobbles. Gravel is subrounded to angular fine to coarse of asphalt, brick and flint. (MADE GROUND)	0.70		42.73	
					0.80		42.63	
Base of Excavation at 0.80m								
					1			
				</				

General Remarks:

1. No groundwater encountered. 2. Backfilled with arisings.

Method: Hand-dug Pit

Date(s): 26/05/2021

Logged By: MR

Checked By: AJ

Client: Oriel Housing Ltd.

Co-ords: 470863.84, 173487.60

Stability: Stable

Dimensions:

Scale:

Hydrock Project No: 19411-GELO

Ground Level: 43.30m OD

Plant: Hand dug pit

0.30m 0.30m

1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.00	B			Light grey asphalt. (MADE GROUND) ... From 0.05m bgl becoming red.		(0.10)	43.20	
				Grey slightly silty sandy GRAVEL of subrounded to angular fine to coarse of brick, gabbro and grey breeze block fragments. (MADE GROUND)	0.10	(0.20)	43.00	
0.50	ES			Dark brown / black slightly sandy gravelly CLAY with occasional brick and concrete cobbles. Gravel is subrounded to angular fine to coarse of brick, flint and asphalt. (MADE GROUND)	0.30	(0.40)	42.60	
0.80	ES			(Very soft) Brown slightly sandy slightly gravelly silty CLAY. Gravel is subrounded to angular fine to coarse of flint, concrete and asphalt. (MADE GROUND)	0.70	(0.20)	42.40	
Base of Excavation at 0.90m					0.90			
					1			
					2			

General Remarks:

1. No groundwater encountered. 2. Backfilled with arisings.

Method: Hand-dug Pit

Date(s): 26/05/2021

Logged By: MR

Checked By: AJ

Client: Oriel Housing Ltd.

Co-ords: 470880.39, 173480.88

Stability: Stable

Dimensions:

Scale:

Hydrock Project No: 19411-GELO

Ground Level: 44.12m OD

Plant: Hand dug pit

0.30m 0.30m

1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Light grey asphalt. (MADE GROUND)	0.15	(0.15)	43.97	
				Reddish brown sandy gravelly COBBLES of brick. Gravel is subrounded to subangular fine to coarse of brick, concrete, glass and possible ACM tile. (MADE GROUND)	0.40	(0.25)	43.72	
0.60	ES			Dark brown / black slightly sandy gravelly CLAY with occasional brick and concrete cobbles. Gravel is subrounded to angular fine to coarse of brick, flint and asphalt. (MADE GROUND)	0.80	(0.40)	43.32	
				(Very soft) brown slightly sandy slightly gravelly CLAY. Gravel is rounded to angular fine to coarse of flint, brick, chalk, asphalt and rare ceramic fragments. (MADE GROUND)	0.90	(0.10)	43.22	
				Base of Excavation at 0.90m				
				1				

General Remarks:

1. No groundwater encountered. 2. Backfilled with arisings.

Method: Hand-dug Pit

Date(s): 26/05/2021

Logged By: MR

Checked By: AJ

Client: Oriel Housing Ltd.

Co-ords: 470864.81, 173480.20

Stability: Stable

Dimensions:

Scale:

Hydrock Project No: 19411-GELO

Ground Level: 43.29m OD

Plant: Hand dug pit

0.30m 0.30m

1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.20	ES			Light grey asphalt. (MADE GROUND) ... From 0.05m bgl becoming red.	0.15	(0.15)	43.14	
				Grey slightly silty sandy GRAVEL of subrounded to angular fine to coarse of brick, gabbro and grey breeze block fragments. (MADE GROUND)	0.25	(0.10)	43.04	
				Grey clayey sandy GRAVEL of subrounded to angular fine to coarse of brick, concrete, asphalt and possible ACM tile. (MADE GROUND)	0.70	(0.45)	42.59	
0.50	ES							
0.80	ES			Dark brown / black slightly sandy gravelly CLAY with occasional brick and concrete cobbles. Gravel is subrounded to angular fine to coarse of brick, flint and asphalt. (MADE GROUND)	0.90	(0.20)	42.39	
				Base of Excavation at 0.90m	1			
					2			

General Remarks:

1. No groundwater encountered. 2. Backfilled with arisings.

Checked By: AJ

Scale:

1:10

HoleBASE SI - Hydrock Trialhole Template v3

Method: Hand-dug Pit

Date(s): 26/05/2021

Logged By: MR

Checked By: AJ

Client: Oriel Housing Ltd.

Stability:

Dimensions:

Scale:

Hydrock Project No: 19411-GELO

Plant: Hand dug pit

0.30m 0.30m

1:10

Samples / Tests			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend
Depth (m)	Type	Results						
0.00	B			Light grey asphalt. (MADE GROUND)		(0.10)		
0.10	ES			Light grey sandy GRAVEL of concrete. (MADE GROUND)	0.10	(0.10)		
0.30	ES			Brown clayey sandy GRAVEL of brick, concrete, asphalt and flints. (MADE GROUND)	0.20	(0.20)		
0.80	ES			(Very soft) dark brown slightly sandy slightly gravelly silty CLAY. Gravel is subrounded to subangular fine to coarse of brick, concrete, flints and wood. (MADE GROUND)	0.40	(0.50)		
Base of Excavation at 0.90m					0.90			
					1			
					2			

General Remarks:

1. No groundwater encountered. 2. Hand pit terminated at 0.50m bgl due to possible underground services (gravel/ shingle layer). 3. Backfilled with arisings.

Appendix C Laboratory Test Data

Mike Rudd
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SO15 2NP

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

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: Group Southampton cc engineer

Analytical Report Number : 21-77760

Project / Site name:	115 Chatham Street	Samples received on:	27/05/2021
Your job number:	19411	Samples instructed on/ Analysis started on:	27/05/2021
Your order number:	PO07329	Analysis completed by:	04/06/2021
Report Issue Number:	1	Report issued on:	04/06/2021
Samples Analysed:	20 soil samples		

Signed:



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

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

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

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

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

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

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

Analytical Report Number: 21-77760
 Project / Site name: 115 Chatham Street
 Your Order No: PO07329

Lab Sample Number				1885629	1885630	1885631	1885632	1885633
Sample Reference				HP201	HP202	HP202	HP203	HP203
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.20	0.60	0.50	0.70
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	11	3.1	14	11	11
Total mass of sample received	kg	0.001	NONE	1.7	1.5	1.2	1.2	1.2

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	8.7	-	8.1	8.1
Free Cyanide	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.030	-	0.023	0.79
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	0.0083	-	0.011	0.0068

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	1.7	-	0.39	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	43	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	40	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	260	-	0.73	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	82	-	0.35	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	280	-	1.4	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	200	-	1.3	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	120	-	0.63	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	96	-	0.69	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	110	-	1.0	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	42	-	0.25	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	72	-	0.70	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	45	-	0.48	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	14	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	47	-	0.56	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	1440	-	8.48	< 0.80
-----------------------------	-------	-----	--------	---	------	---	------	--------

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	37	-	15	17
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	0.21	-	0.96	0.75
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.7	-	0.7	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	3.5	-	0.7	< 0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	< 1.2	-	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	-	9.9	-	27	20
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	9.9	-	28	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	5.1	-	56	42
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	90	-	610	200
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	1.7
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	7.4	-	22	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	9.4	-	33	35
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	490	-	390	90

Analytical Report Number: 21-77760
 Project / Site name: 115 Chatham Street
 Your Order No: PO07329

Lab Sample Number				1885629	1885630	1885631	1885632	1885633
Sample Reference				HP201	HP202	HP202	HP203	HP203
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.80	0.20	0.60	0.50	0.70
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	21	< 2.0	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	67	< 8.0	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	200	< 8.0	-	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	81	< 8.4	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	290	< 10	-	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	< 10	370	< 10	-	-

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	14	< 1.0	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	160	< 2.0	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	800	< 10	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	970	13	-	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	67	< 8.4	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	1900	17	-	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	< 10	2000	17	-	-

TPH Total C5 - C44	mg/kg	10	NONE	< 10	2400	17	-	-
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Miscellaneous Organics

Coal Tar		N/A	NONE	-	-	-	-	-
Total Residue	mg/kg	10	NONE	-	-	-	-	-

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

Analytical Report Number: 21-77760
Project / Site name: 115 Chatham Street
Your Order No: PO07329

Lab Sample Number				1885634	1885635	1885636	1885637	1885638
Sample Reference				HP204	HP204	HP205	HP205	HP205
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	0.50	None Supplied	0.20	1.00
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	1.3	20	1.0	3.3	14
Total mass of sample received	kg	0.001	NONE	2.0	1.2	2.0	1.2	1.5

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	Not-detected	-
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	7.7	-	8.4	-
Free Cyanide	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.034	-	0.028	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	0.032	-	0.014	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.37	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	0.63	0.35	0.31	1.8	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	4.6	21	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.36	3.0	21	-
Phenanthrene	mg/kg	0.05	MCERTS	0.62	1.1	15	160	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.32	3.7	49	-
Fluoranthene	mg/kg	0.05	MCERTS	2.8	2.4	25	220	-
Pyrene	mg/kg	0.05	MCERTS	2.5	2.4	21	160	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.3	1.0	11	110	-
Chrysene	mg/kg	0.05	MCERTS	1.4	1.1	11	77	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	2.6	1.3	13	97	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.79	0.61	4.9	43	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	1.1	8.0	65	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.2	0.59	5.3	41	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.45	< 0.05	1.8	13	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.6	0.79	5.9	44	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	17.2	13.4	134	1120	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	33	-	20	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	2.3	-	0.49	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	2.6	-	0.5	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	-	1.4	-
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	< 1.2	-	< 1.2	-
Chromium (III)	mg/kg	1	NONE	-	22	-	10	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	22	-	11	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	130	-	20	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	390	-	180	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	2.7	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	38	-	9.5	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	40	-	15	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	280	-	300	-

Analytical Report Number: 21-77760
Project / Site name: 115 Chatham Street
Your Order No: PO07329

Lab Sample Number				1885634	1885635	1885636	1885637	1885638
Sample Reference				HP204	HP204	HP205	HP205	HP205
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	0.50	None Supplied	0.20	1.00
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	< 8.0	-	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	< 8.0	-	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	-	< 8.4	-	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	< 10	-	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	-	< 10	-	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	0.013	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	< 2.0	-	160	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	64	-	900	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	200	-	1400	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	-	130	-	460	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	270	-	2400	< 10
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	-	400	-	2900	< 10

TPH Total C5 - C44	mg/kg	10	NONE	-	400	-	2900	< 10
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Miscellaneous Organics

Coal Tar		N/A	NONE	Not Identified	-	Not Identified	-	-
Total Residue	mg/kg	10	NONE	1600	-	13000	-	-

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

Analytical Report Number: 21-77760
Project / Site name: 115 Chatham Street
Your Order No: PO07329

Lab Sample Number				1885639	1885640	1885641	1885642	1885643
Sample Reference				HP206	HP206	HP207	HP207	HP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.50	0.20	0.60	0.20
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	15	7.0	17	2.7
Total mass of sample received	kg	0.001	NONE	1.2	1.5	1.2	1.2	2.0

Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected	-	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	10.0	-	8.5
Free Cyanide	mg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	0.11	-	0.026
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	-	0.020	-	0.023

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	3.6	-	7.8
Acenaphthene	mg/kg	0.05	MCERTS	-	-	110	-	95
Fluorene	mg/kg	0.05	MCERTS	-	-	95	-	86
Phenanthrene	mg/kg	0.05	MCERTS	-	-	540	-	620
Anthracene	mg/kg	0.05	MCERTS	-	-	200	-	200
Fluoranthene	mg/kg	0.05	MCERTS	-	-	600	-	1100
Pyrene	mg/kg	0.05	MCERTS	-	-	430	-	800
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	260	-	580
Chrysene	mg/kg	0.05	MCERTS	-	-	200	-	420
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	260	-	590
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	64	-	150
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	150	-	360
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	99	-	220
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	32	-	69
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	100	-	220

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	3160	-	5470
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	-	15	-	17
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	0.80	-	0.27
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	0.7	-	0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	-	1.1	-	2.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	-	-	< 1.2	-	< 1.2
Chromium (III)	mg/kg	1	NONE	-	-	23	-	11
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	23	-	12
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	-	39	-	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	-	680	-	88
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	-	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	-	19	-	8.6
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	< 1.0	-	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	25	-	14
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	-	580	-	450

Analytical Report Number: 21-77760
Project / Site name: 115 Chatham Street
Your Order No: PO07329

Lab Sample Number				1885639	1885640	1885641	1885642	1885643
Sample Reference				HP206	HP206	HP207	HP207	HP208
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.50	0.20	0.60	0.20
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	16	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	2.1	< 2.0	69	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	100	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	13	< 8.0	330	< 8.0	-
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	270	< 8.4	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	20	< 10	510	< 10	-
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	20	< 10	780	< 10	-

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	25	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	2.6	< 2.0	450	2.5	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	16	< 10	2300	17	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	17	14	2900	36	-
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	< 8.4	< 8.4	770	17	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	36	22	5700	55	-
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	36	22	6500	71	-

TPH Total C5 - C44	mg/kg	10	NONE	56	22	7300	71	-
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Miscellaneous Organics

Coal Tar		N/A	NONE	-	-	-	-	-
Total Residue	mg/kg	10	NONE	-	-	-	-	-

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

Analytical Report Number: 21-77760
Project / Site name: 115 Chatham Street
Your Order No: PO07329

Lab Sample Number				1885644	1885645	1885646	1885647	1885648
Sample Reference				HP208	HP209A	HP210	HP210	HP210
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.80	None Supplied	0.30	0.80
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	6.3	17	1.4	15	12
Total mass of sample received	kg	0.001	NONE	1.0	1.2	2.0	1.2	1.2

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	-	-	-
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.0	7.6	-	-	-
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.99	0.27	-	-	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	0.020	0.034	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	1.7	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.96	0.28	-	-
Acenaphthene	mg/kg	0.05	MCERTS	26	0.60	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	26	0.77	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	220	7.0	0.39	-	-
Anthracene	mg/kg	0.05	MCERTS	75	1.9	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	420	12	0.92	-	-
Pyrene	mg/kg	0.05	MCERTS	330	9.5	1.0	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	200	5.5	0.47	-	-
Chrysene	mg/kg	0.05	MCERTS	200	5.2	0.72	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	230	6.8	0.99	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	71	1.8	0.45	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	140	4.5	0.57	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	92	2.6	0.53	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	29	0.87	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	97	2.9	0.62	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	2140	64.5	6.98	-	-
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	23	33	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.98	2.7	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	2.1	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.0	1.4	-	-	-
Chromium (hexavalent)	mg/kg	1.2	MCERTS	< 1.2	< 1.2	-	-	-
Chromium (III)	mg/kg	1	NONE	19	28	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	29	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	53	120	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	300	1600	-	-	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.2	-	-	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	44	-	-	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	22	45	-	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	620	480	-	-	-

Analytical Report Number: 21-77760
 Project / Site name: 115 Chatham Street
 Your Order No: PO07329

Lab Sample Number				1885644	1885645	1885646	1885647	1885648
Sample Reference				HP208	HP209A	HP210	HP210	HP210
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.80	None Supplied	0.30	0.80
Date Sampled				26/05/2021	26/05/2021	26/05/2021	26/05/2021	26/05/2021
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics & Oxygenates								
Benzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	< 8.0	< 8.0
TPH-CWG - Aliphatic > EC35 - EC44	mg/kg	8.4	NONE	-	-	-	< 8.4	< 8.4
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	< 10	< 10
TPH-CWG - Aliphatic (EC5 - EC44)	mg/kg	10	NONE	-	-	-	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	1.3	22
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	< 10	< 10
TPH-CWG - Aromatic > EC35 - EC44	mg/kg	8.4	NONE	-	-	-	< 8.4	< 8.4
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	< 10	22
TPH-CWG - Aromatic (EC5 - EC44)	mg/kg	10	NONE	-	-	-	< 10	22

TPH Total C5 - C44	mg/kg	10	NONE	-	-	-	< 10	22
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Miscellaneous Organics

Coal Tar		N/A	NONE	-	-	Not Identified	-	-
Total Residue	mg/kg	10	NONE	-	-	1500	-	-

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

Analytical Report Number : 21-77760
Project / Site name: 115 Chatham Street

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1885629	HP201	None Supplied	0.8	Brown clay and loam with gravel.
1885630	HP202	None Supplied	0.2	Brown loam with gravel.
1885631	HP202	None Supplied	0.6	Brown loam and clay with gravel.
1885632	HP203	None Supplied	0.5	Brown loam with gravel.
1885633	HP203	None Supplied	0.7	Brown loam and clay with gravel.
1885634	HP204	None Supplied	None Supplied	Non Soil**
1885635	HP204	None Supplied	0.5	Brown loam and clay with gravel and vegetation.
1885636	HP205	None Supplied	None Supplied	Non Soil**
1885637	HP205	None Supplied	0.2	Brown loam with gravel.
1885638	HP205	None Supplied	1	Brown loam and clay with gravel and vegetation.
1885639	HP206	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
1885640	HP206	None Supplied	0.5	Brown loam and clay with gravel and vegetation.
1885641	HP207	None Supplied	0.2	Brown loam with gravel.
1885642	HP207	None Supplied	0.6	Brown loam with gravel.
1885643	HP208	None Supplied	0.2	Brown loam with gravel.
1885644	HP208	None Supplied	0.5	Brown loam with gravel.
1885645	HP209A	None Supplied	0.8	Brown loam and clay with gravel.
1885646	HP210	None Supplied	None Supplied	Non Soil**
1885647	HP210	None Supplied	0.3	Brown loam and clay with gravel.
1885648	HP210	None Supplied	0.8	Brown loam and clay with gravel.

**Non MCERTS Matrix

Analytical Report Number : 21-77760
Project / Site name: 115 Chatham Street

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPH Chromatogram in Soil	TPH Chromatogram in Soil.	In-house method	L064-PL	D	NONE
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	NONE

Analytical Report Number : 21-77760
Project / Site name: 115 Chatham Street

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

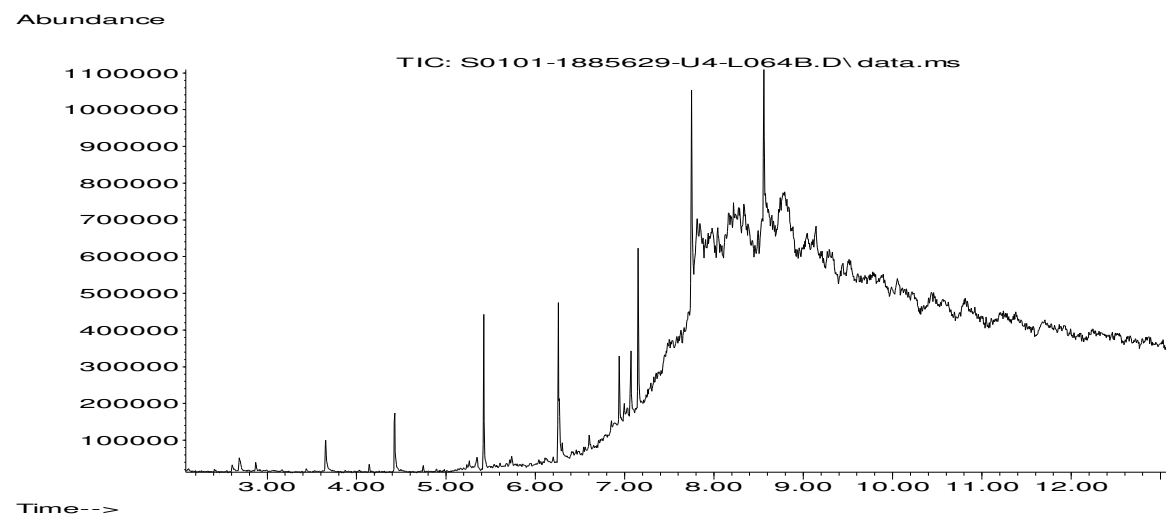
Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Coal Tar in Soil	DCM Extraction with qualitative interpretation via GC/MS	In-house method	L064-PL	D	NONE
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

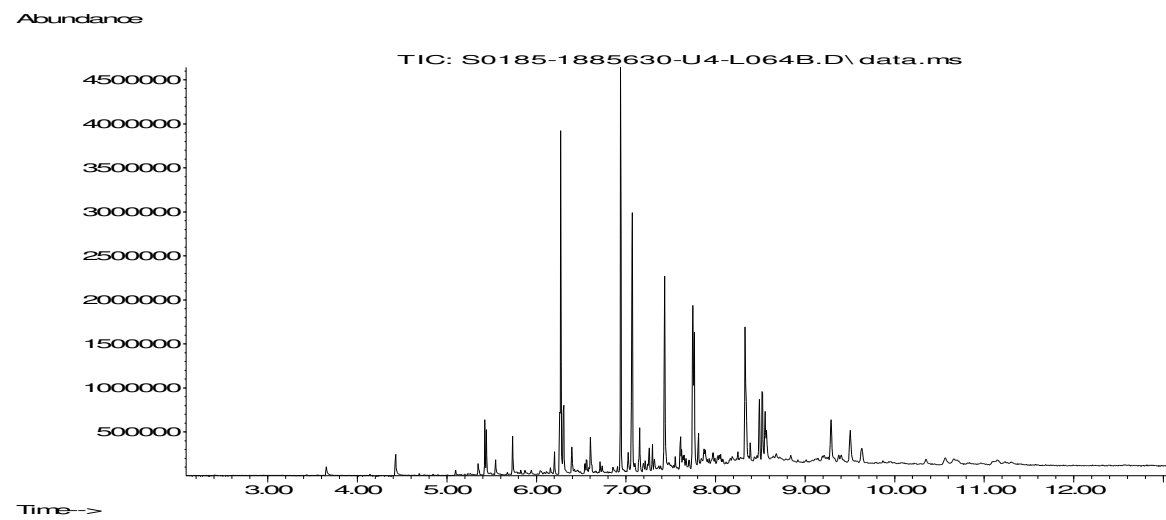
For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

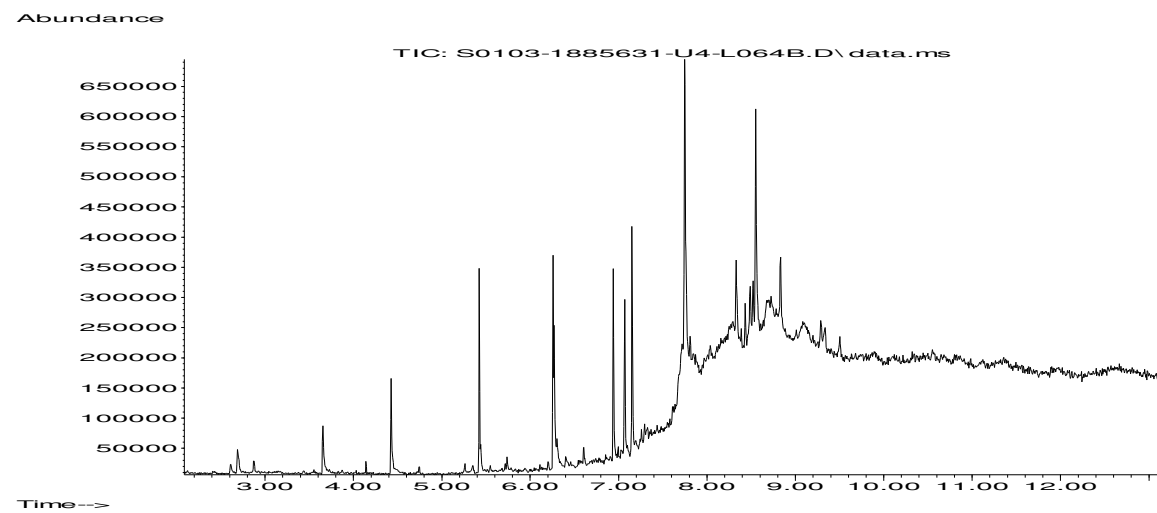
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

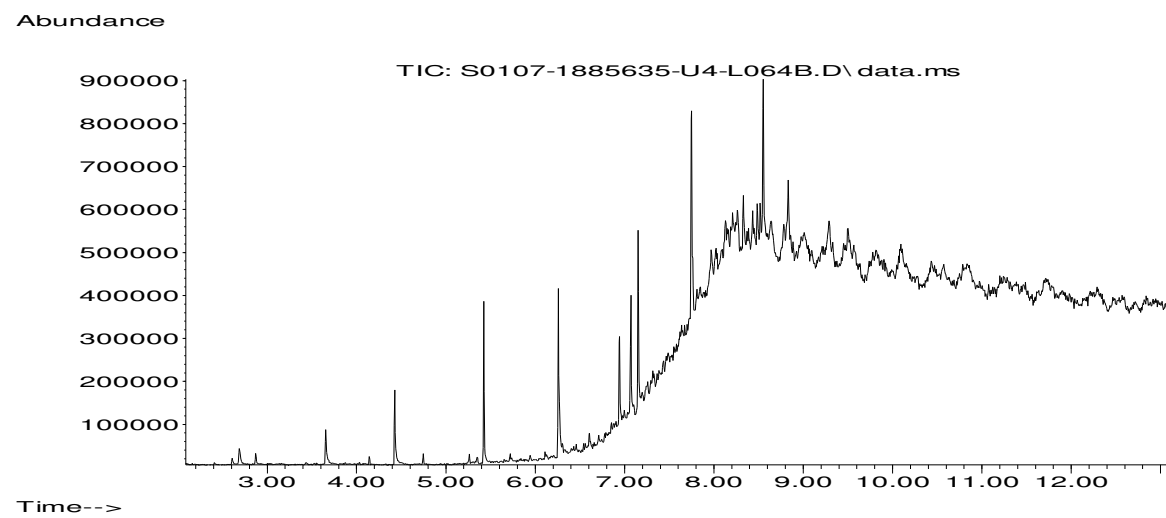
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

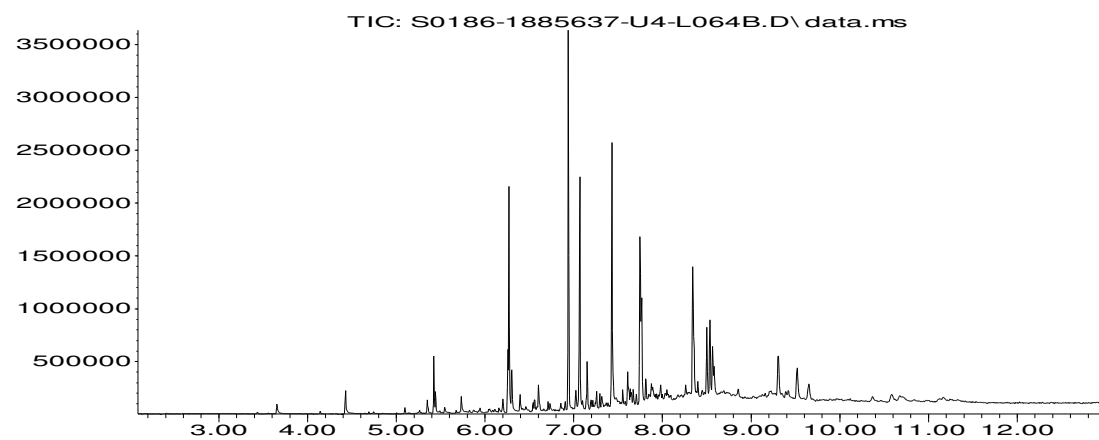




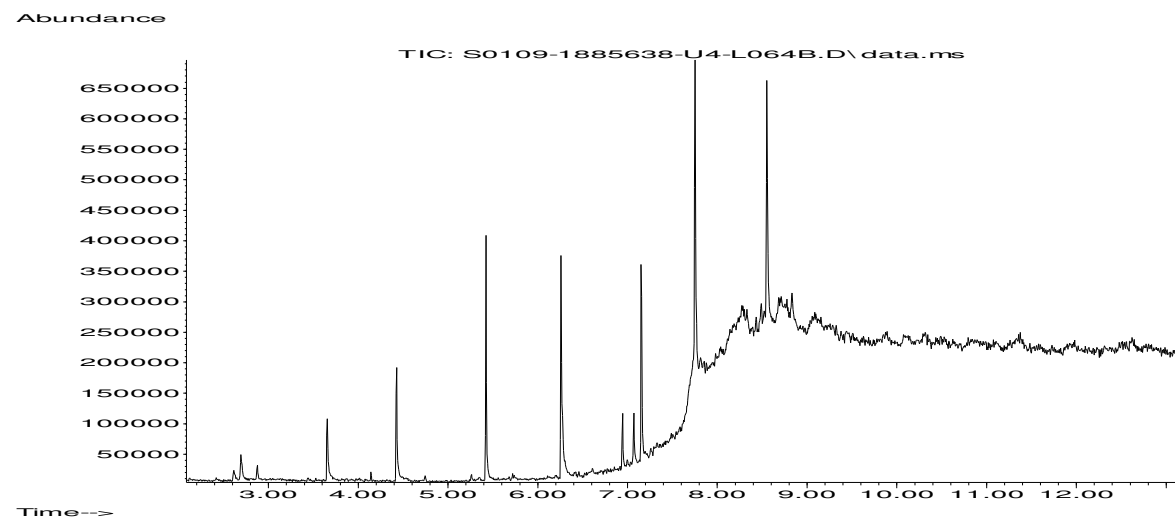


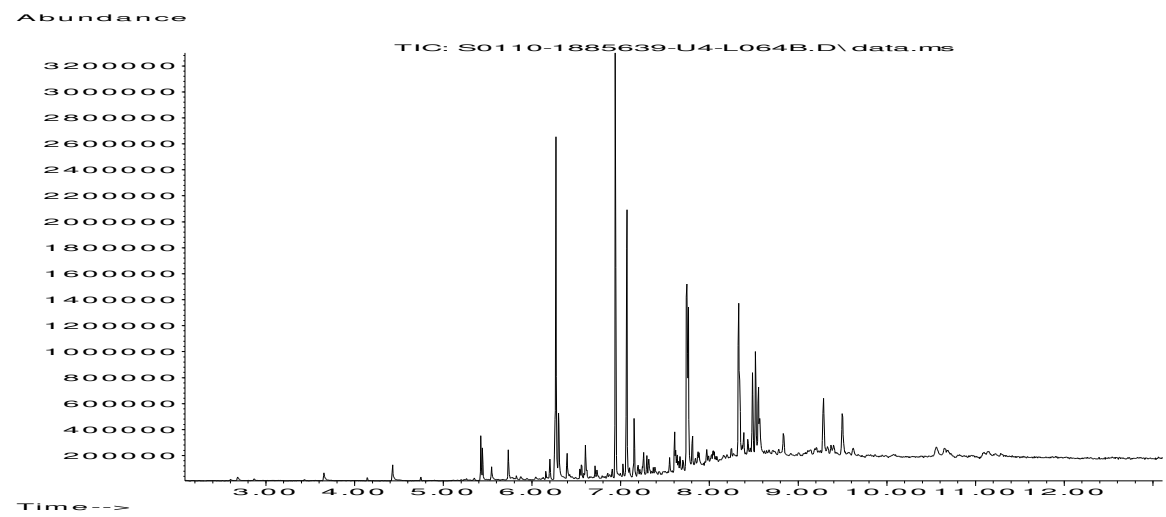


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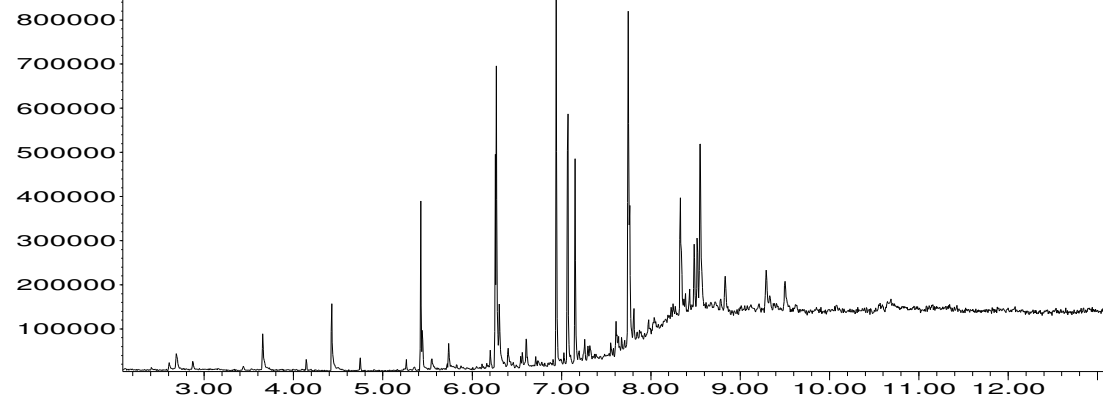
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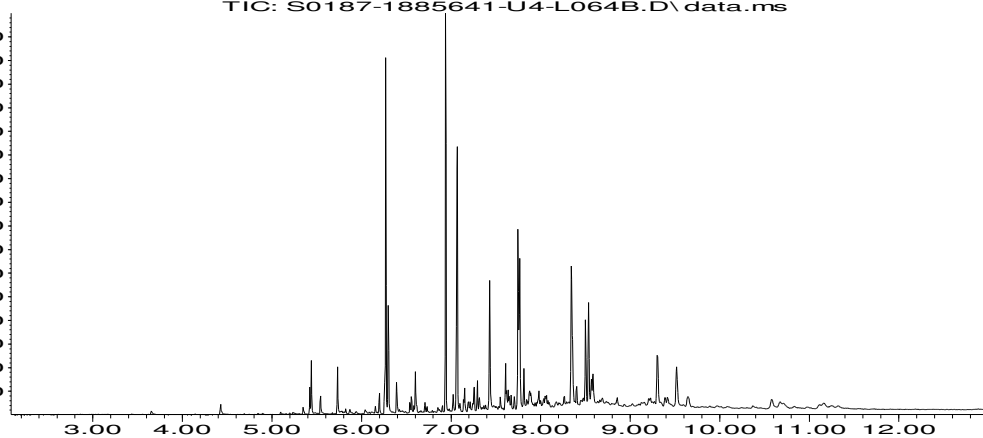
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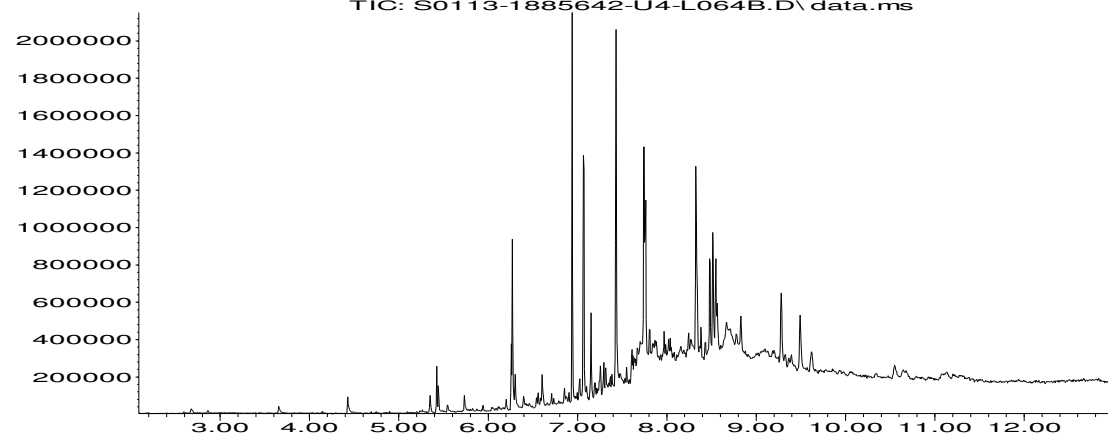
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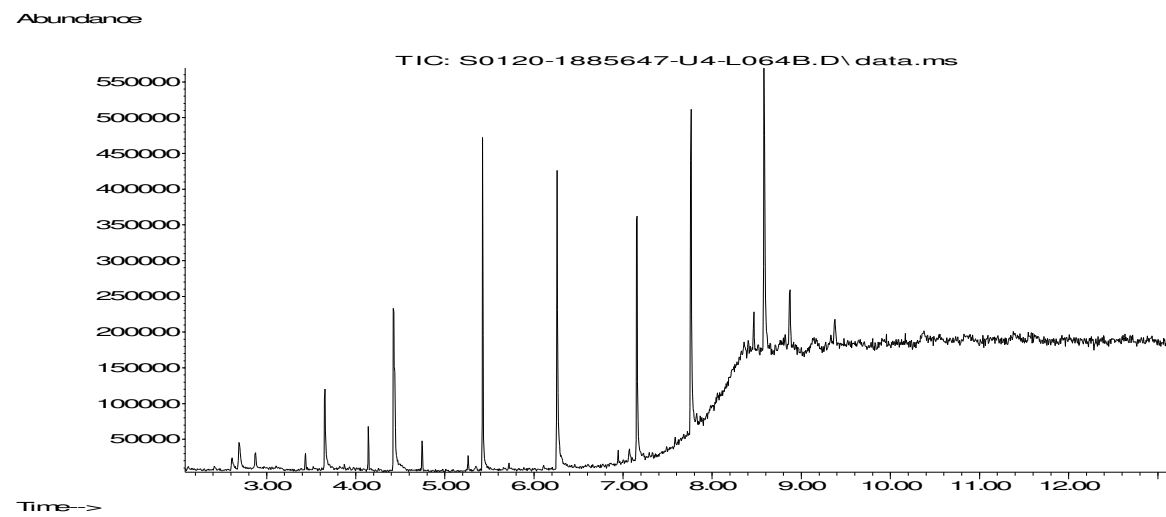


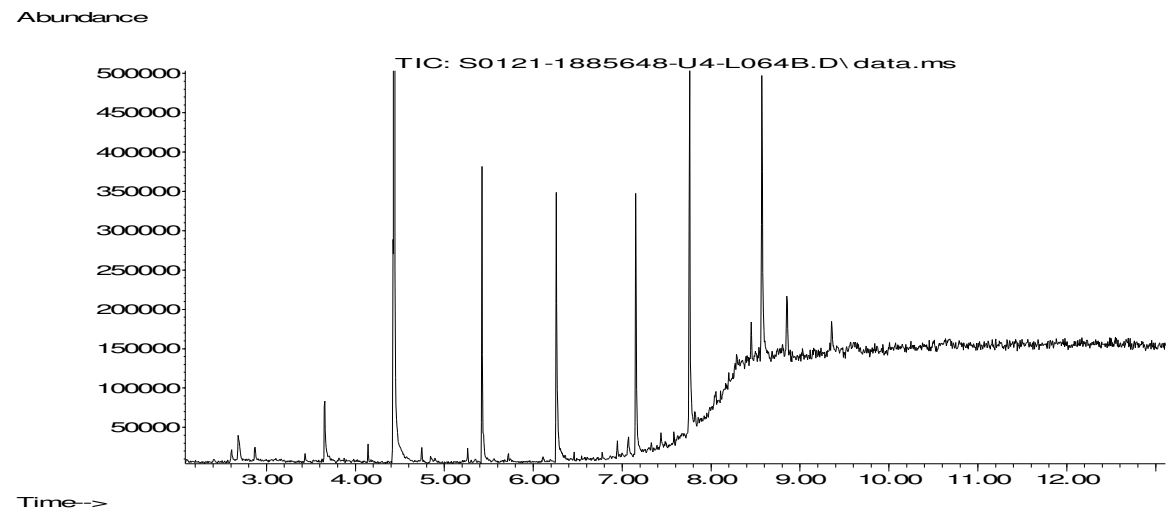
Abundance

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Sample Deviation Report



Analytical Report Number : 21-77760
Project / Site name: 115 Chatham Street

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
HP204	None Supplied	S	1885634	b	Coal Tar in Soil	L064-PL	b
HP204	None Supplied	S	1885634	b	Speciated EPA-16 PAHs in soil	L064-PL	b
HP205	None Supplied	S	1885636	b	Coal Tar in Soil	L064-PL	b
HP205	None Supplied	S	1885636	b	Speciated EPA-16 PAHs in soil	L064-PL	b
HP210	None Supplied	S	1885646	b	Coal Tar in Soil	L064-PL	b
HP210	None Supplied	S	1885646	b	Speciated EPA-16 PAHs in soil	L064-PL	b

Mike Rudd

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t: 01923 225404**f:** 01923 237404**e:** reception@i2analytical.com**e:** Group Southampton cc engineer

Analytical Report Number : 21-77766

Project / Site name:	115 Chatham Street	Samples received on:	27/05/2021
Your job number:	19411	Samples instructed on/ Analysis started on:	27/05/2021
Your order number:	PO07329	Analysis completed by:	04/06/2021
Report Issue Number:	1	Report issued on:	04/06/2021
Samples Analysed:	2 wac multi samples		

**Signed:**

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

i2 Analytical

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Waste Acceptance Criteria Analytical Results							
Report No:	21-77766						
	Client: HYDROCK						
Location	115 Chatham Street						
Lab Reference (Sample Number)	1885682						
Sampling Date	26/05/2021						
Sample ID	HP202						
Depth (m)	0.20						
					Landfill Waste Acceptance Criteria		
					Limits		
					Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Solid Waste Analysis							
TOC (%)**	0.9				3%	5%	6%
Loss on Ignition (%) **	1.6				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) #	130				500	--	--
Total PAH (WAC-17) (mg/kg)	1080				100	--	--
pH (units)**	8.6				--	>6	--
Acid Neutralisation Capacity (mol / kg)	9.1				--	To be evaluated	To be evaluated
Eluate Analysis					Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)					using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.29	0.29		2.9	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	< 0.0010	< 0.0010		< 0.0050	0.5	10	70
Copper *	0.011	< 0.0030		0.028	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.0081	0.0045		0.049	0.5	10	30
Nickel *	0.0015	0.0015		0.015	0.4	10	40
Lead *	< 0.0050	< 0.0050		< 0.020	0.5	10	50
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7	5
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5	7
Zinc *	0.021	0.0152		0.16	4	50	200
Chloride *	< 4.0	< 4.0		19	800	15000	25000
Fluoride	0.42	0.094		1.3	10	150	500
Sulphate *	7.9	3.7		41	1000	20000	50000
TDS*	62	34		370	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	7.5	7.7		77	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.5						
Dry Matter (%)	97						
Moisture (%)	3.1						
Stage 1							
Volume Eluate L2 (litres)	0.34						
Filtered Eluate VE1 (litres)	0.18						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.					* = UKAS accredited (liquid eluate analysis only)		
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation					** = MCERTS accredited		

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

i2 Analytical

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Waste Acceptance Criteria Analytical Results							
Report No:	21-77766						
	Client: HYDROCK						
Location	115 Chatham Street						
Lab Reference (Sample Number)	1885683						
Sampling Date	26/05/2021						
Sample ID	HP204						
Depth (m)	0.50						
Solid Waste Analysis				Limits			
TOC (%)**	2.7			3%	5%	6%	
Loss on Ignition (%) **	8.4			--	--	10%	
BTEX (µg/kg) **	< 10			6000	--	--	
Sum of PCBs (mg/kg) **	< 0.30			1	--	--	
Mineral Oil (mg/kg) #	< 10			500	--	--	
Total PAH (WAC-17) (mg/kg)	13.4			100	--	--	
pH (units)**	7.9			--	>6	--	
Acid Neutralisation Capacity (mol / kg)	8.1			--	To be evaluated	To be evaluated	
Eluate Analysis				Limit values for compliance leaching test			
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	2:1	8:1	Cumulative 10:1	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)			
	mg/l	mg/l	mg/kg				
Arsenic *	0.023	0.014	0.15	0.5	2	25	
Barium *	0.011	0.022	0.21	20	100	300	
Cadmium *	< 0.0005	< 0.0005	< 0.0020	0.04	1	5	
Chromium *	0.0021	0.0025	0.025	0.5	10	70	
Copper *	0.030	0.016	0.17	2	50	100	
Mercury *	< 0.0015	< 0.0015	< 0.010	0.01	0.2	2	
Molybdenum *	0.016	0.013	0.13	0.5	10	30	
Nickel *	0.0031	0.0052	0.050	0.4	10	40	
Lead *	< 0.0050	0.016	0.15	0.5	10	50	
Antimony *	0.017	< 0.0050	0.061	0.06	0.7	5	
Selenium *	< 0.010	< 0.010	< 0.040	0.1	0.5	7	
Zinc *	0.034	0.0287	0.29	4	50	200	
Chloride *	< 4.0	190	1700	800	15000	25000	
Fluoride	0.25	0.23	2.3	10	150	500	
Sulphate *	21	13	140	1000	20000	50000	
TDS*	130	72	780	4000	60000	100000	
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13	< 0.50	1	-	-	
DOC	13	20	200	500	800	1000	
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	1.2						
Dry Matter (%)	80						
Moisture (%)	20						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.17						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.				* = UKAS accredited (liquid eluate analysis only)			
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation				** = MCERTS accredited			

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



Analytical Report Number : 21-77766
Project / Site name: 115 Chatham Street

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1885682	HP202	None Supplied	0.2	Brown loam with gravel.
1885683	HP204	None Supplied	0.5	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 21-77766
Project / Site name: 115 Chatham Street

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

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

Analytical Report Number : 21-77766
Project / Site name: 115 Chatham Street

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

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

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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

Hydrock 19411 stats03 - TPH Level 2 (Ver 10), Summary Human Health

Assessment of Chemicals of Potential Concern to Human Health

Soil Type																		
All values in mg/kg unless otherwise stated							Location & Depth	WS5	WS8	WS9	WS10	HP1	WS1	WS2	WS3			
Chemical of Potential Concern	Lab. RL	No. Samples	Min. Value	Max. Value	No. Samples > or = GAC	GAC		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3			
Arsenic	1	8	6.6	39	0	40		27	8.6	39	14	11	12	6.6	6.8			
Beryllium	0.06	0	0	0	0	73												
Boron	0.2	8	0.2	1.2	0	11000		1.2	0.9	0.5	1.1	1.2	1.2	0.2	0.4			
Cadmium	0.2	8	0.2	4.2	0	87		0.6	0.3	4.2	0.2	0.9	0.2	0.6	0.5			
Chromium (III)	1	0	0	0	0	890												
Chromium (VI)	1.2	8	4	4	0	6.1		4	4	4	4	4	4	4	4			
Copper	1	8	3.4	35	0	7300		11	15	3.4	7.6	35	9	7.9	5.4			
Lead	1	8	7.6	140	0	310		35	77	140	11	120	7.6	16	25			
Mercury, inorganic	0.3	8	0.3	0.7	0	240		0.3	0.3	0.3	0.3	0.7	0.3	0.3	0.3			
Nickel	1	8	2.2	23	0	180		23	15	6	17	17	14	14	2.2			
Selenium	1	8	1	1	0	600		1	1	1	1	1	1	1	1			
Vanadium	1	0	0	0	0	1200												
Zinc	1	8	28	480	0	40000		100	140	480	43	190	28	78	56			
Cyanide (free)	1	0	0	0	0	800												
Phenol (total)	1	0	0	0	0	750												
Acenaphthene	0.05	8	0.05	310	0	3000		0.05	2	2.7	0.05	0.05	0.05	52	310			
Acenaphthylene	0.05	8	0.05	6.1	0	2900		0.05	0.05	0.05	0.05	0.05	0.05	2.2	6.1			
Anthracene	0.05	8	0.05	310	0	31000		0.2	3.3	4.9	0.05	0.11	0.05	80	310			
Benz(a)anthracene	0.05	8	0.05	530	4	5.5		1.9	8.3	15	0.25	0.96	0.05	160	530			
Benzo(a)pyrene	0.05	8	0.05	330	5	1.5		1.6	6.1	9.3	0.05	0.64	0.05	86	330			
Benzo(b)fluoranthene	0.05	8	0.05	510	3	11		2.3	8.1	11	0.05	0.8	0.05	130	510			
Benzo(ghi)perylene	0.05	8	0.05	190	1	71		1	4.7	5.2	0.05	0.41	0.05	49	190			
Benzo(k)fluoranthene	0.05	8	0.05	150	2	15		1	3.6	8	0.05	0.45	0.05	66	150			
Chrysene	0.05	8	0.05	420	2	13		1.2	5.8	8.6	0.15	0.52	0.05	130	420			
Dibenz(a,h)anthracene	0.05	7	0.05	17	3	1.3		0.31	1.3	1.7	0.05	0.05	0.05	17				
Fluoranthene	0.05	8	0.05	1300	0	1500		2.9	19	31	0.47	1.4	0.05	400	1300			
Fluorene	0.05	8	0.05	260	0	2800		0.05	1.6	2.6	0.05	0.05	0.05	65	260			
Indeno(1,2,3,cd)pyrene	0.05	8	0.05	190	2	6.3		1.1	4.3	5.5	0.05	0.37	0.05	50	190			
Naphthalene	0.05	8	0.05	77	2	2.3		0.05	0.05	0.05	0.05	0.05	0.05	4.1	77			
Phenanthrene	0.05	8	0.05	1400	1	1300		0.83	13	22	0.29	0.49	0.05	440	1400			
Pyrene	0.05	8	0.05	910	0	3700		2.5	14	23	0.48	1.3	0.05	280	910			
Asbestos identified	Y/N							N	Y	N	N	N	N	N	N			
FOC (dimensionless)		(mean)																
SOM (calculated)	1.26%	(mean)						0.10%	0.40%	0.10%	0.10%	1.90%	0.10%	2.90%	4.50%			
pH (su)	9.5	(mean)						9.2	8.6	9.9	12.1	7.7	11.7	8.4	8.5			

Risk parameter: Human health - residential without plant uptake (1%SOM)

Data set: Enzygo Data

Client: Abri Group Ltd

Site: 115 Chatham Street, Reading

Job no.: 19411

Lab. report no(s): 20-20898

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate. Values in red are equal to, or greater than, the generic assessment criterion (GAC).

Nat: Natural strata

MG: Made Ground

Assessment of Chemicals of Potential Concern to Plant Life

Soil Type																		
All values in mg/kg unless otherwise stated							WS5	WS8	WS9	WS10	HP1	WS1	WS2	WS3				
Location & Depth							0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3				
Chemical of Potential Concern	Lab. RL	No. Samples	Min. Value	Max. Value	No. Samples > or = GAC	GAC												
Arsenic	1	8	6.6	39	0	250	27	8.6	39	14	11	12	6.6	6.8				
Boron	0.2	8	0.2	1.2	0	3	1.2	0.9	0.5	1.1	1.2	1.2	0.2	0.4				
Chromium (III)	1	0	0	0	0	400												
Chromium (VI)	1.2	8	4	4	0	25	4	4	4	4	4	4	4	4				
Copper	1	8	3.4	35	0	200	11	15	3.4	7.6	35	9	7.9	5.4				
Nickel	1	8	2.2	23	0	110	23	15	6	17	17	14	14	2.2				
Zinc	1	8	28	480	1	300	100	140	480	43	190	28	78	56				
Mean																		
pH (su)	9.5						9.2	8.6	9.9	12.1	7.7	11.7	8.4	8.5				

Risk parameter: Plant life pH >7

Data set: Enzygo Data

Client: Abri Group Ltd

Site: 115 Chatham Street, Reading

Job no.: 19411

Lab. report no(s): 20-20898

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate. Values in red are equal to, or greater than, the generic assessment criterion (GAC).

Nat: Natural strata

MG: Made Ground

Assessment of Chemicals of Potential Concern to Human Health

Chemical of Potential Concern	All values in mg/kg unless otherwise stated						Soil Type												
	Location & Depth						Asphalt	Asphalt	Asphalt	Sub-base	Sub-base	Sub-base	Sub-base	MG - Clay	MG - Clay	MG - Clay	MG - Gravel	Nat	
	Lab. RL	No. Samples	Min. Value	Max. Value	No. Samples > or = GAC	GAC	HP204	HP205	HP210	HP202	HP205	HP207	HP208	HP203	HP204	HP209A	HP208	HP203	
							0	0	0	0.20	0.20	0.20	0.20	0.50	0.50	0.80	0.50	0.70	
Arsenic	1	9	15	37	0	40				37	20	15	17	15	33	33	23	17	
Beryllium	0.06	9	0.21	2.7	0	73				0.21	0.49	0.8	0.27	0.96	2.3	2.7	0.98	0.75	
Boron	0.2	9	0.2	2.6	0	11000				0.7	0.5	0.7	0.2	0.7	2.6	2.1	0.4	1.2	
Cadmium	0.2	9	0.2	3.5	0	87				3.5	1.4	1.1	2.2	0.7	0.2	1.4	2	0.2	
Chromium (III)	1	9	9.9	28	0	890				9.9	10	23	11	27	22	28	19	20	
Chromium (VI)	1.2	9	1.2	1.2	0	6.1				1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Copper	1	9	5.1	130	0	7300				5.1	20	39	24	56	130	120	53	42	
Lead	1	9	88	1600	4	310				90	180	680	88	610	390	1600	300	200	
Mercury, inorganic	0.3	9	0.3	2.7	0	240				0.3	0.3	0.3	0.3	0.3	2.7	1.2	0.3	1.7	
Nickel	1	9	7.4	44	0	180				7.4	9.5	19	8.6	22	38	44	19	20	
Selenium	1	9	1	1	0	600				1	1	1	1	1	1	1	1	1	
Vanadium	1	9	9.4	45	0	1200				9.4	15	25	14	33	40	45	22	35	
Zinc	1	9	90	620	0	40000				490	300	580	450	390	280	480	620	90	
Cyanide (free)	1	9	1	1	0	800				1	1	1	1	1	1	1	1	1	
Phenol (total)	1	9	1	1	0	750				1	1	1	1	1	1	1	1	1	
Acenaphthene	0.05	12	0.05	110	0	3000	0.05	4.6	0.05	43	21	110	95	0.05	0.05	0.6	26	0.05	
Acenaphthylene	0.05	12	0.05	7.8	0	2900	0.63	0.31	0.28	1.7	1.8	3.6	7.8	0.39	0.35	0.96	0.05	0.05	
Anthracene	0.05	12	0.05	200	0	31000	0.05	3.7	0.05	82	49	200	200	0.35	0.32	1.9	75	0.05	
Benz(a)anthracene	0.05	12	0.05	580	7	5.5	1.3	11	0.47	120	110	260	580	0.63	1	5.5	200	0.05	
Benzo(a)pyrene	0.05	12	0.05	360	7	1.5	1.4	8	0.57	72	65	150	360	0.7	1.1	4.5	140	0.05	
Benzo(b)fluoranthene	0.05	12	0.05	590	6	11	2.6	13	0.99	110	97	260	590	1	1.3	6.8	230	0.05	
Benzo(ghi)perylene	0.05	12	0.05	220	3	71	1.6	5.9	0.62	47	44	100	220	0.56	0.79	2.9	97	0.05	
Benzo(k)fluoranthene	0.05	12	0.05	150	5	15	0.79	4.9	0.45	42	43	64	150	0.25	0.61	1.8	71	0.05	
Chrysene	0.05	12	0.05	420	5	13	1.4	11	0.72	96	77	200	420	0.69	1.1	5.2	200	0.05	
Dibenz(a,h)anthracene	0.05	12	0.05	69	6	1.3	0.45	1.8	0.05	14	13	32	69	0.05	0.05	0.87	29	0.05	
Fluoranthene	0.05	12	0.05	1100	0	1500	2.8	25	0.92	280	220	600	1100	1.4	2.4	12	420	0.05	
Fluorene	0.05	12	0.05	95	0	2800	0.05	3	0.05	40	21	95	86	0.05	0.36	0.77	26	0.05	
Indeno(1,2,3,cd)pyrene	0.05	12	0.05	220	5	6.3	1.2	5.3	0.53	45	41	99	220	0.48	0.59	2.6	92	0.05	
Naphthalene	0.05	12	0.05	1.7	0	2.3	0.05	0.37	0.05	0.05	0.05	0.05	0.05	0.05	0.05	1.7	0.05	0.05	
Phenanthrene	0.05	12	0.05	620	0	1300	0.62	15	0.39	260	160	540	620	0.73	1.1	7	220	0.05	
Pyrene	0.05	12	0.05	800	0	3700	2.5	21	1	200	160	430	800	1.3	2.4	9.5	330	0.05	
Asbestos identified	Y/N						N	N	N	N	N	N	N	N	N	N	N	N	
FOC (dimensionless)	0.01879	(mean)								0.0083	0.014	0.02	0.023	0.011	0.032	0.034	0.02	0.0068	
SOM (calculated)	3.24%	(mean)								1.43%	2.41%	3.45%	3.97%	1.90%	5.52%	5.86%	3.45%	1.17%	
pH (su)	8.4	(mean)								8.7	8.4	10	8.5	8.1	7.7		8	8.1	

Risk parameter: Human health - residential without plant uptake (1%SOM)

Data set: Hand Pits

Client: Abri Group Ltd

Site: 115 Chatham Street, Reading

Job no.: 19411

Lab. report no(s): 21-77760-1

Legend: Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate. Values in red are equal to, or greater than, the generic assessment criterion (GAC).

Nat: Natural strata

MG: Made Ground

Hydrock

19411 stats01 - Hydrock Suite (Ver 26) Nat.xlsm, Summary Plant Life

Assessment of Chemicals of Potential Concern to Human Health

Soil Type							Location & Depth										
All values in mg/kg unless otherwise stated							WS1	WS2	WS3	WS4	WS4	WS5	WS6	WS8	WS9	WS10	HP1
							0.3	0.3	0.3	0.3	1	0.3	1	0.3	0.3	0.3	0.3
Chemical of Potential Concern	Lab. RL	No. Samples	Min. Value	Max. Value	No. Samples > or = GAC	GAC											
Aliphatics EC5-EC6	0.001	11	0.001	0.001	0	42	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Aliphatics >EC6-EC8	0.001	11	0.001	0.001	0	100	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Aliphatics >EC8-EC10	0.001	11	0.001	0.001	0	27	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Aliphatics >EC10-EC12	1	11	1	3.4	0	48	1	2.4	3.1	1	1	3.4	1	1.3	1	1	1
Aliphatics >EC12-EC16	2	11	2	12	0	24	2	12	8.8	2	2	5.8	2	3.4	2	2	2
Aliphatics >EC16-EC35	16	11	16	1259	0	65000	16	1259	57	49	16	95	16	59	16	16	16
Aliphatics >EC35-EC44	8.4	8	8.4	500	0	65000	8.4	500	19	-	-	17	-	23	8.4	8.4	8.4
Aromatics EC5-EC7	0.001	11	0.001	0.001	0	370	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Aromatics >EC7-EC8	0.001	11	0.001	0.001	0	860	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Aromatics >EC8-EC10	0.001	11	0.001	0.001	0	47	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Aromatics >EC10-EC12	1	11	1	120	0	250	1	6.3	120	11	1	1	1	1	1	1	1
Aromatics >EC12-EC16	2	11	2	1400	0	1800	2	140	1400	63	2	2	5.7	7.3	15	2	2
Aromatics >EC16-EC21	10	11	10	5200	1	1900	10	1200	5200	360	13	20	53	42	110	10	12
Aromatics >EC21-EC35	10	11	10	4400	2	1900	10	3000	4400	460	45	75	130	120	150	10	27
Aromatics >EC35-EC44	8.4	8	8.4	1400	0	1900	8.4	1400	400	-	-	34	-	72	30	8.4	8.4

Hazard Index table - HI or HQ greater than 1 highlighted with yellow shading.

Legend: Main table values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate. Main table alues in red are equal to, or greater than, the generic assessment criterion (GAC).

Nat: Natual strata
MG: Made Ground

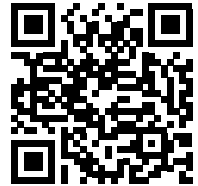
Risk parameter: Human health - residential without plant uptake (1%SOM)
Data set: Enzygo Data
Client: Abri Group Ltd
Site: 115 Chatham Street, Reading
Job no.: 19411
Lab. report no(s): 20-20898

Appendix D Hazwaste Assessment

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



E8SA9-ZXUUU-VE9BC

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in **pale yellow**.

Job name

19411-GELO

Description/Comments

Project

115 Chatham Street, Reading

Site

Classified by

Name:

Kurt Gilmore

Date:

07 Jun 2021 13:46 GMT

Telephone:

Company:

Hydrock Consultants Ltd

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification

Date

08 Sep 2020

Next 3 year Refresher due by Sep 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	HP201[2]	0.80	Non Hazardous		3
2	HP202[3]	0.20	Hazardous	HP 3(i), HP 7, HP 11	4
3	HP202[4]	0.60	Non Hazardous		7
4	HP203[4]	0.50	Non Hazardous		8
5	HP203[5]	0.70	Non Hazardous		10
6	HP204[3]		Non Hazardous		12
7	HP204[4]	0.50	Non Hazardous		14
8	HP205[4]		Non Hazardous		17
9	HP205[5]	0.20	Hazardous	HP 3(i), HP 7, HP 11	18
10	HP205[6]	1.00	Non Hazardous		21
11	HP206[3]	0.30	Non Hazardous		22
12	HP206[4]	0.50	Non Hazardous		23
13	HP207[3]	0.20	Hazardous	HP 3(i), HP 7, HP 11	24
14	HP207[4]	0.60	Non Hazardous		27
15	HP208[3]	0.20	Non Hazardous		28
16	HP208[4]	0.50	Non Hazardous		30
17	HP209A[2]	0.80	Non Hazardous		32
18	HP210[4]		Non Hazardous		34
19	HP210[5]	0.30	Non Hazardous		36
20	HP210[6]	0.80	Non Hazardous		37

Related documents

#	Name	Description
1	Hydrock Standard plus Cresol (ammended Lead)	waste stream template used to create this Job

Report

Created by: Kurt Gilmore

Created date: 07 Jun 2021 13:46 GMT

Appendices	Page
Appendix A: Classifier defined and non CLP determinands	38
Appendix B: Rationale for selection of metal species	39
Appendix C: Version	40

Classification of sample: HP201[2]

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

Sample details

Sample name:	LoW Code:
HP201[2]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.80 m	

Hazard properties

None identified

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	diesel petroleum group				19.333 mg/kg		19.333 mg/kg	0.00193 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	●	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
3	●	TPH (C6 to C40) petroleum group				34.405 mg/kg		34.405 mg/kg	0.00344 %		
				TPH							
Total:									0.00537 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00193%)

TPH (C6 to C40) petroleum group: (conc.: 0.00344%)

Classification of sample: HP202[3]

 **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
HP202[3]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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 hazardous because Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.132%)

TPH (C6 to C40) petroleum group: (conc.: 0.204%)

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.204%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.204%)

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		43 mg/kg		43 mg/kg	0.0043 %			
2	acenaphthylene	205-917-1	208-96-8		1.7 mg/kg		1.7 mg/kg	0.00017 %			
3	anthracene	204-371-1	120-12-7		82 mg/kg		82 mg/kg	0.0082 %			
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4		37 mg/kg	1.32	48.852 mg/kg	0.00489 %			
5	benzo[a]anthracene	601-033-00-9	200-280-6		120 mg/kg		120 mg/kg	0.012 %			

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
6	benzo[a]pyrene; benzo[def]chrysene				72	mg/kg		72	mg/kg	0.0072 %		
	601-032-00-3	200-028-5	50-32-8									
7	benzo[b]fluoranthene				110	mg/kg		110	mg/kg	0.011 %		
	601-034-00-4	205-911-9	205-99-2									
8	benzo[ghi]perylene				47	mg/kg		47	mg/kg	0.0047 %		
		205-883-8	191-24-2									
9	benzo[k]fluoranthene				42	mg/kg		42	mg/kg	0.0042 %		
	601-036-00-5	205-916-6	207-08-9									
10	beryllium { beryllium oxide }				0.21	mg/kg	2.775	0.583	mg/kg	0.0000583 %		
	004-003-00-8	215-133-1	1304-56-9									
11	boron { boron tribromide/trichloride/trifluoride (combined) }				0.7	mg/kg	13.43	9.401	mg/kg	0.00094 %		
			10294-33-4, 10294-34-5, 7637-07-2									
12	cadmium { cadmium sulfide }			1	3.5	mg/kg	1.285	4.498	mg/kg	0.00035 %		
	048-010-00-4	215-147-8	1306-23-6									
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				9.9	mg/kg	1.462	14.469	mg/kg	0.00145 %		
		215-160-9	1308-38-9									
14	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
15	chrysene				96	mg/kg		96	mg/kg	0.0096 %		
	601-048-00-0	205-923-4	218-01-9									
16	copper { dicopper oxide; copper (I) oxide }				5.1	mg/kg	1.126	5.742	mg/kg	0.000574 %		
	029-002-00-X	215-270-7	1317-39-1									
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5											
18	dibenz[a,h]anthracene				14	mg/kg		14	mg/kg	0.0014 %		
	601-041-00-2	200-181-8	53-70-3									
19	diesel petroleum group				1319.333	mg/kg		1319.333	mg/kg	0.132 %		
			68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9									
20	ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
21	fluoranthene				280	mg/kg		280	mg/kg	0.028 %		
		205-912-4	206-44-0									
22	fluorene				40	mg/kg		40	mg/kg	0.004 %		
		201-695-5	86-73-7									
23	indeno[123-cd]pyrene				45	mg/kg		45	mg/kg	0.0045 %		
		205-893-2	193-39-5									
24	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	90	mg/kg		90	mg/kg	0.009 %		
	082-001-00-6											
25	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
26	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
27	nickel { nickel dihydroxide }				7.4	mg/kg	1.579	11.688	mg/kg	0.00117 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
28	pH				8.7	pH		8.7	pH	8.7 pH		
			PH									
29	phenanthrene				260	mg/kg		260	mg/kg	0.026 %		
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
30	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
31	pyrene				200 mg/kg		200 mg/kg	0.02 %			
		204-927-3	129-00-0								
32	TPH (C6 to C40) petroleum group				2040.005 mg/kg		2040.005 mg/kg	0.204 %			
			TPH								
33	zinc { zinc oxide }				490 mg/kg	1.245	609.91 mg/kg	0.061 %			
	030-013-00-7	215-222-5	1314-13-2								
Total:									0.561 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP202[4]

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

Sample details

Sample name:	LoW Code:
HP202[4]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.60 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	diesel petroleum group				20.333 mg/kg		20.333 mg/kg	0.00203 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	●	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
3	●	TPH (C6 to C40) petroleum group				37.405 mg/kg		37.405 mg/kg	0.00374 %		
				TPH							
Total:									0.00577 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00203%)

TPH (C6 to C40) petroleum group: (conc.: 0.00374%)

Classification of sample: HP203[4]

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

Sample details

Sample name:	LoW Code:
HP203[4]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
2	acenaphthylene	205-917-1	208-96-8		0.39 mg/kg		0.39 mg/kg	0.000039 %			
3	anthracene	204-371-1	120-12-7		0.35 mg/kg		0.35 mg/kg	0.000035 %			
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	15 mg/kg	1.32	19.805 mg/kg	0.00198 %			
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.63 mg/kg		0.63 mg/kg	0.000063 %			
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.7 mg/kg		0.7 mg/kg	0.00007 %			
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	1 mg/kg		1 mg/kg	0.0001 %			
8	benzo[ghi]perylene	205-883-8	191-24-2		0.56 mg/kg		0.56 mg/kg	0.000056 %			
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.25 mg/kg		0.25 mg/kg	0.000025 %			
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	0.96 mg/kg	2.775	2.664 mg/kg	0.000266 %			
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.7 mg/kg	13.43	9.401 mg/kg	0.00094 %			
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	0.7 mg/kg	1.285	0.9 mg/kg	0.00007 %			
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		27 mg/kg	1.462	39.462 mg/kg	0.00395 %			
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %			<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9	0.69 mg/kg		0.69 mg/kg	0.000069 %			
16	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	56 mg/kg	1.126	63.05 mg/kg	0.0063 %			

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
18	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
19	fluoranthene				1.4 mg/kg		1.4 mg/kg	0.00014 %			
		205-912-4	206-44-0								
20	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
21	indeno[123-cd]pyrene				0.48 mg/kg		0.48 mg/kg	0.000048 %			
		205-893-2	193-39-5								
22	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	610 mg/kg		610 mg/kg	0.061 %			
	082-001-00-6										
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
25	nickel { nickel dihydroxide }				22 mg/kg	1.579	34.749 mg/kg	0.00347 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26	pH				8.1 pH		8.1 pH	8.1 pH			
			PH								
27	phenanthrene				0.73 mg/kg		0.73 mg/kg	0.000073 %			
		201-581-5	85-01-8								
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
29	pyrene				1.3 mg/kg		1.3 mg/kg	0.00013 %			
		204-927-3	129-00-0								
30	zinc { zinc oxide }				390 mg/kg	1.245	485.438 mg/kg	0.0485 %			
	030-013-00-7	215-222-5	1314-13-2								
Total:									0.128 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP203[5]

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

Sample details

Sample name:	LoW Code:
HP203[5]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.70 m	

Hazard properties

None identified

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2	acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	17 mg/kg	1.32	22.446	mg/kg	0.00224 %		
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
8	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	0.75 mg/kg	2.775	2.082	mg/kg	0.000208 %		
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		1.2 mg/kg	13.43	16.116	mg/kg	0.00161 %		
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	<0.2 mg/kg	1.285	<0.257	mg/kg	<0.00002 %		<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		20 mg/kg	1.462	29.231	mg/kg	0.00292 %		
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1.2 mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
16	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	42 mg/kg	1.126	47.287	mg/kg	0.00473 %		

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
18	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
19	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-912-4	206-44-0								
20	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
21	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
22	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	200 mg/kg		200 mg/kg	0.02 %			
	082-001-00-6										
23	mercury { mercury dichloride }				1.7 mg/kg	1.353	2.301 mg/kg	0.00023 %			
	080-010-00-X	231-299-8	7487-94-7								
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
25	nickel { nickel dihydroxide }				20 mg/kg	1.579	31.59 mg/kg	0.00316 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26	pH				8.1 pH		8.1 pH	8.1 pH			
			PH								
27	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-581-5	85-01-8								
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
29	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-927-3	129-00-0								
30	zinc { zinc oxide }				90 mg/kg	1.245	112.024 mg/kg	0.0112 %			
	030-013-00-7	215-222-5	1314-13-2								
Total:									0.0469 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP204[3]

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

Sample details

Sample name: **HP204[3]** 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: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	● acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2	● acenaphthylene	205-917-1	208-96-8		0.63 mg/kg		0.63	mg/kg	0.000063 %		
3	● anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.3 mg/kg		1.3	mg/kg	0.00013 %		
5	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.4 mg/kg		1.4	mg/kg	0.00014 %		
6	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	2.6 mg/kg		2.6	mg/kg	0.00026 %		
7	● benzo[ghi]perylene	205-883-8	191-24-2		1.6 mg/kg		1.6	mg/kg	0.00016 %		
8	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.79 mg/kg		0.79	mg/kg	0.000079 %		
9	chrysene	601-048-00-0	205-923-4	218-01-9	1.4 mg/kg		1.4	mg/kg	0.00014 %		
10	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.45 mg/kg		0.45	mg/kg	0.000045 %		
11	● fluoranthene	205-912-4	206-44-0		2.8 mg/kg		2.8	mg/kg	0.00028 %		
12	● fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
13	● indeno[123-cd]pyrene	205-893-2	193-39-5		1.2 mg/kg		1.2	mg/kg	0.00012 %		
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	● phenanthrene	201-581-5	85-01-8		0.62 mg/kg		0.62	mg/kg	0.000062 %		
16	● pyrene	204-927-3	129-00-0		2.5 mg/kg		2.5	mg/kg	0.00025 %		
Total:									0.00175 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
■	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: HP204[4]

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

Sample details

Sample name:	LoW Code:
HP204[4]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
2	acenaphthylene	205-917-1	208-96-8		0.35 mg/kg		0.35 mg/kg	0.000035 %			
3	anthracene	204-371-1	120-12-7		0.32 mg/kg		0.32 mg/kg	0.000032 %			
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	33 mg/kg	1.32	43.571 mg/kg	0.00436 %			
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1 mg/kg		1 mg/kg	0.0001 %			
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.1 mg/kg		1.1 mg/kg	0.00011 %			
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	1.3 mg/kg		1.3 mg/kg	0.00013 %			
8	benzo[ghi]perylene	205-883-8	191-24-2		0.79 mg/kg		0.79 mg/kg	0.000079 %			
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.61 mg/kg		0.61 mg/kg	0.000061 %			
10	beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	2.3 mg/kg	2.775	6.383 mg/kg	0.000638 %			
11	boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		2.6 mg/kg	13.43	34.918 mg/kg	0.00349 %			
12	cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		22 mg/kg	1.462	32.154 mg/kg	0.00322 %			
14	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %			<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9	1.1 mg/kg		1.1 mg/kg	0.00011 %			
16	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	130 mg/kg	1.126	146.365 mg/kg	0.0146 %			

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
18	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
19	diesel petroleum group				136.667 mg/kg		136.667 mg/kg	0.0137 %			
			68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9								
20	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
21	fluoranthene				2.4 mg/kg		2.4 mg/kg	0.00024 %			
		205-912-4	206-44-0								
22	fluorene				0.36 mg/kg		0.36 mg/kg	0.000036 %			
		201-695-5	86-73-7								
23	indeno[123-cd]pyrene				0.59 mg/kg		0.59 mg/kg	0.000059 %			
		205-893-2	193-39-5								
24	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	390 mg/kg		390 mg/kg	0.039 %			
	082-001-00-6										
25	mercury { mercury dichloride }				2.7 mg/kg	1.353	3.654 mg/kg	0.000365 %			
	080-010-00-X	231-299-8	7487-94-7								
26	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
27	nickel { nickel dihydroxide }				38 mg/kg	1.579	60.021 mg/kg	0.006 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
28	pH				7.7 pH		7.7 pH	7.7 pH			
			PH								
29	phenanthrene				1.1 mg/kg		1.1 mg/kg	0.00011 %			
		201-581-5	85-01-8								
30	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
31	pyrene				2.4 mg/kg		2.4 mg/kg	0.00024 %			
		204-927-3	129-00-0								
32	TPH (C6 to C40) petroleum group				339.205 mg/kg		339.205 mg/kg	0.0339 %			
			TPH								
33	zinc { zinc oxide }				280 mg/kg	1.245	348.52 mg/kg	0.0349 %			
	030-013-00-7	215-222-5	1314-13-2								
Total:									0.156 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.0137%)

TPH (C6 to C40) petroleum group: (conc.: 0.0339%)

Classification of sample: HP205[4]

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

Sample details

Sample name: **HP205[4]** LoW Code: **17: Construction and Demolition Wastes (including excavated soil from contaminated sites)**
Chapter: **17 05 04 (Soil and stones other than those mentioned in 17 05 03)**
Entry:

Hazard properties

None identified

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	• acenaphthene	201-469-6	83-32-9		4.6 mg/kg		4.6 mg/kg	0.00046 %		
2	• acenaphthylene	205-917-1	208-96-8		0.31 mg/kg		0.31 mg/kg	0.000031 %		
3	• anthracene	204-371-1	120-12-7		3.7 mg/kg		3.7 mg/kg	0.00037 %		
4	benzo[a]anthracene	601-033-00-9	200-280-6		11 mg/kg		11 mg/kg	0.0011 %		
5	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		8 mg/kg		8 mg/kg	0.0008 %		
6	benzo[b]fluoranthene	601-034-00-4	205-911-9		13 mg/kg		13 mg/kg	0.0013 %		
7	• benzo[ghi]perylene	205-883-8	191-24-2		5.9 mg/kg		5.9 mg/kg	0.00059 %		
8	benzo[k]fluoranthene	601-036-00-5	205-916-6		4.9 mg/kg		4.9 mg/kg	0.00049 %		
9	chrysene	601-048-00-0	205-923-4		11 mg/kg		11 mg/kg	0.0011 %		
10	dibenz[a,h]anthracene	601-041-00-2	200-181-8		1.8 mg/kg		1.8 mg/kg	0.00018 %		
11	• fluoranthene	205-912-4	206-44-0		25 mg/kg		25 mg/kg	0.0025 %		
12	• fluorene	201-695-5	86-73-7		3 mg/kg		3 mg/kg	0.0003 %		
13	• indeno[123-cd]pyrene	205-893-2	193-39-5		5.3 mg/kg		5.3 mg/kg	0.00053 %		
14	naphthalene	601-052-00-2	202-049-5		0.37 mg/kg		0.37 mg/kg	0.000037 %		
15	• phenanthrene	201-581-5	85-01-8		15 mg/kg		15 mg/kg	0.0015 %		
16	• pyrene	204-927-3	129-00-0		21 mg/kg		21 mg/kg	0.0021 %		
Total:								0.0134 %		

Key

- User supplied data
- Determinand defined or amended by HazWasteOnline (see Appendix A)

Classification of sample: HP205[5]

 **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
HP205[5]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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 hazardous because Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.153%)

TPH (C6 to C40) petroleum group: (conc.: 0.27%)

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.27%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.27%)

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	acenaphthene	201-469-6	83-32-9		21 mg/kg		21 mg/kg		0.0021 %		
2	acenaphthylene	205-917-1	208-96-8		1.8 mg/kg		1.8 mg/kg		0.00018 %		
3	anthracene	204-371-1	120-12-7		49 mg/kg		49 mg/kg		0.0049 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4		20 mg/kg	1.32	26.407 mg/kg		0.00264 %		
5	benzo[a]anthracene	601-033-00-9	200-280-6		110 mg/kg		110 mg/kg		0.011 %		

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
6	benzo[a]pyrene; benzo[def]chrysene				65	mg/kg		65	mg/kg	0.0065 %		
	601-032-00-3	200-028-5	50-32-8									
7	benzo[b]fluoranthene				97	mg/kg		97	mg/kg	0.0097 %		
	601-034-00-4	205-911-9	205-99-2									
8	benzo[ghi]perylene				44	mg/kg		44	mg/kg	0.0044 %		
		205-883-8	191-24-2									
9	benzo[k]fluoranthene				43	mg/kg		43	mg/kg	0.0043 %		
	601-036-00-5	205-916-6	207-08-9									
10	beryllium { beryllium oxide }				0.49	mg/kg	2.775	1.36	mg/kg	0.000136 %		
	004-003-00-8	215-133-1	1304-56-9									
11	boron { boron tribromide/trichloride/trifluoride (combined) }				0.5	mg/kg	13.43	6.715	mg/kg	0.000672 %		
			10294-33-4, 10294-34-5, 7637-07-2									
12	cadmium { cadmium sulfide }			1	1.4	mg/kg	1.285	1.799	mg/kg	0.00014 %		
	048-010-00-4	215-147-8	1306-23-6									
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				10	mg/kg	1.462	14.616	mg/kg	0.00146 %		
		215-160-9	1308-38-9									
14	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
15	chrysene				77	mg/kg		77	mg/kg	0.0077 %		
	601-048-00-0	205-923-4	218-01-9									
16	copper { dicopper oxide; copper (I) oxide }				20	mg/kg	1.126	22.518	mg/kg	0.00225 %		
	029-002-00-X	215-270-7	1317-39-1									
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5											
18	dibenz[a,h]anthracene				13	mg/kg		13	mg/kg	0.0013 %		
	601-041-00-2	200-181-8	53-70-3									
19	diesel petroleum group				1530.667	mg/kg		1530.667	mg/kg	0.153 %		
			68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9									
20	ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
21	fluoranthene				220	mg/kg		220	mg/kg	0.022 %		
		205-912-4	206-44-0									
22	fluorene				21	mg/kg		21	mg/kg	0.0021 %		
		201-695-5	86-73-7									
23	indeno[123-cd]pyrene				41	mg/kg		41	mg/kg	0.0041 %		
		205-893-2	193-39-5									
24	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	180	mg/kg		180	mg/kg	0.018 %		
	082-001-00-6											
25	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
26	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
27	nickel { nickel dihydroxide }				9.5	mg/kg	1.579	15.005	mg/kg	0.0015 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
28	pH				8.4	pH		8.4	pH	8.4 pH		
			PH									
29	phenanthrene				160	mg/kg		160	mg/kg	0.016 %		
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
30	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
31	pyrene				160 mg/kg		160 mg/kg	0.016 %			
		204-927-3	129-00-0								
32	TPH (C6 to C40) petroleum group				2698.217 mg/kg		2698.217 mg/kg	0.27 %			
			TPH								
33	zinc { zinc oxide }				300 mg/kg	1.245	373.414 mg/kg	0.0373 %			
	030-013-00-7	215-222-5	1314-13-2								
Total:									0.6 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP205[6]

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

Sample details

Sample name:	LoW Code:
HP205[6]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
1.00 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	diesel petroleum group				19.333 mg/kg		19.333 mg/kg	0.00193 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	●	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
3	●	TPH (C6 to C40) petroleum group				34.405 mg/kg		34.405 mg/kg	0.00344 %		
				TPH							
Total:									0.00537 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00193%)

TPH (C6 to C40) petroleum group: (conc.: 0.00344%)

Classification of sample: HP206[3]



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

Sample details

Sample name:	LoW Code:
HP206[3]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.30 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	diesel petroleum group				28.367 mg/kg		28.367 mg/kg	0.00284 %		
			68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	TPH (C6 to C40) petroleum group				48.105 mg/kg		48.105 mg/kg	0.00481 %		
			TPH							
Total:								0.00765 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00284%)

TPH (C6 to C40) petroleum group: (conc.: 0.00481%)

Classification of sample: HP206[4]

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

Sample details

Sample name:	LoW Code:
HP206[4]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.50 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	diesel petroleum group				20.667 mg/kg		20.667 mg/kg	0.00207 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	●	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
3	●	TPH (C6 to C40) petroleum group				38.405 mg/kg		38.405 mg/kg	0.00384 %		
				TPH							
Total:									0.00591 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00207%)

TPH (C6 to C40) petroleum group: (conc.: 0.00384%)

Classification of sample: HP207[3]

 **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
HP207[3]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.20 m	Entry:
	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

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 hazardous because Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.383%)

TPH (C6 to C40) petroleum group: (conc.: 0.628%)

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.628%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.628%)

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	acenaphthene	201-469-6	83-32-9		110 mg/kg		110 mg/kg	0.011 %		
2	acenaphthylene	205-917-1	208-96-8		3.6 mg/kg		3.6 mg/kg	0.00036 %		
3	anthracene	204-371-1	120-12-7		200 mg/kg		200 mg/kg	0.02 %		
4	arsenic { arsenic trioxide }	033-003-00-0	215-481-4		15 mg/kg	1.32	19.805 mg/kg	0.00198 %		
5	benzo[a]anthracene	601-033-00-9	200-280-6		260 mg/kg		260 mg/kg	0.026 %		

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
6	benzo[a]pyrene; benzo[def]chrysene				150	mg/kg		150	mg/kg	0.015 %		
	601-032-00-3	200-028-5	50-32-8									
7	benzo[b]fluoranthene				260	mg/kg		260	mg/kg	0.026 %		
	601-034-00-4	205-911-9	205-99-2									
8	benzo[ghi]perylene				100	mg/kg		100	mg/kg	0.01 %		
		205-883-8	191-24-2									
9	benzo[k]fluoranthene				64	mg/kg		64	mg/kg	0.0064 %		
	601-036-00-5	205-916-6	207-08-9									
10	beryllium { beryllium oxide }				0.8	mg/kg	2.775	2.22	mg/kg	0.000222 %		
	004-003-00-8	215-133-1	1304-56-9									
11	boron { boron tribromide/trichloride/trifluoride (combined) }				0.7	mg/kg	13.43	9.401	mg/kg	0.00094 %		
			10294-33-4, 10294-34-5, 7637-07-2									
12	cadmium { cadmium sulfide }			1	1.1	mg/kg	1.285	1.414	mg/kg	0.00011 %		
	048-010-00-4	215-147-8	1306-23-6									
13	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				23	mg/kg	1.462	33.616	mg/kg	0.00336 %		
		215-160-9	1308-38-9									
14	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1.2	mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
15	chrysene				200	mg/kg		200	mg/kg	0.02 %		
	601-048-00-0	205-923-4	218-01-9									
16	copper { dicopper oxide; copper (I) oxide }				39	mg/kg	1.126	43.91	mg/kg	0.00439 %		
	029-002-00-X	215-270-7	1317-39-1									
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1	mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5											
18	dibenz[a,h]anthracene				32	mg/kg		32	mg/kg	0.0032 %		
	601-041-00-2	200-181-8	53-70-3									
19	diesel petroleum group				3826.667	mg/kg		3826.667	mg/kg	0.383 %		
			68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9									
20	ethylbenzene				<0.001	mg/kg		<0.001	mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4									
21	fluoranthene				600	mg/kg		600	mg/kg	0.06 %		
		205-912-4	206-44-0									
22	fluorene				95	mg/kg		95	mg/kg	0.0095 %		
		201-695-5	86-73-7									
23	indeno[123-cd]pyrene				99	mg/kg		99	mg/kg	0.0099 %		
		205-893-2	193-39-5									
24	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	680	mg/kg		680	mg/kg	0.068 %		
	082-001-00-6											
25	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
26	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
27	nickel { nickel dihydroxide }				19	mg/kg	1.579	30.01	mg/kg	0.003 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]									
28	pH				10	pH		10	pH	10pH		
			PH									
29	phenanthrene				540	mg/kg		540	mg/kg	0.054 %		
		201-581-5	85-01-8									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number								
30		phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD	
		604-001-00-2	203-632-7	108-95-2								
31	■	pyrene				430 mg/kg		430 mg/kg	0.043 %			
			204-927-3	129-00-0								
32	■	TPH (C6 to C40) petroleum group				6280.005 mg/kg		6280.005 mg/kg	0.628 %			
				TPH								
33	🧪	zinc { zinc oxide }				580 mg/kg	1.245	721.934 mg/kg	0.0722 %			
		030-013-00-7	215-222-5	1314-13-2								
Total:									1.48 %			

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Hazardous result
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP207[4]

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

Sample details

Sample name:	LoW Code:
HP207[4]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.60 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	diesel petroleum group				35.5 mg/kg		35.5 mg/kg	0.00355 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	●	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
3	●	TPH (C6 to C40) petroleum group				72.205 mg/kg		72.205 mg/kg	0.00722 %		
				TPH							
Total:									0.0108 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00355%)

TPH (C6 to C40) petroleum group: (conc.: 0.00722%)

Classification of sample: HP208[3]

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

Sample details

Sample name:	LoW Code:
HP208[3]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.20 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1		acenaphthene	201-469-6	83-32-9	95 mg/kg		95 mg/kg	0.0095 %			
2		acenaphthylene	205-917-1	208-96-8	7.8 mg/kg		7.8 mg/kg	0.00078 %			
3		anthracene	204-371-1	120-12-7	200 mg/kg		200 mg/kg	0.02 %			
4		arsenic { arsenic trioxide }	033-003-00-0	215-481-4	17 mg/kg	1.32	22.446 mg/kg	0.00224 %			
5		benzo[a]anthracene	601-033-00-9	200-280-6	580 mg/kg		580 mg/kg	0.058 %			
6		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	360 mg/kg		360 mg/kg	0.036 %			
7		benzo[b]fluoranthene	601-034-00-4	205-911-9	590 mg/kg		590 mg/kg	0.059 %			
8		benzo[ghi]perylene	205-883-8	191-24-2	220 mg/kg		220 mg/kg	0.022 %			
9		benzo[k]fluoranthene	601-036-00-5	205-916-6	150 mg/kg		150 mg/kg	0.015 %			
10		beryllium { beryllium oxide }	004-003-00-8	215-133-1	0.27 mg/kg	2.775	0.749 mg/kg	0.0000749 %			
11		boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2	0.2 mg/kg	13.43	2.686 mg/kg	0.000269 %			
12		cadmium { cadmium sulfide }	048-010-00-4	215-147-8	2.2 mg/kg	1.285	2.828 mg/kg	0.00022 %			
13		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		215-160-9	11 mg/kg	1.462	16.077 mg/kg	0.00161 %			
14		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %			<LOD
15		chrysene	601-048-00-0	205-923-4	420 mg/kg		420 mg/kg	0.042 %			
16		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	24 mg/kg	1.126	27.021 mg/kg	0.0027 %			

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
18	dibenz[a,h]anthracene				69 mg/kg		69 mg/kg	0.0069 %		
	601-041-00-2	200-181-8	53-70-3							
19	fluoranthene				1100 mg/kg		1100 mg/kg	0.11 %		
		205-912-4	206-44-0							
20	fluorene				86 mg/kg		86 mg/kg	0.0086 %		
		201-695-5	86-73-7							
21	indeno[123-cd]pyrene				220 mg/kg		220 mg/kg	0.022 %		
		205-893-2	193-39-5							
22	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	88 mg/kg		88 mg/kg	0.0088 %		
	082-001-00-6									
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
25	nickel { nickel dihydroxide }				8.6 mg/kg	1.579	13.584 mg/kg	0.00136 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
26	pH				8.5 pH		8.5 pH	8.5 pH		
			PH							
27	phenanthrene				620 mg/kg		620 mg/kg	0.062 %		
		201-581-5	85-01-8							
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
29	pyrene				800 mg/kg		800 mg/kg	0.08 %		
		204-927-3	129-00-0							
30	zinc { zinc oxide }				450 mg/kg	1.245	560.121 mg/kg	0.056 %		
	030-013-00-7	215-222-5	1314-13-2							
Total:								0.626 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP208[4]

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

Sample details

Sample name:	LoW Code:
HP208[4]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.50 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	 acenaphthene	201-469-6	83-32-9		26 mg/kg		26	mg/kg	0.0026 %		
2	 acenaphthylene	205-917-1	208-96-8		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
3	 anthracene	204-371-1	120-12-7		75 mg/kg		75	mg/kg	0.0075 %		
4	 arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	23 mg/kg	1.32	30.367	mg/kg	0.00304 %		
5	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	200 mg/kg		200	mg/kg	0.02 %		
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	140 mg/kg		140	mg/kg	0.014 %		
7	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	230 mg/kg		230	mg/kg	0.023 %		
8	 benzo[ghi]perylene	205-883-8	191-24-2		97 mg/kg		97	mg/kg	0.0097 %		
9	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	71 mg/kg		71	mg/kg	0.0071 %		
10	 beryllium { beryllium oxide }	004-003-00-8	215-133-1	1304-56-9	0.98 mg/kg	2.775	2.72	mg/kg	0.000272 %		
11	 boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		0.4 mg/kg	13.43	5.372	mg/kg	0.000537 %		
12	 cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1306-23-6	2 mg/kg	1.285	2.57	mg/kg	0.0002 %		
13	 chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		19 mg/kg	1.462	27.77	mg/kg	0.00278 %		
14	 chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1.2 mg/kg	1.923	<2.308	mg/kg	<0.000231 %		<LOD
15	chrysene	601-048-00-0	205-923-4	218-01-9	200 mg/kg		200	mg/kg	0.02 %		
16	 copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	53 mg/kg	1.126	59.672	mg/kg	0.00597 %		

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
18	dibenz[a,h]anthracene				29 mg/kg		29 mg/kg	0.0029 %		
	601-041-00-2	200-181-8	53-70-3							
19	fluoranthene				420 mg/kg		420 mg/kg	0.042 %		
		205-912-4	206-44-0							
20	fluorene				26 mg/kg		26 mg/kg	0.0026 %		
		201-695-5	86-73-7							
21	indeno[123-cd]pyrene				92 mg/kg		92 mg/kg	0.0092 %		
		205-893-2	193-39-5							
22	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	300 mg/kg		300 mg/kg	0.03 %		
	082-001-00-6									
23	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
24	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
25	nickel { nickel dihydroxide }				19 mg/kg	1.579	30.01 mg/kg	0.003 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
26	pH				8 pH		8 pH	8pH		
			PH							
27	phenanthrene				220 mg/kg		220 mg/kg	0.022 %		
		201-581-5	85-01-8							
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
29	pyrene				330 mg/kg		330 mg/kg	0.033 %		
		204-927-3	129-00-0							
30	zinc { zinc oxide }				620 mg/kg	1.245	771.723 mg/kg	0.0772 %		
	030-013-00-7	215-222-5	1314-13-2							
Total:								0.339 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP209A[2]

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

Sample details

Sample name:	LoW Code:
HP209A[2]	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.80 m	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	 acenaphthene	201-469-6	83-32-9		0.6 mg/kg		0.6 mg/kg	0.00006 %			
2	 acenaphthylene	205-917-1	208-96-8		0.96 mg/kg		0.96 mg/kg	0.000096 %			
3	 anthracene	204-371-1	120-12-7		1.9 mg/kg		1.9 mg/kg	0.00019 %			
4	 arsenic { arsenic trioxide }	033-003-00-0	215-481-4		33 mg/kg	1.32	43.571 mg/kg	0.00436 %			
5	benzo[a]anthracene	601-033-00-9	200-280-6		5.5 mg/kg		5.5 mg/kg	0.00055 %			
6	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		4.5 mg/kg		4.5 mg/kg	0.00045 %			
7	benzo[b]fluoranthene	601-034-00-4	205-911-9		6.8 mg/kg		6.8 mg/kg	0.00068 %			
8	 benzo[ghi]perylene	205-883-8	191-24-2		2.9 mg/kg		2.9 mg/kg	0.00029 %			
9	benzo[k]fluoranthene	601-036-00-5	205-916-6		1.8 mg/kg		1.8 mg/kg	0.00018 %			
10	 beryllium { beryllium oxide }	004-003-00-8	215-133-1		2.7 mg/kg	2.775	7.493 mg/kg	0.000749 %			
11	 boron { boron tribromide/trichloride/trifluoride (combined) }		10294-33-4, 10294-34-5, 7637-07-2		2.1 mg/kg	13.43	28.203 mg/kg	0.00282 %			
12	 cadmium { cadmium sulfide }	048-010-00-4	215-147-8	1	1.4 mg/kg	1.285	1.799 mg/kg	0.00014 %			
13	 chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		28 mg/kg	1.462	40.924 mg/kg	0.00409 %			
14	 chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8		<1.2 mg/kg	1.923	<2.308 mg/kg	<0.000231 %			<LOD
15	chrysene	601-048-00-0	205-923-4		5.2 mg/kg		5.2 mg/kg	0.00052 %			
16	 copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7		120 mg/kg	1.126	135.107 mg/kg	0.0135 %			

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
18	dibenz[a,h]anthracene				0.87 mg/kg		0.87 mg/kg	0.000087 %			
	601-041-00-2	200-181-8	53-70-3								
19	fluoranthene				12 mg/kg		12 mg/kg	0.0012 %			
		205-912-4	206-44-0								
20	fluorene				0.77 mg/kg		0.77 mg/kg	0.000077 %			
		201-695-5	86-73-7								
21	indeno[123-cd]pyrene				2.6 mg/kg		2.6 mg/kg	0.00026 %			
		205-893-2	193-39-5								
22	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	1600 mg/kg		1600 mg/kg	0.16 %			
	082-001-00-6										
23	mercury { mercury dichloride }				1.2 mg/kg	1.353	1.624 mg/kg	0.000162 %			
	080-010-00-X	231-299-8	7487-94-7								
24	naphthalene				1.7 mg/kg		1.7 mg/kg	0.00017 %			
	601-052-00-2	202-049-5	91-20-3								
25	nickel { nickel dihydroxide }				44 mg/kg	1.579	69.498 mg/kg	0.00695 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
26	pH				7.6 pH		7.6 pH	7.6 pH			
			PH								
27	phenanthrene				7 mg/kg		7 mg/kg	0.0007 %			
		201-581-5	85-01-8								
28	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
29	pyrene				9.5 mg/kg		9.5 mg/kg	0.00095 %			
		204-927-3	129-00-0								
30	zinc { zinc oxide }				480 mg/kg	1.245	597.463 mg/kg	0.0597 %			
	030-013-00-7	215-222-5	1314-13-2								
Total:									0.26 %		

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 Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: HP210[4]

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

Sample details

Sample name: **HP210[4]** LoW Code: **17: Construction and Demolition Wastes (including excavated soil from contaminated sites)**
Chapter: **17 05 04 (Soil and stones other than those mentioned in 17 05 03)**
Entry:

Hazard properties

None identified

Determinands

Moisture content: **0% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
1	● acenaphthene	201-469-6	83-32-9		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
2	● acenaphthylene	205-917-1	208-96-8		0.28 mg/kg		0.28	mg/kg	0.000028 %		
3	● anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
4	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.47 mg/kg		0.47	mg/kg	0.000047 %		
5	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.57 mg/kg		0.57	mg/kg	0.000057 %		
6	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.99 mg/kg		0.99	mg/kg	0.000099 %		
7	● benzo[ghi]perylene	205-883-8	191-24-2		0.62 mg/kg		0.62	mg/kg	0.000062 %		
8	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.45 mg/kg		0.45	mg/kg	0.000045 %		
9	chrysene	601-048-00-0	205-923-4	218-01-9	0.72 mg/kg		0.72	mg/kg	0.000072 %		
10	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
11	● fluoranthene	205-912-4	206-44-0		0.92 mg/kg		0.92	mg/kg	0.000092 %		
12	● fluorene	201-695-5	86-73-7		<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
13	● indeno[123-cd]pyrene	205-893-2	193-39-5		0.53 mg/kg		0.53	mg/kg	0.000053 %		
14	naphthalene	601-052-00-2	202-049-5	91-20-3	<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
15	● phenanthrene	201-581-5	85-01-8		0.39 mg/kg		0.39	mg/kg	0.000039 %		
16	● pyrene	204-927-3	129-00-0		1 mg/kg		1	mg/kg	0.0001 %		
Total:									0.00071 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
■	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

Classification of sample: HP210[5]



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

Sample details

Sample name:	LoW Code:
HP210[5]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.30 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
1	diesel petroleum group				19.633 mg/kg		19.633 mg/kg	0.00196 %		
			68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
3	TPH (C6 to C40) petroleum group				34.705 mg/kg		34.705 mg/kg	0.00347 %		
			TPH							
Total:								0.00543 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00196%)

TPH (C6 to C40) petroleum group: (conc.: 0.00347%)

Classification of sample: HP210[6]

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

Sample details

Sample name:	LoW Code:
HP210[6]	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.80 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1	●	diesel petroleum group				40.333 mg/kg		40.333 mg/kg	0.00403 %		
				68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9							
2	●	ethylbenzene				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	601-023-00-4	202-849-4	100-41-4								
3	●	TPH (C6 to C40) petroleum group				55.405 mg/kg		55.405 mg/kg	0.00554 %		
			TPH								
Total:									0.00957 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
<LOD	Below limit of detection
ND	Not detected

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 Sample is not liquid - forced hazardous above 1000mg/kg to correspond with hotspots identified in HH risk assessment.

Hazard Statements hit:

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

Because of determinands:

diesel petroleum group: (conc.: 0.00403%)

TPH (C6 to C40) petroleum group: (conc.: 0.00554%)

Appendix A: Classifier defined and non CLP determinands

■ **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

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

■ **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

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

■ **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

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

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **boron tribromide/trichloride/trifluoride (combined)** (CAS Number: 10294-33-4, 10294-34-5, 7637-07-2)

Description/Comments: Combines the hazard statements and the average of the conversion factors for boron tribromide, boron trichloride and boron trifluoride

Data source: N/A

Data source date: 06 Aug 2015

Hazard Statements: EUH014 , Acute Tox. 2 H330 , Acute Tox. 2 H300 , Skin Corr. 1A H314 , Skin Corr. 1B H314

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

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

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

■ **salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex**

CLP index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

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

■ **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

■ **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

• **lead compounds with the exception of those specified elsewhere in this Annex**

CLP index number: 082-001-00-6

Description/Comments: Least-worst case: IARC considers lead compounds Group 2A; Probably carcinogenic to humans; Lead REACH Consortium, following CLP protocols, considers many simple lead compounds to be Carcinogenic category 2

Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)

Additional Hazard Statement(s): Carc. 2 H351

Reason for additional Hazards Statement(s):

03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium

www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

• **pH (CAS Number: PH)**

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

• **phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)**

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

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

• **pyrene (EC Number: 204-927-3, CAS Number: 129-00-0)**

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

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

• **diesel petroleum group (CAS Number: 68334-30-5, 68476-34-6, 94114-59-7, 1159170-26-9)**

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: Flam. Liq. 3 H226 , Skin Irrit. 2 H315 , Acute Tox. 4 H332 , Carc. 2 H351 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Aquatic Chronic 2 H411

• **ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)**

CLP index number: 601-023-00-4

Description/Comments:

Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)

Additional Hazard Statement(s): Carc. 2 H351

Reason for additional Hazards Statement(s):

03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

• **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: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on hazard statements

beryllium {beryllium oxide}

Worst case species based on hazard statements

boron {boron tribromide/trichloride/trifluoride (combined)}

Worst case species based on hazard statements

cadmium {cadmium sulfide}

Worst case species based on hazard statements

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

Worst case species based on hazard statements

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

Worst case species based on hazard statements

copper {dicopper oxide; copper (I) oxide}

Most likely common species

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Worst case species based on hazard statements

mercury {mercury dichloride}

Worst case species based on hazard statements

nickel {nickel dihydroxide}

Worst case species based on hazard statements

zinc {zinc oxide}

Worst case species based on hazard statements

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.1, May 2018**

HazWasteOnline Classification Engine Version: 2021.155.4797.9144 (05 Jun 2021)

HazWasteOnline Database: 2021.155.4797.9144 (05 Jun 2021)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2019 - UK: 2019 No. 720 of 27th March 2019

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019

Appendix E Plausible Source-Pathway-Receptor Contaminant Linkages

Summary of Potential Contaminant Linkages

Table K.2 lists the plausible contaminant linkages which have been identified. These are considered as potentially unacceptable risks in line with guidelines published in LCRM (2019) and additional risk assessment is required.

Source – Pathway – Receptor Linkages have been assessed in general accordance with guidance in CIRIA Report C552 (Rudland et al 2001) but modified to add a ‘no linkage’ category and to remove low/moderate risk (See Table K.1).

It should be noted that whilst the risk assessment process undertaken in this report may identify potential risks to site demolition and redevelopment workers, consideration of occupational health and safety issues is beyond the scope of this report and need to be considered separately in the Construction Phase Health and Safety Plan.

Table K.1: Consequence versus probability assessment.

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Low risk	Very low risk
	Low Likelihood	Moderate risk	Low risk	Low risk	Very low risk
	Unlikely	Low risk	Very low risk	Very low risk	Very low risk
	No Linkage	No risk			

Table K.2: Exposure model – final source-pathway-receptor contaminant linkages

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments	
Made Ground (metals and PAH) S1	Ingestion, inhalation or direct contact.	Site users.	Likely	Medium	Moderate	There is Made Ground below the entire site, and there are metals and PAH at levels in excess of the GAC.	Direct contact with these materials is plausible only in areas of Public Open Space. Mitigation measures will be required to break the SPR linkage.
	Inhalation of fugitive dust.	Neighbours.	Low likelihood	Medium	Low		The risk of significant generation of dust is likely only during site development process and can therefore be controlled.
	Leaching through unsaturated zone.	Groundwater.	Likely	Medium	Moderate		The underlying strata are classified as Principal Aquifer. Mitigation in the form of source removal will be required.
	Direct contact	Water supply pipes.	Likely	Medium	Moderate	There is Made Ground below the entire site, and there are PAH and petroleum hydrocarbons at levels in excess of the Water UK BHF threshold values. Direct contact with buried water supply pipes is therefore likely. Mitigation measures will be required to break the SPR linkage in the form of protectaline pipework and clean service corridors.	

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments
Made Ground (asbestos) S1	Inhalation of fugitive dust.	Site users.	Low likelihood	Severe	Moderate	Mitigation measures will be required to break the SPR linkage. As asbestos has been identified within sub-base materials present on site, which will require removal, the identified source will no longer be present on site. As there is the potential for asbestos to be present within any of the Made Ground mitigation in the form of a cover system/hard landscaping will be required.
		Neighbours.	Low likelihood	Severe	Moderate	Asbestos fibres have been proven to be present in the soil. The risk of significant generation of dust is likely only during site development process and can therefore be controlled. Suppression should be included in control measures. There is ACM present on site, so works to be undertaken in accordance with CAR 2012.

Sources	Possible Pathways	Receptors	Probability	Consequence	Risk Level	Comments	
Made Ground (petroleum hydrocarbons) S1	Ingestion, inhalation or direct contact.	Site users.	Likely	Medium	Moderate	Investigation has proven petroleum hydrocarbons to be present within the sub-base materials at concentrations in excess of the GAC	Contact with these materials is possible in areas of Public Open Space. Mitigation will be required.
	Vapours.	Neighbours.	Unlikely	Medium	Very Low		Vapour migration is unlikely following remediation of source soils.
	Inhalation of fugitive dust.	Neighbours.	Low	Medium	Low		The risk of significant generation of dust is likely only during site development and can therefore be controlled. Suppression should be included in control measures.
	Leaching through unsaturated zone.	Groundwater	Likely	Medium	Moderate		The strata beneath the site are classified as Principal Aquifer and mitigation will be required.
	Direct contact	Water supply pipes.	Likely	Medium	Moderate		Direct contact with buried water supply pipes is likely and mitigation will be required.

Appendix F Form Templates

Imported Soil Documentation Form

Stockpile Identification Reference	
Material Type	
Source Site	
Consignment Note Reference Numbers	
Volume of Stockpile (or number of loads)	
Plots Material to be used in	
Stockpile Identification Reference	

Sketch Plan of Stockpile Location and Sample Points

Signed _____

Position _____

Date _____

Appendix G Discovery Strategy

DISCOVERY STRATEGY

DISPLAY AND AWARENESS

The Discovery Strategy must be placed on the Health & Safety Notice Board and/or displayed in a prominent area where all site staff are able to consult the document at any time.

Any member of the workforce entering the site to undertake any excavation must be made aware of the potential to discover contamination and the discovery strategy.

HOW TO IDENTIFY POTENTIAL CONTAMINATED MATERIAL

- Looks oily and has an oily odour.
- Solvent type of odour.
- Man-made materials in fill such as paint cans, car parts, glass fragments.
- Contains fragments of white asbestos sheeting, coal/coke clinker.
- Sand bags, and or/subsurface concrete structures.
- Unusual colour e.g. Blue, red or green.
- Asbestos cement/lagging.

(Examples only – This list is not exhaustive. If in any doubt ask the Site Manager)

PROCEDURE

If unexpected evidence of contamination is found the following procedures shall be adhered, including:

1. All site works at the position of the suspected contamination should stop.
2. Site Personnel to inform the Site Manager/Agent.
3. Visual and olfactory observations of the condition of the ground and the extent of contamination should be made and notification shall be given to Hydrock Consultants, who will inform the Local Authority within circa 24 hours after discovery. Should the contamination be likely to affect controlled waters the Environment Agency shall also be informed.
4. In the presence of a suitably qualified geo-environmental engineer on behalf of the Consultant, investigation works shall commence to recover samples for testing and, using visual and olfactory observations of the condition of the ground, delineate the area over which contaminated materials are present.
5. Should Hydrock deem it appropriate, the affected material may be excavated and placed in a stockpile on a suitable impermeable surface. This should be suitably quarantined with no addition to, or removal of, the stockpile while chemical analysis is being undertaken. Alternatively, the material should remain in situ until laboratory test results have been obtained.
6. A photographic record should also be made of relevant observations.
7. Hydrock will determine an appropriate testing suite based on visual and olfactory observations.
8. Test results will be compared against current assessment criteria suitable for the future use of the area of the site affected.

9. If after testing the ground is found to be contaminated, the Local Authority and NHBC shall be informed. After consultation with the Local Authority, NHBC, and if necessary, the Environment Agency, materials should either be removed for disposal to a licensed waste management facility or remediated to agreed clean-up criteria.
10. If the evidence for contamination is severe, as if it leads to pollution of water courses, the Environment Agency shall be informed immediately as an environmental incident (see EA website).

UNEXPECTED TANKS

It is possible that underground tanks, which have not been identified by the investigations to date, may be present. The following procedures are to be adhered to if tanks are identified:

11. All site works at the position of the tanks should stop.
12. A description of the tank should be made by Hydrock including; condition and surround, along with visual and olfactory observations should any contents in the tank be apparent. A photographic record should also be made of relevant observations.
13. The tank's position and depth should be determined and marked on a plan of the site.
14. Notification shall be given to Hydrock Consultants who will inform the Local Authority within 24 hours.
15. During the presence of a suitably qualified geo-environmental engineer on behalf of the Consultant, investigation works should be undertaken to obtain samples of any liquid or sludge contents and to establish dimensions of the tank.
16. Laboratory testing will be determined by Hydrock Consultants based on visual and olfactory observations of the material.
17. Test results will be compared against current assessment criteria and proposals for disposal of any contents determined in agreement with the appropriate Regulatory Parties.
18. Emptying the tank and disposal of contents to a suitable licensed disposal facility.
19. Once the tank has been emptied in accordance with the above proposals, it is to be removed for disposal to a licensed waste management facility. Copies of the relevant waste consignment notes are to be forwarded to Hydrock Consultants.
20. Excavation and remediation of any contaminated soils in accordance with Section 5.
21. Samples of the base and sides of the resultant hole will be sampled as per the Consultant's instructions and an assessment as to whether this may have been a source for groundwater contamination made.

A report will be prepared by Hydrock and submitted to the regulatory parties, the Local Authority and the Environment Agency where groundwater may potentially have been impacted.

Appendix H

Remediation Options Appraisal

This Remediation Options Appraisal has been undertaken in general accordance with Land contamination: risk management (LCRM) (Environment Agency, 2021). It will inform the remediation of the site and reduce / control the risks associated with relevant pollutant linkages to an acceptable level.

The scope of the Remediation Options Assessment comprises:

- Provision of background information (provided in Section 2).
- A summary of the findings of the Risk Assessments (provided in Section 3).
- Selection of feasible remediation options (for each relevant pollutant linkage).
- A detailed evaluation of options.
- Selection of the final remediation options.

Constraints

Any remediation works need to be designed and undertaken with recognition of the site constraints. Whilst the site itself is relatively open and unconstrained, it is located in a residential area, with a busy road network in the surrounding area. Any remediation works will (as much as possible) need to:

- Reduce impact to the adjacent residents with regards to noise, dust, odour and vibration.
- Minimise road traffic by reducing the amount of disposal and maximising re-use of excavated materials.
- Work within the ecological constraints of the site, with works to be restricted to the areas which have had ecological clearance works completed.

Regulatory constraints will also need to be addressed. Detailed regulatory discussions and agreement will be required prior to the finalisation of the remediation scheme.

The site is located on a Secondary A Aquifer (over Unproductive Strata). The remediation works (and associated geotechnical mitigation) will need ensure that additional risks to the environment are not caused.

Selection of feasible remediation options (Options Assessment Tier 1)

In accordance with LCRM (Environment Agency, 2020), the first stage of an options assessment is to select feasible remediation techniques which can be applied to achieve a site which is suitable for the proposed development.

The initial screening process considers the available remedial techniques based on following key criteria:

- Effectiveness. Will the remediation treatment successfully reduce, or control unacceptable risks to a defined (and appropriate) level? The strategy must work within the context of the site and be effective in the removal of contamination linkages.
- Durability. Can the remediation treatment continue to reduce, or control unacceptable risks to a defined level over a period of time?
- Environmental impact. Will the remediation treatment affect the quality of the environment during or following remediation?
- The (relative) cost. Is the strategy reasonable and affordable, given the available resources?
- Sustainability. Is the option sustainable? More sustainable options are preferred.
- Relative Operational Time. The strategy should work in a feasible and realistic time scale.

- Practicality. The strategy has to have been successfully used in similar situations on other sites and readily available within the UK market. Novel solutions or those still in the research stage would require additional consideration.
- How the strategy meets other environmental objectives. For example, on the use of energy and other material resources.
- Are there any indirect benefits that the remediation would bring? For example, will it enhance the amenity or ecological value of an area, remove blight or encourage regeneration
- The legal, financial and commercial context of the site.

Table D.1 below summarises the accepted remedial techniques readily available in the UK and assess each against the ten parameters listed above.

Initially the effectiveness at treating the contamination is assessed. This is broken down into: effective (Y), partially effective (P) or ineffective (N).

The durability of each of the remediation options is assessed as either: durable (D) i.e. providing a long-term solution; durable with maintenance requirements (D-M) e.g. gas venting trenches or permeable reactive groundwater barrier, which may require inspections and maintaining; or temporary (T) i.e. providing a short-term solution, but not necessarily effective in the long term e.g. groundwater pump and treat without source removal

The environmental impact is then assessed as: Low (L), Moderate (M) or High (H).

The listed techniques are then assessed in terms of relative cost ranging from: low cost (£), moderately expensive (££), expensive (£££), to prohibitively expensive for the site under consideration (£££+).

Sustainability is assessed based on a relative comparison of: Sustainable (S) or Unsustainable (U).

The timescale over which the remediation technique is operational has been broadly assessed in units of weeks, months, years and decades. If for example a given technique is only effective over a period of years to decades then its overall feasibility is diminished.

Previous site experience, technical literature and Hydrock's in house knowledge have been used to reject impractical and or unsuitable remediation options. The primary reasons for rejection of an option are due to the ongoing operational constraints, the cost and the inability to treat all the required contaminants. If an option is deemed impractical, it is noted in the comments.

Finally, the feasibility of each of the listed remedial option is assessed in terms of effectiveness at treating the contamination, which is broken down into: effective (Y), partially effective (P) or ineffective (N). Additional comments are provided as necessary and if other environmental objectives, indirect benefits or legal implications are identified, these are noted in the comments.

In some instances, there may be a number of treatment options identified and it may not be possible to determine the best practicable option at this stage. In these instances, all potential remedial options are carried forward.

Table D.17.1: Applicability of Remediation Options and Initial Assessment – Soils

Method	Remediation options	Effectiveness		Durability	Environmental Impact	Relative Cost	Sustainability	Relative Time	Comments and Feasibility
		Arsenic	BaP						
Civil engineering	Containment - cover systems	Y	Y	D	L	£ - ££	S	M	Feasible – In conjunction with other technologies. Will prevent contact between future site users and contaminated soils and break the S-P-R linkage. Would need to be undertaken in association with a Materials Management Strategy (MMS).
	Excavation and disposal	Y	Y	D	H	£££+	U	W - M	Feasible – However, not considered sustainable, and whilst effective is not considered unless all other techniques are not feasible. Will effectively remove the source of the contamination. Expensive, as soils may contain asbestos at elevated concentrations. However, dependent upon other factors some disposal may be unavoidable. Disposal to be minimised as much as possible by reuse of appropriate soils. May also involve pre-treatment by hand picking, screening and sorting.
	Materials management	Y	Y	D	L	£ - ££	S	W - M	Will allow effective reuse of excavated soils and placement (in areas requiring fill/a cover system). If Made Ground is excavated, it could potentially be reused, but only below a cover system. Treatment / screening / sorting would probably also be required. Will prevent contact between future site users and contaminated soils and break the S-P-R linkage. However, would need to be undertaken in association with a Materials Management Strategy (MMS). May require the use of a bespoke permit or waste recovery licence.

Detailed evaluation of options (Options Assessment Tier 2)

The short-list of options presented below represents those technologies which were not rejected during the Tier 1 Options Assessment, and are taken forward to the Tier 2 Options Assessment:

- installation of a 450mm engineered cover system in public open space, comprising a high visibility geotextile layer beneath 450mm subsoil and topsoil;
- Materials management (excavation, processing and reuse of suitable materials);
- disposal of excess or unsuitable soils;

The above remediation techniques are discussed in more detail below. It should also be recognised that in addition to the above mitigation works, there is a requirement for:

- the use of Protectaline (or similar) potable water supply pipework.

Installation of an engineered cover system

Cover systems have been widely used in the UK for managing risks associated with brownfield land developed for residential land uses. The technology involves the placement of a cover to form a barrier between the contaminant and site users thus breaking the source-pathway-receptor linkage.

Subject to site levels available for the installation of the cover, this option is technically simple and represents a low-cost strategy that can be implemented rapidly. However, site levels will not allow the installation of a cover system from the existing levels.

The timescale for installing a barrier is relatively quick allowing for rapid completion of the remediation objectives and this remediation solution could be designed and implemented within a matter of months.

Materials management – excavation, processing, and reuse of suitable materials

Excavation and reuse of suitable materials has been widely used in the UK for managing risks associated with brownfield land. The method involves the excavation of soils, determining the soils suitability (both chemically and geotechnically) and replacement as part of an earthworks programme. The final part of the remediation (if the contaminated soils are not removed from site) would be the placement of a cover to form a barrier between the contaminants and site users, thus breaking the source-pathway-receptor linkages.

Subject to site levels available for the installation of the cover, this option is technically simple and represents a low-cost strategy that can be implemented rapidly. However, in this case the geotechnical constraints of the site require a robust solution to deal with both the geotechnical and contamination issues.

Detailed discussions will be required with the Environment Agency with regards to waste management at the site. It is envisaged that the DoWCoP will be able to be used (at least in part) for the earthworks and materials management at the site. However, there may be a requirement for an Environmental Permit and potentially the requirement for a waste recovery licence.

Disposal of excess or unsuitable soils

Disposal involves the removal of contaminant material from site and disposal at an appropriately licensed waste management facility.

The advantages with regards to excavation and disposal are:

- it represents a relatively rapid remediation strategy; and

- provides a high degree of certainty in the suitability of the site for its intended end use.

The main disadvantages with full Excavation and Disposal are:

- cost of disposal, especially as the majority of the soils would be suitable for use as general fill below the cover system; and
- does not represent a sustainable remediation strategy as significant vehicle movement will be required to and from the site and the contamination is not destroyed but simply relocated to a waste management facility, thus taking up valuable landfill space.

Hydrock does not believe that full disposal of all impacted soils is applicable at the site. However, partial disposal may be required and this option is considered viable if used in conjunction with other techniques or if material is proven to be unsuitable.