Report Title: **Remediation Verification Report**

Project Name: **Hempton Road, Deddington**

Report Reference: BRD3567-OR6-A

Date: June 2022

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REPORT CONTROL SHEET

REPORT TITLE	REMEDIATION VERIFICATION REPORT
PROJECT	HEMPTON ROAD, DEDDINGTON
CLIENT	BURRINGTON ESTATES

REPORT REFERENCE	ISSUE DETAIL	DATE	PREPARED BY	CHECKED BY
BRD3104-OR6-A	First Issue	30/06/2022	J Brockwell	M Morgan

BRD Environmental Limited

Geotechnical and Environmental Services

- Ground Investigation
- Japanese Knotweed Removal
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- Contamination Assessment
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REPORT LAYOUT

This report is divided into the following three sections: Technical Report, Supporting Information and Appendices.

TECHNICAL REPORT

The main report section is intended to provide the technical detail of the investigation and is intended to provide the level of information required by current guidance documents and practice. The Technical Report is written in a language that, in part, assumes knowledge of subject matter so that it can be written in as concise a form as possible. Its intended audience is peers, regulators and other professionals in related disciplines.

SUPPORTING INFORMATION

This section of the report provides background details of a generic nature together with specific technical approaches adopted by BRD and details of the guidance documents that are commonly referenced in the report. The section also includes explanations of technical terms to assist non-specialist readers in understanding the Technical Report. It should be noted that not all the information within this section is necessarily applicable to this specific report.

APPENDICES

The final section of the report presents the factual data collected and employed as part of the investigation.

APPENDIX 1	SITE PLANS & PHOTOGRAPHS	
	Site Location Plan	Ref. BRD3567-OP2-B
	Proposed Development Layout	'External Works & Site Level Layout' Expedite drawing ref. ES20.020 02.05 P9, dated 01/03/22.
	Remediation Works Photographs	Ref. BRD3567-OP18-A
	Asbestos Remediation Verification Plan	Ref. BRD3567-OP17-A
	Remedial Capping Plan	Ref. BRD3567-OP11-B
	Revised Conceptual Site Model	Ref. BRD3567-OP10-B
APPENDIX 2	ASBESTOS REMOVAL & WASTE DISPOSAL	
	Hazardous waste tickets (5No.) and contractor certification for asbestos removal.	7 x A4 pages
APPENDIX 3	LABORATORY TEST RESULTS	
	DETS reports 21-10142 & 22-05437	9 x A4 pages

1. INTRODUCTION TO TECHNICAL REPORT

1.1. CONTRACT DETAILS

CLIENT	Burrington Estates (Deddington) Ltd trading as Burrington Estates.
SITE	Land situated north of Hempton Road in the village of Deddington, Oxfordshire.
CLIENT'S ADVISORS	BRD Environmental Limited (BRD) has been commissioned directly by the Client.
REPORT CONTEXT	The site is currently being redeveloped as a residential housing estate.
REPORT TYPE	Remediation verification report.
REPORT OBJECTIVES	The purpose of the report is to provide details of the remediation verification works undertaken at the site in accordance with the following report referenced as follows: • 'Additional Ground Investigation & Remediation Strategy', BRD Environmental Ltd, report ref. BRD3567-OR3-A, March 2021. An area of asbestos impacted soils were identified beneath the barn and driveway to the site, as well as some lead contamination in the backfilled soils in the south western corner of the site. A strategy for dealing with this was developed within the above referenced report. This current verification report aims to demonstrate that the contamination risks have been mitigated in accordance with the agreed strategy and thereby meet the requirements of Condition 9 of the Planning Permission issued by Cherwell District Council referenced 18/02147/OUT, as well as meeting NHBC land quality conditions.

1.2. SCOPE OF WORKS

The scope of works was phased as follows:

During Site Clearance

- Supervision / Inspection by Geo-Environmental Consultant trained in working with Non-Licenced Asbestos to verify the removal of the asbestos contaminated soil beneath the barn and access track and to collect verification samples, as required.
- Chemical testing of soil samples for asbestos quantification.

Capping Layer Placement in SW corner

- Inspection visit by Geo-Environmental Technician to confirm the placement of clean topsoil into the new landscaping and front garden areas and to collect soil samples.

- Chemical testing of topsoil samples with the budget based on the following testing schedule:

    - 3No. Metals Suite - As, Cd, Cr, CrVI, Hg, Pb, Se, Cu, Ni and Zn.
    - 3No. Inorganics Suite – water soluble sulphate, pH, organic matter.
    - 3No. Speciated Polycyclic Aromatic Hydrocarbons (PAH).

- Provision of a Remediation Verification Report to demonstrate that the necessary remediation works have been undertaken and that the site is suitable for the proposed residential scheme.

1.3. REPORT LIMITATIONS

Any site boundary lines depicted on plans included within this report are approximate only and do not imply legal ownership of land. Any observations of tree species, asbestos containing materials within structures or invasive weeds, such as Japanese Knotweed, does not constitute a formal survey of such features. The identification of such features is therefore tentative only. The report does not consider whether sensitive ecology or archaeology is present as these require consideration by professionals specialising in these matters. It should be recognised that the collection of desk study information may not be exhaustive and that other information pertinent to the site may be available.

The recommendations, interpretations and conclusions of this report are based solely on the ground conditions found at the exploratory holes. Due to the variability in the nature of ground, conditions between exploratory holes can only be interpreted and not defined. The description of the site and the ground conditions is accurate only for the dates of the field works. In particular, groundwater levels can vary due to seasonal and other effects.

The assessment and interpretation of contamination risks is based on the scope of works agreed with the Client together with the budgetary and programme constraints imposed. Further investigation, analysis and assessment of contamination may be required by regulators or other third parties with an interest in the site. An ecological risk assessment of contaminated soils is beyond the scope of this report. This report is concerned with assessing those contamination risks which apply to the future use of the site through the proposed development as part of the planning regime. The assessment does not consider the risk to current site users or continued future use of the site in its current state. If development of the site should occur that differs from that proposed, then the findings of the contamination assessment would need to be re-evaluated.

This report is restricted to a contamination assessment only and does not include any form of geotechnical advice.

2. SITE CHARACTERISTICS

2.1. SITE SETTING

SITE ADDRESS AND POST CODE	Land at Hempton Road, Deddington, Oxfordshire, OX15 0QH.
NATIONAL GRID REFERENCE	445970E, 231830N.

2.2. SITE DESCRIPTION

FORMER SITE CONDITION	The site formerly comprised two fields with an access track. The smaller southernmost field contained a barn in the north east corner, with an access track off the Hempton Road, and the field was slightly overgrown. The large arable field to the north was accessed by a grassy track, also off Hempton Road, and was until recently used for growing crops.
CURRENT DEVELOPMENT	The site is currently being redeveloped with residential houses with the development nearing completion.
HISTORICAL SUMMARY	The earliest available map indicates the south west corner of the site was previously used as an old quarry. The timeline of the backfilling of the quarry is ambiguous as the mapping indicates this has been completed by 1974, but some anecdotal evidence would suggest that it was later. Throughout the 20th Century the site appears to have primarily been used as arable land. A farm building was constructed by 1974 but subsequently demolished and another building constructed by 1994. The site then remained relatively unchanged up to the recent development.
PUBLISHED GEOLOGY	The site is shown to be devoid of superficial deposits. The shallowest bedrock unit is shown to be Marlstone Rock Formation in the southern extent of the site and the Whitby Mudstone Formation in the northern extent of the site.
ACTUAL GROUND CONDITIONS	Investigations across the site have proved a large proportion of the site is underlain by backfilled material comprising reworked ironstone to depths of between 2m and 3m. Elsewhere the natural Marlstone Rock Formation was encountered. The affected quarry area was found to be larger than the quarry boundaries identified on the historical maps, however, it should be noted that the majority of the fill is just reworked ironstone backfill that was the natural overburden soil that was placed back in the quarry following extraction of the rock layer. The only exception was a layer of buried topsoil was encountered in the fill in the extreme south western corner of the site, which contained pockets of ash and charcoal fragments. Beneath the barn and the access track to the south, extensive brick and concrete rubble has been identified which may relate to the historic demolition of an old barn. Some asbestos cement fragments were identified within this material.

HYDROGEOLOGY	The underlying bedrock geology is designated a Secondary A Aquifer and the site is not located within a groundwater Source Protection Zone.
HYDROLOGY	The closest water feature to the site is a drainage ditch approximately 270m south west of the site. The site is not in an area indicated to be at risk of flooding.

3. SUMMARY OF REMEDIATION STRATEGY

3.1. INTRODUCTION

The overall aim of the remediation strategy was to design the remediation works necessary to mitigate the unacceptable risks identified through the previous phases of investigation.

A summary of the remediation strategy is provided below, however, for full details reference should be made to the entire previous report, referenced as follows:

- 'Additional Ground Investigation & Remediation Strategy', BRD Environmental Ltd, report ref. BRD3567-OR3-A, March 2021.

3.2. IDENTIFIED CONTAMINATION RISKS

Following the previous intrusive investigations, the following contamination sources were identified which needed addressing as part of the residential redevelopment in order to mitigate the identified risks to human health:

- Occasional asbestos cement fragments and fibres have been identified in the near surface underlying soils beneath the barn and access track area, present to a depth of up to 0.6m bgl.
- A localised area of lead contamination relating to a buried layer of ash and clinker within the buried topsoil has also been identified in the south western corner of the site, at depths below 0.8m bgl.

3.3. PLANNED REMEDIAL WORKS

3.3.1. Remediation

3.3.1.1. Removal of asbestos impacted soils

It was proposed that the asbestos impacted soils should be removed immediately following the demolition of the barn and associated floor slab in order to prevent any further cross contamination.

While dealing with the cement bonded asbestos fragments in soils, measures to protect the health and safety of site workers should always be implemented including use of appropriate personal protective equipment, education and good hygiene practices. The JIWG Decision Support Tool for CAR2012 Work Categories proposes that a low risk to construction workers is posed by the presence of these fragments and suggests that the remedial work as proposed is classified as 'Non-Licensed Work'. Consequently the proposed works involving asbestos containing materials (ACM) will be undertaken by competent contractors with procedures for addressing the associated risks and all operatives will be trained in Non-Licensed asbestos removal.

The excavation should encompass the entire surface brick and concrete rubble layer, which extends to depths of up to 0.6m and is raised by a similar level in relation to the surrounding fields. In most areas, the underlying soils are the easily distinguishable reworked ironstone and this will form the base of the excavation. In those areas beneath the access track, further Made Ground in the forms of sands, gravels and cobbles extended beneath the surface brick and concrete rubble in some locations, but did not contain any asbestos. In all instances the supervising BRD Consultant will advise on the limits of the required excavation.

3.3.1.2. Confirmation of capping layer over Lead contamination

Following construction works in this area, a suitable cover of uncontaminated soils will need to be confirmed above any contamination, which is left on site in areas of garden or landscaping. As the finished levels proposed to be similar to the existing levels, there is already a 'capping' layer of uncontaminated reworked ironstone of at least 0.8m above the contaminated soils, which will prevent future residents coming into contact with the underlying soil contamination.

The extent of the contaminated area coincides with the proposed landscaping along the south western area together with the front garden sections of Plot 2. Therefore it will be necessary to confirm a minimum required thickness of clean capping of 300mm (0.3m) across these areas. The rear private garden of Plot 2 is outside the area of contamination. In addition, the upper 150mm should comprise topsoil and it is likely that there is sufficient site won topsoil that can be reused for the redevelopment.

If imported soils are to be used for any parts of the capping, it will be a requirement that the topsoil and subsoil are proven to be suitable for a residential setting and samples must be submitted for a general contamination suite.

3.3.2. Verification

3.3.2.1. Removal of asbestos impacted soils

Following the removal of asbestos impacted soils beneath the barn and access track, it is proposed that the area is visually inspected by a suitable qualified environmental consultant and a series of confirmatory samples taken from the exposed landform.

Samples should be analysed for Asbestos Quantification and any results above 0.001%, or the visual presence of asbestos fragments, will dictate that further excavation and additional verification is required.

3.3.2.2. Confirmation of capping layer over Lead Contamination

The proposed landscaping along the south western area together with the front garden sections of Plot 2 will require that a clean capping layer is maintained.

The thickness of the 300mm capping layer, comprising of the original clean soils, will be verified by an environmental consultant through the excavation of hand dug inspection pits undertaken through the placed soils once this area of the development is nearing completion.

Although not anticipated, should the need arise to import topsoil or subsoil, they will need to be tested to confirm their suitability for the development in accordance with the criteria set out in the remediation strategy.

4. ACTUAL REMEDIATION WORKS COMPLETED

4.1. GENERAL OVERVIEW

The initial site clearance works was undertaken by the demolition contractor, Cawarden Co Demolition Ltd, with specialist asbestos clearance undertaken by Craven Environmental Ltd. The external asbestos debris clearance was undertaken in January 2021. The removal of the underlying asbestos impacted soils beneath the barn floor slab was undertaken in August 2021.

BRD undertook direct verification of the soil capping layer on 21st June 2022.

Details of the various remediation and verification activities are discussed in the following sections.

4.2. REMEDIATION WORKS & VERIFICATION

SURFACE CLEARANCE OF ASBESTOS CEMENT DEBRIS	The removal of the identified asbestos cement debris next to the barn was undertaken by suitably trained operatives from Craven Environmental Ltd. This resulted in 40kg of asbestos cement (chrysotile) materials being removed from the site as hazardous waste. An inspection record and hazardous waste consignment note confirming this was provided to BRD and this is included in Appendix 2.
REMOVAL OF ASBESTOS IMPACTED SOILS BENEATH THE BARN AND ACCESS TRACK	The slab and the access track were grubbed out by the demolition contractor in August 2021. On the underside of the concrete slab to the building, more abundant asbestos cement sheets were found stuck to the underside of the concrete. As the asbestos couldn't be separated from the concrete, it was all added to the contaminated stockpile, along with the soils containing more abundant fragments. The underlying hardcore was then scraped up and inspected for asbestos cement fragments. The quantity of fragments within the hardcore was generally quite sparse and these were handpicked by the specialist asbestos contractors and added to the asbestos contamination stockpile. A total of 4No. loads of asbestos contaminated soils and rubble were removed from site as hazardous waste on 13th and 16th August 2021. The waste was removed to Dunton Technology's waste treatment facility at Horseley Fields, Wolverhampton. A BRD Consultant attended site on 13th August 2021 to inspect the exposed ground and confirm a visual lack of asbestos within the exposed soils once they had all been removed from the area. A verification sample was taken from the base of the excavation. As the hardcore layer beneath the barn and track had been reduced to be level with the surrounding field (as it was originally raised by around 0.6m in relation to the fields), only one exposed face on the southern side of the access track could be sampled. Photographic records of the inspection is provided in Appendix 1 and the hazardous waste disposal tickets are included in Appendix 2. The testing results from the verification sampling is included in Appendix 3. This testing confirms that both samples were below the detection limit of <0.001% asbestos.

CONFIRMATION OF CAPPING LAYER	As part of an inspection visit on 21st June 2022, BRD undertook a series of hand dug inspection pits (ref. HD01-HD03) in the landscaping and garden areas around Plot 2 to confirm the capping thickness. The inspection pits confirmed 0.3m of site-won topsoil in all pits. The Topsoil was described as "Brown silty sand Topsoil with ironstone gravel" and was typical of the site-derived topsoil encountered during the initial investigation. It should be noted that the area around the passing bay has now been surfaced with tarmac and therefore the amount of landscaping is reduced. Three representative samples of the topsoil were taken from each of the inspection pits and analysed for the testing suite just to confirm that they were all in keeping with the site-won topsoil, as tested during the previous investigations. The capping area plan, showing the inspection pit locations, and photographic records of the hand dug pits and the completed garden areas are provided in Appendix 1. The testing results from the topsoil sampling is included in Appendix 3. The three sample results are all in keeping with the testing from the initial investigations. With the exception of arsenic, all of the contaminants are below their respective generic assessment criteria. As would be expected given the soils are site-won, the naturally elevated arsenic concentrations are recorded between 109 and 129 mg/kg, but this is all in keeping with the previous findings. These values are below the site specific assessment criterion of 411mg/kg that was derived as part of the previous contamination assessment and therefore no additional contamination risks are presented.
PREVIOUSLY UNIDENTIFIED CONTAMINATION	During the course of the site development, no additional contamination sources were identified.

5. RISK EVALUATION

5.1. REVISED CONCEPTUAL MODEL

The conceptual model described in the remediation strategy has changed by virtue that the pollutant linkages have been broken by the removal of the asbestos containing materials and asbestos impacted soils and the installation of an appropriate thickness of capping into future gardens and landscaping around Plot 2.

The revised conceptual site model plan is presented in Appendix 1.

5.2. UPDATED CONTAMINATION RISK ASSESSMENT

The pollutant linkages identified in the revised conceptual site model will now be evaluated as to their severity.

SOURCES AND CONTAMINANTS	PATHWAYS	RECEPTORS	POTENTIAL RISK
Quarry backfill (SW corner) - Elevated Lead concentrations	Ingestion of dust Dermal contact Inhalation of dust Consumption of home grown produce	Future Residents	Negligible
Asbestos impacted sub-base / hardcore beneath barn and driveway - Presence of asbestos fragments and fibres in the soil/rubble matrix	Inhalation of dusts	Future Residents	Negligible

The contamination risks that are presented to the various receptor groups are discussed further in the following sections:

RISK TO HUMAN HEALTH
Following the remedial measures implemented at the site, the contamination risks to human health at the site are now negligible. All the asbestos and impacted soils have been removed from site. The Lead contaminated soils in the south west corner of the site are at a depth of around 1m below the surface and the surface 0.3m of the front gardens and landscaping in this area has been confirmed to comprise 0.3m of site-won uncontaminated topsoil.

RISK TO WATER ENVIRONMENT
No risks to the groundwater environment have been identified.

RISK TO BUILDING MATERIALS AND SERVICES
No risks to building materials or services have been identified.

5.3. RECOMMENDATIONS

Following the completion of the remediation works there are no significant risks remaining to the proposed development.

It is recommended that this verification report is submitted to the planning department of Cherwell District Council and to the warranty providers to confirm that the remediation works have been completed in accordance with the remediation strategy and that the associated planning conditions and land quality conditions can be discharged.

REPORT SPECIFIC REFERENCES

- 'Phase 1 Geo-Environmental Desk Study – Hempton Road, Deddington', BRD Environmental Ltd, ref. BRD3567, dated October 2019.
- 'Phase 2 Geo-Environmental Site Investigation - Hempton Road, Deddington', BRD Environmental Ltd, report ref. BRD2567-OR2-A, dated January 2020.
- 'Additional Ground Investigation & Remediation Strategy', BRD Environmental Ltd, report ref. BRD3567-OR3-A, March 2021.

CONTAMINATION ASSESSMENT METHODOLOGY

UK Policy

The UK Government's policy in relation to land affected by historic contamination is based on a 'suitable for use' approach. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Contamination risks therefore need to be assessed on a site-by-site basis. The 'suitable for use' approach limits requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to either the current use or future use of the land.

The three main drivers for contamination assessment and remediation are:

- *Voluntary action.*
- *Development as part of the planning regime.*
- *Regulatory action to mitigate unacceptable risks e.g. Part 2A of the Environmental Protection Act 1990.*

Pollutant Linkages

For a contamination risk to exist there must be a 'pollutant linkage' from the contaminant (source) via a pathway (the route from contaminant to receptor) to a receptor (the entity that could be harmed). The absence of a contaminant, pathway or receptor breaks the pollutant linkage and therefore no contamination risk exists.

Contamination is typically present at a site (in the ground and/or in the underlying groundwater) as a result of a historic or current industrial use, usually as a result of leaks, spills or disposal of residues, wastes and excess raw materials from the industrial processes. Contamination may also be present due to:

- *The deliberate application of chemicals e.g. the spraying of herbicide/pesticide.*
- *Migration of pollutants from adjacent land.*
- *Naturally occurring processes e.g. elevated concentrations of particular heavy metals associated with specific geological strata.*

Conceptual Site Model

The conceptual site model can be defined as a textual or graphical representation of the identified pollutant linkages for a given site. The model forms the basis for designing the investigation as the aim will be to target all of the potential pollutant linkages to determine, through the subsequent phases of risk assessment, whether or not they pose an actual risk.

It is important that the conceptual site model is updated with new information as the various investigation, risk assessment and remediation works are completed.

Technical Guidance

The technical and legal framework for contamination assessment is complex. The process adopted through this report for assessing contamination risks is in general accordance with the following guidance, as listed below:

- *'Investigation of Potentially Contaminated Sites - Code of Practice - BS 10175:2011+A2:2017', The British Standards Institution 2017.*
- *'Model Procedures for the management of Land Contamination - CLR Document No. 11', Environment Agency, 2004.*
- *'Guidance for the safe development of housing on land affected by contamination - R&D66: 2008', NHBC/Environment Agency, 2008.*

Risk Assessment Methodology

In line with the technical guidance, the contamination risk assessment follows a series of phased stages for each particular site:

PHASE	*DESCRIPTION*	*RISK ASSESSMENT STAGE*
PHASE1	*Generally limited to desk based research and a site walkover survey to develop an initial conceptual site model and identify what risks, if any, are likely to be presented by the site.*	*Hazard Identification and Assessment* *A preliminary stage of risk assessment concerned with identifying and characterising the hazards that may be associated with a particular site and identifying potential pollutant linkages.*
PHASE 2	*This phase is concerned with establishing whether contamination is present, usually through intrusive ground investigation, and then evaluating the degree and magnitude of the associated risks.*	*Risk Estimation* *A stage concerned with estimating the likelihood that receptors will suffer adverse effects if they come into contact with, or are otherwise affected by, a hazardous substance or agent under defined conditions.* *Risk Evaluation* *A stage of risk assessment concerned with evaluating the acceptability of estimated risks, taking into account the nature and scale of the risk estimates, any uncertainties associated with the assessment and the broad costs and benefits of taking action to mitigate risks.*
PHASE 3	*The appraisal and selection of remediation techniques, their implementation and verification.*	*Risk Management* *The process whereby decisions are made to accept a known or assessed risk and/or the implementation of action to reduce the consequences or probabilities of occurrence.*

Risk Classification

The objective of risk assessment is to identify the nature and magnitude of the potential risks and should be based on a consideration of both:

- *The likelihood/probability of an event [taking into account both the presence of the hazard and receptor and the integrity of the pathway].*
- *The severity of the potential consequence [taking into account both the potential severity of the hazard and the sensitivity of the receptor].*

There is a need for a logical, transparent and repeatable system in defining the categories of severity of consequence and likelihood as well as for the risk itself and therefore the following risk rating matrix is employed:

		SEVERITY OF CONSEQUENCE			
		SEVERE	MEDIUM	MILD	MINOR
PROBABILITY	HIGH LIKELIHOOD	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	LIKELY	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	LOW LIKELIHOOD	Moderate Risk	Moderate/Low Risk	Low Risk	Negligible Risk
	UNLIKELY	Moderate/Low Risk	Low Risk	Negligible Risk	Negligible Risk

These risk classifications are defined as follows:

- *Very High Risk - There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action.*
- *High Risk - Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action.*
- *Moderate Risk - It is possible that without appropriate remediation action harm could arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild.*
- *Low Risk - It is possible that harm could arise to a designated receptor from an identified hazard. It is likely that, at worst if any harm was realised any effects would be mild.*
- *Negligible Risk - The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.*

This risk assessment matrix and classification system is based on guidance produced by Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency in connection with contaminated land assessment.

RISK ESTIMATION - SOILS

Introduction to Soil Human Health Generic Assessment Criteria (GAC)

The Environment Agency (EA) and Department of Environment Food and Rural Affairs (DEFRA) had previously issued revised guidance following the consultation about the DEFRA publication "Assessing risks from land contamination – a proportionate approach. Soil Guideline Values: the Way Forward". This resulted in a revised version of the Contaminated Land Exposure Model (CLEA) model (version 1.06) and a few of the previously published Soil Guideline Values (SGVs) were revised.

The main legislative driver for dealing with historical land affected by contamination is Part 2A of the Environmental Protection Act 1990. Revised Statutory Guidance to support Part 2A was published in April 2012. This Guidance introduced a new four-category system for classifying land under Part 2A for cases of a Significant Possibility of Significant Harm to human health,1 where Category 1 includes land where the level of risk is clearly unacceptable and Category 4 includes land where the level of risk posed is acceptably low. The impact assessment for the new Statutory Guidance stated "The new statutory guidance will bring about a situation where the current SGVs/GACs are replaced with more pragmatic (but still strongly precautionary) Category 4 screening levels (C4SLs) which will provide a higher simple test for deciding that land is suitable for use and definitely not contaminated land". The C4SLs are still derived using the CLEA model, but adopt a slightly different approach to toxicological assessment and exposure modelling.

In March 2014, the outcome of "SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination - Final Project Report" (CL:AIRE) was published. Due to slightly ambiguous wording within this report, Lord de Mauley, Parliamentary Under Secretary, DEFRA wrote to all local authorities on 3 September 2014 to confirm that the published C4SLs were final and that they can be used in risk assessment undertaken under the planning regime.

Whilst there are proposals for the industry to develop C4SLs for other contaminants, these have yet to produce any new values. BRD do not believe that C4SLs could be developed by a single organisation with sufficient confidence. BRD has therefore employed other, more conservative guidance based on the CLEA model (detailed below) within this assessment for compounds where C4SLs are not available. However, it should be noted that the results of this investigation may need to be reinterpreted as new C4SLs become available.

Due to the limited number of published C4SL values at this time, the Chartered Institute of Environmental health (CIEH) and Land Quality Management Ltd (LQM) have produced Generic Assessment Criteria (GAC) known as Suitable for Use Levels (S4ULs), for use in contaminated land human health risk assessment. These S4ULs (2014) have been derived for a large number of substances using the current CLEA model and are therefore consistent with current guidance. They also incorporate the revised exposure parameters as adopted by the C4SL programme, but have not adopted the revised toxicological approach adopted by the C4SLs and so remain a more conservative assessment criteria. The substances for which SGVs were previously published have also been revised as new S4ULs in light of the new exposure parameters proposed by the C4SL programme, and therefore effectively replace the existing SGVs.

In addition, in December 2009, other GAC for less common substances were produced by the Environmental Industries Commission (EIC), The Association of Geotechnical and Geoenvironmental Specialists (AGS) and Contaminated Land: Applications in Real Environments (CL:AIRE) using the CLEA model. These are referred to as the EIC/AGS/CLAIRE GAC.

In summary, C4SLs have been used where these are available. For those substances where C4SLs have yet to be issued, then the S4ULs have been adopted or in some cases, the EIC/AGS/CLAIRE GAC. All of the previously produced SGVs have now either been withdrawn, or superseded by the respective C4SLs or S4ULs.

The only exception to this approach is the PAH compound benzo(a)pyrene (BaP) where a C4SL guideline value has been produced, whereas BRD has adopted the S4UL value. The C4SL for BaP relates to its use as a surrogate marker compound representing all of the genotoxic PAH compounds as a mixture, rather than this individual compound. BRD has therefore adopted the compound specific S4UL value as the initial screening value, for consistency with the other PAH compounds before then employing the C4SL is necessary.

It should be noted that unless otherwise stated, all the assessment criteria adopted within this report have been derived based on a sandy loam soil at pH 7 and the values quoted are for a conservative soil organic matter content of 1% where applicable (i.e. organic contaminants).

Human Health - Soil Generic Assessment Criteria

The results of the soils analysis have been compared to generic assessment criteria for the default exposure scenarios comprising either residential land with plant uptake, residential land without plant uptake, or commercial/industrial land use. The criteria values selected are listed in the table below and full details on the source are referred to above. Where applicable, the results have also been assessed with reference to the required statistical tests presented within CLAIRE document "Guidance on comparing soil contamination data with a critical concentration".

ANALYSIS	GENERIC ASSESSMENT CRITERIA (mg/kg unless stated)			SOURCE
	RESIDENTIAL WITH PLANT UPTAKE	RESIDENTIAL WITHOUT PLANT UPTAKE	COMMERCIAL / INDUSTRIAL	
Arsenic	37	40	640	C4SL
Cadmium	22	150	410	
Chromium (total)[$]	910	910	8,600	S4UL
Chromium VI	21	21	49	C4SL
Lead	200	310	2,330	
Mercury*	11	15	320	S4UL
Selenium	250	430	12,000	
Nickel	180	180	980	
Copper	2400	7,100	68,000	
Zinc	3,700	40,000	730,000	
pH	<5 - 10> units			Professional judgement
Naphthalene	2.3	2.3	190	S4UL
Acenaphthylene	170	2,900	83,000	
Acenaphthene	210	3,000	84,000	
Fluorene	170	2,800	63,000	
Phenanthrene	95	1,300	22,000	
Anthracene	2,400	31,000	520,000	
Fluoranthene	280	1,500	23,000	
Pyrene	620	3,700	54,000	
Benzo(a)anthracene	7.2	11	170	
Chrysene	15	30	350	
Benzo(b)fluoranthene	2.6	3.9	44	
Benzo(k)fluoranthene	77	110	1,200	
Benzo(a)pyrene	2.2	3.2	35	
Indeno(1,2,3-cd)pyrene	27	45	500	
Dibenzo(a,h)anthracene	0.24	0.31	3.5	S4UL
Benzo(ghi)perylene	320	360	3,900	
TPH Aliphatic C5-C6	42	42	3,200	
TPH Aliphatic C6-C8	100	100	7,800	
TPH Aliphatic C8-C10	27	27	2,000	
TPH Aliphatic C10-C12	130	130	9,700	
TPH Aliphatic C12-C16	1,100	1,100	59,000	
TPH Aliphatic C16-C35	65,000	65,000	1,600,000	
TPH Aliphatic C35-C44	65,000	65,000	1,600,000	

ANALYSIS	GENERIC ASSESSMENT CRITERIA (mg/kg unless stated)			SOURCE
	RESIDENTIAL WITH PLANT UPTAKE	RESIDENTIAL WITHOUT PLANT UPTAKE	COMMERCIAL / INDUSTRIAL	
TPH Aromatic C5-C7	70	370	26,000	
TPH Aromatic C7-C8	130	860	56,000	
TPH Aromatic C8-C10	34	47	3,500	
TPH Aromatic C10-C12	74	250	16,000	
TPH Aromatic C12-C16	140	1,800	36,000	
TPH Aromatic C16-C21	260	1,900	28,000	
TPH Aromatic C21-C35	1,100	1,900	28,000	
TPH Aromatic C35-C44	1,100	1,900	28,000	
Benzene	0.87	3.3	98	C4SL
Toluene	130	880	56,000	S4UL
Ethylbenzene	47	83	5,700	
Xylene^	56	79	5,900	
MTBE	49	73	7,900	EIC/AGS/CL:AIRE GAC

Notes:
** The S4UL for methyl mercury has been adopted as the worst case mercury compound as generally there is no desk study evidence to suggest the potential for elemental mercury on the majority of sites.*
^ The lowest S4UL of either p-xylene, o-xylene or m-xylene has been adopted for each land use as a conservative measure.
$ S4UL for Chromium III adopted, as in the absence of Chromium VI it is likely that all of the chromium will be in this form as these are the two most common and stable forms of chromium in the soil environment.

Where no GAC is available, any concentrations exceeding the laboratory limit of detection are identified and discussed in more detail.

Water Environment - Soil Generic Assessment Criteria

There are no UK published Generic Assessment Criteria for soil test results in respect of the risk to the water environment and therefore risk estimation is on the basis of the professional judgement and experience of BRD to employ values that are a reasonable concentration above which concern for water resources is valid.

The Total PAH GAC employed is the sum of the 16No. priority PAH compounds regularly tested for in contaminated land analysis (i.e. US EPA 16PAHs). BRD employ a soil screening based upon the total PAH limit for 'inert waste' of 100mg/kg. The rationale is based on PAHs are recognised to be generally of low solubility and the risk to the water environment is correspondingly low.

In respect of Total Petroleum Hydrocarbons, BRD employ a value of 500 mg/kg as a screening value in comparison to the sum of the component aliphatic and aromatic TPH carbon bands. The employed soil screening value is based upon:

- *In common with some other consultants, the professional judgement and experience of BRD suggests that this value is a reasonable concentration above which concern for water resources is valid. The rationale is based on the fact that lower concentrations of fuel based contaminants are more likely to naturally degrade than migrate any great distance.*

- *BRD is aware of regional Environment Agency groundwater and contaminated land teams historically employing 500 mg/kg as a screening value for considering whether or not TPH could represent a risk to water resources.*

- *The value mirrors the mineral oil Waste Acceptance Criteria limits for what is considered 'inert waste'.*

Should elevated contaminants that pose a potential risk to the water environment be identified then site specific assessment criteria should be developed.

Building Materials and Services – Soil Generic Assessment Criteria

Some hydrocarbon compounds are known to both attack and permeate through certain plastic pipe materials, with the primary concern being the degradation and tainting of water supplies. The UK Water Industry Research (UKWIR) has therefore produced a document 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' (ref. 10/WM/03/21) that specifies threshold criteria for the adoption of 'standard' polythene (PE) or PVC pipes, protective barrier pipe and ductile iron/steel/copper pipes.

The UKWIR threshold assessment criteria from Table 3.1 of this document for standard PE pipes have been employed. It should be noted that the approach taken by UKWIR is very conservative, and both the document and research are flawed. However, it is these values that are being using to specify water pipe materials and therefore it is appropriate to consider them.

The UKWIR guidance is particularly flawed in respect of the chemical analysis it expects as it seeks a limit of detection that is generally below limits that are reasonable or commonly employed in contaminated land assessment. The UKWIR seeks that where a substance is below the limit of detection it should be taken as being present at half this concentration. For the larger suite of chemicals where the limit is against a sum of compounds, this approach would mean that a sample of virgin sub-soil from a greenfield site with absolutely no contamination would actually fail the criteria for using standard PE pipes. To avoid this situation, BRD have adopted the approach of summing only those compounds detected above their respective limits of detection.

In terms of building materials, the primary concern is in respect of concrete as certain commonly occurring natural ground conditions can adversely impact on buried concrete as discussed in 'Special digest 1:2005 Concrete in aggressive ground', BRE, 2005.

ANALYSIS	*GENERIC ASSESSMENT CRITERIA*	*SOURCE*
pH	*<5.5*	*BRE Special Digest 1:2005*
Sulphate (w/s)	*500 mg/l*	*BRE Special Digest 1:2005*
Sum of any VOC above detection limits	*0.5 mg/kg*	*Relevant compounds adapted from UKWIR Table 3.1*
Sum of SVOC + Aliphatic TPH >C5-C10 + Aromatic TPH >C5-C10 above detection limits	*2 mg/kg*	
Sum of Aliphatic TPH >C10-C21 + Aromatic TPH >C10-C21 above detection limits	*10 mg/kg*	
Sum of Aliphatic TPH >C21-C34 + Aromatic TPH >C10-C35 above detection limits	*500 mg/kg*	
Sum of BTEX + MTBE above detection limits	*0.1 mg/kg*	
Phenols	*2 mg/kg*	
Cresols and chlorinated phenols	*2 mg/kg*	
Naphthalene	*0.5 mg/kg*	
Benzo(a)pyrene	*0.5 mg/kg*	

RISK ESTIMATION – GROUNDWATER

The initial assessment of the contamination risk to groundwater is by comparing dissolved groundwater concentrations with screening values (GAC) that are protective of groundwater resources.

The reference source for the target concentrations is generally the EA's Environmental Quality Standards (EQS) (accessed July 2018: http://evidence.environment-agency.gov.uk/ChemicalStandards/report.aspx?cid=17), the Water Supply (Water Quality) Regulations 2016 and the DW1/DW2 criteria from the Surface Water (Abstraction for drinking water)(classification) Regulations 1996. The target concentrations are outlined in the table below. The 'Petroleum Hydrocarbons in Groundwater: Guidance on assessing petroleum hydrocarbons using existing hydrogeological risk assessment methodologies'. CL:AIRE, 2017 has also been used as reference source for the values.

ANALYSIS	GENERIC ASSESSMENT CRITERIA (GAC)	SOURCE
Arsenic	50 µg/l	DW1 & EQS
Cadmium	5 µg/l	EQS
Chromium (total)	50 µg/l	DW2 & EQS
Copper	50 µg/l	DW1
Nickel	20 µg/l	EQS
Lead	50 µg/l	DW1
Mercury	1 µg/l	WSR
Selenium	10 µg/l	WSR
Zinc	5 mg/l	DW2
Cyanide	50 µg/l	WSR
pH	6 to 9 units	EQS
Benzene	10 µg/l	EQS
Toluene	74 µg/l	EQS
Ethylbenzene	300 µg/l	WHO guideline
Xylene	30 µg/l	EQS
Methyl tert-butyl ether (MTBE)	15 µg/l	Taste and odour threshold.
Naphthalene	2 µg/l	EQS
Benzo(a)pyrene	0.0017 µg/l	EQS – Less than Limit of Detection (LOD)
Total PAH	0.2 µg/l	DW1
TPH Aliphatic C5-C6	15,000 µg/l	World Health Organization (WHO) guide values for TPHCWG fractions in drinking water
TPH Aliphatic C6-C8	15,000 µg/l	
TPH Aliphatic C8-C10	300 µg/l	
TPH Aliphatic C10-C12	300 µg/l	
TPH Aliphatic C12-C16	300 µg/l	
TPH Aromatic C5-C7	10 µg/l	
TPH Aromatic C7-C8	700 µg/l	
TPH Aromatic C8-C10	300 µg/l	
TPH Aromatic C10-C12	90 µg/l	
TPH Aromatic C12-C16	90 µg/l	
TPH Aromatic C16-C21	90 µg/l	
TPH Aromatic C21-C35	90 µg/l	

There are no available generic assessment criteria for some of the analytical parameters which have been scheduled, for example hexavalent chromium, and some VOC compounds. These parameters will be assessed based on professional judgement should they exceed the limit of detection.

RISK ESTIMATION - GROUND GAS

Introduction

A variety of potentially hazardous gases occur in naturally in the ground environment. Microbial decay of organic matter under anaerobic conditions and geological processes can lead to the generation of Methane and Carbon Dioxide, but can also include traces gases such as Hydrogen sulphide and Carbon monoxide.

Methane is a colourless and odourless gas that has the hazardous properties of being flammable and, at certain air/Methane mixtures, explosive. Methane has a low toxicity, but can be a simple asphyxiant due to the displacement of oxygen.

Carbon Dioxide is a colourless, odourless and non-combustible gas that has the hazardous property of being a highly toxic chemical. At concentrations of 3% by volume, shortness of breath and headaches will occur becoming acute by 6%. At levels of above 10% by volume headache, visual distortion, tremors and rapid loss of consciousness occur. Concentrations of Carbon Dioxide above 22% by volume are likely to be fatal. The effects of Carbon Dioxide poisoning are made more severe if there is accompanying reduction in oxygen concentrations.

Hydrogen sulphide is a colourless and flammable gas that has an odour of rotten eggs. It is important to that the sense of smell is over powered at higher concentrations. The gas is toxic and can be an asphyxiant.

Carbon monoxide is a colourless, odourless and explosive gas in air mixtures that has the hazardous property of being a highly toxic chemical.

Radon is a naturally occurring colourless and odourless gas that is radioactive. It is formed by the radioactive decay of radium which in turn is derived from the radioactive decay of uranium, both of which are minerals that can be found in many soil types. Whilst it is recognised that the air inside every building contains radon, some buildings built in certain defined areas of the country might have unacceptably high concentrations and require special precautions to be taken. The maps contained within BRE211:2015 'Radon: guidance on protective measures for new buildings' identify areas where no radon protection measures are necessary or where higher concentrations are present that either basic or full radon protection measures are required to be fitted to all new buildings, extensions or refurbishments.

Basis of Gas Assessment

In order to classify the level of risk and need, if any, for gas protection measures at a site with the potential for a gas problem, consideration of each of the following is necessary:

- *The source of the gas.*
- *The generation potential of the gas.*
- *The location of the source and the geological setting.*
- *Boreholes flow rate and estimated surface emission rate.*
- *The nature of the proposed development.*
- *Confidence in the knowledge of the gas regime.*

The gas assessment is made with reference to 'C665 - Assessing risks posed by hazardous ground gases to buildings', Construction Industry Research and Information Association (CIRIA), 2007 and 'BS8485:2015 - Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings' BSi 2015.

Gas Screening Value

The methods within CIRIA C665 and BS8485 both use the gas concentrations together with the borehole flow rates to define a characteristic situation for a site based on the limiting borehole gas volume flow for Methane and Carbon Dioxide. This limiting borehole gas volume flow is called the Gas Screening Value (GSV) and is expressed below:

Gas Screening Value (l /hr) = borehole flow rate (l/hr) x gas concentration (fraction)

***The calculation of GSV is completed for both Methane and Carbon Dioxide and then the 'worse case' maximum values are used in the assessment. The assessment is to determine the gas regime** at the site is dependent upon the nature of the development.*

Characteristic Gas Situation

The characteristic situation for many sites is determined from evaluation of the Gas Screening Value derived against the criteria in the following table.

Characteristic situation	*Hazard potential*	*Gas Screening Value (CH4 or CO2 l/hr)*	*Additional factors*
CS1	*Very low risk*	*<0.07*	*Typically Methane ≤1% and/or Carbon Dioxide ≤5%. Otherwise consider an increase to characteristic situation 2.*
CS2	*Low risk*	*0.07 to <0.7*	*Borehole air flow rate not to exceed 70 l/hr. Otherwise consider an increase to characteristic situation 3.*
CS3	*Moderate risk*	*0.7 to <3.5*	*-*
CS4	*Moderate to high risk*	*3.5 to <15*	*-*
CS5	*High risk*	*15 to <70*	*-*
CS6	*Very high risk*	*>70*	*-*

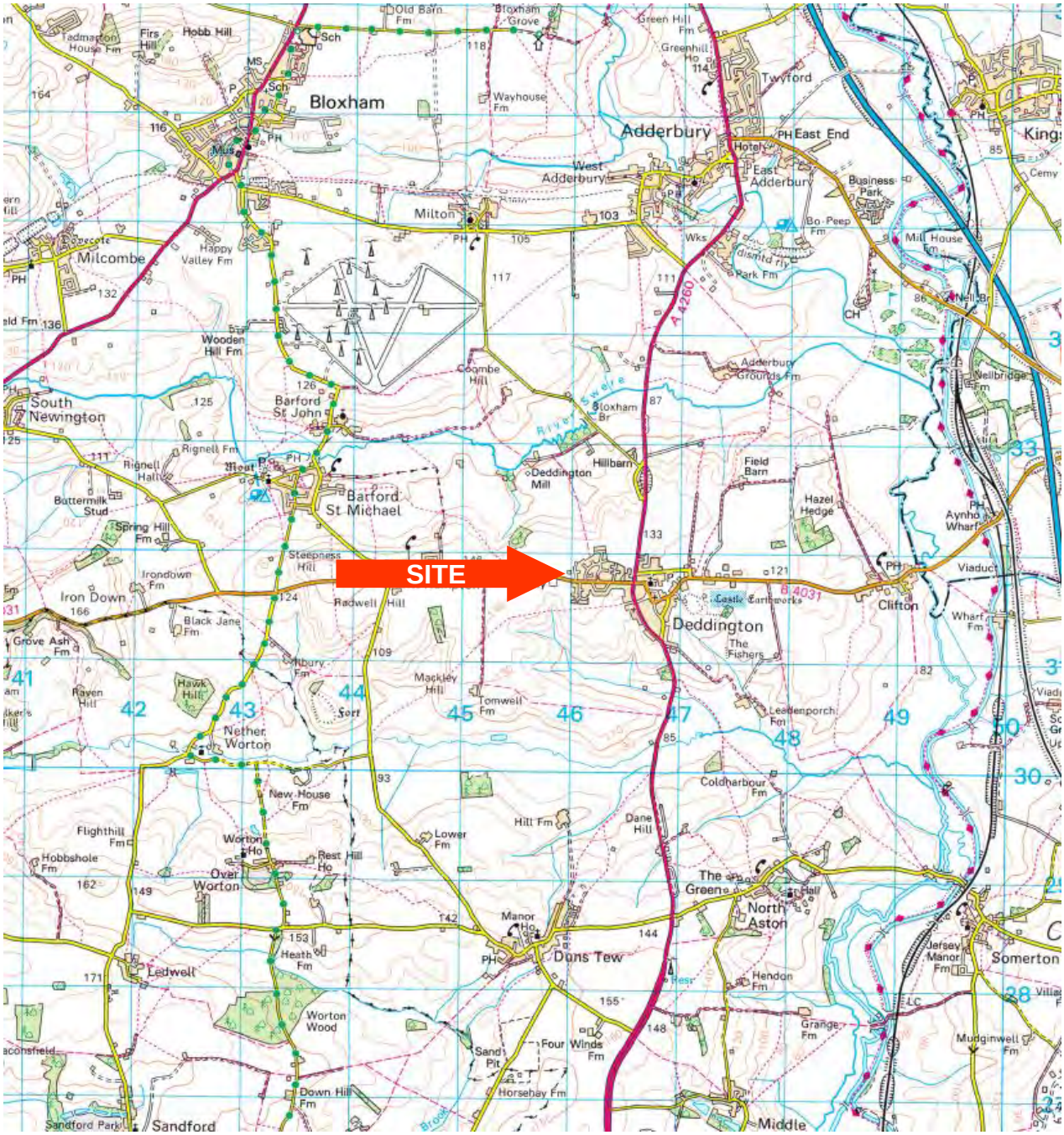
*Low rise housing with gardens – **NHBC 'Traffic Lights'***

The NHBC model for low rise housing development considered a typical residential house with a ground floor area of 64m^2, suspended floor and ventilated sub-floor void of height 150mm. Where the proposed development of a site is consistent with this model, the NHBC traffic light situation of the site is determined from evaluation of the Gas Screening Value against the criteria in the following table.

Traffic Lights	*Methane*		*Carbon Dioxide*	
	Typical maximum concentrations (%)	*Gas Screening Value (l/hr)*	*Typical maximum concentrations (%)*	*Gas Screening Value (l/hr)*
Green	*≤1*	*≤0.16*	*≤5*	*≤0.78*
Amber 1	*1> to ≤5*	*>0.16 to ≤0.63*	*>5 to ≤10*	*>0.78 to ≤1.56*
Amber 2	*5> to ≤20*	*>0.63 to ≤1.56*	*>10 to ≤30*	*>1.56 to ≤3.13*
Red	*>20*	*>1.56*	*>30*	*>3.13*

APPENDIX 1

Site Location Plan



Not to scale.

Project Title:	Hempton Road, Deddington
Client:	Burrington Estates
BRD Reference:	BRD3567-OP2-B
Date Issued:	March 2021

BRD
01295 272244
info@brduk.com

EXTERNAL LEVELS KEY:

138.00 +	Proposed Finished Ground / Earthworks Level
1:15	Gradient of Path, Driveway or Garden
137.950	Proposed Finished Floor Level
300TK	Linetype highlights areas where External Ground Level is within 150mm or above Finished Floor Level. Dimension is from Finished Floor Level to External Ground Level
450GB	Linetype highlights areas where External Ground Level is more than 150mm below Finished Floor Level. Dimension is from Finished Floor Level to External Ground Level
2DPC	Linetype highlights areas where double DPC is required
CGB	Proposed Concrete Gravel Board (maximum retained height 300mm)
2S	Proposed Steps (150mm Rise & 300mm Going)
TS	Threshold Step (150mm)
	Proposed 1.8m High Timber Closeboard Fence
	Proposed 1.5m Cleft Chestnut Post and Rail Fence
	Proposed 1.2m Coursed Local Ironstone Screen Wall
	Proposed 1.8m Coursed Local Ironstone Screen Wall
	Proposed Paths, Patio and Marshalls Saxon Textured 600 X 450 X 50mm
	Proposed Electric Car Charging Point
G	Gas Meter Location
E	Electric Meter Location

SURFACE WATER INFILTRATION BASIN

BED LEVEL	134.850mAOD
TOP OF BANK LEVEL	136.500mAOD
SIDE SLOPES	1:4 MAX

REV:	DESCRIPTION:	BY:	DATE:
P9	Drawing name changed, Rear paths and Patios, ECV charging points and meter positions added	TB	01.03.22
P8	Plot levels 13,14 & 19-21 lowered	PG	26.08.21
P7	Plot levels reduced 300mm	PG	17.08.21
P6	Plot 1 and 8 Garage revised	PG	12.08.21
P5	Turning head arrangement revised Plot 15-21 Car Park revised	PG	05.08.21
P4	Proposed Levels raised 300mm	PG	23.07.21
P3	Updated to S38 Comments	DM	03.06.21
P2	Issued for Tender	DM	26.05.21
P1	First Issue	DM	24.02.21

STATUS: CONSTRUCTION

EXPEDITE

Exeter
The Design Studio
Dean Clarke House
Southernhay East
Exeter
EX1 1AP
t: 01392 691 631

www.expediteps.com

CLIENT: BURRINGTON HOMES (MIDLANDS)

SITE: LAND AT HEMPTON ROAD DEDDINGTON

TITLE: EXTERNAL WORKS & SITE LEVEL LAYOUT

SCALE AT A1:	DATE:	DRAWN:	CHECKED:
1:250	Feb 2021	DM	KSR

PROJECT NO:	DRAWING NO:	REVISION:
ES20.020	02.05	P9

Remediation Works Photographs

Plate 1: Asbestos cement sheets on underside of barn floor slab.

Plate 2: Asbestos cement fragments through the near surface hardcore sub-base to slab.

Project Title:	Hempton Road, Deddington
Client:	Burrington Estates
BRD Reference:	BRD3567-OP18-A
Date Issued:	June 2022

BRD
01295 272244
info@brduk.com

Remediation Works Photographs

Plate 3: Scraping up of underlying hardcore layer beneath barn and track.

Plate 4: Exposed reworked quarry soils beneath hardcore. Flush with surrounding levels.

BRD
01295 272244
info@brduk.com

Remediation Works Photographs

Plate 5: Hardcore layer chased out to access road entrance. (Face 1 sample taken from this location).

Plate 6: Stockpile of asbestos contaminated soils and concrete for off-site disposal.

01295 272244
info@brduk.com

Remediation Works Photographs

Plate 7: Front garden to Plot 2.

Plate 8: Landscaping to side of Plot 2 garage.

Project Title:	Hempton Road, Deddington
Client:	Burrington Estates
BRD Reference:	BRD3567-OP18-A
Date Issued:	June 2022

BRD
01295 272244
info@brduk.com

Remediation Works Photographs

Plate 9: Landscaping to side of access road. Note tarmacked area around passing bay.

Plate 10: Sample HD03 in landscaped area.

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info@brduk.com

Remediation Works Photographs

Plate 11: Sample HD01 in front garden to Plot 2.

Plate 12: Sample HD02 in landscaped area to Plot 2 garage.

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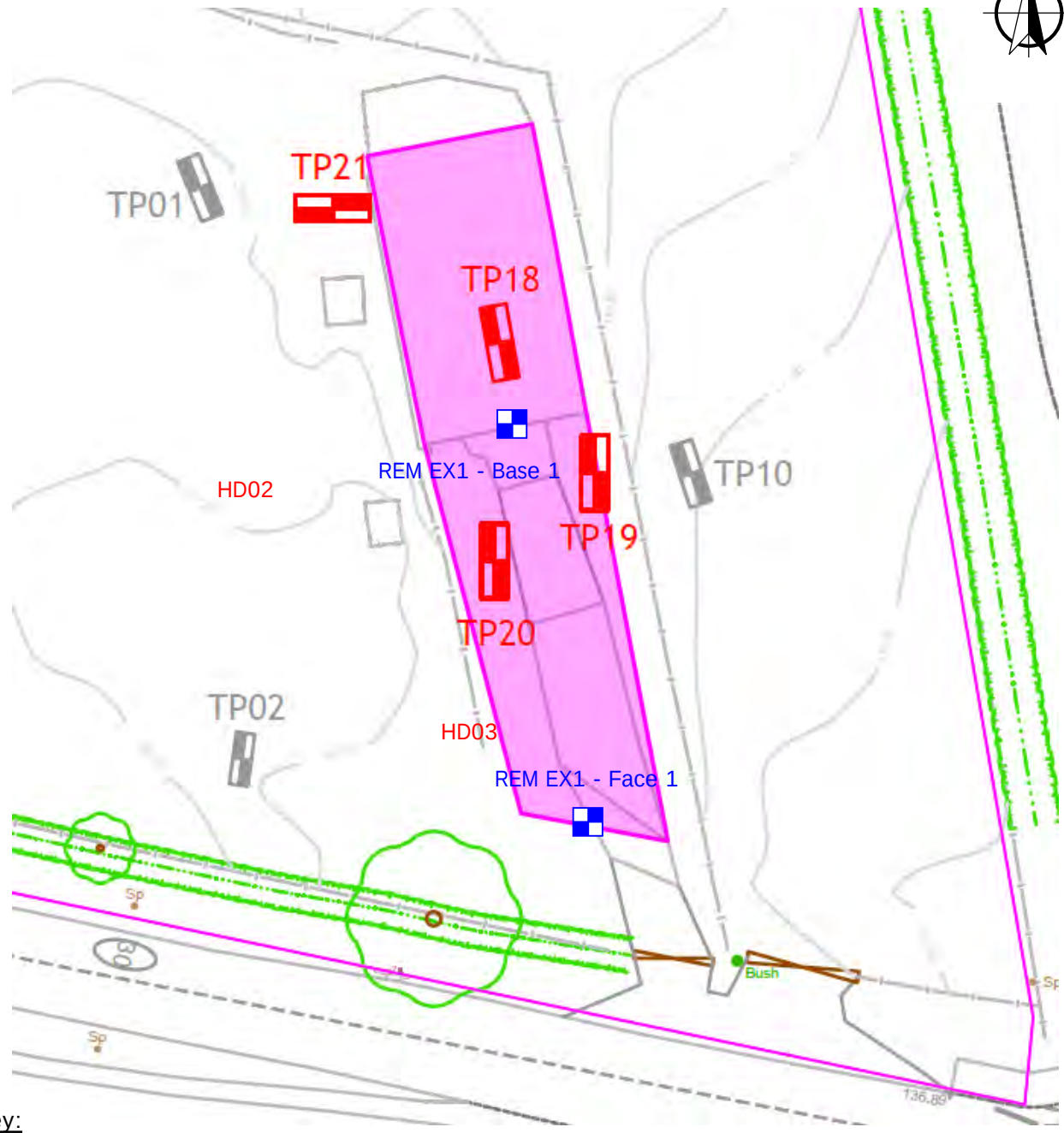
info@brduk.com

Asbestos Remediation Verification Plan



Key:

Surface Soil Verification Sample

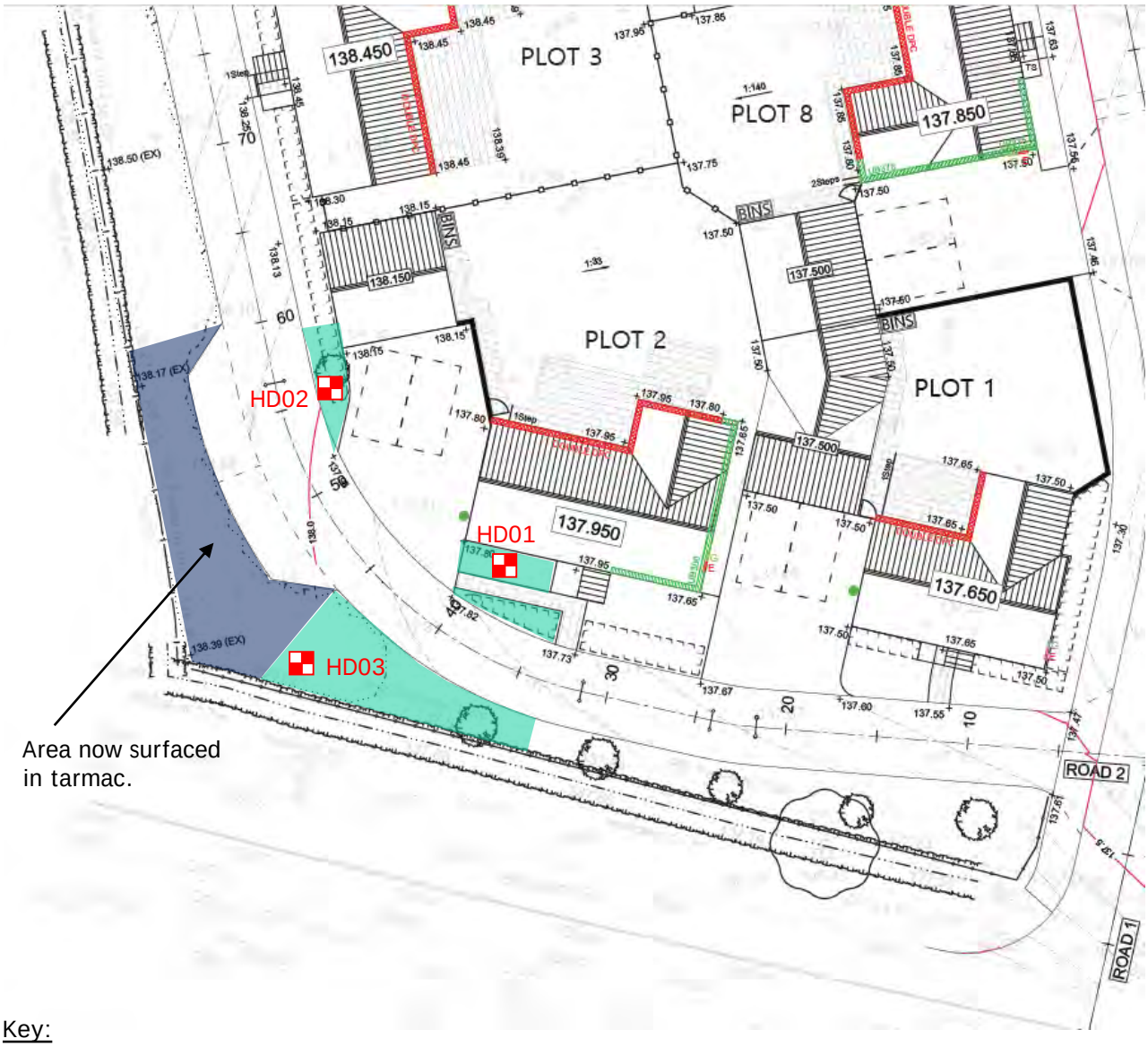
Remediation excavation to remove hardcore containing asbestos fragments.

Not to scale.
All positions illustrative only.

Project Title:	Hempton Road, Deddington
Client:	Burrington Estates
BRD Reference:	BRD3567-OP17-A
Date Issued:	June 2022

BRD
01295 272244
info@brduk.com

Remedial Capping Plan



Key:

Hand Dug Inspection Pit

Areas of landscaping and front gardens confirmed to have at least 300mm of site-won clean soil capping layer.

Not to scale.

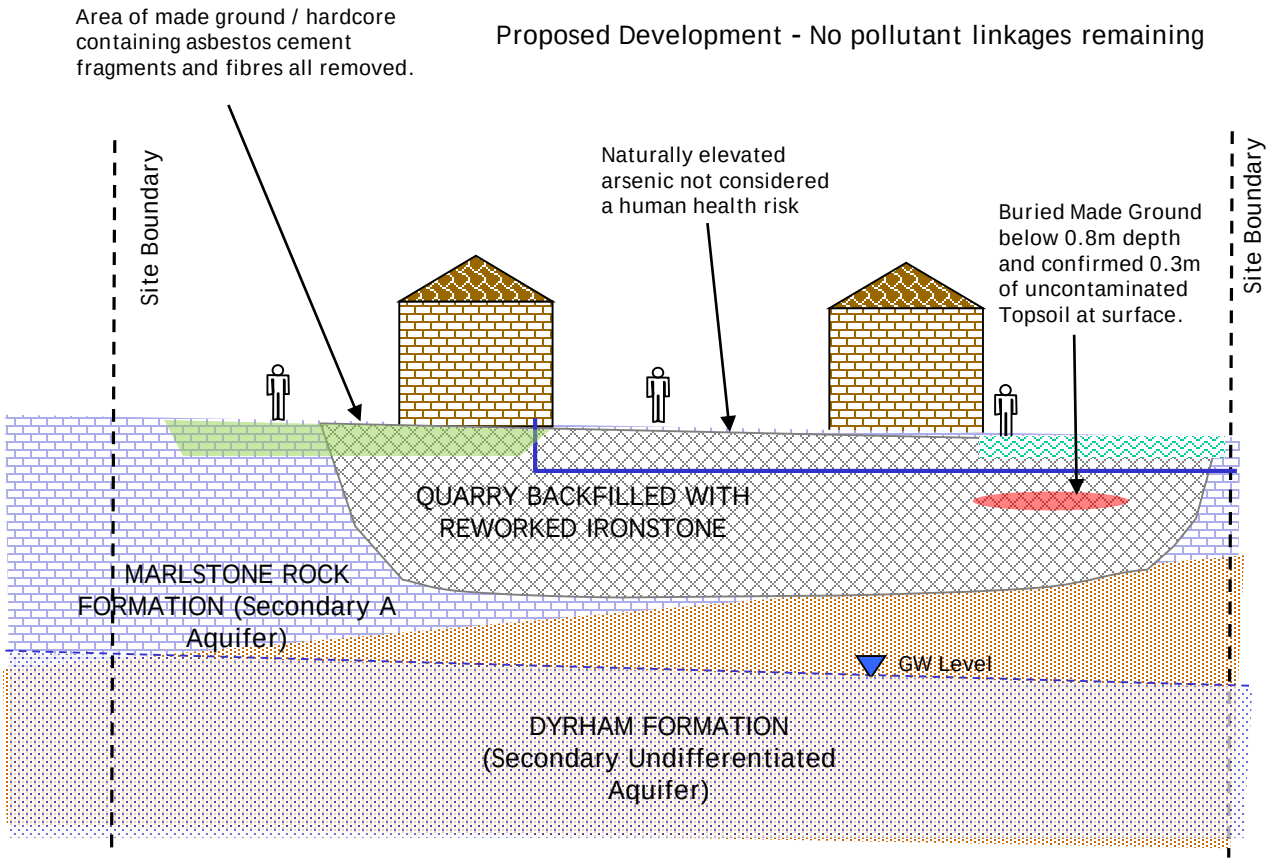
All positions illustrative only.

Reproduced from Expedite Engineering drawing ref. ES20.020 02.05 P9, dated 01/03/22.

Project Title:	Hempton Road, Deddington
Client:	Burrington Estates
BRD Reference:	BRD3567-OP11-B
Date Issued:	June 2022

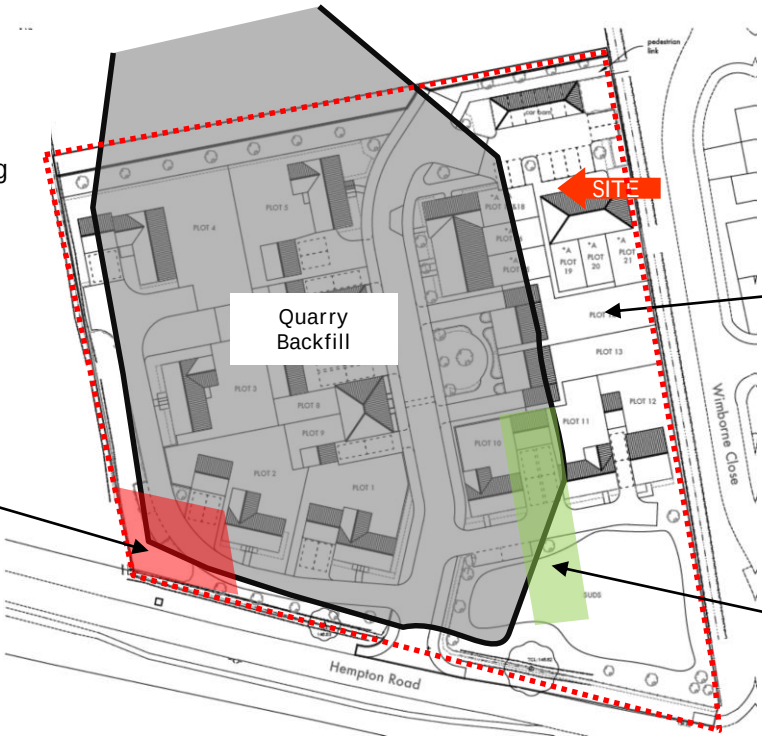
BRD
01295 272244
info@brduk.com

Revised Conceptual Model



Proposed Development

No pollutant linkages remaining



N

Naturally elevated arsenic not considered a human health risk

Buried Made Ground below 0.8m depth and confirmed 0.3m of uncontaminated Topsoil at surface.

Area of made ground / hardcore containing asbestos cement fragments and fibres all removed.

Project Title:	Hempton Road, Deddington.
Client:	Burrington Estates
BRD Reference:	BRD3567-OP10-B
Date Issued:	June 2022

BRD
01295 272244
info@brduk.com

APPENDIX 2

CERTIFICATE OF CLEANLINESS

SITE: The Barn, Hampton Road Deddington OX15 0QH

INSTRUCTED BY: Mr Sam Crooks, of Cawarden Co Demolition Ockbrook, Derby DE72 3RX

JOB DESCRIPTION: Removal of cement debris to exterior area adjacent to the barn that was surveyed at Hampton Road Deddington OX15 0QH. The Works were carried in accordance with the Health and Safety at Work Act, Environmental Protection Act the Asbestos regulations 2012 and other UK Regulations applicable to the Works at the time they are undertaken.
The removal and environmental clean (short duration work) were carried out as far as reasonably practicable. The area was inspected by x1 P402 qualified asbestos surveyor to confirm a visual clearance of the area and there is no asbestos debris present. Also, asbestos warning tape was applied to the perimeter of the building






(For Craven Environmental ltd)

JOB COMPLETED and signed off by:
Mr Wayne Watson 07817539130

[redacted]

DATE: 14/01/2021

Craven Environmental Ltd
Unit 5i, Bestwood Business Park
Bestwood Village
Nottingham
NG6 8TQ
Tel: 0115 9797192

Company Number 09416046 Asbestos Licence No 151505758

Building cordoned off and asbestos warning signs have been applied

Craven Environmental Ltd
Unit 5i, Bestwood Business Park
Bestwood Village
Nottingham
NG6 8TQ
Tel: 0115 9797192

Company Number 09416046 Asbestos Licence No 151505758

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

PRODUCER'S/HOLDER'S/CONSIGNOR'S COPY (Delete as appropri

PART A Notification details

1 Consignment note code: CRAVN12A0527

2 The waste described below is to be removed from (name, address,

The Barn, Hampton Road Deddington OX15 0QH

3 Premises code (where applicable): NA

4 The waste will be taken to (name, address and postcode):

Carl Wright (Haulage & Plant) Ltd
Bakerbook Ind Est, Wigwam Lane
Hucknall Nottingham NG15 7SZ

PART B Description of the waste

If continuation sheet used, tick here ■

1 The process giving rise to the waste(s) was: **Removal**

2 SIC for the process giving rise to the waste: 39.80/

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code)(6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard code(s)	Container type, number and size
Asbestos cement	170605	40Kg	Chrysotile	10-20%	SOLID	HP7	VAN

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170605	2590	BONDED ASBESTOS	CLASS 9	3	CV9 CV13

PART C Carrier's certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ■)

I certify that I today collected the consignment and that the details in A2, A4 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises part of a multiple collection the round number and collection number are: / N/A

1 Carrier name:

Craven Environmental Ltd Unit 5i, Bestwood Business Park Nottingham NG6 8TQ Tel: 0115 9797192

2 Carrier registration no./reason for exemption:

CBDU238507

3 Vehicle registration no. (or mode of transport, if not road):

BN09 ACU

Signature [redacted]

Date 02/02/21 Time 12:40

PART D Consignor's certificate

I certify that the information in A, B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011.

1 Consignor name: **Mr. Simon Watson**

On behalf of (name, address, postcode, telephone, e-mail,

Craven Environmental Ltd Unit 5i, Bestwood Business Park Nottingham NG6 8TQ Tel: 0115 9797192

Signature [redacted]

Date 02/02/21 Time 12:40

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC code received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170605	220kg	Acc	D15

Date 05/02/2021 Time 12:50

1 I received this waste at the address given in A4 on:

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details: BN09 ACC

I certify that waste permit/exempt waste operation number: CBDU238507

authorises the management of the waste described in B at the address given in A4.

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are: 3

Name: [redacted]

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Carl Wright (Haulage & Plant) Ltd
Georgia House
Wigwam Lane, Hucknall
Nottingham, NG15 7SZ

Signature [redacted]

Date 05/02/2021 Time 12:50

Form HWCN01v112

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

PRODUCER'S COPY

PART A Notification details

1 Consignment note code: CAWARD/EN002

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):

Land at Hempton Road, Deddington, Oxfordshire, OX15 0QH
Oliver Crooks
o.crooks@cawarden.com

3 The waste will be taken to (name, address and postcode):

Dunton Environmental
Lower Horseley Fields, WV1 3DT
Tel: 01902456905

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

PART B Description of the waste

If continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: Excavation

2 SIC (2007) for the process giving rise to the waste 38.22

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code) (6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard Code(s)	Container type, number and size
Soils and stones with visible asbestos fragments	170503*	18,000	Asbestos Fragments	>0.1%	Solid	HP5, HP7	8W Tipper

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170503*	N/A	N/A	N/A	N/A	N/A

PART C Carrier's Certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ☐ **)**

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises of a multiple collection the round number and collection number are: /

1 Carrier name: **FGD Ltd**

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

F G DAVIS & SONS (CONTRACTORS) LTD, BRIDGNORTH ROAD , WOLVERHAMPTON, WV5 8AY

2 Carrier registration no./reason for exemption: CBDU209504

3 Vehicle registration no. (or mode of transport, if not road): WV12 YTO

Signature [redacted]

Date 13082021 Time 1215

PART D Consignor's Certificate

I certify that the information in A,B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and wales)Regulations 2011

1. Consignor name: [redacted]

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

Signature [redacted]

Date 13082021 Time 1215

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170503	20,600	Accept	D9

1 I received this waste at the address given in A3 on: Date 13 08 2021 Time

2 Vehicle registration no. (or mode of transport if not road): WV12 YTO

3 Where waste is rejected please provide details:

I certify that waste permit/exempt waste operation number: EPR/BP3331OD

authorises the management of the waste described in B at the address given in A3

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Name: C. SUTCLIFFE

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Dunton TECHNOLOGIES Restoring Our Environment

NORTHGATE, ALDRIDGE WEST MIDLANDS WS9 8TH, UK

Signature [redacted]

Date Time

Form HWCN01v112

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

PRODUCER'S COPY

PART A Notification details

1 Consignment note code: CAWARD / EN001

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):

Land at Hempton Road, Deddington, Oxfordshire, OX15 0QH
Oliver Crooks
o.crooks@cawarden.com

3 The waste will be taken to (name, address and postcode):

Dunton Environmental
Lower Horseley Fields, WV1 3DT
Tel: 01902456905

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

PART B Description of the waste

if continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: Excavation

2 SIC (2007) for the process giving rise to the waste 38.22

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code) (6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard Code(s)	Container type, number and size
Soils and stones with visible asbestos fragments	170503*	18,000	Asbestos Fragments	>0.1%	Solid	HP5, HP7	8W Tipper

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170503*	N/A	N/A	N/A	N/A	N/A

PART C Carrier's Certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ☐ **)**

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises of a multiple collection the round number and collection number are:

/

1 Carrier name: **FGD Ltd**

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

F G DAVIS & SONS (CONTRACTORS) LTD, BRIDGNORTH ROAD , WOLVERHAMPTON, WV5 8AY

2 Carrier registration no./reason for exemption: CBDU209504

3 Vehicle registration no. (or mode of transport, if not road): WV12 YTO

Signature [redacted]

Date 13082021 Time 0815

PART D Consignor's Certificate

I certify that the information in A,B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and wales)Regulations 2011

1. Consignor name: S. LOWES

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

Signature [redacted]

Date 13082021 Time 0805

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170503	20,480	✓	D9

1 I received this waste at the address given in A3 on: Date 13/08/2021 Time

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details:

I certify that waste permit/exempt waste operation number: EPR/BP3331DD

authorises the management of the waste described in B at the address given in A3

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Name: [redacted]

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Dunton TECHNOLOGIES
Restoring Our Environment
DUNTON TECHNOLOGIES
SOTERION HOUSE
HGATE, ALDRIDGE
DLANDS WS9 8TH, UK

Signature [redacted]

Date Time

Form HWCN01v112

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

PRODUCER'S COPY

PART A Notification details

1 Consignment note code: CAWARD / EN004

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):

Land at Hempton Road, Deddington, Oxfordshire, OX15 0QH
Oliver Crooks
o.crooks@cawarden.com

3 The waste will be taken to (name, address and postcode):

Dunton Environmental
Lower Horseley Fields, WV1 3DT
Tel: 01902456905

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

PART B Description of the waste

if continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: Excavation

2 SIC (2007) for the process giving rise to the waste: 38.22

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code) (6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard Code(s)	Container type, number and size
Soils and stones with visible asbestos fragments	170503*	18,000	Asbestos Fragments	>0.1%	Solid	HP5, HP7	8W Tipper

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170503*	N/A	N/A	N/A	N/A	N/A

PART C Carrier's Certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ☐ **)**

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises of a multiple collection the round number and collection number are: /

1 Carrier name: **FGD Ltd**

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

F G DAVIS & SONS (CONTRACTORS) LTD, BRIDGNORTH ROAD , WOLVERHAMPTON, WV5 8AY

2 Carrier registration no./reason for exemption: CBDU209504

3 Vehicle registration no. (or mode of transport, if not road): WV12YTO

Signature [redacted]

Date 16082021 Time 1200

PART D Consignor's Certificate

I certify that the information in A,B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and wales)Regulations 2011

1. Consignor name: S. LOWES

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

Signature [redacted]

Date 16082021 Time 1200

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170504	17 180 Kg	✓	D9

1 I received this waste at the address given in A3 on: Date 16 08 2021 Time

2 Vehicle registration no. (or mode of transport if not road):

3 Where waste is rejected please provide details: WV12YTO

I certify that waste permit/exempt waste operation number: EPR/BP3331DD

authorises the management of the waste described in B at the address given in A3

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Name:

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Dunton TECHNOLOGIES
Restoring Our Environment
DUNTON TECHNOLOGIES
SOTERION HOUSE
NORTHGATE, ALDRIDGE
WEST MIDLANDS WS9 8TH, UK

Signature

Date 16/08/2021 Time

Form HWCN01v112

The Hazardous Waste Regulations 2005: Consignment Note

Environment Agency

PRODUCER'S COPY

PART A Notification details

1 Consignment note code: CAWARD / EN003

2 The waste described below is to be removed from (name, address, postcode, telephone, e-mail, facsimile):

Land at Hempton Road, Deddington, Oxfordshire, OX15 0QH
Oliver Crooks
o.crooks@cawarden.com

3 The waste will be taken to (name, address and postcode):

Dunton Environmental
Lower Horseley Fields, WV1 3DT
Tel: 01902456905

4 The waste producer was (if different from 2) (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

PART B Description of the waste

If continuation sheet used, tick here ☐

1 The process giving rise to the waste(s) was: Excavation

2 SIC (2007) for the process giving rise to the waste: 38.22

3 WASTE DETAILS (where more than one waste type is collected all of the information given below must be completed for each EWC identified)

Description of waste	List of wastes (EWC code) (6 digits)	Quantity (kg)	The chemical/biological components in the waste and their concentrations are: Component	Concentration (% or mg/kg)	Physical form (gas, liquid, solid, powder, sludge or mixed)	Hazard Code(s)	Container type, number and size
Soils and stones with visible asbestos fragments	170503*	18,000	Asbestos Fragments	>0.1%	Solid	HP5, HP7	8W Tipper

The information given below is to be completed for each EWC identified

EWC code	UN identification number(s)	Proper shipping name(s)	UN class(es)	Packing group(s)	Special handling requirements
170503*	N/A	N/A	N/A	N/A	N/A

PART C Carrier's Certificate

(If more than one carrier is used, please attach schedule for subsequent carriers. If schedule of carriers is attached tick here. ☐)

I certify that I today collected the consignment and that the details in A2, A3 and B3 are correct and I have been advised of any specific handling requirements.

Where this note comprises of a multiple collection the round number and collection number are: /

1 Carrier name: **FGD Ltd**

On behalf of (name, address, postcode, telephone, e-mail, facsimile):
F G DAVIS & SONS (CONTRACTORS) LTD, BRIDGNORTH ROAD , WOLVERHAMPTON, WV5 8AY

2 Carrier registration no./reason for exemption: CBDU209504

3 Vehicle registration no. (or mode of transport, if not road): WV12 YTO

Signature [redacted]

Date 16082021 Time 0800

PART D Consignor's Certificate

I certify that the information in A,B and C has been completed and is correct, that the carrier is registered or exempt and was advised of the appropriate precautionary measures. All of the waste is packaged and labelled correctly and the carrier has been advised of any special handling requirements.

I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and wales)Regulations 2011

1. Consignor name: S. LOWES

On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Cawarden, Scotland Farm, Far Lane, Ockbrook, Derby, DE72 3RX

Signature [redacted]

Date 16082021 Time 0800

PART E Consignee's certificate (where more than one waste type is collected all of the information given below must be completed for each EWC)

Individual EWC code(s) received	Quantity of each EWC received (kg)	EWC code accepted/rejected	Waste management operation (R or D code)
170503	20880	✓	D9

1 I received this waste at the address given in A3 on: Date 16082021 Time

2 Vehicle registration no. (or mode of transport if not road): WV12 YTO

3 Where waste is rejected please provide details:

I certify that waste permit/exempt waste operation number: EPR/BP3331DD

authorises the management of the waste described in B at the address given in A3

Where the consignment forms part of a multiple collection, as identified in Part C, I certify that the total number of consignments forming the collection are:

Name:
On behalf of (name, address, postcode, telephone, e-mail, facsimile):

Dunton TECHNOLOGIES
Restoring Our Environment

DUNTON TECHNOLOGIES
SOTERION HOUSE
ORTHGATE. ALDRIDGE
MIDLANDS WS9 8TH. UK

Signature [redacted]

Date 16082021 Time

APPENDIX 3

Matt Wood
BRD Environmental Ltd
Hawthorne Villa
1 Old Parr Road
Banbury
Oxfordshire
OX16 5HT

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 21-10142

Site Reference:	Hempton Road, Deddington
Project / Job Ref:	BRD3567
Order No:	None Supplied
Sample Receipt Date:	17/08/2021
Sample Scheduled Date:	17/08/2021
Report Issue Number:	1
Reporting Date:	23/08/2021

Authorised by:

[redacted]

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

UKAS TESTING 4480

Soil Analysis Certificate							
DETS Report No: 21-10142	Date Sampled	13/08/21	13/08/21			
BRD Environmental Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Hempton Road, Deddington	TP / BH No	Rem Ex 1	Rem Ex 1			
Project / Job Ref: BRD3567	Additional Refs	Face 1	Base 1			
Order No: None Supplied	Depth (m)	None Supplied	None Supplied			
Reporting Date: 23/08/2021	DETS Sample No	560019	560020			

Determinand	Unit	RL	Accreditation					
Asbestos Quantification (S)	%	< 0.001	ISO17025	< 0.001	< 0.001			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 21-10142
BRD Environmental Ltd
Site Reference: Hempton Road, Deddington
Project / Job Ref: BRD3567
Order No: None Supplied
Reporting Date: 23/08/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

James Brockwell
BRD Environmental Ltd
Hawthorne Villa
1 Old Parr Road
Banbury
Oxfordshire
OX16 5HT

Derwentside Environmental Testing Services Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 22-05437

Site Reference:	Hempton Road, Deddington
Project / Job Ref:	BRD3567
Order No:	None Supplied
Sample Receipt Date:	23/06/2022
Sample Scheduled Date:	23/06/2022
Report Issue Number:	1
Reporting Date:	27/06/2022

Authorised by:

[redacted]

Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
DETS Report No: 22-05437	Date Sampled	21/06/22	21/06/22	21/06/22		
BRD Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Hempton Road, Deddington	TP / BH No	HD01	HD02	HD03		
Project / Job Ref: BRD3567	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.20	0.20	0.30		
Reporting Date: 27/06/2022	DETS Sample No	602352	602353	602354		

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	8.2	7.9	7.9		
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	57	22	23		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.06	0.02	0.02		
Organic Matter (SOM)	%	< 0.1	MCERTS	3.9	4.9	5.3		
Arsenic (As)	mg/kg	< 2	MCERTS	124	129	109		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.6	0.8	0.9		
Chromium (Cr)	mg/kg	< 2	MCERTS	238	247	182		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	26	25	33		
Lead (Pb)	mg/kg	< 3	MCERTS	49	39	47		
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1		
Nickel (Ni)	mg/kg	< 3	MCERTS	78	81	68		
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3		
Zinc (Zn)	mg/kg	< 3	MCERTS	169	180	177		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)

DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 22-05437	Date Sampled	21/06/22	21/06/22	21/06/22		
BRD Environmental Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Hempton Road, Deddington	TP / BH No	HD01	HD02	HD03		
Project / Job Ref: BRD3567	Additional Refs	None Supplied	None Supplied	None Supplied		
Order No: None Supplied	Depth (m)	0.20	0.20	0.30		
Reporting Date: 27/06/2022	DETS Sample No	602352	602353	602354		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	0.21	< 0.1	0.16		
Pyrene	mg/kg	< 0.1	MCERTS	0.19	< 0.1	0.14		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Chrysene	mg/kg	< 0.1	MCERTS	0.13	< 0.1	0.14		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.13	< 0.1	0.16		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6		

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Soil Analysis Certificate - Sample Descriptions	
DETS Report No: 22-05437	
BRD Environmental Ltd	
Site Reference: Hempton Road, Deddington	
Project / Job Ref: BRD3567	
Order No: None Supplied	
Reporting Date: 27/06/2022	

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
602352	HD01	None Supplied	0.20	14.2	Brown sandy clay with stones
602353	HD02	None Supplied	0.20	16.7	Brown sandy clay with stones and vegetation
602354	HD03	None Supplied	0.30	19.2	Brown sandy clay with stones and vegetation

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 22-05437
BRD Environmental Ltd
Site Reference: Hempton Road, Deddington
Project / Job Ref: BRD3567
Order No: None Supplied
Reporting Date: 27/06/2022

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

List of HWOL Acronyms and Operators

Acronym	Description
HS	Headspace analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up - e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
2D	GC-GC - Double coil gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics only
AR	Aromatics only
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative eg. EH+HS_Total or EH_CU+HS_Total

Det - Acronym