

Mr Salim Nacer

Willowbank Road,
Hinckley

Interpretative Desk Study &
Exploratory Investigation

May 2025



Document Control

Project: Willowbank Road, Hinckley – Interpretative Desk Study & Exploratory Investigation

Site Address: Land north of Willowbank Road and to the rear of 47 Clarendon Road, Hinckley, Leicestershire, LE10 0PJ

Client: Mr Salim Nacer

Author: G&J Geoenvironmental Consultants Ltd

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Brief Description of Contents Review of desk top information and the results of exploratory soil analysis to determine likely ground conditions and develop a conceptual model in order to establish the geo-environmental site setting, identify any potential Source-Pathway-Receptor pollutant linkages and associated environmental issues, and to provide recommendations for any further works (as required).

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1.0 INTRODUCTION

G&J Geoenvironmental Consultants Ltd (G&J) was commissioned by Mr Salim Nacer to carry out an Interpretative Desk Study, including initial exploratory soil sampling and analysis, for a site located to the north of Willowbank Road, Hinckley, in support of a proposed residential development.

The purpose of this report is to collate and interpret information pertaining to the site from a desk-based review of available data. The scope of the study is as follows:

- To determine the environmental setting of the site and its surroundings in terms of location, topography, ground conditions and land-use;
- To discuss the geology, hydrogeology and hydrology at, and in the vicinity of, the site;
- To determine the site history and that of the surrounding area;
- To assess potential contamination issues pertaining to the site with consideration of the site's current and historic use;
- To undertake initial exploratory sampling and analysis of near surface soils;
- To develop an initial Conceptual Site Model (CSM) linking sources of potential contamination with pathways and receptors;
- To produce a Preliminary Risk Assessment for contamination in accordance with the Environment Agency's *Land Contamination Risk Management* (LCRM) framework;
- To provide recommendations for any further work and / or mitigation measures (if required); and
- To support any planning applications for development of the site.

1.1 Terms and Conditions

This report has been prepared for Mr Salim Nacer in consideration of the current use of the site and the proposed future residential development. Much of the environmental information relates to the site in its present state and should not be used in a different context without reference to G&J.

1.2 Sources of information

The following sections describe the environmental setting of the site, the site history and the anticipated ground conditions based on information taken from a variety of sources, including;

- Site Inspection;
- Current maps and plans;
- Geological maps and records;
- Site Photographs (Appendix A);
- Websites of relevant authorities and organisations such as The British Geological Survey, the Coal Authority, Groundsure, National Library of Scotland, Natural England, MAGIC, Google Earth and the Environment Agency.

Although every effort has been made to ensure the accuracy of the information contained herein, no checks have been carried out to ensure the accuracy of information obtained from third parties and no liability can be accepted for any errors or misinterpretation of the third-party information where it has been incorporated into this report.

1.2.1 Exploratory Soil Sampling

The study has also included exploratory sampling and analysis of soils from five near surface locations. This is in order to provide additional information on near surface soil conditions and to help determine the requirement for any future investigation works or mitigation measures.

1.3 Policy Context – Land Contamination

The primary legal and policy mechanisms for managing contaminated land are Part IIA of the Environmental Protection Act 1990 and the National Planning Policy Framework.

Part IIA provides a statutory definition of Contaminated Land and supporting guidance which defines how to decide whether or not land meets this definition. For land to be determined as contaminated land, the onus is on demonstrating with sufficient certainty that land is in such condition, by reasons of substances in, on or under the ground that;

- a) Significant harm is being caused or there is a significant possibility of such harm being caused; or

- b) Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.

Significant harm and how to determine if a significant possibility of such harm exists is defined in the statutory guidance which accompanies Part IIA. The guidance also defines four categories of land with respect to the risks to human health and the water environment and how the degree of risk relates to the statutory definition of contaminated land, as summarised in the following figure:

Figure 1.1 Part IIA Categories

Land Category	Human Health	Water	
1	Unacceptably high probability that Significant Harm would occur if no action taken	Strong case that a Significant Possibility of Significant Pollution exists	Part IIA Contaminated Land
2	The risks are sufficient that a Significant Possibility of Significant Harm exists	Of sufficient concern to present a Significant Possibility of Significant Pollution	
3	Not low risk but does not pose a Significant Possibility of Significant Harm	The risks are not sufficient to constitute Significant Possibility of Significant Pollution	Not Part IIA Contaminated Land
4	Low risk to human health and no possibility of meeting the statutory definition	No/low risk to controlled waters and would not meet the statutory definition	

In terms of planning policy, a precautionary approach is adopted whereby it is necessary to demonstrate with sufficient confidence that the site cannot meet the statutory definition of contaminated land. Although the above categorisation is not explicitly applicable to planning decisions, a site classed as Category 4 should be considered suitable for development in accordance with planning policy. While a Category 3 site could be considered suitable, the reduced level of confidence associated with such a site means this is less likely.

2.0 SITE SETTING

2.1 Site Location

The site is located between 47-53 Clarendon Road to the north and Willowbank Road to the south, approximately 500m south of Hinckley town centre. The site is approximately centred on National Grid Reference 442460, 293400. The site location and layout are shown in Figure 2.1.

Figure 2.1 Site Location and Layout



Contains Ordnance Survey data, © Crown copyright 2024

2.2 Site Description

The site covers an area of approximately 700m² and formerly comprised a series of domestic garages and part of the rear gardens of 47 and 49 Clarendon Road. The garages ran along much of the eastern side of the site, but have now been largely demolished. Construction works are currently being undertaken on the new garages which form part of the proposed development. The garages are located in the north of the site and occupy the former gardens of 47 and 49 Clarendon Road. The rest of the site currently comprises the remaining concrete slab on the footprint of the former garages, with rough ground elsewhere. Construction materials such as bricks, breeze blocks, sand and pallets are currently stored across the site, as well as some limited waste materials such as rubble, wood and vegetation.

The site is bound by Willowbank Road to the south, 47 to 53 Clarendon Road the north, Fabius Close to the east and residential apartments to the west.

The site is accessed via Willowbank Road to the south and via Fabius Close from the north-east.

Site photographs are included in Appendix A

2.3 Surrounding Land Use

The surrounding land use is predominantly residential, although some commercial uses, including window supplies, tool hire, landscaping supplies, council offices and other shops and offices, are also present nearby.

Industrial / commercial land uses within 250m include supermarkets (one including a fuel station), various other retail premises and offices, and a railway line (approximately 250m to the south).

2.4 Potential Sources of Contamination

No evidence of significant contamination was noted during the site inspection. There is potential for minor contamination from vehicles and small quantities of substances such as oil and fuels associated with the garages.

2.5 Environmental Designations

The site is within a nitrate vulnerable zone, but otherwise there are no environmentally sensitive land uses within close proximity to the site.

2.6 Proposed Development

It is proposed to construct two detached residential properties, with separate garages in the north of the site.

The proposed development layout is shown in Figure 2.2.

The site plan shows a development bounded by Willowbank Road to the west and Fabius Close to the south. The development is divided into three main plots:

- Plot 1:** A large rectangular area in the center, divided into two sections labeled 'Plot 1' and 'Plot 2'.
- Plot 2:** A smaller rectangular area to the east of Plot 1, also divided into two sections labeled 'Plot 1' and 'Plot 2'.
- Plot 3:** A small rectangular area to the west of Plot 1, labeled 'Plot 3'.

Other features include a north arrow pointing towards the top right, a scale bar indicating 0 to 100 meters, and various annotations regarding planning and design. A red dashed line runs along the boundary of the development. The plan also shows existing buildings, trees, and a parking area.

3.0 GROUND CONDITIONS

3.1 Geology

The British Geological Survey (BGS) geological map of the area shows the site to be underlain by superficial deposits of the Wolston Sand and Gravel, which may overlie the Bosworth Clay Member (lacustrine clays and silts). The bedrock underlying the superficial deposits is shown to comprise the Mercia Mudstone Group.

Three borehole records approximately 60m south of the site recorded limited Made Ground overlying between approximately 0.5 – 3.5m of sand over grey/blue clay.

3.2 Mining and Extraction

The site is not within an area that may be affected by coal mining and there are no records of mineral extraction in close proximity to the site.

3.3 Radon

The site is not located in a Radon Affected Area as defined by the Health Protection Agency (HPA), as less than 1% of properties are above the Action Level. Radon protective measures are not a requirement in new buildings in such areas.

3.4 Made Ground and Landfills

There are no records suggesting the presence of significant thicknesses of fill or Made Ground on the site.

The nearest recorded landfill is approximately 500m to the south-west at Brookfield Road, which accepted waste between 1950 and 1990.

3.5 Hydrogeology

The superficial glacial deposits and the Mercia Mudstone bedrock are classed as Secondary Aquifers, meaning they may support water supplies at a local rather than strategic scale, and in some cases form an important source of base flow to rivers.

The site lies outside any groundwater Source Protection Zone, meaning it is outside the catchment of a groundwater abstraction used for potable supply.

4.0 HYDROLOGY

4.1 Watercourses

The nearest watercourse is Sketchley Brook, which emerges from a culvert approximately 300m south of the site.

4.2 Flood Risk

The site is shown to be located in Flood Zone 1, meaning it is outside the predicted extent of extreme flooding from rivers or the sea.

The risks from other forms of flooding are considered to be low.

4.3 Water Quality

Sketchley Brook was rated as Moderate for ecological quality in 2022. For chemical quality it was rated as Fail in 2019 (due to mercury, PFOS and PBDE), but did not require assessment in 2022.

4.4 Site Drainage

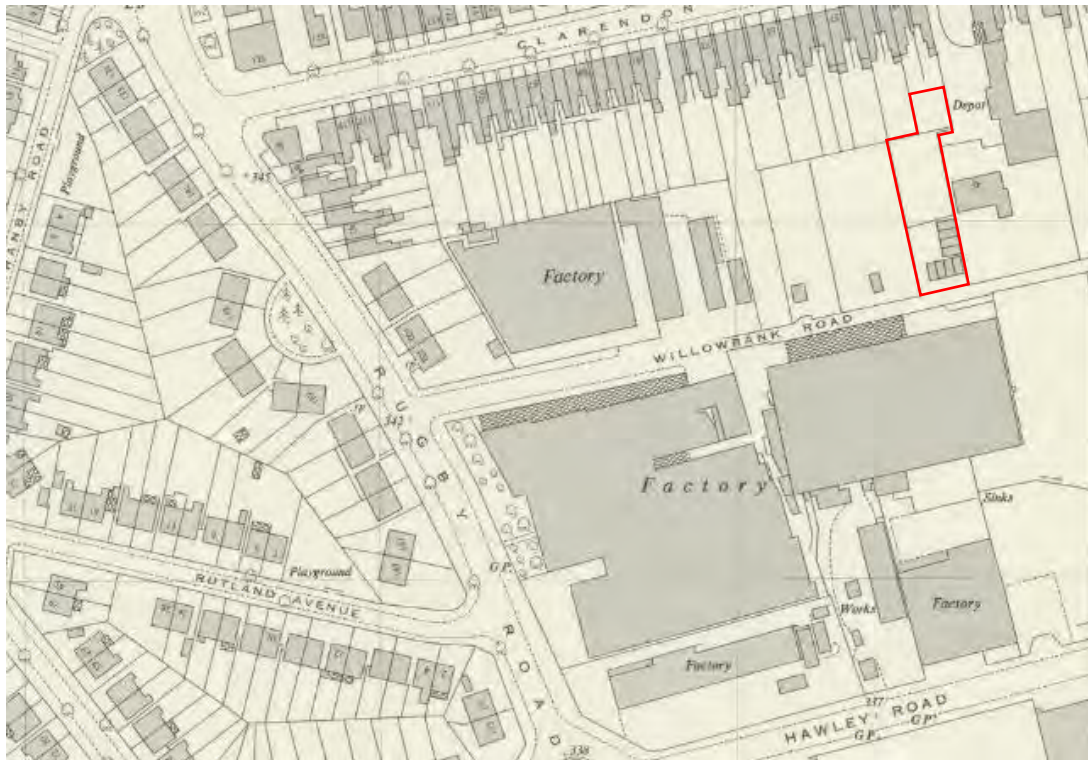
Prior to construction, the site was partly covered by the remaining concrete slab, with rest being rough ground. Drainage would have been by a combination of run-off and infiltration. The new development will result in drainage from roofs and hard surfaces being directed to a dedicated drainage system.



1901



1938



1960



1999 (Google Earth)



2018 (Google Earth)



2023 (Google Earth)

5.1.1 Summary of Site History

The earliest mapping shows the site was part of undeveloped fields around the start of the 20th century. Railway sidings / sheds are shown to the south-east at this time. By the 1930s, houses had been developed along Clarendon Road, with gardens extending into the northern part of the site. The majority of the site to the south, however, is shown as part of allotment gardens. Some industrial development is shown around the same time, with the 'Benco' works shown to the north of Clarendon Road and a hosiery works shown to the south-east.

Garages are first shown on the site in mapping from 1960 in the south of the site. Large factories are shown close by to the south and west of the site, while a depot is adjacent to the site to the east.

Google Earth aerial imagery shows garages occupying the eastern side of the site by 1999. The factories are still shown to be present, while the land immediately to the west is shown to be occupied by trees. Residential properties are now shown to the west of the site where the depot was formerly located.

Imagery from 2018 shows only partial remains of the garages (slab and some remnant walls), while the factories to the south have been replaced by residential developments. By 2023, the part of the site that extends onto the former gardens of 47 & 49 Clarendon Road is shown to have been cleared and joined to the rest of the site. Residential apartments have been constructed on the land immediately west of the site.

5.2 UXO

Based on available high-level risk mapping, the site is located in an area that has a low risk of air-dropped unexploded ordnance (UXO).

5.3 Previous Investigations

G&J is not aware of any previous ground investigations on the site.

6.0 EXPLORATORY INVESTIGATION

6.1 Investigation Works

During the walkover survey, undertaken on 24th April 2025, five soil samples were taken from shallow (0.1-0.2m) hand dug pits in accessible areas and sent for chemical analysis in order to provide additional information with respect to near surface Made Ground. The sample locations are shown in Figure 6.1 below, while photographs of the sample locations are included in Appendix A.

Figure 6.1 Sample Locations



Each of the five samples were scheduled for a suite of analysis that comprised the following;

- Metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn); Speciated PAHs (EPA16); Asbestos Screen.

6.2 Investigation Findings

6.2.1 Ground Conditions

The samples were taken from hand dug pits at approximately 0.1m in areas of accessible soft ground. Samples S1 to S3 were taken from rough ground within the footprints of the proposed garden areas, while S4 and S5 were taken from within the proposed building footprints. No samples were taken from the location of the garages as these were under construction at the time of the site visit.

The material encountered in each location was described as follows:

- S1 – Dark brown, sandy, silty, clayey soil with fragments of brick, concrete and glass
- S2 – Sand and gravel aggregate including stone and brick
- S3 – Red-brown, sandy gravel of stone to 5cm depth, over dark brown, silty loam soil
- S4 – Red-brown, sandy gravel of angular stone
- S5 – Sandy, gravelly clay including brick and glass fragments

6.2.2 Soil Chemistry

Table 6.1 presents a summary of the results of chemical analyses undertaken on the 5 soil samples from the site. Substances not recorded above laboratory detection limits are not included in the table. The significance of these results is discussed in the Risk Assessment in Section 6.3. Full soil chemical analytical results are presented in Appendix B.

Table 6.1 Summary of soil analytical results

Substance	units	S1	S2	S3	S4	S5
Arsenic	mg/kg	11	6	13	12	14
Cadmium	mg/kg	0.7	<0.2	0.2	0.2	0.4
Chromium	mg/kg	18	10	9	10	21
Copper	mg/kg	394	20	24	30	49
Lead	mg/kg	106	21	28	27	81
Nickel	mg/kg	18	8	9	10	24
Zinc	mg/kg	286	61	58	59	134
Asbestos	-	Detected	Detected	ND	Detected	Detected
Benzo(a)pyrene*	mg/kg	0.40	0.26	0.14	<0.1	0.17
Total PAHs*	mg/kg	3.5	2.5	<1.6	<1.6	2.1

*For full speciated PAH, see Appendix B

6.3 Generic Quantitative Risk Assessment for Human Health

A Generic Quantitative Risk Assessment (GQRA) has been undertaken by comparing recorded contaminant concentrations to Generic Assessment Criteria (GAC) to identify the contaminants of concern that have the potential to adversely affect the health of site users. If the observed concentration of a particular substance is below the GAC then the risk is generally considered to be acceptable and does not generally warrant further assessment. Furthermore, a substance recorded in excess of a particular GAC does not necessarily indicate that a significant risk is present that would require mitigation. Where a GAC is exceeded, further assessment may be necessary to evaluate the significance in line with the current UK tiered risk assessment framework.

6.3.1 Assessment Criteria

In order to generate generic assessment criteria (GACs) which are protective of human health, the Environment Agency recommends the use of the CLEA 1.06 software in conjunction with advice found on their CLEA web pages. CLEA was initially used to derive Soil Guideline Values (SGVs), the last of which were published in 2009. These were produced for a limited number of substances for three common land uses; residential, allotments and commercial / industrial. SGVs represented concentrations that would present a minimal risk in the context of the exposure scenario for a particular land use.

Following the publication of updated Statutory Guidance for Part IIA of the Environmental Protection Act in 2012, new screening values, designated Category 4 Screening Levels (C4SLs), were published in 2014 which are consistent with the more pragmatic risk-based approach adopted by the Guidance. They represent a level of risk which is 'low' rather than 'minimal', but are still strongly precautionary and are consistent with land within Category 4, as described in the Statutory Guidance and summarised in Section 1.3.

The C4SLs have been developed using a modified version of the CLEA framework for some of the most significant substances associated with contaminated land (although more are in development) and cover 6 classes of generic land use. For the purposes of this report, appropriate C4SLs have been used in the first instance, where available.

Where C4SLs do not exist, alternative GACs derived using CLEA are required. Accordingly, the Chartered Institute of Environmental Health (CIEH) in partnership with Land Quality Management (LQM) derived a set of Generic Assessment Criteria Values (GAC) for contaminants of concern using the CLEA software. The LQM/CIEH S4ULs (Suitable for Use levels) published in 2014 present GACs for 89 contaminants of concern under six land use scenarios and for three soil organic matter percentages. They differ from C4SLs in that they are derived based on 'minimal' rather than 'low' risk. The input

parameters used for calculating each S4UL value are listed in the substance specific chapters of the reference document associated with the S4ULs, namely 'The LQM/CIEH S4ULs for Human Health Risk Assessment' (Land Quality Press, 2015, Unique publication number S4UL3312). S4ULs have therefore been used where no C4SL is available. In the absence of a C4SL or S4UL, reference has been made to Soil Generic Assessment Criteria (SGAC, CL:AIRE 2010).

6.3.2 Characterisation and Assessment

The generic screening values that G&J have used to establish whether soils are suitable for the proposed site use are detailed in Table 6.2. The screening values are based on a residential land use with gardens and a Soil Organic Matter content of 1%. The table also includes the locations where concentrations were recorded in excess of the GAC.

Table 6.2 GACs – Residential land use and 1.0 % SOM

Determinand	Chemical acceptance criteria – GAC (mg/kg)	Source	Locations >GAC
Arsenic	37	C4SL	-
Cadmium	22	C4SL	-
Chromium	910	S4UL	-
Copper	2400	S4UL	-
Lead	200	C4SL	-
Nickel	130	S4UL	-
Zinc	3700	S4UL	-
Benzo(a)pyrene	5	C4SL	-

All soil data from the exploratory investigation have been screened against the GAC, as detailed above, to determine the potential risk to human health. Based on the preliminary screening exercise, no contaminants have been recorded at concentrations above the GAC in any sample. Therefore, none of the contaminants in the above table are considered to represent a significant risk in the context of the proposed development.

6.3.3 Asbestos

Due to the nature of asbestos and the wide range of factors that influence the level of risk associated with asbestos contamination, no GAC is available. Instead, the risks from asbestos are generally assessed based on lines of evidence which consider factors including the type and amount of asbestos present, its location and distribution, the ground conditions and potential exposure routes for site users.

Of the 5 samples, all except S3 recorded the presence of asbestos (as bundles of chrysotile fibres), although no obvious asbestos containing materials were noted during the site inspection. It is possible

the asbestos in the soil is a result of the demolition of the garages (that may have contained ACMs such as asbestos cement) or may have been a component of imported Made Ground.

Based on the available evidence, there is no evidence to suggest the presence of gross asbestos contamination, but some mitigation will be required.

7.0 CONCEPTUAL SITE MODEL

7.1 Introduction

The information obtained from the desk-based study has been collated and evaluated to develop a Conceptual Model for the site.

The site has been assessed in line with current UK guidelines, namely the Contaminated Land (England) Regulations 2000 and Part IIA of the Environmental Protection Act 1990, and follows the procedures set out in the Environmental Agency 'Land Contamination Risk Management' (LCRM) framework.

LCRM provides the technical framework for structured decision making about land contamination and replaces 'Model Procedures for the Management of Land Contamination – Contaminated Land Report (CLR) 11', which built on previous work carried out under the Contaminated Land Research Programme of the former Department of the Environment. LCRM has adopted and refined the methodology and terminology that has been used in contaminated land risk assessment for a number of years.

LCRM defines the three essential elements to any risk:

- A contaminant source - a substance that is in, on or under land and has the potential to cause harm or to cause pollution of controlled waters.
- A receptor – in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body.
- A pathway - a route or means by which a receptor can be exposed to or affected by a contaminant.

Each of these elements can exist independently and create a risk only where they are linked together, so that a particular contaminant affects a particular receptor through a particular pathway. This kind of linked combination of source-pathway-receptor is described as a contaminant linkage or pollutant linkage.

The following describes a Preliminary Risk Assessment and presents a Stage 1 Conceptual Model for the site, based on the proposed residential development.

7.2 Hazard Identification

7.2.1 Potential Contamination Sources

The site has little previous development history prior to the garages being built, when it was shown to be part of allotment gardens. There are no obvious past or current on-site sources other than the garages, the use of which may have been the source of small quantities of substances such as fuels, oils and paints, while the garages themselves may have been a source of contamination such as asbestos, if used in the construction. Made Ground can also be the sources of contaminants such as metals, PAHs and asbestos.

Analysis of 5 samples of the near surface soils (Made Ground) revealed only low concentrations of contaminants, although asbestos fibres were detected in all but one sample.

Overall, the potential for significant widespread contamination is considered to be low, but minor contamination from asbestos fibres appears to be a feature of the Made Ground.

Potential contamination sources are summarised in Table 6.1.

Table 6.1 Summary of Potential Contaminant Sources

Structure / Process	Potential Contaminants
Minor contamination of the Made Ground associated with past site use. (S1)	• Metals • PAHs • Asbestos

7.2.2 Potential Receptors

The following are considered the potential receptors assuming a future residential use of the site.

- Future land users – Occupiers of the proposed development.
- Buildings (including foundations) and below ground services / infrastructure – Concrete foundations, drinking water supply pipes and other service infrastructure.
- Groundwater – Underlying Secondary Aquifer.
- Flora – Any vegetation within current or proposed site landscaping.

7.2.3 Potential Contamination Pathways

The following are considered potential contamination pathways given the nature of the site and the potential contaminative sources identified, and assuming a future residential end use with gardens.

- Ingestion and dermal absorption through direct contact with contaminated soils and soil-derived dusts;
- Uptake of contaminants by plants intended for human consumption;
- Inhalation of airborne soil-derived dust/particulate matter;
- Migration and inhalation of gases and vapour;
- Contamination of drinking water pipes by contaminated material leading to the ingestion of contaminated drinking water;
- Attack on concrete foundations by aggressive soil conditions.
- Leaching of contaminants by percolating rainwater and dissolution, followed by horizontal and vertical migration through the unsaturated zone to shallow groundwater.

7.3 Preliminary Risk Assessment

Risks from land contamination in the UK are assessed on the 'suitability for use' principle, whereby pollutant linkages are considered with regard to the intended end use of the site, and the specific exposure pathways and receptors associated with that use.

The CSM forms the basis for the design of subsequent stages of investigation, which should aim to confirm (or otherwise) the presence and significance of the potential pollutant linkages highlighted by the CSM. The risk assessment has been carried out based on a residential land use with gardens.

For the purpose of this report, the environmental risks associated with each potential pollutant linkage have been initially assessed based on the available information using the following scale;

Figure 6.1 Risk Definitions

Risk Level	Description
Very Low / Negligible	The contaminant linkage may not be complete or is otherwise very unlikely to result in significant effects*, and further investigation should not be necessary
Low	Significant effects* are unlikely and further investigation may not be necessary, but should be considered
Medium	Significant effects* are a possibility and further investigation is recommended
High	Significant effects* are likely and further investigation is required
Very High	There is evidence that significant effects* are currently occurring, or are likely to occur, and immediate action is required.

*Significant effects are considered to be any of the following:

- Exposure of site users to levels of contamination that may constitute significant harm as defined by Part IIA of the Environmental Protection Act
- An impact on controlled waters from contamination in contradiction of the aims of the Water Framework Directive, which may constitute Part IIA significant harm
- Exposure of an ecological system, or part thereof, to levels of contamination that may constitute Part IIA significant harm
- Exposure of crops, domesticated animals and animals subject to hunting / fishing rights to levels of contamination that may constitute Part IIA significant harm
- Exposure of construction and underground service materials to levels of contamination which may cause damage or exceed industry thresholds

In accordance with LCRM, professional judgement has been employed to evaluate the risk on a qualitative basis using available information.

Based on the potential sources, pathways and receptors associated with the proposed residential development site use, an initial Conceptual Site Model has been developed, and is summarised in Table 6.2.

Table 6.2 Conceptual Site Model

Area / Structure	Contaminants (Chemicals of Concern)	Pathway		Risk	Comment / Recommended Actions
Source 1 Minor contamination of the Made Ground associated with past site use.	Metals, PAHs, asbestos.	Ingestion and dermal adsorption through direct contact	Humans (Future site users)	Very Low / Negligible	The potential for significant (gross) contamination to be present is low, but some minor contamination of the Made Ground from asbestos has been identified and mitigation is considered necessary.
		Consumption of plants grown in contaminated ground		Very Low / Negligible	
		Inhalation of dust / particulates		Low / Medium	
		Inhalation of gases / vapours		Very Low / Negligible	
		Direct contact	Buildings / Foundations / Services	Very Low / Negligible	The potential for significant contamination to be present that could affect construction materials is very low.
		Leaching and migration through unsaturated zone	Secondary Aquifer	Very Low / Negligible	The potential for significant contamination to be present that could impact the groundwater is very low.
		Plant uptake	Flora	Low	The Made Ground may not represent a suitable growing medium for any future planting.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Preliminary Risk Assessment

Based on the information reviewed during this survey, the risks from land contamination (except those to construction workers) are considered to be low to medium. The risks reflect the presence of asbestos fibres in the Made Ground and the sensitivity of the proposed development.

8.1.1 Construction Workers

Given the unique exposure scenario for any construction, investigation or maintenance worker involved in groundworks or excavations, the risks are considered separately from those to other receptors which are described above.

There is always a risk of exposure to contamination for those involved in ground disturbance, particularly in Made Ground and near surface soils where materials such as asbestos can be present. Measures should be taken to minimise exposure of such workers to these risks, in accordance with common good practice.

8.2 Further Investigation Requirements

The desk study and exploratory investigation is considered to have provided sufficient characterisation, and no further investigation works are considered necessary.

8.3 Mitigation

It is considered that mitigation measures are required to address the risks associated with the presence of asbestos in the Made Ground. Given asbestos fibres were recorded in 4 of the 5 samples, minor asbestos contamination can be considered to be a feature of the Made Ground as a whole.

Risks are only considered to be present where the Made Ground may be exposed at the surface, and therefore where there may be potential for direct exposure and the generation of airborne dusts. Where buildings and hard surfaces are presents, there are not considered to be any significant risks.

As such, it is recommended that measures are taken to reduce / prevent exposure in areas of gardens and soft landscaping.

This can be achieved by either of the following methods:

- Removal of the Made Ground from garden areas down to natural soils, verified through a programme of inspection and sample analysis (see 8.3.1, below)
- Where Made Ground remains in-situ, the placement of a barrier layer comprising a geotextile membrane overlain by 600mm verified clean soil (see 8.3.1, below)

The cover layer may be impractical without the removal of some soils to accommodate it, given it would result in a raising of site levels. Depending on the thickness of the Made Ground (it is considered likely to be limited), a reduction in levels may result in the removal of the Made Ground anyway, in which case the cover layer would obviously not be required (although some replacement clean soil may be necessary to make back up to the original level).

8.3.1 Verification

Where Made Ground is completely removed, verification will be through the inspection of the exposed natural soils and the collection of representative samples (minimum of one per garden) for laboratory analysis for asbestos. The results will need to confirm the absence of asbestos in order to verify that the affected Made Ground has been removed.

The placement of the cover layer should be verified through inspection and sampling by a geo-environmental engineer to demonstrate that the cover has been placed to the necessary depth and specification as described above, and that the soil used is of a suitable quality.

At least three samples per source should be taken from the soils used in the cover layer. Samples should be tested for metals, PAHs and asbestos as a minimum, plus any other contaminants that may be relevant to the soil source. Soils should be free of any obvious evidence of contamination (staining, odours, suspicious materials) and the results of chemical analysis benchmarked against the generic assessment criteria included in Appendix C. This applies to any soils imported for use on the site, whether in a cover layer or not.

All verification works should be detailed in a Verification Report which includes details of the works undertaken, photographs and laboratory analysis results.

8.3.2 Previously Unidentified Contamination

In the event of any evidence of previously unidentified significant contamination (odours, staining, suspicious materials, potential ACMs) being encountered during any future earthworks or construction, the works should be paused and a geo-environmental specialist consulted to determine the most appropriate course of action.

8.3.3 Water Pipes

The service provider should be consulted to determine the most suitable pipe material for the water supply to the development, although standard plastic pipes are considered likely to be appropriate.

APPENDICES

A – Site Photographs



Looking north into the site from Willowbank Road



Looking north along the eastern boundary, with remaining garage walls on the right



Looking south towards Willowbank Road



Rubble pile on western site boundary



Garages under construction in the north of the site



Sample location S1



Sample Location S2



Sample location S3



Sample location S4



Sample location S5

B – Chemical Laboratory Certificates

Chris Hepworth
G & J Geoenvironmental Consultants Ltd
35-37 High Street
Barrow-upon-Soar
Loughborough
Leicestershire
LE12 8PY

Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 25-04469

Site Reference: Willowbank Road

Project / Job Ref: GJ352

Order No: None Supplied

Sample Receipt Date: 25/04/2025

Sample Scheduled Date: 28/04/2025

Report Issue Number: 1

Reporting Date: 07/05/2025

Authorised by:



Steve Knight
Customer Support Manager

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

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Soil Analysis Certificate						
DETS Report No: 25-04469	~ Date Sampled	24/04/25	24/04/25	24/04/25	24/04/25	24/04/25
G & J Geoenvironmental Consultants Ltd	~ Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~ Site Reference: Willowbank Road	~ TP / BH No	S1	S2	S3	S4	S5
~ Project / Job Ref: GJ352	~ Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~ Order No: None Supplied	~ Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 07/05/2025	DETS Sample No	774261	774262	774263	774264	774265

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	(n)
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Detected	Detected	Not Detected	Detected	Detected
Sample Matrix ^(S)	Material Type	N/a	NONE	Chrysotile present as fibre bundles	Chrysotile present as fibre bundles		Chrysotile present as fibre bundles	Chrysotile present as fibre bundles
Asbestos Type ^(S)	PLM Result	N/a	ISO17025	Chrysotile	Chrysotile		Chrysotile	Chrysotile
Arsenic (As)	mg/kg	< 2	MCERTS	11	6	13	12	14
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.7	< 0.2	0.2	0.2	0.4
Chromium (Cr)	mg/kg	< 2	MCERTS	18	10	9	10	21
Copper (Cu)	mg/kg	< 4	MCERTS	394	20	24	30	49
Lead (Pb)	mg/kg	< 3	MCERTS	106	21	28	27	81
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	18	8	9	10	24
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Zinc (Zn)	mg/kg	< 3	MCERTS	286	61	58	59	134

Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 25-04469	~ Date Sampled	24/04/25	24/04/25	24/04/25	24/04/25	24/04/25
G & J Geoenvironmental Consultants Ltd	~ Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~ Site Reference: Willowbank Road	~ TP / BH No	S1	S2	S3	S4	S5
~ Project / Job Ref: GJ352	~ Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~ Order No: None Supplied	~ Depth (m)	0.10	0.10	0.10	0.10	0.10
Reporting Date: 07/05/2025	DETS Sample No	774261	774262	774263	774264	774265

Determinand	Unit	RL	Accreditation	(n)	(n)	(n)	(n)	(n)
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	0.27	0.28	< 0.1	< 0.1	0.27
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.64	0.48	0.18	< 0.1	0.48
Pyrene	mg/kg	< 0.1	MCERTS	0.53	0.42	0.19	< 0.1	0.42
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.41	0.21	0.12	< 0.1	0.22
Chrysene	mg/kg	< 0.1	MCERTS	0.31	0.23	0.12	< 0.1	0.20
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.37	0.27	0.16	< 0.1	0.20
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	0.17	0.10	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.40	0.26	0.14	< 0.1	0.17
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.21	0.15	< 0.1	< 0.1	0.12
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.19	0.14	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	3.5	2.5	< 1.6	< 1.6	2.1

Soil Analysis Certificate - Sample Descriptions

DETS Report No: 25-04469	
G & J Geoenvironmental Consultants Ltd	
~Site Reference: Willowbank Road	
~Project / Job Ref: GJ352	
~Order No: None Supplied	
Reporting Date: 07/05/2025	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
774261	S1	None Supplied	0.10	10.2	Brown loamy sand with vegetation and stones
774262	S2	None Supplied	0.10	4	Brown sandy gravel with stones and concrete
774263	S3	None Supplied	0.10	6	Brown sandy gravel with stones
774264	S4	None Supplied	0.10	5.4	Brown sandy gravel with stones and brick
774265	S5	None Supplied	0.10	13.9	Brown sandy clay with stones and vegetation

Moisture content is part of procedure E003 & is not an accredited test

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 25-04469

G & J Geoenvironmental Consultants Ltd

~Site Reference: Willowbank Road

~Project / Job Ref: GJ352

~Order No: None Supplied

Reporting Date: 07/05/2025

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 FOC 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

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

Certificate Key

Symbol	Description
F	Filtered sample
UF	Unfiltered sample
D	Dried sample
AR	As received sample
RL	Reporting limit
~	Sample details provided by customer and can affect the validity of results
M/S	Missing Sample
n	Please note that we are MCERTS soil accredited (UK soils only) for sand, loam, and clay, and UKAS accredited for groundwater, tap water, surface water, and generated leachates. Other matrices are outside our scope of accreditation.
S	Subcontracted analysis
M	MCERTS accredited test
U	UKAS accredited test

C – Generic Assessment Criteria

Generic Assessment Criteria

Land Use **Residential (with gardens)**
SOM Content **1%**

Determinand	GAC (mg/kg)	Source*
Arsenic	37	C4SL
Antimony	550	SGAC
Barium	1300	SGAC
Beryllium	1.7	S4UL
Boron	290	S4UL
Cadmium	22	C4SL
Chromium III	910	S4UL
Chromium VI	21	C4SL
Copper	2400	S4UL
Lead	200	C4SL
Mercury (inorganic)	40	S4UL
Mercury (elemental)	1.2	S4UL
Mercury (methylmercury)	11	S4UL
Molybdenum	670	SGAC
Nickel	130	S4UL
Selenium	250	S4UL
Vanadium	410	S4UL
Zinc	3700	S4UL
Total Cyanide	74	Acute exposure calculation
Naphthalene	15	C4SL
Benzo(a)pyrene (as a surrogate for genotoxic PAHs – benz(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(ah)anthracene), indeno(123-cd)pyrene, benzo(ghi)perylene)	5	C4SL
Acenaphthene	210	S4UL
Acenaphthylene	170	S4UL
Anthracene	2400	S4UL
Fluoranthene	280	S4UL
Fluorene	170	S4UL
Phenanthrene	95	S4UL
Pyrene	620	S4UL
Aliphatic Hydrocarbons (C5-6)	42	S4UL
Aliphatic Hydrocarbons (C6-8)	100	S4UL
Aliphatic Hydrocarbons (C8-10)	27	S4UL
Aliphatic Hydrocarbons (C10-12)	130	S4UL
Aliphatic Hydrocarbons (C12-16)	1100	S4UL
Aliphatic Hydrocarbons (C16-44)	65000	S4UL
Aromatic Hydrocarbons (C5-7)	70	S4UL
Aromatic Hydrocarbons (C7-8)	130	S4UL
Aromatic Hydrocarbons (C8-10)	34	S4UL
Aromatic Hydrocarbons (C10-12)	74	S4UL
Aromatic Hydrocarbons (C12-16)	140	S4UL
Aromatic Hydrocarbons (C16-21)	260	S4UL
Aromatic Hydrocarbons (C21-44)	1100	S4UL
MTBE	49	SGAC

Determinand	GAC (mg/kg)	Source*
Benzene	0.2	C4SL
Toluene	130	S4UL
Ethylbenzene	47	S4UL
o-xylene	60	S4UL
m-xylene	59	S4UL
p-xylene	56	S4UL
Chlorobenzene	0.46	S4UL
1,2-dichlorobenzene	23	S4UL
1,3-dichlorobenzene	0.40	S4UL
1,4-dichlorobenzene	61	S4UL
1,2,3-trichlorobenzene	1.5	S4UL
1,2,4-trichlorobenzene	2.6	S4UL
1,3,5-trichlorobenzene	0.33	S4UL
1,2,4-trimethylbenzene	0.35	SGAC
Phenol	280	S4UL
Chlorophenols (except pentachlorophenol)	0.87	S4UL
Pentachlorophenol	0.22	S4UL
2,4-dimethylphenol	19	SGAC
Total cresols (2-, 3- and 4-methylphenol)	80	SGAC
Trichloroethene (TCE)	0.0093	C4SL
Vinyl Chloride	0.0064	C4SL
Tetrachloroethene (PCE)	0.31	C4SL
Tetrachloromethane (Carbon Tetrachloride)	0.026	S4UL
Trichloromethane (Chloroform)	0.91	S4UL
1,2-dichloroethane	0.11	C4SL
1,1,1-trichloroethane	8.8	S4UL
1,1,2,2-tetrachloroethane (PCA)	1.6	S4UL
1,1,1,2-tetrachloroethane (PCA)	1.2	S4UL
cis-1,2-dichloroethene	0.46	C4SL
trans-1,2-dichloroethene	0.90	C4SL
Dichloromethane	0.58	SGAC
Aldrin	5.7	S4UL
Dieldrin	0.97	S4UL
Atrazine	3.3	S4UL
Bis (2-ethylhexyl) phthalate	280	SGAC
Butyl benzyl phthalate	1400	SGAC
Diethyl phthalate	120	SGAC
Di-n-butyl phthalate	13	SGAC
Di-n-octyl phthalate	2300	SGAC
PCBs	Detection	-
Asbestos	Absence	-
PFOA	0.0076	C4SL
PFOS	0.013	C4SL
PFHxS	0.0081	C4SL
PFNA	0.0073	C4SL

*Based on Category 4 Screening Levels (C4SLs, Defra 2014) in the first instance, or where no C4SL exists, then on Suitable For Use Levels (S4ULs, Land Quality Press, 2015, Unique publication S4UL3312) or Soil Generic Assessment Criteria (SGAC, CL:AIRE 2010).

The above table includes the GACs for many of the more commonly encountered contaminants. Other contaminants to be screened against appropriate GAC (if available) based on the same hierarchy.