Land Science

LAND SOUTH OF LOCK LANE, PARTRIDGE GREEN, HORSHAM, RH13 8EF

PHASE I CONTAMINATION ASSESSMENT

CROUDACE HOMES

28TH AUGUST 2024

LS7420

Site:	**LAND SOUTH OF LOCK LANE, PARTRIDGE GREEN, HORSHAM, RH13 8EF**
Title:	**PHASE I CONTAMINATION ASSESSMENT**
Project:	**RESIDENTIAL DEVELOPMENT OF 101 DWELLINGS**
Client:	**CROUDACE HOMES**
Contact:	**STRUTT & PARKER (ESTATE AGENT)**
Date:	**28TH AUGUST 2024**
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1.0 INTRODUCTION

1.1 General

Land Science was instructed to undertake a Phase I Contamination Assessment in relation to the proposed development of land south of Lock Lane, Partridge Green, Horsham, RH13 8EF. The location is shown on Figure 1, which is centred at grid reference TQ 1883 1871.

1.2 Client

The Client for this appointment was Croudace Homes. This report may only be used by this named client and their project team for the purposes set out and subject to the report conditions. It was understood that the Client did not own the site, and that this report was to support a pre-purchase appraisal.

1.3 Area Under Investigation

The area under investigation comprised a large field south of Lock Lane. The layout is indicated on Figure 2, and a walkover survey is presented in section 3.0. The area was approximately 4.90 hectares.

1.4 Proposed Development

The proposed development was understood to comprise a new housing estate with 101no. residential dwellings. It includes a cycle/footpath connecting through the site from Bines Road to Lock Lane. Figure 3 illustrates the layout of the proposed development. The findings of this report may not be valid if the proposed development is altered.

1.5 Previous Investigations

Originally, Land Science completed this desk study 9th August 2024, however, the Client has since slightly altered the site boundary, and proposed number and layout of residential dwellings. Therefore, this report is a reappraisal with updated figures, history of the site and revised Conceptual Site Model (CSM).

1.6 Scope of Work

The work carried out is described in detail in the following sections but in summary included:

- A phase I assessment desk study and site walkover survey.

The site walkover survey was conducted on the 2nd of August 2024.

1.7 Geo-Environmental Objectives

A preliminary phase I assessment was carried out, to identify potential sources of contamination, to develop a preliminary Conceptual Site Model (CSM) and to form the basis of a Preliminary Risk Assessment (PRA).

The report was required to assess risks associated with end users, the proposed redevelopment, adjacent land uses, and the wider environment, in the context of the planning regime.

1.8 Standards

Where practicable, the investigation was undertaken in accordance with the following primary standards and guidance:

- Land Contamination Risk Management (LCRM) Environment Agency 2020
- BS10175:2011+A1:2013, Investigation of Potentially Contaminated Sites.
- National Planning Policy Framework, July 2018.
- Building Regulations Approved Document C: Site preparation and resistance to contaminants and moisture, HM Government, July 2013.
- NHBC Standards Chapter 4.1: Land Quality - Managing Ground Conditions, 2019.

Other technical sources have been cited in respect of specific aspects of the investigation, as referenced throughout the text.

2.0 WALKOVER SURVEY

2.1 General

A walkover survey was carried out to order to provide an assessment of the existing site conditions and to identify potential areas of concern. A record of the inspection is shown in Appendix A, with photographs in Appendix B.

2.2 Site Description

In summary, the area under investigation comprised a well-kept approximately flat and level field that had been used for agricultural arable use.

Multiple large mature oak trees were in the field, which also had an overhead electrical cable with associated poles running through the site trending northeast to the southwest.

2.3 Neighbouring Land

The neighbouring land use to the north, west and south was primarily agricultural with prepared fields and farmhouses and barns. To the east the primary land use was residential and industrial, with residential dwellings and industrial units present.

2.4 Geo-Environmental Conditions

In terms of the environmental condition of the site, the following key features were identified:

- A rabbit burrow was observed on the site near the southern boundary along with potential rabbit droppings indicating that there are likely rabbits present on the site.
- A small eggshell was found during the walkover, possibly indicating the presence of nests and birds on the site.
- Large mature oak trees were identified on site approximately 10-20m in height, with six trees along the western boundary, six trees running north to south down the middle of the site, and two trees in the southwest corner. It was also noted that there were conifer and willow trees, 10-15m in height, next to the site boundary to the east.
- Along the southern boundary a ditch was observed, no water appeared to be present and there were no obvious signs of contamination. However, the ditch was noted to contain overgrown vegetation.

2.5 Geotechnical Conditions

In terms of the geotechnical condition of the site, the following key features were identified:

- A number of mature trees were noted in the vicinity of the proposed dwellings. These included species of oak, willow and conifer to heights estimated at around 10-20m.

3.0 DESK STUDY

3.1 General

A desk study was carried out to inform the preliminary conceptual understanding of the site and its setting, and to identify potential aspects of concern, in the context of the stated report objectives.

3.2 Historical Mapping

Various historical records were reviewed to assess potential historical land uses and activities that may impact on ground conditions at the site.

A set of historical ordnance survey maps was obtained from Envirocheck and a copy is presented in Appendix C. The following key features were noted:

- The earliest map dated 1875-1879 showed the main site comprised three main agricultural fields with part of a fourth to the southeast leading to a track (to Moat Farm), with a drainage channel running along the main southern border.
- By 1974 the main site was shown as two fields, divided by a north-south line (becoming an open field by 2000). The drainage channel was shown to flow towards the River Adur >750m west, flowing south.
- The latest map dated 2024 showed the site to be in a broadly similar layout to the present day, with no field divides (except to the southeast field) and no boundary to the west.

- Off site, the earliest map dated 1875-1879 showed the site surrounded by farms, with tracks/roads bordering to the north and east. The Moat Farm >100m south had a moat connected to the drainage ditch on site. Two structures were located along the southeastern perimeter known as Crouchers, with a small pond and well within ~30m. A smithy was located ~20m east with a few residential properties. A property was adjacent to the northeast border. Partridge Green station, railway line and sidings were located from ~60m northeast, trending northwest to southeast. The road was raised via an embankment, crossing the railway line. A pond was located >15m north of the site.
- By 1897 there was a small sand pit located along the southeast border and a further pond ~20m east. By 1998-1899 Brick Works were located >200m northeast (later shown as Pottery Works).
- By 1911 a further three ponds were located >15m and >50m north and >150m west of the site. The station sidings showed a Goods Shed.
- By 1974 the railway was no longer shown (dismantled by 1980-1982), however there were Works buildings from >120m northeast. There was a Forge and Engineering Works >20m east of site. Residential areas were expanding, with two further residential dwellings and an allotment adjacent the southeast border
- By 1978-1991 the additional Works buildings had been developed to the northeast and extended southwest to within ~30m of site (and extended in a southeast direction in the latest maps).
- The historical map set included an aerial photograph dated 1999. The imagery showed the site to be in a broadly similar layout to the present day, with spaced trees trending north-south in two approximate lines. The southern border had further trees before an open field

to the south/southeast before the road. The western boundary showed no site border with the field extending further west.

3.3 Aerial Imagery

Recent aerial photography covering the site was examined using Google Earth Pro. The imagery showed that the site has not changed since 2001 with the fields being used for agricultural purposes, such as the grass being cut and bailed.

3.4 Current Industrial Land Use Data

The desk study included a search of contemporary land use records from various databases. Such land uses may impact on the condition of the site and the vicinity. The following significant land use information was identified:

- Pollution Incident to Controlled Waters – two on site in northeastern quarter:
  - Water company sewage - surface water outfall with oils/other oil pollutant dated 1997, classed as a minor incident (located beside Lock Lane).
  - Miscellaneous urban runoff of grey water in ditch dated 1996, classed as a minor incident.

- Pollution Incident to Controlled Waters – three off site – 35m north, 50m northeast and 58m west – all classed as minor incidents.

- Discharge Consent – three off site:
  - One 23m northwest - domestic property with sewage discharges for final/treated effluent to stream/river.
  - Two to northeast – nearest being 52m northeast – industrial development with discharge of other matter – surface water into stream/river.

- Potentially Infilled Land (non-water) - off site 153m northeast – unknown filled ground (pit, quarry etc.)

Contemporary Trade Directory Entries:

- British International Industries, Aviation Engineers (active) – off site 47m northeast
- Bus & Coach Operators & Stations (inactive) - off site 176m northeast
- Albion Plating, Metal Finishing Services (active) – off site 178m northeast
- KARS – Garage Services (active) off site 206m northeast
- Pretty's Garage, Petrol Station (active) – off site 229m north

Whilst other records were identified, these were unlikely to be significant in terms of this project due to a combination of their size, distance from the site, and the intervening geology and hydrogeology.

3.5 Ground Conditions

A preliminary ground model was derived for the site by based on a combination of various sources including published maps, borehole records, previous investigations, and the site history. In summary, the following potential ground model was identified:

Strata	Approximate Depth (mbgl)	Summary Description
Made Ground	< 1.00	The site has been subject to previous development and there is a potential for construction and demolition wastes, imported fill materials, and zones of disturbed ground, etc.
Weald Clay Formation (mudstone, locally sandstone)	To depth	Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine to medium grained sandstones, including calcareous sandstone, shelly limestones and clay ironstones.

In addition, groundwater was anticipated, as follows:

- Perched water – in granular soils upon cohesive soil.
- Water table depth: The groundwater table is expected to be encountered below 1.30mbgl.

3.6 Geological Hazards

The desk study included searches of geological hazards, with none identified as moderate or above for the site.

A search of various databases for coal mining, mining, brine compensation, and natural cavities was carried-out. No relevant features were identified.

3.7 Environmental Setting

The site lies in the following groundwater setting:

- Superficial aquifer: None - No superficial strata were classified.
- Bedrock aquifer: The Weald Clay – sandstone (limited seams on site) strata was classified as a Secondary A - Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
- Bedrock aquifer: The Weald Clay – mudstone (majority of site) was classified as an Unproductive Strata - Low permeability strata that have negligible significance for water supply or river base flow.
- Source protection zone: None - no groundwater Source Protection Zones were identified on site or in the vicinity.
- Flooding from Rivers and Sea: Zone 1 Low Probability - Land having a less than 1 in 1,000 annual probability of river or sea flooding.
- Surface water flooding on site: Very low risk - each year this area has a chance of flooding of less than 0.1%. Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding. Flooding would occur in northeastern corner and along southern border.

- Groundwater flooding on site: Flooding from groundwater is unlikely in this area. However, the BGS records potential for groundwater flooding 18m to the southwest.
- Nitrate Vulnerability Zone: adjacent from 2m east of the site.
- Nearest Surface Water: on site in southwest quarter; this was anticipated to be the ditch that was noted to be dry on the walkover.

3.8 Radon Gas

The requirement for Radon Protection Measures (RPM) has been assessed in accordance with BRE 211:2015. Public Health England and the BGS estimate the potential for radon and the requirement for Radon Protection Measures on site as follows:

- Radon probability: Not at risk - less than 1% of homes are estimated by PHE to exceed the threshold for Radon gas in residential dwellings.
- Radon Protection Measures (RPM): No Radon protection is required for new dwellings or extensions constructed at this location.

3.9 UXO Risk Assessment

Free online maps suggest the risk from UXO might be Low. As such, no further assessment is considered necessary at this stage.

4.0 CONCEPTUAL SITE MODEL (CSM)

4.1 Source-Pathway-Receptor (SPR) Model

The assessment of potential contamination risks follows a Source-Pathway-Receptor (SPR) approach, following established guidance and best practice. The principle of primary and secondary sources has been adopted:

- A **primary source** for instance a leaking tank or drainage, industrial activity, buried fill materials, etc, identified as part of the desk study and site walkover.

- A **secondary source** is the environmental media (or phases) in which any resulting contamination may occur, being soils, ground gases, volatile vapours, and groundwater:

Secondary source	Summary
Soil	Soils (Made Ground) contaminated with materials such as ash, clinker, bitumen, refuse, wastes, asbestos, etc [Endogenic] or soils contaminated by discharges, spillage, drainage, run-off, migration etc of contaminants from diffuse or point sources [Anthropogenic].
Ground water	Mobile contaminants entering groundwater, being either perched water (impermeable horizons such as clays or buried structures) or as a water table (more persistent water bodies within productive strata).
Volatile vapours	Volatile or semi-volatile compounds generating vapours which exist in a gas phase and may be generated from soils, groundwater or directly from storage such as underground tanks.
Ground gases	Ground gases occurring from a variety of natural and man-made sources, principally from the decomposition of waste materials, organic matter, organic contaminants. Examples include landfill sites, alluvium, and mine workings etc.

4.2 Qualitative Risk Assessment Framework

A qualitative estimate of risk associated with the identified source-pathway-receptor linkages has been made. Each source, pathway and receptor in each linkage is given a rating from 0-5, and the overall rating for the linkage is expressed as a multiple of the three numbers. The overall risk ratings are concluded in the next chapter (Preliminary Risk Assessment).

Rating	Source	Pathway	Receptor	SPR Linkage
Unlikely	0	0	0	0
Very Low	1	1	1	1-3
Low	2	2	2	4-17
Moderate	3	3	3	18-48
High	4	4	4	49-100
Very high	5	5	5	100+

The scoring is based on professional judgement and qualitative assessment of various factors:

Source - Whether it is on-site or off-site, the distance from the site, the age and time period, the history and evolution, whether it has been redeveloped and when, the overall magnitude or extent, any existing data or observations. Sources are identified from the conceptual site model.

Pathway - Proximity and relationship to the associated receptor, frequency, the ground conditions, flow directions, migration pathways. Pathways may vary between each source and each receptor.

Receptor - Direct or indirect effects, human health or non-human receptor, age classes, exposure duration and frequency, types of activity, materials, existing evidence of harm, quality of the receptor and significance of any harm. This will depend on any existing or proposed site uses.

Potential sources and Receptors are identified first, before identifying whether any active realistic pathways exist between them.

4.3 Primary Sources

Potential sources of contamination were identified and rated as follows:

Primary sources	Soils	Ground Water	Vapours	Ground Gases
Made Ground <1m - localised only	Low	Very Low	Very Low	Unlikely
Agricultural land (fields)	Very Low	Very Low	Very Low	Unlikely
Railway land / sidings (off site)	Unlikely	Unlikely	Unlikely	Unlikely
Petrol filling stations (off site)	Unlikely	Unlikely	Unlikely	Unlikely
OVERALL RATING	Low	Very low	Very low	Unlikely

Made Ground may be present on site from past ground works, compacted trackways or field preparation. Although given the site history and the nature of the site, the composition of the Made Ground is not expected to be particularly onerous. These materials may contain a wide range of potential contaminants including metals, non-metals and organic contaminants. The likelihood of soil contamination is therefore rated to be Low. Contaminants may be mobile and leach out into ground water, and water was unexpected in the mudstone of the Weald Clay; this has been rated as Very Low. The age and composition of Made Ground was such that the potential for significant generation of organic vapours was Very Low. The depth of Made Ground was not anticipated to be greater than 1.00m and therefore was Unlikely to be a significant source of ground gases.

The rating of the agricultural fields is however Very Low, due to the use of artificial pesticides/herbicides being unlikely. Contaminants may be mobile and leach out into groundwater, however, water was unexpected in the mudstone of the Weald Clay; this has been rated as Very Low. The nature of agricultural use of fuels meant that the potential for significant generation of organic vapours was Very Low. There is potential for animal burials contributing to the potential of ground gases, but this rating is Unlikely.

Whilst there are possible sources surrounding the site including the railway/sidings and petrol filling station it is considered that the distance and geology would limit the migration of possible contamination to Unlikely for soils, groundwater, vapours and gases.

4.4 Potential Receptors

The following potential receptors associated with the site and the proposed development have been considered in this report:

Receptor	Rating	Justification
End Users	High	Occupants of the proposed development. The proposed development comprised 101 residential houses with private gardens and open spaces.
Adjacent Land	Very low	Sensitive land uses identified locally. The site was surrounded by agricultural fields with residential dwellings adjacent to the southeast.
Soft Landscaping	Moderate	Areas of planting including lawns, shrubs, trees, etc. New private garden areas were to be formed from existing agricultural land. No evidence of existing plant phytotoxicity was observed during the walkover and was unlikely to be a significant issue.
Structural Concrete	Low	New foundations etc. cast in contact with the ground. The development was anticipated to include shallow foundations.
Water Supply Pipework	Low	Water supplies may be damaged or tainted when mains are laid in contaminated ground. New potable water mains are to be laid.
Groundwater	Low	The site overlies the Weald Clay Formation with the majority as mudstone classified as Unproductive Strata and is negligibly permeable therefore unlikely to be used for potable or commercial abstractions.
Surface Water	Low	Surface water in lakes and rivers etc. Surface water was identified on site as a drainage channel along the southern border.

4.5 Receptors Excluded

The following potential receptors were excluded from the assessment as they are covered by other legislative controls and are outside the remit of this report.

- Ecological receptors such as statutory protected species or wildlife areas. An assessment of such risks was outside the scope of this report.
- Site workers such as those involved in construction work or future maintenance. Any risks posed to site workers would be controlled through Health & Safety legislation, including the CDM and COSHH regulations etc.

5.0 PRELIMINARY RISK ASSESSMENT (PRA)

5.1 SPR Linkages and Risk Ratings

The source-pathway-receptor linkages identified are summarised below:

Soils	Pathways	Rating	Receptor	Rating	Overall Rating
Low	Dermal contact with soil and soil-borne dust	Very high	End Users	High	**Moderate**
Low	Ingestion of soil and soil-borne dust	Very high	End Users	High	**Moderate**
Low	Inhalation of soil-borne dust	Very high	End Users	High	**Moderate**
Low	Consumption of homegrown produce	High	End Users	High	**Moderate**
Low	Inhalation of soil-borne dust	Moderate	Adjacent Land	Very Low	**Low**
Low	Plant uptake, phytotoxic effects	High	Planting	Moderate	**Moderate**
Low	Chemical attack	High	Concrete	Low	**Low**
Low	Chemical attack	High	Pipework	Low	**Low**
Low	Leaching-out, migration to water table	High	Groundwater	Low	**Low**
Low	Leaching-out, migration to water bodies	High	Surface Water	Low	**Low**

Ground water	Pathways	Rating	Receptor	Rating	Overall Rating
Very low	Direct contact	Unlikely	End Users	High	**Unlikely**
Very low	Direct contact	Unlikely	Adjacent Land	Very Low	**Unlikely**
Very low	Plant uptake, phytotoxic effects	Very Low	Planting	Moderate	**Very low**
Very low	Chemical attack	Very high	Concrete	Low	**Low**
Very low	Chemical attack	Moderate	Pipework	Low	**Low**
Very low	Migration to Controlled Water receptor	Low	Groundwater	Low	**Low**
Very low	Lateral migration to water bodies	Moderate	Surface Water	Low	**Low**

Vapours	Pathways	Rating	Receptor	Rating	Overall Rating
Very low	Inhalation, ignition	High	End Users	High	**Low**
Very low	Inhalation, ignition	High	Adjacent Land	Very Low	**Low**
Very low	Root asphyxiation, phytotoxic effects	High	Planting	Moderate	**Low**
Very low	Not a significant hazard	-	Concrete	Low	**Unlikely**
Very low	Chemical attack	High	Pipework	Low	**Low**
Very low	Not a significant hazard	-	Groundwater	Low	**Unlikely**
Very low	Not a significant hazard	-	Surface Water	Low	**Unlikely**

Ground Gasses	Pathways	Rating	Receptor	Rating	Overall Rating
Unlikely	Inhalation, ignition	High	End Users	High	**Unlikely**
Unlikely	Inhalation, ignition	Unlikely	Adjacent Land	Very Low	**Unlikely**
Unlikely	Root asphyxiation, phytotoxic effects	Moderate	Planting	Moderate	**Unlikely**

Unlikely	Not a significant hazard	-	Concrete	Low	**Unlikely**
Unlikely	Not a significant hazard	-	Pipework	Low	**Unlikely**
Unlikely	Not a significant hazard	-	Groundwater	Low	**Unlikely**
Unlikely	Not a significant hazard	-	Surface Water	Low	**Unlikely**

5.2 Other Factors

The following other areas of possible concern were identified, but were outside the geo-environmental risk assessment:

Site managers are responsible for the safety of persons in their employ under a variety of instruments including the CDM regulations and Health & Safety at Work Act. In terms of working on contaminated sites, guidance can be sought from the CIRIA publication entitled "A Guide for Safe Working on Contaminated Sites". Any work in confined spaces confined spaces should only be carried out following appropriate risk assessment. Detailed risk assessment for workers is outside the scope of this report.

Damaging, disturbing or removing protected species can result in prosecution under a range of environmental legislation. Potential impacts on the ecological environment include:

- Disturbance of birds, badgers, bats and other protected species
- Removal and fragmentation of habitats
- Disturbance to aquatic wildlife and water quality
- Disturbance to wildlife from noise and vibration
- Damage to trees and hedgerows.

It is recommended that the advice of an appropriately qualified ecologist should be sought prior to undertaking any works.

6.0 SUMMARY PHASE I ASSESSMENT

6.1 Qualitative Ratings

Overall, the level of risk ranged between Unlikely and Moderate. Consequently, a **Moderate** level of risk has been assigned to the site in respect of the proposed development. This is primarily due to the potential Made Ground, agricultural land use and proposed residential end use.

6.2 Recommendations

It would be necessary to undertake basic ground investigation works, which may include;

- Shallow boreholes, or trial pits, to assess the composition and depth of any Made Ground and any field evidence of contamination into the underlying soils.
- Selected samples (including materials bearing field evidence of contamination) should be sent for laboratory analysis. The main analytical suite is identified below.
- Soil samples should be screened for vapours using a Photoionisation Detector (PID).
- Positions should be located in areas of concern; i.e. targeted in receptor sensitive locations such as in proposed garden areas, below the footprint dwellings, in the location of buried services, etc.
- Positions should be located adjacent to the site boundaries in the southeastern area, to evaluate the potential for contamination to have migrated laterally off site and impact on adjacent land users.

The analytical suite, based on the known site history and walkover survey, should include:

- General parameters: Acidity (pH), fraction of organic carbon.
- A selection of shallow samples should be screened for pesticides and herbicides.
- Metals; Arsenic, Cadmium, Chromium (total), Lead, Mercury, Selenium, Boron, Copper, Nickel and Zinc.
- Non-metals: water soluble Sulphate, Sulphide, total Cyanide.
- Targeted organic parameters; TPH, BTEX, Speciated PAHs, VOCs and SVOCs, scheduled based on PID screening and field evidence etc.
- Visual asbestos screening of all Made Ground samples. Where possible asbestos fibres or ACMs are identified, these should be examined under a microscope to determine type.

Further positions may be required, additional samples analysed or additional determinands added to the analysis, as appropriate, based on any field evidence of possible contamination encountered.

In addition, the requirement for Waste Acceptance Criteria (WAC) testing should be considered to categorise soils in terms of disposal.

It would be prudent to confirm the scope of ground investigation works with the Local Authority and other stakeholders before carrying out these works.

REFERENCES

A number of technical references have been referred to in the preparation of this document, including:

- Smith, I. (2014) Smith's Elements of Sil Mechanics. Chichester. Wiley Blackwell. 9th Edition.
- Highways England 2009. Interim Advice Note 73/06 revision 1: Design Guidance for Road Pavement foundations (draft HD25)
- BRE Design Guide 365. Soakaway design ("DG365")
- Radon: Guidance on protective measures for new buildings, BRE Report BR 211, 2015 2ND edition
- Groundwater protection: Principles and practice (GP3) August 2013 Version 1.1
- Revised EU Waste Framework Directive 2008 2008/98/EC [transposed into English law under The Waste (England and Wales) Regulations 2011]
- European Community (EC) Directive 1999/31/EC [transposed into English law under the Landfill (England and Wales) Regulations 2002]
- Defining Waste Recovery - Permanent Deposit of Waste on Land, EPR13 v1.0, EA 2010
- The definition of waste: Development Industry Code of Practice, v2, CL:AIRE 2011
- Guidance on the classification and assessment of waste Technical Guidance WM3 ("WM3") EA publication (1st edition 2015)

REPORT CONDITIONS

The Client

This report may also be used only by the client named in section 1 and their appointed project team for the purpose of design, obtaining planning, building regulations approval, and in connection with finance. This report must not be used by any other persons or for other purposes without express written agreement of Land Science.

General

Land Science takes all reasonable professional care in preparation of this report, using current standards and industry practice. However, the evaluation of ground conditions depends on an interpretation and extrapolation of the conditions revealed by a limited data set. The level of risk is related to the extent of investigation and no site is ever free of risk. The client should understand their risks and liabilities. We accept no liability whatsoever in respect of:

- The scope, extent or design of an investigation.
- Any conditions not directly revealed by the investigation.
- Published standards or methodologies used or adopted in this report.
- The opinion of any other party including any regulator, authority or stakeholder.
- Any dispute, claim or consequential loss arising from any findings of this report.
- Third party information and data.

This report relates solely to ground-related matters as set out in the objectives and makes no representation on other matters such as ecology, arboriculture, invasive plant species, the condition of buildings and structures, hazardous building materials such as insulation or asbestos, the locations of boundaries, unexploded ordnance, and or planning constraints etc. Further reports should be commissioned in this respect as appropriate.

Regulators and Approvals

This (and any other) report should be submitted to relevant authorities for their own assessments and to provide their approval or comments accordingly. This should be in good time before commencing on site in case additional work is to be carried out.

Standards, technical guidance and regulatory positions change over time and which may therefore affect the findings and recommendations made in this report; this should be verified by the client prior to any critical project milestones. Where this information is used in design, the designer should verify that the information is appropriate and has been used correctly.

Variations with time

The report relates to conditions revealed at the time of the investigation and any monitoring visits. Some parameters may vary over time or seasonally; groundwater levels, ground gas compositions, or concentrations of contaminants are particularly variable in this respect. Further monitoring or verification should be considered as appropriate.

GLOSSARY OF TERMS

ACM	Asbestos Containing Material
BGS	British Geological Survey
BRE	Building Research Establishment
BS	British Standard
C4SL	Category 4 Screening Level
CBR	California Bearing Ratio
CDM	Construction Design and Management regulations
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment model
CSM	Conceptual Site Model
EA	Environment Agency
EQS	Environmental Quality Standards
FOC	Fraction of Organic Carbon
GAC	Generic Assessment Criterion
GQRA	Generic Quantitative Risk Assessment
mbgl	Meters Below Ground Level
NHBC	National House Building Council
mOD	Metres above Ordnance Datum
PAH's	Polycyclic Aromatic Hydrocarbons
PHE	Public Health England
PID	Photo-Ionisation Detector
PQRA	Preliminary Quantitative Risk Assessment
PSD	Particle Size Distribution Test
RMS	Remediation Method Statement
S4UL	Suitable for Use Level
SOM	Soil Organic Matter
SPZ	Source Protection Zone
SPT	Standard Penetration Test
SSSI	Sites of Special Scientific Interest
ST-WEL	Short Term Workplace Exposure Limit
SVOC's	Semi-Volatile Organic Compounds
TPH	Total Petroleum Hydrocarbons
TRRL / TRL	Transport Road Research Laboratory
TWA-WEL	Time Weighted Average Workplace Exposure Limit
UK HBF	United Kingdom House Building Federation
VOC's	Volatile Organic Compounds
WAC	Waste Acceptance Criteria