A PHASE II CONTAMINATION ASSESSMENT AT:

FOXES LANE, MENDHAM, HARLESTON, IP20 0PE

CLIENT: **Alyson Waller**

REFERENCE: **MSH/23.019/PhaseII**

DATE: **22 February 2023**

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1. INTRODUCTION

A F Howland Associates Limited was instructed by Alyson Waller (the "Client") to carry out a Phase II Contamination Assessment at Foxes Lane, Mendham, Harleston, IP20 0PE (Drawing 23.019/01). It is proposed to develop the site for residential use and a proposed layout was provided on Durrants Building Consultancy drawing 303468/20-003 appended to this report.

This report provides the factual details of the fieldwork and laboratory testing undertaken during the investigation and discusses the findings with respect to the proposed development. The report follows on from a Phase I Desk Study report (AFHA, 2019) which should be referred to for the background data pertinent to the scheme. It was prepared for the use of the Client and its advisors. Other parties using the contained information do so at their own risk and any duty of care to those parties is specifically excluded. The report has been carried out in general accordance with accepted best practice and methodologies (BSI, 2017; Environment Agency, 2020; DCLG, 2010).

2. BACKGROUND

2.1 SITE DESCRIPTION

The site was located within a rural area south of the village of Mendham and approximately 3 km south east of Harleston. It was centred at National Grid reference 627755, 281767 and was at an elevation of around 44 m above Ordnance Datum (aOD).

The site comprised a large rectangular barn constructed with blockwork with a corrugated cement board roof and its surrounds. There were other barns adjacent to the north of the site but these are not part of the development.

2.2 GEOLOGY

Geological mapping (BGS, 2023) indicates the site to be underlain by bedrock geology of the Crag Group overlain by a sequence of glacial superficial deposits with the Lowestoft Formation mapped at surface.

2.3 SITE HISTORY

The barn was constructed during the 1960s and was previously used to store and process grain. In the immediate surrounding area, there have been barns since a least the late nineteenth century (AFHA, 2019).

3. INTRUSIVE INVESTIGATION

3.1 FIELDWORK

The fieldwork was carried out on the 18 January 2023 and comprised eight trial pits.

The exploratory hole positions were set out in general accordance with the requirements of the Client and to target areas of high potential contamination exposure of the finished development. The locations are shown on Drawing 23.019/02. The National Grid co-ordinates, and the elevation of the hole positions relative to Ordnance Datum, were measured using a Hemisphere S320 VRS GPS (RTK) system by A F Howland Associates Limited. A cable avoidance tool (CAT) was used to sweep the exploratory hole positions and the immediate surrounding area to locate any potential services and the location adjusted as necessary.

Sampling and soil descriptions were carried out in accordance with BS EN1997-2:2007 Eurocode 7 and its UK National Annex supported by BS 5930:2015+A1:2020. Representative specialist environmental samples were collected for subsequent laboratory analysis. The environmental samples were placed in dedicated containers, stored in cool boxes and delivered to a UKAS accredited facility for analysis of possible contaminants.

The **trial pits**, referenced TP01 to TP08, were machine excavated to depths of between 1.0 and 1.1 m depth. They were logged *in situ* to about 1.0 m below ground level, with soil below this depth described at surface from excavated material. The trial pits were monitored for **groundwater** ingress during advance and seepages were observed within most of the trial pits. Upon completion all trial pits were backfilled with arisings.

Details of the strata encountered, the sampling and laboratory testing are shown on records appended to this report.

3.2 GROUND CONDITIONS

3.2.1 Soil

The investigation found topsoil or made ground underlain by natural sand with clay present at depth.

The **made ground** was recorded within trial pits TP01 and TP02, both located adjacent to the barn. It was found to depths of 0.50 and 0.70 m bgl and comprised dark brown slightly clayey silty sand with occasional flint gravel and fragments of brick.

Topsoil was found elsewhere, to between 0.15 and 0.50 m bgl. The topsoil comprised dark brown slightly clayey silty sand with occasional flint gravel.

The underlying **natural soils** initially comprised orange brown silty, sometimes clayey, slightly gravelly sand. Towards the base of some of the trial pits, light brown, grey and orange mottled, silty, slightly gravelly clay was present. This sequence of natural soils is considered to represent the mapped Lowestoft Formation.

3.2.2 Groundwater

Groundwater was encountered during fieldwork at depths ranging between 0.70 and 0.95 m bgl. Only two of the trial pits positions were dry and these were both located in the east of the site. However, observations reported during advancement of the holes will have been affected by the permeability of the ground, the rate of progress of the hole and the techniques in operation. The general procedures used do not allow precise measurements of the groundwater conditions, but give only a general guide to the overall situation. Fluctuations in any groundwater table will also occur as a result of seasonal or climatic effects, as well as other outside influences.

The groundwater encountered is not expected to represent the regional groundwater table but rather localised perched groundwater within the sequence of superficial deposits.

3.3 LABORATORY TESTING

The programme of laboratory testing included analysis of two samples of made ground, two sample of topsoil and six samples of the underlying natural soil. The following suite of generic contaminants was tested for in all samples, in line with the key contaminants associated with the historical use of the site;

- Heavy metals/metalloids (antimony, arsenic, beryllium, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc);
- Cyanide (total, free, and complex) and thiocyanate;
- Phenol (total monohydric);

- Polycyclic aromatic hydrocarbons (PAH) (total and speciated - USEPA-16) and coronene;
- BTEX (benzene, toluene, ethylbenzene and xylene) and MTBE (methyl tertiary butyl ether);
- Petroleum hydrocarbons (Criteria Working Group bandings between C_5 and C_{44});
- Soil organic matter content (soils only to assist with selection of appropriate contamination criteria).

Each sample was subject to asbestos screening and quantification where fibres in soil were detected.

The results of the laboratory testing are provided in the analytical reports referenced 23-00732 and 23-01398 presented in Appendix C.

4. QUANTITATIVE CONTAMINATION RISK ASSESSMENT

4.1 GENERAL

It is proposed to convert the existing barn into two dwellings with associated private gardens, soft landscaping and new hardstanding for vehicle access and parking. The proposals are presented on Durrants Building Consultancy drawing 303468/20-003 appended to this report.

The Phase I Contamination Assessment (AFHA, 2019) concluded that agricultural use of the site and surrounding area may have introduced localised areas of contamination and this represented a moderate risk to future site users. No significant sources of ground gas were identified. The risk to controlled waters was considered to be low to medium.

During the walkover for the Phase I Contamination Assessment stacks of cement board, thought to be asbestos containing material (ACM), were present in the area immediately to the north of the barn and within an area of grass to the east of the barn. Occasional cement board fragments were also observed within the exposed soils north of the barn. By the time of the fieldwork, the cement board had been picked from the site surface and it was stored ready for collection by a licenced contractor for suitable off-site disposal.

The intrusive investigation recorded topsoil or made ground underlain by natural sand with clay present at depth. The made ground was only found adjacent to the barn. No evidence of significant contamination such as staining or odours, bulk or fibrous materials were observed within the trial pits during fieldwork.

The quantitative risk assessment presented below is intended to establish the potential risk to human end-users, construction workers and controlled waters. Human health risk is based on long-term chronic exposure pathways, and is not directly applicable to short-term contact such as that experienced by construction workers. Nevertheless, without any current UK guidelines that allow an assessment of the potential risk to workers from contaminated soils the approaches used provide an applicable assessment criteria.

4.2 HUMAN HEALTH ASSESSMENT

4.2.1 Methodology

In order to provide an assessment of the condition of the site as part of the development, the soil contamination results have been assessed against generic assessment criteria (GAC) developed for various land-use scenarios (EA, 2009c and LQM, 2015).

Based on the proposals the scenario used within this assessment is a "residential with plant uptake" end-use. This assumes a typical residential property with a private garden including flower beds and a small vegetable patch (EA, 2009c).

4.2.2 Generic Assessment Criteria

The GAC used in the assessment have been produced by Land Quality Management Limited (LQM) in association with the Chartered Institute of Environmental Health (CIEH) (LQM, 2015) and which are referred to as 'suitable for use levels' (S4ULs). The S4ULs provide GAC values from a risk based approach to human exposure through the pathways of inhalation, ingestion, and dermal contact which have been derived using the CLEA software version 1.06 and Environment Agency guidance (Environment Agency, 2009a, 2009b, and 2009c). A soil organic matter content of 1.0% has been assumed based on the results of laboratory testing. When relevant S4ULs were unavailable, such as in the case of antimony, lead, and cyanide, the results were compared to alternative screening values. For antimony and cyanide, soil screening values (SSVs) have been derived by WS Atkins Consultants Limited (W S Atkins, 2017), using the ATRISKsoil programme. For lead, Category 4 Screening Levels (C4SLs) were used, which have been developed by Department for Environment, Food and Rural Affairs (DEFRA, 2014), using the Environment Agency Contaminated Land Exposure Assessment (CLEA) model. The derivation of C4SLs uses the concept of a low level of toxicological concern (LLTC), which represents the estimated concentration of a contaminant that would pose an 'acceptably low' risk to human health. These allow a higher (though still 'acceptably low') level of risk while maintaining a precautionary approach.

The risk from the release of asbestos fibres from asbestos containing soil (ACS)[1] has been considered in accordance with the approach provided in CIRIA C733 (2014). Asbestos refers to six fibrous minerals that are known to cause serious health effects when inhaled

[1] Asbestos containing soil (ACS) is any soil found to contain asbestos fibres and/or bulk asbestos containing material (ACM)

into the lung. The main forms are chrysotile (white asbestos), amosite (brown asbestos) and crocidolite (blue asbestos)[2].

4.2.3 Assessment Results

The results can be summarised as follows:

- Concentrations of all heavy metals/metalloids were below their respective GAC.
- Concentrations of PAH were mostly below the method detection limit (MDL) and all below their respective GAC.
- Concentrations of TPH, BTEX, MTBE, cyanide and phenols were all below the MDL.
- Asbestos fibres were found within samples of made ground. The asbestos was recorded as bundle of amosite and chrysotile fibres and the fibre concentration has been quantified at <0.001 %.

4.2.4 Discussion

Loose fibres of chrysotile and amosite asbestos were detected within the made ground. Made ground was only found within the trial pits adjacent to the barn.

There is no known safe threshold of exposure to airborne asbestos fibres, but the risk is proportional to the level of exposure.

Exposure to asbestos is expressed in terms of the concentration of asbestos in air (fibres/ml) and the duration of exposure (hours) giving a cumulative exposure (fibres/ml.hours). The quantitative asbestos risk assessment outlined below has been carried out following the empirical exposure assessment approach presented in CIRIA C733. This uses asbestos fibre quantity in soil to predict cumulative exposures to airborne asbestos fibres together with risk prediction models to provide an estimate of the likelihood that such exposures would cause, or contribute to the cause of, asbestos related diseases. The risk is a function of the composition and quantity of fibres released from the soil, the exposure scenario and the critical receptor. The exposure parameters used in the assessment are commensurate with those for a standard “residential” land-use scenario (EA, 2009a), and the estimated excess lifetime cancer risks (ELCR) are presented and discussed below.

[2] The colours associated with the different asbestos types are apparent in their natural state and should not be used to identify asbestos in soils which is likely to be discoloured by the surrounding matrix

The model output is presented in Appendix D. This indicates that exposure to loose amosite and chrysotile asbestos fibre concentrations in a residential setting with a maximum soil concentration of 0.001% generally results in a "probably insignificant" excess lifetime cancer risk and a 6 in 100 000 adjusted lifetime risk for mesothelioma.

This risk can be considered in context based on published tolerable risks from other common hazards (HSE, 2001), such as:

- Annual risk of death from a road accident 1 in 16,800 (approximately 6 in 100,000).
- Annual risk of death to workers in the construction industry 1 in 17,000 (approximately 6 in 100,000).
- Annual risk of lung cancer caused by radon in dwellings 1 in 29,000 (approximately 3.5 in 100,000).

It is difficult to compare a lifetime excess risk with an annual risk but what is apparent is that the tolerable risks listed above present a much higher risk than the risk of mesothelioma from asbestos fibres within the made ground at this site[3]. This level of risk is generally considered as acceptable but the measures discussed in Section 5 would further reduce this risk.

Further to the quantitative risk from airborne asbestos fibres, there needs to be a number of mechanisms in place for asbestos fibres to become airborne before there is a likelihood of end-user exposure. The factors influencing the generation of airborne asbestos fibres include; development proposals, asbestos type and form, distribution, ground conditions, existing or proposed ground cover and likelihood of disturbance. These are discussed below.

Development Proposals

The development includes residential dwellings with private gardens and hard surfacing. The garden areas are to include a combination of grass and bare soil. The covering of vegetation will minimise the exposure to the underlying soil, reduce the potential for soil disturbance and the likelihood of dust generation and asbestos fibre release.

[3] The lifetime risk for death by road accident in the UK is estimated as 1 in 240 (various online sources).

Fibre Type & Depth

The release of fibres from soil has been found to vary based on the type of fibre present. Work by Addison et al. (1988) suggests that chrysotile fibres are released the least readily from soil whilst crocidolite fibres are released the most. This was based on tests on three soil types (sandy, intermediate and clay) and variable moisture content. Only chrysotile fibres have been identified during laboratory analysis.

In the absence of significant physical disturbance, the release of asbestos fibres from soils will only occur where the fibres are present at the soil-air interface and the soil is sufficiently dry to generate airborne dust. Asbestos fibres which are buried, or are below the soil surface, will pose a lower risk as these materials cannot directly release airborne fibres (CIRIA, 2014). It is acknowledged that disturbance due to animals or through gardening may bring fibres to the surface. However, the made ground is expected to remain below a layer of vegetation in the long term.

Soil Characteristics

Fibre release is most likely to occur from coarse soils, with fine clay dominated soils releasing asbestos fibres less readily, based on research by Addison et al., 1988. During the research, three soil types were tested; a sandy soil, an intermediate soil and a clay dominated soil. Generally, the sandy soil produced the highest airborne fibre concentrations whilst the intermediate and clay dominated soils released 40% and 60% less fibres respectively. The made ground was found to comprise a clayey gravelly sand and is considered to represent an intermediate soil.

Furthermore, asbestos fibre release occurs mainly when the soil moisture content falls below 10%, with significant dust generation possible below 5%. Research undertaken by Addison et al. (1988) suggests that the strongest control on fibre release is the moisture content of soils, which demonstrated an exponential relationship. If 100% of fibres are released at 0% moisture, then an increase to 5% moisture reduced the release of fibres by 85 – 90%. No fibre release was observed above 15% moisture. The guidance contained in CIRIA C733 suggests that in the UK, most soils are not likely fall below 5% moisture, even during prolonged dry periods. However, the immediate soil surface may fall below this, allowing dust generation. This will vary rapidly depending on the local weather conditions and the activities of the end-user, as lawns and planting areas are likely to be watered during dry periods. Bare dry soils are the most likely to release asbestos fibres and considering the proposals here, there will be limited areas where these exist. Surface

vegetation will reduce moisture loss from the soil and prevent dust generation from wind action or light disturbance such as walking.

Receptors

Long term environmental exposure of end-users to airborne asbestos fibres depends on the nature of the land use and the frequency and intensity of any physical disturbance. Such activities may include gardening or children playing. The deposition of soil onto hardstanding is also possible. Once deposited, the soil will readily dry out and is more likely to undergo significant disturbance from activities such as sweeping or the action of the wind and therefore generate dust. Whilst this is possible, the likelihood of tracking the soil containing asbestos fibres onto hardstanding is significantly reduced by the vegetation covering and the isolated and low quantity of fibres.

4.3 CONSTRUCTION WORKER ASSESSMENT

An assessment of risk to construction workers suggests that only chemical contamination of acute toxicity might represent an unacceptable risk to the health of construction workers but which should be managed through health and safety procedures, such as wearing gloves and washing hands before eating.

Asbestos fibres were detected in the made ground. The asbestos was recorded as bundles of chrysotile and amosite fibres. Any residual risk from exposure to asbestos can be controlled using simple measures discussed in Section 5.

4.4 CONTROLLED WATERS RISK ASSESSMENT

The site is underlain by superficial deposits of the Lowestoft Formation; a secondary (undifferentiated) aquifer. The underlying bedrock of the Crag Group is classified as a principal aquifer. The site is not located within a groundwater source protection zone nor are there groundwater abstractions nearby (AFHA, 2019). Shallow perched groundwater was encountered during the investigation.

The nearest surface water features are ponds and drainage ditches.

Evidence of significant mobile or leachable contamination was not identified and laboratory analysis recorded potential contaminants mostly below the relevant screening levels or laboratory limits of detection.

Given the above, it is unlikely that any that potential leachate or mobile contamination from the site would impact controlled waters.

4.5 WATER SUPPLY PIPE ASSESSMENT

An assessment of the laboratory results with respect to UKWIR guidance (2010) suggests that, the concentrations of PAH, and petroleum hydrocarbons within the natural soils are below threshold values for polyethylene (PE) and polyvinyl chloride (PVC) pipes.

4.6 GROUND GAS ASSESSMENT

No potential sources of ground gases were identified within the Phase I report (AFHA, 2019). Deep made ground or made ground with degradable materials was not found during the investigation.

There is a negligible risk of ground gas.

4.7 CONCEPTUAL MODEL AND RISK ASSESSMENT

Following assessment of the laboratory analysis, a conceptual model and risk assessment is presented in Table 1 below. Risk management and remediation measures are discussed in Section 5, where appropriate.

A risk category is determined for the potential linkages and an assessment made of risk and the significance of that risk from professional judgement. Risk assessment classification is appended.

Source of Contamination	Pathway	Receptor	Probability and Reasoning	Consequence and Reasoning	Risk Classification
Contaminated soils (historical and recent use)	Direct contact, and ingestion	Human end-users	**Unlikely** – Concentrations of potential soil contaminants all below assessment criteria.	**Medium** – Chronic damage to human health.	**Low Risk**
		Construction workers		**Mild** – Potential short-term exposure can be managed with PPE and adoption of good hygiene practices.	**Very Low Risk**
	Inhalation of dusts and fibres	Human end-users	**Low likelihood** – loose asbestos fibres have been recorded within the made ground on site, however the exposure risk deemed "probably insignificant" and a 6 in 100 000 lifetime risk for mesothelioma	**Medium** – Chronic damage to human health	**Low/Moderate Risk**
		Construction workers		**Medium** – Potential short-term exposure can be managed assuming the recommendations within the Control of Asbestos Regulations 2012 are followed	**Low/Moderate Risk**
	Percolation of leachate / mobile contaminants	Groundwater	**Unlikely –** mobile or leachable contamination not found.	**Medium** – The site overlies both secondary and principal aquifers but the site is not in a source protection zone and there are no nearby groundwater abstractions.	**Low Risk**
		Surface water		**Medium** – Surface watercourses are sensitive ecosystems and have the potential to be adversely impacted by contaminants.	**Low Risk**
	Permeation through water supply pipes	Human end-users	**Unlikely** – organic contaminants, which may permeate plastic water supply pipes, have not been found.	**Medium** – Chronic damage to human health.	**Low Risk**
	Direct contact	Buried concrete	**Unlikely** – Chemicals aggressive to concrete not expected.	**Mild –** Robust receptor.	**Very Low Risk**
Potentially infilled land on or off site	Gas and vapour migration through permeable strata, ingress and accumulation in structures	Human end-users	**Unlikely** – On or off sources of ground gas not identified.	**Severe** – Acute risk to potential end users.	**Low/Moderate Risk**[4]
		Structures			
Radon Gas		Human end-users	**Unlikely** – Site outside of radon affected area.	**Medium** – Chronic risk to human end users.	**Low Risk**

Table 1: Conceptual Model

[4] Whilst the comparison of consequence against probability results in a moderate/low risk classification, the risk has been downgraded to low based on the negligible risk of gas generation

5. RISK MANAGEMENT AND MITIGATION MEASURES

5.1 INTRODUCTION

The review of risk and assessment of appropriate management or remediation is based on the presence of a "source-pathway-receptor". In the absence of the linkage, the risk is eliminated. The discussion below is based on the findings of the investigation and is therefore limited to these areas. If any suspected contamination is encountered during the construction phase then this should be evaluated and appropriate action taken.

5.2 CHEMICAL CONTAMINATION

5.2.1 Human end-users

Loose fibres of chrysotile and amosite asbestos were detected within the made ground at concentrations of <0.001%. This has been calculated as a "probably insignificant" risk of lung cancer and a 6 in 100 000 lifetime risk of mesothelioma. This level of risk is comparable to known tolerable risks and is generally considered to be acceptable. Furthermore, the site proposals and setting reduce the likelihood of asbestos fibres becoming airborne and posing a risk. Whilst there is no safe level of asbestos, the following measures would further reduce the risk of asbestos fibre release from the made ground:

- Ensure all cement board is removed from site by a suitably licenced contractor. This includes doing a surface hand pick to remove the fragments broken of cement board.
- The made ground is expected to be confined to the area immediately surrounding the barn. The proposed paving in this area and this would reduce the likelihood of exposure to asbestos fibres. Consideration could be given to increasing the area of paving.
- Workers should be vigilant during construction for any indication of suspect bulk or fibrous materials, which if encountered, should be reported to the client for further investigation.
- Prior to conversion of the existing barn, an asbestos survey and removal of all asbestos containing materials should be completed by a licenced contractor for suitable off site disposal. Care is required not to adversely impact the site or surroundings during this process.

5.2.2 Construction workers

The concentrations of chemical contaminants recorded within the made ground do not necessarily pose a short-term risk to construction workers and can be addressed by using standard personal protective equipment, including gloves, when handling soils and usual hygiene precautions such as washing hands before eating.

Asbestos fibres were recorded within the made ground. A duty is placed on the employer or Principal Contractor, by the Asbestos Regulations 2012 (as discussed in CL:AIRE, 2016) to prevent the exposure of employees and members of the public to asbestos fibres, so far as is reasonably practicable. If this is not possible, the exposure must be reduced to the lowest level reasonably practicable.

The following control measures are recommended:

- Damping down of bare soils, particularly during dry and/or windy weather, and when excavations and vehicle/plant movements are taking place;
- The provision of suitable welfare facilities and the adoption of good hygiene practices; and,
- Provision of suitable PPE/RPE on a task specific basis and depending on the amount of soil disturbance anticipated during, ground work or remediation.

5.2.3 Controlled waters

Concentrations of potential soil contamination levels were found to be low. Mobile contamination or leachate with significant concentrations of contaminants is unlikely. A low risk to controlled waters is concluded.

5.2.4 Water supply pipes

Organic contaminants, which may permeate plastic water supply pipes, have not been found and a low risk is concluded.

5.3 GROUND GASES

There are no on or off sources of ground gas and the risk is negligible.

The site is not located within a radon affected area and protection measures are not required.

6. SUMMARY

1. A Phase II Contamination Assessment was carried out for a proposed barn conversion at: Foxes Lane, Mendham, Harleston, IP20 0PE.
2. The investigation found a surface covering of topsoil or shallow made ground underlain by sand and clay of the Lowestoft Formation. Shallow perched groundwater was encountered.
3. Loose fibres of chrysotile and amosite asbestos were detected within the made ground at concentrations of <0.001%. Concentrations of all other potential contaminants were found to be below the assessment criteria.
4. The presence of asbestos fibre within the made ground represents a "probably insignificant" risk of lung cancer and a 6 in 100 000 lifetime risk of mesothelioma. The site proposals and setting also reduce the likelihood of the generation of airborne asbestos fibres. This is a generally considered an acceptable level of risk.
5. It is recommended that all existing cement board is removed from site by a suitably licenced contractor. This includes doing a surface hand pick to remove any fragments broken of cement board.
6. Prior to conversion of the existing barn, an asbestos survey and removal of all asbestos containing materials should be completed by a licenced contractor for suitable off site disposal. Care is required not to adversely impact the site or surroundings during this process.
7. The overall risk to construction workers is considered to be low to moderate, predominantly driven by the presence of loose asbestos fibres, and should be mitigated by the adoption of good site practices as described in the Control of Asbestos Regulations 2012.
8. Significant mobile and leachable was not found and a low risk to controlled waters is concluded.
9. Gas protection measures are not required.
10. The site can be considered suitable for the proposed use and no further investigation is required. If any suspected contamination is encountered during development specialist advice should be taken with respect to appropriate actions.

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APPENDIX A: REFERENCES

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APPENDIX B: TRIAL PIT RECORDS

KEY

ES Environmental disturbed sample

Each sample type is numbered sequentially with depth and relates to the depth range quoted

All depths and measurements are given in metres, except as noted

Strata descriptions complied by visual examination of soil, after BS EN1997-2:2007 Eurocode 7 and its UK National Annex supported by BS 5930:2015+A1:2020 and modified in accordance with laboratory test results where applicable

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Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP01

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.50 m W x 1.30 m L x 1.00 m D	45.52	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627730 E 281772 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.70)	MADE GROUND (Dark brown slightly clayey silty fine to medium sand with occasional flint and brick gravel) ... frequent roots		
0.40	ES1							
				44.82	0.70			
0.80	ES2				(0.30)	Soft light brown with grey orange mottling silty slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium chalk and flint		
				44.52	1.00			
						Complete at 1.00m		

Remarks

1. Location CAT scanned prior to excavation
2. Groundwater encountered as seepage at 0.95 m.
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10	ZRH	23.019.TP01

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Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP02

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.50 m W x 1.10 m L x 1.00 m D	46.66	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627735 E 281759 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	MADE GROUND (Dark brown slightly clayey silty fine to medium sand with rare brick fragments)		
0.30	ES1			46.16	0.50	Orange brown silty slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium flint		
0.70	ES2				(0.50)			
				45.66	1.00	Complete at 1.00m		

Remarks

1. Location CAT scanned prior to excavation
2. Groundwater encountered at 0.90 m.
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10	ZRH	23.019.TP02

A F Howland Associates
Geotechnical Engineers

Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP03

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.50 m W x 1.20 m L x 1.00 m D	48.16	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627763 E 281765 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	TOPSOIL (Grass over dark brown slightly clayey silty fine to medium SAND with frequent roots and occasional flint gravel)		
0.30	ES1			47.66	0.50	Orange brown silty slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium flint		
0.70	ES2				(0.40)	... becoming clayey		
				47.26	0.90	Soft light brown with grey orange mottling silty slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium chalk and flint		
					(0.10)			
				47.16	1.00	Complete at 1.00m		

Remarks

1. Location CAT scanned prior to excavation
2. Groundwater encountered as seepage at 0.90 m.
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10	ZRH	23.019.TP03

A F Howland Associates
Geotechnical Engineers

Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP04

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.55 m W x 1.30 m L x 1.00 m D	45.17	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627774 E 281770 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL (Grass over dark brown slightly clayey silty fine to medium SAND with frequent roots and occasional flint gravel)		
0.20	ES1			44.87	0.30			
						Light brown mottled orange silty slightly gravelly fine to medium SAND. Gravel is subangular to subrounded fine to coarse flint		
0.50	ES2				(0.50)			
				44.37	0.80			
					(0.20)	Firm light brown with grey orange mottling silty slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium chalk and flint		
				44.17	1.00			
						Complete at 1.00m		

Remarks

1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10	ZRH	23.019.TP04

A F Howland Associates
Geotechnical Engineers

Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP05

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.55 W x 1.40 m L x 1.00 m D	44.63	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627783 E 281765 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	TOPSOIL (Grass over dark brown slightly clayey silty fine to medium SAND with frequent roots and occasional flint gravel)		
0.30	ES1			44.23	0.40			
0.50	ES2				(0.50)	Orange brown silty slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium flint ... becoming slightly clayey		
				43.73	0.90			
					(0.10)	Firm light brown with grey orange mottling silty slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium chalk and flint		
				43.63	1.00	Complete at 1.00m		

Remarks

1. Location CAT scanned prior to excavation
2. No groundwater encountered
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10	ZRH	23.019.TP05

A F Howland Associates
Geotechnical Engineers

Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP06

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.70 m W x 1.30 m L x 1.00 m D	43.86	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627764 E 281756 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.30)	TOPSOIL (Grass over dark brown slightly clayey silty fine to medium SAND with frequent roots and occasional flint gravel)		
0.20	ES1			43.56	0.30			
					(0.70)	Orange brown silty slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium flint		
0.80	ES2			42.86	1.00			
						Complete at 1.00m		

Remarks

1. Location CAT scanned prior to excavation
2. Groundwater encountered at 0.80 m.
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10	ZRH	23.019.TP06

A F Howland Associates
Geotechnical Engineers

Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP07

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.65 m W x 1.30 m L x 1.00 m D	44.55	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627750 E 281749 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.25)	TOPSOIL (Grass over dark brown slightly clayey silty fine to medium SAND with frequent roots and occasional flint gravel)		
				44.30	0.25			
0.30	ES1				(0.65)	Brown slightly clayey silty fine to medium SAND		
0.90	ES2			43.65	0.90			
					(0.10)	Orange brown silty slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium flint		
				43.55	1.00	Complete at 1.00m		

Remarks

1. Location CAT scanned prior to excavation
2. Groundwater encountered at 0.70 m.
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10		23.019.TP07

A F Howland Associates
Geotechnical Engineers

Site	Trial Pit Number
Foxes Lane, Mendham, Harleston IP20 0PE	TP08

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Machine dug	0.60 m W x 1.40 m L x 1.10 m D	45.03	Alyson Waller	23.019
	Location	**Dates**	**Engineer**	**Sheet**
	627733 E 281741 N	18/01/2023		1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.15)	TOPSOIL (Grass over dark brown slightly clayey silty fine to medium SAND with frequent roots and occasional flint gravel)		
				44.88	0.15	Brown slightly clayey silty fine to medium SAND		
0.50	ES1				(0.45)			
0.70	ES2			44.43	0.60	Orange brown silty slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to medium flint		
					(0.50)			
				43.93	1.10	Complete at 1.10m		

Remarks

1. Location CAT scanned prior to excavation
2. Groundwater encountered at 0.80 m.
3. Trial pit remained open and sidewalls stable during excavation.
4. Trial pit backfilled with arisings upon completion.

Scale (approx)	Logged By	Figure No.
1:10	ZRH	23.019.TP08

APPENDIX C: LABORATORY TESTING

Analytical reports: 23 00732 and 23-01398

Barney Horne
AF Howland Associates Ltd
The Old Exchange
Newmarket Road
Cringleford
Norwich
Norfolk
NR4 6UF

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

DETS Report No: 23-00732

Site Reference:	Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites
Project / Job Ref:	23.019
Order No:	BJH/23.019/00/01
Sample Receipt Date:	20/01/2023
Sample Scheduled Date:	20/01/2023
Report Issue Number:	1
Reporting Date:	30/01/2023

Authorised by:

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: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP01	TP01	TP02	TP02	TP03
Project / Job Ref: 23.019	Additional Refs	ES1	ES2	ES1	ES2	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.40	0.80	0.30	0.70	0.30
Reporting Date: 30/01/2023	DETS Sample No	629117	629118	629119	629120	629121

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Detected	Not Detected	Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE	Amosite bundles present		Chrysotile bundles present		
Asbestos Type (S)	PLM Result	N/a	ISO17025	Amosite		Chrysotile		
pH	pH Units	N/a	MCERTS	7.7	8.0	7.3	7.9	7.3
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Complex Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Organic Matter (SOM)	%	< 0.1	MCERTS	2.5	0.8	3.9	0.8	3.6
Antimony (Sb)	mg/kg	< 1	NONE	< 1	2.2	< 1	< 1	1.1
Arsenic (As)	mg/kg	< 2	MCERTS	5	12	5	5	5
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5	0.7	< 0.5	< 0.5	< 0.5
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7	16	6	5	8
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	8	10	9	< 4	7
Lead (Pb)	mg/kg	< 3	MCERTS	18	9	18	4	23
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	7	19	7	5	6
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	14	31	12	13	13
Zinc (Zn)	mg/kg	< 3	MCERTS	38	29	33	15	46
Total Phenols (monohydric)	mg/kg	< 1	NONE	< 2	< 2	< 2	< 2	< 2
TPH - Aliphatic >C35 - C40 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >C35 - C40 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic / Aromatic (C6 - C40) - Total : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42

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						
DETS Report No: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP03	TP05	TP05	TP07	TP08
Project / Job Ref: 23.019	Additional Refs	ES2	ES1	ES2	ES1	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.70	0.30	0.50	0.30	0.50
Reporting Date: 30/01/2023	DETS Sample No	629122	629123	629124	629125	629126

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE					
Asbestos Type (S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	7.5	7.8	7.9	8.1	7.9
Total Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Complex Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Free Cyanide	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Thiocyanate as SCN	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Organic Matter (SOM)	%	< 0.1	MCERTS	2	0.8	0.6	0.6	0.5
Antimony (Sb)	mg/kg	< 1	NONE	1	1.1	< 1	< 1	< 1
Arsenic (As)	mg/kg	< 2	MCERTS	6	7	4	< 2	< 2
Beryllium (Be)	mg/kg	< 0.5	MCERTS	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	7	8	5	3	< 2
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	7	4	< 4	< 4	< 4
Lead (Pb)	mg/kg	< 3	MCERTS	14	6	4	3	5
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	7	8	4	< 3	< 3
Selenium (Se)	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Vanadium (V)	mg/kg	< 1	MCERTS	14	22	11	6	5
Zinc (Zn)	mg/kg	< 3	MCERTS	29	20	11	9	6
Total Phenols (monohydric)	mg/kg	< 1	NONE	< 2	< 2	< 2	< 2	< 2
TPH - Aliphatic >C35 - C40 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aromatic >C35 - C40 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
TPH - Aliphatic / Aromatic (C6 - C40) - Total : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 42	NONE	< 42	< 42	< 42	< 42	< 42

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: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP01	TP01	TP02	TP02	TP03
Project / Job Ref: 23.019	Additional Refs	ES1	ES2	ES1	ES2	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.40	0.80	0.30	0.70	0.30
Reporting Date: 30/01/2023	DETS Sample No	629117	629118	629119	629120	629121

Determinand	Unit	RL	Accreditation					
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	< 0.1	< 0.1	< 0.1	< 0.1	0.17
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	0.12	< 0.1	< 0.1	< 0.1	0.19
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.15
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
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	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Coronene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Soil Analysis Certificate - Speciated PAHs							
DETS Report No: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP03	TP05	TP05	TP07	TP08
Project / Job Ref: 23.019	Additional Refs	ES2	ES1	ES2	ES1	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.70	0.30	0.50	0.30	0.50
Reporting Date: 30/01/2023	DETS Sample No	629122	629123	629124	629125	629126

Determinand	Unit	RL	Accreditation					
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	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
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	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Coronene	mg/kg	< 0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7	< 1.7	< 1.7	< 1.7	< 1.7

DETS Ltd
Unit 1, Rose Lane Industrial Estate
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Soil Analysis Certificate - TPH LQM Banded							
DETS Report No: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP01	TP01	TP02	TP02	TP03
Project / Job Ref: 23.019	Additional Refs	ES1	ES2	ES1	ES2	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.40	0.80	0.30	0.70	0.30
Reporting Date: 30/01/2023	DETS Sample No	629117	629118	629119	629120	629121

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C35 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic >C35 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 30	NONE	< 30	< 30	< 30	< 30	< 30
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (>C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 30	NONE	< 30	< 30	< 30	< 30	< 30
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 60	NONE	< 60	< 60	< 60	< 60	< 60

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Soil Analysis Certificate - TPH LQM Banded							
DETS Report No: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP03	TP05	TP05	TP07	TP08
Project / Job Ref: 23.019	Additional Refs	ES2	ES1	ES2	ES1	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.70	0.30	0.50	0.30	0.50
Reporting Date: 30/01/2023	DETS Sample No	629122	629123	629124	629125	629126

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6 : HS_1D_MS_AL	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic >C6 - C8 : HS_1D_MS_AL	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aliphatic >C8 - C10 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C10 - C12 : EH_CU_1D_AL	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16 : EH_CU_1D_AL	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C35 : EH_CU_1D_AL	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic >C35 - C44 : EH_CU_1D_AL	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C44) : HS_1D_MS+EH_CU_1D_AL	mg/kg	< 30	NONE	< 30	< 30	< 30	< 30	< 30
Aromatic >C5 - C7 : HS_1D_MS_AR	mg/kg	< 0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic >C7 - C8 : HS_1D_MS_AR	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Aromatic >C8 - C10 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C10 - C12 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C12 - C16 : EH_CU_1D_AR	mg/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Aromatic >C16 - C21 : EH_CU_1D_AR	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35 : EH_CU_1D_AR	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic >C35 - C44 : EH_CU_1D_AR	mg/kg	< 10	NONE	< 10	< 10	< 10	< 10	< 10
Aromatic (>C5 - C44) : HS_1D_MS+EH_CU_1D_AR	mg/kg	< 30	NONE	< 30	< 30	< 30	< 30	< 30
Total >C5 - C44 : HS_1D_MS+EH_CU_1D_Total	mg/kg	< 60	NONE	< 60	< 60	< 60	< 60	< 60

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Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP01	TP01	TP02	TP02	TP03
Project / Job Ref: 23.019	Additional Refs	ES1	ES2	ES1	ES2	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.40	0.80	0.30	0.70	0.30
Reporting Date: 30/01/2023	DETS Sample No	629117	629118	629119	629120	629121

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

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Soil Analysis Certificate - BTEX / MTBE							
DETS Report No: 23-00732	Date Sampled	18/01/23	18/01/23	18/01/23	18/01/23	18/01/23
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP03	TP05	TP05	TP07	TP08
Project / Job Ref: 23.019	Additional Refs	ES2	ES1	ES2	ES1	ES1
Order No: BJH/23.019/00/01	Depth (m)	0.70	0.30	0.50	0.30	0.50
Reporting Date: 30/01/2023	DETS Sample No	629122	629123	629124	629125	629126

Determinand	Unit	RL	Accreditation					
Benzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
Toluene : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5
Ethylbenzene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
p & m-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
o-xylene : HS_1D_MS	ug/kg	< 2	MCERTS	< 2	< 2	< 2	< 2	< 2
MTBE : HS_1D_MS	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

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Soil Analysis Certificate - Sample Descriptions
DETS Report No: 23-00732
AF Howland Associates Ltd
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites
Project / Job Ref: 23.019
Order No: BJH/23.019/00/01
Reporting Date: 30/01/2023

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
629117	TP01	ES1	0.40	17.2	Brown loamy sand with vegetation
629118	TP01	ES2	0.80	17.7	Brown clay
629119	TP02	ES1	0.30	13.8	Black sandy clay with vegetation
629120	TP02	ES2	0.70	12	Brown sandy clay
629121	TP03	ES1	0.30	12.6	Black loamy sand with vegetation
629122	TP03	ES2	0.70	9.5	Black loamy sand with vegetation
629123	TP05	ES1	0.30	12.1	Brown sandy clay
629124	TP05	ES2	0.50	10.8	Brown sand
629125	TP07	ES1	0.30	11.5	Brown sand
629126	TP08	ES1	0.50	12.3	Brown sand

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: 23-00732
AF Howland Associates Ltd
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites
Project / Job Ref: 23.019
Order No: BJH/23.019/00/01
Reporting Date: 30/01/2023

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

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List of HWOL Acronyms and Operators
DETS Report No: 23-00732
AF Howland Associates Ltd
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites
Project / Job Ref: 23.019
Order No: BJH/23.019/00/01
Reporting Date: 30/01/2023

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
Benzene - HS_1D_MS
Ethylbenzene - HS_1D_MS
MTBE - HS_1D_MS
TPH CWG - Aromatic >C16 - C21 - EH_CU_1D_AR
TPH LQM - Aliphatic >C10 - C12 - EH_CU_1D_AL
TPH LQM - Aliphatic >C12 - C16 - EH_CU_1D_AL
TPH LQM - Aliphatic >C16 - C35 - EH_CU_1D_AL
TPH LQM - Aliphatic >C35 - C40 - EH_CU_1D_AL
TPH LQM - Aliphatic >C35 - C44 - EH_CU_1D_AL
TPH LQM - Aliphatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AL
TPH LQM - Aliphatic >C5 - C6 - HS_1D_MS_AL
TPH LQM - Aliphatic >C6 - C8 - HS_1D_MS_AL
TPH LQM - Aliphatic >C8 - C10 - EH_CU_1D_AL
TPH LQM - Aromatic >C10 - C12 - EH_CU_1D_AR
TPH LQM - Aromatic >C12 - C16 - EH_CU_1D_AR
TPH LQM - Aromatic >C21 - C35 - EH_CU_1D_AR
TPH LQM - Aromatic >C35 - C40 - EH_CU_1D_AR
TPH LQM - Aromatic >C35 - C44 - EH_CU_1D_AR
TPH LQM - Aromatic >C5 - C44 - HS_1D_MS+EH_CU_1D_AR
TPH LQM - Aromatic >C5 - C7 - HS_1D_MS_AR
TPH LQM - Aromatic >C7 - C8 - HS_1D_MS_AR
TPH LQM - Aromatic >C8 - C10 - EH_CU_1D_AR
TPH LQM - Total >C5 - C44 - HS_1D_MS+EH_CU_1D_Total
TPH LQM - Total >C6 - C40 - HS_1D_MS+EH_CU_1D_Total
Toluene - HS_1D_MS
m & p-xylene - HS_1D_MS
o-Xylene - HS_1D_MS

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DETS Report No: 23-01398

Site Reference:	Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites
Project / Job Ref:	23.019
Order No:	BJH/23.019/00/01
Sample Receipt Date:	03/02/2023
Sample Scheduled Date:	03/02/2023
Report Issue Number:	1
Reporting Date:	09/02/2023

Authorised by:

Dave Ashworth
Technical Manager

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

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UKAS TESTING 4480

Soil Analysis Certificate						
DETS Report No: 23-01398	Date Sampled	18/01/23	18/01/23			
AF Howland Associates Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites	TP / BH No	TP01	TP02			
Project / Job Ref: 23.019	Additional Refs	ES1	ES1			
Order No: BJH/23.019/00/01	Depth (m)	0.40	0.30			
Reporting Date: 09/02/2023	DETS Sample No	631944	631945			

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)

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Soil Analysis Certificate - Methodology & Miscellaneous Information
DETS Report No: 23-01398
AF Howland Associates Ltd
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites
Project / Job Ref: 23.019
Order No: BJH/23.019/00/01
Reporting Date: 09/02/2023

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

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Unit 1, Rose Lane Industrial Estate
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Tel : 01622 850410

UKAS TESTING 4480

List of HWOL Acronyms and Operators
DETS Report No: 23-01398
AF Howland Associates Ltd
Site Reference: Foxes Lane, Mendham, Harleston IP20 0PE - AFHA Suites
Project / Job Ref: 23.019
Order No: BJH/23.019/00/01
Reporting Date: 09/02/2023

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

APPENDIX D: ASBESTOS EXPOSURE RISK MODEL

Asbestos exposure risk model *(following guidance set out in CIRIA C733)*

Land use scenario modelled	Residential					
Position/Sample/Depth	TP02/ES1					
Bulk asbestos type	Miscellaneous					
Asbestos fibre type in soil matrix	Chrysotile and Amosite					
Soil type	Sand					
Fibre quantity %	0.001					
Exposure Parameters						
Exposure/year (days) (Child, age 3-11 years)	15	-	-	-	-	-
Exposure/day (hours) (Child, age 3-11 years)	4	-	-	-	-	-
Exposure duration/year (Child, age 3-11 years)	60	-	-	-	-	-
Exposure duration (years) (Y_i) (Child, age 3-11 years)	20	-	-	-	-	-
Default occupational year [1] (hours per year)	1920	-	-	-	-	-
If multiple types of asbestos, which has been determined as the risk driver?	Amosite	-	-	-	-	-
Concentration in air of the main risk driver [2] (fibre/ml/mg/m^3)	0.04	-	-	-	-	-
Ambient respirable dust levels [3] (mg/m^3)	0.1	-	-	-	-	-
Concentration of fibres in air Ci (fibre/ml)	0.004	-	-	-	-	-
Annual exposure Ei (fibre/ml.hours/year	0.24	-	-	-	-	-
Cumulative exposure CEi (fibre/ml/hours)	4.80	-	-	-	-	-
Cumulative exposure based on default occupational year (fibre/ml.years)	0.003	-	-	-	-	-
Mesothelioma Risk						
Lifetime risk for mesothelioma per 100 000 exposed [4]	About 2 (highest arguable 15)	-	-	-	-	-
Adopted value based on assessment of above result	2	-	-	-	-	-
Age at which exposure commences (years)	0					
Taking risk as persisting for 60 or 80 years?	60 years					
Age adjustment factor [5]	2.8					
Adjusted lifetime risk for mesothelioma per 100 000 people exposed [4]	6	-	-	-	-	
Lung Cancer Risk						
Lifetime risk for asbestos related lung cancer per 100 000 people exposed [6]	Probably Insignificant (mesothelioma now dominant)	-	-	-	-	-

[1] Based upon land use as specified [Jeffries and Martin *(SR3)* , 2009; CIRIA C733]

[2] Figures 3 to 6 [Addison et al., 1998]

[3] Values based upon example scenarios [CIRIA C733 Box 13.3 and Box 13.4]
(conservative values adopted for allotment and commercial scenarios)

[4] [CIRIA C733 Table 14.1 and Hodgson and Darnton (2000)]

[5] [CIRIA C733 Table 14.2]

[6] Risks below 1 per 100,000 people are described as probably insignificant [CIRIA C733 Table 14.3 and Hodgson and Darnton (2000)]

= User specified data

= Calculated risk statements for asbestos exposure risk

APPENDIX E: DRAWINGS

Drawing 23.019/01	Site Location Plan
Drawing 23.019/02	Exploratory Hole Location Plan
Drawing 303468/20-003	Site Layout Plan Barn 2 (Durrants Building Consultancy)

North

Circle indicates approximate location of site

Scale 1: 50,000 @ A4

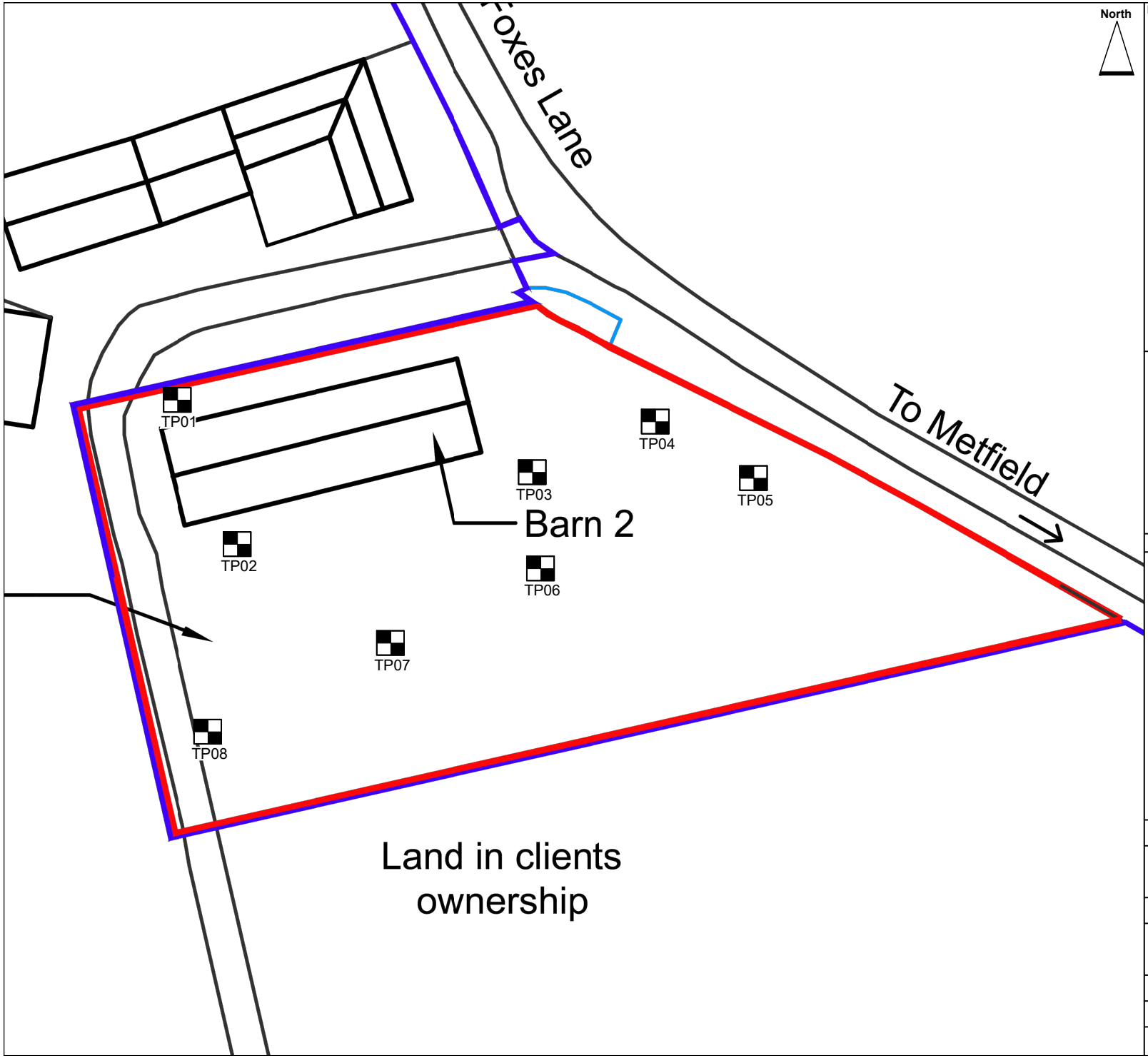
A F Howland Associates
Geotechnical Engineers

Site: Foxes Lane, Mendham, Harleston IP20 0PE

SITE LOCATION PLAN

Client : Alyson Waller

Date : February 2023 **Dwg :** 23.019/01



Key:

Trial pit location and reference

Rev	Date	Revision Description	Drwn	Chkd

A F Howland Associates
Geotechnical Engineers

A F Howland Associates Ltd
The Old Exchange
Newmarket Road
Cringleford
Norwich
NR4 6UF

Tel: 01603 250754 Fax: 01603 250749

web: www.howland.co.uk
mail: admin@howland.co.uk

Client: Alyson Waller

Site:
Foxes Lane, Mendham, Harleston IP20 0PE

Job No.: 23.019

Drawing Title:
EXPLORATORY HOLE LOCATION PLAN

Date: February 2023

Drawing No: 23.019/02

Scale: 1:500 @ A4

PROPOSED SITE LAYOUT PLAN

Scale 1:500

DRAWING NOTE
- This drawing must not be reissued, loaned or copied without the written consent of Durrants.
- All errors, omissions, discrepancies should be reported to Durrants immediately.
- All dimensions to be checked before site fabrication by the contractor, his sub-contractor or supplier.
- Any deviation from the drawing to be reported to Durrants immediately.
- **This drawing is only to be used for the purpose identified in the boxes below.**

DO NOT SCALE FROM DRAWING

CDM 2015 DESIGNER RISK INFORMATION

In addition to the hazards/risks normally associated with the type of construction work detailed on this drawing which a competent contractor should be able to control using normal good practice and procedures.
NOTE THE FOLLOWING UNUSUAL AND EXTRAORDINARY RISKS TO HEALTH AND SAFETY:-

CONSTRUCTION

MAINTENANCE/CLEANING

DECOMMISSIONING/DEMOLITION

Further information can be found on designer risk assessment number / document ref:-

It is assumed that all works will be carried out by a contractor competent under CDM 2015 working to an approved method statement and that unless otherwise advised a principle designer has been appointed

Rev.	Date	Details	Drawn	Checked

Issued for:

PLANNING

Client/Project:

MRS J CROCKETT & MR D GODBOLD
CONVERSION OF BARN, PANORAMA,
MENDHAM, HARLESTON, SUFFOLK

Drawing Title:

SITE LAYOUT PLAN
BARN 2

Drawn.	Checked.	Size.	Scale.	Date.
DM	TM	A3	1:500	MAY 20

Project No.	Drawing No.	Revision.
303468	20-003	-

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DURRANTS SINCE 1883

APPENDIX F: RISK ASSESSMENT CLASSIFICATION

Classification	Definition	Examples
High Likelihood	There is a pollution linkage and an event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.	Free product visible on surface of sensitive water body or in the soil. On site or adjacent gassing 'landfill site'.
Likely	There is a pollution linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.	Potentially contaminative land use i.e. 'Brownfield' site, fuel storage depot, factory, petrol station etc. Sensitive receptors to be introduced as part of site redevelopment. Potentially infilled land identified on site or off-site with credible migration pathway.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.	Potential source of contamination identified i.e. historical land use as allotments or domestic above ground fuel storage tanks, areas of burning garden waste. Possible off-site infilled land.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.	No significant potential sources of contamination identified e.g. 'Greenfield' site. No potential sources of ground gas.

TABLE H1: CLASSIFICATION OF PROBABILITY

Classification	Definition	Examples
Severe	**Short term (acute) risk to human health.** Short term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short term risk to a particular ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Credible source of ground gas.
Medium	**Chronic damage to Human Health.** **Pollution of sensitive water resources.** A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of a contaminant from site exceeds the generic, or site specific assessment criteria. Leaching of contaminants from a site to a Secondary or Principal aquifer or watercourse.
Mild	**Pollution of non-sensitive water resources.** Significant damage to buildings/structures and crops ("significant harm" as defined in the Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures or the environment.	Concentrations of a contaminant do not exceed the generic, or site specific assessment criteria. Leaching of contaminants from a site to an Unproductive Aquifer. Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as Personal Protective Equipment, etc).	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme.

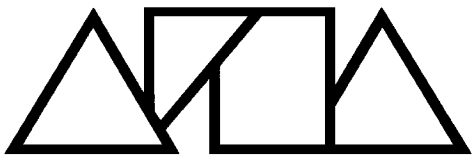
TABLE F2: CLASSIFICATION OF CONSEQUENCE

Classification	Definition
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is occurring. The risk, if realised, is likely to result in a substantial liability. **Urgent investigation and remediation will be required.**
High Risk	Harm or chronic damage is likely to arise to a designated receptor from an identified hazard. **Investigation is required and remediation is likely to be required** to ensure the site is suitable for a proposed use.
Moderate Risk	It is possible that harm or chronic damage could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that any such harm would be severe. **Investigation and remediation are likely to be required** to ensure the site is suitable for a proposed use.
Low/Moderate Risk	It is possible that harm or chronic damage could arise to a designated receptor from an identified hazard. **Investigation is likely to be required.** However, circumstances are such that investigation may prove the consequence to be mild and the site suitable for use without remediation.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard but it is likely that this harm, if realised, would at worst be mild. **Investigation is unlikely to be required.**
Very Low Risk	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe. **Investigation is not required.**

TABLE F3: DESCRIPTION OF RISK

		CONSEQUENCE			
		Severe	**Medium**	**Mild**	**Minor**
PROBABILITY	**High likelihood**	**Very High**	**High**	**Moderate**	**Low/Moderate**
	Likely	**High**	**Moderate**	**Low/Moderate**	**Low**
	Low likelihood	**Moderate**	**Low/Moderate**	**Low**	**Very Low**
	Unlikely	**Low/Moderate**	**Low**	**Very Low**	**Very Low**

TABLE F4: DETERMINATION OF RISK



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