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OREHAM MANOR FARM, OREHAM COMMON, HENFIELD,
WEST SUSSEX, BN5 9SB

Contamination Risk Assessment

July 2023
(Revised August 2024)

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Environmental Assessment Services Ltd

REPORT DATA SHEET

Requirement	**Data**
Report Ref:	574a/PRowePlanning/OrehamManorFarm/CRA
Date	July 2023
Client	Andrew Barrott
Report type	Contamination Risk Assessment
Purpose	Planning
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1. BACKGROUND

1.1 This report follows the Preliminary Contamination Risk Assessments completed for the site in February 2023 and June 2023 for the workshop (Ref: DC/21/2039) and The Stables (Ref: DC/22/2092). The site was found to have some potential contamination risk relating to its former use as agricultural buildings, agricultural yard and 'light industrial' workshop.

1.2 The site is intended for residential redevelopment. It was recommended that a Contamination Risk Assessment including intrusive site investigation be undertaken in order to assess the extent of any potential contamination at the site and the potential risk to future site users and the wider environment.

1.3 This assessment includes a superficial examination of the site, the excavation of nine trial pits at locations reasonably representative of potential contamination, the analysis of soil samples plus a review of data compiled as part of the Preliminary Contamination Risk Assessments. This report does not attempt to comment on the commercial value or viability of the site.

2. THE SITE & PROPOSED DEVELOPMENT

2.1 The site sits within the Oreham Manor Farm complex and comprises The Stables residential dwelling and adjacent yard area, the workshop building, adjacent redundant pigsties and derelict land / materials storage to the south. The site lies within a predominately agricultural area with scattered large dwellings to the south of Henfield. The total site area is approximately 0.5 ha. The Ordnance Survey (OS) map reference for the site is TQ 22399 13451. The site elevation is approximately + 20 m OD.

2.2 The site is accessed via a gravel drive which splits at the entrance, the eastern section leading to the parking area of Oreham Manor Farmhouse.

2.3 To the north of the yard area is a single storey building with externally rendered block facades, a timber frame, a tiled roof, with solar panels on the eastern and southern façades, and a concrete floor. This building is presently in use for storage, and contains various cardboard boxes, assorted household items including containers of cider and beer and a bicycle, reels of cord, cement mix, Growatt batteries (associated with the solar panels), and small containers of fuel and Roundup (herbicide). The western section was locked and was not accessed.

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2.4 The Stables dwelling is single storey and comprises rendered block facades, wood framed windows, plastic rain goods and a suspected asbestos cement corrugated roof. The majority of this building comprises a dwelling containing general household items and minimal quantities of general cleaning products. A small, fenced garden area lies to the west, predominately laid to concrete, with tables and chairs, raised planters, and areas of astroturf.

2.5 The northern section of The Stables building comprises a separate store, accessed from the western façade. The floor is laid to concrete. This contained various supplies generally associated with plumbing and decorating on shelving and on a work bench, including containers of sealer, paint, tiling adhesive, dry cement mix and cement mortar plasticiser, and a 20-litre container of hydraulic oil.

2.6 The yard area to the west of the workshop building is laid to concrete and road planings and is in current use for materials storage. This includes pallets and bulk bags of aggregate bricks and tiles, corrugated metal, stone, concrete blocks, and scaffolding. A modern internally bunded oil tank sits adjacent to the building at the north of the yard. A sewage treatment plant is located to the west. There is a central skip which appears to be full of general waste, and an area which appears to have been used for bonfires. There are redundant pigsties to the south of this area adjacent to the bulk of the stored materials. There is a disused tank to the south which is thought to have been associated with keeping of pigs, likely for slurry, but the precise former use is unknown.

2.7 There is a small area of soft landscaping to the southeast of the stables (adjacent to the workshop), comprising mown grass and shrubs. This is used for storage of concrete blocks, rubber excavator tracks and a redundant fuel tank. This tank has been moved from its original location, which was previously situated, when in use, on the concrete.

2.8 The workshop building is comprised of two adjoined buildings of block construction with a concrete frame, and asbestos fibre cement cladding. There is a concrete floor throughout, which is in good condition, with a central inspection pit in the eastern section of the building. The floor level of the eastern section is slightly higher than the western section.

2.9 The eastern section of the building is larger and is used predominately for storage of materials and vehicles/machinery. This includes two excavators, a dumper, a sit-on mower, a forklift, and several motorcycles. This area is used for storage of bulk bags of wood and a table saw, plus various building materials, vehicle parts and equipment, some of which are stored in wooden crates. There is storage of various small quantities of fluids (generally associated with vehicle maintenance), a number of 25 litre containers, and a universal bulk container, which is currently empty but was previously used for storage of diesel.

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2.10 The eastern and western sections of the building are connected internally. A trailer and tubing are stored within this area. The western section is divided into two rooms. The northern room is used for storage of timber planks and plastic pipes on shelving. This previously housed an old car which has been removed from the room via the removal of the northern external wall. This car now sits within the parking area to the north. The southern room is used for further storage, including several large gas canisters.

2.11 The area to the south of the wider site was previously a yard area under hardstanding. The hardstanding has been removed and retained on site as piled hardcore, intended to be crushed and used as recycled aggregate. The underlying soil has been reprofiled and the ground level raised.

3. POTENTIAL SOURCES OF CONTAMINATION

3.1 Land use history has comprised agricultural land from pre 1873 to circa 1970s (which may have comprised grazing livestock and/or arable farming), and agricultural buildings from circa 1970s to date (which has included use as piggeries and 'light industrial' workshop to the southwest which included vehicle storage and maintenance). The Stables and workshop building first appear on OS mapping in 1975 (1:10,000 scale).

3.2 Potential contamination from historic land use is associated with historic agricultural use. The agricultural use included piggeries and may have included the storage and maintenance of farm equipment and vehicles. Two above ground tanks were observed on site, one is a known redundant fuel tank, and the other is of unknown use associated with the historic piggery, likely to be for slurry. The redundant fuel tank (thought to have been used for red diesel) is currently stored on/adjacent to an area of soft landscaping adjacent to the north of the workshop building. This has been moved from its original location on concrete.

3.3 Potential contaminants associated with historic land use may have included petroleum hydrocarbons, heavy metals and PAHs (from fuels, maintenance fluids and waste disposal / burning waste on site), and possibly pesticides and heavy metals associated with crops and animal treatments which may have been used on the farm.

3.4 Land immediately to the south and east of the site, which could be used for soft landscaping/gardens for the proposed residence, was a historic landfill. The Oreham Piggeries landfill is classified as an inert waste landfill which likely comprised waste soil and builders' rubble, although there is some (low) potential for the landfilled waste to include asbestos containing materials.

3.5 Recent workshop usage, including vehicle maintenance and storage, pose potential contamination risks, including the current and possible historic storage of maintenance fluids, oil and fuel. This included the recent bulk storage of fuels; a universal bulk container was observed within the workshop which previously contained diesel.

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3.6 The presence of concrete surfacing on site is likely to have acted as a barrier between any leakage or spillage of fluids and the underlying soil. No evidence of any significant spillage/s was noted during the site walkover.

3.7 ACM (asbestos containing materials) were identified on site, in the form of asbestos fibre cement roofing and upper elevation cladding on the workshop. Samples of the roofing material have been collected and sent for asbestos analysis for confirmation.

4. SITE SENSITIVITY

4.1 **Environmental site sensitivity**

4.1.1 The site lies upon Weald Clay Formation – Mudstone, classified by the Environment Agency (EA) as Unproductive Strata. The site does not lie within a groundwater source protection zone and is not considered to be hydrogeologically sensitive.

4.1.2 The site does not lie within 500 m of any controlled waters (inland fresh waters, groundwater and coastal waters).

4.1.3 According to the Environment Agency flood mapping, the site lies within Flood Zone 1 (at low risk of flooding with a less than 1 in 1000 annual probability of tidal or fluvial flooding). The site is predominantly at very low risk of surface water flooding, with a small area of medium to high risk adjacent to The Stables.

4.2 **Future site users**

4.2.1 It is proposed to redevelop the site for residential use comprising two dwellings (application ref: DC/21/2039 and DC/22/2092) with associated parking, soft landscaping and garden.

4.2.2 Future site users in this case are likely to include construction workers (considered to be adults) engaged in the development of the site, and future residents (which may include both adults and children). Both construction works and residents are considered likely to come into direct contact with soil on the site. Future residents are likely to come into contact with the soil in the gardens areas and may also grow produce for consumption. Construction workers will also come into contact with suspected asbestos fibre cement roofing materials.

4.2.3 New underground service lines will need to be installed as part of the site's development. Depending on the materials used, some water supply pipework may be vulnerable to contaminants within the soil (where present). See UKWIR guidelines.

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5. INTRUSIVE SITE INVESTIGATION

5.1 The objectives of the site investigation were to confirm the nature of the underlying soil to establish or confirm whether the former land uses had resulted in contamination of the soil or groundwater at the site.

5.2 The site investigation was carried out on 26th June 2023 and 9th August 2024. The investigation comprised the excavation of seventeen trial pits. The trial pits allowed visual inspection of the underlying soil as well as the selection of samples for analysis.

5.3 The existing site layout is given in Figure 2 and the proposed development plus trial pit locations are shown on Figure 3. The trial pit logs are given in Appendix B. In most cases the trial pits encountered made ground of soil mixed with brick and concrete gravel or hardcore over stiff grey/brown/ blue clay.

5.4 The determinands selected for analysis were those contaminants typically associated with historic agricultural land uses as identified in the PCRA, including those for which guideline thresholds have been published, as listed below.

Toxic metals:	Arsenic Boron (water-soluble) Cadmium Chromium Lead Mercury Selenium
Phytotoxic metals:	Copper Nickel Zinc
Other parameters:	pH Asbestos
Organics:	Cyanide Sulphate, Total Petroleum Hydrocarbons Polycyclic Aromatic Hydrocarbons

6. RESULTS OF THE SITE INVESTIGATION

6.1 A total of 33 soil samples, comprising 17 upper soil samples and 16 lower soil samples were taken during the site investigation and sent for analysis at Scientific Analysis Laboratories (SAL) Limited of Braintree, Essex. Copies of the sample analysis certificates, together with the laboratory's methods and accreditations, are given in Appendix C.

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6.2 No groundwater was encountered in any of the trial pits during the site investigation, apart from TP17, where the hole was saturated. It is suspected that represented a lens of perched water trapped beneath the inspection pit floor.

7. INTERPRETATION OF RESULTS

7.1 **Physical appearance and topography of the soils**

Apparent oil staining, unusual colouring, odour and other superficial indications of significant contamination were noted within the made ground in TP8.

Photographs taken at the site during the current investigation are provided in Appendix A.

7.2 **Analysis of the soil samples**

7.2.1 The results of the soil sample analysis have been compared with the published DEFRA Category 4 Screening Levels (C4SL) for Assessment of Land Affected by Contamination (as updated 2014) and the LQM/CIEH Suitable for Use Levels (S4UL) for Human Health Risk Assessment (2015). *Copyright Land Quality Management Limited reproduced with permission; Publication Number: S4UL3601. All rights reserved.* The proposed land use is classified as residential with plant uptake.

7.2.2 The pH values in the soil samples ranged from 4.9 to 11. The samples are generally alkaline due to the underlying clay.

7.2.3 The toxic metals; arsenic, cadmium, chromium, lead and mercury and the phytotoxic metals; copper, nickel and zinc were recorded within most of the soil samples at generally low concentrations or below the limit of detection. These concentrations all fall well below the current threshold values for residential use with plant uptake, with the exception of an exceedance for arsenic within the upper sample at TP8, and exceedances for lead within the lower samples of TP1, and the upper samples of TP5, TP6, TP8 and TP9.

7.2.4 Polycyclic Aromatic Hydrocarbons (PAHs) were recorded at generally low concentrations or below the limit of detection within the soil samples. There were several exceedances of the current threshold values for residential use with plant uptake for four PAHs. These include benzo(a)anthracene (TP9 upper), benzo(b)fluoranthene (upper samples of TP2, TP3, TP4, TP5, TP8, TP9 & TP10), benzo(a)pyrene (upper samples of TP2, TP3, TP4, TP8, TP9 & TP10), dibenz(a,h)anthracene (upper samples of TP2, TP3, TP4, TP5, TP8,TP9 & TP10) and Chrysene (TP10). The most PAH contamination was recorded in the upper sample from TP10. This trial pit was excavated in the former pond location identified from the historic maps. The reason for the high PAH concentration is uncertain, although the pond may have been backfilled with material with a high coal ash or bonfire waste content.

7.2.5 Petroleum Hydrocarbons were recorded within the majority of the upper soil samples. These concentrations all fell below the threshold values for residential use with plant uptake. The samples taken from under the former workshop floors, including the inspection pit, were not found to be contaminated.

7.2.6 Asbestos fibres were detected in the upper samples (made ground) in TP3, TP4, TP5, TP6 and TP8. All the fibres detected were Chrysotile (white asbestos). This is not surprising given the ubiquity of the material on site and elsewhere.

7.2.7 Crocidolite (blue asbestos) fibre was detected in the upper sample from TP5. Quantification analysis was carried out on the sample which revealed the concentration to be below the quantifiable quantity and could be no more than a single fibre.

7.2.8 Based on the analysis of soil samples taken from the nine trial pits, it is apparent that there is some contamination of the superficial made ground layer across the area covered by several trial pits.

7.2.9 It will be necessary to remove some of the made ground at these locations and replace it with clean soil from an uncontaminated source placed over permeable geotextile in order to render it suitable for the proposed residential land use.

7.2.10 The significant soil samples and the nature of their contamination is summarised in Table 7.1 below:

TABLE 7.1

Sample identity		**Nature of contamination**	**Significance**
Trial pit	**Depth**		
TP 1	0.8 m	Heavy metal	Minor
TP 2	0.2 m	PAHs	Minor - Moderate
TP 3	0.25 m	PAHs	Minor – Moderate
TP 4	0.3 m	PAHs	Minor - Moderate
TP 5	0.25 m	PAHs, Heavy Metal	Minor - Moderate
TP 6	0.2 m	Heavy metal	Minor - Moderate
TP 8	0.3 m	PAHs, Heavy Metals	Minor - Moderate
TP 9	0.25 m	PAHs, Heavy Metal	Minor - Moderate
TP 10	0.2 m	PAHs, TPH	Moderate - High
TP 10	0.6 m	PAHs	Moderate
TP 11	0.3 m	PAHs, TPH	Minor
TP 12	0.2 m	PAHs	Minor
TP 13	0.1 m	PAHs	Moderate
TP 15	0.15 m	PAHs	Minor
TP 17	1.5 m	PAHs	Minor

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8. RISK ASSESSMENT

8.1 The contamination risk assessment has been prepared in accordance with the recommendations given in the Defra/EA publication "Model Procedures for the Management of Land Contaminated – Contaminated Land Report 11" 2004.

8.2 For contamination to be significant, there must be three elements present: *Contamination* (a substance that has the potential to cause harm or cause pollution of controlled waters), a *receptor* (something that could be adversely affected by a contaminant) and a feasible *pathway* (route or means) between substance and receptor. See Figure 4 below.

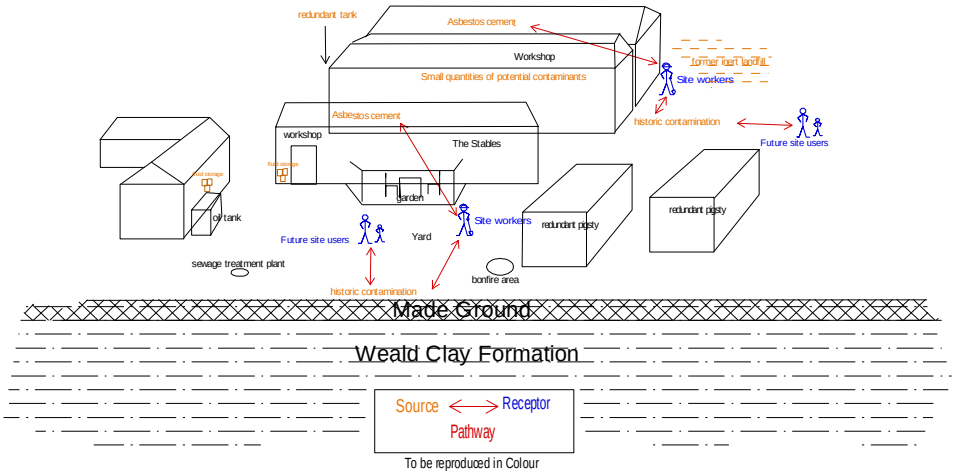

FIGURE 4
CONCEPTUAL MODEL

8.3 In this case, the model may be applied to three cases:

i. Construction workers engaged in the redevelopment of the site and exposed to contamination. The receptor assumed to be an adult.

ii. Future residents on the site after the redevelopment is complete and exposed to contact with soil in any garden areas plus, possibly, eating produce grown in a garden. The receptor assumed to be a child.

iii. Post-redevelopment impacts on the wider environment. Includes off-site contamination migration, contamination of watercourses, etc.

In this case evidence of contamination appears to be limited to the upper soil samples with the exception of the lower sample at TP1 (which is suspected to be cross-contamination from the overlying made ground) and contamination is minor – moderate. Contamination does not appear to have penetrated or otherwise affected the underlying clay, except in the case of TP10, where some evidence of soil mixing at the top of the clay layer was apparent.

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8.4 Exposure during construction

In the absence of mitigation, those appointed to undertake site clearance and groundworks may be exposed to PAH, and heavy metal contamination across the site.

This is most effectively addressed by general industrial hygiene when the surface soil and made ground is handled during site clearance and groundworks. Measures should include the wearing of boots, gloves and coveralls, and dust masks on dry days if dust is generated. Eating and smoking in excavations should be avoided.

8.5 Exposure of residents on the site after redevelopment

The site is to be redeveloped for residential use, including areas of soft landscaping and garden.

In the absence of remediation, future site users may be exposed to contaminants within the soil via inhalation, dermal contact and consumption of home grown produce.

This will only be a significant risk if the contaminated upper soil/made ground is allowed to remain within the garden and soft landscaping areas, where residents' contact with the soil is likely.

This is to be addressed by removing any upper soil/made ground identified as contaminated in the proposed garden and soft landscaping areas and replacing with clean topsoil from an uncontaminated source placed over permeable geotextile.

8.6 Post-redevelopment risks to buildings, services and the wider environment

There are no particular concerns regarding sulphate concentrations within the soil in relation to concrete building foundations, etc.

Migration of contamination off site is considered very unlikely due to the low permeability of the underlying strata and is considered to be limited to the upper soil/made ground across the site.

The site does not lie within a groundwater Source Protection Zone and is within an area which is not considered to be hydrogeologically sensitive. In this case, the proposed residential redevelopment of the site is not considered likely to pose a risk of contamination to the wider environment.

8.7 Asbestos Quantification

Chrysotile fibre (white asbestos) was identified within the upper soil samples at TP3, TP4, TP5, and TP6.

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Crocidolite fibre (blue asbestos) was also identified at TP5, this is a more harmful type of asbestos. This sample was sent for quantification analysis which revealed through hand picking / weighing that asbestos within the sample was present but fell below the reporting limit of detection. Thus, no additional recommendations are made.

9. CONCLUSIONS

9.1 The site lies on a layer of made ground and/or topsoil underlain by Weald Clay Formation.

9.2 The site lies on Unproductive Strata and does not lie within a groundwater source protection zone. The site is not considered to be hydrogeologically sensitive.

9.3 The site lies within Flood Zone 1 (at low risk of flooding with a less than 1 in 1000 annual probability of tidal or fluvial flooding). The site is predominantly at very low risk of surface water flooding, with a small area of medium to high risk adjacent to The Stables.

9.4 Oreham Piggeries (historic) landfill lies immediately to the south and east of the site. This was an inert waste landfill. No evidence of putrescible/organic material was observed during the excavation of the trial pits. There is not considered to be at significant risk of ground gas.

9.5 The site is not within a radon affected area and no radon protection measures for new buildings are indicated.

9.6 Land history has comprised agricultural land from pre 1873 to circa 1970s (which may have comprised grazing livestock and/or arable farming), and agricultural buildings from circa 1970s to date (which has included use as piggeries and ‘light industrial’ workshop to the southwest which included vehicle storage and maintenance).

9.7 The site investigation, comprising seventeen trial pits, has identified mainly minor – moderate contamination, principally heavy metal and polycyclic aromatic hydrocarbons (PAHs), in the made ground and in the topsoil at the site. The underlying clay was found to be uncontaminated with the exception of the lower samples from TP1 and TP10, although this is suspected to be due to superficial soil mixing at the interface between the made ground and the underlying clay. The made ground sample from TP10 was the most heavily PAH contaminated. TP10 is located in a former pond and it is suspected that the pond was backfilled with material with a high ash or other bonfire residuals content. Asbestos fibre was detected in the upper soil samples at TP3, TP4, TP5, TP6 and TP8, but was not found to be present in quantities likely to be of concern.

9.8 The overall environmental risk for the site is rated according to the risk assessment matrix in Table 9.1 below:

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TABLE 9.1
RISK ASSESSMENT MATRIX

PROBABILITY OF IMPACT	CONTAMINATION POTENTIAL		
	SEVERE	MODERATE OR UNCERTAIN	MINIMAL
High	4	3	2
Medium	3	2	1
Low	2	1	1

1 = low risk, 2 = low to medium risk, 3 = medium to high risk, 4 = high risk

9.9 In this case, the probability of impact is medium for a residential land use with minimal hydrogeological sensitivity. Generally minor to moderate contamination has been identified in the upper soil across the site, and within the lower soil at TP1 and TP10, which would give a rating of 2. Subject to remediation measures as recommended below, the overall environmental risk rating could be reduced to 1 (low).

10. RECOMMENDATIONS

10.1 The existing upper soil, whether made ground or topsoil, may be retained beneath permanent hardstanding, buildings and roadways. However, in the proposed garden and soft landscaping areas, the soil should be removed down to the clean underlying clay or to a depth of 0.6 m (whichever is reached first), a permeable geotextile laid, and the soil replaced with clean topsoil imported from an uncontaminated source.

10.2 The made ground in the former pond area (which exhibited the highest PAH concentrations) should be excavated down to the underlying clean clay, stockpiled, subject to Waste Acceptance Criteria (WAC) testing and disposed of to a suitably licenced landfill. The resulting void may be backfilled with clean soil or crushed recycled concrete, depending on the proposed future use.

10.3 The presence of PAHs within the upper and (some) lower layers of soil on the site may affect any new underground plastic (PE and PVC) water supply pipework. If new pipes are to be laid, analysis results should be reviewed against current UKWIR guidance, and barrier pipe may be required.

10.4 Evidence that the remediation has been carried out as recommended will need to be kept, including photographs of the work in progress, documentary evidence of the origin of the replacement topsoil and copies of the tickets for any material disposed of off-site. On completion of the works, a completion or verification report should be provided for the benefit of the local planning authority and the house insurers/guarantee providers.

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10.5 Groundworkers engaged in the removal of, or working within, the existing upper soil/made ground should practice appropriate industrial hygiene. Measures should include the wearing of boots, gloves and coveralls, and dust masks on dry days if dust is generated. Eating and smoking in excavations should be avoided.

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FIGURES

FIGURE 1: **Site Location Plan**
FIGURE 2: **Existing Site Layout**
FIGURE 3: **Proposed Development Plan (& trial pit locations)**
FIGURE 4: **Conceptual Model (in text)**



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Figure 1: Site Location

July 2023

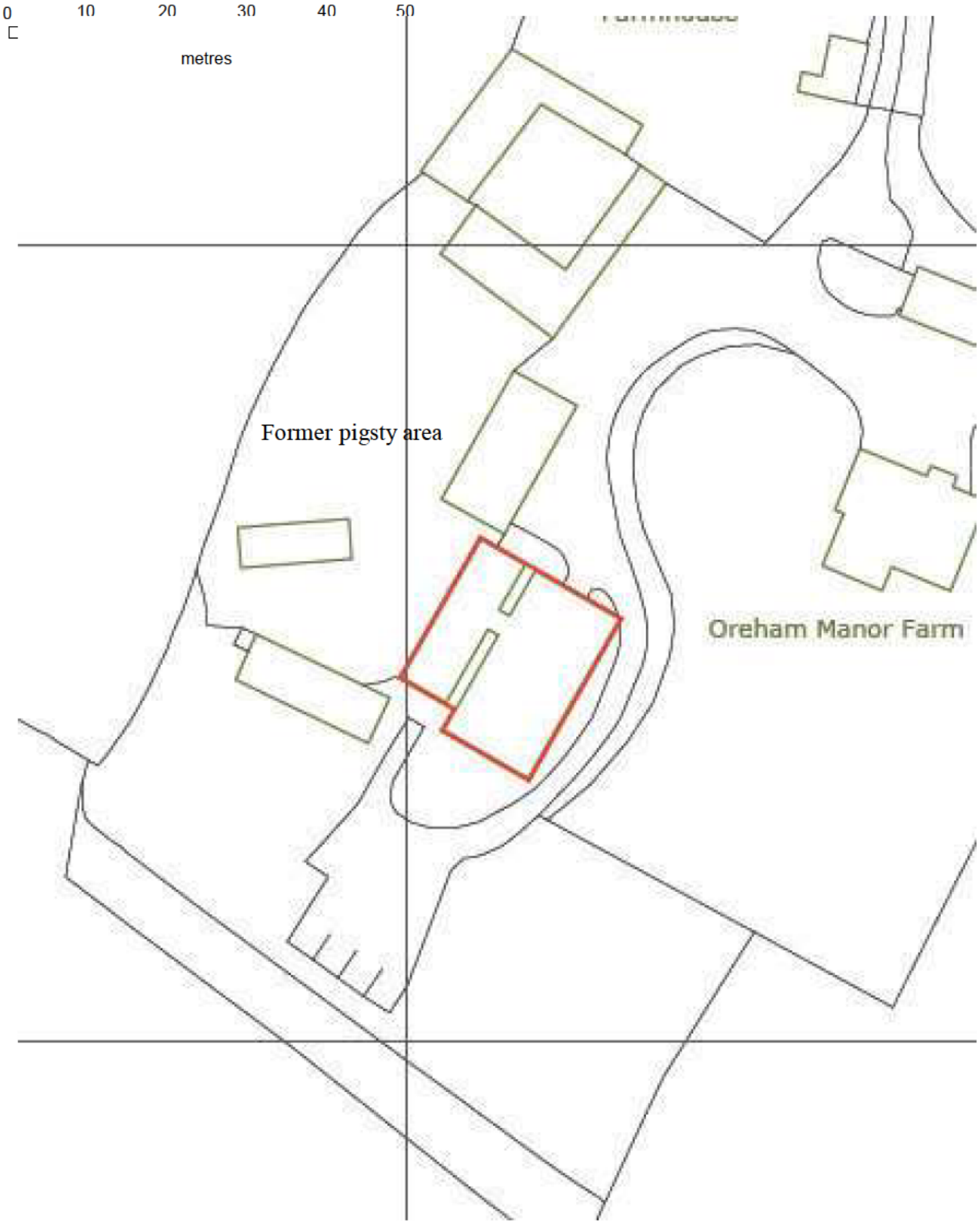

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Figure 2: Site Layout

July 2023

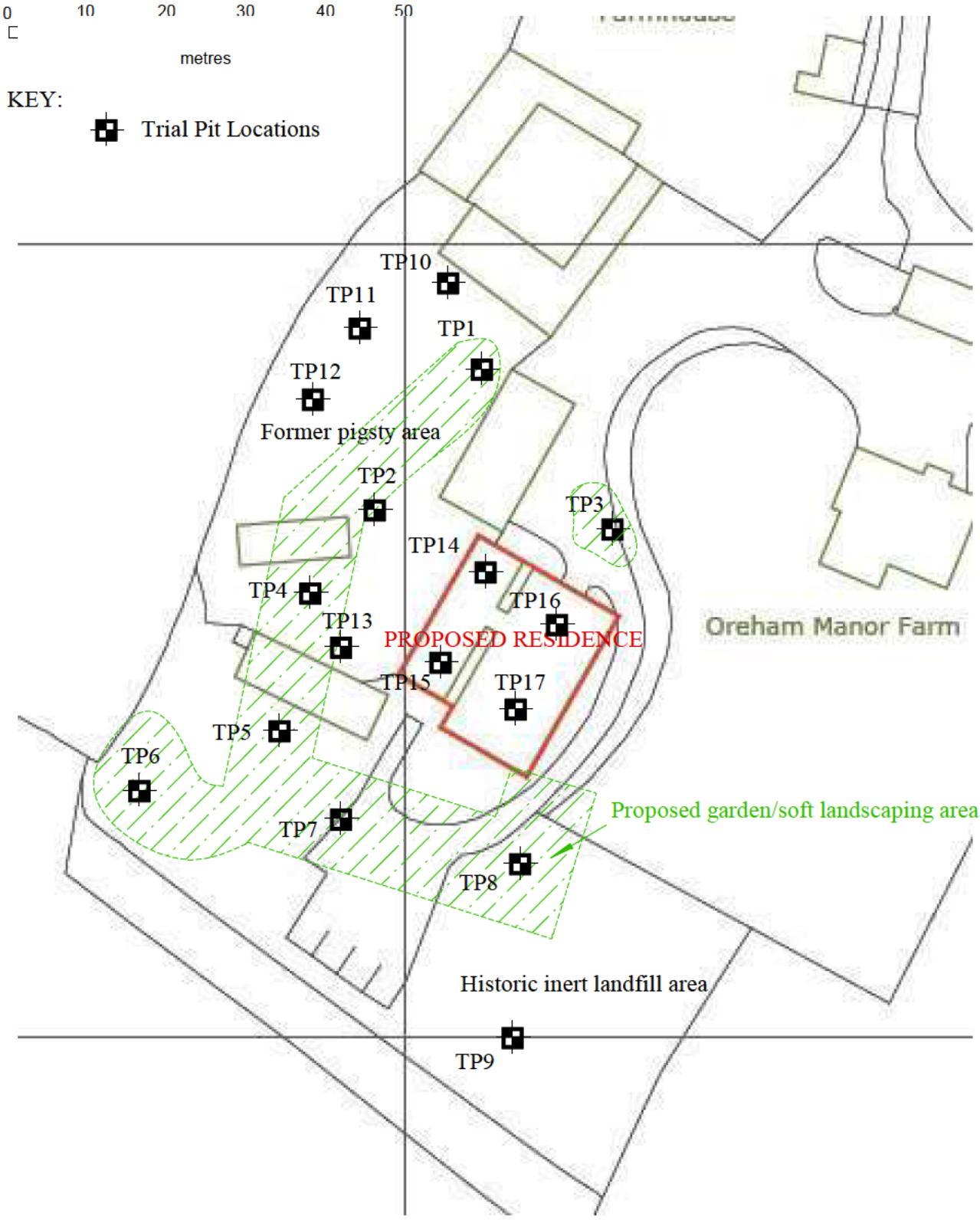

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Figure 3: Proposed Development & Trial Pit Locations

August 2024

APPENDIX A

Trial Pit Photographs



Photo 1: TP1



Photo 2: TP2



Photo 3: TP3



Photo 4: TP4



Photo 5: TP5



Photo 6: TP6



Photo 7: TP7



Photo 8: TP8

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Photo 9: TP9



Photo 10: TP10



Photo 11: TP11



Photo 12: TP12



Photo 13: TP13



Photo 14: TP14



Photo 15: TP15



Photo 16: TP16



Photo 17: TP17

APPENDIX B

Trial Pit Logs

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Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.4 m					Mixed re-worked clay & stone gravel MADE GROUND
	D	0.8 m			0.7 m		Dark grey silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.2
Made by	LC
Job No.	574
Borehole or Trial Pit No.	1 Former pond location

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Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.2 m					Brick & concrete gravel with re-worked clay MADE GROUND
					0.6 m		
	D	0.7 m					Brown/grey silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.2
Made by	LC
Job No.	574
Borehole or Trial Pit No.	2

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.25m			0.2 m		Brick & concrete hardcore MADE GROUND
							Dark brown topsoil with roots
	D	1.0 m			0.9 m		Brown silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.3
Made by	LC
Job No.	574
Borehole or Trial Pit No.	3

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Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.3 m					Brick & concrete gravel with reworked clay MADE GROUND
					0.6m		
	D	0.7 m					Brown/grey silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.1
Made by	LC
Job No.	574
Borehole or Trial Pit No.	4

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Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
							Stone gravel & soil
	D	0.25m			0.2 m		Drak brown soil & tarmac MADE GROUND
					0.6m		Brown/grey silty clay WEALD CLAY
	D	1.2 m					

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.4
Made by	LC
Job No.	574
Borehole or Trial Pit No.	5

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.2 m					Stone gravel & soil MADE GROUND
					0.5 m		
	D	0.6 m					Brown silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.0
Made by	LC
Job No.	574
Borehole or Trial Pit No.	6

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.25m					Brick & concrete gravel soil mix MADE GROUND
					0.4 m		
	D	0.5 m					Brown/grey silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 0.9
Made by	LC
Job No.	574
Borehole or Trial Pit No.	7

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.3 m					Dark brown soil & tarmac mix MADE GROUND
					1.0 m		
	D	1.2 m					Brown silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.5
Made by	LC
Job No.	574
Borehole or Trial Pit No.	8

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Original Trial Pits	Date: 16 June 2023

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.25m					Brick & flint brown soil mix MADE GROUND
					1.1 m		
	D	1.2 m					Brown/grey silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 1.5
Made by	LC
Job No.	574
Borehole or Trial Pit No.	9

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Additional Trial Pits	Date: 09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.2 m			0.1 m		Light brown topsoil
							Weathered clay and gravel
							MADE GROUND
	D	0.6 m			0.55 m		Dark grey silty clay
							WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 0.9
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	10

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Additional Trial Pits	Date: 09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
							Concrete
	D	0.3 m			0.28 m		Gravel & hardcore
					0.4 m		MADE GROUND
	D	0.6 m					Dark grey & brown silty clay
							WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 0.9
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	11

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Additional Trial Pits	Date: 09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.2 m					Topsoil & gravel MADE GROUND
					0.3 m		
	D	0.6 m					Dark grey & brown silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 0.9
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	12

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Additional Trial Pits	Date: 09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
					0.05 m		Concrete
	D	0.1 m					Gravel & hardcore
							MADE GROUND
					0.3 m		
							Dark grey & brown silty clay
	D	0.6 m					WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	1.0 x 0.5 x 0.9
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	13

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Additional Trial Pits	Date: 09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
							Concrete
	D	0.15 m			0.14 m		Gravel & hardcore MADE GROUND
					0.4 m		
	D	0.5 m					Dark grey & brown silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	0.5 x 0.5 x 0.9
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	14

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Additional Trial Pits	Date: 09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
	D	0.15 m			0.1 m		Concrete
							Gravel & hardcore
					0.3 m		MADE GROUND
	D	0.5 m					Dark grey & brown silty clay
							WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	0.5 x 0.5 x 0.9
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	15

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield Additional Trial Pits	Date: 09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
							Concrete
	D	0.3 m			0.25 m		Gravel & hardcore MADE GROUND
					0.4 m		
	D	0.55 m					Dark grey & brown silty clay WEALD CLAY

Remarks

No groundwater encountered

Method	Trial Pit
Dimensions Dia	0.5 x 0.5 x 0.9
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	16

Environmental Assessment Services Limited

Oreham Manor Farm, Henfield
Additional Trial Pits

Date:
09 Aug 2024

Standpipe	Sampling			Strata			
	Type	Depths From	Depths To	Legend	Depth bgl	R L	Strata Description
				Inspection pit			
					1.2 m		Concrete
					1.3 m		Gravel & hardcore MADE GROUND
	D	1.5 m			1.35 m		Dark grey & brown silty clay WEALD CLAY

Remarks

Soil saturated
Hole filled with water to underside of concrete

Method	Trial Pit
Dimensions Dia	0.5 x 0.5 x 1.6
Made by	XL
Job No.	574B
Borehole or Trial Pit No.	17

APPENDIX C

Analysis Certificates

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Analytical Report Number : 23-41550

Project / Site name:	Oreham Manor Farm	**Samples received on:**	27/06/2023
Your job number:	574A	**Samples instructed on/ Analysis started on:**	27/06/2023
Your order number:	574A	**Analysis completed by:**	06/07/2023
Report Issue Number:	1	**Report issued on:**	06/07/2023
Samples Analysed:	18 soil samples		

Signed:

Dominika Warjan
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-41550
Project / Site name: Oreham Manor Farm
Your Order No: 574A

Lab Sample Number				2727579	2727580	2727581	2727582
Sample Reference				TP1	TP1	TP2	TP2
Sample Number				Lower	Upper	Lower	Upper
Depth (m)				0.80	0.40	0.70	0.20
Date Sampled				26/06/2023	26/06/2023	26/06/2023	26/06/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	5.2	18	12
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	SPU	N/A	SPU
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	11	9.2	6.9	7.8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.56	0.15	0.042	0.023
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.18
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.07
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.09
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.39	< 0.05	0.69
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.1	< 0.05	0.3
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.1	< 0.05	3.1
Pyrene	mg/kg	0.05	MCERTS	< 0.05	1.1	< 0.05	3.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.74	< 0.05	2.2
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.69	< 0.05	2.3
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	1.1	< 0.05	4.1
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.47	< 0.05	1.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.93	< 0.05	3.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.58	< 0.05	2
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.11	< 0.05	0.53
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.73	< 0.05	2.3
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	8.15	< 0.80	25.5
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	31	16	22	15
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	0.8	0.6	2.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	6.8	0.6	< 0.2	1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	40	16	25	28
Copper (aqua regia extractable)	mg/kg	1	MCERTS	62	47	26	89
Lead (aqua regia extractable)	mg/kg	1	MCERTS	200	48	33	56
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	37	16	15	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	5.8	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	190	270	60	410
Petroleum Hydrocarbons							
TPH C10 - C40 EH_CU_1D_TOTAL	mg/kg	10	MCERTS	< 10	71	< 10	95

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-41550
Project / Site name: Oreham Manor Farm
Your Order No: 574A

Lab Sample Number				2727583	2727584	2727585	2727586
Sample Reference				TP3	TP3	TP4	TP4
Sample Number				Lower	Upper	Lower	Upper
Depth (m)				1.00	0.25	0.70	0.30
Date Sampled				26/06/2023	26/06/2023	26/06/2023	26/06/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	17	11	23	5.4
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile- Loose Fibres	-	Chrysotile- Loose Fibres
Asbestos in Soil	Type	N/A	ISO 17025	-	Detected	-	Detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	SPU	N/A	SPU
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	7.9	8.6	6.9	8.8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.12	0.19	0.16	0.13
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.52	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.36	< 0.05	0.18
Acenaphthene	mg/kg	0.05	MCERTS	0.15	0.21	< 0.05	0.62
Fluorene	mg/kg	0.05	MCERTS	0.19	0.2	< 0.05	0.65
Phenanthrene	mg/kg	0.05	MCERTS	1	3	< 0.05	5.5
Anthracene	mg/kg	0.05	MCERTS	0.3	1	< 0.05	1.1
Fluoranthene	mg/kg	0.05	MCERTS	1.7	10	< 0.05	7.5
Pyrene	mg/kg	0.05	MCERTS	1.3	10	< 0.05	6.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.58	6.5	< 0.05	3.6
Chrysene	mg/kg	0.05	MCERTS	0.56	5.6	< 0.05	2.8
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.63	10	< 0.05	4.5
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.21	2.9	< 0.05	1.4
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.45	7.2	< 0.05	3.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.21	4.2	< 0.05	1.7
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.05	1.2	< 0.05	0.51
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.25	5	< 0.05	2
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	7.62	68.2	< 0.80	41.5
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	24	11	34	8.1
Boron (water soluble)	mg/kg	0.2	MCERTS	0.8	0.5	1.1	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.5	< 0.2	1.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	18	39	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	39	52	33	63
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	120	23	75
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	25	14	14	9.6
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	73	200	60	180
Petroleum Hydrocarbons							
TPH C10 - C40 $_{EH_CU_1D_TOTAL}$	mg/kg	10	MCERTS	< 10	280	< 10	88

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 23-41550
Project / Site name: Oreham Manor Farm
Your Order No: 574A

Lab Sample Number				2727587	2727588	2727589	2727590
Sample Reference				TP5	TP5	TP6	TP6
Sample Number				Lower	Upper	Lower	Upper
Depth (m)				1.20	0.25	0.60	0.20
Date Sampled				26/06/2023	26/06/2023	26/06/2023	26/06/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	22	23	18	15
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1.2	1.2
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile, Crocidolite- Loose Fibres	-	Chrysotile- Loose Fibres
Asbestos in Soil	Type	N/A	ISO 17025	-	Detected	-	Detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	SPU	N/A	SPU

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8	7.6	7.6	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	3.5	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.18	0.077	0.19	0.096

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.15	0.17	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.09	0.11	< 0.05	0.08
Acenaphthene	mg/kg	0.05	MCERTS	0.15	0.12	< 0.05	0.08
Fluorene	mg/kg	0.05	MCERTS	0.26	0.16	< 0.05	0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.5	1.2	< 0.05	1
Anthracene	mg/kg	0.05	MCERTS	0.27	0.3	< 0.05	0.29
Fluoranthene	mg/kg	0.05	MCERTS	2.5	3	< 0.05	2.3
Pyrene	mg/kg	0.05	MCERTS	2.4	3.1	< 0.05	2.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.4	1.6	< 0.05	1.2
Chrysene	mg/kg	0.05	MCERTS	1.5	1.7	< 0.05	1.3
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2	2.6	< 0.05	1.7
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.72	0.93	< 0.05	0.72
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4	1.8	< 0.05	1.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.79	1.4	< 0.05	0.83
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.22	0.29	< 0.05	0.19
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.9	1.4	< 0.05	1

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	16.3	19.7	< 0.80	14.3

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	22	21	18
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	1.2	1.4	2.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	3.5	< 0.2	1.7
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	39	33	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	17	190	28	200
Lead (aqua regia extractable)	mg/kg	1	MCERTS	55	1800	29	210
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.6	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	39	15	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	190	5200	71	680

Petroleum Hydrocarbons

TPH C10 - C40 $_{EH_CU_1D_TOTAL}$	mg/kg	10	MCERTS	< 10	320	< 10	75

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 23-41550
Project / Site name: Oreham Manor Farm
Your Order No: 574A

Lab Sample Number				2727591	2727592	2727593	2727594
Sample Reference				TP7	TP7	TP8	TP8
Sample Number				Lower	Upper	Lower	Upper
Depth (m)				0.50	0.25	1.20	0.30
Date Sampled				26/06/2023	26/06/2023	26/06/2023	26/06/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	18	11	17	8
Total mass of sample received	kg	0.001	NONE	1.3	1.3	1.3	1.3
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Chrysotile- Loose Fibres
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	Detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	SPU	N/A	SPU
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	7.1	7.6	7.5	7.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.24	1.7	0.086	1.4
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.64
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.34
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.73
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.56
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.14	< 0.05	3.7
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	1.2
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.25	0.11	10
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.29	0.1	9.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.17	0.05	6
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.15	0.08	5.6
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.18	0.09	7.3
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.09	< 0.05	3
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.12	< 0.05	5.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.07	< 0.05	3.3
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.8
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.12	< 0.05	3.6
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	1.58	< 0.80	62
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	15	18	49
Boron (water soluble)	mg/kg	0.2	MCERTS	0.4	1	1.8	7.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.6	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	26	17	25	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	25	26	280
Lead (aqua regia extractable)	mg/kg	1	MCERTS	25	45	39	340
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	13	12	19	43
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	53	80	67	420
Petroleum Hydrocarbons							
TPH C10 - C40 $_{EH_CU_1D_TOTAL}$	mg/kg	10	MCERTS	< 10	340	< 10	270

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-41550
Project / Site name: Oreham Manor Farm
Your Order No: 574A

Lab Sample Number				2727595	2727596
Sample Reference				TP9	TP9
Sample Number				Lower	Upper
Depth (m)				1.20	0.25
Date Sampled				26/06/2023	26/06/2023
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	24	4.8
Total mass of sample received	kg	0.001	NONE	1.3	1.3

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	SPU

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.13	0.27

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.21
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.46
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	1
Fluorene	mg/kg	0.05	MCERTS	< 0.05	1.1
Phenanthrene	mg/kg	0.05	MCERTS	0.24	11
Anthracene	mg/kg	0.05	MCERTS	0.06	3.4
Fluoranthene	mg/kg	0.05	MCERTS	0.47	25
Pyrene	mg/kg	0.05	MCERTS	0.41	24
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.26	14
Chrysene	mg/kg	0.05	MCERTS	0.26	11
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.34	14
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.1	6.2
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.24	13
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.16	6.5
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	1.4
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.18	6.9

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	2.72	138

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	15
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.6
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	29
Copper (aqua regia extractable)	mg/kg	1	MCERTS	37	58
Lead (aqua regia extractable)	mg/kg	1	MCERTS	44	240
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	29	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	110	200

Petroleum Hydrocarbons

TPH C10 - C40 $_{EH_CU_1D_TOTAL}$	mg/kg	10	MCERTS	< 10	230

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 23-41550
Project / Site name: Oreham Manor Farm

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2727579	TP1	Lower	0.8	Brown clay and sand.
2727580	TP1	Upper	0.4	Brown sand with gravel and vegetation.
2727581	TP2	Lower	0.7	Brown clay and sand.
2727582	TP2	Upper	0.2	Brown sand with gravel and vegetation.
2727583	TP3	Lower	1	Brown clay with vegetation.
2727584	TP3	Upper	0.25	Brown sand with gravel and vegetation.
2727585	TP4	Lower	0.7	Brown clay.
2727586	TP4	Upper	0.3	Brown sandy loam with gravel and vegetation.
2727587	TP5	Lower	1.2	Brown sandy clay with gravel.
2727588	TP5	Upper	0.25	Brown sand with gravel.
2727589	TP6	Lower	0.6	Brown clay and sand.
2727590	TP6	Upper	0.2	Brown sandy clay with gravel.
2727591	TP7	Lower	0.5	Brown clay and sand.
2727592	TP7	Upper	0.25	Brown sand with gravel.
2727593	TP8	Lower	1.2	Brown clay and sand.
2727594	TP8	Upper	0.3	Brown sandy loam with gravel and vegetation.
2727595	TP9	Lower	1.2	Brown clay and sand.
2727596	TP9	Upper	0.25	Brown sandy loam with gravel and vegetation.

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Analytical Report Number : 23-41550
Project / Site name: Oreham Manor Farm

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS

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Analytical Report Number : 23-41550
Project / Site name: Oreham Manor Farm

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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Analytical Report Number : 24-036542

Project / Site name:	Oreham Manor Farm 5746	**Samples received on:**	13/08/2024
Your job number:	5746	**Samples instructed on/ Analysis started on:**	14/08/2024
Your order number:		**Analysis completed by:**	22/08/2024
Report Issue Number:	1	**Report issued on:**	22/08/2024
Samples Analysed:	15 soil samples		

Signed: [redacted]

Rafał Szczepańczyk
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 24-036542
Project / Site name: Oreham Manor Farm 5746

Lab Sample Number				287488	287489	287490	287491	287492
Sample Reference				TP	TP	TP	TP	TP
Sample Number				10	10	11	11	12
Depth (m)				0.20	0.60	0.30	0.60	0.20
Date Sampled				09/08/2024	09/08/2024	09/08/2024	09/08/2024	09/08/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	38.9	< 0.1	31.5
Moisture Content	%	0.01	NONE	13	47	11	27	9.9
Total mass of sample received	kg	0.1	NONE	0.8	0.8	0.3	0.5	0.2
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EC	-	EC	-	EC
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	9.6	8.4	11.1	7.8	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	300	170	480	710	390
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	148	86.8	241	355	194
Organic Matter (automated)	%	0.1	MCERTS	4.7	1.6	0.8	4.5	2.6
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	0.49	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	1.8	0.07	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	1.2	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	1.3	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	20	0.4	0.05	< 0.05	0.4
Anthracene	mg/kg	0.05	MCERTS	5.7	0.11	< 0.05	< 0.05	0.08
Fluoranthene	mg/kg	0.05	MCERTS	54	1.3	0.13	0.07	0.49
Pyrene	mg/kg	0.05	MCERTS	49	1.3	0.12	0.07	0.42
Benzo(a)anthracene	mg/kg	0.05	MCERTS	28	0.71	< 0.05	< 0.05	0.19
Chrysene	mg/kg	0.05	MCERTS	25	0.65	< 0.05	< 0.05	0.19
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	36	0.84	< 0.05	< 0.05	0.29
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	14	1.2	< 0.05	< 0.05	0.08
Benzo(a)pyrene	mg/kg	0.05	MCERTS	33	0.83	0.08	< 0.05	0.21
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	16	0.44	< 0.05	< 0.05	0.11
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	3.9	0.2	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	17	0.5	< 0.05	< 0.05	0.13
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	307	8.53	< 0.80	< 0.80	2.56
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	23	5.4	18	13
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	0.7	0.7	2.4	1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.9	4.5	0.4	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	30	30	19	29	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	41	25	15	21	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	98	150	33	38	35
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	33	28	12	18	13
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.4	4.2	1.4	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	160	130	190	80	150

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Analytical Report Number: 24-036542
Project / Site name: Oreham Manor Farm 5746

Lab Sample Number				287488	287489	287490	287491	287492
Sample Reference				TP	TP	TP	TP	TP
Sample Number				10	10	11	11	12
Depth (m)				0.20	0.60	0.30	0.60	0.20
Date Sampled				09/08/2024	09/08/2024	09/08/2024	09/08/2024	09/08/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	6.1	< 2.0	2.2	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	18	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	97	< 8.0	110	< 8.0	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	120	< 10	110	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	21	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	220	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	580	23	34	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	830	23	34	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-036542
Project / Site name: Oreham Manor Farm 5746

Lab Sample Number				287493	287494	287495	287496	287497
Sample Reference				TP	TP	TP	TP	TP
Sample Number				12	13	13	14	14
Depth (m)				0.60	0.10	0.60	0.15	0.50
Date Sampled				09/08/2024	09/08/2024	09/08/2024	09/08/2024	09/08/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	35.5	< 0.1
Moisture Content	%	0.01	NONE	20	12	22	5.3	23
Total mass of sample received	kg	0.1	NONE	0.3	0.3	0.8	0.8	0.8
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	-	Not-detected	-	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	-	EC	-	EC	-
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.3	9.2	7.4	11.6	8.3
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	350	250	170	94	580
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	177	125	83.9	47.2	291
Organic Matter (automated)	%	0.1	MCERTS	1.5	1.6	0.8	0.3	0.6
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.07	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.1	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.09	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	1.3	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.38	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	2.1	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	2	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	1.1	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	1.2	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	1.9	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	0.63	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	1.6	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.97	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.17	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	1.1	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	14.6	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	18	12	32	11	36
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	0.3	0.9	2.2	1.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	1.5	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	28	42	13	44
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	30	21	7.5	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	28	120	27	9.7	22
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	17	16	9.7	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.2	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	51	130	56	26	49

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Analytical Report Number: 24-036542
Project / Site name: Oreham Manor Farm 5746

Lab Sample Number				287493	287494	287495	287496	287497
Sample Reference				TP	TP	TP	TP	TP
Sample Number				12	13	13	14	14
Depth (m)				0.60	0.10	0.60	0.15	0.50
Date Sampled				09/08/2024	09/08/2024	09/08/2024	09/08/2024	09/08/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	16	< 8.0
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10	< 10	16	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	16	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	16	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number: 24-036542
Project / Site name: Oreham Manor Farm 5746

Lab Sample Number				287498	287499	287500	287501	287502
Sample Reference				TP	TP	TP	TP	TP
Sample Number				15	15	16	16	17
Depth (m)				0.15	0.60	0.30	0.50	1.50
Date Sampled				09/08/2024	09/08/2024	09/08/2024	09/08/2024	09/08/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Stone Content	%	0.1	NONE	23.6	< 0.1	24.8	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	6.9	24	4.4	22	19
Total mass of sample received	kg	0.1	NONE	0.2	0.8	0.8	0.8	0.8
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	-	Not-detected	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	EC	-	EC	-	EC
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	11.6	8	12	8.1	7.8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	120	810	57	180	620
Water Soluble SO_4 16hr extraction (2:1)	mg/l	1.25	MCERTS	61.8	405	28.6	87.7	308
Organic Matter (automated)	%	0.1	MCERTS	0.7	2.8	0.3	2.1	0.6
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.06	< 0.05	< 0.05	< 0.05	0.06
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05	< 0.05	0.06
Pyrene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	< 0.80	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	22	8.9	26	17
Boron (water soluble)	mg/kg	0.2	MCERTS	1	1.6	0.5	0.5	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	30	14	35	38
Copper (aqua regia extractable)	mg/kg	1	MCERTS	46	24	7.4	23	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14	30	5.2	37	19
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	15	12	20	16
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	75	60	44	79	47

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Analytical Report Number: 24-036542
Project / Site name: Oreham Manor Farm 5746

Lab Sample Number				287498	287499	287500	287501	287502
Sample Reference				TP	TP	TP	TP	TP
Sample Number				15	15	16	16	17
Depth (m)				0.15	0.60	0.30	0.50	1.50
Date Sampled				09/08/2024	09/08/2024	09/08/2024	09/08/2024	09/08/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**					
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	11	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	78	< 8.0	52	< 8.0	46
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	78	< 10	64	< 10	46
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10	< 10	< 10	< 10
VOCs								
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 24-036542
Project / Site name: Oreham Manor Farm 5746

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
287488	TP	10	0.2	Brown loam and clay with gravel and vegetation
287489	TP	10	0.6	Brown clay and sand with gravel
287490	TP	11	0.3	Brown loam with gravel and stones
287491	TP	11	0.6	Brown loam and clay with gravel and vegetation
287492	TP	12	0.2	Brown loam with vegetation and stones
287493	TP	12	0.6	Brown loam and clay with gravel
287494	TP	13	0.1	Brown loam with gravel and vegetation
287495	TP	13	0.6	Brown loam and clay with gravel
287496	TP	14	0.15	Brown loam with gravel and stones
287497	TP	14	0.5	Brown clay and sand with gravel
287498	TP	15	0.15	Brown loam with gravel and stones
287499	TP	15	0.6	Brown loam and clay with gravel and vegetation
287500	TP	16	0.3	Brown loam with gravel and stones
287501	TP	16	0.5	Brown loam and clay with gravel
287502	TP	17	1.5	Brown clay and sand with gravel and vegetation

Analytical Report Number : 24-036542
Project / Site name: Oreham Manor Farm 5746

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS

Analytical Report Number : 24-036542
Project / Site name: Oreham Manor Farm 5746

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

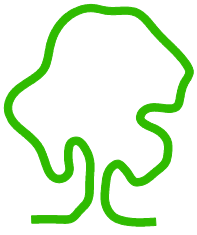
For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#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 e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution



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