



**Manor Nursery
Angmering
West Sussex**

**Revised Ground Contamination
Risk Assessment Report**

Report Beneficiary:
Roffey Homes Ltd.
17-19 Buckingham Road
Worthing
West Sussex
BN11 1TH

Project Reference: P14618

Report Reference: R14233

Document Control			
Issue No.	Status	Issue Date	Notes
1	Final	29 th May 2020	
Report Section		Prepared By	Approved By
Preliminary Ground Contamination Risk Assessment		Stuart Card BA (Hons)	Alex Minchell-Bewick BSc MSc DIC AIEMA MEnvSc CEnv
Factual Section		Stuart Card BA (Hons)	Alex Minchell-Bewick BSc MSc DIC AIEMA MEnvSc CEnv
Quantitative Ground Contamination Risk Assessment		Stuart Card BA (Hons)	Alex Minchell-Bewick BSc MSc DIC AIEMA MEnvSc CEnv
Remediation Strategy and Verification Plan		Stuart Card BA (Hons)	Alex Minchell-Bewick BSc MSc DIC AIEMA MEnvSc CEnv

Head Office
Unit 3
The Old Grain Store
Ditchling Common Business Park
Ditchling
East Sussex
BN6 8SG

Northern Office
Suite C2
Dunham House
85-89 Cross Street
Sale
Cheshire
M33 7HH

Limitations

This report was prepared specifically for the Client's project and may not be appropriate to alternative schemes. The copyright for the report and licence for its use shall remain vested in Ashdown Site Investigation Limited (the Company) who disclaim all responsibility or liability (whether at common law or under the express or implied terms of the Contract between the Company and the Client) for any loss or damage of whatever nature in the event that this report is relied on by a third party, or is issued in circumstances or for projects for which it was not originally commissioned.

This report is not intended to be either an ecological, archaeological or flood risk assessment. An appropriate specialist should be consulted about any concerns that may arise in this regard.

EXECUTIVE SUMMARY

The following presents a summary of the main findings of the report. It is emphasised that no reliance should be placed on any individual point until the whole of the report has been read as other sections of the report may put into context the information contained herein.

It is proposed to construct 32 new houses with private gardens and associated car parking and new access roads at the site of the former Manor Nursery, Angmering West Sussex. An area of public open space is also proposed in the north west of the site.

At the time of the site walkover survey undertaken in March 2015, the site comprised a retail nursery, with associated car parking, display and growing area. A small brick built plant room with a suspected asbestos roof was located adjacent to the north eastern corner of the nursery. In the south eastern corner of the site was an open area of ground where the remains of a large bonfire, including various pieces of scrap metal, was noted.

At the time of the current phase of ground investigation, the buildings on site (with the exception of the plant room) had been demolished, though the floor slab for the nursery building remained in situ. The plant room roof had been removed. The location of the bonfire was significantly overgrown by this time, though no evidence of remaining bonfire residue was observed between the brambles and weeds.

The site was undeveloped up until circa 1977 when nursery buildings were first shown. The construction and subsequent demolition of some ancillary structures has taken place since the nursery was first developed.

The site is reported to be within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings.

Reference to geological datasets indicates that the site is expected to be underlain by the River Terrace Deposits overlying the White Chalk Subgroup. The ground investigation confirmed the underlying soils to comprise a variable thickness of made ground, overlying generally gravelly clays and gravels of the River Terrace Deposits.

The River Terrace Deposits are classed as a Secondary A Aquifer. The White Chalk Subgroup is classed as a Principal Aquifer. The site does not lie within an Environment Agency Source Protection Zone with regard to the protection of the quality of groundwater that is abstracted for potable supply. Groundwater was not encountered during the intrusive works.

The preliminary contamination risk assessment identified potential pollutant linkages relating to both proposed end users of the site and controlled waters.

Following two phases of ground investigation, no unacceptable risks to end users or controlled waters from soil contamination is considered to be present at the site. However, remedial measures will be necessary to mitigate the risk from radon gas at the site.

The recommendations made and the conclusions drawn should be considered as provisional until such time as the risk assessment has been approved by the Local Authority.

TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	WALKOVER SURVEY	2
3.	ENVIRONMENTAL AND GEO-ENVIRONMENTAL DATA REVIEW	4
3.1	Geological Data Review	4
3.2	Hydrogeology and Hydrology	6
3.3	Environmental Data Review	7
4.	HISTORICAL MAP REVIEW	8
5.	PRELIMINARY CONTAMINATION RISK ASSESSMENT	9
5.1	Introduction	9
5.2	Basis of Assessment	9
5.3	Potential Contamination Sources Identified	10
5.4	Preliminary Conceptual Model	10
6.	GROUND INVESTIGATION	11
6.1	Introduction	11
6.2	Exploratory Holes	11
6.3	Sampling	11
6.4	Laboratory Testing	12
7.	GROUND CONDITIONS	13
7.1	Stratigraphy	13
7.2	Stability	13
7.3	Groundwater Conditions	13
8.	REVISED QUANTITATIVE CONTAMINATION ASSESSMENT	14
8.1	Assessment Strategy	14
8.2	Analysis of Contamination Test Results	14
8.3	Radon Gas	19
8.4	Revised Quantitative Contamination Risk Assessment	19
8.5	Risks to Other Potential Receptors	20
8.6	Recommendations	20
8.7	Discovery Strategy	20
9.	REGULATORY APPROVAL	21

FIGURES AND APPENDICES

FIGURES

- Figure 1 Site Location Plan
- Figure 2 Site Plan

APPENDIX A

- Proposed Development Layout

APPENDIX B

- Classification of Probability, Consequence and Risk

APPENDIX C

- Preliminary Conceptual Model

APPENDIX D

- Exploratory Hole Notes
- Exploratory Hole Records (LW26073)
- Exploratory Hole Records (P14618)

APPENDIX E

- Contamination Test Results (LW26073)
- Contamination Test Results (P14618)

APPENDIX F

- Statistical Analysis Summary Sheets

APPENDIX G

- Quantitative Conceptual Model

1. INTRODUCTION

It is proposed to construct 32 new houses with private gardens and associated car parking and new access roads at the site of the former Manor Nursery, Angmering West Sussex. An area of public open space is also proposed in the north west of the site. A copy of the proposed development layout is presented in Appendix A.

Ashdown Site Investigation Ltd. has previously undertaken a ground investigation at the site as presented within a combined geotechnical and ground contamination risk assessment¹. At the time of the first phase of investigation the nursery buildings were still operational.

The preliminary ground contamination risk assessment undertaken at that time identified a number of potential pollutant linkages, including that the site is located within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings.

The quantitative ground contamination risk assessment identified elevated concentrations of arsenic in the location of a bonfire in the south eastern corner of the site. The assessment also concluded that there remained the potential for petroleum hydrocarbon contamination in the vicinity of a plant room, which had previously housed an oil fired boiler.

Following demolition and clearance of the nursery buildings, Ashdown Site Investigation Ltd. has been instructed to undertake additional ground investigation works at the site to further quantify the risks previously identified, and to produce an updated report including a revised quantitative risk assessment for the site to assist in the discharge of planning conditions.

The specific objectives of the works were to:

- a) Establish the expected geology, hydrogeology and hydrology at the site;
- b) Ascertain the development history and current site use;
- c) Develop a preliminary conceptual model of the site identifying potential pollutant linkages relating to end users of the proposed development works, to controlled waters beneath and in the vicinity of the site, or to other off-site sensitive receptors, if identified;
- d) Investigate the ground and groundwater conditions prevailing at the site;
- e) Test for the presence of contaminants identified by the preliminary conceptual model; and
- f) Develop a quantitative conceptual model of the site, refining the preliminary model to identify any pollutant linkages that may be present.

This report includes the geo-environmental data and historical maps² together with the factual information (exploratory hole logs and laboratory test results) obtained from the previous phase of investigation.

The scope of the works covered by this report, and the terms and conditions under which they were undertaken, were set out within the offer letter Q8714, dated 26th June 2019. The instruction to proceed was received from the client, Roffey Homes Ltd.

¹ Report No. LW26073, dated April 2015.

² Report Number LW26073/map, dated March 2015.

R14233

2. WALKOVER SURVEY

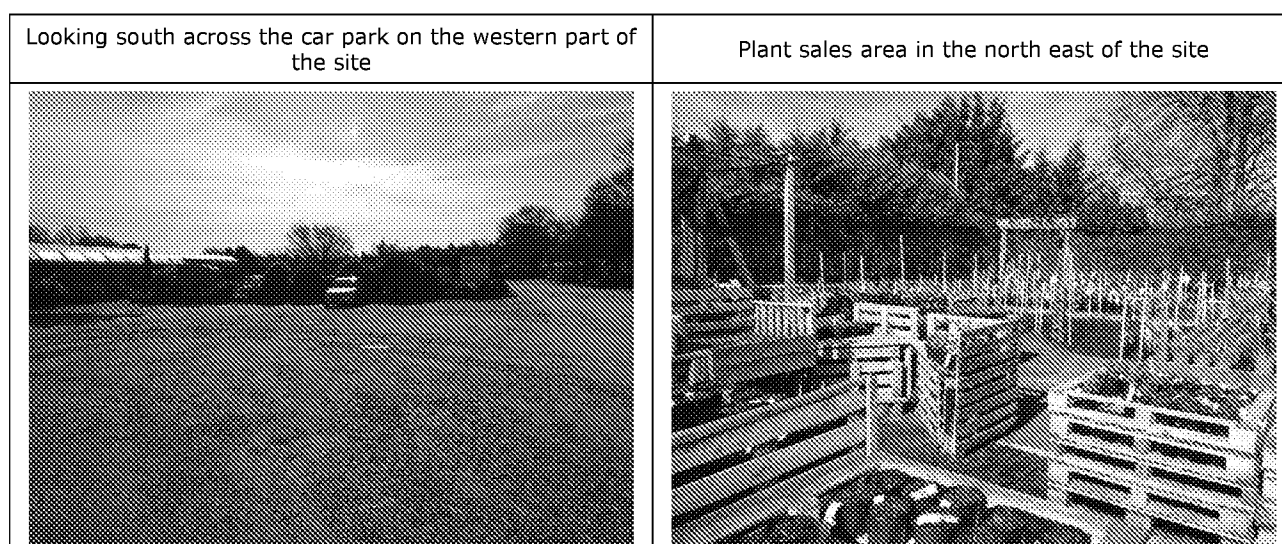
The site comprises an irregular shaped plot of land located off High Street, Angmering, West Sussex, and is centred on the approximate Ordnance Survey national grid reference TQ 0764 0424. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively.

At the time of the walkover undertaken in March 2015, the site comprised a retail nursery, with associated car parking, display and growing area.

An access road led onto the site in its north western corner. This led to a roadstone surfaced car park which occupied much of the western half of the site.

Some pallets of compost and other products were stored in various places in the car park. A small wooden toilet block was located on the southern boundary of the site.

The north eastern part of the site was occupied by an outdoor plant display area which was surfaced with a mixture of concrete and geotextile matting.

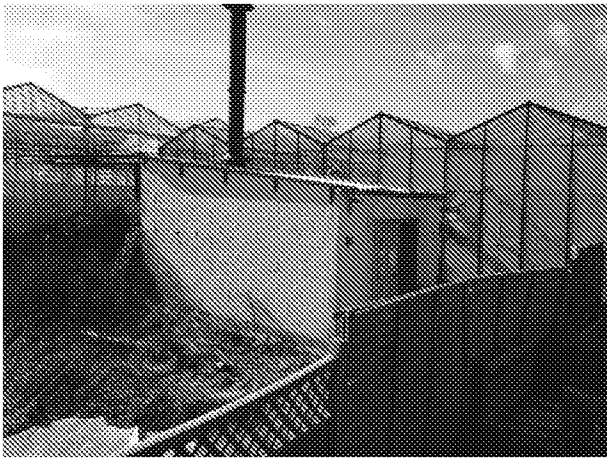
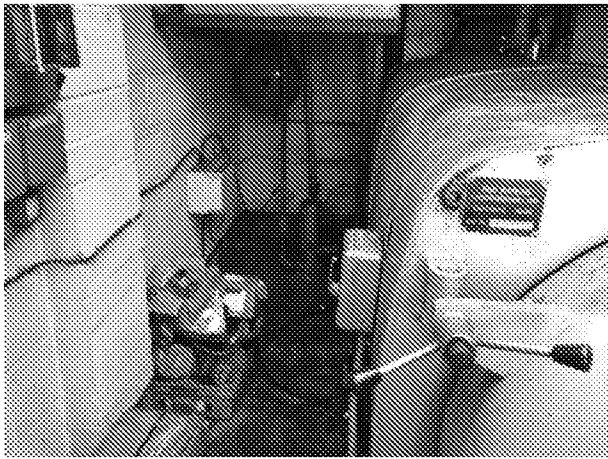


To the south of this was the main nursery building which comprised a single storey steel frame and glass building that covered the majority of the south eastern part of the site.

A small brick built plant room with a suspected asbestos panel roof was located adjacent to the north eastern corner of the nursery.

The plant room contained a boiler that was formerly oil fired. The oil tank had been removed from the room and had been placed on the eastern boundary of the site along with a pile of other demolition spoil and waste materials.

R14233

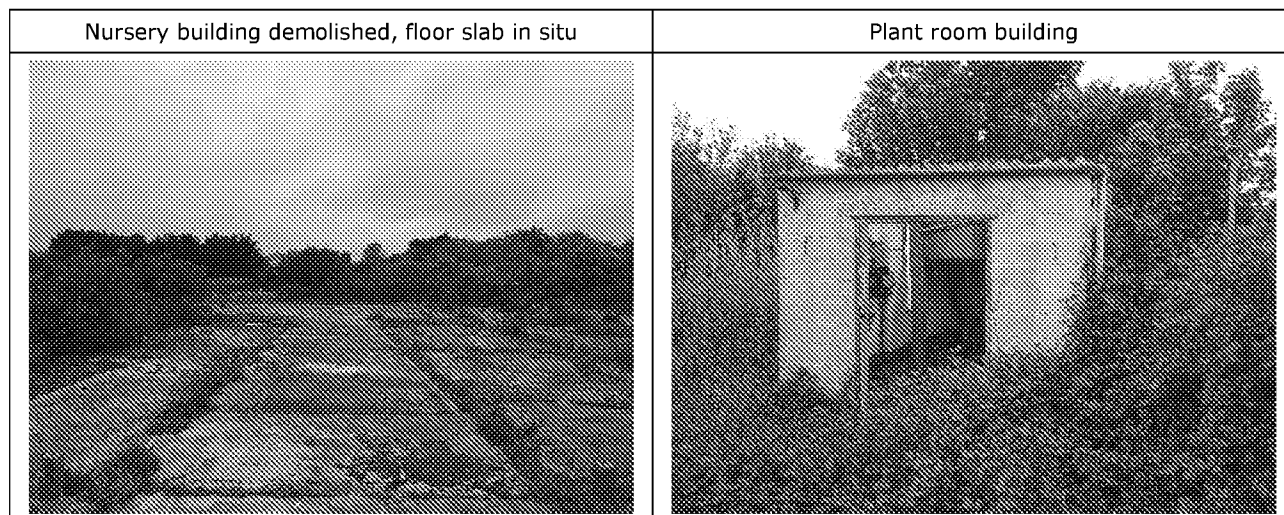
Plant room in the east of the site	Inside the plant room showing the staining on the floor slab
	
Demolition spoil and above ground oil tank formerly located in the plant room	Demolition spoil and above ground oil tank formerly located in the plant room
	

In the south eastern corner of the site was an open area of ground where the remains of a large bonfire, including various pieces of scrap metal, was noted.

Bonfire Mound in the south eastern corner of the site.	View to the south along the western part of the site towards the bonfire mound
	

R14233

At the time of the current phase of the ground investigation, the buildings on site (with the exception of the plant room) had been demolished, though the floor slab for the nursery building remained in situ. The plant room roof had been removed.



The location of the bonfire was significantly overgrown by this time, though no evidence of remaining bonfire residue was observed between the brambles and weeds.

3. ENVIRONMENTAL AND GEO-ENVIRONMENTAL DATA REVIEW

3.1 Geological Data Review

3.1.1 Expected Geology

The data presented in the GeoInsight section of the accompanying Geo-Environmental Data has been reviewed. Reference has also been made to the British Geological Survey lexicon of named rock units and British Geological Survey mapping data.

The stratigraphic succession that may be expected to underlie the site is presented in the following table.

Table 1. Expected Geological Strata

Type	Stratum
Superficial Deposits	River Terrace Deposits
Bedrock Deposits	White Chalk Subgroup

The River Terrace Deposits generally comprise well graded sandy fine to coarse gravel of flint. Locally sand or gravel strata may predominate.

The White Chalk Subgroup comprises a weak, white chalk locally with flint bands together with scattered nodular flints. It may be expected to have a deeply convoluted upper surface as a result of solution weathering. The presence of cavities in the chalk is very rare and solution features, if present, can be expected to be infilled with Quaternary deposits such as the River Terrace Deposits or the Head.

R14233

The infill material may be significantly weaker than the surrounding chalk. Solution features can comprise pipes extending to several metres deep into the chalk or conical depressions and basin shaped structures.

3.1.2 Radon Gas

The site is reported to be within an area where between 5% and 10% of properties are above the action level requiring radon gas protection measures to be installed in new buildings or extensions to existing ones. Basic radon protection measures are reported to be needed within new buildings and extensions to existing ones. It is recommended that discussions with building control are undertaken to confirm their exact requirements in this connection.

3.1.3 Ground Workings

The only area of ground workings identified refers to an "unspecified pit" located some 210m to the north east. Inspection of the historical maps indicates that that this appears to be an extant feature and as such is not considered to represent a significant risk.

3.1.4 Mining, Extractions and Natural Cavities

No significant risks from mining, natural cavities or extractions are reported on or in the vicinity of the site.

3.1.5 Natural Ground Subsidence

The maximum hazard rating of natural subsidence within the site boundary (including a 50m buffer zone) is low. This hazard rating is based on the interrogation of the six British Geological Survey (BGS) natural ground stability datasets (GeoSure). These are reviewed individually in the table below.

Table 2. Natural Ground Subsidence Hazards

Section	Risk Assessment (GroundSure)
Soil Volume Change Potential (Shrink-Swell)	Low
Landslides	Very Low
Ground Dissolution of Soluble Rocks	Low
Compressible Deposits	Negligible
Collapsible Deposits	Low
Running Sands	Low

It should be noted that the assessment provided within the data represents a generic assessment only.

3.1.6 Background Mean Soil Concentrations of Metals

The GroundSure GeoInsight report provides information on background chemistry of the soils in the area of the site. The following estimated mean concentrations of metals are reported. It should be noted that the data set may not reflect higher concentrations of contaminants that may be present within made ground soils or natural soils that may have been affected by current or historical uses of the site.

Table 3. Background Mean Soil Concentrations of Metals

Metal	Mean Soil Concentration (mg/kg)
Arsenic	15-25
Cadmium	<1.8
Chromium	60-90
Nickel	15-30
Lead	<100

The mean soil concentrations indicated are not considered to be significantly elevated for the proposed use.

3.2 Hydrogeology and Hydrology

3.2.1 Aquifer Classification

The River Terrace Deposits and White Chalk Subgroup expected beneath the site are classified as a Secondary A Aquifer and a Principal Aquifer respectively.

3.2.2 Groundwater Source Protection Zones

The site does not lie within an Environment Agency Source Protection Zone with regard to the protection of the quality of groundwater that is abstracted for potable supply.

3.2.3 Groundwater and Surface Water Abstraction Licences

The closest groundwater abstraction licence is recorded to lie 571m to the south west of the site. The abstraction is listed as being for horticultural watering.

There are no potable groundwater abstractions within 2km of the site.

The closest surface water abstraction licence is recorded to lie 1959m to the west of the site. The abstraction is listed as being for direct spray irrigation.

3.2.4 Surface Water Features

The closest surface water feature identified appears to be a drainage ditch associated with the A280, some 80m to the south east of the site.

R14233

There is no Environment Agency information on river quality within 250m of the site.

3.2.5 Flooding

The site lies within an Environment Agency Flood Zone 1.

There are no flood defences, areas benefiting from flood defences or areas used for flood storage within 250m of the site.

The site lies within 50m of an area where a limited potential of Clearwater Flooding (flooding associated with an unconfined aquifer) is recorded.

The BGS consider the confidence rating of their data in this area to be high.

3.3 Environmental Data Review

Records of potentially contaminative activities, authorisations, pollution incidents and land uses recorded by the regulatory authorities and compiled by GroundSure in their EnviroInsight Report have been reviewed. Data are supplied by the British Geological Survey (BGS), Environment Agency, Health Protection Agency, The Coal Authority and Local Authorities.

Table 4. Environmental Permits, Incidents and Registers

Section	Remarks
Records of Licensed Discharge Consents	The data identifies four records within 250m with the closest being located 177m north east. All four entries refer to non-water company sewage discharges, most likely to be septic tanks. Given the nature of the entries and the distance from the site they are not considered to pose an unacceptable risk to the site.
Environment Agency Recorded Pollution Incidents – National Incidents Recording System, List 2	The data identifies two records which both refer to an incident on site on 24 th January 2002. No details of what the pollutants were are provided but they are recorded as a category 3 (minor) land impact.

No landfills or other waste sites considered to pose a significant risk have been identified on or in the vicinity of the site.

Table 5. Current Land Uses

Section	Remarks
Current Industrial Data	The data identifies one record within 250m located 230m south west for an electricity substation. Given the distance from the site the substation is not considered to pose an unacceptable risk to the site.

No fuel sites or underground oil or gas pipelines considered to pose a significant risk have been identified on or in the vicinity of the site.

4. HISTORICAL MAP REVIEW

Historical Ordnance Survey maps covering the area of the site have been reviewed and are summarised in the following table.

It is noted that each map presents information applicable at the time of the survey (or revision date) and is subject to surveying and cartographic errors and/or advances. Revisions to maps are made at irregular intervals and it is possible that significant developments may have taken place on or within the vicinity of the site that are not shown on the maps.

'In the Vicinity of the Site' generally refers to features of relevance within approximately 250m of the site boundary but may also include more distant features if considered to be pertinent to the assessment of the development history.

Table 6. Summary of Significant Features Identified on Historical Maps

Map Details	On-Site	In the Vicinity of the Site
1876 1:10,560	The site comprises part of an open field.	Unlabelled roads run along the northern and the southern part of the eastern site boundary A pond is shown approximately 150m east of the site.
1970 1:2,500	No significant changes.	The pond is no longer shown and appears to have been backfilled.
1977 1:2,500	The site is now labelled as a Nursery. Two buildings are shown partially occupying the footprint of the existing structure. Two other long rectangular structures are shown within the existing car park buildings.	No significant changes.
1994 1:2,500	The two long structures are no longer shown in the western part of the site. The whole footprint of the existing nursery building is now shown as being occupied by structures. An additional rectangular structure is shown to the east of the main nursery and extends off site to the north east.	No significant changes.
2010 1:10,000	The building in the eastern part of the site is no longer shown due to the change in route of the A280.	The route of the new A280 now runs along the eastern boundary.

5. PRELIMINARY CONTAMINATION RISK ASSESSMENT

5.1 Introduction

The risk assessment considers the potential sources of contamination identified, the receptors that may be present in view of the development proposals and the contaminant pathways by which these may be linked. A complete pollutant linkage is only deemed to exist where all three are present and a site is considered suitable for use where no complete pollutant linkages are identified.

Where a complete pollutant linkage is deemed to be present, an assessment of the level of risk associated with the pollutant linkage has been carried out in line with current guidance³.

The level of risk is determined using the risk matrix presented in the following table. Classifications of probability, consequence and risk are presented in Appendix B.

Table 7. Risk Assessment Matrix

		Probability			
		Very Low	Low	Moderate	High
Consequence	Very Minor	Negligible	Very Low	Low	Low/Moderate
	Minor	Very Low	Low	Low/Moderate	Moderate
	Moderate	Low	Low/Moderate	Moderate	High
	Severe	Low/Moderate	Moderate	High	Very High

5.2 Basis of Assessment

The development is to comprise new residential buildings together with areas of private garden where end users can expect to come into contact with the underlying soils, where soil derived dusts may be generated and where the growing of fruit and vegetables may feasibly occur.

The proposed development layout is presented in Appendix A. Should the proposed development plans be altered, a revised risk assessment may be required.

It is noted that an asbestos survey of existing structures and infrastructure⁴ was beyond the brief of this report. The risk assessment has been undertaken on the basis that such a report was undertaken prior to demolition of the site and that any asbestos materials, with particular attention to the possible suspected asbestos cement roof panels, were removed appropriately by licensed contractors and asbestos materials disposed of in accordance with legal requirements prior to demolition.

The findings of the preliminary contamination assessment have been used to inform the ground investigation works which are discussed in the following section of the report.

³ Contaminated Land Risk Assessment: A guide to good practice, CIRIA C552, 2001.

⁴ As defined under Section 5(a) of the Control of Asbestos Regulations, 2012.

5.3 Potential Contamination Sources Identified

The following potential sources of contamination have been identified by the preliminary contamination risk assessment:

- Use of the site as a nursery.
- Made ground from demolition works.
- Pollution incident.
- Plant room, above ground tank and waste materials.
- Bonfire remains.
- Radon gas.

5.4 Preliminary Conceptual Model

The preliminary conceptual model for the proposed development is presented in Appendix C.

6. GROUND INVESTIGATION

6.1 Introduction

The first phase of the ground investigation comprised the excavation of a series of dynamic sampler boreholes and hand augered boreholes. The fieldwork was carried out on the 6th and 11th March 2015.

The current phase of the ground investigation comprised the excavation of a series of hand dug trial pits. The fieldwork was carried on the 29th April 2020.

The exploratory hole locations from both phase of investigation are shown on Figure 2.

Descriptions of the strata encountered and comments on groundwater conditions are shown in the exploratory hole records given in Appendix D, together with notes to assist in their interpretation.

6.2 Exploratory Holes

6.2.1 *Dynamic Sampler Boreholes*

Eleven boreholes (designated WS1 to WS11) were drilled to depths of 3m below ground level.

The boreholes were formed by a series of 1.0m long, open ended, hollow steel tubes of up to 100mm diameter, each containing a removable plastic liner. The tubes, progressively reducing in diameter, were driven into the ground by means of a track-mounted drop weight. Each tube was extracted from the ground using a hydraulically operated jack and the enclosed sample was recovered in its plastic liner.

The system enables sub-samples to be taken for detailed examination and laboratory testing.

6.2.2 *Hand Auger Boreholes*

Two boreholes (designated HA1 and HA2) were bored to depths of 1m below ground level. The hand auger enables disturbed soil samples to be taken using a cutting tool twisted into the soil by hand.

6.2.3 *Trial Pits*

17 trial pits, designated TP01 to TP17, were dug using hand tools to depths of 0.5m below ground level to enable samples of the soils to be obtained.

6.3 Sampling

Disturbed samples of soil were taken at the depths shown in the exploratory hole records and were collected in plastic liners, plastic bags, plastic tubs or amber jars fitted with gas tight lids.

On collection the amber jars were stored in cool boxes with cooling blocks to maintain temperatures below 4°C until transferred to refrigerators upon return to the office and subsequently forwarded to the external accredited chemical testing laboratory.

6.4 Laboratory Testing

Laboratory testing was scheduled by Ashdown Site Investigation Ltd. Results from the laboratory tests are provided in Appendix E.

6.4.1 Chemical Testing

Chemical testing of selected samples was undertaken by a laboratory with recognised (UKAS and MCERTS) accreditation for quality control.

7. GROUND CONDITIONS

7.1 Stratigraphy

7.1.1 Surface Covering

Boreholes WS5, WS6, WS7 and WS11 and trial pits TP01-TP10 and TP17 and were progressed through a surface covering of topsoil some 50mm to 250mm in thickness.

Boreholes WS1 to WS4, located within the car park, were excavated through a covering of broken asphalt and crushed hardcore some 200mm or 300mm thick.

Trial Pits TP14-TP16, undertaken through the floor slab of the demolished nursery building, were excavated through concrete between 50mm and 180mm thick.

No specific surface coverings were recorded at the remaining exploratory hole positions.

7.1.2 Made Ground/ Reworked Ground

With the exception of boreholes WS5 and WS7, made ground or reworked ground, generally comprising sandy gravelly clay or silt was recorded to depths of between 0.20m and 1.10m below ground level. The gravel fraction contained variable quantities of flint, brick, plastic, nails, ironstone and geo-membrane.

These soils persisted to the full depth of the shallow trial pits excavated as part of the second phase of ground investigation.

7.1.3 River Terrace Deposits

Underlying the made ground/surfacing, where penetrated, the investigation progressed into undisturbed sandy gravelly clays and clayey gravel deposits to the full depth of the investigation.

These soils are considered to represent the River Terrace Deposits indicated on the published geological map.

7.2 Stability

Instability was recorded locally within the coarse grained soils.

7.3 Groundwater Conditions

Groundwater was not encountered during the intrusive works.

It should be noted that water levels within the exploratory hole positions may not have equilibrated with the groundwater table at the time the readings were recorded and that groundwater levels should be expected to fluctuate seasonally.

8. REVSIED QUANTITATIVE CONTAMINATION ASSESSMENT

8.1 Assessment Strategy

The design of the ground investigation considered the potential contaminant sources identified by the preliminary ground contamination risk assessment. The investigation strategy employed to assess the potential sources is detailed in the following table.

Table 8. Investigation Works Carried Out

Contaminant source	Exploratory Positions
Site use as a nursery	As the use of the site may have led to contamination occurring in any location, all boreholes from the first phase of the investigation are considered to be relevant to this source. TP14-TP16 in the second phase of the ground investigation undertaken through the floor slab of the former nursery buildings
Made Ground from Demolition Works	Boreholes WS1, WS2, WS3, WS10, WS11, HA1 and HA2.
Pollution Incident	Due to the absence of any information as to the specific location of this incident, all boreholes from the first phase of the investigation are considered to be relevant to this source.
Plant Room, above ground tank and waste materials	Boreholes HA1 and HA2 and sample DS. TP11-TP13 in the second phase of ground investigation.
Bonfire Remains	Borehole WS10 TP01-TP10 in the second phase of investigation.
Radon Gas	Not Applicable

8.2 Analysis of Contamination Test Results

Statistical analysis of the concentrations of heavy metals and polycyclic aromatic hydrocarbon (PAH) compounds within the 8 samples of the shallow soils (samples were tested from depths of up to 0.5m below ground level) obtained during the first phase of investigation was undertaken in line with CIEH/CL:AIRE guidance⁵.

The CIEH/CL:AIRE guidance provides a framework for assessing measured contaminant concentrations on a site against user defined critical concentrations – or indicators of risk.

Under a planning scenario, the null hypothesis tested is that the true population mean is greater than a “critical concentration”. The “critical concentration” used in this assessment are the ‘Suitable For Use Levels’ (S4UL)⁶ or, in lieu of an S4UL being developed for lead, the Category 4 Screening Level (C4SL)⁷. These are collectively referred to as soil screening values (SSV).

⁵ Comparing Soil Contamination Data with a Critical Concentration, published by the CIEH/ CL:AIRE, May 2008.

⁶ Nathanail, C.P, et al., The LQM/CIEH S4ULs for Human Health Risk Assessment, 2015, Land Quality Press, Nottingham. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3071.

⁷ SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report, published by DEFRA, 2014.

R14233

The null hypothesis can be rejected if it can be shown (with a sufficient degree of confidence) that the true population mean lies below the critical concentration. The confidence level recommended within the guidance is 95% i.e. the statistical evidence must show that there is 95% likelihood that the true population mean lies below the critical concentration. In this instance the site is considered suitable for the proposed use.

Where there is insufficient evidence to reject the null hypothesis, further risk assessment and/or remediation may be necessary.

The statistical analysis was undertaken using the ESI Contaminated Land Statistics Calculator version 2. Copies of the summary page from the spreadsheet are presented within Appendix F.

Statistical analysis has not been undertaken on the results of the petroleum hydrocarbon testing. The results of the testing have been compared directly with calculated S4UL.

In view of the development proposal, the SSV utilised in this assessment are those calculated for the generic "Residential" land use⁸. The critical receptor for this land use is considered to be a young female child resident on site from birth to age 6. Exposure routes that are considered include the potential for direct ingestion of the soil, the outdoor and indoor ingestion of dust, the potential inhalation of dust and vapours, ingestion of site grown vegetables and ingestion of soil attached to vegetables.

For the assessment of risk to controlled waters a qualitative assessment has been undertaken based upon the concentrations of contaminants recorded within the soil samples and the information obtained about the sensitivity of the underlying strata or nearby surface water receptors.

8.2.1 Heavy Metals

The following table summarises the SSV, maximum, minimum and mean concentrations and the 95th percentile upper confidence limits for the heavy metals tested for from the samples of shallow soils.

Table 9. Summary of Test Results and Statistical Analysis for Heavy Metals in Shallow Samples

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	Mean Concentration (mg/kg)	95% Upper Confidence Limit (mg/kg)	No of exceedances	Can H ₀ be rejected
Arsenic	37	8	4	12.2	1	7.8	10.0	0	Yes
Cadmium	11	8	<LOD	0.6	0.5	0.3	0.5	0	Yes
Chromium	910	8	6.5	27.2	5	18.0	23.2	0	Yes
Copper	2400	8	<LOD	26.4	5	16.5	22.3	0	Yes
Lead	200	8	13.1	53.3	5	31.8	41.7	0	Yes
Mercury	40	8	<LOD	<LOD	0.5	0.3	0.3	0	Yes

⁸ As defined within Science Report SC050021/SR3, January 2009, with the amendments discussed in the LQM/CIEH report.

R14233

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	Mean Concentration (mg/kg)	95% Upper Confidence Limit (mg/kg)	No of exceedances	Can H ₀ be rejected
Nickel	180	8	<LOD	28.1	5	14.6	19.9	0	Yes
Selenium	250	8	<LOD	1.1	1	0.6	0.9	0	Yes
Zinc	3700	8	<LOD	234	45	76.2	180.4	0	Yes
Hexavalent Chromium	6	8	<LOD	<LOD	0.8	0.4	0.4	0	Yes
Water Soluble Boron	290	8	<LOD	1.1	0.5	0.5	0.9	0	Yes

None of the shallow samples tested recorded concentrations of heavy metals above their respective SSV and the upper 95th percentile concentration calculated for each contaminant lies below the published SSV.

The sample of demolition spoil also did not record any elevated concentrations of heavy metals in relation to the SSV.

The four samples of shallow soils from beneath the footprint of the building did not record any elevated concentrations of heavy metals in relation to the SSV.

The sample of bonfire ash taken from ground level at borehole WS10, in the first phase of the ground investigation, recorded an elevated concentration of arsenic in relation to the SSV.

In the second phase of investigation ten samples of the shallow soils from the area immediately around the former bonfire area were tested for concentrations of arsenic. The range of concentrations of arsenic was between 8.6mg/kg-12.2mg/kg, similar to those recorded elsewhere on the site by the first phase of the ground investigation and significantly below the SSV.

In the absence of any evidence of residual bonfire materials and on the basis of the extensive additional testing in this area, there is not considered to be an unacceptable risk to end users from arsenic contamination in this part of the site.

At the low concentrations recorded, none of the heavy metals would be expected to exhibit any significant mobility and they are not considered to pose an unacceptable risk to controlled waters beneath the site.

8.2.2 Asbestos

No suspected asbestos materials were noted within any of the exploratory holes undertaken at the site but three samples of the made ground, including the sample of demolition spoil, were screened for the presence of asbestos materials. None of the samples recorded the presence of any asbestos fibres.

In addition, the four samples from beneath the building footprint were also screened for asbestos. None of the samples recorded the presence of any asbestos fibres.

R14233

Based on the findings of this investigation, no significant risk to end users is considered to be posed by asbestos materials within soils. However, due to the heterogeneity of made ground, there will always remain the potential for localised asbestos materials to be encountered during construction works, though the likelihood of this is considered to be very low. All workers at the site should be made aware of what actions to take in the event that suspected asbestos materials are identified at any time during the development works.

8.2.3 Polycyclic Aromatic Hydrocarbon (PAH) Compounds

The following table summarises the SSV, maximum, minimum and mean concentrations and the 95th percentile upper confidence limits for the PAH compounds tested from the samples of shallow soils.

Table 10. Summary of Test Results and Statistical Analysis for PAH Compounds in Shallow Samples

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	Mean Concentration (mg/kg)	95% Upper Confidence Limit (mg/kg)	No of exceedances	Can H ₀ be rejected
Naphthalene	2.3	8	<LOD	0.02	0.01	0.01	0.02	0	Yes
Acenaphthylene	170	8	<LOD	0.04	0.01	0.01	0.03	0	Yes
Acenaphthene	210	8	<LOD	0.02	0.01	0.01	0.02	0	Yes
Fluorene	170	8	<LOD	<LOD	0.01	0.01	0.01	0	Yes
Phenanthrene	95	8	<LOD	0.17	0.01	0.06	0.09	0	Yes
Anthracene	2400	8	<LOD	0.05	0.01	0.02	0.05	0	Yes
Fluoranthene	280	8	0.02	0.53	0.01	0.22	0.34	0	Yes
Pyrene	620	8	0.02	0.52	0.01	0.20	0.31	0	Yes
Benz(a)anthracene	7.2	8	<LOD	0.4	0.01	0.12	0.20	0	Yes
Chrysene	15	8	0.01	0.43	0.01	0.13	0.34	0	Yes
Benzo(b)fluoranthene	2.6	8	0.02	0.47	0.01	0.15	0.37	0	Yes
Benzo(k)fluoranthene	77	8	<LOD	0.49	0.01	0.14	0.38	0	Yes
Benzo(a)pyrene	2.2	8	0.02	0.58	0.01	0.17	0.45	0	Yes
Indeno(123-cd)pyrene	27	8	0.01	0.34	0.01	0.10	0.26	0	Yes
Dibenz(ah)anthracene	0.24	8	<LOD	0.11	0.01	0.03	0.08	0	Yes
Benzo(ghi)perylene	320	8	0.01	0.47	0.01	0.18	0.29	0	Yes

None of the shallow samples tested recorded concentrations of PAH compounds above their respective SSV and the upper 95th percentile concentration calculated for each PAH compound lies below the published SSV.

The sample of demolition spoil also did not record any elevated concentrations of PAH compounds in relation to the SSV.

R14233

The four samples of shallow soils from beneath the footprint of the building did not record any elevated concentrations of PAH compounds in relation to the SSV.

The concentrations of PAH compounds present within the shallow soils beneath the site are not considered to pose an unacceptable risk to end users of the site.

At the low concentrations recorded, none of the PAH compounds would be expected to exhibit any significant mobility and they are not considered to pose an unacceptable risk to controlled waters beneath the site.

8.2.4 Petroleum Hydrocarbons

The following table lists the SSV for petroleum hydrocarbon equivalent carbon weight fractions calculated for 1% organic content.

Table 11. SSV for petroleum hydrocarbon equivalent carbon weight fractions

Petroleum Hydrocarbon Fraction	SSV (mg/kg)	Petroleum Hydrocarbon Fraction	SSV (mg/kg)
Aliphatic EC 5-6	42	Aromatic EC 5-7	70
Aliphatic EC >6-8	100	Aromatic EC >7-8	130
Aliphatic EC >8-10	27	Aromatic EC >8-10	34
Aliphatic EC >10-12	130	Aromatic EC >10-12	74
Aliphatic EC >12-16	1100	Aromatic EC >12-16	140
Aliphatic EC >16-35	65000	Aromatic EC >16-21	260
Aliphatic EC >35-44	65000	Aromatic EC >21-35	1100
		Aromatic EC >35-44	1100

Whilst full speciation of the concentrations of petroleum hydrocarbons by aromatic and aliphatic fractions was not undertaken, the results of the testing undertaken can still be compared with the more stringent of the screening values for the respective equivalent carbon weight fraction and, where the concentration recorded is found to be lower, it can be reasonably concluded that no significant risk is present.

In the first phase of the ground investigation, four samples from HA1 and HA2, positions specifically targeted at the location of the plant room and the waste materials which included the redundant above ground oil tank, were tested for concentrations of petroleum hydrocarbons.

None of these samples recorded any detectable concentrations of petroleum hydrocarbons.

In the second phase of the ground investigation, a further six samples from TP11 to TP13, positions which were also targeted at the location of the plant room, were tested for concentrations of petroleum hydrocarbons.

Only one sample recorded concentrations of petroleum hydrocarbons above the limit of detection of the test. The sample, from TP12 at 0.05m, recorded just 1.1mg/kg in the >C21-C35 fraction significantly below the more conservative SSV for the carbon weight fraction.

During the first phase of the ground investigation, non-targeted samples from WS1 and WS8 were tested for concentrations of petroleum hydrocarbons, all of which recorded concentrations

of each weight fraction significantly below the more conservative SSV for each carbon weight fraction.

Similarly, in the second phase of the ground investigation, the samples from beneath the footprint of the nurse building also recorded concentrations of each weight fraction significantly below the more conservative SSV for each carbon weight fraction.

Following both phases of ground investigation, no evidence of widespread or significant petroleum hydrocarbon contamination has been identified and no unacceptable risk to end users or controlled waters is considered to be present.

Comparison of the test results has been made with the threshold criteria for the use of PE water supply pipes⁹, this indicates that the protection of water supply services is unlikely to be required. However, it is noted that the testing undertaken to date does not encompass all of the contaminants that may be required by water supply companies for assessment purposes. Notwithstanding the above it is strongly recommended that designers consult with the proposed water supply company to ascertain whether they require further laboratory testing and assessment specific to proposed routes of services.

8.2.5 *Herbicides and Pesticides*

Two samples were screened for a variety of pesticides and herbicides. Neither sample recorded any detectable concentrations of the compounds tested for. No visual or olfactory evidence of any significant pesticide or herbicide contamination was noted within any of the boreholes.

There is not considered to be an unacceptable risk to end users of the site from widespread pesticide or herbicide contamination.

8.3 Radon Gas

As noted within the preliminary contamination risk assessment, the site lies within an area where basic radon protection measures are required to be incorporated within all new buildings.

8.4 Revised Quantitative Contamination Risk Assessment

8.4.1 *Basis of Assessment*

The development is to comprise new residential buildings together with areas of private garden where end users can expect to come into contact with the underlying soils, where soil derived dusts may be generated and where the growing of fruit and vegetables may feasibly occur.

The proposed development layout is presented in Appendix A. Should the proposed development plans be altered, a revised risk assessment may be required.

⁹ Set out within Table 3.1 of the Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UK Water Industry Research, 2010.

8.4.2 Contamination Sources Identified

The following source of contamination has been identified by the quantitative contamination risk assessment:

- Radon Gas

8.4.3 Quantitative Conceptual Model

The quantitative conceptual model for the proposed development is presented in Appendix G.

8.5 Risks to Other Potential Receptors

All construction workers must undertake their own risk assessment, based upon the works to be carried out and the proposed method by which this will be achieved, in accordance with current health and safety legislation. Their assessment should take into account all available information about the site, including that present within this report.

Appropriate working procedures and PPE should be adopted to ensure the health and safety of the site operatives. Instruction should be given in the recognition of potentially hazardous materials. All site personnel should be appropriately briefed on the discovery strategy, presented below, and what actions they must take in the event that further evidence of contamination is identified or suspected.

8.6 Recommendations

No complete pollutant linkages have been identified at the site in relation to soil contamination. However, the site is identified to be located within an area where basic radon protection measures are required to be incorporated within all new buildings.

The design of the radon protection measures should take into account the BRE guidance¹⁰, the details of which should be provided to Building Control and if required to Environmental Health in relation to Condition 24 parts 3 and 4. Agreement should also be made on the details required to verify the installation of the radon protection in relation to Condition 26.

Similar land quality conditions may also be imposed by warrantors and agreement may also be required with them.

8.7 Discovery Strategy

If, during the course of the site clearance and development works, any materials not previously identified by the investigation that are suspected of being 'contaminants' are encountered, then the following procedure should apply:

- All works in that area should cease and the site manager should be informed.
- Advice should be sought from suitably qualified and experienced personnel as to whether any further site inspection, sampling, testing and/or assessment is deemed necessary.

¹⁰ Radon: Guidance on protective measures for new buildings, BRE 211, 2015

- If required, the conclusions of any assessment and any proposed remedial works (if required) should be agreed by the local authority.
- If necessary, full details of any remedial works should be included in a verification report for the site.

Suspected 'contamination' may take the following form, though it is noted that this list is not exhaustive and site operatives should ask if they are at all unsure of any findings:

- Soil or water looks oily and/or has an oily odour
- Soil or water has a solvent type of odour
- Significant quantities of man-made materials within fill such as paint cans, car parts, glass fragments
- Suspected asbestos containing materials (insulating boards, cement, loose fibres etc.)
- Significant volumes of clinker like or ashy material
- Sand bags, and/or subsurface concrete structures
- Animal carcasses or evidence of animal burial pits

9. REGULATORY APPROVAL

It is recommended that this report should be submitted to the Local Authority in relation to an application to discharge Condition 24 of the planning permission¹¹.

The recommendations made and the conclusions drawn should be considered as provisional until such time as the risk assessment has been approved by the Local Authority and the condition discharged.

Ashdown Site Investigation Ltd.

¹¹ Arun District Council, Application Ref: A/51/14/OUT
Manor Nursery, Angmering, West Sussex

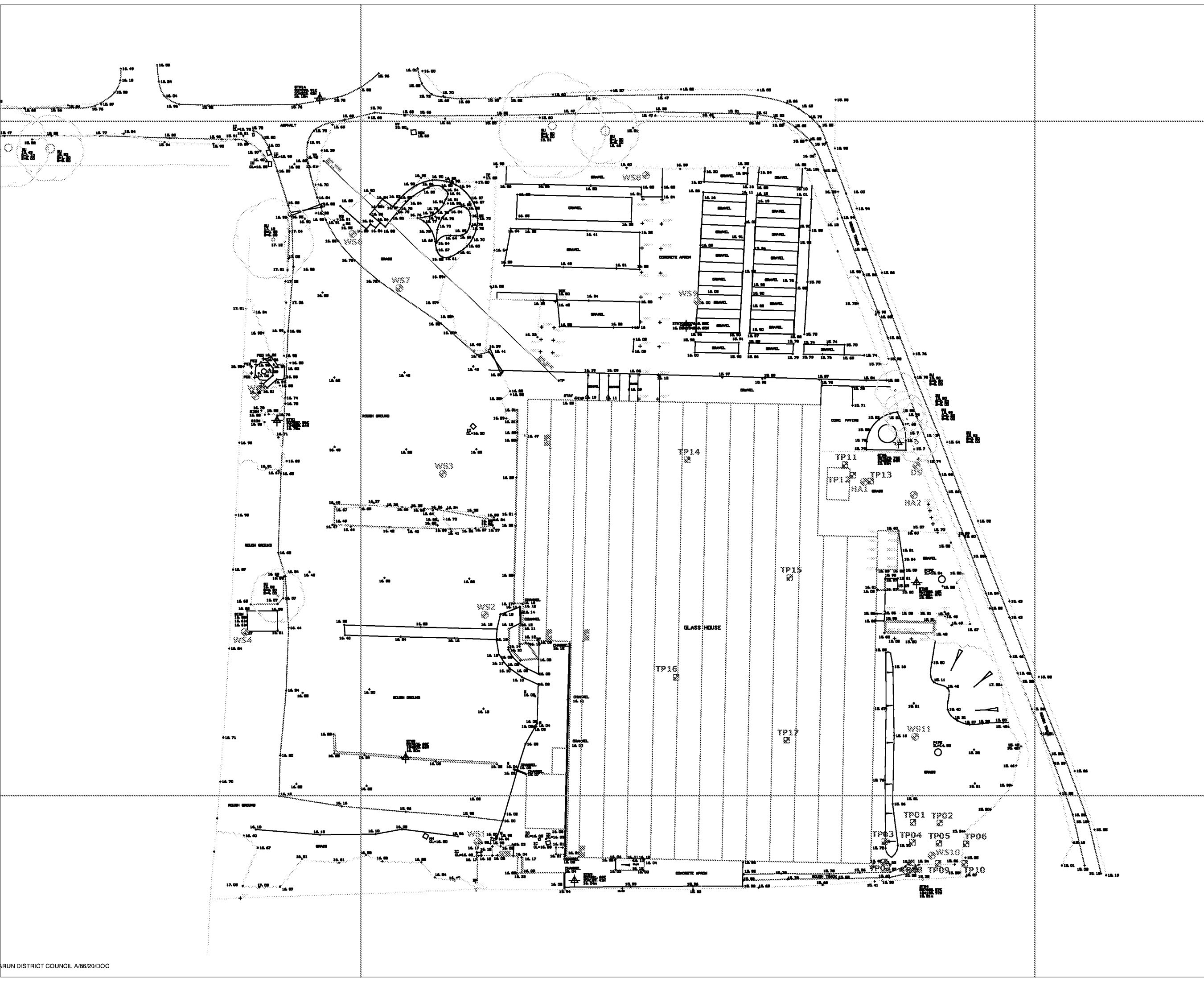
FIGURES

Figure 1 Site Location Plan

Figure 2 Site Plan



ASHDOWN SITE INVESTIGATION LIMITED	Site Name		Figure No.	Project Reference
	Manor Nursery, Angmering, West Sussex		1	P14618



L • I • M • I • T • E • D

Site:

Report Ref:

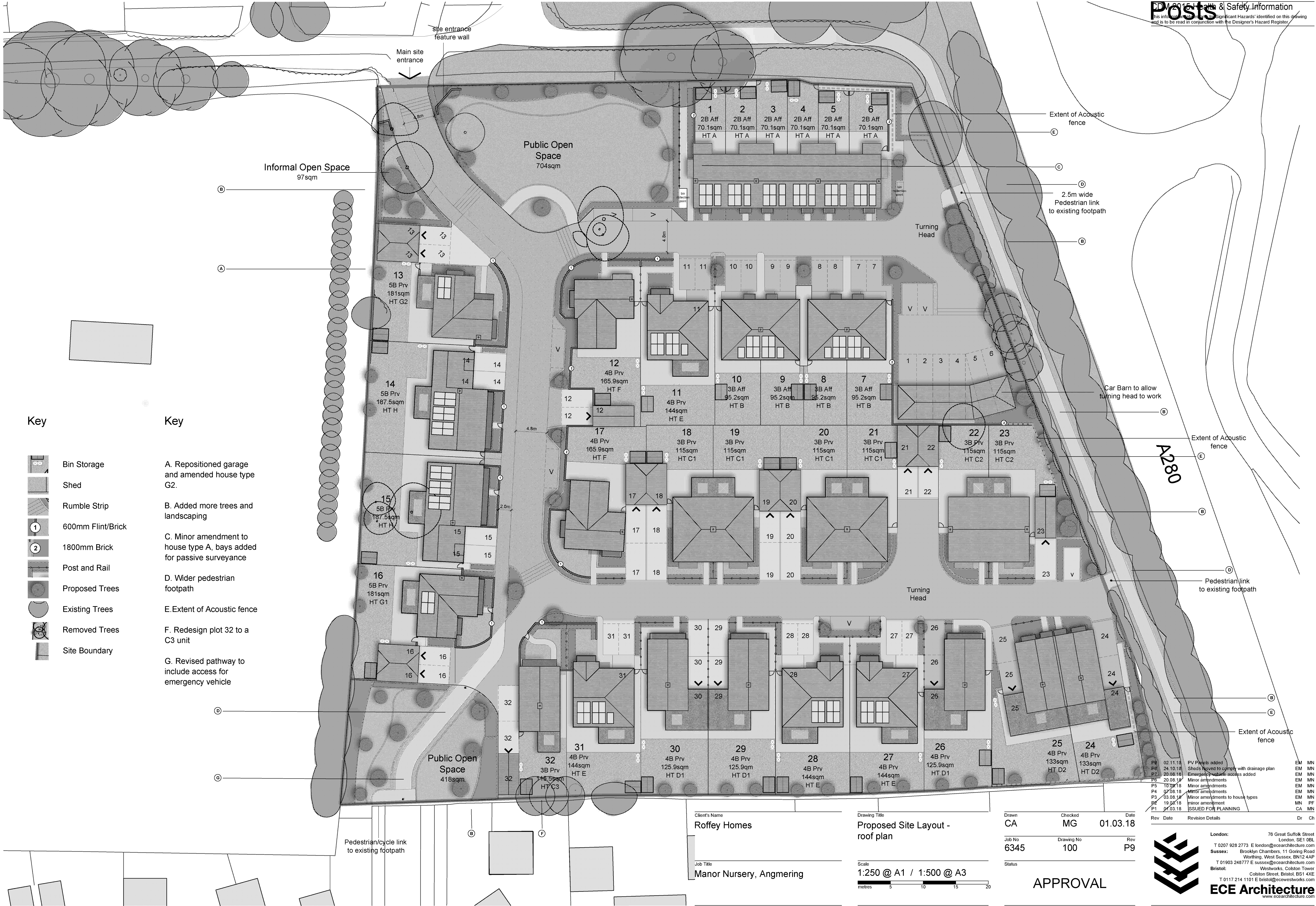
2

--

Scale

APPENDIX A

Proposed Development Layout



Key

- Bin Storage
- Shed
- Rumble Strip
- 600mm Flint/Brick
- 1800mm Brick
- Post and Rail
- Proposed Trees
- Existing Trees
- Removed Trees
- Site Boundary

Key

- A. Repositioned garage and amended house type G2.
- B. Added more trees and landscaping
- C. Minor amendment to house type A, bays added for passive surveillance
- D. Wider pedestrian footpath
- E. Extent of Acoustic fence
- F. Redesign plot 32 to a C3 unit
- G. Revised pathway to include access for emergency vehicle

Client's Name
Roffey Homes

Job Title
Manor Nursery, Angmering

Drawing Title
Proposed Site Layout - roof plan

Scale
1:250 @ A1 / 1:500 @ A3

Drawn
CA

Checked
MG

Date
01.03.18

Job No
6345

Drawing No
100

Rev
P9

Status
APPROVAL

Rev	Date	Revision Details	Dr	Ch
P9	02.11.18	PV Panels added	EM	MN
P8	24.10.18	Sheds moved to comply with drainage plan	EM	MN
P7	20.08.18	Emergency vehicle access added	EM	MN
P6	20.08.18	Minor amendments	EM	MN
P5	10.08.18	Minor amendments	EM	MN
P4	07.08.18	Minor amendments	EM	MN
P3	03.08.18	Minor amendments to house types	EM	MN
P2	19.02.18	Minor amendment	MN	PF
P1	01.03.18	ISSUED FOR PLANNING	CA	MN

London: 78 Great Suffolk Street London, SE1 0BL
T 0207 928 2773 E london@ecearchitecture.com
Sussex: Brooklyn Chambers, 11 Goring Road Worthing, West Sussex, BN12 4AP
T 01903 248777 E sussex@ecearchitecture.com
Bristol: Westworks, Colston Tower Colston Street, Bristol, BS1 4XE
T 0117 214 1101 E bristol@ecwestworks.com

ECE Architecture
www.ecearchitecture.com

CAD Plot date: 21/12/18 - 11:52:15 6345 site layout.dwg

Probability of risk being realised	
Classification	Definition
High	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Moderate	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.
Low	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.
Very Low	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Consequence of risk being realised		
Classification	Category	Definition
Severe	Human Health	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA.
	Controlled Waters	Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource.
	Property	Catastrophic damage to buildings/property.
	Ecological Systems	A short term risk to a particular ecosystem or organisation forming part of such ecosystem.
Moderate	Human Health	Chronic damage to Human Health.
	Controlled Waters	Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution).
	Ecological System	A significant change in a particular ecosystem or organism forming part of such ecosystem.
Minor	Controlled Waters	Pollution of non-sensitive water resources.
	Property	Significant damage to crops, buildings, structures and services.
	Ecological Systems	Damage to sensitive buildings/structures/services or the environment.
Very Minor	Human Health	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc).
	Property	Easily repairable effects of damage to buildings, structures and services.
	Project	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve.

Risk classification definitions	
Very High	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 to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the long term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but there is a low likelihood of this hazard occurring and if realised, harm would at worst normally be mild.
Very Low	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.

APPENDIX C

Preliminary Conceptual Model

Manor Nursery, Angmering, West Sussex				Preliminary Conceptual Model		P14618	
Potential Source	Potential Receptor	Potential Contaminants	Potential Pathway	Complete Linkage Present?	Probability	Consequence	Risk
• Use of the site as a nursery	End Users	Heavy Metals, Herbicides, PAH Compounds, Pesticides and Petroleum Hydrocarbons	Dermal contact with soil and dust (indoor & outdoor)	Yes	P3: Moderate	C3: Moderate	Moderate
			Ingestion of soil and indoor dust	Yes	P3: Moderate	C3: Moderate	Moderate
			Consumption of home-grown produce and attached soil	Yes	P3: Moderate	C3: Moderate	Moderate
			Inhalation of soil dust (indoor and outdoor)	Yes	P3: Moderate	C3: Moderate	Moderate
			Inhalation of soil vapours	Yes	P3: Moderate	C3: Moderate	Moderate
			Inhalation of soil gases/ Risk of explosion	Identified contaminants do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)	Petroleum Hydrocarbons	Contamination of incoming services	Yes	P3: Moderate	C3: Moderate	Moderate
	Groundwater	Heavy Metals, Herbicides, PAH Compounds, Pesticides and Petroleum Hydrocarbons	Migration to groundwater	Yes	P2: Low	C3: Moderate	Low/Moderate
• Made ground from demolition works	End Users	Asbestos, Heavy Metals and PAH Compounds	Dermal contact with soil and dust (indoor & outdoor)	Yes	P2: Low	C2: Minor	Low
			Ingestion of soil and indoor dust	Yes	P2: Low	C2: Minor	Low
			Consumption of home-grown produce and attached soil	Yes	P2: Low	C2: Minor	Low
			Inhalation of soil dust (indoor and outdoor)	Yes	P2: Low	C2: Minor	Low
			Inhalation of soil vapours	Identified contaminants do not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Identified contaminants do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)		Contamination of incoming services	Identified contaminants do not pose a risk via this pathway			N/A
	Groundwater	Heavy Metals and PAH Compounds	Migration to groundwater	Yes	P1: Very Low	C2: Minor	Very Low

Manor Nursery, Angmering, West Sussex				Preliminary Conceptual Model		P14618	
Potential Source	Potential Receptor	Potential Contaminants	Potential Pathway	Complete Linkage Present?	Probability	Consequence	Risk
• Pollution incident	End Users	Heavy Metals, PAH Compounds and Petroleum Hydrocarbons	Dermal contact with soil and dust (indoor & outdoor)	Yes	P2: Low	C3: Moderate	Low/Moderate
			Ingestion of soil and indoor dust	Yes	P2: Low	C3: Moderate	Low/Moderate
			Consumption of home-grown produce and attached soil	Yes	P2: Low	C3: Moderate	Low/Moderate
			Inhalation of soil dust (indoor and outdoor)	Yes	P2: Low	C3: Moderate	Low/Moderate
			Inhalation of soil vapours	Yes	P2: Low	C2: Minor	Low
			Inhalation of soil gases/ Risk of explosion	Identified contaminants do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)	Petroleum Hydrocarbons	Contamination of incoming services	Yes	P2: Low	C2: Minor	Low
	Groundwater	Heavy Metals, PAH Compounds and Petroleum Hydrocarbons	Migration to groundwater	Yes	P1: Very Low	C1: Very Minor	Negligible
• Plant room, above ground tank and waste materials	End Users	Asbestos, Heavy Metals, PAH Compounds and Petroleum Hydrocarbons	Dermal contact with soil and dust (indoor & outdoor)	Yes	P3: Moderate	C4: Severe	High
			Ingestion of soil and indoor dust	Yes	P3: Moderate	C4: Severe	High
			Consumption of home-grown produce and attached soil	Yes	P3: Moderate	C4: Severe	High
			Inhalation of soil dust (indoor and outdoor)	Yes	P3: Moderate	C4: Severe	High
			Inhalation of soil vapours	Yes	P3: Moderate	C4: Severe	High
			Inhalation of soil gases/ Risk of explosion	Identified contaminants do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)	Petroleum Hydrocarbons	Contamination of incoming services	Yes	P3: Moderate	C4: Severe	High
	Groundwater	Heavy Metals, PAH Compounds and Petroleum Hydrocarbons	Migration to groundwater	Yes	P3: Moderate	C4: Severe	High

Manor Nursery, Angmering, West Sussex				Preliminary Conceptual Model		P14618	
Potential Source	Potential Receptor	Potential Contaminants	Potential Pathway	Complete Linkage Present?	Probability	Consequence	Risk
• Bonfire remains	End Users	Heavy Metals and PAH Compounds	Dermal contact with soil and dust (indoor & outdoor)	Yes	P2: Low	C2: Minor	Low
			Ingestion of soil and indoor dust	Yes	P2: Low	C2: Minor	Low
			Consumption of home-grown produce and attached soil	Yes	P2: Low	C2: Minor	Low
			Inhalation of soil dust (indoor and outdoor)	Yes	P2: Low	C2: Minor	Low
			Inhalation of soil vapours	Identified contaminants do not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Identified contaminants do not pose a risk via this pathway			N/A
	End Users (via Water Supply Pipework)		Contamination of incoming services	Identified contaminants do not pose a risk via this pathway			N/A
	Groundwater	Heavy Metals and PAH Compounds	Migration to groundwater	Yes	P1: Very Low	C2: Minor	Very Low
• Radon gas	End Users	Radon	Dermal contact with soil and dust (indoor & outdoor)	Identified contaminant does not pose a risk via this pathway			N/A
			Ingestion of soil and indoor dust	Identified contaminant does not pose a risk via this pathway			N/A
			Consumption of home-grown produce and attached soil	Identified contaminant does not pose a risk via this pathway			N/A
			Inhalation of soil dust (indoor and outdoor)	Identified contaminant does not pose a risk via this pathway			N/A
			Inhalation of soil vapours	Identified contaminant does not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Yes	P3: Moderate	C3: Moderate	Moderate
	End Users (via Water Supply Pipework)		Contamination of incoming services	Identified contaminant does not pose a risk via this pathway			N/A
	Groundwater		Migration to groundwater	Identified contaminant does not pose a risk via this pathway			N/A

APPENDIX D

Exploratory Hole Notes
Exploratory Hole Records (LW26073)
Exploratory Hole Records (P14618)

NOTES FOR THE INTERPRETATION OF EXPLORATORY HOLE RECORDS

1 Symbols and abbreviations

Samples

U	'Undisturbed' Sample: - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
U _o	Sample not obtained
U*	Full penetration of sample not obtained
Pi	Piston Sample: 'Undisturbed' sample 100mm diameter by 600mm long.
D	Disturbed Sample
R	Root Sample
B	Bulk Disturbed Sample
W	Water Sample
J	Jar Sample (sample taken in amber glass jar fitted with gas tight lid)
T	Tub Sample
Vi	Vial Sample

In situ Testing

S	Standard penetration test (SPT): Using the split spoon sampler.
C	Standard Penetration Test (SPT): using a solid cone instead of the sampler - conducted usually in coarse grained soils or weak rocks.
V	Shear Vane Test: Undrained shear strength (cohesion) (kN/m ²) shown within the Vane/Pen Test and N Value column.
H	Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m ²) shown within the Vane/Pen Test and N Value column.
P	Perth Penetrometer Test: Number of blows for 300mm penetration shown under Vane/Pen Test and N Value column.

Excavation Method

CP	Cable Percussion Borehole
WLS	Dynamic Sampler Borehole using windowless sampler tubes
WS	Dynamic Sampler Borehole using window sampler tubes
TP	Trial Pit excavated using mechanic excavator
HDP	Trial Pit excavated using hand tools

2 Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1) and Part 2 Principles of classification (BS EN 14688-2) as well as the BS5930 code of Practice for Ground Investigations.

3 Rock Description

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1) as well as the BS5930 code of Practice for Ground Investigations. TCR – Total Core Recovery, SCR – Solid Core Recovery, RQD – Rock Quality Designation, NI – Non Intact, If – indicative fracture spacing (min/ave/max), FI – Fracture Index.

4 Chalk Description

Chalk description is based on BS EN ISO 14688, BS EN ISO 14689 and BS5930. The classification of chalk generally follows the guidance offered by the Construction Industry Research and Information Association (CIRIA) C574, 'Engineering in Chalk'. This is based on assessment of chalk density, discontinuity and aperture spacing, and the proportion of intact chalk to silt of chalk.



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS1

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 11/03/2015

End Date: 11/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
	J T	0.10					0.20	MADE GROUND: Slightly sandy gravel. Gravel is subangular to rounded fine to coarse flint.
	H	0.40		35				Soft brown slightly gravelly silty CLAY with some fine rootlets. Gravel is subangular to rounded fine flint. (River Terrace Deposits) becoming stiff below 0.60m depth.
	J T	0.50						
	D	0.60						
	H	0.60		140				
	J T H	0.90		120				
	V	1.00		80				
	H	1.10		140				
	J T	1.20						
	D H	1.40		180			1.50	Loose to medium dense brown silty clayey GRAVEL. Gravel is angular to rounded fine to medium flint. (River Terrace Deposits) becoming medium dense below 1.70m depth.
	D	1.80						
							2.10	
	D	2.20						Soft light brown slightly gravelly silty CLAY. Gravel is angular to rounded fine flint. (River Terrace Deposits)
	H	2.30						
	J T	2.50						
	H	2.60					2.80	
	D	2.80						Loose to medium dense brown silty clayey GRAVEL. Gravel is angular to rounded fine to medium flint. (River Terrace Deposits)
							3.00	
								End of Borehole

Remarks:

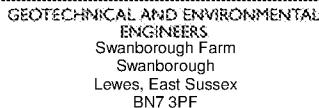
Borehole dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: DE



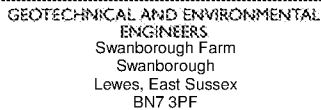
Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 06/03/2015

End Date: 06/03/2015

Remarks: Borehole dry and stable on completion. Dynamic probe carried out adjacent to borehole.	Excavation Method: Dynamic Sampler
	Borehole Diameter: Various
	Made By: PM



End Date: 06/03/2015

Made By: PM



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS4

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 06/03/2015

End Date: 06/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
	J T D	0.10 0.20					0.20	MADE GROUND: Brown grey gravel. Gravel is angular to subangular fine to coarse flint.
	J T D H	0.40 0.50		115				Stiff brown orange slightly sandy slightly gravelly silty CLAY. Gravel is angular to subangular fine to coarse flint. (River Terrace Deposits)
	D J T H V	0.80 0.90 1.00		115 95			1.10	
	D	1.20						Stiff to very stiff brown orange slightly sandy silty very gravelly CLAY. Gravel is angular to subangular fine to coarse flint. (River Terrace Deposits)
	J T	1.50					2.00	
								Medium dense brown slightly sandy silty clayey GRAVEL. Gravel is angular to subangular fine to coarse flint. (River Terrace Deposits)
	J T D	2.50 2.60					3.00	
								End of Borehole

Remarks:

Borehole dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: PM



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS5

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 06/03/2015

End Date: 06/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
							0.25	Topsoil with roots.
	D	0.10						
	J T	0.20						
	H	0.30		140				
	D	0.40						
	J T H	0.50		90				Stiff brown orange slightly sandy slightly gravelly silty CLAY. Gravel is angular to subangular fine to medium flint. (River Terrace Deposits)
	H	0.80		140				
	V	1.00		110				
	J T	1.20						
	D	1.50					1.70	
	J T	2.20						Loose to medium dense brownn slightly sandy silty clayey GRAVEL. Gravel is angular to subangular fine to coarse flint. (River Terrace Deposits)
	D H	2.50		140				with a pocket of stiff slightly gravelly slightly sandy silty CLAY at 2.50m depth.
							3.00	
								End of Borehole

Remarks:

Borehole dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: PM



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS6

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 06/03/2015

End Date: 06/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
	J T	0.10					0.15	Topsoil.
	J T	0.30						Firm brown orange slightly sandy silty CLAY with occasional gravel of angular to subrounded fine to medium flint. (River Terrace Deposits) becoming firm to stiff below 0.80m depth. becoming stiff below 1.40m depth.
	D	0.40						
	D H	0.80		60				
	J T	0.90						
	V	1.00		85				
	H	1.40		140				
	J T	1.50						
	D H	1.80		140				
	V	2.00		90			2.20	
	D	2.40						
	J T	2.50						Medium dense brown slightly sandy silty clayey GRAVEL. Gravel is angular to subrounded fine to coarse flint. (River Terrace Deposits)
							3.00	
								End of Borehole

Remarks:

Borehole dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: PM



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS7

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 06/03/2015

End Date: 06/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
	J T	0.10					0.20	Topsoil with occasional gravel of angular to subangular fine to medium flint and occasional brick.
	D	0.30						Firm brown orange slightly silty CLAY with occasional gravel of angular to subangular fine to medium flint. (River Terrace Deposits) becoming stiff below 0.80m depth.
	J T H	0.50		90				
	H	0.80		115				
	V	1.00		110				
	D	1.20						
	J T H	1.50		90			1.90	Loose to medium dense brown slightly sandy silty clayey GRAVEL. Gravel is angular to subangular fine to coarse flint. (River Terrace Deposits)
	D	2.40						
	J T	2.50					3.00	
								End of Borehole

Remarks:

Borehole dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: PM



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS8

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 11/03/2015

End Date: 11/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
	J T	0.10					0.15	MADE GROUND: Dark brown gravelly clayey silt. Gravel is subangular to rounded fine to medium flint (50mm) over, MADE GROUND: Yellow brown slightly clayey very gravelly sand. Gravel is subangular to rounded fine to medium flint.
	D	0.50		70			0.60	Reworked: Brown mottled red slightly gravelly silty clay. Gravel is subangular to rounded fine to medium ironstone.
	H	0.65						
	J T	0.70		90				Firm to stiff brown slightly gravelly silty CLAY. Gravel is subangular to rounded fine to medium flint. (River Terrace Deposits)
	H	0.80						
	V	1.00		80				
	J T H	1.20						
	D	1.30						
	H	1.50		95			1.60	
	D	1.70						Medium dense brown silty clayey GRAVEL. Gravel is angular to rounded fine to medium flint. (River Terrace Deposits)
	J T	1.90						
	D	2.20						
	J T	2.50						becoming loose below 2.50m depth.
	D	2.80					3.00	
								End of Borehole

Remarks:

Borehole is dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: DE



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS9

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 11/03/2015

End Date: 11/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
							0.20	MADE GROUND: Dark brown very gravelly silt. Gravel is subangular to rounded fine to medium flint.
	J T H	0.30		35				Soft grey mottled brown slightly gravelly silty CLAY. Gravel is subangular to rounded fine to medium flint. (River Terrace Deposits) becoming brown at 0.50m depth.
	D	0.40						
	H	0.50		35				
	J T	0.80						
	D H	0.90		115				
								becoming stiff and very gravelly below 1.10m depth.
	D H	1.20		115			1.40	
	J T	1.50						Medium dense brown silty clayey GRAVEL. Gravel is angular to rounded fine to medium flint. (River Terrace Deposits)
	D	1.70						
	D	2.10						
	J T	2.50						
	D	2.80					3.00	
								End of Borehole

Remarks:

Borehole dry on completion.

Borehole collapsed to 2.50m depth on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: DE



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS10

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 11/03/2015

End Date: 11/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
	J T	0.00					0.10	MADE GROUND: Dark grey mottled brown clayey gravelly silt. Gravel is subangular to rounded fine to medium flint, nails and ash.
	H	0.20		195				
	D	0.40						MADE GROUND: Brown slightly gravelly silty clay. Gravel is subangular to rounded fine to medium flint and brick.
	J T H	0.50		80				
	D H	0.80		90				Medium dense brown silty clayey GRAVEL. Gravel is angular to rounded fine to medium flint. (River Terrace Deposits)
	J T	0.90					1.10	
	V	1.00		80				
	J T	1.50						
	D	1.80						
	J T	2.50						
	D	2.60						
	D	2.90					3.00	
								End of Borehole

Remarks:

Borehole dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: DE



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: WS11

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 11/03/2015

End Date: 11/03/2015

Standpipe Installation	Samples and Testing					Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	DPSH Profile Blows/100mm 5 15 25	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)					
							0.00	Ground Level
	J T	0.10					0.30	Topsoil (50mm) over, MADE GROUND: Dark brown clayey very gravelly silt. Gravel is subangular to rounded fine to medium flint, brick and plastic.
	D H	0.50		150				Very stiff dark brown slightly gravelly silty CLAY. Gravel is angular to rounded fine to medium flint. (River Terrace Deposits)
	J T	0.60						
	D H	0.90		70				becoming firm to stiff very gravelly at 0.80m depth.
	H	1.20		200			1.40	
	D	1.30						
	J T	1.50						Loose to medium dense brown silty clayey GRAVEL. Gravel is angular to rounded fine to medium flint. (River Terrace Deposits)
	D	1.80						
	D	2.20						becoming medium dense to dense and slightly silty below 2.10m depth.
	J T	2.50						
	D	2.70					3.00	
								End of Borehole

Remarks:

Borehole dry and stable on completion.

Dynamic probe carried out adjacent to borehole.

Excavation Method: Dynamic Sampler

Borehole Diameter: Various

Made By: DE



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

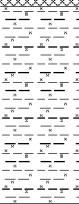
Borehole No.: HA1

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 11/03/2015

End Date: 11/03/2015

Standpipe Installation	Samples and Testing				Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)				
						0.00	Ground Level
	J T	0.10				0.20	Topsoil (50mm) over, MADE GROUND: Brown mottled red silty clay with pockets of red sand.
	J T	0.80				1.00	Brown slightly gravelly silty CLAY. Gravel is angular to rounded fine flint. (River Terrace Deposits)
							End of Borehole

Remarks:

Borhole dry and stable on completion.

Excavation Method: Hand Auger

Borehole Diameter: Various

Made By: DE



GEOTECHNICAL AND ENVIRONMENTAL
ENGINEERS
Swanborough Farm
Swanborough
Lewes, East Sussex
BN7 3PF

Borehole No.: HA2

Site Name: Manor Nursery, Angmering, West Sussex

Job No.: LW26073

Start Date: 11/03/2015

End Date: 11/03/2015

Standpipe Installation	Samples and Testing				Strata		
	Sample Type	Depths		Vane/ Pen Test N Value	Legend	Depth / Reduced Level	Strata Descriptions
		From (m)	To (m)				
						0.00	Ground Level
	J T	0.30				0.40	Topsoil (50mm) over, MADE GROUND: Dark brown slightly sandy slightly gravelly silty clay. Gravel is angular to rounded fine flint.
	J T	0.90				1.00	Brown slightly gravelly silty CLAY. Gravel is subangular to rounded fine to medium flint. (River Terrace Deposits)
							End of Borehole

Remarks:

Borehole dry and stable on completion.

Excavation Method: Hand Auger

Borehole Diameter: Various

Made By: DE

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method:	HDP
	Pit Length:	n/a
	Pit Width:	n/a
	Made By:	MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method:	HDP
	Pit Length:	n/a
	Pit Width:	n/a
	Made By:	MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: MR

End Date: 29/04/2020

Sheet 1 of 1

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method:	HDP
	Pit Length:	n/a
	Pit Width:	n/a
	Made By:	MR

Site Name: Manor Nursery, Angmering, West Sussex

Job Number: P14618

Start Date: 29/04/2020

End Date: 29/04/2020

Trial Pit Number: TP11

Sheet 1 of 1

Samples and In Situ Testing		Legend		Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result		
J T	0.10			0.00	MADE GROUND: Black and brown gravelly sandy clay. Gravel is angular to subangular fine to medium flint and brick.
				0.30	REWORKED: Dark brown and dark brown slightly sandy silty clay.
J T	0.50			0.50	End of trial pit at 0.50m

Remarks	
---------	--

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: MR

Site Name: Manor Nursery, Angmering, West Sussex

Job Number: P14618

Start Date: 29/04/2020

End Date: 29/04/2020

Trial Pit Number: **TP12**

Sheet 1 of 1

Samples and In Situ Testing					Stratum Description	
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
J T	0.05				0.00	MADE GROUND: Black and brown gravelly sandy clay. Gravel is angular to subangular fine to medium flint and brick.
J T	0.40				0.30	REWORKED: Dark brown and dark brown slightly sandy silty clay.
					0.50	End of trial pit at 0.50m

Remarks	
---------	--

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: MR

Site Name: Manor Nursery, Angmering, West Sussex

Job Number: P14618

Start Date: 29/04/2020

End Date: 29/04/2020

Trial Pit Number: **TP13**

Sheet 1 of 1

Samples and In Situ Testing						Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	
J T	0.10				0.00	REWORKED: Dark brown slightly sandy silty clay.
J T	0.50				0.50	
						End of trial pit at 0.50m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: MR

Site Name: Manor Nursery, Angmering, West Sussex

Job Number: P14618

Start Date: 29/04/2020

End Date: 29/04/2020

Trial Pit Number: **TP14**

Sheet 1 of 1

Samples and In Situ Testing					Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend		
J T	0.20				0.00	Concrete.
J T	0.40				0.05	MADE GROUND: Sandy angular to subangular fine to coarse gravel of flint.
					0.08	REWORKED: Brown slightly sandy silty clay.
					0.50	End of trial pit at 0.50m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: MR

ASHDOWN SITE INVESTIGATION

LIMITED

E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk

Site Name: Manor Nursery, Angmering, West Sussex

Job Number: P14618

Start Date: 29/04/2020

End Date: 29/04/2020

Trial Pit Number: **TP15**

Sheet 1 of 1

Samples and In Situ Testing						Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	
					0.00	Concrete.
J T	0.25				0.18	MADE GROUND: Grey brown gravelly fine to coarse sand. Gravel is angular to subangular fine to coarse brick, flint and concrete.
J T	0.40				0.30	
					0.50	REWORKED: Brown slightly gravelly silty clay. Gravel is angular to subangular fine to coarse flint.
						End of trial pit at 0.50m

Remarks Groundwater: Trial pit dry on completion. Stability: Trial pit stable on completion. Notes: n/a	Excavation Method: HDP
	Pit Length: n/a
	Pit Width: n/a
	Made By: MR

Site Name: Manor Nursery, Angmering, West Sussex

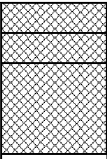
Job Number: P14618

Start Date: 29/04/2020

End Date: 29/04/2020

Trial Pit Number: **TP16**

Sheet 1 of 1

Samples and In Situ Testing						Stratum Description	
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level		
J T	0.40				0.00	Concrete.	
					0.10	MADE GROUND: Grey gravelly sand. Gravel is angular to subangular fine to coarse flint and concrete.	
					0.20		
					0.50	REWORKED: Brown slightly sandy silty clay.	
						End of trial pit at 0.50m	

Remarks
Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: MR

Site Name: Manor Nursery, Angmering, West Sussex

Job Number: P14618

Start Date: 29/04/2020

End Date: 29/04/2020

Trial Pit Number: **TP17**

Sheet 1 of 1

Samples and In Situ Testing						Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	
J T	0.10				0.00	Topsoil.
					0.15	REWORKED: Orange brown slightly gravelly slightly sandy silty clay. Gravel is angular to subangular fine to coarse flint.
J T	0.40				0.50	
						End of trial pit at 0.50m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: HDP

Pit Length: n/a

Pit Width: n/a

Made By: MR

APPENDIX E

Contamination Test Results (LW26073)

Contamination Test Results (P14618)



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 15-00921

Issue: 1

Date of Issue: 13/03/2015

Contact: David Harris

Customer Details: Ashdown Site Investigation Limited
The Old Dairy
Swanborough Farm
Lewes
East Sussex

Quotation No: Q14-00001

Order No: 150192

Customer Reference: LW26073

Date Received: 09/03/2015

Date Approved: 13/03/2015

Details: Manor Nursery, Angmering, West Sussex

Approved by:

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 15-00921

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
13881	WS2 0.40	06/03/2015	10/03/2015	Silty loam	



Results Summary

Report No.: 15-00921

ELAB Reference	18881
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	WS2
Sample Depth (m)	0.40
Sampling Date	06/03/2015

Determinand	Codes	Units	LOD	
SVOC				
Herbicides	N	mg/kg	0.01	< 0.01



Method Summary

Report No.: 15-00921

Parameter	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil				
SVOC in solids	As submitted sample	11/03/2015	167	GC-MS

Report Information

Report No.: 15-00921

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

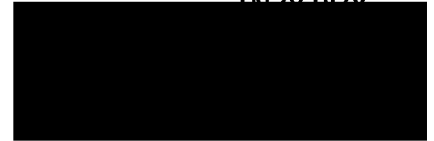
All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9DY



THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 15-00921

Issue: 2

Date of Issue: 19/03/2015

Contact: David Harris

Customer Details: Ashdown Site Investigation Limited
The Old Dairy
Swanborough Farm
Lewes
East Sussex

Quotation No: Q14-00001

Order No: 150192

Customer Reference: LW26073

Date Received: 09/03/2015

Date Approved: 19/03/2015

Details: Manor Nursery, Angmering, West Sussex

Approved by:



John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



Sample Summary

Report No.: 15-00921

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
13881	WS2 0.40	06/03/2015	10/03/2015	Silty loam	



2683



Results Summary

Report No.: 15-00921

ELAB Reference	18881
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	WS2
Sample Depth (m)	0.40
Sampling Date	06/03/2015

Determinand	Codes	Units	LOD	
OrganoChlorine Pesticides				
alpha-HCH	M	ug/kg	10	< 10
beta_HCH	M	ug/kg	10	< 10
gamma-HCH	M	ug/kg	10	< 10
delta-HCH	N	ug/kg	10	< 10
Heptachlor	N	ug/kg	10	< 10
Aldrin	M	ug/kg	10	< 10
Heptachlor expoxide	N	ug/kg	10	< 10
trans-Chlordane	N	ug/kg	10	< 10
alpha cis-Chlordane	N	ug/kg	10	< 10
p,p-DDE	M	ug/kg	10	< 10
Dieldrin	M	ug/kg	10	< 10
Endrin	N	ug/kg	10	< 10
p,p-DDD	M	ug/kg	10	< 10
Endosulfan II	N	ug/kg	10	< 10
Endrin aldehyde	N	ug/kg	10	< 10
p,p-DDT	M	ug/kg	10	< 10
Endosulphan sulphate	M	ug/kg	10	< 10
Methoxychlor	N	ug/kg	10	< 10
Endrin ketone	N	ug/kg	10	< 10



2683



Results Summary

Report No.: 15-00921

ELAB Reference	18881
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	WS2
Sample Depth (m)	0.40
Sampling Date	06/03/2015

Determinand	Codes	Units	LOD	
OrganoPhosphorus Pesticides				
Acephate	N	ug/kg	100	< 100
Aziniphos-methyl	N	ug/kg	100	< 100
Chlorpyrifos	N	ug/kg	100	< 100
Demeton-s-methyl	N	ug/kg	100	< 100
Dichlorvos	N	ug/kg	100	< 100
Dimethoate	N	ug/kg	100	< 100
Ethion	N	ug/kg	100	< 100
Malathion	N	ug/kg	100	< 100
Mathidathion	N	ug/kg	100	< 100
Methamidophos	N	ug/kg	100	< 100
Omethoate	N	ug/kg	100	< 100
Pirimifos-methyl	N	ug/kg	100	< 100
Profenofos	N	ug/kg	100	< 100
Pyrazophos	N	ug/kg	100	< 100
Tokuthion	N	ug/kg	100	< 100
Tolclofos-methyl	N	ug/kg	100	< 100



Results Summary

2683

Report No.: 15-00921

ELAB Reference	18881
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	WS2
Sample Depth (m)	0.40
Sampling Date	06/03/2015

Determinand	Codes	Units	LOD	
SVOC				
Acid herbicides	N	mg/kg	0.01	< 0.01



Method Summary

Report No.: 15-00921

Parameter	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil				
SVOC in solids	As submitted sample	11/03/2015	167	GC-MS
Organochlorine Pesticides in solids	As submitted sample	18/03/2015	173	GC-MS
Organophosphorus Pesticides in solids	As submitted sample	18/03/2015	173	GC-MS



Report Information

Report No.: 15-00921

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



2683



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 15-01073

Issue: 1

Date of Issue: 20/03/2015

Contact: David Harris

Customer Details: Ashdown Site Investigation Limited
The Old Dairy
Swanborough Farm
Lewes
East Sussex

Quotation No: Q14-00001

Order No: 150207

Customer Reference: LW26073

Date Received: 13/03/2015

Date Approved: 20/03/2015

Details: Manor Nursery, Angmering, West Sussex

Approved by:

John Wilson, Operations Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

Sample Summary

Report No.: 15-01073

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
19699	WS1 0.10	11/03/2015	16/03/2015	Sandy loam	
19700	WS2 0.20	06/03/2015	16/03/2015	Loamy sand	
19701	WS3 0.20	06/03/2015	16/03/2015	Sandy silty loam	
19702	WS5 0.20	06/03/2015	16/03/2015	Silty loam	
19703	WS7 0.10	06/03/2015	16/03/2015	Sandy silty loam	
19704	WS8 0.10	11/03/2015	16/03/2015	Silty loam	
19705	WS10 GL	11/03/2015	16/03/2015	Sandy silty loam	
19706	WS10 0.50	11/03/2015	16/03/2015	Silty loam	
19707	DS GL	11/03/2015	16/03/2015	Sandy silty loam	
19708	HA1 0.10	11/03/2015	16/03/2015	Sandy silty loam	
19709	HA1 0.80	11/03/2015	16/03/2015	Silty loam	
19710	HA2 0.30	11/03/2015	16/03/2015	Silty loam	
19711	HA2 0.90	11/03/2015	16/03/2015	Silty loam	



2683



Results Summary

Report No.: 15-01073

Report Ref: 15 01676

ELAB Reference				19699	19700	19701	19702	19703	19704
Customer Reference									
Sample ID									
Sample Type				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location				WS1	WS2	WS3	WS5	WS7	WS8
Sample Depth (m)				0.10	0.20	0.20	0.20	0.10	0.10
Sampling Date				11/03/2015	06/03/2015	06/03/2015	06/03/2015	06/03/2015	11/03/2015
Determinand	Codes	Units	LOD						
Metals									
Arsenic	M	mg/kg	1	5.5	4.0	4.0	7.2	8.6	12.2
Cadmium	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	0.6	< 0.5
Chromium	M	mg/kg	5	9.9	6.5	10.9	17.8	23.3	27.2
Copper	M	mg/kg	5	5.4	< 5.0	17.6	17.9	18.9	26.4
Lead	M	mg/kg	5	13.1	14.6	21.9	33.8	37.2	53.3
Mercury	M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	5.2	< 5.0	28.1	13.6	15.8	17.7
Selenium	M	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	45	< 45.0	54.2	< 45.0	61.9	63.0	234
Inorganics									
Hexavalent Chromium	N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Water Soluble Boron	N	mg/kg	0.5	< 0.5	< 0.5	< 0.5	1.1	0.5	< 0.5
Miscellaneous									
pH	M	units	0.1	9.2	9.1	8.4	7.7	7.7	7.4
Soil Organic Matter	U	%	0.1	1.3	0.9	1.6	6.1	3.0	2.2



2683



Results Summary

Report No.: 15-01073

ELAB Reference	19699	19700	19701	19702	19703	19704
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS1	WS2	WS3	WS5	WS7	WS8
Sample Depth (m)	0.10	0.20	0.20	0.20	0.10	0.10
Sampling Date	11/03/2015	06/03/2015	06/03/2015	06/03/2015	06/03/2015	11/03/2015

Determinand	Codes	Units	LOD						
Organics									
>C8-C10 BCB	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	< 1.0
>C10-C12 BCB	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	< 1.0
>C12-C16 BCB	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	< 1.0
>C16-C21 BCB	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	1.6
>C21-C35 BCB	N	mg/kg	1	4.8	n/t	n/t	n/t	n/t	14.0
>C35-C40 BCB	N	mg/kg	1	< 1.0	n/t	n/t	n/t	n/t	3.2
Total (>C8-C40) BCB	N	mg/kg	1	4.8	n/t	n/t	n/t	n/t	18.8
Polyaromatic hydrocarbons									
Naphthalene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	0.02	< 0.01	0.01	< 0.01
Acenaphthylene GCMS	N	mg/kg	0.01	0.02	< 0.01	0.04	0.01	0.01	< 0.01
Acenaphthene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01
Fluorene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene GCMS	N	mg/kg	0.01	0.17	0.04	0.09	0.04	0.07	0.04
Anthracene GCMS	N	mg/kg	0.01	0.05	0.01	0.05	0.02	0.02	< 0.01
Fluoranthene GCMS	N	mg/kg	0.01	0.42	0.12	0.53	0.18	0.27	0.14
Pyrene GCMS	N	mg/kg	0.01	0.38	0.10	0.52	0.17	0.23	0.12
Benzo (a) anthracene GCMS	N	mg/kg	0.01	0.18	0.06	0.40	0.10	0.13	0.05
Chrysene GCMS	N	mg/kg	0.01	0.21	0.09	0.43	0.12	0.09	0.07
Benzo (b) fluoranthene GCMS	N	mg/kg	0.01	0.16	0.07	0.47	0.11	0.14	0.17
Benzo (k) fluoranthene GCMS	N	mg/kg	0.01	0.20	0.08	0.49	0.13	0.15	0.06
Benzo (a) pyrene GCMS	N	mg/kg	0.01	0.23	0.10	0.58	0.14	0.17	0.07
Indeno (1,2,3-cd) pyrene GCMS	N	mg/kg	0.01	0.11	0.06	0.34	0.08	0.10	0.04
Dibenzo(a,h)anthracene GCMS	N	mg/kg	0.01	0.03	0.02	0.11	0.03	0.03	0.01
Benzo(ghi)perylene GCMS	N	mg/kg	0.01	0.16	0.09	0.41	0.11	0.15	0.04
Total PAH(16) GCMS	N	mg/kg	0.04	2.35	0.87	4.50	1.27	1.58	0.85



Results Summary

Report No.: 15-01073

2683

ELAB Reference	19699	19700	19701	19702	19703	19704
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS1	WS2	WS3	WS5	WS7	WS8
Sample Depth (m)	0.10	0.20	0.20	0.20	0.10	0.10
Sampling Date	11/03/2015	06/03/2015	06/03/2015	06/03/2015	06/03/2015	11/03/2015

Determinand	Codes	Units	LOD						
OrganoChlorine Pesticides									
alpha-HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
beta_HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
gamma-HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
delta-HCH	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Heptachlor	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Aldrin	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Heptachlor expoxide	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
trans-Chlordane	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
alpha cis-Chlordane	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
p,p-DDE	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Dieldrin	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Endrin	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
p,p-DDD	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Endosulfan II	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Endrin aldehyde	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
p,p-DDT	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Endosulphan sulphate	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Methoxychlor	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
Endrin ketone	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	< 10
OrganoPhosphorus Pesticides									
Acephate	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Aziniphos-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Chlorpyrifos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Demeton-s-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Dichlorvos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Dimethoate	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Ethion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Malathion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Mathidathion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Methamidophos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Omethoate	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Pirimifos-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Profenofos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Pyrazophos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Tokuthion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100
Tolclofos-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	< 100



2683



Results Summary

Report No.: 15-01073

ELAB Reference			19705	19706	19707	19708	19709	19710
Customer Reference								
Sample ID								
Sample Type			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location			WS10	WS10	DS	HA1	HA1	HA2
Sample Depth (m)			GL	0.50	GL	0.10	0.80	0.30
Sampling Date			11/03/2015	11/03/2015	11/03/2015	11/03/2015	11/03/2015	11/03/2015
des	Units	LOD						
M	mg/kg	1	48.4	10.4	3.8	10.8	n/t	n/t
M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	n/t	n/t
M	mg/kg	5	38.7	24.4	5.1	23.6	n/t	n/t
M	mg/kg	5	91.3	25.7	5.7	17.9	n/t	n/t
M	mg/kg	5	25.9	31.1	6.9	49.1	n/t	n/t
M	mg/kg	0.5	< 0.5	< 0.5	< 0.5	< 0.5	n/t	n/t
M	mg/kg	5	12.5	17.1	< 5.0	16.4	n/t	n/t
M	mg/kg	1	1.1	1.1	< 1.0	< 1.0	n/t	n/t
M	mg/kg	45	211	60.5	< 45.0	91.0	n/t	n/t
N	mg/kg	0.8	< 0.8	< 0.8	< 0.8	< 0.8	n/t	n/t
N	mg/kg	0.5	2.1	0.6	< 0.5	0.6	n/t	n/t
M	units	0.1	8.0	7.3	8.2	6.8	n/t	n/t
U	%	0.1	6.2	2.2	3.8	2.1	n/t	n/t



Results Summary

Report No.: 15-01073

2683

ELAB Reference	19705	19706	19707	19708	19709	19710
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS10	WS10	DS	HA1	HA1	HA2
Sample Depth (m)	GL	0.50	GL	0.10	0.80	0.30
Sampling Date	11/03/2015	11/03/2015	11/03/2015	11/03/2015	11/03/2015	11/03/2015
Determinand	Codes	Units	LOD			
Organics						
>C8-C10 BCB	N	mg/kg	1	n/t	n/t	n/t
>C10-C12 BCB	N	mg/kg	1	n/t	n/t	n/t
>C12-C16 BCB	N	mg/kg	1	n/t	n/t	n/t
>C16-C21 BCB	N	mg/kg	1	n/t	n/t	n/t
>C21-C35 BCB	N	mg/kg	1	n/t	n/t	n/t
>C35-C40 BCB	N	mg/kg	1	n/t	n/t	n/t
Total (>C8-C40) BCB	N	mg/kg	1	n/t	n/t	n/t
Polyaromatic hydrocarbons						
Naphthalene GCMS	N	mg/kg	0.01	0.16	< 0.01	< 0.01
Acenaphthylene GCMS	N	mg/kg	0.01	0.01	< 0.01	< 0.01
Acenaphthene GCMS	N	mg/kg	0.01	0.01	< 0.01	< 0.01
Fluorene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Phenanthrene GCMS	N	mg/kg	0.01	0.04	0.02	0.01
Anthracene GCMS	N	mg/kg	0.01	0.02	< 0.01	< 0.01
Fluoranthene GCMS	N	mg/kg	0.01	0.10	0.04	0.02
Pyrene GCMS	N	mg/kg	0.01	0.09	0.03	0.02
Benzo (a) anthracene GCMS	N	mg/kg	0.01	0.02	0.01	< 0.01
Chrysene GCMS	N	mg/kg	0.01	0.03	0.02	< 0.01
Benzo (b) fluoranthene GCMS	N	mg/kg	0.01	0.03	0.05	< 0.01
Benzo (k) fluoranthene GCMS	N	mg/kg	0.01	0.02	0.03	< 0.01
Benzo (a) pyrene GCMS	N	mg/kg	0.01	0.01	0.02	< 0.01
Indeno (1,2,3-cd) pyrene GCMS	N	mg/kg	0.01	< 0.01	0.01	< 0.01
Dibenzo(a,h)anthracene GCMS	N	mg/kg	0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene GCMS	N	mg/kg	0.01	< 0.01	0.01	0.02
Total PAH(16) GCMS	N	mg/kg	0.04	0.56	0.25	0.12



Results Summary

2683

Report No.: 15-01073

ELAB Reference	19705	19706	19707	19708	19709	19710
Customer Reference						
Sample ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	WS10	WS10	DS	HA1	HA1	HA2
Sample Depth (m)	GL	0.50	GL	0.10	0.80	0.30
Sampling Date	11/03/2015	11/03/2015	11/03/2015	11/03/2015	11/03/2015	11/03/2015

Determinand	Codes	Units	LOD						
OrganoChlorine Pesticides									
alpha-HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
beta_HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
gamma-HCH	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
delta-HCH	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Heptachlor	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Aldrin	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Heptachlor expoxide	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
trans-Chlordane	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
alpha cis-Chlordane	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDE	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Dieldrin	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDD	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endosulfan II	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin aldehyde	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
p,p-DDT	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endosulphan sulphate	M	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Methoxychlor	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
Endrin ketone	N	ug/kg	10	n/t	n/t	n/t	n/t	n/t	n/t
OrganoPhosphorus Pesticides									
Acephate	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Azinphos-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Chlorpyrifos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Demeton-s-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Dichlorvos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Dimethoate	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Ethion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Malathion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Mathidathion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Methamidophos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Omethoate	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Pirimifos-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Profenofos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Pyrazophos	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Tokuthion	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t
Tolclofos-methyl	N	ug/kg	100	n/t	n/t	n/t	n/t	n/t	n/t



2683



Results Summary

Report No.: 15-01073

ELAB Reference	19711
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	HA2
Sample Depth (m)	0.90
Sampling Date	11/03/2015

Determinand	Codes	Units	LOD	
Metals				
Arsenic	M	mg/kg	1	n/t
Cadmium	M	mg/kg	0.5	n/t
Chromium	M	mg/kg	5	n/t
Copper	M	mg/kg	5	n/t
Lead	M	mg/kg	5	n/t
Mercury	M	mg/kg	0.5	n/t
Nickel	M	mg/kg	5	n/t
Selenium	M	mg/kg	1	n/t
Zinc	M	mg/kg	45	n/t
Inorganics				
Hexavalent Chromium	N	mg/kg	0.8	n/t
Water Soluble Boron	N	mg/kg	0.5	n/t
Miscellaneous				
pH	M	units	0.1	n/t
Soil Organic Matter	U	%	0.1	n/t



2683



Results Summary

Report No.: 15-01073

ELAB Reference	19711
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	HA2
Sample Depth (m)	0.90
Sampling Date	11/03/2015

Determinand	Codes	Units	LOD	
Organics				
>C8-C10 BCB	N	mg/kg	1	< 1.0
>C10-C12 BCB	N	mg/kg	1	< 1.0
>C12-C16 BCB	N	mg/kg	1	< 1.0
>C16-C21 BCB	N	mg/kg	1	< 1.0
>C21-C35 BCB	N	mg/kg	1	< 1.0
>C35-C40 BCB	N	mg/kg	1	< 1.0
Total (>C8-C40) BCB	N	mg/kg	1	< 1.0
Polyaromatic hydrocarbons				
Naphthalene GCMS	N	mg/kg	0.01	n/t
Acenaphthylene GCMS	N	mg/kg	0.01	n/t
Acenaphthene GCMS	N	mg/kg	0.01	n/t
Fluorene GCMS	N	mg/kg	0.01	n/t
Phenanthrene GCMS	N	mg/kg	0.01	n/t
Anthracene GCMS	N	mg/kg	0.01	n/t
Fluoranthene GCMS	N	mg/kg	0.01	n/t
Pyrene GCMS	N	mg/kg	0.01	n/t
Benzo (a) anthracene GCMS	N	mg/kg	0.01	n/t
Chrysene GCMS	N	mg/kg	0.01	n/t
Benzo (b) fluoranthene GCMS	N	mg/kg	0.01	n/t
Benzo (k) fluoranthene GCMS	N	mg/kg	0.01	n/t
Benzo (a) pyrene GCMS	N	mg/kg	0.01	n/t
Indeno (1,2,3-cd) pyrene GCMS	N	mg/kg	0.01	n/t
Dibenzo(a,h)anthracene GCMS	N	mg/kg	0.01	n/t
Benzo(ghi)perylene GCMS	N	mg/kg	0.01	n/t
Total PAH(16) GCMS	N	mg/kg	0.04	n/t



Results Summary

Report No.: 15-01073

2683

ELAB Reference	19711
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	HA2
Sample Depth (m)	0.90
Sampling Date	11/03/2015

Determinand	Codes	Units	LOD	
OrganoChlorine Pesticides				
alpha-HCH	M	ug/kg	10	n/t
beta_HCH	M	ug/kg	10	n/t
gamma-HCH	M	ug/kg	10	n/t
delta-HCH	N	ug/kg	10	n/t
Heptachlor	N	ug/kg	10	n/t
Aldrin	M	ug/kg	10	n/t
Heptachlor expoxide	N	ug/kg	10	n/t
trans-Chlordane	N	ug/kg	10	n/t
alpha cis-Chlordane	N	ug/kg	10	n/t
p,p-DDE	M	ug/kg	10	n/t
Dieldrin	M	ug/kg	10	n/t
Endrin	N	ug/kg	10	n/t
p,p-DDD	M	ug/kg	10	n/t
Endosulfan II	N	ug/kg	10	n/t
Endrin aldehyde	N	ug/kg	10	n/t
p,p-DDT	M	ug/kg	10	n/t
Endosulphan sulphate	M	ug/kg	10	n/t
Methoxychlor	N	ug/kg	10	n/t
Endrin ketone	N	ug/kg	10	n/t
OrganoPhosphorus Pesticides				
Acephate	N	ug/kg	100	n/t
Azinphos-methyl	N	ug/kg	100	n/t
Chlorpyrifos	N	ug/kg	100	n/t
Demeton-s-methyl	N	ug/kg	100	n/t
Dichlorvos	N	ug/kg	100	n/t
Dimethoate	N	ug/kg	100	n/t
Ethion	N	ug/kg	100	n/t
Malathion	N	ug/kg	100	n/t
Mathidathion	N	ug/kg	100	n/t
Methamidophos	N	ug/kg	100	n/t
Omethoate	N	ug/kg	100	n/t
Pirimifos-methyl	N	ug/kg	100	n/t
Profenofos	N	ug/kg	100	n/t
Pyrazophos	N	ug/kg	100	n/t
Tokuthion	N	ug/kg	100	n/t
Tolclofos-methyl	N	ug/kg	100	n/t



Results Summary

2683

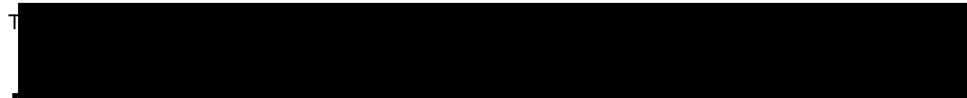
Report No.: 15-01073

ELAB Reference	19704
Customer Reference	
Sample ID	
Sample Type	SOIL
Sample Location	WS8
Sample Depth (m)	0.10
Sampling Date	11/03/2015

Determinand	Codes	Units	LOD	
SVOC				
Acid herbicides	N	mg/kg	0.01	< 0.01



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY



Results Summary

Report No.: 15-01073

Asbestos Qualitative Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) L in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No	Depth (m)	Clients Reference	Description of Sample Matrix #	Result
19699	0.10	WS1	Sandy loam	No asbestos detected
19704	0.10	WS8	Silty loam	No asbestos detected
19707	GL	DS	Sandy silty loam	No asbestos detected

Method Summary

Report No.: 15-01073

Parameter	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil				
Polyaromatic hydrocarbons (GC-MS)	As submitted sample	18/03/2015		GC-MS
Hexavalent chromium	As submitted sample	19/03/2015	110	Colorimetry
pH	Air dried sample	20/03/2015	113	Electromeric
Aqua regia extractable metals	Air dried sample	19/03/2015	118	ICPMS
SVOC in solids	As submitted sample	18/03/2015	167	GC-MS
Organochlorine Pesticides in solids	As submitted sample	18/03/2015	173	GC-MS
Organophosphorus Pesticides in solids	As submitted sample	18/03/2015	173	GC-MS
Water soluble boron	Air dried sample	19/03/2015	202	Colorimetry
Basic carbon banding in soil	As submitted sample	18/03/2015	218	GC-FID
Soil organic matter	Air dried sample	19/03/2015	BS1377:P3	Titrimetry
Asbestos identification	As submitted sample	19/03/2015	PMAN	Microscopy



Report Information

Report No.: 15-01073

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage



2683



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY

THE ENVIRONMENTAL LABORATORY LTD

Analytical Report Number: 20-28015

Issue: 1

Date of Issue: 12/05/2020

Contact: Lab Results

Customer Details: Ashdown Site Investigation Ltd
Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
West Sussex BN6 8SG

Quotation No: Q15-00267

Order No: 8558

Customer Reference: P14618

Date Received: 04/05/2020

Date Approved: 12/05/2020

Details: Manor Nursery, Angmering

Approved by:

Mike Varley, Technical Manager

Any comments, opinions or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

This report may only be reproduced in full

Sample Summary

Report No.: 20-28015, issue number 1

Elab No.	Client's Ref.	Date Sampled	Date Scheduled	Description	Deviations
203358	TP01 0.05	29/04/2020	04/05/2020	Silty loam	
203359	TP02 0.05	29/04/2020	04/05/2020	Silty loam	
203360	TP03 0.05	29/04/2020	04/05/2020	Silty loam	
203361	TP04 0.05	29/04/2020	04/05/2020	Silty loam	
203362	TP05 0.05	29/04/2020	04/05/2020	Silty loam	
203363	TP06 0.05	29/04/2020	04/05/2020	Silty loam	
203364	TP07 0.10	29/04/2020	04/05/2020	Silty loam	
203365	TP08 0.05	29/04/2020	04/05/2020	Silty loam	
203366	TP09 0.05	29/04/2020	04/05/2020	Silty loam	
203367	TP10 0.10	29/04/2020	04/05/2020	Silty loam	
203368	TP11 0.10	29/04/2020	04/05/2020	Silty loam	
203369	TP11 0.40	29/04/2020	04/05/2020	Silty loam	
203370	TP12 0.05	29/04/2020	04/05/2020	Silty loam	
203371	TP12 0.40	29/04/2020	04/05/2020	Silty loam	
203372	TP13 0.10	29/04/2020	04/05/2020	Silty loam	
203373	TP13 0.50	29/04/2020	04/05/2020	Silty loam	
203374	TP14 0.40	29/04/2020	04/05/2020	Silty clayey loam	
203375	TP15 0.40	29/04/2020	04/05/2020	Silty loam	
203376	TP16 0.40	29/04/2020	04/05/2020	Silty loam	
203377	TP17 0.10	29/04/2020	04/05/2020	Silty loam	



Results Summary

2683

Report No.: 20-28015, issue number 1

ELAB Reference	203358	203359	203360	203361	203362
Customer Reference					
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	TP01	TP02	TP03	TP04	TP05
Sample Depth (m)	0.05	0.05	0.05	0.05	0.05
Sampling Date	29/04/2020	29/04/2020	29/04/2020	29/04/2020	29/04/2020
Determinand	Codes	Units	LOD		
Soil sample preparation parameters					
Material removed	N	%	0.1	25.1	23.9
Description of Inert material removed	N		0	Stones	Stones
Metals					
Arsenic	M	mg/kg	1	10.4	11.2
Cadmium	M	mg/kg	0.5	n/t	n/t
Chromium	M	mg/kg	5	n/t	n/t
Copper	M	mg/kg	5	n/t	n/t
Lead	M	mg/kg	5	n/t	n/t
Mercury	M	mg/kg	0.5	n/t	n/t
Nickel	M	mg/kg	5	n/t	n/t
Selenium	M	mg/kg	1	n/t	n/t
Zinc	M	mg/kg	5	n/t	n/t
Inorganics					
Hexavalent Chromium	N	mg/kg	0.8	n/t	n/t
Acid Soluble Sulphate (SO4)	U	%	0.02	n/t	n/t
Acid Soluble Sulphate (SO4)	N	mg/kg	200	n/t	n/t
Water Soluble Boron	N	mg/kg	0.5	n/t	n/t
Miscellaneous					
pH	M	pH units	0.1	n/t	n/t
Soil Organic Matter	U	%	0.1	n/t	n/t
Organics					
>C8-C10 BCB	N	mg/kg	1	n/t	n/t
>C10-C12 BCB	N	mg/kg	1	n/t	n/t
>C12-C16 BCB	N	mg/kg	1	n/t	n/t
>C16-C21 BCB	N	mg/kg	1	n/t	n/t
>C21-C35 BCB	N	mg/kg	1	n/t	n/t
>C35-C40 BCB	N	mg/kg	1	n/t	n/t
Total (>C8-C40) BCB	N	mg/kg	1	n/t	n/t
Polyaromatic hydrocarbons					
Naphthalene	M	mg/kg	0.1	n/t	n/t
Acenaphthylene	M	mg/kg	0.1	n/t	n/t
Acenaphthene	M	mg/kg	0.1	n/t	n/t
Fluorene	M	mg/kg	0.1	n/t	n/t
Phenanthrene	M	mg/kg	0.1	n/t	n/t
Anthracene	M	mg/kg	0.1	n/t	n/t
Fluoranthene	M	mg/kg	0.1	n/t	n/t
Pyrene	M	mg/kg	0.1	n/t	n/t
Benzo(a)anthracene	M	mg/kg	0.1	n/t	n/t
Chrysene	M	mg/kg	0.1	n/t	n/t
Benzo(b)fluoranthene	M	mg/kg	0.1	n/t	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	n/t	n/t
Benzo(a)pyrene	M	mg/kg	0.1	n/t	n/t
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	n/t	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	n/t	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	n/t	n/t
Total PAH(16)	M	mg/kg	0.4	n/t	n/t

Tests marked N are not UKAS accredited.

The Environmental Laboratory Ltd. Reg. No. 3882193

Page 3 of 9



Results Summary

2683

Report No.: 20-28015, issue number 1

ELAB Reference	203363	203364	203365	203366	203367
Customer Reference					
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	TP06	TP07	TP08	TP09	TP10
Sample Depth (m)	0.05	0.10	0.05	0.05	0.10
Sampling Date	29/04/2020	29/04/2020	29/04/2020	29/04/2020	29/04/2020
Determinand	Codes	Units	LOD		
Soil sample preparation parameters					
Material removed	N	%	0.1	19.3	24.5
Description of Inert material removed	N		0	Stones	Stones
Metals					
Arsenic	M	mg/kg	1	10.8	10.1
Cadmium	M	mg/kg	0.5	n/t	n/t
Chromium	M	mg/kg	5	n/t	n/t
Copper	M	mg/kg	5	n/t	n/t
Lead	M	mg/kg	5	n/t	n/t
Mercury	M	mg/kg	0.5	n/t	n/t
Nickel	M	mg/kg	5	n/t	n/t
Selenium	M	mg/kg	1	n/t	n/t
Zinc	M	mg/kg	5	n/t	n/t
Inorganics					
Hexavalent Chromium	N	mg/kg	0.8	n/t	n/t
Acid Soluble Sulphate (SO4)	U	%	0.02	n/t	n/t
Acid Soluble Sulphate (SO4)	N	mg/kg	200	n/t	n/t
Water Soluble Boron	N	mg/kg	0.5	n/t	n/t
Miscellaneous					
pH	M	pH units	0.1	n/t	n/t
Soil Organic Matter	U	%	0.1	n/t	n/t
Organics					
>C8-C10 BCB	N	mg/kg	1	n/t	n/t
>C10-C12 BCB	N	mg/kg	1	n/t	n/t
>C12-C16 BCB	N	mg/kg	1	n/t	n/t
>C16-C21 BCB	N	mg/kg	1	n/t	n/t
>C21-C35 BCB	N	mg/kg	1	n/t	n/t
>C35-C40 BCB	N	mg/kg	1	n/t	n/t
Total (>C8-C40) BCB	N	mg/kg	1	n/t	n/t
Polyaromatic hydrocarbons					
Naphthalene	M	mg/kg	0.1	n/t	n/t
Acenaphthylene	M	mg/kg	0.1	n/t	n/t
Acenaphthene	M	mg/kg	0.1	n/t	n/t
Fluorene	M	mg/kg	0.1	n/t	n/t
Phenanthrene	M	mg/kg	0.1	n/t	n/t
Anthracene	M	mg/kg	0.1	n/t	n/t
Fluoranthene	M	mg/kg	0.1	n/t	n/t
Pyrene	M	mg/kg	0.1	n/t	n/t
Benzo(a)anthracene	M	mg/kg	0.1	n/t	n/t
Chrysene	M	mg/kg	0.1	n/t	n/t
Benzo(b)fluoranthene	M	mg/kg	0.1	n/t	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	n/t	n/t
Benzo(a)pyrene	M	mg/kg	0.1	n/t	n/t
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	n/t	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	n/t	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	n/t	n/t
Total PAH(16)	M	mg/kg	0.4	n/t	n/t

Tests marked N are not UKAS accredited.

The Environmental Laboratory Ltd. Reg. No. 3882193

Page 4 of 9



Results Summary

2683

Report No.: 20-28015, issue number 1

ELAB Reference	203368	203369	203370	203371	203372
Customer Reference					
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	TP11	TP11	TP12	TP12	TP13
Sample Depth (m)	0.10	0.40	0.05	0.40	0.10
Sampling Date	29/04/2020	29/04/2020	29/04/2020	29/04/2020	29/04/2020
Determinand	Codes	Units	LOD		
Soil sample preparation parameters					
Material removed	N	%	0.1	n/t	n/t
Description of Inert material removed	N		0	n/t	n/t
Metals					
Arsenic	M	mg/kg	1	n/t	n/t
Cadmium	M	mg/kg	0.5	n/t	n/t
Chromium	M	mg/kg	5	n/t	n/t
Copper	M	mg/kg	5	n/t	n/t
Lead	M	mg/kg	5	n/t	n/t
Mercury	M	mg/kg	0.5	n/t	n/t
Nickel	M	mg/kg	5	n/t	n/t
Selenium	M	mg/kg	1	n/t	n/t
Zinc	M	mg/kg	5	n/t	n/t
Inorganics					
Hexavalent Chromium	N	mg/kg	0.8	n/t	n/t
Acid Soluble Sulphate (SO4)	U	%	0.02	n/t	n/t
Acid Soluble Sulphate (SO4)	N	mg/kg	200	n/t	n/t
Water Soluble Boron	N	mg/kg	0.5	n/t	n/t
Miscellaneous					
pH	M	pH units	0.1	n/t	n/t
Soil Organic Matter	U	%	0.1	n/t	n/t
Organics					
>C8-C10 BCB	N	mg/kg	1	< 1.0	< 1.0
>C10-C12 BCB	N	mg/kg	1	< 1.0	< 1.0
>C12-C16 BCB	N	mg/kg	1	< 1.0	< 1.0
>C16-C21 BCB	N	mg/kg	1	< 1.0	< 1.0
>C21-C35 BCB	N	mg/kg	1	< 1.0	< 1.0
>C35-C40 BCB	N	mg/kg	1	< 1.0	< 1.0
Total (>C8-C40) BCB	N	mg/kg	1	< 1.0	< 1.0
Polyaromatic hydrocarbons					
Naphthalene	M	mg/kg	0.1	n/t	n/t
Acenaphthylene	M	mg/kg	0.1	n/t	n/t
Acenaphthene	M	mg/kg	0.1	n/t	n/t
Fluorene	M	mg/kg	0.1	n/t	n/t
Phenanthrene	M	mg/kg	0.1	n/t	n/t
Anthracene	M	mg/kg	0.1	n/t	n/t
Fluoranthene	M	mg/kg	0.1	n/t	n/t
Pyrene	M	mg/kg	0.1	n/t	n/t
Benzo(a)anthracene	M	mg/kg	0.1	n/t	n/t
Chrysene	M	mg/kg	0.1	n/t	n/t
Benzo(b)fluoranthene	M	mg/kg	0.1	n/t	n/t
Benzo(k)fluoranthene	M	mg/kg	0.1	n/t	n/t
Benzo(a)pyrene	M	mg/kg	0.1	n/t	n/t
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	n/t	n/t
Dibenzo(a,h)anthracene	M	mg/kg	0.1	n/t	n/t
Benzo[g,h,i]perylene	M	mg/kg	0.1	n/t	n/t
Total PAH(16)	M	mg/kg	0.4	n/t	n/t

Tests marked N are not UKAS accredited.

The Environmental Laboratory Ltd. Reg. No. 3882193

Page 5 of 9



Results Summary

2683

Report No.: 20-28015, issue number 1

ELAB Reference	203373	203374	203375	203376	203377
Customer Reference					
Sample ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sample Location	TP13	TP14	TP15	TP16	TP17
Sample Depth (m)	0.50	0.40	0.40	0.40	0.10
Sampling Date	29/04/2020	29/04/2020	29/04/2020	29/04/2020	29/04/2020

Determinand	Codes	Units	LOD					
Soil sample preparation parameters								
Material removed	N	%	0.1	n/t	< 0.1	51.2	< 0.1	21.4
Description of Inert material removed	N		0	n/t	None	Stones	None	Stones
Metals								
Arsenic	M	mg/kg	1	n/t	7.6	10.5	10.9	12.0
Cadmium	M	mg/kg	0.5	n/t	< 0.5	0.7	0.5	< 0.5
Chromium	M	mg/kg	5	n/t	20.5	22.8	25.3	29.2
Copper	M	mg/kg	5	n/t	21.5	15.5	22.1	20.9
Lead	M	mg/kg	5	n/t	24.8	51.2	48.8	75.8
Mercury	M	mg/kg	0.5	n/t	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	M	mg/kg	5	n/t	15.1	16.3	17.5	20.0
Selenium	M	mg/kg	1	n/t	< 1.0	< 1.0	< 1.0	< 1.0
Zinc	M	mg/kg	5	n/t	54.6	130	107	99.1
Inorganics								
Hexavalent Chromium	N	mg/kg	0.8	n/t	< 0.8	< 0.8	< 0.8	< 0.8
Acid Soluble Sulphate (SO4)	U	%	0.02	n/t	0.04	0.08	0.04	0.04
Acid Soluble Sulphate (SO4)	N	mg/kg	200	n/t	370	790	400	370
Water Soluble Boron	N	mg/kg	0.5	n/t	1.2	1.4	1.6	1.4
Miscellaneous								
pH	M	pH units	0.1	n/t	7.1	10.3	8.3	8.2
Soil Organic Matter	U	%	0.1	n/t	1.0	1.4	1.7	1.8
Organics								
>C8-C10 BCB	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C10-C12 BCB	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C12-C16 BCB	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
>C16-C21 BCB	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	1.4
>C21-C35 BCB	N	mg/kg	1	< 1.0	3.2	< 1.0	1.7	5.9
>C35-C40 BCB	N	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total (>C8-C40) BCB	N	mg/kg	1	< 1.0	3.2	< 1.0	1.7	7.3
Polyaromatic hydrocarbons								
Naphthalene	M	mg/kg	0.1	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	M	mg/kg	0.1	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	M	mg/kg	0.1	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	M	mg/kg	0.1	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	M	mg/kg	0.1	n/t	< 0.1	0.3	< 0.1	0.1
Anthracene	M	mg/kg	0.1	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	M	mg/kg	0.1	n/t	< 0.1	0.5	0.1	0.3
Pyrene	M	mg/kg	0.1	n/t	< 0.1	0.5	0.1	0.3
Benzo(a)anthracene	M	mg/kg	0.1	n/t	< 0.1	0.2	< 0.1	0.2
Chrysene	M	mg/kg	0.1	n/t	< 0.1	0.3	0.1	0.2
Benzo(b)fluoranthene	M	mg/kg	0.1	n/t	< 0.1	0.3	< 0.1	0.2
Benzo(k)fluoranthene	M	mg/kg	0.1	n/t	< 0.1	0.3	< 0.1	0.3
Benzo(a)pyrene	M	mg/kg	0.1	n/t	< 0.1	0.3	< 0.1	0.2
Indeno(1,2,3-cd)pyrene	M	mg/kg	0.1	n/t	< 0.1	0.1	< 0.1	0.1
Dibenzo(a,h)anthracene	M	mg/kg	0.1	n/t	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	mg/kg	0.1	n/t	< 0.1	0.2	< 0.1	0.1
Total PAH(16)	M	mg/kg	0.4	n/t	< 0.4	3.1	0.5	2.1

Tests marked N are not UKAS accredited.

The Environmental Laboratory Ltd. Reg. No. 3882193

Page 6 of 9



Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonards on Sea, East Sussex, TN38 9BY

Results Summary

Report No.: 20-28015, issue number 1

Asbestos Results

Analytical result only applies to the sample as submitted by the client. Any comments, opinions or interpretations (marked #) in this report are outside UKAS accreditation (Accreditation No2683). They are subjective comments only which must be verified by the client.

Elab No:Depth (m)	Clients Reference	Description of Sample Matrix #	Asbestos	Gravimetric Analysis Total (%)	Gravimetric Analysis by ACM Type (%)	Free Fibre Analysis (%)	Total Asbestos (%)
203374 :0.40	TP14	Brown Soil (Clay)	No asbestos detected	n/t	n/t	n/t	n/t
203375 :0.40	TP15	Brown Soil, (Clay), Stones	No asbestos detected	n/t	n/t	n/t	n/t
203376 :0.40	TP16	Brown Soil, (Clay), Stones, Clinker	No asbestos detected	n/t	n/t	n/t	n/t
203377 :0.10	TP17	Brown Soil, (Clay), Stones, Plant	No asbestos detected	n/t	n/t	n/t	n/t

Method Summary

Report No.: 20-28015, issue number 1

Parameter	Codes	Analysis Undertaken On	Date Tested	Method Number	Technique
Soil					
Hexavalent chromium	N	As submitted sample	06/05/2020	110	Colorimetry
pH	M	Air dried sample	06/05/2020	113	Electromeric
Acid Soluble Sulphate	U	Air dried sample	06/05/2020	115	Ion Chromatography
Aqua regia extractable metals	M	Air dried sample	05/05/2020	118	ICPMS
PAH (GC-FID)	M	As submitted sample	05/05/2020	133	GC-FID
Water soluble boron	N	Air dried sample	05/05/2020	202	Colorimetry
Basic carbon banding in soil	N	As submitted sample	05/05/2020	218	GC-FID
Soil organic matter	U	Air dried sample	06/05/2020	BS1377:P3	Titrimetry
Asbestos identification	U	Air dried sample	12/05/2020	PMAN	Microscopy

Tests marked N are not UKAS accredited



Report Information

Report No.: 20-28015, issue number 1

Key

U	hold UKAS accreditation
M	hold MCERTS and UKAS accreditation
N	do not currently hold UKAS accreditation
^	MCERTS accreditation not applicable for sample matrix
*	UKAS accreditation not applicable for sample matrix
S	Subcontracted to approved laboratory UKAS Accredited for the test
SM	Subcontracted to approved laboratory MCERTS/UKAS Accredited for the test
NS	Subcontracted to approved laboratory. UKAS accreditation is not applicable.
I/S	Insufficient Sample
U/S	Unsuitable sample
n/t	Not tested
<	means "less than"
>	means "greater than"

Soil sample results are expressed on an air dried basis (dried at < 30°C), and are uncorrected for inert material removed.

ELAB are unable to provide an interpretation or opinion on the content of this report.

The results relate only to the sample received.

PCB congener results may include any coeluting PCBs

Uncertainty of measurement for the determinands tested are available upon request

Unless otherwise stated, sample information has been provided by the client. This may affect the validity of the results.

Deviation Codes

-
- | | |
|---|--|
| a | No date of sampling supplied |
| b | No time of sampling supplied (Waters Only) |
| c | Sample not received in appropriate containers |
| d | Sample not received in cooled condition |
| e | The container has been incorrectly filled |
| f | Sample age exceeds stability time (sampling to receipt) |
| g | Sample age exceeds stability time (sampling to analysis) |

Where a sample has a deviation code, the applicable test result may be invalid.

Sample Retention and Disposal

All soil samples will be retained for a period of one month

All water samples will be retained for 7 days following the date of the test report

Charges may apply to extended sample storage

APPENDIX F

Statistical Analysis Summary Sheets

Client/client ref:
Project ref: P14618
Site ref: Moor Nursery, Angmering, West Sussex
Data description: Shallow Soils
Contaminant(s): Heavy Metals
Test scenario: Planning
Data: SC
User details: 43972

	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Zinc	Hexavalent Chromium	Water Soluble Boron
Critical concentration, C _c	37	11	910	2400	200	40	180	250	3700	6	290
Notes	S4UL	S4UL	S4UL	S4UL	C4SL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL
Full dataset size	8	8	8	8	8	8	8	8	8	8	8
Outliers present?	No	Yes	No	No	No	No	No	Yes	Yes	No	Yes
Number of outliers temporarily excluded	0										
Number removed by filter	0	0	0	0	0	0	0	0	0	0	0
Sample size, n	8	8	8	8	8	8	8	8	8	8	8
Sample mean, $\bar{x}$	7.8375	0.29375	17.95	16.5375	31.7625	0.25	14.55	0.575	76.2	0.4	0.475
Standard deviation, s	3.16856773	0.12374369	7.86801845	8.55852749	14.8262256	0	7.91508506	0.21213203	67.6086216	5.9344E-17	0.29880715
Number of non-detects	0	7	0	1	0	8	1	7	2	8	4
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Distribution	Normal	Non-normal	Normal	Normal	Normal	Single value	Normal	Non-normal	Non-normal	Non-normal	Non-normal
Statistical approach	Auto: One-sample t	Auto: Chebychev	Auto: One-sample t	Auto: One-sample t	Auto: One-sample t	Auto: Chebychev	Auto: One-sample t	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev

Test scenario:	Planning: is true mean lower than critical concentration ($\mu < C_c$)?				Evidence level required:		95%	Use Normal distribution to test for outliers			
t statistic, t _o (or k _o)	-26.03195298	-244.7142857	-320.6777454	-787.6880679	-32.09498645	N/A	-59.12296135	-3325.666667	-151.6027686	-2.66905E+17	-2740.564799
Upper confidence limit (on true mean concentration, μ)	9.95991658	0.48445183	23.2202717	22.2702986	41.6936202	0.25	19.8517985	0.90191742	180.391883	0.4	0.93549275
Evidence level	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Base decision on:	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level
Result	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$

Client/client ref: Project ref: P14618 Site ref: Maor Nursery, Angmering, West Sussex Data description: Shallow Soils Contaminant(s): PAH Compounds Test scenario: Planning Date: SC User details: 43972	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(123-cd)pyrene	Dibenz(ah)anthracene	Benzo(ghi)perylene
Critical concentration, C _c	2.3	170	210	170	95	2400	280	620	7.2	15	2.6	77	2.2	27	0.24	320
Notes	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL	S4UL
Full dataset size	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Outliers present?	Yes	Yes	Yes	No	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Number of outliers temporarily excluded	0															
Number removed by filter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sample size, n	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Sample mean, $\bar{x}$	0.0075	0.0125	0.006875	0.005	0.059375	0.020625	0.215	0.19625	0.116875	0.13	0.14875	0.143125	0.16625	0.095	0.03	0.18
Standard deviation, s	0.00534522	0.01224745	0.0053033	0	0.05199159	0.01916796	0.18079191	0.17492345	0.12886697	0.13617216	0.14035033	0.15424789	0.18220377	0.10528872	0.03412163	0.16894631
Number of non-detects	6	4	7	8	1	3	0	0	1	0	0	1	0	0	2	0
Set non-detect values to:	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit	Half detection limit
Distribution	Non-normal	Non-normal	Non-normal	Single value	Normal	Non-normal	Normal	Normal	Normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Non-normal	Normal
Statistical approach	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: One-sample t	Auto: Chebychev	Auto: One-sample t	Auto: One-sample t	Auto: One-sample t	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: Chebychev	Auto: One-sample t
Test scenario:	Planning: is true mean lower than critical concentration ($\mu < C_c$)?				Evidence level required:		95%	Use Normal distribution to test for outliers								
t statistic, t ₀ (or k ₀)	-1213.076976	-39256.93155	-111996.3333	N/A	-5164.92495	-354141.3141	-4377.13993	-10021.92509	-155.463441	-308.8642448	-49.39911533	-1409.316354	-31.57077169	-722.7633951	-17.40742384	-5354.290008
Upper confidence limit (on true mean concentration, μ)	0.01573754	0.03137459	0.01504794	0.005	0.09420077	0.05016481	0.33610069	0.3134198	0.20319457	0.33985539	0.36504438	0.38083696	0.44704487	0.25726081	0.08258497	0.2931661
Evidence level	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Base decision on:	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level	evidence level
Result	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$	$\mu < C_c$

APPENDIX G

Quantitative Conceptual Model

Manor Nursery, Angmering, West Sussex				Quantitative Conceptual Model		P14168	
Source	Receptor	Contaminants	Pathway	Complete Linkage Present?	Probability	Consequence	Risk
• Radon Gas	End Users	Radon	Dermal contact with soil and dust (indoor & outdoor)	Identified contaminant does not pose a risk via this pathway			N/A
			Ingestion of soil and indoor dust	Identified contaminant does not pose a risk via this pathway			N/A
			Consumption of home-grown produce and attached soil	Identified contaminant does not pose a risk via this pathway			N/A
			Inhalation of soil dust (indoor and outdoor)	Identified contaminant does not pose a risk via this pathway			N/A
			Inhalation of soil vapours	Identified contaminant does not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	Yes	P3: Moderate	C3: Moderate	Moderate
	End Users (via Water Supply Pipework)		Contamination of incoming services	Identified contaminant does not pose a risk via this pathway			N/A
	Groundwater		Migration to groundwater	Identified contaminant does not pose a risk via this pathway			N/A