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Ground Investigation & Risk Assessment Report



Project Name: 196 Salvington Road

Location: Salvington Road, Worthing, BN13 2JS

Client: Castleview Homes

Project ID: J15101

Report Date: 9th February 2024

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SUMMARY

The site, which extended to approximately 200m^2, comprised 196 Salvington Road; an end of terrace, two storey house, with garden, a shed and a garage. It is proposed to demolish the existing garage and construct a new single-storey flat roofed garage, in the location of the shed. It is also proposed to construct a single-storey rear extension with flat roof, a part two-storey part single-storey side extension with pitched and flat roofs; with a porch to be constructed to the front elevation of the property.

Geological records indicated the site to be underlain by Head, Lambeth Group and Spetisbury Chalk Member (Culver Chalk Formation).

A desk study was carried out previously by Southern Testing (ref. J15101 dated 5th April 2022).From Ordnance Survey mapping the site was located on the periphery of land used as a smithy, circa 1875 to 1911. The smithy is denoted as a forge from the 1933 mapping to the 1994 map.

An Unexploded Ordnance (UXO) risk assessment was not included in our brief.

A single phase of intrusive investigation was carried out. All areas of the site were accessible during the fieldwork. It should not be assumed that the same ground conditions would apply across the site.

The soils encountered comprised Made Ground, underlain by clay or gravelly clay (reworked ground or Made Ground). Boreholes BH3 and BH4 met refusal at 0.9mbgl, in Made Ground. This could be due to a buried area of hard standing.

Groundwater was encountered at a depth of 1.1mbgl in one borehole (BH1).

There is evidence of soil contamination, comprising two instances of elevated lead and two instances of elevated arsenic within the Made Ground encountered beneath this site.

Preliminary recommendations are given for remediation of the site. Please note that this section does not constitute a remediation method statement document. The presence of contamination may affect the classification of waste soils, or the potential for their re-use.

It is noted that the property is in an intermediate probability radon area; where 1% to 3% of homes are estimated to be at or above the Action Level; therefore basic radon protection may be required on this site. A more detailed radon risk report should be obtained, via the UK Health Security Agency website, and this will help clarify the potential for radon to impact upon the proposals.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

As with any site, areas of contamination not identified during investigation works may come to light during the course of redevelopment. Accordingly, a discovery strategy must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site. The presence of contamination may affect the classification of waste soils, or the potential for their re-use.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Castleview Homes and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

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For and on behalf of Southern Testing Laboratories Limited

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a completed STL project order form, from Castleview Homes, dated 3 January dated 2024.

2 Location

The site is located approximately 3.2km north-west of Worthing, West Sussex. The approximate National Grid Reference of the site is TQ 11947 05247. The site location is indicated on Figure 1 within Appendix A.

3 Proposed Construction

It is proposed to demolish the existing garage and construct a new single-storey flat roofed garage. It is also proposed to construct a single-storey rear extension with flat roof, a part two-storey part single-storey side extension with pitched and flat roofs; with a porch to be constructed to the front elevation of the property. For the purposes of the contamination risk assessment, the proposed development land use is classified as Residential with consumption of Homegrown Produce, CLEA Model Ref [1] / C4SL Report Ref [2].

The gas sensitivity of the proposed development is rated as High CIRIA C665 Ref [3].

4 Object

This is a Phase II contamination (risk estimation and evaluation) investigation (Tier 1).

The object of the investigation was to assess soil parameters relevant to the proposed development, and to assess the likely nature and extent of soil, groundwater and soil gas contamination on the site.

5 Scope

This report presents our exploratory hole logs and test results and our interpretation of these data.

A UXO risk assessment was not requested within our brief for these works.

As with any site there may be differences in soil conditions between exploratory hole positions.

The ground investigation has been completed with reference to BS 5930 Ref [4] and BS 10175 Ref [5].

Geotechnical issues are not considered in this report.

Waste Classification of soils has not been included within the brief for the investigation.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The investigation was conducted and this report has been prepared for the sole internal use and reliance of Castleview Homes and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

B DESK STUDY AND WALKOVER SURVEY

6 Desk Study

A desk study has been carried out previously, by STL; see desk study report ref: J15101, dated April 2022.

6.1 Geology

The British Geological Survey Map No 318 indicated that the site geology consisted of Head, underlain by Lambeth Group and Spetisbury Chalk Member (Culver Chalk Formation).

6.1.1 Head

Head is a superficial deposit comprising a poorly sorted and poorly stratified material formed mostly by solifluction and/or hillwash and soil creep. This is a polymict deposit of gravel, sand and clay depending on the local upslope geology, from which it is derived.

6.1.2 Lambeth Group

The Lambeth Group comprises a vertically and laterally very variable sequence of multicoloured and mottled clays and sands. The sands are greenish yellow or brown, and generally alternate with the multicoloured mottled clays and sometimes bands of lignite. Pebble Beds, locally cemented into conglomerate, and some bands of concretionary ironstone may also be present. Shells are frequently found in the clays and are sometimes locally cemented into a limestone bed that may form an obstruction to pile borings. At the base of the formation there can be layer of greenish sands with flint pebbles where they rest directly above the Thanet Beds.

Clays within this group are known to contain pyrite.

6.1.3 Spetisbury Chalk (Part of the Culver Chalk Formation)

The Culver Chalk Formation is typically a generally homogenous white chalk with regular bands of large flints and few or no marl seams. It is characterised by the predominance of regular vertical jointing as opposed to the inclined conjugate jointing that is a feature of the underlying Newhaven Chalk Formation. The Culver Chalk has been sub-divided into the locally named Tarrant and Spetisbury Chalk Members.

The White Chalk outcrop in particular is frequently highly fractured and highly permeable, and usually has good infiltration characteristics. On the other hand, Chalk Head, highly weathered Chalk and Chalk under a low permeability superficial cover may have very poor infiltration characteristics.

Chalk is slightly soluble in water and, while it has excellent bearing properties when unweathered, this solubility can lead to deep weathering and softening, and the upper layers of chalk often have an irregular boundary with overlying strata

The Chalk may be softened by solution to a depth of 5 to 15 metres and bearing capacities and engineering properties improve with depth. Where there is an outcrop of impermeable soil overlying the chalk there may be a dramatically increased solution effect due to concentrated surface water flow to the Chalk close to the outcrop boundary.

Solution features are common in the Chalk, and these can present significant difficulties to development on affected sites.

Man has also worked the chalk for flints, and for other purposes, for thousands of years and any signs of old workings should be carefully investigated.

6.2 Site History

The site had an initial history of use that comprised being located either within or on the periphery of land used as a smithy, circa 1875 to 1911 mapping. The smithy is then denoted as a forge, from the 1933 mapping to the 1994 map. Planning permission to extend this building, and to convert it to residential use was granted in 1996.

The site was also located to the edge of a horticultural nursery, with a number of glasshouses, from 1932 mapping, to circa 1960s. These glasshouses would probably have had coal fired heating systems.

The property, 196 Salvington Road, is first shown on the 1971 map

An above ground storage tank was shown 1m north-west, of the site, on the 1954 mapping.

A building located 20m to the west was described as a garage from the 1954 mapping to the 1976 mapping and a works/workshop from the 1975 mapping to the 1994 map. This was Overingtons Workshop that was, based upon planning records, scheduled for demolition in 1998.

Other houses were also previously described as "Ovingtons Workshop" and these comprised Wheelwrights (198 Salvington Road) and 200 Salvington Road. Planning records indicate that the forge and 200 Salvington Road were converted to residential use circa 1996.

The terrace of four houses, where no. 196 Salvington Road forms the western end, were first shown on the 1971 mapping.

The surrounding area was in use as horticultural nurseries to the east and south east from the 1932 mapping to the 1960s.

Residential development began to the west of the site on the 1911 mapping.

6.3 Radon Risk

With reference to the Envirocheck report, UK Radon Ref [6] and BRE Radon Ref [7] guidance: the property is in an intermediate probability radon area; where 1 to 3% of homes are estimated to be at or above the Action Level; therefore basic radon protection could be required on this site.

The current UK radon risk assessments are based on 1km square grids, on a UK wide atlas. A 1km square is a very coarse grid. This risk assessment is indicative, rather than definitive, highlighting the highest radon potential found within the 1km square. That means the radon levels is not actually known, but the potential chance of high radon levels has been identified.

A more detailed radon risk report should be obtained, via the UK Health Security Agency website, and this will help clarify the potential for radon to impact upon the proposals.

6.4 UXO Risk Management

A preliminary, or a detailed UXO risk assessment was not part of the scope of works.

7 Site Walkover Survey

7.1 General Site Description and Boundaries

The site, which was roughly triangular in shape, comprised 196 Salvington Road, which was the western end unit of a terrace of four houses - 190 to 196 Salvington Road.

The site boundaries comprised a low wall, constructed from flint and brick and Salvington Road to the south. The Old School House, Rose Cottage and Wheelwrights – the former forge building (all being listed buildings) to the west; these being behind a low brick wall and the east boundary wall of Wheelwrights. The adjoining house and gardens of number 194 Salvington Road to the east and a concrete access track / parking area with lock up domestic garages to the north.

196 Salvington Road comprised a two storey, end of terrace house, constructed from red and yellow brick, beneath a pitched roof, clad with roofing tiles.

7.2 Topography and Drainage

The site and surrounding area sloped gently to the south.

The site most likely drained via the combined sewerage system, located beneath Salvington Road, to the south.

7.3 Vegetation

Two flowering cherry trees were noted to the west side of the house. The front garden had borders with shrubs and a mountain laurel bush, whilst the rear garden was surfaced with artificial grass. Extensive ivy was noted to the southern boundary wall.

Number 194 Salvington Road had a flowering cherry tree and a camellia in the front garden. A laurel was noted in the rear garden of Wheelwrights, adjacent to the boundary wall with number 196.

7.4 Buildings and Land Use on Site and Nearby

The subject site; 196 Salvington Road can be divided into four parts:

House

The house, which was the western end of terrace house, consisted of a two storey house, constructed from red and yellow brick, beneath a pitched roof, clad with roofing tiles.

Gardens

The house had front, side and rear gardens.

The front garden to the south, being set to borders with shrubs, with a concrete surfaced garden path, leading to the front door. The boundary for the front garden to the west and the south comprised walls, constructed from brick.

The side garden to the west, being partly surfaced with concrete and partly soft surfaced, was used for utility purposes, such as drying washing, wheelie bin storage and wood storage. The boundary for the side garden to the west comprised a wall, constructed from brick.

The rear garden, which was located to the north of the house, was surfaced with concrete to the north side of the house and along the east side of the garage, to form a garden path; a raised area of patio slabs to the north east corner and artificial grass to the centre.

The rear garden was separated from the parking and access track to the north by a wooden panel fence. The east rear garden boundary also consisted of a wood panel fence with a garden gate. The boundary to the west comprised a wall, constructed from brick.

Garage

The existing garage was constructed from bricks, with a flat roof, clad with roofing felt. It had a metal door to the northern end.

Shed

A wooden shed, with a pitched roof that was covered in roofing felt, was located in the north-western corner of the site. The door was located to the southern end of the shed. The surface beneath the shed comprised concrete.

A number of listed buildings were situated to the western side of the house. These comprised:

Wheelrights Cottage (198 Salvington Road): a one storey house, with rooms in the roof, and an adjoining garage, constricted from brick, with flint infill. Both the house and garage had pitched roofs clad with roofing tiles. This building was formerly the forge.

200 Salvington Road: A single story house, constructed from flint and brick, with a pitched roof, clad with roofing tiles.

The Old School House (202A Salvington Road) and **Rose Cottage** (202 Salvington Road): A two storey residential building, constructed from flints, with brick edging, with a pitched roof, clad with roofing tiles. Originally one unit. This building had been divided into two houses.

190- 194 Salvington Road: the subject site formed the western end unit of a terrace of houses. The other three houses to the east being of the same construction method as number 196; constructed from red and yellow brick, beneath a pitched roof, clad with roofing tiles.

To the north of the site was a concrete surfaced access track and parking area and two sets of lock up garages, constructed from brick with flat roofs, clad with roofing felt. A set of three garage units was located to the north-west, whilst a set of four units was situated to the north side of the access road / parking area.

No visible signs of cracking, or other indicators of poor ground conditions were noted during the walkover survey.

7.5 Inaccessible Site Areas

The interior of the house, the shed and garage were not accessible during the walkover survey.

7.6 Site Photographs

A series of photographs showing the site and surrounding area is included in Appendix D.

C PRELIMINARY SITE MODEL

8 Conceptual Site Model

In the context of this report, the conceptual model summarises the potential pollutant linkages identified for the site and forms the basis of the risk assessment for the site. The preliminary model comprises the potential sources of contamination, receptors that could be harmed and exposure pathways identified from the Desk Study and walkover survey. These potential linkages form the basis upon which the investigation is designed and reported.

8.1 Potential Sources of Contamination

The site has a history of more recent residential use and is located within an area that had historical industrial uses as a smithy/forge and workshops and use as horticultural nurseries.

A few potentially contaminative uses have been identified, both on site and in the locality.

Potential contaminants associated with these uses have been compiled from DoE industry profiles and our experience of such sites.

8.1.1 On Site Sources

Potential Source	Potential Contaminants
Made Ground	Variable, may include: metals, non-metals, polyaromatic hydrocarbons (PAH compounds), petroleum hydrocarbons and asbestos containing materials (ACMs), soil gas emissions
Fabric of house	Asbestos containing materials
Radon gas emissions	Radon

Asbestos containing materials may be present within the buildings. STL have not made any assessment of the buildings.

8.1.2 Off-Site Sources

The site may be impacted by contamination migrating from beyond the site boundary. The following potential off site sources have been identified.

Potential Source	Distance from Site Boundary	Direction	Potential Contaminants	Likely hazard to Site
Smithy/forge (1875-1994) possibly also on site	0	W	Metals, PAH compounds	High
Above ground tank	1	NW	Petroleum hydrocarbons	Moderate to low

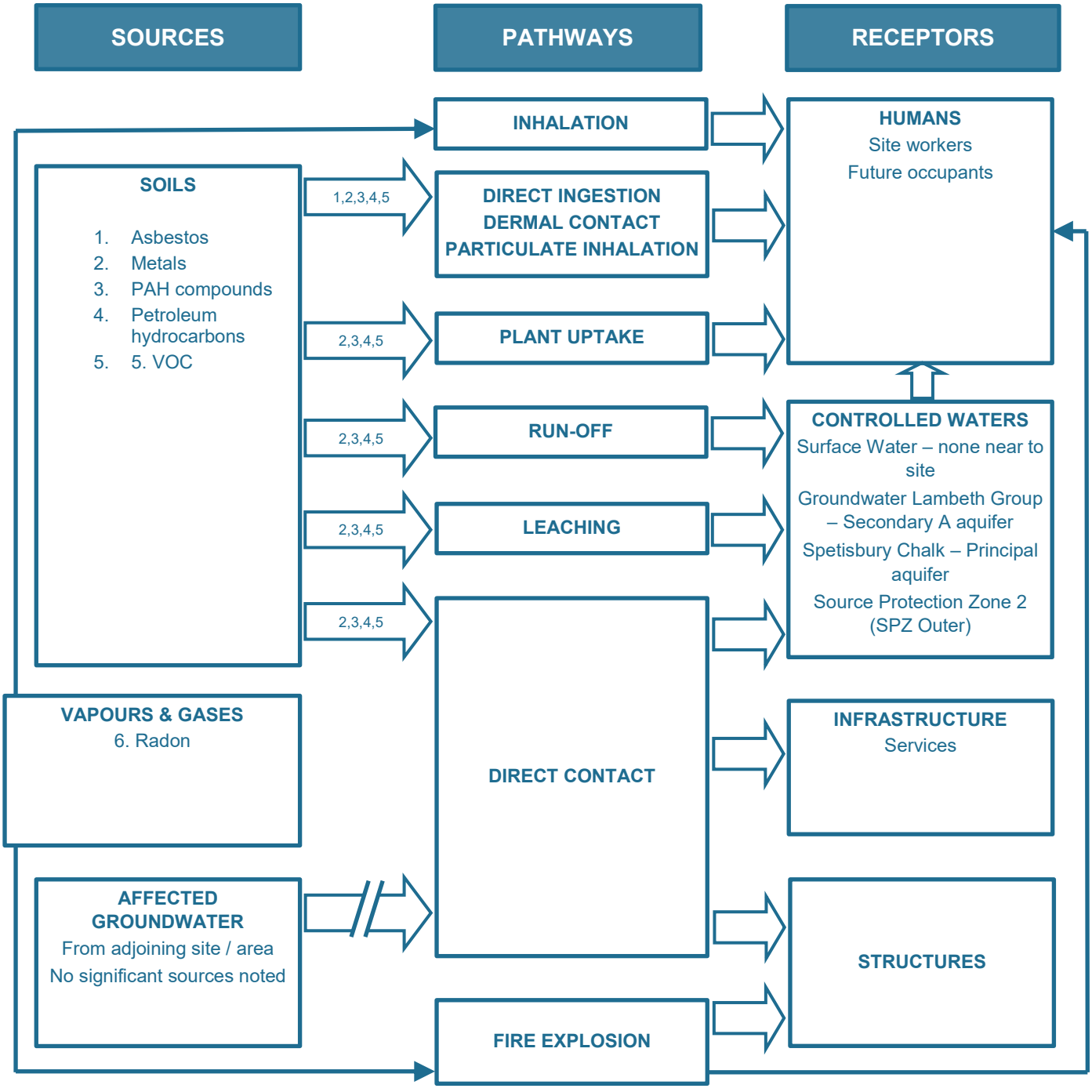
Potential Source	Distance from Site Boundary	Direction	Potential Contaminants	Likely hazard to Site
Horticultural nurseries	10	E	Metals, PAH compounds	Moderate to low
Workshop	20	W	Petroleum hydrocarbons	Low

The forge has been classified as potentially high risk, because the subject site may have formed part of the forge complex.

The other off site sources noted appear to be moderate to low or low risk.

8.2 Pollutant Linkages and Conceptual Site Model Summary

The following diagram shows the potential pollutant linkages identified for the site and summarises the preliminary conceptual model:



// Denotes potential pollutant linkage not complete.

D GROUND INVESTIGATION

9 Strategy and Method

The strategy adopted for the intrusive investigation comprised the following:

Activity / Method	Purpose	Max Depth Range (mbgl)	Installations / Notes
BH1 to BH4 hand auger boreholes	Boreholes to investigate the shallow ground conditions within external areas. To allow the collection of samples for contamination testing.	0.9 – 1.1	

Exploratory hole locations are shown on Figure 2 in Appendix A.

Boreholes BH3 and BH4 both refused at a depth of 0.9mbgl, in Made Ground; on what appeared to be a possible former area of hard standing. They could not be relocated, due to the presence of electric cables beneath the ground.

10 Weather Conditions

The fieldwork was carried out on 16th January 2024, at which time the weather was generally cold, preceding weeks had been wet.

11 Soils as Found

The soils encountered are described in detail in the attached exploratory hole logs (Appendix A), but in general comprised a covering of Made Ground, underlain by clay that appeared to be reworked. A summary is given below.

Depth (mbgl)	Thickness (m)	Soil Type	Description
GL-0.9/1.0/>0.9	0.9-1.0	Made Ground	Silty fine sandy CLAY with occasional to some fine to coarse angular to subrounded gravel of flint with occasional brick and concrete, very occasional clinker noted, occasional subordinate bands of sand noted
0.9/1.0- >1.1	-	Reworked ground / natural ground	BH1 Brown silty fine to coarse sandy gravelly CLAY, gravel is fine to coarse flint BH2 Brown sandy silty CLAY with some fine to coarse gravel of flint

The soils found are generally in accordance with those anticipated.

11.1 Visual and Olfactory Evidence of Contamination

Evidence of possible contamination in the form of Made Ground was recorded at the location of all trial holes.

These occurrences are discussed in Section E.

12 Groundwater Observations

Groundwater was observed in the exploratory holes as follows:

Hole ID	Water Strike Depth (mbgl)	Comment	Stratum
BH1	1.1	Very slow seepage	Made Ground / clay interface

E DISCUSSION OF GEOENVIRONMENTAL TEST RESULTS AND RECOMMENDATIONS

13 Analytical Framework

There is no single methodology that covers all the various aspects of the assessment of potentially contaminated land and groundwater. Therefore, the analytical framework adopted for this investigation is made up of a number of procedures, which are outlined below. All of these are based on a Risk Assessment methodology centred on the identification and analysis of Source – Pathway – Receptor linkages.

The CLEA model Ref [1], provides a methodology for quantitative assessment of the long-term risks posed to human health by exposure to contaminated soils. Toxicological data is used to calculate a Soil Guideline Value (SGV) for an individual contaminant, based on the proposed site use; these represent minimal risk concentrations and may be used as screening values.

In the absence of any published SGVs for certain substances, Southern Testing have derived or adopted Tier 1 screening values for initial assessment of the soil, based on available current UK guidance including the LQM/CIEH S4UL's Ref [8] and CL:AIRE Soil Generic Assessment Criteria Ref [9]. In addition, in 2014, DEFRA Ref [10] published the results of a research programme to develop screening values to assist decision making under Part 2A of the Environmental Protection Act. Category 4 screening levels were published for 6 substances, with reference to human health risk only. This guidance includes revisions of the CLEA exposure parameters, presenting parameters for public open space land use scenarios, and also of the toxicological approach. The screening levels represent a low risk scenario, based on a 'Low Level of Toxicological Concern' rather than the 'Minimal Risk' of CLEA, and the analytical results of this investigation may be considered relative to these levels.

Site-specific assessments are undertaken wherever possible and/or applicable.

CLEA requires a statistical treatment of the test results to take into account the normal variations in concentration of potential contaminants in the soil and allow comparisons to be made with published guidance.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

14 Site Investigation – Soils

14.1 Sampling Regime

The number of sample locations was intended to provide general coverage.

14.2 Testing

The potential for contamination due to the historic use of the adjacent site as a blacksmiths and the likely presence of Made Ground was identified in the preliminary conceptual model. Observations made on site confirmed the presence of Made Ground. Therefore, the following tests were selected.

Test Suite	Number of Samples	Soil Tested
STL Key Contamination Suite	6	5 Made Ground 1 reworked ground
Asbestos Screen	6	5 Made Ground 1 reworked ground
Petroleum hydrocarbon screen	6	5 Made Ground 1 reworked ground
Speciated petroleum hydrocarbons with aliphatic and aromatic split	2	2 Made Ground
VOC	2	2 Made Ground

The test results are presented in full in Appendix C. A summary and discussion of the significance of the results and identified contamination sources is given below.

14.3 Test Results and Identified Contamination Sources

14.3.1 General Contaminants

The results of the key contaminant tests have been analysed in accordance with the CLEA methodology. The samples have been grouped into two populations, comprising Made Ground and natural soil. For each parameter in each population the sample mean is calculated and compared to a Tier 1 screening value. If the sample mean exceeds the screening value, the soil may be regarded as contaminated and further assessment may be required. If neither the sample mean nor any single value exceeds the screening value, the soil may be regarded as not contaminated, though further confirmatory assessment may be required. Where any single parameter value exceeds the screening value but the sample mean does not, further statistical analysis may be applied to that parameter if the available data is suitable. Such analysis would include an assessment of the Normality of the distribution of the data, consideration of the presence of outliers, and the calculation of a UCL estimate of the mean.

Summary data is presented in the tables below and the laboratory analysis is included in Appendix C. The screening values and source notes are presented in Table 1 “Tier 1 Screening Values” at the front of Appendix C.

Soil Type: Made Ground

Contaminants	Units	No of Samples Tested	Range	Sample Mean	Residential with Home-grown Produce Consumption Tier 1 Screening Values
Arsenic (As)	mg/kg	5	13-**65**	31	37
Cadmium (Cd)	mg/kg	5	1..2-1.6	1.3	11
Trivalent Chromium (CrIII)*	mg/kg	5	39-300	134	910
Hexavalent Chromium (CrVI)	mg/kg	5	1.8	1.8	6
Lead (Pb)	mg/kg	5	110-**320**	190	200
Mercury (Hg)	mg/kg	5	<0.3-0.5	0.34	7.6-11
Selenium (Se)	mg/kg	5	<1-1.4	1.1	250
Nickel (Ni)	mg/kg	5	21-31	26	130
Copper (Cu)	mg/kg	5	33-43	38	2,400
Zinc (Zn)	mg/kg	5	160-350	240	3,700
Phenol	mg/kg	5	<1	1	120-380
Benzo(a)pyrene (BaP)	mg/kg	5	0.5-2	1.1	1.7-2.4
Naphthalene	mg/kg	5	<0.05	0.05	2.3-13
Total Cyanide (CN)	mg/kg	5	<1	1	-
Acidity (pH values)	-	5	7-8.1	7.5	-
Soil Organic Matter	%	5	2.9-4.3	3.6	-

* Assumed as Total Cr minus CrVI

Elevated concentrations of arsenic were found in the Made Ground Samples tested from BH1 @ 0.2mbgl (65mg/kg) and BH2 @ 0.2mbgl (46mg/kg), with elevated concentrations of lead in BH1 @ 0.2mbgl (220mg/kg) and BH4 @ 0.2mbgl (320mg/kg). Whilst the mean concentrations of both contaminants were below their respective tier 1 screening values, consideration of the suitability of these soils as a growing medium is also required.

Benzo(a)pyrene is used as a surrogate marker for all genotoxic PAH compounds, in line with HPA guidance Ref [11]. The test data has been compared with the concentration limits reported for the Culp study, as recommended by HPA, and is consistent with this approach. On the basis of the test results, the genotoxic PAH compounds in the samples would not be considered to pose a potential risk to human health.

The measured concentrations of PAH compounds do not exceed the UKWIR threshold(s) for the use of plastic water supply pipes / British Plastics Federation Pipes Group thresholds for drainage and sewage pipes.

Soil Type: reworked or natural soil

Contaminants	Units	BH2 @ 1.0mbgl	Residential with Home-grown Produce Consumption Tier 1 Screening Values
Arsenic (As)	mg/kg	31	37
Cadmium (Cd)	mg/kg	1	11
Trivalent Chromium (CrIII)*	mg/kg	200	910
Hexavalent Chromium (CrVI)	mg/kg	<1.8	6
Lead (Pb)	mg/kg	24	200
Mercury (Hg)	mg/kg	<0.3	7.6-11
Selenium (Se)	mg/kg	<1	250
Nickel (Ni)	mg/kg	42	130
Copper (Cu)	mg/kg	32	2,400
Zinc (Zn)	mg/kg	83	3,700
Phenol	mg/kg	<1	120-380
Benzo(a)pyrene (BaP)	mg/kg	<0.05	1.7-2.4
Naphthalene	mg/kg	<0.05	2.3-13
Total Cyanide (CN)	mg/kg	<1	-
Acidity (pH values)	-	8.1	-
Soil Organic Matter	%	1.1	-

* Assumed as Total Cr minus CrVI

Based upon the one sample of reworked or natural ground tested for this site, no results of concern were noted.

14.3.2 Asbestos Containing Materials

No asbestos containing materials were detected in the samples analysed and none were observed in the exploratory holes. However, it should be noted that the exploratory holes are of small size, relative to the area investigated and the investigation was constrained by site use; therefore, the samples obtained may not reflect the full composition of the soils on the site, and there is always the potential for pockets of asbestos or for asbestos containing materials to be present, which have not been detected in the sampling.

It is also our experience that asbestos containing materials are quite often encountered in buried pockets and beneath slabs (sometimes adhering to the concrete) on older sites. It is, therefore, advised that further examination is carried out in trial pits, when suitable access is available. Given what had been found this far, this is considered low risk.

No assessment of the existing buildings has been made by STL.

14.3.3 Organic Contaminants

The following table summarises the results of the analysis for petroleum hydrocarbons.

Hydrocarbon Substance or Fraction	Measured Concentrations in mg/kg	
	BH3 @ 0.3m	BH4 @ 0.2m
Aliphatics		
EC5-EC6	<0.02	<0.02
>EC6-EC8	<0.02	<0.02
>EC8-EC10	<0.05	<0.05
>EC10-EC12	<1	<1
>EC12-EC16	<2	<2
>EC16-EC21	<8	<8
>EC21-EC35	<8	<8
Aromatics		
EC5-EC7 (Benzene)	<0.01	<0.01
>EC7-EC8 (Toluene)	<0.01	<0.01
>EC8-EC10	<0.05	<0.05
>EC10-EC12	<1	<1
>EC12-EC16	<2	<2
>EC16-EC21	16	12
>EC21-EC35	25	23
Hazard Index	0.064	0.055
TPHC10-C40	42	37

Petroleum hydrocarbon mixtures are assessed using the Hazard Index approach. The calculation sheet is included in Appendix C. The calculated Hazard Index values for BH3 and BH4 were less than 1, indicating that the recorded concentrations are well below tolerable limits for long term exposure with regards to human health.

Measured Concentration of Total Petroleum Hydrocarbons (mg/kg)			
BH1 @ 0.2m	BH2 @ 0.2m	BH2 @ 1.0m	BH3 @0.9m
18	16	<10	24

The results for total petroleum hydrocarbon were found to be low and are thus not of concern.

All results for Volatile Organic Compounds (VOC) were below the laboratory limit of detection.

The measured concentrations of the petroleum hydrocarbon fractions and VOC do not exceed the UKWIR threshold(s) for the use of plastic water supply pipes or British Plastics Federation Pipes Group thresholds for drainage and sewage pipes.

15 Site Investigation – Waters

Groundwater sampling and laboratory analysis was not included in the scope of works.

However, from nearby boreholes, available via the BGS website, it would appear that the superficial Head and Lambeth Group soils, which overly the principal Chalk aquifer, are around 10m thick, and should therefore provide protection to the more sensitive ground water at depth.

Given the elevated concentrations of contaminants identified in the soils were at shallow depth, and no evidence of any mobile contamination (petroleum hydrocarbons or VOCs) was found, there does not appear to be a risk to groundwater.

There are no surface water receptors within 500m of the site.

16 Site Investigation - Gas

The Desk Study did not identified any potential off site sources of ground gases. With the exception of the possibility of Made Ground, no potential on site sources were identified.

Given the nature of the Made Ground, which comprises largely re-worked clay with variable amounts of inert anthropogenic material (brick and concrete and very occasional clinker), this is not considered to pose a potential risk to the site in terms of the generation of ground gases.

It is noted that the property is in an intermediate probability radon area; where 1% to 3% of homes are estimated to be at or above the action level; therefore basic radon protection may be required on this site.

A more detailed radon risk report should be obtained, via the UK Health Security Agency website, and this will help clarify the potential for radon to impact upon the proposals.

17 Summary of Identified Contamination

Elevated concentrations of arsenic and lead were identified in the shallow Made Ground. Whilst the mean concentrations of both contaminants were below their respective tier 1 screening values, consideration of the suitability of these soils as a growing medium is also required.

The property is in an intermediate probability radon area; where 1% to 3% of homes are estimated to be at or above the action level.

18 Risk Evaluation

The object of the risk evaluation is to assess the pollution linkages for specific contaminant groups considered in the conceptual model, identify any unacceptable risks and, therefore establish whether there is a need for further investigation and/or remedial action.

The risks are considered in the context of the specific development proposals for the site and, therefore, the conclusions may not be appropriate for alternative schemes.

18.1 Lead and Arsenic

The Made Ground associated with boreholes BH1, BH2 and BH4 would be considered contaminated, with respect to arsenic and lead, with respect to risks to human health.

On this basis this material is not considered suitable to be retained in garden or soft landscaped areas.

This material could be retained beneath the proposed extensions and access path.

The risks to site workers from this material can be mitigated by adopting good site hygiene practices, refraining from eating drinking and smoking within the working area, wearing gloves, the provision of welfare facilities etc.

18.2 Radon

It is noted that the property is in an intermediate probability radon area; where 1% to 3% of homes are estimated to be at or above the action level; therefore basic radon protection may be required on this site.

A more detailed radon risk report should be obtained, via the UK Health Security Agency website, and this will help clarify the potential for radon to impact upon the proposals.

18.3 Revised Conceptual Model

The preliminary site model has been refined in light of the findings of this investigation and is summarised below.

Metals	Petroleum Hydrocarbons	PAH Compounds	VOC	Land Gas (radon)	Asbestos	Pathways	Receptors
Y	N	N	N	n/a	P	Ingestion/inhalation of contaminated soil & dust	Human Health
Y	N	N	N	n/a	n/a	Dermal contact with contaminated soil & dust	
n/a	N	N	N	P	n/a	Inhalation of vapours or gases	
Y	N	N	N	n/a	n/a	Uptake into edible fruit and vegetables	
Y	N	N	N	n/a	n/a	Surface water run-off into surface water features	Water Environment
Y	N	N	N	n/a	n/a	Migration through ground into surface water or groundwater	
n/a	N	N	N	n/a	n/a	Off-site migration of contaminated groundwater	
Y	N	N	N	n/a	n/a	Vegetation on site growing in contaminated soil	Flora and Fauna
Y	N	N	N	n/a	n/a	Aquatic life in affected waters	
n/a	N	N	N	n/a	n/a	Contact with contaminated soils	Building materials / buried services
n/a	N	N	N	N	n/a	Fire or explosion	

Key:

Y	Pollutant linkage likely
N	Pollutant linkage not likely
P	Pollutant linkage possible
n/a	Pathway not applicable to contaminant

18.4 Relevant Pollutant Linkages

Some Pollutant Linkages for which remedial action will be required have been identified in the revised conceptual model, as follows.

Contaminant / Source	Pathways	Receptor
Lead and arsenic in Made Ground	Soil/dust dermal exposure Soil/dust ingestion/inhalation	Site/construction workers Future residents
Lead and arsenic in Made Ground	Plant uptake	Future residents

Potential pollutant linkages were identified for radon gas emissions.

Potential pollutant linkages have also been identified for the presence of asbestos containing materials; however given that none have been found or detected thus far, this appears to be low risk. A careful watch should be kept during groundworks for any such material.

19 Soil Waste Management

19.1 Re-use of Soils

It is anticipated that the arisings from groundworks on this site will consist of Made Ground, clay and gravelly clay.

Clean natural arisings from groundworks may be re-used on site without further testing, where there is a definite use for such materials, e.g. raising levels or construction of landscaping layers or bunds as set out in the approved plans for the development.

Treated contaminated soils may be reused on site under an appropriate Materials Management Plan, where certain criteria are met, in accordance with the CL:AIRE Definition of Waste Code of Practice, Ref [12].

19.2 Disposal of Soils

Some soils will require removal from site and disposal to suitably licensed landfills. Different guidelines and charges will apply to different waste classifications. As waste producers, the Developer holds responsibilities under the various governing regulations, particularly the Waste Duty of Care Code of Practice under the Environmental Protection Act 1990, Ref [13].

The chemical analyses appended to this report can be used to inform the initial classification of the soils as either Hazardous or Non-Hazardous, and derive the appropriate EWC code, for offsite disposal or transfer. Waste Acceptance Criteria (WAC) testing may be needed for confirmation of the material's classification, and will be required to demonstrate an inert classification.

There are strict requirements in place for the accurate description of wastes using EWC codes and, therefore, it is essential that materials that would be given different descriptions (e.g. blacktop, made ground and natural soils), as well as those with different classifications, are carefully segregated during excavation and storage on site. This will also ensure the most cost effective disposal. Mixing these materials can give rise to significant difficulties in disposal and also substantially increase costs.

Soil arisings may be transferred to other development sites under a Materials Management Plan, where certain criteria are met, in accordance with the CL:AIRE Definition of Waste Code of Practice Ref [12].

All soils leaving site will need to be pre-treated. Waste minimisation by selective excavation is a recognised form of pre-treatment.

20 Discussion and Conclusions

Where areas of soft landscaping are proposed, the existing Made Ground will require either removal and replacement, or capping with clean soils.

The soils represented by BH1 and BH2 appear to be located beneath the proposed extension, with BH4 being located in the proposed new site access, and as such could remain in situ; unless the areas are part of new landscaping, in which case some soil removal may be required.

With respect to potential radon emissions; a more detailed radon risk report should be obtained, via the UK Health Security Agency website, and this will help clarify the potential for radon to impact upon the proposals. If this shows that the site is potentially at risk; the next step would be to undertake monitoring within the existing house. Testing soils for radon is not recommended, because it is very inconclusive.

This section does not constitute a formal remediation strategy document.

As with any site, areas of contamination not identified during site investigation works may come to light in the course of redevelopment. Accordingly, a discovery strategy must be in place during the redevelopment to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner. Depending on the nature of any such contamination, it may prove necessary to reassess the remedial strategy for the site.

21 General Guidance

Allowance should be made for verification of any remedial works by suitably experienced personnel.

It may be that specific local requirements apply to this site, of which we are not aware at this time.

In general terms, the workforce and general public should be protected from contact with contaminated material. There is a range of relevant documents published by the Health and Safety Executive, and organisations such as CIRIA, and the BRE.

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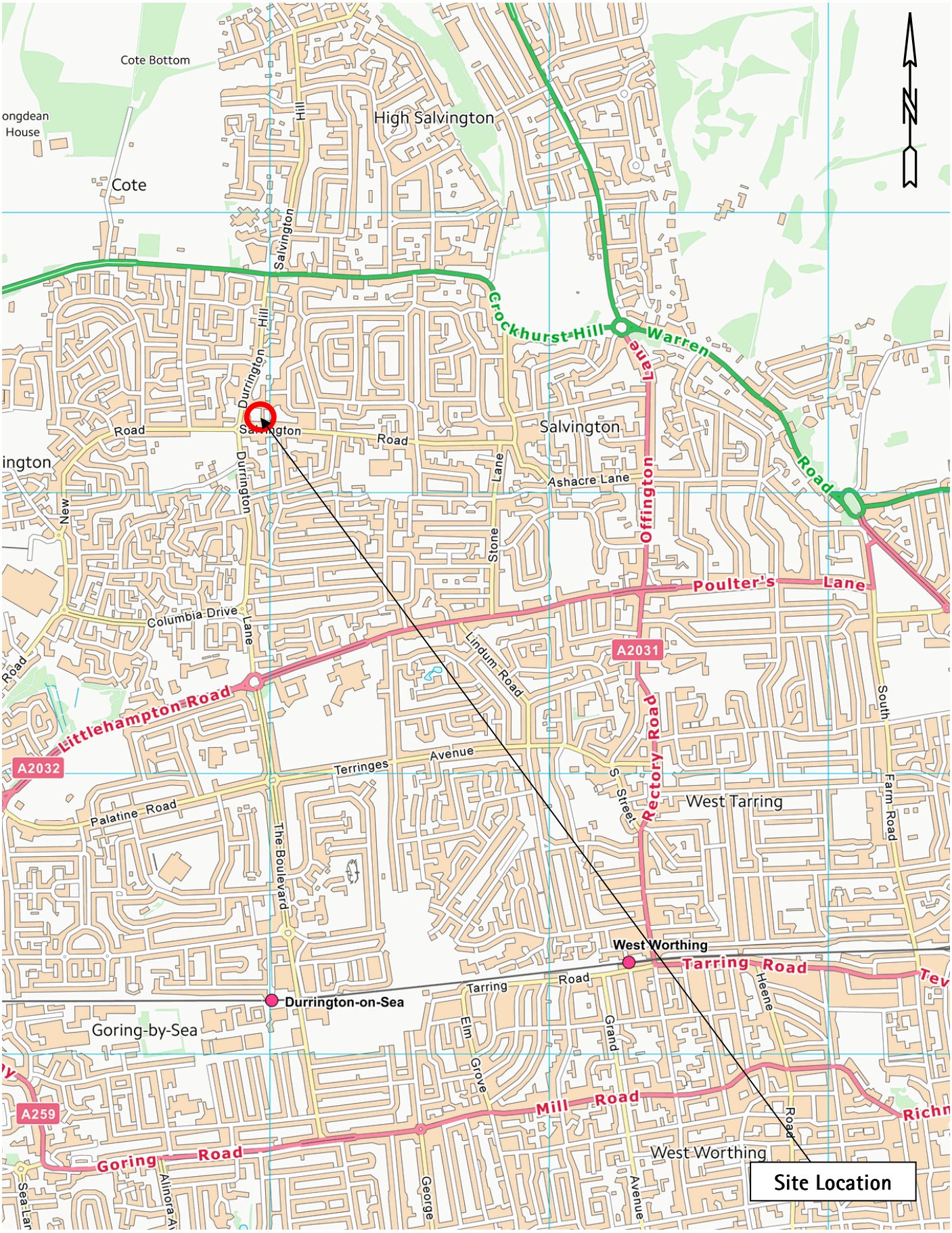


APPENDIX A

Site Plans and Exploratory Hole Logs



A



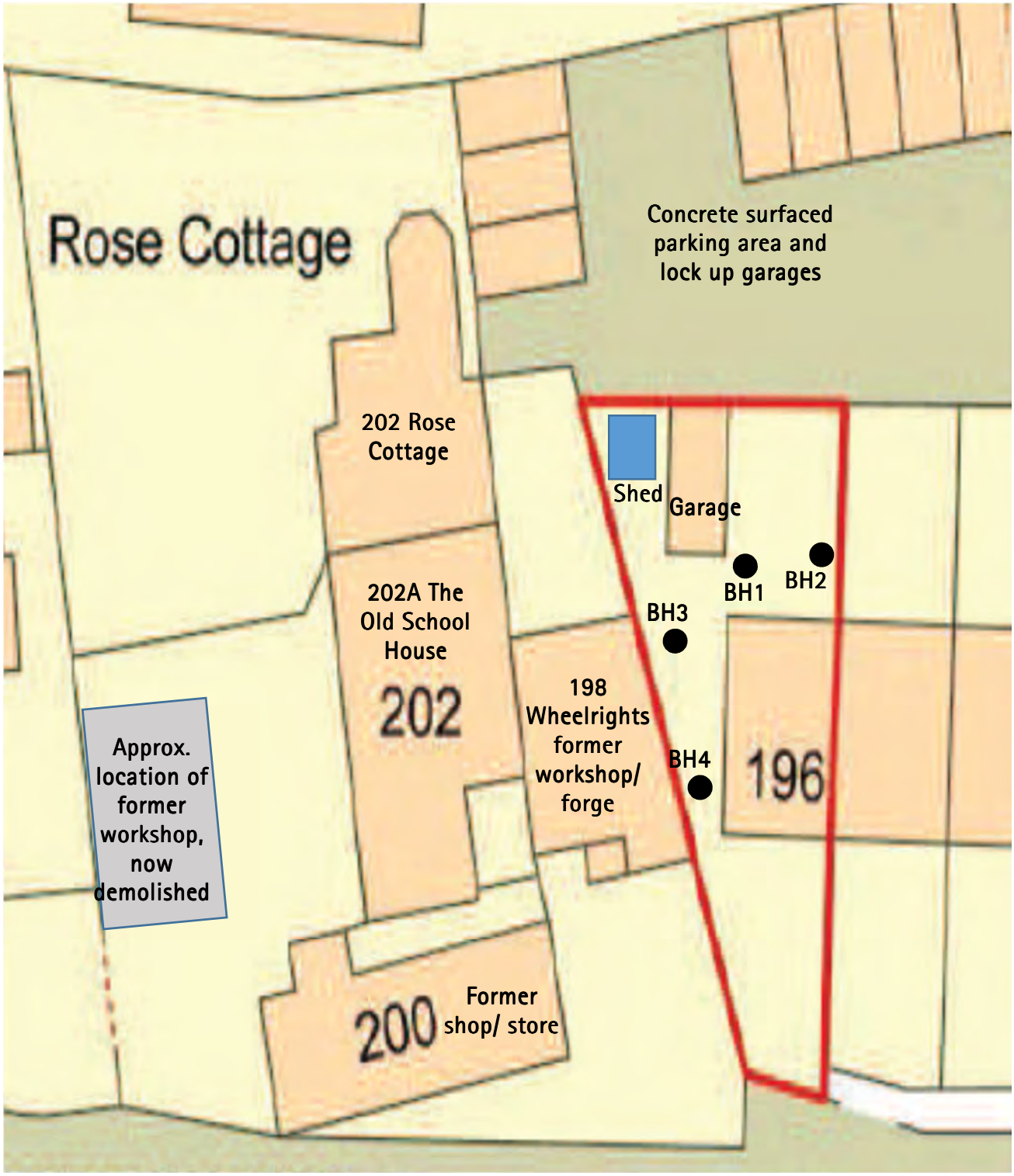
NB: Contains Ordnance Survey Data © Crown copyright and database right 2022.

Site: 196 Salvington Road, Worthing, BN13 2JS	STL: J15101	Fig No: 1
Date: 24th March 2022	Site Location Plan	

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Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

ST Consult



Salvington Road

Site boundary

Borehole location

Site:	196 Salvington Road, Worthing, BN13 2JS	STL: J15101	Fig No: 2
Date:	1st February 2024	Trial Hole Location Plan – Not to Scale	

Southern Testing

Southern Testing: Keeble House, Stuart Way, East Grinstead, West Sussex RH19 4QA
ST Consult: Twigden Barns, Brixworth Road, Creaton, Northampton NN6 8NN

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Key to Exploratory Hole Logs, Plans and Sections

Backfill Symbols		Pipe Symbols		Principal Soil Types		Principal Rock Types		Drilling Records	
Arisings		Plain Pipe		Topsoil		Mudstone		Water Strike	
Concrete		Slotted Pipe		Made Ground		Claystone		Depth Water Rose	
Blacktop		Piezometer		Clay		Siltstone		Total Core Recovery (%) [TCR]	
Bentonite		Piezometer Tip		Silt		Sandstone		Solid Core Recovery (%) [SCR]	
Gravel Filter		Filter Tip		Sand		Limestone		Rock Quality Index (%) RQD]	
Sand Filter		Extensometer		Gravel		Chalk		Fracture Index (fractures / m) [FI]	
		Inclinometers		Peat					

All soil and rock descriptions are in general accordance with BS5930 2015, BS EN ISO 14688-1:2002+A1:2013 and BS EN ISO 14689-1:2003. Chalk descriptions are also based on CIRIA C574 and "Logging the Chalk – R.N. Mortimer 2015". The Geology Code is only provided where a positive identification of the sample strata has been made.

Location / Method Identifiers	
BH	Borehole (undefined)
CP	Cable Percussive
RC	Rotary Core
RO	Rotary Open Hole
ODC	Rotary Odex/Symmetrix drilling cased
CP+RC	Cable Percussive to Rotary Core
SNC	Sonic
CFA	Continuous Flight Auger
FA	Flight Auger
VC	Vibro Core
WLS+RC	Windowless (Dynamic) Sampler to Rotary Core
WLS	Windowless Sampler
WS	Window Sampler
HA	Hand Auger
C	Road / Pavement Core
IP	Inspection Pit (Hand Excavation)
TP	Trial Pit (Machine Excavated)
OP	Observation Pit (Supported Excavation Hand or Machine)

In-situ Test Location / Method	
DP	Dynamic Probe
CPT	Cone Penetration Test
CBR	In-situ CBR Test
DCP	CBR using Dynamic Cone Penetrometer
CBRT	CBR using TRL Probe
PB	Plate Bearing Test
SPT (S)	Standard Penetration Test (Split Barrel Sampler)
SPT (C)	Standard Penetration Test (Solid Cone)
N	SPT Result
-/-	Blows/Penetration (mm) after seating drive
-*/-	Total Blows / Penetration (mm)
( )	Extrapolated Value
PPT	Perth Penetration (In-House Method - Equivalent N Value)
HP / UCS	Strength from Hand Penetrometer (kN/m^2)
IVN	Strength from Hand Vane ((kN/m^2) P = peak, R = residual
PID	Photo Ionisation Detector (ppm)
MEXE	Mexi-Cone CBR (%)

Samples / Test Type	
B	Bulk Sample
BLK	Block Sample
C	Core Sample
CBRS	CBR Mould Sample
D	Small Disturbed Sample
ES	Environmental Sample (Soil)
EW	Environmental Sample (Water)
GS	Environmental Sample (Gas)

Samples / Test Type	
SPTLS	Standard Penetration Test Split Barrel Sample
TW	Thin Wall Push In Sample (e.g. Shelby Sampler)
U	Undisturbed Open Drive Sample (blows to take)
UT	Thin Wall Undisturbed Open Drive Sample (blows to take)
W	Water Sample (Geotechnical)
SP	Sample from Stockpile
P	Piston Sample
AMAL	Amalgamated Sample

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH1
	16/01/2024	J15101	HA	Sheet 1 of 1

Client:	Castleview Homes	Co-ordinates:	Level (m AOD)	Logger:
				er
Project Name:	196 Salvington Road	**Location:**	Salvington Road, Worthing, BN13	

Well	Water Strikes	Samples and Insitu Testing			Progress	Depth (m)	Level (m AOD)	Legend	Stratum Description	
		Depth (m)	Type/FI	Results	Window Run					
						0.05	(0.05)		Brown fine to coarse SAND Made Ground	
		0.20	ES				(0.35)		Soft dark brown silty fine sandy CLAY with occasional to some fine to coarse angular to subrounded gravel of flint with occasional brick and concrete, very occasional clinker noted Made Ground	
						0.40			Soft dark brown silty fine sandy CLAY with very occasional fine to coarse gravel of flint and very occasional fine to medium gravel of brick Made Ground	
						1.00	(0.60)		Brown silty fine to coarse sandy gravelly CLAY, gravel is fine to coarse flint possible reworked ground	1
	▼	1.10	ES			1.10	(0.10)		End of Borehole at 1.10m	2

Remarks:

slight seepage of groundwater at 1.1mbgl

Status:	FINAL	Log Print Date and Time:	01/02/2024 12:49	Log Approved By:	

Southern Testing ST Consult

Start - End Date:	Project ID:	Hole Type:	BH2
16/01/2024	J15101	HA	Sheet 1 of 1

Client:	Castleview Homes	Co-ordinates:	Level (m AOD)	Logger:
				er
Project Name:	196 Salvington Road	**Location:**	Salvington Road, Worthing, BN13	

Well	Water Strikes	Samples and Insitu Testing: Depth (m)	Type/FI	Results	Progress: Window Run	Depth (m)	Level (m AOD)	Legend	Stratum Description
		0.20	ES			0.30	(0.30)		Dark brown silty fine sandy CLAY with some fine to coarse gravel of flint, occasional gravel of brick Made Ground
						0.40	(0.10)		Brown fine to coarse SAND (composed of crushed concrete) with some fine gravel of brick, very occasional clinker noted Made Ground
						0.60	(0.20)		Brown / dark brown silty sandy CLAY with occasional to some fine gravel of flint, brick, concrete, clinker Made Ground
						0.90	(0.30)		Soft pale brown silty CLAY with some fine gravel of flint and occasional fine gravel of brick Made Ground
		1.00	ES			1.00	(0.10)		Soft brown sandy silty CLAY with some fine to coarse gravel of flint reworked ground
									End of Borehole at 1.00m

Remarks:

Status:	FINAL	Log Print Date and Time:	01/02/2024 12:49	Log Approved By:	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH3
	16/01/2024	J15101	HA	Sheet 1 of 1

Client:	Castleview Homes	Co-ordinates:	Level (m AOD)	Logger:
				er
Project Name:	196 Salvington Road	**Location:**	Salvington Road, Worthing, BN13	

Well	Water Strikes	Samples and Insitu Testing			Progress	Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type/FI	Results	Window Run				
		0.30	ES				(0.90)		Soft dark brown silty fine sandy CLAY with occasional fine to coarse gravel of brick and flint, very occasional clinker noted Made Ground
		0.90	ES			0.90			End of Borehole at 0.90m

Remarks:

dry, refusal at 0.9mbgl possible concrete slab, could not relocated due to service runs

Status:	FINAL	Log Print Date and Time:	01/02/2024 12:49	Log Approved By:	

Southern Testing ST Consult	Start - End Date:	Project ID:	Hole Type:	BH4
	16/01/2024	J15101	HA	Sheet 1 of 1

Client:	Castleview Homes	Co-ordinates:	Level (m AOD)	Logger:
				er
Project Name:	196 Salvington Road	**Location:**	Salvington Road, Worthing, BN13	

Well	Water Strikes	Samples and Insitu Testing			Progress	Depth (m)	Level (m AOD)	Legend	Stratum Description
		Depth (m)	Type/FI	Results	Window Run				
		0.20	ES						Soft dark brown silty fine sandy CLAY with occasional fine to coarse gravel of brick and flint, very occasional clinker noted Made Ground
							(0.90)		
		0.90	ES			0.90			End of Borehole at 0.90m

Remarks:

dry, refusal at 0.9mbgl possible concrete slab, could not relocated due to service runs

Status:	FINAL	Log Print Date and Time:	01/02/2024 12:49	Log Approved By:	

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APPENDIX B

Field Sampling and In-Situ Test Methods and Results



B

Soil and Rock Descriptions

All soil and rock descriptions are in general accordance with BS5930 Ref [4].

Anthropogenic soils ('made ground' or 'fill') describe materials which have been placed by man and can be divided into those composed of reworked natural soils and those composed of or containing man-made materials. 'Fill' is used to describe material placed in a controlled manner and 'made ground' is used to describe materials placed without strict engineering control.

The classification of materials such as topsoil is based on visual description only and should not be interpreted to mean that the material complies with criteria used in BS 3882 Ref [13].

Chalk descriptions are based on CIRIA C574 Ref [14] and Mortimore Ref [15].

The geology code is only provided on logs where a positive identification of the sample strata has been made.

Inspection Pit

Inspection pits are hand excavated from the surface (maximum depth 1.2 – 1.5m) using appropriate tools to locate and avoid existing buried services at exploratory hole positions. They are also regularly used as part of investigations on existing structures to expose and determine foundation detail.

Disturbed Samples

Disturbed samples were taken from exploratory holes in general accordance with BS 5930 [4] and BS EN ISO 22475-1 Ref [16] as required and stored in appropriately labelled containers. Details of the type, size and depth of sample will be recorded within the exploratory hole record. Such samples can be regarded as being between Class 5 up to Class 3 quality depending upon their method of sampling.

Environmental Samples

Environmental samples were taken from the boreholes at regular intervals in the made ground and natural soils as indicated on the exploratory hole logs. The sampling strategy was in general accordance with BS10175 Ref [5] and BS ISO 18400 Refs [17], [18], [19], [20] & [21].

These samples were collected and stored in glass jars or plastic pots and transferred to the laboratory in cool boxes as appropriate to the proposed laboratory testing.

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APPENDIX C

Contamination Laboratory Test Methods and Results



C

These screening values are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

Table 1 – Tier 1 Screening Values							
Contaminant	Units	Proposed Land Use					
		Residential with home grown produce consumption	Residential without home grown produce consumption	Open Space * (Residential)	Open Space * (Park)	Allotments	Commercial / Industrial
Arsenic (As) [2]	mg/kg	37	40	79	170	43	640
Cadmium (Cd) [2]	mg/kg	11	85	120	555	1.9	190
Trivalent Chromium (CrIII) [2]	mg/kg	910	910	1,500	33,000	18,000	8600
Hexavalent Chromium (CrVI) [2]	mg/kg	6	6	7.7	220	1.8	33
Lead (Pb) [3]	mg/kg	200	310	630	1300	80	2330
Mercury (Hg) [1,2,7]	mg/kg	7.6-11	9.2-15	40	68-71	6.0	29-320
Selenium (Se) [2]	mg/kg	250	430	1,100	1,800	88	12,000
Nickel (Ni) [2,4]	mg/kg	130	180	230	800	53	980
Copper (Cu) [2,4]	mg/kg	2,400	7,100	12,000	44,000	520	68,000
Zinc (Zn) [2,4]	mg/kg	3,700	40,000	81,000	170,000	620	730,000
Phenol [1,2]	mg/kg	120-380	440-1200	440-1300	440-1300	23-83	440-1300
Benzo[a]pyrene [1,5]	mg/kg	1.7-2.4	2.6	4.9	10	0.67-2.7	36
Naphthalene [1,2]	mg/kg	2.3-13	2.3-13	77-430^{+}	77-430^{+}	4.1-24	77-430^{+}
Total Cyanide (CN) [6]	mg/kg	/	/	/	/	/	/
Free Cyanide [6]	mg/kg	/	/	/	/	/	/
Complex Cyanides [6]	mg/kg	/	/	/	/	/	/
Thiocyanate [6]	mg/kg	/	/	/	/	/	/

Notes:

* Open Space levels calculated on the basis of the exposure modelling developed in the C4SL research.

+ Screening values constrained to saturation limit. Higher values may be acceptable on a site specific basis.

[1] Where ranges of values are given for organic contaminants the screening value is dependent on the Soil +Organic Matter.

[2] LQM/CIEH S4UL (2014). Copyright Land Quality Management Ltd. reproduced with permission; Publication Number S4UL 3116. All rights reserved.

[3] C4SL (DEFRA 2014).

[4] Copper, Zinc and Nickel may have phototoxic effects at the given concentrations. Alternative criteria should be adopted for importation of Topsoil or other soils for cultivation. BS3882:2015 and BS8601:2013 suggest values of 200 to 300mg/kg for Zn, 100 to 200mg/kg for Cu, and 60 to 110mg/kg for Ni, for topsoil and subsoil, depending on pH.

[5] Based on the Surrogate Marker approach and modelled using the modified exposure parameters of C4SL but retaining 'minimal risk' HCV.

[6] Screening criteria derived on a site specific basis if test results indicate.

[7] S4UL for Methyl Mercury, higher concentrations may be tolerable if inorganic mercury is the only species present. Lower concentrations apply for elemental Mercury.

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Analytical Report Number : 24-000481

Project / Site name:	196 Salvington Road, Worthing	Samples received on:	18/01/2024
Your job number:	J15101	Samples instructed on/ Analysis started on:	18/01/2024
Your order number:	J15101-1	Analysis completed by:	26/01/2024
Report Issue Number:	1	Report issued on:	29/01/2024
Samples Analysed:	6 soil samples		

Signed:

Joanna Wawrzeczko
Senior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 24-000481
Project / Site name: 196 Salvington Road, Worthing
Your Order No: J15101-1

Lab Sample Number				103803	103804	103805	103806	103807
Sample Reference				BH1	BH2	BH2	BH3	BH3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.20	1.00	0.30	0.90
Date Sampled				16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Time Taken				0900	1200	1230	1230	1300
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	16	14	11	18	15
Total mass of sample received	kg	0.1	NONE	0.3	0.8	0.3	0.7	0.3
Asbestos								
Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MJN	MJN	MJN	MJN	MJN
General Inorganics								
pH (L099)	pH Units	N/A	MCERTS	7.5	7.7	8.1	8.1	7
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	54	58	28	31	66
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0268	0.0288	0.014	0.0157	0.0328
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	26.8	28.8	14	15.7	32.8
Sulphide	mg/kg	1	MCERTS	< 1.0	15	< 1.0	< 1.0	< 1.0
Organic Matter (automated)	%	0.1	MCERTS	2.9	3.3	1.1	4.3	3.7
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	0.07	< 0.05	0.21	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.07	< 0.05	< 0.05	0.08	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.08	< 0.05	< 0.05	0.13	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.9	0.76	0.17	2.5	0.58
Anthracene	mg/kg	0.05	MCERTS	0.16	0.09	< 0.05	0.3	0.06
Fluoranthene	mg/kg	0.05	MCERTS	1.7	1.4	0.19	4.4	1.1
Pyrene	mg/kg	0.05	MCERTS	1.6	1.2	0.17	3.9	0.98
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.71	0.47	< 0.05	1.6	0.39
Chrysene	mg/kg	0.05	MCERTS	0.81	0.6	0.07	1.9	0.5
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	1.2	0.85	0.09	2.5	0.68
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.42	0.25	< 0.05	0.89	0.19
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.87	0.54	< 0.05	2	0.5
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.49	0.33	< 0.05	1.1	0.28
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	0.15	0.1	< 0.05	0.32	0.07
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.57	0.39	< 0.05	1.3	0.33
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	9.68	7.03	< 0.80	23	5.64

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Analytical Report Number: 24-000481
Project / Site name: 196 Salvington Road, Worthing
Your Order No: J15101-1

Lab Sample Number				103803	103804	103805	103806	103807
Sample Reference				BH1	BH2	BH2	BH3	BH3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.20	1.00	0.30	0.90
Date Sampled				16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Time Taken				0900	1200	1230	1230	1300
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	65	46	31	16	17
Boron (water soluble)	mg/kg	0.2	MCERTS	1.1	0.6	0.4	2.1	1.6
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.6	1.2	1	1.3	1.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	< 1.8	< 1.8	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	120	300	200	72	140
Copper (aqua regia extractable)	mg/kg	1	MCERTS	43	33	32	40	33
Lead (aqua regia extractable)	mg/kg	1	MCERTS	220	180	24	120	110
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	26	28	42	25	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.4	1.3	< 1.0	1	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	43	37	49	36	37
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	220	160	83	260	210
Petroleum Hydrocarbons								
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	-	-	-	< 0.020	-
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	-	-	-	< 0.020	-
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	-	-	-	< 0.050	-
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL_#1_#2	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL_#1_#2	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	-	-	-	< 8.0	-
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	-	-	-	< 8.0	-
TPHCWG - Aliphatic >C6 - C35 EH_CU+HS_1D_AL_#1_#2	mg/kg	10	NONE	-	-	-	< 10	-
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	-	-	-	< 0.010	-
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	-	-	-	< 0.050	-
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR_#1_#2	mg/kg	1	MCERTS	-	-	-	< 1.0	-
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR_#1_#2	mg/kg	2	MCERTS	-	-	-	< 2.0	-
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	-	-	-	16	-
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	-	-	-	25	-
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR_#1_#2	mg/kg	10	NONE	-	-	-	40	-
TPH Total >C6 - C40 EH_CU+HS_1D_TOTAL_#1_#2	mg/kg	10	NONE	18	16	< 10	42	24
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C10 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	18	16	< 10	42	24
VOCs								
Chloromethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Chloroethane	µg/kg	5	NONE	-	-	-	< 5.0	-
Bromomethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Vinyl Chloride	µg/kg	5	NONE	-	-	-	< 5.0	-
Trichlorofluoromethane	µg/kg	5	NONE	-	-	-	< 5.0	-
1,1-Dichloroethene	µg/kg	5	NONE	-	-	-	< 5.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	-	-	-	< 5.0	-
Trans 1,2-dichloroethylene	µg/kg	5	NONE	-	-	-	< 5.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	-	-	< 5.0	-
1,1-Dichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
2,2-Dichloropropane	µg/kg	5	NONE	-	-	-	< 5.0	-
Chloroform	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2-Dichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1-Dichloropropene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-

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Analytical Report Number: 24-000481
Project / Site name: 196 Salvington Road, Worthing
Your Order No: J15101-1

Lab Sample Number				103803	103804	103805	103806	103807
Sample Reference				BH1	BH2	BH2	BH3	BH3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.20	0.20	1.00	0.30	0.90
Date Sampled				16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Time Taken				0900	1200	1230	1230	1300
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Benzene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Carbontetrachloride	µg/kg	5	NONE	-	-	-	< 5.0	-
1,2-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Trichloroethene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Dibromomethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Bromodichloromethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Toluene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,3-Dichloropropane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Dibromochloromethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Tetrachloroethene	µg/kg	5	NONE	-	-	-	< 5.0	-
1,2-Dibromoethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Chlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Ethylbenzene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
p & m-Xylene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Styrene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Bromoform	µg/kg	5	NONE	-	-	-	< 5.0	-
o-Xylene	µg/kg	5	MCERTS	-	-	-	< 5.0	-
Isopropylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	-	-	-	< 5.0	-
Bromobenzene	µg/kg	5	NONE	-	-	-	< 5.0	-
n-Propylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
2-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
4-Chlorotoluene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
tert-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
sec-Butylbenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,3-Dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
p-Isopropyltoluene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,4-Dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2-Dichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Butylbenzene	µg/kg	5	NONE	-	-	-	< 5.0	-
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-
Hexachlorobutadiene	µg/kg	5	NONE	-	-	-	< 5.0	-
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	-	-	-	< 5.0	-

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

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Analytical Report Number: 24-000481
Project / Site name: 196 Salvington Road, Worthing
Your Order No: J15101-1

Lab Sample Number				103808
Sample Reference				BH4
Sample Number				None Supplied
Depth (m)				0.20
Date Sampled				16/01/2024
Time Taken				1400
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	15
Total mass of sample received	kg	0.1	NONE	0.7

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	MJN

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7
Total Cyanide	mg/kg	1	MCERTS	< 1.0
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	20
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.01
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	10
Sulphide	mg/kg	1	MCERTS	< 1.0
Organic Matter (automated)	%	0.1	MCERTS	3.8

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	0.16
Acenaphthene	mg/kg	0.05	MCERTS	0.08
Fluorene	mg/kg	0.05	MCERTS	0.11
Phenanthrene	mg/kg	0.05	MCERTS	2.2
Anthracene	mg/kg	0.05	MCERTS	0.27
Fluoranthene	mg/kg	0.05	MCERTS	3.7
Pyrene	mg/kg	0.05	MCERTS	3.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	1.3
Chrysene	mg/kg	0.05	MCERTS	1.7
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	2.2
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.63
Benzo(a)pyrene	mg/kg	0.05	MCERTS	1.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.89
Dibenzo(a,h)anthracene	mg/kg	0.05	MCERTS	0.25
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.99

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	19.1

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Analytical Report Number: 24-000481
Project / Site name: 196 Salvington Road, Worthing
Your Order No: J15101-1

Lab Sample Number				103808
Sample Reference				BH4
Sample Number				None Supplied
Depth (m)				0.20
Date Sampled				16/01/2024
Time Taken				1400
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Heavy Metals / Metalloids				
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13
Boron (water soluble)	mg/kg	0.2	MCERTS	1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	39
Copper (aqua regia extractable)	mg/kg	1	MCERTS	41
Lead (aqua regia extractable)	mg/kg	1	MCERTS	320
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	34
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	350
Petroleum Hydrocarbons				
TPHCWG - Aliphatic >C5 - C6 HS_1D_AL	mg/kg	0.02	NONE	< 0.020
TPHCWG - Aliphatic >C6 - C8 HS_1D_AL	mg/kg	0.02	NONE	< 0.020
TPHCWG - Aliphatic >C8 - C10 HS_1D_AL	mg/kg	0.05	NONE	< 0.050
TPHCWG - Aliphatic >C10 - C12 EH_CU_1D_AL_#1_#2	mg/kg	1	MCERTS	< 1.0
TPHCWG - Aliphatic >C12 - C16 EH_CU_1D_AL_#1_#2	mg/kg	2	MCERTS	< 2.0
TPHCWG - Aliphatic >C16 - C21 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	< 8.0
TPHCWG - Aliphatic >C21 - C35 EH_CU_1D_AL_#1_#2	mg/kg	8	MCERTS	< 8.0
TPHCWG - Aliphatic >C6 - C35 EH_CU+HS_1D_AL_#1_#2	mg/kg	10	NONE	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	NONE	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	NONE	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.05	NONE	< 0.050
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR_#1_#2	mg/kg	1	MCERTS	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR_#1_#2	mg/kg	2	MCERTS	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	12
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR_#1_#2	mg/kg	10	MCERTS	23
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR_#1_#2	mg/kg	10	NONE	36
TPH Total >C6 - C40 EH_CU+HS_1D_TOTAL_#1_#2	mg/kg	10	NONE	37
Petroleum Range Organics (C6 - C10) HS_1D_TOTAL	mg/kg	1	NONE	< 1.0
TPH (C10 - C40) EH_CU_1D_TOTAL_#1_#2	mg/kg	10	MCERTS	37
VOCs				
Chloromethane	µg/kg	5	ISO 17025	< 5.0
Chloroethane	µg/kg	5	NONE	< 5.0
Bromomethane	µg/kg	5	ISO 17025	< 5.0
Vinyl Chloride	µg/kg	5	NONE	< 5.0
Trichlorofluoromethane	µg/kg	5	NONE	< 5.0
1,1-Dichloroethene	µg/kg	5	NONE	< 5.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	5	NONE	< 5.0
Trans 1,2-dichloroethylene	µg/kg	5	NONE	< 5.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	< 5.0
1,1-Dichloroethane	µg/kg	5	ISO 17025	< 5.0
2,2-Dichloropropane	µg/kg	5	NONE	< 5.0
Chloroform	µg/kg	5	ISO 17025	< 5.0
1,1,1-Trichloroethane	µg/kg	5	ISO 17025	< 5.0
1,2-Dichloroethane	µg/kg	5	ISO 17025	< 5.0
1,1-Dichloropropene	µg/kg	5	ISO 17025	< 5.0
Cis-1,2-dichloroethene	µg/kg	5	ISO 17025	< 5.0

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Analytical Report Number: 24-000481
Project / Site name: 196 Salvington Road, Worthing
Your Order No: J15101-1

Lab Sample Number				103808
Sample Reference				BH4
Sample Number				None Supplied
Depth (m)				0.20
Date Sampled				16/01/2024
Time Taken				1400
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Benzene	µg/kg	5	MCERTS	< 5.0
Carbontetrachloride	µg/kg	5	NONE	< 5.0
1,2-Dichloropropane	µg/kg	5	ISO 17025	< 5.0
Trichloroethene	µg/kg	5	ISO 17025	< 5.0
Dibromomethane	µg/kg	5	ISO 17025	< 5.0
Bromodichloromethane	µg/kg	5	ISO 17025	< 5.0
Cis-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0
Trans-1,3-dichloropropene	µg/kg	5	ISO 17025	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0
1,1,2-Trichloroethane	µg/kg	5	ISO 17025	< 5.0
1,3-Dichloropropane	µg/kg	5	ISO 17025	< 5.0
Dibromochloromethane	µg/kg	5	ISO 17025	< 5.0
Tetrachloroethene	µg/kg	5	NONE	< 5.0
1,2-Dibromoethane	µg/kg	5	ISO 17025	< 5.0
Chlorobenzene	µg/kg	5	ISO 17025	< 5.0
1,1,1,2-Tetrachloroethane	µg/kg	5	ISO 17025	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0
p & m-Xylene	µg/kg	5	MCERTS	< 5.0
Styrene	µg/kg	5	ISO 17025	< 5.0
Bromoform	µg/kg	5	NONE	< 5.0
o-Xylene	µg/kg	5	MCERTS	< 5.0
Isopropylbenzene	µg/kg	5	ISO 17025	< 5.0
1,1,2,2-Tetrachloroethane	µg/kg	5	NONE	< 5.0
Bromobenzene	µg/kg	5	NONE	< 5.0
n-Propylbenzene	µg/kg	5	ISO 17025	< 5.0
2-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0
4-Chlorotoluene	µg/kg	5	ISO 17025	< 5.0
1,3,5-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0
tert-Butylbenzene	µg/kg	5	ISO 17025	< 5.0
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	< 5.0
sec-Butylbenzene	µg/kg	5	ISO 17025	< 5.0
1,3-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
p-Isopropyltoluene	µg/kg	5	ISO 17025	< 5.0
1,4-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
1,2-Dichlorobenzene	µg/kg	5	ISO 17025	< 5.0
Butylbenzene	µg/kg	5	NONE	< 5.0
1,2-Dibromo-3-chloropropane	µg/kg	5	ISO 17025	< 5.0
1,2,4-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0
Hexachlorobutadiene	µg/kg	5	NONE	< 5.0
1,2,3-Trichlorobenzene	µg/kg	5	ISO 17025	< 5.0

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

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Analytical Report Number : 24-000481
Project / Site name: 196 Salvington Road, Worthing

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
103803	BH1	None Supplied	0.2	Brown clay and sand with gravel
103804	BH2	None Supplied	0.2	Brown clay and sand with gravel
103805	BH2	None Supplied	1	Brown clay and sand with gravel
103806	BH3	None Supplied	0.3	Brown loam and clay with gravel and vegetation
103807	BH3	None Supplied	0.9	Brown loam and clay with gravel and vegetation
103808	BH4	None Supplied	0.2	Brown clay and sand with gravel

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode	In-house method	L010	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil	L038B	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES	In-house method based on Second Site Properties version 3	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated EPA-16 PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088	D/W	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry	In-house method	L080	W	MCERTS
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS

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Project / Site name: 196 Salvington Road, Worthing

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	D	MCERTS

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

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APPENDIX D

Photographs



D



Plate 1: 190-196 Salvington Lane.



Plate 2: East to 190 and 192 Salvington Lane.



Plate 3: 200 and 198 Salvington Lane, to the west of the site.



Plate 4: 196 side garden looking north.



Plate 5: Access track to north side of site looking west.



Plate 6: West to garage, 196 and parking area.



Plate 7: Shed to north west site corner, garage behind.



Plate 8: Shed to north west site corner.



Plate 9: 196 rear garden looking south to house, garage to west.



Plate 10: Rear garden looking south east to garden fence.



Plate 11: Access gate and north site boundary fence.



Plate 12: Access track looking east.



Plate 13: Parking area and garages to north of site, west.



Plate 14: Garden walls and front gardens to south side of houses, looking west.



Plate 15: Boundary wall to southern end of site.



Plate 16: Wheelwrights to west side of site.

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