

Phase 1 Desk Study

Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR

On behalf of Richard Brooks

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Table of Contents

Table of Contents.....	i
EXECUTIVE SUMMARY	iii
1. INTRODUCTION.....	1
1.1. General.....	1
1.2. Aims of the Investigation	1
1.3. Conditions and Limitations	1
2. SITE SETTING	2
2.4.1. Relevant Geological Formations	3
2.4.2. BGS Borehole Records	4
3. HISTORICAL REVIEW.....	6
3.1. Historical Map Review	6
3.2. Historical Aerial Photography Review.....	6
4. GROUNDSURE DATASHEETS REVIEW	8
4.1. Groundsure Datasheets	8
5. ONLINE REVIEW AND PREVIOUS SITE INVESTIGATIONS.....	10
5.1. Online Planning Database	10
5.2. Internet Search.....	10
5.3. Previous Site Investigations	10
6. PHASE I RISK ASSESSMENT.....	11
6.1. Contaminant Source-Pathway-Receptor Model.....	11
6.2. Potential On-site Sources of Contaminants	11
6.3. Potential Off-site Sources of Contaminants.....	11
6.4. Potential Receptors.....	12
6.5. Contaminant Absorption Pathways	13
6.6. Tabulated Conceptual Site Model.....	13
6.7. Recommendations and Phase II Objectives	16
6.7.1. Soils	16
6.7.2. Services	16
6.7.3. Groundwater	17
6.7.4. Ground-gas.....	17
6.7.5. General.....	17
6.7.6. Chalk Dissolution Risk Assessment	17
FIGURES.....	1
APPENDIX A: Conditions and Limitations.....	2

APPENDIX B: Site Photographs	5
APPENDIX C BGS Radon Report	6
APPENDIX D: Historical Maps.....	7
APPENDIX E: Groundsure EnviroInsight and GeoInsight Datasheets	8

EXECUTIVE SUMMARY

PROPOSED DEVELOPMENT	At the time of reporting, July 2021, the proposed development was understood to comprise the erection of a two storey detached residential property with a detached garage, associated car parking and garden areas.
GEOLOGY	The British Geological Survey Solid and Drift Geology Map for the Fontwell area (Chichester Sheet no. 317) revealed that the site was underlain by Head Deposits and Raised Beach Deposits over the Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk formation, Culver Chalk Formation and Portsdown Chalk Formation. No areas of Made Ground or Reworked Ground were noted within a 250m radius.
HYDROGEOLOGY	A study of the aquifer maps on the DEFRA website revealed the site was underlain by a Secondary (A) Aquifer comprising the superficial Head Deposits and Raised Beach Deposits, underlain by a Principal Aquifer comprising bedrock deposits of the Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation. Examination of the Environment Agency records showed that the majority of the site was located within an Outer Zone (Zone II) Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. An Outer Zone (Zone II) Groundwater source Protection Zone is defined by a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction. No surface water features were present within a 250m radius of the site. From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation. Some amounts of groundwater however may be present at shallower depths within Made ground, parts of the Head Deposits or silty/sandy pockets of the Raised Beach Deposits. It was considered that groundwater was flowing in a southerly direction in line with local topography. Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a very low probability of flooding.
RADON	A BGS Radon Risk Assessment was commissioned for the site which indicated that basic radon protection measures are not required to be installed in new buildings. The risk assessment can be seen in Appendix B.
POTENTIAL SOURCES OF CONTAMINATION	Full details can be seen in sections 6.3 and 6.4 of this report. Onsite - The Desk study has revealed the following potential sources of contamination onsite: • Potential for Made Ground (associated with on-site activities) • Low Risk of ground-gas. Offsite - The Desk study has revealed the following potential sources of contamination within the site's environs: • Low Risk of ground-gas.

**RECOMMENDATIONS/
PHASE 2 OBJECTIVES**

A site investigation was recommended across the entire area of the site to confirm the presence of Made Ground.

An Asbestos Management Strategy should be put in place so that any potentially asbestos containing materials are identified and removed from site in a suitable manner to prevent cross-contamination.

Due to the presence of potential Made Ground, the risk of ground-gas was considered to be low and consideration could be given to further investigation.

Low risk to groundwater was identified due to the sensitive receptor and the nature of potentially thick Made Ground on-site.

1. INTRODUCTION

1.1. General

Ground and Water Limited were instructed by Richard Brooks on the 16th April 2021 to conduct a Desk Study on the site at Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR. The scope of the investigation was detailed within the fee proposal GWQ6355, dated the 29th March 2021.

1.2. Aims of the Investigation

This Phase 1 Desk Study was undertaken to advise the client on risk factors pertaining to the site with special reference to former and present day potential contaminative uses and their impact on sensitive receptors, these being human health, controlled waters, buildings, building materials and services.

1.3. Conditions and Limitations

This report has been prepared based on the terms, conditions and limitations outlined within Appendix A of this report.

2. SITE SETTING

2.1. Site Location

The site comprised a 0.15ha rectangular-shaped plot of land to the south of a “Sundown”, orientated in an east to west direction on the eastern side of Littleheath Road. The site was located to the west of the village of Fontwell in West Sussex. The national grid reference/Easting Northing for the centre of the site was approximately TQ 94545 07675. A site location plan is given within Figure 1. A plan showing the site area is given within Figure 2.

2.2. Site Description

A Site Walkover was undertaken on the 13th April 2021. A description of the site, as noted during the Site Walkover, is tabulated below. An aerial view of the site, showing an approximate site boundary, is given within Figure 3. Photographs taken from the site walkover can be viewed within Appendix B.

Site Description Sheet	
Use of site	At the time of the Site Walkover, 23 rd March 2020, the site was an open plot of land located to the south of “Sundown” to the north.
Site topography	The western portion of the site was flat. The eastern portion of the site comprised a depression that was ~2m lower with a steep break of slope separating the two portions. An ~2m high cut face formed the eastern boundary.
Area topography	The general area flat and level with a very gentle slope towards the south. A depression ~2m deep extended to the north and south of the eastern portion of the site at the same level as the ground surface of the site.
Structures onsite	None noted.
Structures off-site	Detached residential buildings were noted to the north, east and south. An area of woodland was noted to the west of the site across Littleheath Road.
Use of surrounding ground	Residential to the north, east and south and an area of woodland to the west
Boundary features	Northern Boundary: Western portion comprised ~2m high wooden fence; the eastern portion was a ~1m high wire and post fence.. Eastern Boundary: An ~1.80m high wooden fence on top of an ~2m high cut face at the edge of the depression. Southern Boundary: The western portion was a row of cropped trees; the eastern portion was open. Western Boundary: ~2m high wooden fence
Site covering	The site was an area of soft landscaping.
Contamination sources onsite	None noted.
Contamination sources off-site	Above ground unbunded heating oil tanks associated with the residential properties to the north and south.
Vegetation onsite	A number of ~20 – 25m mature trees were located to the east of the proposed structure within the base of the depression. A cropped line of trees was located along the southern boundary of the site.
Vegetation off-site	~Numerous trees of varying heights and maturity were noted in the gardens of the properties to the north, east and south of the site. An area of mixed woodland was noted on the western side of Littleheath Road to the west of the site.
Services	None noted

2.3. Proposed Development

At the time of reporting, July 2021, the proposed development was understood to comprise the erection of a two storey detached residential property with a detached garage, associated car parking

and garden areas. No lower ground floor level or basement was anticipated. The proposed development plan can be seen within Figure 4.

2.4. Geology

The British Geological Survey Solid and Drift Geology Map for the Fontwell area (Chichester Sheet No. 317) revealed that the site was underlain by superficial Head Deposits over Raised Beach Deposits and bedrock deposits of the Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation. No other superficial deposits, outcrops of bedrock deposits or areas of Made/Worked Ground were noted within a 250m radius of the site.

Superficial deposits (Drift) are the youngest geological deposits formed during the most recent period of geological time. They rest on older deposits or rocks referred to as bedrock (Solid), which are the main mass forming the Earth. Bedrock is present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

2.4.1. Relevant Geological Formations

Head Deposits

Periglacial activity in a succession of cold periods and more recent downwash was responsible for the formation of Head Deposits and Head Gravel Deposits. Head is widespread in the district but had been mapped mainly in valleys where locally more than 2m may occur. The lithology of Head Deposits is determined largely by the parent materials upslope.

Raised Beach Deposits

The deposits are variable and predominantly comprise gravel (shingle), Sand, Silt and Clay, commonly containing organic debris. The deposits are now at the level of the present shoreline as a results of earth movement or a general fall in sea level.

Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation

The Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation is a soft white friable microporous limestone composed of coccolith biomicrites with a varying proportion of larger shell fragments. Flint characterises the Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation, occurring as nodular courses, tabular beds and linings to fractures.

At various levels clay sized material occurs as marl seams and partings. Close to the surface the upper few metres are invariably discoloured brown, due to leaching from the overlying strata. The interface with any overlying stratum is invariably extremely irregular as a result of localised weathering and dissolution. Weathering by frost action may extend to a depth of several metres.

Occasional erosional features, such as pipes, swallow holes and solution cavities, usually in-filled with drift deposits; can be found in the chalk deposits. These features sometimes manifest themselves at the surface as shallow circular depressions. Solution features may be reactivated by the concentrated ingress of water from leaking drains or soakaways. Reactivation may lead to surface collapse.

2.4.2. BGS Borehole Records

Several BGS borehole records in the area have revealed ~8-9m of superficial deposits generally comprising dense gravel overlying the chalk. No groundwater was noted.

2.5. Hydrogeology and Hydrology

A study of the aquifer maps on the DEFRA website revealed the site was underlain by a **Secondary (A) Aquifer** comprising the superficial Head Deposits and Raised Beach Deposits, underlain by a **Principal Aquifer** comprising bedrock deposits of the Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation.

Secondary aquifers include a wide range of drift deposits with an equally wide range of water permeability and storage capacities. **Secondary (A) Aquifers** consist of deposits with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers.

A **Principal Aquifer** is a layer of rock or drift deposits that have high intergranular and/or fracture permeability meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Examination of the Environment Agency records showed that the majority of the site was located within an Outer Zone (Zone II) Groundwater Source Protection Zone (SPZ) as classified in the Policy and Practice for the Protection of Groundwater. Descriptions of each classification have been provided below:

- An Outer Zone (Zone II) Groundwater source Protection Zone is defined by a 400 day travel time from a point below the water table. The previous methodology gave an option to define SPZ2 as the minimum recharge area required to support 25 per cent of the protected yield. This option is no longer available in defining new SPZs and instead this zone has a minimum radius of 250 or 500 metres around the source, depending on the size of the abstraction.

No surface water features were present within a 250m radius of the site. The nearest surface water feature was an unnamed pond associated with the Cannizaro Park located ~775m west of the site. The River Wandle was located ~2km south-east/east of the site and it was flowing in a north-west to south-east direction. The River Thames located ~4.50km north of the site, flowing in a north-east to south-west direction.

From analysis of hydrogeological and topographical maps the actual groundwater table was anticipated to be encountered at depth within the Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation. Some amounts of groundwater however may be present at shallower depths within Made ground, parts of the Head Deposits or silty/sandy pockets of the Raised Beach Deposits, especially after periods of intense or prolonged rainfall. It was considered that groundwater was flowing in a southerly direction in line with local topography.

Examination of the Environment Agency records showed that the site was located within a Flood Zone 1, i.e. an area with a very low probability of flooding.

2.6. Radon

BRE 211 (2015) Map 4 of the Hampshire, Berkshire and south Oxfordshire area indicated that the site was located within an area **where basic mandatory protection measures against the ingress of radon were likely to be required.**

A review of the freely available Public Health England radon database, UK Radon, indicated that the site was located within a 1km grid square, where the maximum radon potential of 3 – 5%. Basic radon protection measures are required in areas where more than 3% of houses are at or above the Action Level. The site was in an area where a risk assessment was required.

A BGS Radon Risk Assessment was commissioned for the site which indicated that basic radon protection measures are not required to be installed in new buildings. The risk assessment can be seen in Appendix C.

2.7. Internet Search (Site Setting)

2.7.1. Available Unexploded Ordnance (UXO) Map Review

A review of the data available on www.zeticauxo.com/ revealed the site was located within a low-risk area associated with unexploded ordnance (UXO), as indicated by having <15 bombs dropped per 1000 acres. 1No. known Luftwaffe Bombing Target site was located 1.00km south-west of the site.

2.7.2. Historical Landfill Tool Review

A review of the data available on www.groundsure.io/ revealed that an area of Historical Landfilling approximately 450m north-east of the site associated with the Slindon Bottom Gravel Pit operational between 31/12/1954 and 31/12/1975. Further review identified a second area of Historical Landfilling located approximately 1.13km south-west of the site.

3. HISTORICAL REVIEW

3.1. Historical Map Review

The object of this search was to report on the history of the site and its environs from available County Series and Ordnance Survey Maps dating from the mid to late 19th Century to the present day and downloaded from Groundsure. In the following sections dealing with individual maps, only features considered to have a potential contaminative impact on the site and usually within a notional 250 metre radius of the site boundaries are discussed. Any distances quoted for features remote from the site have been scaled from the maps and are only approximate. The north point and approximate extent of the site are indicated on each figure. The historical maps referred to are given within Appendix D. The implications of the map search are discussed later within this report.

Environmental Significance of Data from Historical Maps			
Maps Dated Between	Scale	Site	Environs
1875 – 1876	1:2,500 (x1) 1:10,560 (x1)	The site comprised a part of an undeveloped open plot of land, likely agricultural land/fields.	The site environs generally comprised undeveloped agricultural land/fields. The north to south Littleheath Road was shown to the immediate west of the site.
1896 – 1897	1:2,500 (x1) 1:10,560 (x1)	A Sand Pit was shown in the eastern portion of the site. Remainder as previous map.	The sand pit was noted extending marginally beyond the northern and southern boundaries of the site. A Nursery was shown ~240m south of the site. Remainder as previous map.
1910 – 1914	1:2,500 (x1) 1:10,560 (x1)	The sand pit had been further extended across the site almost to the eastern boundary and across the western portion of the site. Only the north-west corner remained unaffected.	The sand pit had now been extended ~30m to the north and south of the site. Unknown small rectangular structures were shown ~90m and ~100m south-east and south of the site respectively. Remainder as previous map.
1939 – 1941	1:2,500 (x1) 1:10,560 (x1)	Apart from the parts of the site outside the sand pit being shown as woodland, no significant changes were recorded.	Semi-detached and detached residential properties were shown fronting onto Duke's Lane to the immediate east of the site. Assumed detached residential properties were shown from 100m to the south along Littleheath Road. Remainder as previous map.
1969 – 1973	1:2,500 (x1) 1:10,560 (x1)	The sand pit was no longer shown within the site boundaries and only the eastern portion was shown as wooded.	"Sundown" had been constructed to the north of the site and further residential properties ("Oakland", "Dell Cottage and Four Seasons") had been built to the immediate south along Littleheath Road. A Nursery was shown ~100m south-east of the site. Remainder as previous map.
1979 - 2021	1:1,250 (x1) 1:2,500 (x3) 1:10,000 (x5)	The western portion of the site was open and the eastern portion was wooded	As previous map.

3.2. Historical Aerial Photography Review

The object of this search was to report on the history of the site and its environs from available Aerial Photography dating from the late-20th Century to the present day and downloaded from Google Earth and Groundsure. In the following sections, only features considered to have a potential contaminative impact on the site and usually within a notional 250 metre radius of the site boundaries are discussed.

Any distances quoted for features remote from the site have been scaled from the photography and are only approximate.

At the time of the earliest aerial photography, 1999, the western portion of the site was an open area of soft landscaping and the eastern portion was heavily wooded. Residential properties were located to the north, east and south. The remainder of the site's environs comprised fields. No changes were noted on the 2012, 2013, 2015 and the most recent 2018 photography.

4. GROUNDSURE DATASHEETS REVIEW

4.1. Groundsure Datasheets

GroundSure Environmental and Geological Datasheets were obtained for the site. Unless the data indicates a significant risk, only information within a 250m buffer zone has been included. The GroundSure Datasheets are also presented in Appendix E and a summary is given below and overleaf(s).

Source	Environmental Insight
	Nearest Distance from Site/Dated/Type
Past Land Use	
Historical industrial land uses	4 on-site and 2 off-site records within a 250m radius: 1x record of a refuse heap on-site (1969), 3x records of a sand pit on-site (1896, 1910 – 1940). 2x records of a nursery east and 241m south (1977, 1876 – 1940).
Current Industrial Land Use	
Recent Industrial Land Uses	1 off-site record within a 250m radius. 1x record of construction completion services.
Hydrogeology	
Superficial Aquifer	1 record on-site: 1x Secondary A Aquifer.
Bedrock Aquifer	1 record onsite: 1x Principal Aquifer.
Groundwater Vulnerability	1 record onsite: 1x Secondary superficial aquifer – medium vulnerability, leaching class: intermediate. 1x Principal bedrock aquifer – medium vulnerability, leaching class: intermediate.
Groundwater Vulnerability – Soluble Rock Risk	7% of grid square covered by maximum risk Very significant soluble rocks are likely to be present. High possibility of localised subsidence or dissolution-related degradation of bedrock occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow.
Source Protection Zones	1 record on-site: 1x Zone II – Outer Catchment
Hydrology	
WFD Surface Water Body Catchments	1 record within a 250m radius: 1x Aldingbourne Rife (Part of a river WB catchment on-site).
WFD Groundwater Bodies	1 record within a 250m radius: 1x Chichester Chalk on-site.
River and Coastal Flooding	
Surface Water Flooding	Highest risk onsite – Negligible - 1 in 30 years, 0.1m – 0.3m; Highest risk within 50m – 1 in 30 years, 0.3m – 1.0m.
Groundwater Flooding	Highest risk on-site – High. Highest risk within 50m - High
Environmental Designations	
Nitrate Vulnerable Zones	2x on-site records. 1x Aldingbourne Rife NVZ (surface water) – on-site. 1x Sussex Chalk Groundwater – on-site.
SSSI Impact Risk Zones	1 record onsite: 1x Type of developments requiring consultation: All applications.
Visual and Cultural Designations	
National Parks	1x off-site record within a 250m radius. South Down - 32m north-east
Agricultural Designations	
Agricultural Land Classification	1x record on-site and 4x off-site records within a 250m radius: 1x Grade 3 good to moderate agricultural land on-site, 3x Grade 3b moderate agricultural land 34m north-east, 60m west and 120m north, 1x Grade 2 very good agricultural land on-site 60m west.
Habitat Designation	
Priority Habitat Inventory	1x on-site and 3x records within a 250m radius: 1x deciduous woodland on-site. 1x deciduous woodland 10m west, 23m west and 241m east.
Habitat Networks	1x off-site record within a 250m radius: 1x Network Enhancement Zone 237m south.

Geological Insight	
Source	Nearest Distance from Site/Dated/Type
Artificial and Made Ground (1:10,000 Scale)	1x on-site record: 1x record on-site – Worked Ground (undivided).
Superficial Geology (1:10,000 Scale)	2x on-site records: 1x record on-site – Head Deposits (Clay, Silt, Sand and Gravel). 1x record on-site – Raised Beach Deposits, 2 (Sand and Gravel).
Bedrock Geology (1:10,000 Scale)	1 on-site record: 1x Tarrant Chalk Member (Chalk).
Superficial Geology and Permeability (1:50,000 scale)	1 on-site record: 1x Head Deposits (gravel, sand, silt and clay). Flow Type: Intergranular, Maximum Permeability: Very High, Minimum Permeability: Low.
Bedrock Geology and Permeability (1:50,000 scale)	1 record onsite: 1x Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven chalk formation, Culver Chalk Formation and Portsdown Chalk Formation (Undifferentiated). Flow Type – Fracture, Maximum Permeability – Very High, Minimum Permeability – Very High.
Boreholes	
BGS recorded boreholes	3 records within a 250m radius: 5m west (9.00m depth), 5m west (10.00m depth), 5m west (9.00m depth).
Natural Hazard Findings	
Shrink-Swell Clay	Very Low hazard onsite.
Running Sands	Very Low hazard onsite.
Compressible Deposits	Negligible hazard onsite.
Collapseable Deposits	Very Low hazard onsite.
Landslides	Very Low hazard onsite.
Ground Dissolution of Soluble Rocks	Low hazard onsite.
Mining, Ground Working and Natural Cavities	
Records of BritPits	1x on-site record: On-site: Westfield Sand Pit: Surface mineral working (Sand Pit), Type: Ceased.
Records of Surface Ground Workings	4x on-site records: 1x record of a refuse heap on-site (1969), 3x records of a sand pit on-site (1896, 1910 – 1940).
Records of Non-coal Mining	1 on-site record: On-site: chalk Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered.
Radon	
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.
Estimated Background Soil Chemistry	
Records of BGS estimated background soil chemistry	One on-site and one off-site record within a 250m radius: On-site and 15m west: Arsenic: 15mg/kg Bioaccessible Arsenic: no data Bioaccessible Lead 100mg/kg (60mg/kg bioaccessible) Cadmium: 1.8mg/kg Chromium: 60 – 90mg/kg Nickel: 15 – 30mg/kg

5. ONLINE REVIEW AND PREVIOUS SITE INVESTIGATIONS

5.1. Online Planning Database

A review of the Arun District Council Planning Database revealed that two planning applications had been filed for the land to the rear of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR. Those pertinent to the site development area are tabulated below.

Planning Applications for: Land to the rear of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR		
Application No./Date	Proposed	Decision
AL/66/21/PL 01/06/2021	1 No. 4 bedroom detached dwelling with a detached 3 bay garage (2 open bays and 1 enclosed), associated foul field drain, storm soakaway, new front boundary treatment, roof mounted PV & Ground Source Heat pump System (resubmission following AL/62/19/PL). This site is in CIL Zone 3 and is CIL Liable as new dwelling.	Undecided
AL/31/21/DOC 26/02/2021	Approval of details reserved by condition imposed under ref APP/C3810/W/19/3241407 (AL/62/19/PL) relating to Condition Nos 3 - surface water drainage and 4 - protection of retained trees & boundary vegetation.	DOC refused

The applications indicate that the current planning application is undecided at the time of reporting.

5.2. Internet Search

An internet search did not identify any other information pertinent to this report.

5.3. Previous Site Investigations

An internet search did not identify any other previous site investigations pertinent to this report.

6. PHASE I RISK ASSESSMENT

6.1. Contaminant Source-Pathway-Receptor Model

In the UK, the assessment of risk from contamination follows the source-pathway-receptor (SPR) approach. For a risk to be present there must be a source of contamination, a receptor or receptors, and a pathway for contaminants to migrate or be absorbed. If one of these three elements are absent, it is considered that there is no risk of harm. If, however, there is a linkage between any given source and any given receptor, then a risk-based approach is used to assess the significance or impact of the pollutant linkage.

The Phase 1 Desk Study has been used to identify potential on-site and off-site sources of contamination, which are summarised in this section of the report. Additional potential sources of contamination identified within the Desk Study have been discounted based on the absence of a realistic SPR linkage (i.e. the distance from the site or the nature or age of any potential contamination sources).

In line with the requirements of BS 21365:2020, *Soil Quality – Conceptual site models for potentially contaminated sites*, the Conceptual Site Model (CSM) can be described in text, tabulated or presented as a figure. A tabulated CSM is provided in Section 6.6 of this report, where each component is discussed in the following sections. A diagrammatic CSM is provided within Figure 5.

6.2. Potential On-site Sources of Contaminants

This Desk Study revealed that at the time of the earliest historical mapping (1875) the site comprised undeveloped fields until 1896, when a sand pit was shown in the eastern portion of the site. By the time of the 1910 - 1914 mapping, the sand pit had been further extended across the site almost to the eastern boundary and across the western portion of the site. Only the north-west corner remained unaffected. By the 1930s the site was shown as a wooded area. From the 1970s onwards, the eastern portion of the site was shown to be wooded and the western portion of the site was open.

The Phase 1 Desk Study revealed the following on-site sources of contamination:

- A sand pit was shown mainly in the eastern portion of the site between 1896 and 1930s. The Groundsure Datasheets, presented in Appendix E of this report, revealed three historical land uses and four on-site surface ground workings comprising: sand pit (1896 – 1940) and a refuse heap (1969). The datasheets revealed one on-site BritPit comprising 1x Westfield Sand Pit (sand)
- The Site Walkover revealed that the depression formed during the extraction remains as a wooded depression that also forms part of the rear garden of Sundown to the north and also extends to the rear of the back gardens of the properties to the south of the site. Excavations in the base of the depression revealed natural soils from ground surface. The western portion of the site has had a number of trees removed and the slope into the depression appeared to have been regraded to allow access for plant. As a result, various thicknesses of Made Ground resulting from these activities are likely to be encountered close to the edge of the regraded slope. Contaminants of concern associated with Made Ground deposits could include; metals, Petroleum Hydrocarbons (TPHs), Polycyclic aromatic hydrocarbons (PAHs), asbestos, sulphates, volatile organic compounds (VOCs) and ground gases.

6.3. Potential Off-site Sources of Contaminants

The Phase 1 Desk Study revealed the following potential off-site sources of contamination:

- A sand pit was shown extending to the north and south of the site between 1896 and 1930s. As explained above, there was no evidence of any significant back filling. Therefore, whilst the risk of ground-gas/imported fill affecting the site was considered to be **low**, a short period ground-gas monitoring should be undertaken in a standpipe installed in boreholes so that this potential source can be discounted.
- Nurseries were shown on the historical maps ~240m south of the site between 1896 and 1940 and ~100m south-east of the site during the 1970s. The Groundsure Datasheets, presented in Appendix E of this report, revealed two historical land uses within a 250m radius of the site comprising two nurseries 102m south east (1977) and 241m south (1876 - 1940). Sporadic use of pesticides and herbicides may have occurred within the nurseries; however, they were both no longer shown by the 1980s, so it was considered unlikely that there would be remnants of these chemicals left in the near surface soils. Also given that site levels do not appear to have been raised since that time, the likelihood of fill having been imported to the site was considered to be negligible and these potential sources were dismissed.
- Above ground unbunded heating oil tanks associated with the residential properties ~50m to the north and south were noted during the Site Walkover. No visual or olfactory evidence for leaks/stains of heating oil were associated with the tanks. Fuel oils are generally lighter end (C10 – C15) and therefore volatilise to atmosphere and quickly bio-degrade meaning migration over the distance the tanks are from the site is considered a negligible risk and these potential sources of contamination can be dismissed.
- A review of the data available on www.groundsure.io/ revealed that an area of Historical Landfilling approximately 450m north-east of the site associated with the Slindon Bottom Gravel Pit operational between 31/12/1954 and 31/12/1975. Further review identified a second area of Historical Landfilling located approximately 1.13km south-west of the site. Given the distances from the site, ground-gases generated by either landfill site were considered to pose no risk to the site and therefore these potential sources of contamination have been dismissed.

6.4. Potential Receptors

At the time of reporting, July 2021, the proposed development was understood to comprise the erection of a two storey detached residential property with a detached garage, associated car parking and garden areas. No lower ground floor level or basement was anticipated. The proposed development plan can be seen within Figure 4.

Based on the proposed development, the potential receptors are presented below and comprise:

Human Health

- End users of the site (Residents/Future site visitors);
- Construction workers during redevelopment;
- Site operatives during maintenance works; and
- Neighbours and members of the public.

Flora and Fauna

- Vegetation within soft landscaped areas;

Building Materials and Services

- Buildings;
- Buried concrete;
- Confined spaces; and
- Underground services (Water Pipes).

Controlled Waters

- Secondary (A) Aquifer (Head Deposits and Raised Beach Deposits)
- Principal Aquifer (Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation).

6.5. Contaminant Absorption Pathways

The potential pathways for contaminant absorption between the identified sources and the identified receptors are as follows:

Human Health:

- Direct ingestion of soil and soil derived dust;
- Dermal contact of soil and soil derived dust;
- Inhalation of dust (indoors and outdoors) with elevated concentration of determinands;
- Ingestion of home-grown produce, and soil attached;
- Direct ingestion of groundwater;
- Inhalation of volatile vapour (indoors and outdoors);
- Inhalation of ground gases.; and
- Explosion.

Flora and Fauna

- Direct uptake of groundwater; and
- Direct uptake of contaminants in the soil.

Building Materials and Services

- Direct contact;
- Explosion.

Controlled Waters

- Vertical and lateral migration in permeable strata horizons;
- Via anthropogenic pathways (infilled ground and service runs);
- Surface water Runoff.

6.6. Tabulated Conceptual Site Model

The tabulated Conceptual Site Model developed as part of this Desk Study is outlined overleaf. For ease of reference and understanding, the risks have been classified within this risk assessment against four possible levels / categories, summarised in the table overpage.

Risk Categories used in the Tabulated CSM	
Negligible	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is no plausible risk. Therefore, there is no need to further assess this potential source of contamination.
Low Risk	Regarding this potential SPR linkage, the site is considered suitable for the proposed end-use and there is not considered to be an unacceptable risk to receptors. However, it is considered that further investigation to confirm this is recommended.
Moderate Risk	Regarding this potential SPR linkage, the site may not be suitable for the proposed end-use in its current condition and there may be an unacceptable risk to receptors. Further investigation is required to confirm this.
High Risk	Regarding this potential SPR linkage, the site is probably or certainly not suitable for proposed end-use and there is likely to be an unacceptable risk to receptors. Contaminants probably or certainly present and urgent action required in the short term.

Tabulated Conceptual Site Model – Pollutant Linkage Summary				(On-Site Sources)
Potential Sources	Potential Absorption Pathways	Potential Receptors	Risk Classification	
Made Ground from on-site activities: - Asbestos, - PAHs, - TPHs, - VOCs, - Sulphates, and - Metals.	- Direct ingestion of soil and soil derived dust - Dermal contact of soil and soil derived dust - Inhalation of dust (indoors and outdoors) with elevated concentration of determinands - Ingestion of home-grown produce, and soils attached - Direct ingestion of groundwater - Inhalation of volatile vapour (indoors and outdoors)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development - Site operatives during maintenance works - Neighbours and public	Low	
	- Direct uptake of groundwater - Direct uptake of determinands in the soil	Flora and Fauna Vegetation within soft landscaped area	Low	
	- Anthropogenic (man-made) pathways - Vertical and lateral migration in permeable strata - Surface water runoff	Controlled Waters - Secondary (A) Aquifer (Head Deposits and Raised Beach Deposits) - Principal Aquifer (Undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation).	Low	
Aggressive ground conditions with Made Ground and natural ground, including groundwater: - Sulphates, - PAH/TPH.	Direct contact with aggressive ground conditions	Building Materials and Services - Buried Concrete - Underground services (water pipes)	High	
Ground gases generated by Made Ground: - Methane, - Carbon Dioxide, - Hydrogen Sulphide, and - Carbon Monoxide.	- Migration through anthropogenic & natural pathways - Inhalation of Asphyxiating gases - Explosion (methane only)	Human Health - End Users (Residents/Future site visitors) - Construction workers during development (especially in confined spaces) - Site operatives during maintenance works in confined spaces - Neighbours and public	Low	
	- Migration through anthropogenic & natural pathways - Explosion (methane only)	Building Materials and Services - Buildings - Confined spaces - Underground services	Low	

6.7. Recommendations and Phase II Objectives

This section of the report will present recommendations for the further investigation of each plausible pollutant linkage identified by the Conceptual Site Model.

It is recommended that an intrusive ground investigation is undertaken at the site to evaluate the risk that contaminants of concern within the soils and groundwater may affect end-users. This should determine the underlying ground and groundwater conditions and include an assessment of the level of contamination to enable the quantification of the ground-related risks associated with the proposed redevelopment.

Consideration should be given to the testing of soil samples recovered from exploratory holes for chemical laboratory testing. The testing should be for a broad range of contaminants in accordance with DEFRA / CLEA methodologies and include the contaminants of concern identified within the Conceptual Site Model.

6.7.1. Soils

It is possible that asbestos and asbestos containing materials will be incorporated within any Made Ground. An asbestos management strategy should be implemented to ensure that any asbestos uncovered during the investigation does not pose a risk to members of the public that use the site.

On the basis of the Phase 1 Site Assessment the following contaminants of concern have been identified and should be included in the chemical analysis suite for the ground investigation:

- Asbestos.
- Semi-metals and heavy metals;
- Poly-cyclic aromatic hydrocarbons (PAHs);
- Speciated TPH including full aliphatic/aromatic split;
- Volatile/semi-volatile organic compounds – BTEX Used as marker compounds;
- Sulphates;
- Cyanide.

The list above does not imply that these determinands are present on-site or that they are likely to cause contamination issues at the site. The ground investigation will be used to prove the presence or absence of these contaminants. The sampling and testing strategy must be in line with current standards. Results should be assessed against suitable assessment criteria to be protective of human health as well as vegetation.

Sub-surface concrete may be damaged due to being in contact with aggressive ground conditions. Sampling should be undertaken where the proposed foundations will be in contact with Made Ground and/or natural ground and tested for aggressive ground conditions (sulphates/pH). Classification should then be undertaken of the ground conditions in accordance with Building Research Establishment Special Digest 1, 2005, 'Concrete in Aggressive Ground'.

6.7.2. Services

The CSM has identified a low/moderate risk for aggressive ground conditions that may affect water supply pipes as part of the development. Consideration should be given to the targeted sampling (0.75

– 1.50m bfgl) and scheduling for contaminants of concern: TPH, Naphthalene, Phenols, BTEX, VOCs and SVOCs.

6.7.3. Groundwater

If analytical results show elevated concentrations of contaminants of concern in the soil samples then there might be a requirement to assess the potential risks of leachability of contaminants migrating into the Secondary A Aquifer and Principal Aquifer groundwater underlying the site. This might mean leachate testing on soils samples is required or groundwater sampling and testing.

6.7.4. Ground-gas

The CSM has identified a low risk from ground gases at the site as a result of potential Made Ground on-site or within the site's environs. Analysis of soil samples should include Total Organic Carbon (TOC) testing in order to enable a pragmatic ground gas risk assessment to be undertaken at the site. This approach will only quantify the risk associated with on-site sources. Geotechnical Review

6.7.5. General

The BGS have identified the following natural hazards on-site and within a 50m buffer.

Natural Hazards	
Shrink-Swell Clay	Very Low hazard onsite.
Running Sands	Very Low hazard onsite.
Compressible Deposits	Negligible hazard onsite.
Collapsible Deposits	Very Low hazard onsite.
Landslides	Very Low hazard onsite.
Ground Dissolution of Soluble Rocks	Low hazard onsite.

Based on the above, it was considered that further investigation in the form of a chalk dissolution risk assessment is carried out for the site.

When designing foundations, the potential presence of aggressive ground conditions should be taken into consideration. Further investigation may be required in accordance with the guidance established in BRE Special Digest 1 (SD1) (2005) 'Concrete in aggressive ground'. The BGS do not record any details regarding the potential for aggressive ground conditions within shallow units identified at the site.

It is recommended that as part of the site-specific ground investigation on-site, geotechnical testing is undertaken to determine the underlying ground conditions and to evaluate any geotechnical related risks associated with the proposed redevelopment of the site.

The Groundsure datasheets have indicated that the superficial Head Deposits/Raised Beach Deposits is likely to have a low to high permeability and may be suitable for surface water disposal. The underlying chalk was recorded to have a very high permeability and therefore would be suitable for surface water disposal. These will be subject to on-site testing. The water discharge into chalk may worsen/create dissolution features and therefore soakaways should be remote from structures and undertaken in accordance with the current guidance.

6.7.6. Chalk Dissolution Risk Assessment

The presence of dissolution features on-site can prove problematic, as they often provide inconsistency within the underlying geology. Often formed during glacial and periglacial conditions,

the depth and width of these features can vary substantially, often providing inconsistency in geological strength data.

If a dissolution feature is suspected, a geotechnical engineer and structural engineer should be contacted for suitable engineering designs, based on further works identifying and classifying the area the feature occupies.

The Groundsure Geosight datasheets, presented Appendix E of this report, revealed the following information which may be pertinent to this risk assessment.

- Ground Dissolution of Soluble Rocks – The site was classified as a Low risk of ground dissolution of soluble rocks across the site. Low Risk was described as *“Soluble rocks are present within the ground. Some dissolution features may be present. Potential for difficult ground conditions are at a level where they may be considered, localised subsidence need not to be considered except in exceptional circumstances”*.
- An on-site Class A Historical Mining area was identified on-site. A Class A area was described as *“Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level, where they need not be considered”*. However, this is generally a precautionary statement attributed to all areas associated with chalk within the ground profile. Therefore, this does not identify any underground chalk features at the site location.
- 4No. on-site surface ground workings were identified comprising: sand pit (1896 – 1940) and a refuse heap (1969).
- 1No. BritPit was identified comprising 1x Westfield Sand Pit (sand).
- No records of Underground workings, Natural Cavities, Mining Cavities or JPB Mining Areas were noted within a 500m radius of the site.

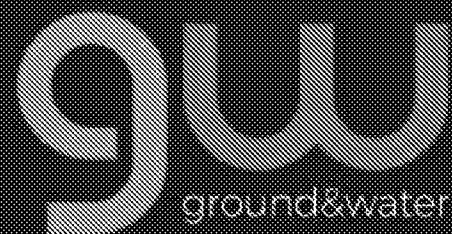
The historical mapping review undertaken in section 3.1 of this report confirmed the findings of the groundsure datasheets discussed above. A former sand pit was located across eastern portion of the site.

A review of the data available on www.lidarfinder.com showed no features of concern (e.g. potential infilled ground or potential indication for dissolution related features) on or in a close proximity to the site.

This risk assessment indicates that there is a low risk from the dissolution of soluble rocks at the site. Although no natural cavities have been identified within the chalk and the geology of the area is similar to the site, the presence of natural cavities in this area should not be discounted without further investigation.

This chalk dissolution risk assessment should be updated following site investigation works.

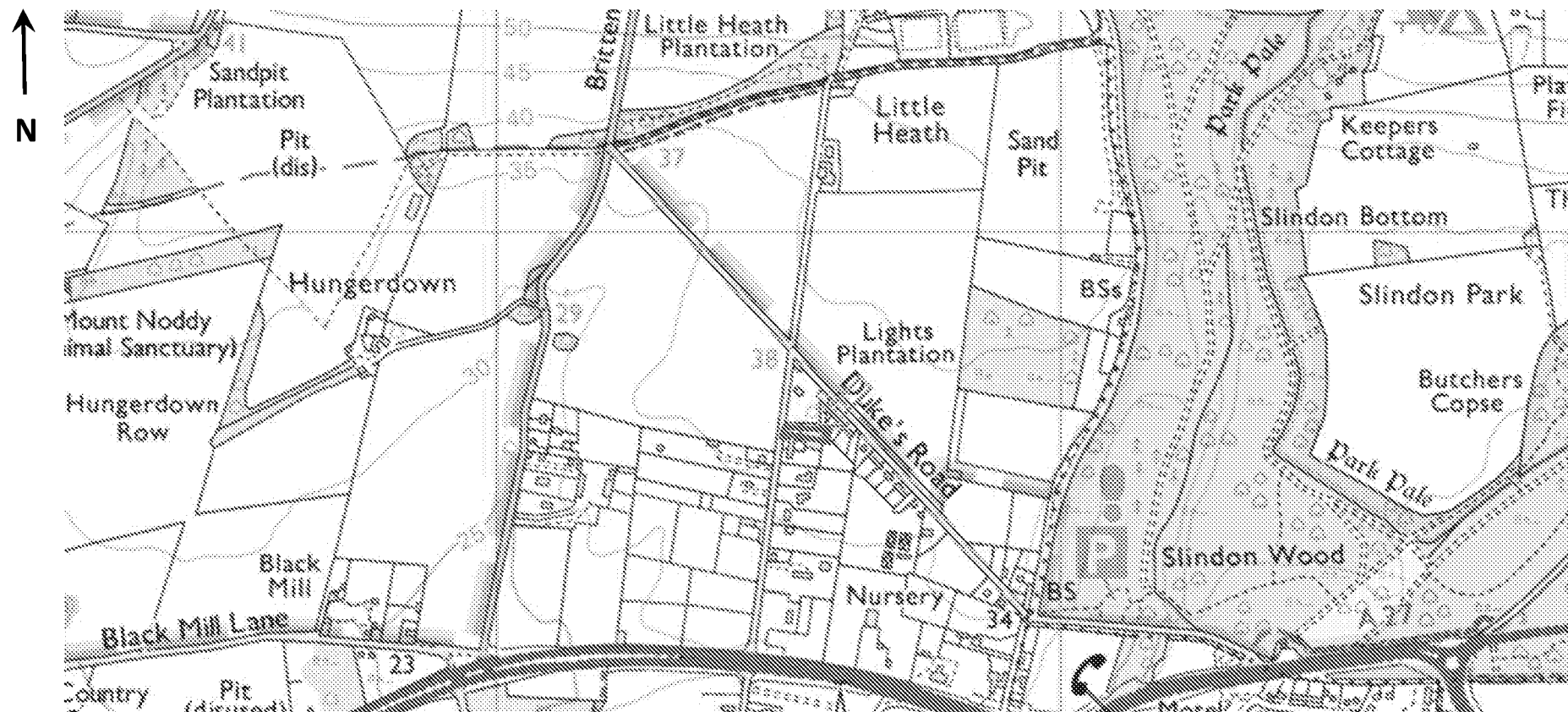
geotechnical and environmental consultants



FIGURES

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB

Registered Office: Kington House, 31 Horse Fairs, Bampton, Oxfordshire OX16 6AE. Registered in England No. 07632003



Approximate Site Boundary

NOT TO SCALE

Project:
Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR

Client:
Richard Brookes

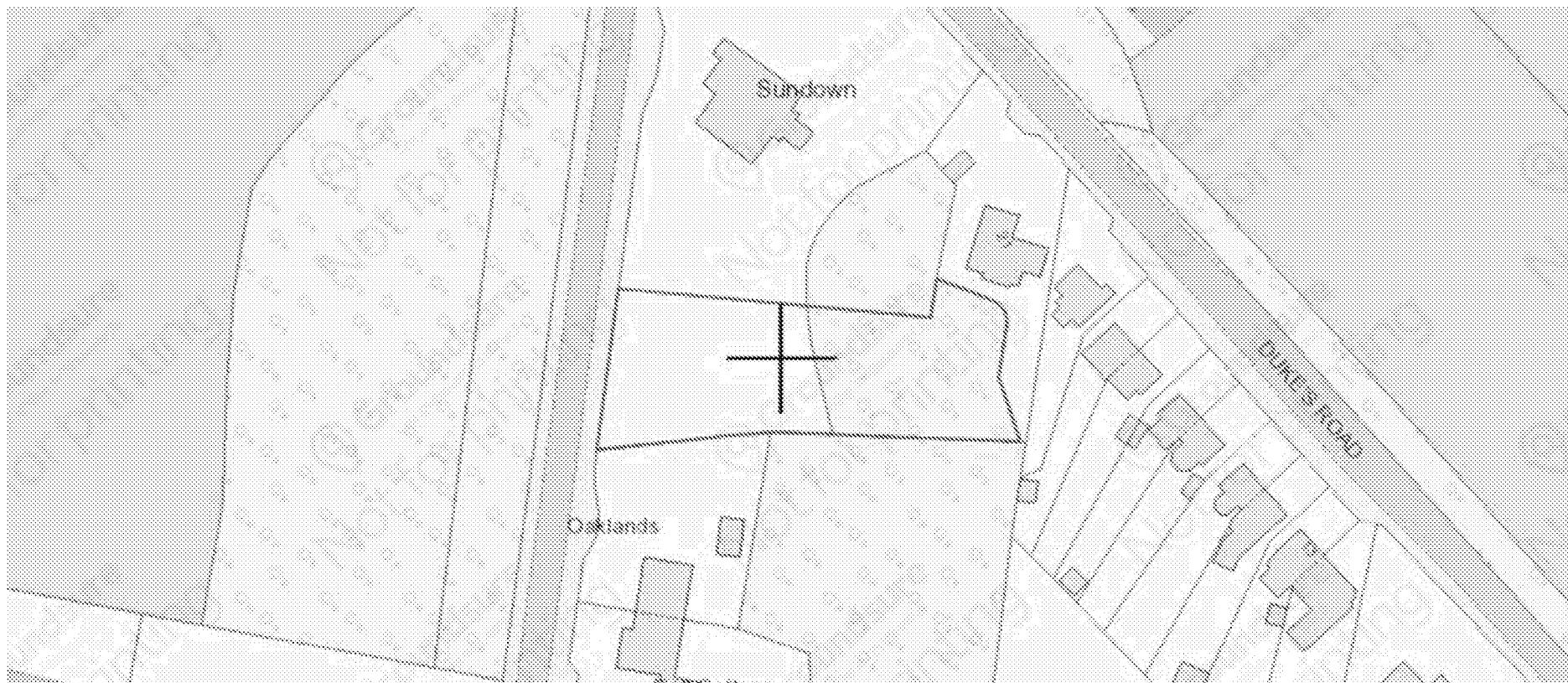
Date:
July 2021

Site Location Plan

Ref:
GWPR4206

Figure 1





Approximate Site Boundary



NOT TO SCALE

Project:

Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR

Client:

Richard Brookes

Date:

July 2021

Site Development Area

Ref:

GWPR4206

Figure 2





----- Approximate Site Boundary

NOT TO SCALE

Project:
Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR

Client:
Richard Brookes

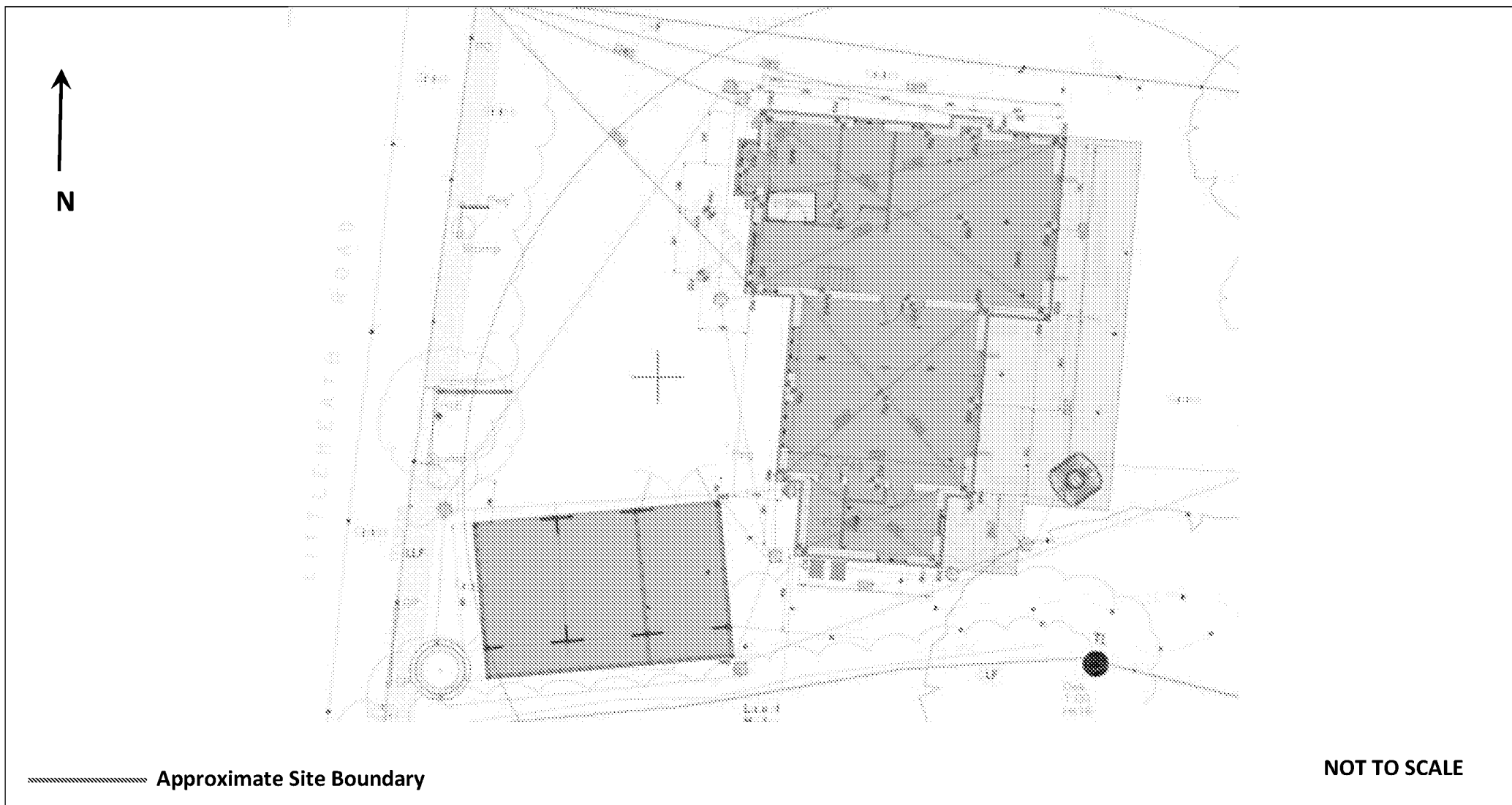
Date:
July 2021

Aerial View of Site

Ref:
GWPR4206

Figure 3





Project:
Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR

Client:
Richard Brookes

Date:
July 2021

Proposed Development – Plan View

Ref:
GWPR4206

Figure 4



SE

NW

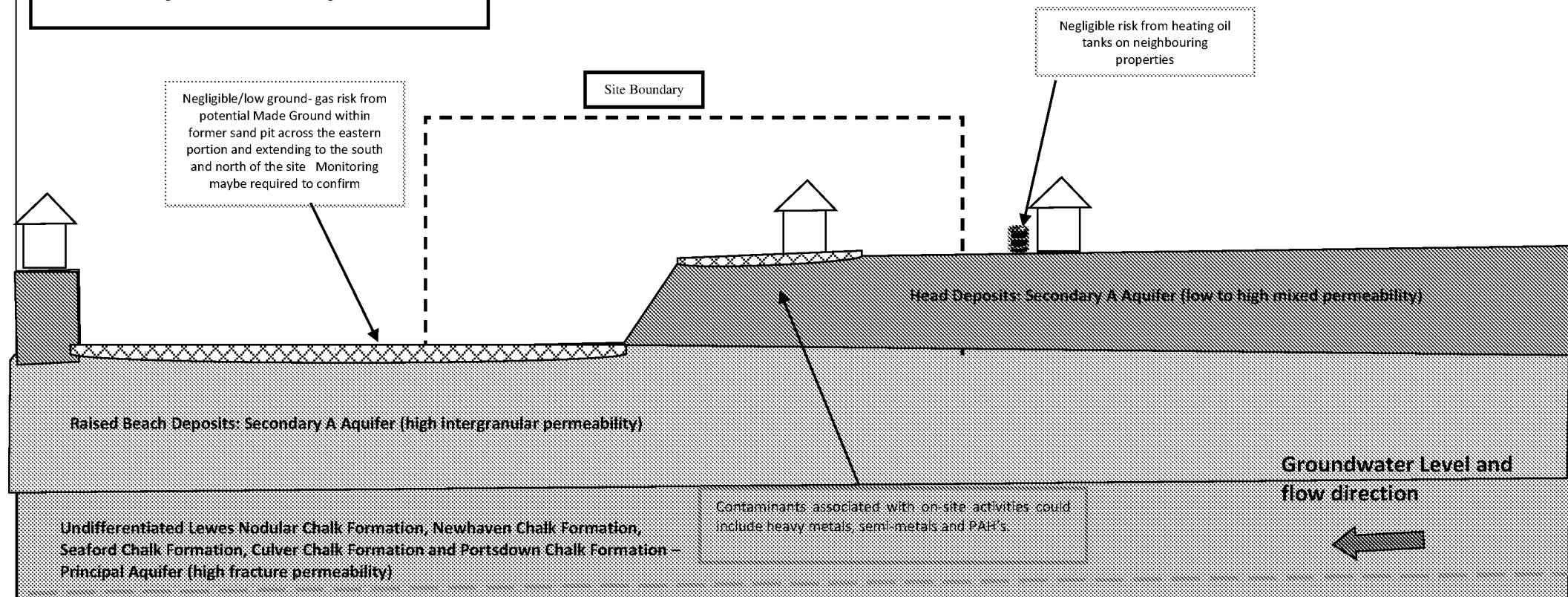
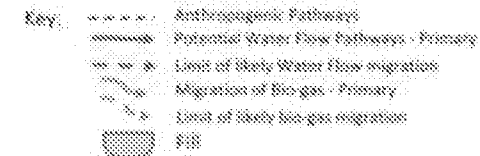
Exposure Scenarios for human health include

- Direct ingestion of soil and soil derived dust;
- Dermal contact of soil and soil derived dust;
- Ingestion of soil with elevated concentration of determinants;
- Dermal contact with impacted soils;
- Inhalation of impacted dust (indoors and outdoors) with elevated concentration of determinants;
- Inhalation of volatiles (indoors and outdoors).
- Consumption of home grown vegetables.
- Direct ingestion of soil attached to vegetables.

Head Deposits and Raised Beach Deposits –
Secondary A Aquifer

Undifferentiated Lewes Nodular Chalk
Formation, Newhaven Chalk Formation,
Seaford Chalk Formation, Culver Chalk
Formation and Portsdown Chalk Formation –
Principal Aquifer

Deep depth to groundwater
(>6m) within the Lower
Greensand Group and flow
direction to the south-east in
alignment with topography



Project:

Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR

Client:

Richard Brookes

Date:

July 2021

Diagrammatic Conceptual Site Model

Ref:

GWPR4206

Figure 5



APPENDIX A: Conditions and Limitations

The ground is a product of continuing natural and artificial processes. As a result, the ground will exhibit a variety of characteristics that vary from place to place across a site, and also with time. Whilst a ground investigation will mitigate to a greater or lesser degree against the resulting risk from variation, the risks cannot be eliminated.

The report has been prepared on the basis of information, data and materials which were available at the time of writing. Accordingly, any conclusions, opinions or judgements made in the report should not be regarded as definitive or relied upon to the exclusion of other information, opinions and judgements.

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief; as such these do not necessarily address all aspects of ground behaviour at the site. No liability is accepted for any reliance placed on it by others unless specifically agreed in writing.

Any decisions made by you, or by any organisation, agency or person who has read, received or been provided with information contained in the report ("you" or "the Recipient") are decisions of the Recipient and we will not make, or be deemed to make, any decisions on behalf of any Recipient. We will not be liable for the consequences of any such decisions.

Current regulations and good practice were used in the preparation of this report. An appropriately qualified person must review the recommendations given in this report at the time of preparation of the scheme design to ensure that any recommendations given remain valid in light of changes in regulation and practice, or additional information obtained regarding the site.

Any Recipient must take into account any other factors apart from the Report of which they and their experts and advisers are or should be aware. The information, data, conclusions, opinions and judgements set out in the report may relate to certain contexts and may not be suitable in other contexts. It is your responsibility to ensure that you do not use the information we provide in the wrong context.

This report is based on readily available geological records, the recorded physical investigation, the strata observed in the works, together with the results of completed site and laboratory tests. Whilst skill and care has been taken to interpret these conditions likely between or below investigation points, the possibility of other characteristics not revealed cannot be discounted, for which no liability can be accepted. The impact of our assessment on other aspects of the development required evaluation by other involved parties.

The opinions expressed cannot be absolute due to the limitations of time and resources within the context of the agreed brief and the possibility of unrecorded previous in ground activities. The ground

2 The Long Barn, Norton Farm, Selborne Road, Alton, Hampshire GU34 3NB

conditions have been sampled or monitored in recorded locations and tests for some of the more common chemicals generally expected. Other concentrations of types of chemicals may exist. It was not part of the scope of this report to comment on environment/contaminated land considerations.

The conclusions and recommendations relate at Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR

Trial hole is a generic term used to describe a method of direct investigation. The term trial pit, borehole or window sampler borehole implies the specific technique used to produce a trial hole.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation on a plot-by-plot basis prior to the construction of foundations. Where trees are mentioned in the text this means existing trees, recently removed trees (approximately 15 years to full recovery on cohesive soils) and those planned as part of the site landscaping.

Ownership of copyright of all printed material including reports, laboratory test results, trial pit and borehole log sheets, including drillers log sheets, remain with Ground and Water Limited. Licence is for the sole use of the client and may not be assigned, transferred or given to a third party.

Only our client may rely on this report and should this report or any information contained in it be provided to any third party we accept no responsibility to the third party for the contents of this report save to the extent expressly outlined by us in writing in a reliance letter addressed from us to the third party.

Recipients are not permitted to publish this report outside of their organisation without our express written consent.

APPENDIX B:

Site

Photographs

Photograph 1: View of the site entrance in the south-west corner from Littleheath Road



Photograph 2: View looking north along Littleheath Road on the western boundary of the site.



Project:

**Land to the south of Sundown,
Littleheath Road, Fontwell, West Sussex BN18 0SR**

Client:

Richard Brookes

Date:

July 2021

Plate 1:



Appendix B: Site Photographs

Ref:

GWPR4206

Photograph 3: View looking east along the southern boundary of the site



Photograph 4: View looking north-east across the western portion of the site from the south-west corner.



Project: Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR		Plate 2: 
Client: Richard Brookes	Date: July 2021	
Appendix B: Site Photographs	Ref: GWPR4206	

Photograph 5: View looking north from the southern boundary in the western half of the site.



Photograph 6: View looking north along the western boundary of the site showing tree root balls that have been removed.



Project: Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR		Plate 3: 
Client: Richard Brookes	Date: July 2021	
Appendix B: Site Photographs	Ref: GWPR4206	

Photograph 7: View looking north-east towards the northern boundary in the bottom of the depression in the eastern portion of the site.



Photograph 8: View across the eastern portion of the site looking north showing the depression extending beyond the northern boundary.



Project: Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR R		Plate 4: 
Client: Richard Brookes	Date: July 2021	
Appendix B: Site Photographs	Ref: GWPR4206	

Photograph 9: View looking south-east towards the southern boundary in the bottom of the depression in the eastern portion of the site



Photograph 10: View from the southern boundary looking south along the bottom of the depression that extends to the south.



Project: Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR		Plate 5: 
Client: Richard Brookes	Date: July 2021	
Appendix B: Site Photographs	Ref: GWPR4206	

Photograph 11: View of the western side of the depression crossing the centre of the site looking west.



Photograph 12: View of soils exposed in a trench in the base of the depression showing no Made Ground or infilling has taken place



Project: Land to the south of Sundown, Littleheath Road, Fontwell, West Sussex BN18 0SR		Plate 6: 
Client: Richard Brookes	Date: July 2021	
Appendix B: Site Photographs	Ref: GWPR4206	

Photograph 13: View of the heating oil tank adjacent to the property to the south of the site



Project:

**Land to the south of Sundown,
Littleheath Road, Fontwell, West Sussex BN18 0SR**

Client:

Richard Brookes

Date:

July 2021

Appendix B: Site Photographs

Ref:

GWPR4206

Plate 7:



APPENDIX C

BGS Radon

Report

Roger Foord
Ground and Water Limited
2 The Iond Barn
Norton farm
Selborne Road
Alton
GU34 3NB

Radon Report

Advisory report on the requirement for radon protective measures in new buildings, conversions and extensions to existing buildings. The report also indicates whether a site is located within a radon Affected Area

Report Id: *BGS_318602/24003*

Client reference: GWPR4206 Land to the South of Sundown,
Littleheath Road, Fontwell, West Sussex BN18 0SR

Search location



Contains OS data © Crown Copyright and database right 2021. OS OpenMap Local: Scale: 1:5 000 (1cm = 50 m)
Search location indicated in red

*This report describes a site located at National Grid Reference 494545, 107675.
Note that for sites of irregular shape, this point may lie outside the site boundary.
Where the client has submitted a site plan the assessment will be based on the area given.*

Radon Report: UK

When extensions are made to existing buildings in high radon areas, or new buildings are constructed in these areas, the Building Regulations for England, Wales, Scotland and Northern Ireland require that protective measures are taken against radon entering the building.

This report provides information on whether radon protective measures are required. Depending on the probability of buildings having high radon levels, the Regulations may require either:

1. No protective measures
2. Basic protective measures
3. Full protective measures

This is an advisory report on the requirement for radon protective measures in new buildings, conversions and extensions. The report also indicates whether a site is located within a radon Affected Area

Requirement for radon protective measures

The determination below follows advice in *BR211 Radon: Guidance on protective measures for new buildings (2015 edition)*, which also provides guidance on what to do if the result indicates that protective measures are required.

Is the property in an area where radon protective measures are required for new buildings or extensions to existing ones as described in publication BR211 (2015 edition) Radon: Guidance on protective measures for new buildings?

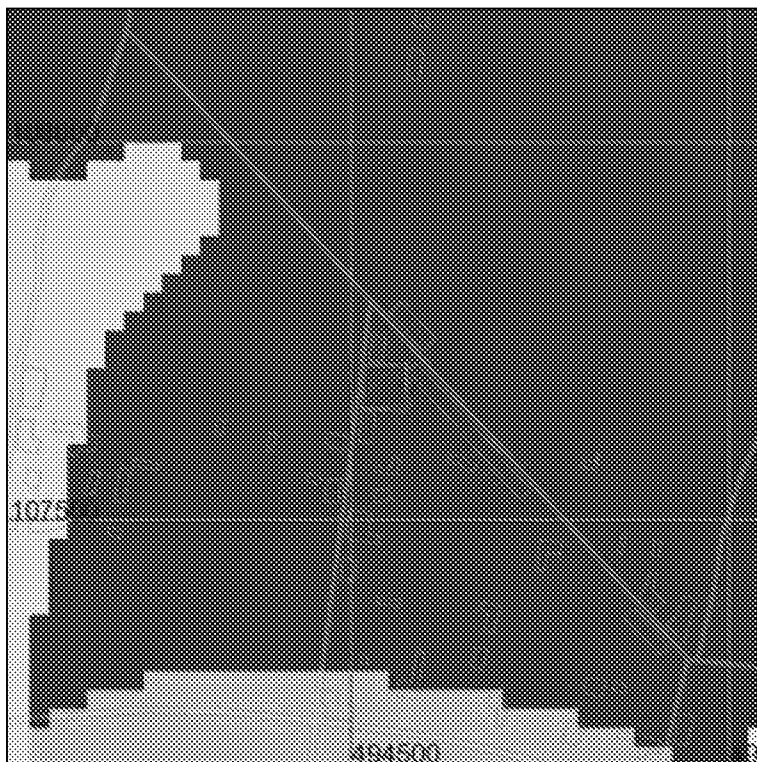
NO RADON PROTECTIVE MEASURES ARE REQUIRED FOR THE REPORT AREA.

More details of the protective measures required are available in *BR211 Radon: Guidance on protective measures for new buildings (2015 Edition)*. Additional information and guidance is available from the Building Research Establishment website (<http://www.bre.co.uk/radon/>).

Whether or not the radon level in a building is above or below the radon Action Level can only be established by having the building tested. The PHE provides a radon testing service which can be accessed at www.ukradon.org or by telephone [REDACTED]

If you require further information or guidance, you should contact your local authority building control officer or approved inspector.

Radon Affected Area



	% Homes estimated to be at or above the action level
	0-1%
	1-3%
	3-5%
	5-10%
	10-30%
	30-100%

Contains OS data © Crown Copyright and database right 2021
Scale: 1:10 000 (1cm = 100 m)
Search area indicated in red

Is the property in a radon Affected Area as defined by Public Health England (PHE) and if so what percentage of homes are estimated to be above the Action Level? NO

Additional Information

THE PROPERTY IS IN AN AREA WHERE LESS THAN 1% OF HOMES ARE ESTIMATED TO BE AT OR ABOVE THE ACTION LEVEL. THE PROPERTY IS NOT IN A RADON AFFECTED AREA.

PHE recommends a radon 'Action Level' of 200 Becquerels per cubic metre of air (Bq m^{-3}) for the annual average of the radon gas concentration in a home. Where 1% or more of homes are estimated to exceed the Action Level the area should be regarded as a radon Affected Area.

This report informs you whether the property is in a radon Affected Area and the percentage of homes that are estimated to be at or above the radon Action Level at this location. Being in an Affected Area does not necessarily mean there is a radon problem in the property; the only way to find out whether the radon level is above or below the Action Level is to carry out a radon measurement.

PHE advises that radon gas should be measured in all properties within radon Affected Areas and that homes with radon levels above the Action Level (200 Bq m^{-3}) should be remediated. Householders with levels between the Target Level (100 Bq m^{-3}) and Action Level should seriously consider reducing their radon level, especially if they are at greater risk, such as if they are current or ex smokers. Whether or not a home is in fact above or below the Action Level or Target Level can only be established by having the building tested. PHE provides a validated radon testing service which can be accessed at www.ukradon.org.

The information in this report provides an answer to one of the standard legal enquiries on house purchase in England and Wales, known as Law Society CON29 Enquiries of the Local Authority (2016); 3.14 Radon Gas: Do records indicate that the property is in a "Radon Affected Area" as identified by PHE. The data can also be used to advise house buyers and sellers in Scotland and Northern Ireland.

If you are buying a new build property in a Radon Affected Area, you should ask the builder whether radon protective measures were incorporated in the construction of the property.

If you are buying a currently occupied property in a radon Affected Area, you should ask the present owner whether radon levels have been measured in the property. If they have, ask whether the results were above the radon Action Level and if so, whether remedial measures were installed, radon levels were re-tested, and if the results of re-testing confirmed the effectiveness of the measures.

Further information on radon is available from PHE at www.ukradon.org.

What is radon?

Radon is a naturally occurring radioactive gas, which is produced by the radioactive decay of radium which, in turn, is derived from the radioactive decay of uranium. Uranium is found in small quantities in all soils and rocks, although the amount varies from place to place. Radon released from rocks and soils is quickly diluted in the atmosphere. Concentrations in the open air are normally very low and do not present a hazard. Radon that enters enclosed spaces such as some buildings (particularly basements), caves, mines, and tunnels may reach high concentrations in some circumstances. The construction method and degree of ventilation will influence radon levels in individual buildings. A person's exposure to radon will also vary according to how particular buildings and spaces are used.

Inhalation of the radioactive decay products of radon gas increases the chance of developing lung cancer. If individuals are exposed to high concentrations for significant periods of time, there may be cause for concern. In order to limit the risk to individuals, the Government has adopted an Action Level for radon in homes of 200 becquerels per cubic metre (Bq m^{-3}). The Government advises householders that, where the radon level exceeds the Action Level, measures should be taken to reduce the concentration.

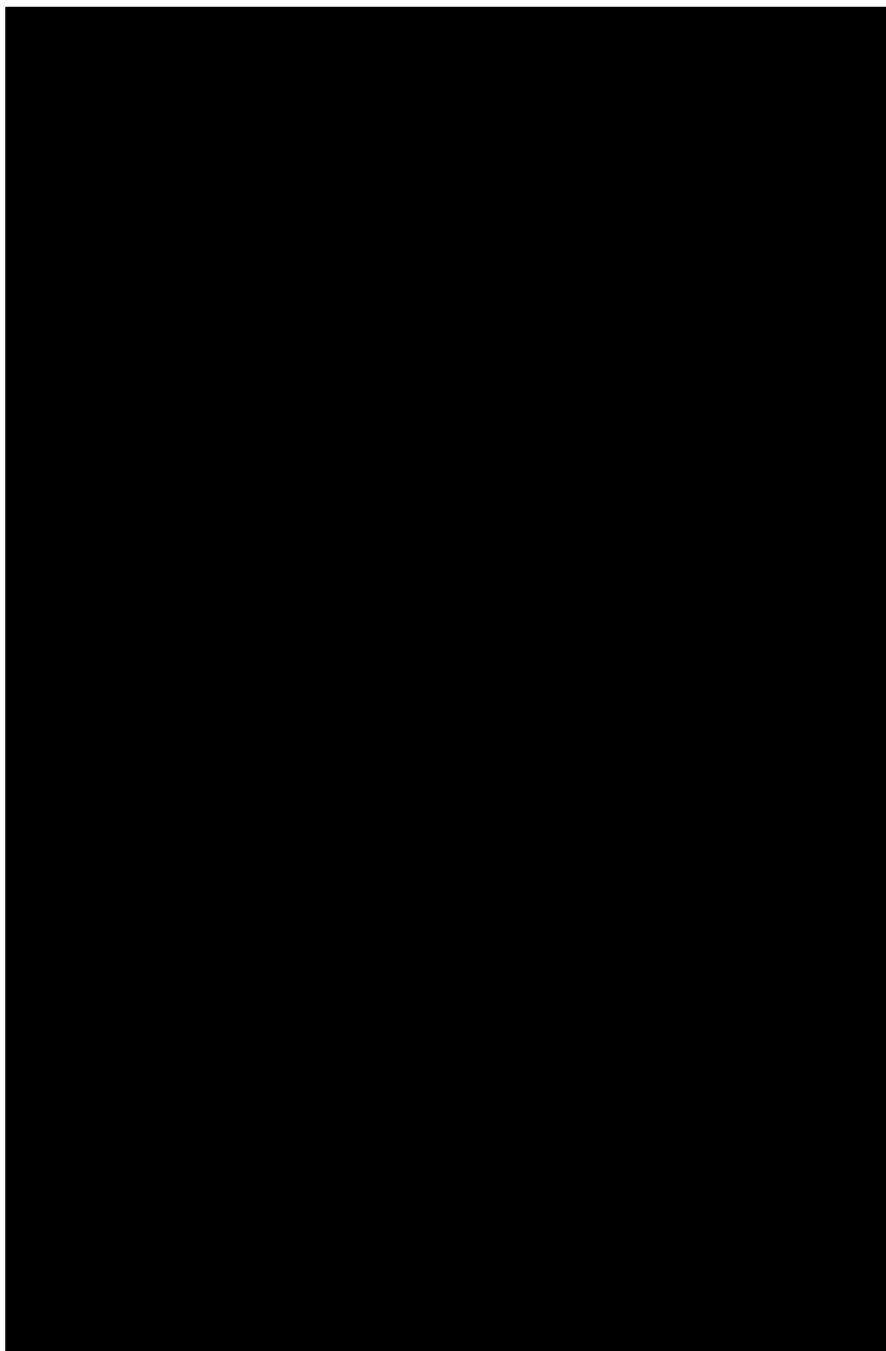
Radon in workplaces

The Ionising Radiation Regulations, 1999, require employers to take action when radon is present above a defined level in the workplace. Advice may be obtained from your local Health and Safety Executive Area Office or the Environmental Health Department of your local authority. The BRE publishes a guide (BR293): **Radon in the workplace.**

BRE publications may be obtained from the BRE Bookshop,

website: www.brebookshop.com

Contact Details



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BGS_318602/24003

Page: 8 of 8
BGS Report No: