

**Pound Place
Roundstone Lane
Angmering
West Sussex**

**Combined Geotechnical and
Ground Contamination Risk Assessment**

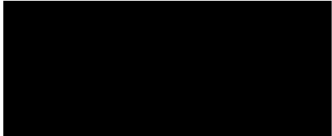
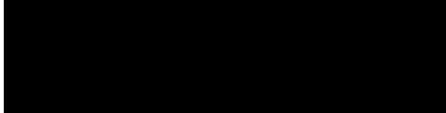
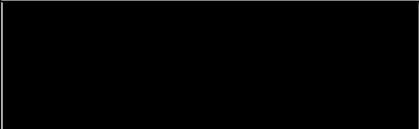
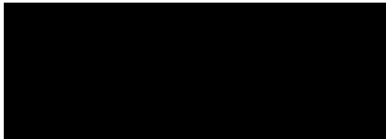


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The risk assessment presented in this report follows 'source-pathway-receptor' techniques for the determination of whether a site is contaminated. This is standard practice in the UK, being intrinsic to Part 2A of the Environmental Protection Act 1990 as amended.

The report considers the proposed end users as the most sensitive human health receptors. If significant risks to construction workers are identified by the preliminary assessment attention is drawn to this, although it is noted that no assessment of risk from acute exposure has been undertaken in this connection.

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

EXECUTIVE SUMMARY

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

It is proposed to demolish the existing buildings and develop a new two-storey care home with associated car parking and communal landscaping/garden areas on land off Roundstone Lane, Angmering, West Sussex.

The site is currently occupied by an existing two-storey residential property with associated outbuildings, parking and access, and established gardens.

The site comprised open fields with a cottage occupying the easternmost area at the time of the earliest historical map referenced in 1876. The site appears to have remained unchanged until the 1980's around which time the cottage was demolished and a new residential property, 'Pound Place', was developed which remains to the current day.

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

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

Following the ground investigation, no complete pollutant linkages have been identified to be present relating to either end users or controlled waters. No further assessment works in this regard are, therefore, considered to be required.

Precautions against shrinkage and heave for any new foundation system should assume a medium volume change potential for the fine-grained River Terrace Deposits and take into account current guidance such as that given by the Building Research Establishment (BRE) or the National House Builders Council (NHBC). The coarse-grained soils of the River Terrace Deposits are considered to be non-plastic and hence non-shrinkable.

Net allowable bearing capacities of 100kN/m² and 150kN/m² may be assumed for spread (pad or strip) foundations up to 1.0m across bearing within the fine-grained River Terrace Deposits of at least firm consistency and stiff consistency/medium dense relative density, respectively.

A DS-1 Design Sulfate Class and an AC-1 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground.

Whilst suspended floors are recommended, ground bearing floors may be employed subject to the criteria set out within this report having been met.

A design equilibrium CBR value of no greater than 2.5% should be assumed for the design of pavement bearing on the River Terrace Deposits or derived made ground soils. The subgrade is not likely to be susceptible to frost heave.

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The results of the infiltration tests indicate that the River Terrace Deposits possess good infiltration characteristics.

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1. INTRODUCTION

It is proposed to demolish the existing buildings and develop a new care home on land off Roundstone Lane, Angmering, West Sussex. The development proposals for the site are understood to comprise the construction of a new two-storey building providing sheltered accommodation, along with provision of car parking and communal landscaping/garden areas. A copy of the proposed development layout is presented in Appendix A.

Ashdown Site Investigation Limited was requested to provide an estimate for carrying out a combined geotechnical and ground contamination risk assessment of the site by Andrew Rimmington of ARC Engineers Ltd, 3 Cadman Court, Leeds, LS27 0RX. The scope of the works allowed for and the terms and conditions under which the works were to be undertaken were set out within the offer letter Q18-6994, dated 5th March 2018. The instruction to proceed was received from the client, Hallmark Care Homes, in an email dated 12 March 2018.

The objectives of the works were to:

- a) Establish the expected geology, hydrogeology and hydrology at the site;
- b) Ascertain the development history and current site use;
- c) Develop a preliminary conceptual model of the site identifying potential complete pollutant linkages relating to end users of the proposed development works, to controlled waters beneath and in the vicinity of the site, or to other off-site sensitive receptors, if identified;
- d) Investigate the shallow ground and groundwater conditions prevailing at the site;
- e) Provide advice to assist others in undertaking design of spread foundations, ground floors, road pavement and soakaways;
- f) Test for the presence of contaminants identified by the preliminary conceptual model; and
- g) Develop a quantitative conceptual model of the site, refining the preliminary model to identify any remaining pollutant linkages.

The preliminary conceptual model has been based on the findings of a walkover survey and reference to historical Ordnance Survey maps and published geological and environmental information obtained from various sources.

Copies of the historical maps and geo-environmental data referred to in this report are included in a separate volume¹.

¹ Geo-Environmental Data and Historical Maps (Ashdown Site Investigation Limited, Report Number R18-12844/map, dated March 2018).

2. WALKOVER SURVEY

The site comprises a roughly rectangular shaped plot of land located at Roundstone Lane, Angmering, Littlehampton, and is centred on the approximate Ordnance Survey national grid reference TQ 0751 0399. A site location plan and site plan are presented as Figure 1 and Figure 2, respectively. Photographs taken during the walkover survey are included in Appendix B.

The site is generally level and is bounded by Roundstone Lane to the west and new residential properties in all other directions.

The site currently contains a two-storey residential property along with associated outbuildings/garage within the eastern portion of the site. To the front (west) of the property lies a parking area, with connecting driveway providing access off Roundstone Lane. The remainder of the site comprises landscaped gardens with numerous mature trees and shrubs both within and around the perimeter of the site.

A plastic heating oil storage tank was noted on the northern boundary adjacent to the property. In the rear garden, a large water storage tank was observed, along with two sheds and a greenhouse.

3. ENVIRONMENTAL AND GEO-ENVIRONMENTAL DATA REVIEW

3.1 Geological and Hydrogeological Information

3.1.1 Expected Geology and Aquifer Designation

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

Table 1. Expected Strata and Aquifer Designation

Type	Stratum	Aquifer Designation
Superficial	River Terrace Deposits (undifferentiated)	Secondary A Aquifer
Bedrock	White Chalk Subgroup	Principal Aquifer

The River Terrace Deposits in this area were formerly denoted as the Brickearth and comprise brown sandy (fine) silt or clay largely originating from the solution weathering of the previously existing chalk. The material will have been reworked by water flow to produce some lateral variability in the grain size of the soil (sand and gravel) and can be expected to contain a variable content of flint.

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

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

3.1.2 Mining and Natural Ground Hazards

Table 2. Mining and Natural Ground Subsidence Hazards from Envirocheck Data

Section	Risk Assessment
Non-Coal Mining Areas of Great Britain	In an area that might not be affected by coal mining
Potential for Collapsible Ground Stability Hazards	Rare
Potential for Compressible Ground Stability Hazards	Low
Potential for Ground Dissolution Stability Hazards	No Hazard Identified
Potential for Landslide Ground Stability Hazards	Low
Potential for Running Sand Ground Stability Hazards	Very Low
Potential for Shrinking or Swelling Clay Ground Stability Hazards	Low

Screening of the site was also undertaken by Terra Firma for past underground mining hazards. The screening report is included in Appendix C.

Based on this initial screen the site is considered to be located within an area that has experienced past underground mining. The risk identified is generic to the underlying White Chalk Subgroup geology and is further discussed below.

Historically, chalk deposits were often mined locally. Most commonly historical mines characteristically comprise a narrow shaft with a number of chambers radiating from the base. These structures are colloquially known as “deneholes”, “chalk-wells” or “chalkangles”. The depth of the features reflects the depth to the underlying chalk bedrock. The shaft width was commonly in the order of 2m to 3m, widening out into galleries at depth. The chalk was extracted for soil improvement and was usually applied directly to fields though sometimes the chalk was processed, typically by burning in kilns where the chalk was used to produce quicklime (calcium oxide). Once they had reached their limits the mines were commonly capped. Various capping techniques were used; examples include the use of upturned trees or brick arching. Records pertaining to the distribution of these localised mines are incomplete, usually being limited to features marked as shafts or the occurrence of circular depressions on historic Ordnance Survey maps. In the field they are most likely to be visible as shallow depressions, if at all.

Site inspection and inspection of historical maps extending back in time to 1876 does not reveal the presence of any significant features at the site though, for reasons given above, their presence cannot be fully discounted.

It is therefore recommended that further searches and assessment is undertaken, such as the Terra Firma TerraSearch Assess report, and that all stripped formation levels should be inspected for evidence of historical backfilled shafts as a precaution.

Detailed assessment of the geotechnical characteristics of the soils encountered at the site is presented in Section 8 of this report.

3.1.3 Radon

Table 3. Radon

Section	Risk Assessment
Radon Affected Areas	The site is reported to be within an area where between 1% and 3% of properties are above the action level requiring radon gas protection measures to be installed in new buildings. However, no radon protective measures are reported by the British Geological Survey to be necessary in the construction of new dwellings.
Radon Protection Measures	No radon protection measures are reported by the British Geological Survey to be necessary in the construction of new dwellings or extensions.

3.1.4 Groundwater Source Protection Zones

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

3.1.5 Groundwater and Surface Water Abstraction Licences

The closest groundwater abstraction licence is recorded to lie 312m to the south west of the site. The abstraction is reported to be for horticultural use.

No surface water abstraction licences are indicated within 1km of the site.

3.1.6 Surface Water Features

The nearest recorded significant surface water feature is a drainage channel, located 163m to the east of the site.

The nearest available river quality information is for Black Ditch, located approximately 593m northwest, which was most recently (2000) assigned a River Quality Grade D.

3.1.7 Flooding

The site lies within an Environment Agency Flood Zone 1.

The site lies within an area where the British Geological Survey report the "Limited Potential for Groundwater Flooding to occur".

The GeoSmart Groundwater Flood Risk (GW5) Map (GeoSmart, 2017)² states that the risk of groundwater flooding at the site is 'negligible' over the majority of the site and 'low' in the north west of the site.

² GeoSmart Information Limited, 2017. National Groundwater Flood Risk Map (GW5)
Pound Place, Roundstone Lane, Angmering, West Sussex

Based on the susceptibility of the site to groundwater flooding, a groundwater flood risk assessment is not considered necessary for the site.

3.2 Agency & Hydrological Data

The data has been reviewed and none of the entries within this section are considered to pose a significant risk to the site.

3.3 Waste

The data has been reviewed and none of the entries within this section are considered to pose a significant risk to the site.

3.4 Hazardous Substance

The data has been reviewed and none of the entries within this section are considered to pose a significant risk to the site.

3.5 Industrial Land Use

The data has been reviewed and none of the entries within this section are considered to pose a significant risk to the site.

3.6 Sensitive Land Use

The South Downs (National Park) is recorded 227m north east of the site.

4. HISTORICAL MAP REVIEW

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

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

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

Table 4. *Summary of Significant Features Identified on Historical Maps*

Map Details	On-Site	In the Vicinity of the Site
1876 1:2,500	The site mainly comprises open fields, with a field boundary running east-west through the southern part of the site. A small cluster of buildings is shown at the eastern end of the site.	No significant features.
1897 1:2,500	The buildings in the east of the site are denoted as 'Pound Cottage'.	No significant features.
1971 1:2,500	No significant changes.	Nurseries are shown to the west of the site on the opposite side of Roundstone Lane.
1985 1:2,500	Pound Cottage is no longer shown and a new building appears in the eastern part of the site, with associated driveway off Roundstone Lane to the west, consistent with the current site layout.	No significant changes.
2018 1:10,000	No significant changes.	New residential development is shown immediately adjacent to the north, east and south of the site.

5. PRELIMINARY CONTAMINATION RISK ASSESSMENT

5.1 Introduction

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

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

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

Table 5. Risk Assessment Matrix

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

5.2 Basis of Assessment

The development is to comprise new residential buildings together with areas of communal soft landscaping where end users can expect to come into contact with the underlying soils, where soil derived dusts may be generated but where the growing of any significant volumes of fruit or vegetables would either not be permitted or would not be feasible.

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

It is noted that an asbestos survey of existing structures and infrastructure⁴ was beyond the brief of this report. The risk assessment has been undertaken on the basis that should asbestos be identified within buildings or infrastructure; these materials will be removed appropriately by licensed contractors and asbestos materials disposed of in accordance with legal requirements prior to demolition or other works in order to avoid contaminating soils at the site.

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

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

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

5.3 Potential Contamination Sources Identified

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

- Made ground associated with historically demolished buildings in the eastern part of the site.
- Domestic heating oil storage tank.

5.4 Preliminary Conceptual Model

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

6. GROUND INVESTIGATION

6.1 Introduction

The ground investigation comprised the excavation of a series of mechanically and hand dug trial pits and a series of dynamic sampler boreholes, together with accompanying in-situ geotechnical testing. The fieldwork was carried out on 16th March 2018. The exploratory hole locations are shown on Figure 2.

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

6.2 Exploratory Holes

6.2.1 Dynamic Sampler Boreholes

Five boreholes (designated WS01 to WS05) were drilled to depths of between 2.6m and 3.0m below ground level.

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

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

6.2.2 Trial Pits

Two trial pits (designated TP01 and TP02) were dug by mechanical excavator to respective depths of 2.8m and 3.0m below ground level. The pits were unsupported and were logged from the surface.

In addition, one trial pit (designated TP03) was dug using hand tools to a depth of 0.9m below ground level.

6.3 Sampling

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

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

6.4 In-situ Testing

The depths of in-situ testing, together with the test results, are either given on the exploratory hole records or are summarised separately in Appendix E. Notes providing additional information on the tests performed are included in the appendix.

6.4.1 DPSH Dynamic Probe (Super Heavy) Testing

Continuous dynamic probe tests were undertaken adjacent to each of the boreholes. The tests were conducted to depths of between 4.0m and 6.0m below ground level using a super heavy DPSH-B⁵ probing geometry.

The DPSH-B configuration is similar to that of the standard penetration test (SPT); the main differences being that the tip comprises a 90° cone, the driving rods are lighter than those used for SPT testing and the blow counts are recorded over 100mm increments rather than 300mm, as is the case for the SPT.

The blow counts recorded and the calculated dynamic point resistances, which account for inertia of the anvil and driving rods, are presented on the borehole records and separately in Appendix E.

6.4.2 Undrained Shear Strength

Undrained shear strength determinations were made in-situ within the fine-grained soils using a Geonor hand shear vane.

Additionally, undrained shear strength determinations were made within samples of the fine-grained soils held in the dynamic sampler liners using a hand penetrometer.

6.4.3 California Bearing Ratio Tests

Testing to determine the in-situ California Bearing Ratio (CBR) of soils was conducted at shallow depths adjacent to each of the exploratory holes using a Transport Research Laboratory (TRL) cone penetrometer.

6.4.4 Soakage Testing

Falling head soakage tests were undertaken in boreholes WS03 and WS04 with the holes at a depth of 3.0m. The tests were carried out in general accordance with Kent County Council guidance⁶. Falling head soakage tests were also undertaken on completing excavation of each trial pit. The tests were carried out in general accordance with BRE guidance⁷.

⁵ As defined by BS EN ISO 22476-2:2005.

⁶ The Soakaway Design Guide published by Kent County Council, 2000.

⁷ Section 3.2.3 of Building Research Establishment (BRE) Digest 365, 2016.

6.5 Laboratory Testing

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

6.5.1 Geotechnical Testing

Geotechnical testing was undertaken by Ashdown Site Investigation Ltd in accordance with the methods given in BS1377⁸. Chemical testing to enable classification of the chemical environment of soils in accordance with BRE SD1⁹ was undertaken by an external UKAS accredited laboratory. Notes to assist with the interpretation of the tests are contained within Appendix F.

6.5.2 Chemical Testing

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

⁸ BS1377:1990 Parts 1 to 8, Methods of test for soils for civil engineering purposes.

⁹ BRE Special Digest 1:2005 Concrete in Aggressive Ground.

7. GROUND CONDITIONS

7.1 Stratigraphy

7.1.1 *Surface Covering*

Each of the exploratory holes was excavated through a surface cover of topsoil some 50mm to 350mm in thickness.

7.1.2 *Made Ground*

Made ground, generally comprising gravelly clay, was locally recorded to depths of between 0.35m and 0.45m below ground level within exploratory holes WS01, WS03 and WS05. The gravel fraction comprised variable quantities of flint, chalk, brick and charcoal/clinker-type material.

7.1.3 *River Terrace Deposits*

Underlying the made ground/surfacing, the investigation progressed into undisturbed firm to very stiff, locally slightly gravelly, clay deposits persisting to depths of between 1.10m and 2.00m. These clay deposits were in turn found to be underlain by stiff to very stiff, very gravelly clay or medium dense clayey fine to coarse gravel. Borehole WS02 was terminated at a depth of 2.6m due to the dense nature of the strata.

These soils, which were proven to the full depth of the investigation of 3.0m below ground level, are considered to represent the River Terrace deposits indicated on the published geological map.

It is noted that below the borehole termination depths, the dynamic probe tests generally indicated a significant increase in blow count, which may be indicative of the presence of underlying White Chalk Subgroup deposits.

7.2 Stability

Instability was recorded locally within the coarse-grained soils.

7.3 Groundwater Conditions

Groundwater was not encountered during the short period of the intrusive investigation.

8. GEOTECHNICAL ASSESSMENT

The geotechnical assessment has been prepared in connection with the development proposals shown on the drawing produced by Buckle Chamberlain Partnership Ltd, reference 1388/sk-014, dated February 2018. A copy of the proposed development layout is presented in Appendix A.

In summary the proposed development comprises the construction of a new two-storey building providing residential accommodation, along with provision of car parking and communal landscaping/garden areas.

At the time of writing, no details were available concerning the specific loads likely to be applied to the foundations.

8.1 Spread Foundations

8.1.1 Soil Shrinkage/Heave Potential

The fine-grained soils of the River Terrace Deposits have been classified as clays of intermediate to high plasticity and with modified plasticity indices in the range of 8% to 23% the soils may be expected to exhibit a non-plastic through to medium volume change potential. The undisturbed coarse-grained soils of the River Terrace Deposits may be considered to be non-plastic and hence non-shrinkable.

It is recommended that the design of precautions against shrinkage and heave for any new foundation system (spread footings and ground beams etc.) should assume a medium volume change potential for the fine-grained River Terrace Deposits soils and take into account current guidance such as that given by the Building Research Establishment (BRE)¹⁰ or the National House Builders Council (NHBC)¹¹.

Whilst this report has been prepared to provide advice to assist designers in undertaking detailed design, the report itself does not represent a detailed design statement. It is recommended that an arboricultural survey of the site should be conducted to establish the species and maturity of the existing trees in the areas of the proposed new buildings. The survey should be extended to include a review of historical photographs and detailed site plans (if available) to establish the species and location of any felled trees that may affect foundation design. The information obtained from the arboricultural survey, information on proposed planting schemes and the findings of this report should be provided to the structural engineer responsible for the detailed design of foundation systems, including assessment of minimum founding depths for spread foundations and requirements for placement of void formers et cetera.

8.1.2 Foundation Depths for Spread Foundations

Foundations should be constructed so as to bear below soils that are likely to be affected by significant soil volume changes caused by seasonal changes in moisture content in order to avoid damage to foundations that could otherwise arise. In addition, all made ground and any soils disturbed by the construction or removal of any previously existing foundations or services should be regarded as being variable in nature and state of compaction and, as such, unsuitable

¹⁰ www.bre.co.uk : BRE Digests 40, 241 and 242, Low rise buildings on shrinkable clay soils, parts 1, 2 and 3; and BRE Digest 298, The influence of trees on house foundations in clay soils and BRE Digest 412, Desiccation in clay soils.

¹¹ <http://www.nhbc.co.uk/> : NHBC Standards, Chapter 4.2.

as a founding medium for shallow footings. New footings should be constructed so as to bear below made ground/disturbed natural soils and soil subject to seasonal soil volume changes, whichever is the deeper, and onto undisturbed, competent, natural deposits.

Summary guidance on suitable minimum foundation depths to protect against the effects of seasonal soil volume changes is presented in the table below but designers undertaking detailed design of foundations should follow the detailed guidance provided within Chapter 4.2 of the NHBC Standards.

Table 6. Indicative Minimum Foundation Depths

Tree Type	Water Demand of Tree	Tree Distance to Tree Height Ratio (D/H)									
		0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.25
		Minimum Foundation Depth Required in Medium Volume Change Potential Soils (m)									
Broad Leaf	High	†			2.50	2.35	2.20	2.00	1.70	1.35	0.90*
	Moderate	2.00	1.85	1.70	1.60	1.45	1.30	1.15	0.90*	0.90*	0.90*
	Low	1.50	1.40	1.30	1.15	1.05	0.90*	0.90*	0.90*	0.90*	0.90*
Coniferous	High	†		2.30	1.95	1.60	1.25	0.90*	0.90*	0.90*	0.90*
	Moderate	2.00	1.70	1.40	1.10	0.90*	0.90*	0.90	0.90*	0.90*	0.90*

* Minimum foundation depth required to protect against soil volume changes.

† Foundations deeper than 2.50m require specialist design to protect against soil volume changes.

Details on the water demand and mature height of common trees is given within Table 3 of Chapter 4.2 of the NHBC standards which should be referred to when assessing minimum foundation depths required for the proposed development. A summary is provided in the table below.

Table 7. Indicative Summary of Water Demand and Mature Height of Common Trees

Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
Broad Leaf	Elm	18 – 24*	Acacia	18	Birch	14
	Oak	16 – 24*	Alder	18	Elder	10
	Poplar	15 – 28*	Apple	10	Fig	8
	Willow	16 – 24*	Ash	11 – 23*	Hazel	8
	Eucalyptus	18	Laurel	10	Holly	12
	Hawthorn	10	Beech	20	Honey Locust	14
			Blackthorn	8	Hornbeam	17
			Cherry	8 – 17*	Laburnum	12
			Chestnut	20 – 24*	Magnolia	9
			Lime	22	Mulberry	9
			Maple	8 – 18*	Tulip Tree	20
			Pear	12		
			Plane	26		
			Plum	10		

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Tree Type	High Water Demand		Moderate Water Demand		Low Water Demand	
	Tree	Height (m)	Tree	Height (m)	Tree	Height (m)
			Sycamore	22		
			Tree of Heaven	20		
			Walnut	18		
			Whitebeam	12		
Coniferous	Cypress	18 – 20*	Cedar	20		
			Douglas Fir	20		
			Larch	20		
			Monkey Puzzle	18		
			Pine	20		
			Spruce	18		
			Wellingtonia	30		
			Yew	12		

* Dependent on particular species.

8.1.3 Bearing Capacity for Spread Foundations

For design purposes, net allowable bearing capacities of 100kN/m² and 150kN/m² may be assumed for spread (pad or strip) foundations up to 1.0m across bearing within the fine-grained River Terrace Deposits of at least firm consistency and stiff consistency/medium dense relative density, respectively. The quoted bearing capacities are expected to limit settlement to less than 25mm.

Attention is drawn to the presence of interbedded fine-grained soils and coarse-grained soils beneath the site. As there is the potential for mixed soil conditions to be present beneath footings, designers should consider the need for foundations to be reinforced due to the potential for differential cracking to develop as a result of coarse-grained and fine-grained soils settling at different rates under loading.

8.2 Groundwater

Groundwater was not encountered during the short duration that the boreholes remained open. However, it is possible that heavy precipitation during construction could lead to the ingress of perched groundwater or surface water run-off into excavations. In such circumstances it would be expected that water entering into excavations would be adequately managed by pumping from sumps or natural drainage.

8.3 Stability of Excavations

All made ground or coarse-grained natural soils exposed in excavations should be assumed to be unstable, even in the short term. Whilst fine-grained natural soils may remain stable for a short period of time if not subjected to surcharge loads (such as may be imposed by existing foundations, traffic or storage of materials), the stability of these deposits if left unsupported should be assumed to have the potential to deteriorate. Where stable excavations are required,

excavations should either be suitably supported or side slopes should be battered back to a safe angle of repose.

All excavations requiring human entry must be shored or battered as necessary to conform to current best practice, as accepted by the Health and Safety Executive (HSE)¹². Current legislation requires that where personnel access is required into any excavation a competent person must inspect excavation supports or battering of slopes at the start of the working shift and at other specified times. No work should take place until the excavation is safe. Excavations should also be inspected after any event that may have affected their stability, such as a significant weather event, changes in surcharge loadings imposed by temporary storage of materials or changes in site traffic plans or alteration of support systems. Inspections should be formally recorded and any faults that are found should be corrected immediately.

Particular attention must be paid to ensuring the stability of nearby structures and services.

8.4 Aggressivity to Concrete

The aggressivity of the soils to concrete has been assessed in accordance with guidance published by the BRE¹³.

In consideration of the soils encountered beneath the site it is considered that 'natural ground conditions' may be assumed for the purpose of assessing the aggressivity of the chemical environment for concrete classification (ACEC class). In the absence of long term groundwater monitoring and given the good infiltration rates recorded in the natural soils, 'mobile groundwater' conditions should be conservatively assumed.

Assessment of the chemical analysis of the soil indicates a sulphate content falling into Design Sulfate Class DS-1 of Table C1. The results of the pH tests indicate that the underlying soils are acidic to neutral.

In accordance with the digest, a DS-1 Design Sulfate Class and an AC-1 ACEC classification should be assumed as a minimum for the design of concrete in contact with the ground.

8.5 Ground Floors

In view of the presence of soils of up to medium volume change potential underlying the site, it is recommended that ground floors should be suspended.

Current guidance¹⁴ suggests that ground bearing floor slabs may, however, be considered where made ground soils are not present or are to be removed from beneath building footprints and the depth of foundations required to protect against seasonal soil volume changes close to trees is less than 1.5m. In such circumstances further works should be undertaken to demonstrate, that close to the time of construction, no significant soil desiccation is present. If ground bearing floors are adopted it is recommended that the potential for differential movement, both between the floor slab and walls and across the floor slab itself, should be anticipated. Such floors should be fully debonded from walls. Formations should be adequately proof rolled and any excessively soft materials excavated and replaced with a suitable, well graded granular fill. The depth of any

¹² Relevant guidance is given on the HSE website, www.hse.gov.uk

¹³ BRE Special Digest 1:2005 Concrete in Aggressive Ground.

¹⁴ <http://www.nhbc.co.uk/> : NHBC Standards, Chapter 4.2.

fill should be limited to a maximum of 600mm unless placed to an engineering specification designed to limit internal settlement of the fill materials to a tolerance to be advised by the designer.

The detailing of services through, or under, ground-bearing floors should incorporate flexible connections and, where appropriate, enhanced falls.

8.6 Pavement Design

Cone penetrometer tests undertaken to establish the California bearing ratio (CBR) of the in-situ soils indicated CBR values ranging between 1% and 24% but typically in the range 1% to 10% in the underlying River Terrace Deposits at the time of the investigation. It is noted that CBR values are, in part, dependent on the moisture content of the tested soils and are consequently subject to seasonal variation.

Equilibrium CBR values¹⁵ are derived from knowledge of soil classification data (plasticity index for soils exhibiting cohesion (clay type) and particle size distribution for granular soils), the location of the water table, pavement thickness, and weather conditions at the time of construction. This guidance document suggests a design equilibrium CBR value of 2.5% to 5% would be applicable to the natural soils for the construction of thin (300mm) pavement under poor to average construction conditions and assuming a low (lower than 1m below formation level) groundwater table.

Based upon review of the in-situ test results and the quoted guidance it is recommended that, for the River Terrace Deposits or derived made ground soils, a CBR value of no greater than 2.5% should be adopted for preliminary pavement design.

All formations should be proof rolled and any excessively large, soft, degradable or otherwise unsuitable materials thus identified should be removed and be replaced with well compacted coarse-grained fill. Prepared subgrades should be protected from severe adverse weather by ensuring they are graded to falls to prevent ponding, and they should be reasonably protected from trafficking during construction.

The subgrade may be assumed not to be susceptible to frost heave.

8.7 Stormwater Infiltration Systems

In-situ infiltration testing¹⁶ was carried out in each of the trial pits. From the test results, calculations were made to determine the infiltration rate that could be expected for infiltration systems constructed into the underlying River Terrace Deposits.

For each test the soil infiltration rate (f) was calculated by dividing the volume of water lost between 75% and 25% of the initial test depth by the sum of the average surface area of the sides of the trial pit in contact with the water during the test monitoring period, and its base area. This figure was then divided by the test duration (time taken for the water level to fall between 75% and 25% of the initial test depth) to give the soil infiltration rate in metres per second.

¹⁵ Transport Research Laboratory (TRL) Report LR1132, Structural design of Bituminous Roads.

¹⁶ Conducted in general accordance with the requirements of BRE 365, Soakaway Design.

In-situ infiltration testing¹⁷ was also undertaken in boreholes WS03 and WS04. During each of these tests, some 25 litres of water was introduced into the boreholes (up to 3 times) which drained away immediately and therefore the infiltration rate has been conservatively calculated by dividing the volume of water introduced into the boreholes by the area of the exposed (uncased) test section by the time taken to introduce the water (some 30 seconds).

The infiltration rates derived from the tests are summarised in the following table.

Table 8. Calculated Infiltration Rates

Exploratory Hole	Test Response Zone Depth (m)		Stratum	Infiltration Rate (f) (m/sec)	Driving Head of Water (m)
	Top	Bottom			
TP01 Test 1	1.90	2.80	River Terrace Deposits	5.9×10^{-3}	-
TP01 Test 2	1.10	2.80	River Terrace Deposits	4.5×10^{-3}	-
TP01 Test 3	0.96	2.80	River Terrace Deposits	2.6×10^{-3}	-
TP02 Test 1	0.95	3.00	River Terrace Deposits	2.4×10^{-3}	-
TP02 Test 2	0.85	3.00	River Terrace Deposits	1.5×10^{-3}	-
TP02 Test 3	0.87	3.00	River Terrace Deposits	1.5×10^{-3}	-
TP03 Test 1	0.50	0.90	River Terrace Deposits	5.6×10^{-3}	-
TP03 Test 2	0.54	0.90	River Terrace Deposits	6.8×10^{-3}	-
TP03 Test 3	0.51	0.90	River Terrace Deposits	2.0×10^{-3}	-
WS03	2.00	3.00	River Terrace Deposits	2.0×10^{-3}	-
WS04	2.00	3.00	River Terrace Deposits	2.0×10^{-3}	-

The value 'f' is equivalent to the soil infiltration coefficient 'q' quoted in the Construction Industry Research and Information Association (CIRIA) Report 156.

The results from the infiltration tests indicate that the River Terrace Deposits possess good infiltration characteristics. The results from the infiltration tests should be provided to engineers responsible for the design of the drainage system.

To minimise the risk of subsidence, and in consideration of the likely proximity of the underlying chalk deposits, point discharging infiltration systems (conventional ring or trench soakaways) should be constructed a minimum of 10.0m away from proposed or existing buildings.

In the event that discharge to ground via infiltration systems is proposed, it is recommended that designers of the system provide for the prevention of pollution of groundwater. In this regard attention is drawn to guidance provided within BRE 365 and by the Environment Agency which requires a contamination risk assessment to be carried out in order to assess the potential risk to groundwater. In this connection attention is drawn to the contamination risk assessment provided within Section 9 of this report, which indicates that the soils at the site are unlikely to pose a risk to groundwater. Appropriate consideration should, however, be given to whether there is a need for inclusion of interceptors and oil separators. The Local Authority and/or relevant water company should be consulted in relation to consent for discharge of water from rooftops, areas of hardstanding and roadways to drains.

¹⁷ Conducted in accordance with The Soakaway Design Guide, published by Kent County Council, July 2000.

9. QUANTITATIVE CONTAMINATION ASSESSMENT

9.1 Assessment Strategy

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

Table 9. Investigation Works Carried Out

Contaminant source	Exploratory Positions
Made ground soils	Potentially all locations, though more likely to be present in WS03 to WS05 and TP03 in the east of the site.
Heating oil tank	WS02

The investigation recorded localised made ground to be present at some of the intrusive positions. Three samples of the made ground and two of the shallow topsoil recorded elsewhere were tested for heavy metals, PAH compounds and asbestos as identified in the preliminary conceptual model. Samples from throughout borehole WS02 were tested for petroleum hydrocarbons to assess the risk posed by the heating oil tank.

9.2 Analysis of Contamination Test Results

For comparison purposes the laboratory test results have been compared with the published 'Suitable For Use Levels' (S4ULs) calculated as a joint project between LQM and CIEH¹⁸. In lieu of an S4UL screening value for lead, the Category 4 Screening Level (C4SL) was used, as published within SP1010¹⁹. Collectively these are referred to as soil screening values (SSV).

Initial comparison has been made with SSV calculated for a generic "Residential" land use²⁰. The critical receptor for this land use is considered to be a young female child resident on site from birth to age 6. Exposure routes that are considered include the potential for direct ingestion of the soil, the outdoor and indoor ingestion of dust, the potential inhalation of dust and vapours, ingestion of site grown vegetables and ingestion of soil attached to vegetables.

It is noted that these SSV are highly conservative given the age of the receptors, proposed land use and absence of pathways.

9.3 Heavy Metals

The following table summarises the soil screening values along with the maximum and minimum concentrations of the heavy metals tested for.

¹⁸ The LQM/CIEH Suitable 4 Use Levels, 2015.

¹⁹ SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report, published by DEFRA, 2014.

²⁰ As defined within Science Report SC050021/SR3, January 2009, with the amendments discussed in the LQM/CIEH report.

Table 10. Summary of Test Results for Heavy Metals

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	No of exceedances
Arsenic	37	5	7	9	<2	0
Water Soluble Boron	290	5	<1	<1	<1	0
Cadmium	11	5	<0.2	0.2	<0.2	0
Chromium	910	5	15	20	<2	0
Hexavalent Chromium	6	5	<2	<1	<2	0
Copper	2400	5	11	19	<4	0
Lead	200	5	20	52	<3	0
Mercury	40	5	<1	<1	<1	0
Nickel	180	5	10	14	<3	0
Selenium	250	5	<3	<3	<3	0
Zinc	3700	5	41	101	<3	0

None of the sample tested recorded concentrations of heavy metals above their respective SSV. There is not considered to be an unacceptable risk to end users of the site from heavy metal contamination within the shallow made ground or topsoil.

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

9.4 Asbestos

Four samples of the made ground were screened for the presence of asbestos. None of the samples recorded the presence of any asbestos materials.

Furthermore, no suspected asbestos materials were noted within any of the exploratory holes undertaken at the site.

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

9.5 Organic Contaminants

9.5.1 Polycyclic Aromatic Hydrocarbon (PAH) Compounds

The following table summarises the soil screening values, maximum and minimum concentrations for the PAH compounds tested for.

Table 11. Summary of Test Results for PAH Compounds

Contaminant	SSV (mg/kg)	No. of Samples	Minimum Concentration (mg/kg)	Maximum concentration (mg/kg)	Limit of Detection (mg/kg)	No of exceedances
Naphthalene	2.3	5	<0.1	<0.1	<0.1	0
Acenaphthylene	170	5	<0.1	<0.1	<0.1	0
Acenaphthene	210	5	<0.1	<0.1	<0.1	0
Fluorene	170	5	<0.1	<0.1	<0.1	0
Phenanthrene	95	5	<0.1	<0.1	<0.1	0
Anthracene	2400	5	<0.1	<0.1	<0.1	0
Fluoranthene	280	5	<0.1	0.15	<0.1	0
Pyrene	620	5	<0.1	0.15	<0.1	0
Benz(a)anthracene	7.2	5	<0.1	<0.1	<0.1	0
Chrysene	15	5	<0.1	<0.1	<0.1	0
Benzo(b)fluoranthene	2.6	5	<0.1	<0.1	<0.1	0
Benzo(k)fluoranthene	77	5	<0.1	<0.1	<0.1	0
Benzo(a)pyrene	2.2	5	<0.1	<0.1	<0.1	0
Indeno(123-cd)pyrene	27	5	<0.1	<0.1	<0.1	0
Dibenz(ah)anthracene	0.24	5	<0.1	<0.1	<0.1	0
Benzo(ghi)perylene	320	5	<0.1	<0.1	<0.1	0

None of the sample tested recorded concentrations of individual PAH compounds above their respective SSV. There is not considered to be an unacceptable risk to end users of the site from PAH compounds contamination within the shallow made ground or topsoil.

At the very low concentrations recorded, PAH compounds would not be expected to exhibit any significant mobility and are not considered to pose an unacceptable risk to controlled waters beneath the site.

9.5.2 Petroleum Hydrocarbons

None of the samples from borehole WS02 recorded concentrations of petroleum hydrocarbons above the limit of detection of the test.

9.6 Quantitative Contamination Risk Assessment

The investigation has not identified any sources of contamination which may be considered to pose a risk to future site users.

9.6.1 Quantitative Conceptual Model

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

9.7 Risks to Other Potential Receptors

The following general guidance is given with regard to other potential on site receptors, which may not necessarily be statutory drivers for remedial works.

As a minimum and in accordance with industry best practice all ground-workers should be issued with the appropriate PPE and should be instructed in safe working methods.

As a precautionary measure, instructions should be given in the recognition of potentially hazardous materials, including oily and odorous soil and water and discoloured or fibrous substances. Any oil-like substances contacting the skin must be washed off immediately using an appropriate cleanser. Operatives should be warned to avoid contact between hands and mouth before washing. The consumption of food and smoking must be confined to designated clean areas. Suitable welfare (washing) facilities should be provided. These precautions should be taken in addition to anything highlighted by a site-specific risk assessment which should be undertaken by any contractor prior to commencing work.

All site personnel should be appropriately briefed on what actions to take in the event that evidence of significant contamination is identified or suspected.

9.8 Discovery Strategy

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

- All works in that area should cease and the site manager should be informed.
- Advice should be sought from suitably qualified and experienced personnel as to whether any further site inspection, sampling, testing and/or assessment is deemed necessary.
- If required, the conclusions of any assessment and any proposed remedial works (if required) should be agreed by the local authority.
- If necessary, full details of any remedial works should be included in a verification report for the site.

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

- Soil or water looks oily and/or has an oily odour
- Soil or water has a solvent type of odour
- Significant quantities of man-made materials within fill such as paint cans, car parts, glass fragments

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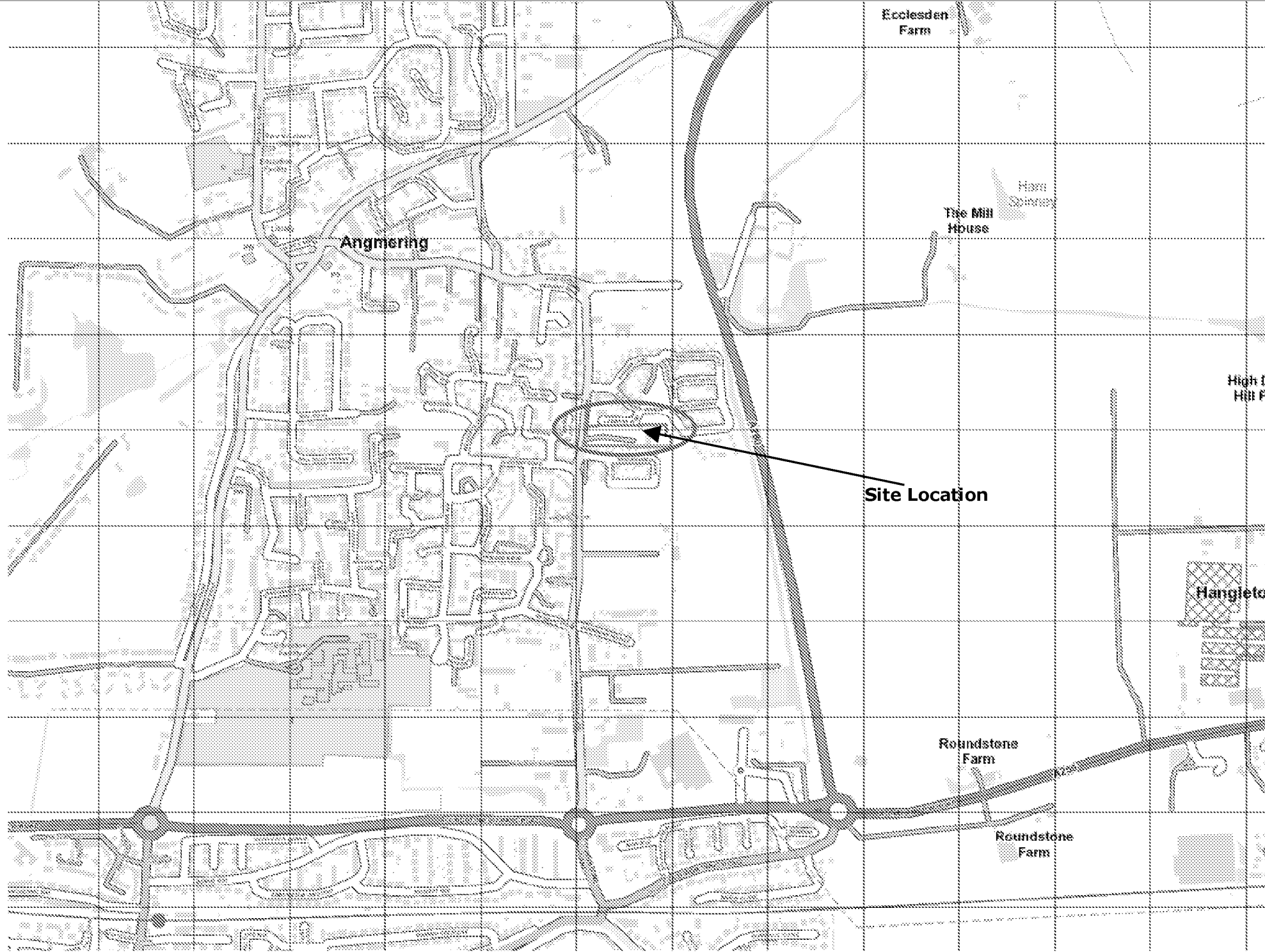
- Suspected asbestos containing materials (insulating boards, cement, loose fibres etc.)
- Significant volumes of clinker like or ashy material
- Sand bags, and/or subsurface concrete structures
- Animal carcasses or evidence of animal burial pits

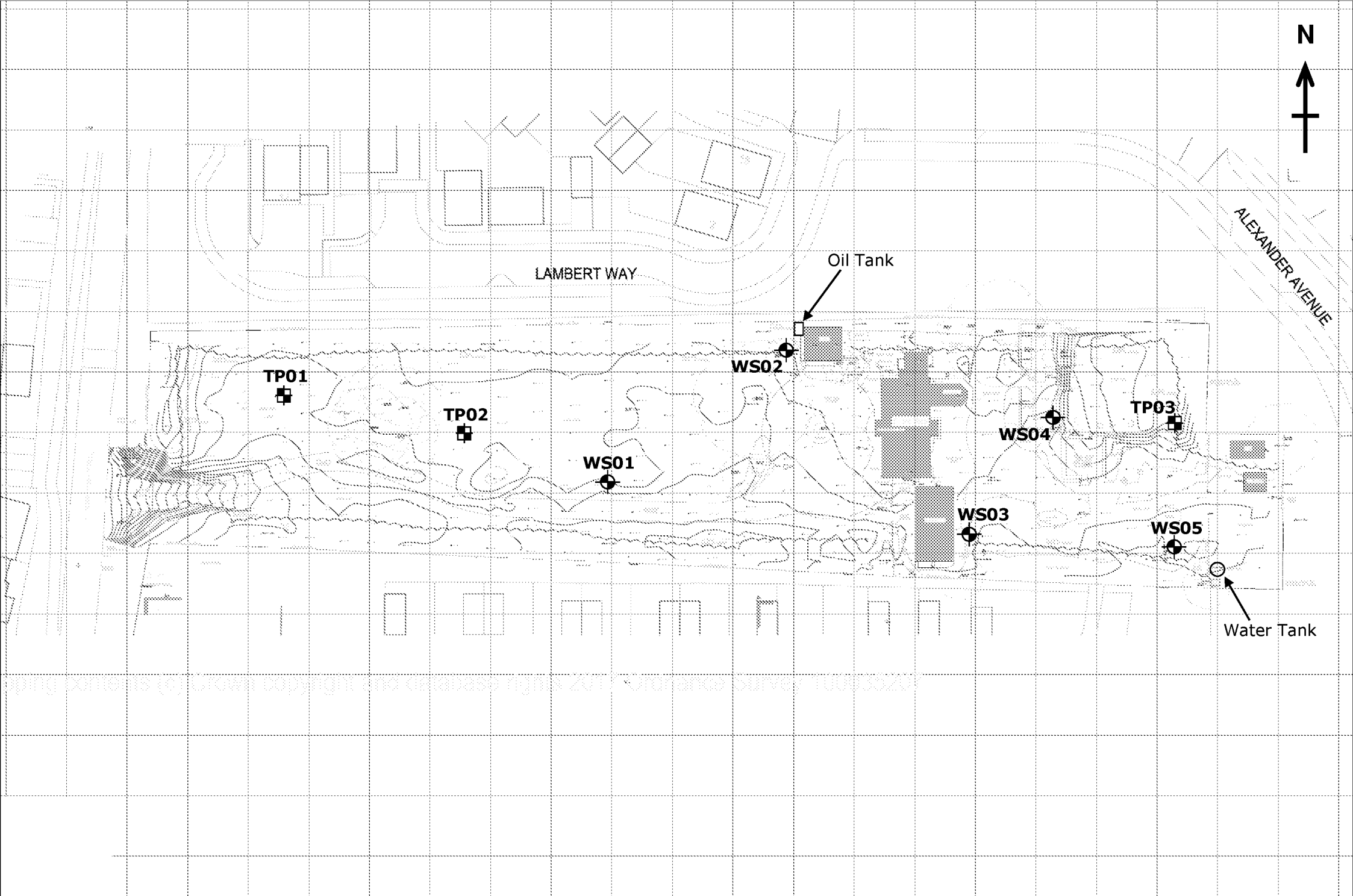
Ashdown Site Investigation Ltd.
April 2018

FIGURES

Figure 1 Site Location Plan

Figure 2 Site Plan

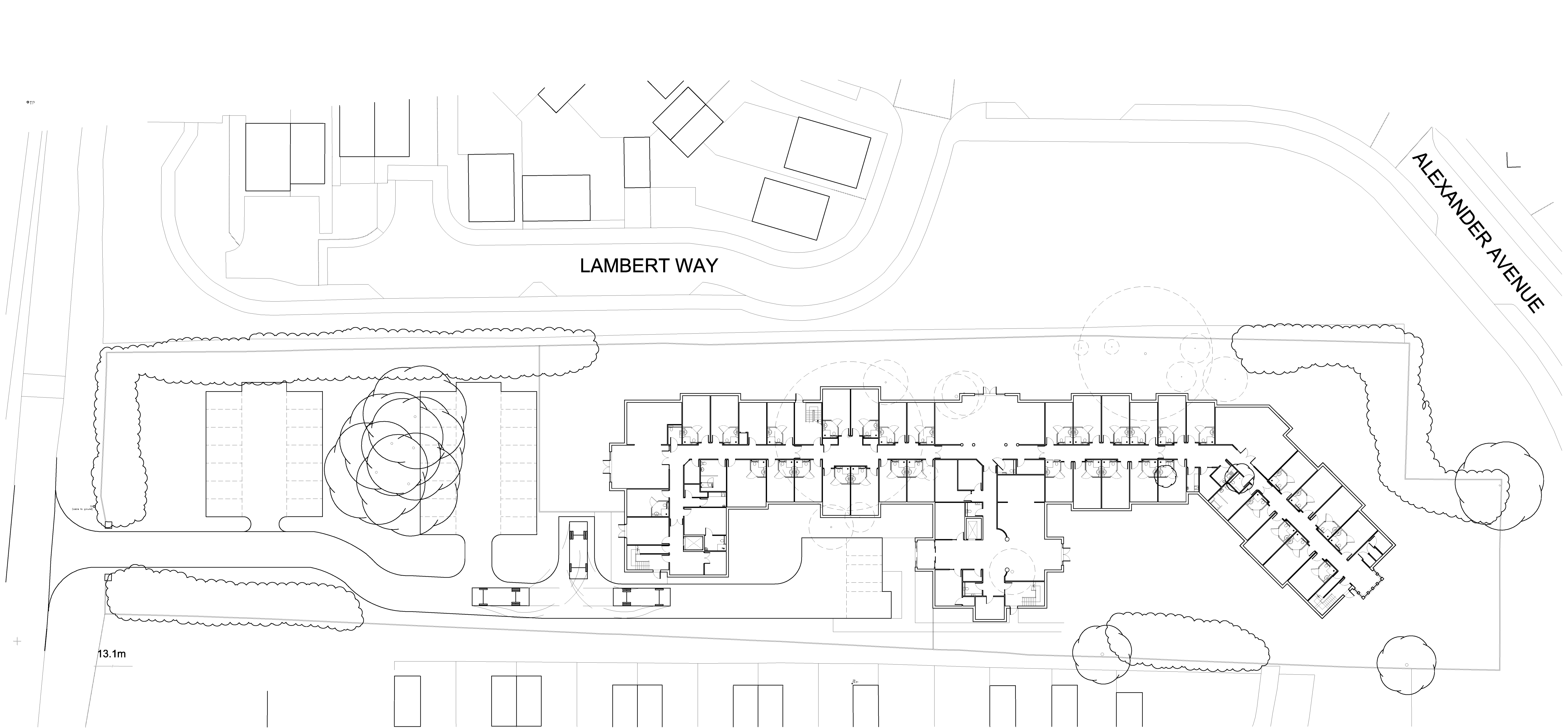




R18-12844

APPENDIX A

Proposed Development Layout



Rev:	Desc:	By:	Date:	Chkd:
•	•	•	•	•

Buckle Chamberlain Partnership Ltd.
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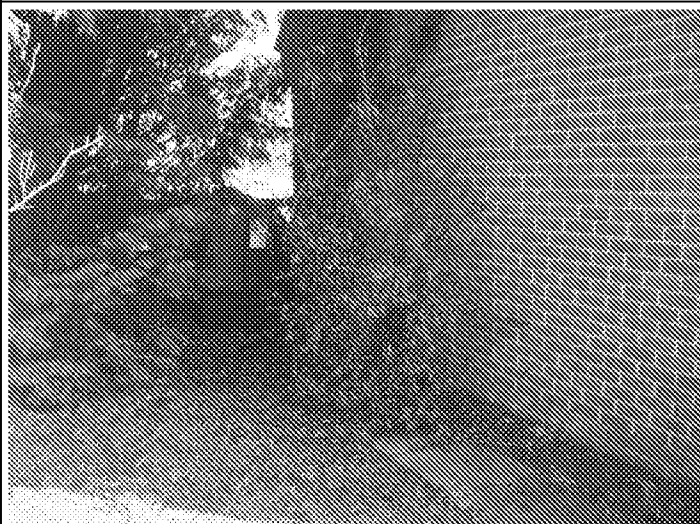
Client	Hallmark Care Homes		
Project	Proposed Care Home Pound Place Roundstone Road Angmering		
Drawing	Illustrative Site Layout		
Date	Feb. 2018	Scale	1:250 @ A1
Drawn by	RAC	Drawing No	1388/sk-014
Checked by	.		
Status	Preliminary		

APPENDIX B

Site Walkover Photographs



View east along driveway towards existing property.



Heating oil storage tank adjacent to north side of property.



View west across rear garden area.

APPENDIX C

Terra Firma TerraSearch Report

FURTHER ACTION

The scope of this service is run the TerraSearch® Hazard Alert Service to screen for past underground mining hazards.

This site (Property & Land) is considered to be located within an area that has experienced past underground mining. It is recommended that a **TerraSearch® Assess report** is purchased to obtain a professional assessment.

Report on:

Pound Place, Roundstone Lane, Angmering, Littlehampton, West Sussex, BN16 4AL

Latitude:

507500

Longitude:

104000

Important Information

This is a search alert report recommendation service and is not to be used in a property transaction as evidence of mining-related ground instability and/or the impact from present and planned mineral extraction.

This alert is not covered by TerraSearch® terms and conditions and is to be used solely for the purpose of highlighting a risk.

No liability will be held by ourselves to any persons not party to the commissioning of this Terrasearch® Hazard Alert.

Date:

14/03/2018

Our Ref:

TFC20180313103946-BN164AL

Client Ref:

66163.109.01

Recommendations

The TerraSearch® Assess search report is available where the TerraSearch® Hazard Alert Service identifies there is a "Potential Risk" from past underground mining hazards. TerraSearch® Assess is a professional desktop assessment by a mining geologist that comprehensively assesses the risk to a site (Property & Land) from all past, present and planned mineral extraction hazards in a single search report.

TerraSearch® Assess is provided within 2 – 5 days and for an additional fee can be expedited to be provided within 24hrs.

The final certificate will provide either a "Passed" or "Further Action" outcome with a professional opinion and clear recommended next steps.

ASSESS

WE TRUST THIS REPORT PROVIDES THE INFORMATION YOU REQUIRE. PLEASE CONTACT US IF YOU HAVE ANY QUERIES OR IF WE CAN BE OF ANY FURTHER ASSISTANCE.

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APPENDIX D

Preliminary Conceptual Model

Pound Place, Roundstone Lane, Angmering, West Sussex				Preliminary Conceptual Model		R18-12844	
Potential Source	Potential Receptor	Potential Contaminants	Potential Pathway	Complete Linkage Present?	Probability	Consequence	Risk
Made ground associated with site redevelopment	End Users	Heavy Metals, PAH Compounds and Asbestos	Dermal contact with soil and dust (indoor & outdoor)	Yes	P1: Very Low	C3: Moderate	Low
			Ingestion of soil and indoor dust	Yes	P1: Very Low	C3: Moderate	Low
			Consumption of home-grown produce and attached soil	No private gardens proposed			N/A
			Inhalation of soil dust (indoor and outdoor)	Yes	P1: Very Low	C3: Moderate	Low
			Inhalation of soil vapours	Identified contaminant(s) do not pose a risk via this pathway			N/A
			Inhalation of soil gases/ Risk of explosion	No potential gas source identified			N/A
	End Users (via Water Supply Pipework)		Contamination of incoming services	Identified contaminant(s) do not pose a risk via this pathway			N/A
	Groundwater	Heavy Metals and PAH Compounds	Migration to groundwater	Yes	P1: Very Low	C1: Very Minor	Negligible
Domestic heating oil tank	End Users	Petroleum Hydrocarbons	Dermal contact with soil and dust (indoor & outdoor)	Yes	P2: Low	C2: Minor	Low
			Ingestion of soil and indoor dust	Yes	P2: Low	C2: Minor	Low
			Consumption of home-grown produce and attached soil	No private gardens proposed			N/A
			Inhalation of soil dust (indoor and outdoor)	Yes	P2: Low	C2: Minor	Low
			Inhalation of soil vapours	Yes	P2: Low	C2: Minor	Low
			Inhalation of soil gases/ Risk of explosion	No potential gas source identified			N/A
	End Users (via Water Supply Pipework)	Petroleum Hydrocarbons	Contamination of incoming services	Yes	P1: Very Low	C2: Minor	Very Low
	Groundwater	Petroleum Hydrocarbons	Migration to groundwater	Yes	P1: Very Low	C1: Very Minor	Negligible

APPENDIX E

Exploratory Hole Notes

In-situ Testing Notes

Exploratory Hole Records

DPSH-B Dynamic Probe Records

Summary of In-situ TRL Cone Penetrometer (CBR) Test Results

Summary of Borehole Falling Head Soakage Test Results

Summary of Trial Pit Falling Head Soakage Test Results

NOTES FOR THE INTERPRETATION OF EXPLORATORY HOLE RECORDS

1 Symbols and abbreviations

Samples

U	'Undisturbed' Sample: - also known as 'U100' or 'U4' - 100mm diameter by 450mm long. The number of blows to drive in the sampling tube is shown after the test index letter in the SPT column.
Uo	Sample not obtained.
U*	Full penetration of sample not obtained.
Pi	Piston Sample: 'Undisturbed' sample 100mm diameter by 600mm long.
D	Disturbed Sample.
R	Root Sample.
B	Bulk Disturbed Sample.
W	Water Sample.
J	Jar Sample (sample taken in amber glass jar fitted with gas tight lid)
T	Tub Sample
Vi	Vial Sample

In situ Testing

S	Standard penetration test (SPT): In the borehole record the depth of the test is that at the start of the normal 450mm penetration. The number of blows per 75mm penetration is recorded, with the initial 150mm for seating blows being recorded followed by the blows recorded for the remaining 300mm of the test. The total blows to achieve the standard penetration of 300mm, discounting the seating blows, is noted as the N value on the log. Where the full penetration of the test cannot be achieved (a refusal) the number of blows achieved and the penetration achieved will be reported.
C	Standard Penetration Test (SPT) conducted usually in coarse grained soils or weak rocks using the same procedure as for the SPT but with a 50mm diameter, 60° apex solid cone fitted in place of the sampler. Variations in test results are indicated by the same symbols as for the SPT (above).
V	Shear Vane Test: Undrained shear strength (cohesion) (kN/m^2) shown within the Vane/Pen Test and N Value column.
H	Hand penetrometer Test: Undrained shear strength (cohesion) (kN/m^2) shown within the Vane/Pen Test and N Value column.
P	Perth Penetrometer Test: See "In Situ Testing Notes" for full description. Number of blows for 300mm penetration shown under Vane/Pen Test and N Value column. In sand the number of blows is approximately equivalent to the SPT "N" value.

Excavation Method

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

2 **Soil Description**

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1:2002+A1:2013) and Part 2 Principles of classification (BS EN 14688-2:2004+A1:2013) as well as the BS5930:2015 code of Practice for Ground Investigations.

Fine Grained Soils

The consistency of fine grained soils given in the report is based on visual inspection of the samples and the strength is based on results of in situ and/or laboratory undrained shear strength tests when carried out.

The consistency is determined on the following basis:

Consistency	Manual Test
Very Soft	Soil exudes between fingers when squeezed in hand
Soft	Soils can be moulded by light finger pressure
Firm	Cannot be moulded by finger but rolled to 3mm threads without breaking/crumbling
Stiff	Crumbles/breaks when rolled to 3mm thick threads but can be moulded into a lump again
Very Stiff	Cannot be moulded and crumbles under pressure, can be indented by thumbnail

The terms used for the designation of the undrained shear strength are as follows:

Undrained Shear Strength	
Extremely to Very Low	<20 kPa
Low	20-40 kPa
Medium	40-75 kPa
High	75-150 kPa
Very High	150-300 kPa
Extremely high	300-600 kPa

Note: The undrained shear strength of the soils is measured either by laboratory testing or in the field using hand shear vane.

It is recognised that any coarse grained soil that has in excess of approximately 35% fine grained soil (clay and silt) can often be expected to behave as a fine grained soil despite the dominance of coarse grained material within the soil mass. To reflect this, it is the soil type that dominates the behaviour of the soil mass that appears on the exploratory hole records.

Coarse Grained Soils

The relative densities of coarse grained soils (sand and gravel) given in the report are based on field estimations and the results of the Standard Penetration Test (SPT) and equivalent correlation from other testing. The classification in terms of "N" Values is as follows:

SPT 'N' Value	Relative Density
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
Greater than 50	Very Dense

3 **Rock Description**

Description and classification of rocks has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of rock, Part 1 Identification and classification (BS EN ISO 14689-1:2003) as well as the BS5930:2015 code of Practice for Ground Investigations.

The description of rock mass includes the type of rock, structure, discontinuities and weathering.

The unconfined compressive strength of rock material is determined on the following basis:

Term	Field Identification	Unconfined Compressive Strength (MPa)
Extremely Weak	Indented by thumbnail	Less than 1
Very Weak	Crumbles under firm blows with point of geological hammer, peeled by pocket knife	1 to 5
Weak	Peeled by pocket knife with difficulty, shallow indentations made by firm blow with geological hammer	5 to 25
Medium Strong	Cannot be peeled or scraped with knife, can be fractured with single firm blow of geological hammer	25 to 50
Strong	Requires more than one blow of geological hammer to fracture	50 to 100
Very Strong	Requires many blows of geological hammer to fracture it	100 to 250
Extremely Strong	Can only be chipped with geological hammer	Greater than 250

The terms describing discontinuity and bedding spacing are as follows:

Bedding Thickness

Very Thick	>2000mm
Thick	2000-600mm
Medium	600-200mm
Thin	200-60mm
Very Thin	60-20mm
Thickly Laminated	20-6mm
Thinly Laminated	<6mm

Discontinuity Spacing

Very Wide	>2000mm
Wide	2000-600mm
Medium	600-200mm
Close	200-60mm
Very Close	60-20mm
Extremely Close	<20mm

Chalk

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

IN SITU TESTING NOTES

1 Standard Penetration Testing

Standard penetration testing (SPT) is carried out within a cased cable percussion borehole. The test is performed using either a split spoon (barrel) sampler in finer grained deposits, or, in coarser grained soils or weak rocks, using a 50mm diameter, 60° apex solid cone fitted in place of the sampler.

The sampler is driven into the deposits at the base of the borehole by means of a 63.5kg hammer falling freely through 760mm.

In the borehole record the depth of the test is that at the start of the normal 450mm penetration, the number of blows to achieve the standard penetration of 300mm (the "N" value) is shown after the test index letter, but the seating blows through the initial 150mm penetration are not reported unless the full penetration of 450mm cannot be achieved.

(BS EN ISO 22476-3:2005+A1:2011, Geotechnical investigation and testing – Field Testing, Part 3 and BS5930:2015 code of practice of for ground investigations)

2 Dynamic Probe Testing

The DPH (heavy) dynamic probing rig drives a 32mm diameter rod with a 15cm² area, 90° end cone into the ground by means of a 50kg hammer which falls freely through a distance of 0.5m. The number of blows per 100mm penetration (N_{100}) is recorded.

The DPSH (super heavy) dynamic probing rig drives a 35mm diameter rod with a 20cm² area, 90° end cone into the ground by means of a 63.5kg hammer that falls freely through a distance of 0.75m. The number of blows per 100mm penetration (N_{100}) is recorded. The results can provide a useful indication of the relative strength of the material. The dynamic probing is carried out in accordance with BS EN ISO 22476-2:2005+A1:2011 and BS5930.

3 Perth Penetrometer Test

In this test a hardened stainless steel rod is driven into the deposit by a 9.5kg sliding hammer falling freely through 600mm. After an initial penetration of 150mm the number of blows required to drive the rod a further 300mm is recorded. In sand the Perth blow count gives a close correlation to the "N-value" that could be expected from a standard penetration test (SPT) made in similar materials. The results are less reliable in coarser grained materials but can give an indication of their engineering properties. The perth penetrometer test is carried out in accordance with the Australian Standard AS 1289:6.3.3-1997, Method of Testing Soils for Engineering Purposes, there is no European equivalent code.

4 Undrained Shear Strength

Undrained shear strength determinations are made in situ within the fine grained soils using a Geonor hand shear vane or (usually in the case of window sampler boreholes) a hand penetrometer. The test records the undrained shear strength (cohesion) in kN/m². The shear vane records a maximum shear strength of 130kN/m² and the hand penetrometer records a maximum shear strength of 250kN/m².

3 California Bearing Ratio Test

In this test a hand held Farnell cone penetrometer apparatus is pushed into the deposits for the estimation of the California bearing ratio of the subgrade (for use in pavement design). The test equipment is design for the estimation of the bearing ratio of fine grained soils (clay and silt) only and is unsuitable for use in coarse grained soils and rock.

Site Name: Pound Place, Roundstone Lane, Angmering, West Sussex

Job Number: R18-12844

Start Date: 16/02/2018

End Date: 16/02/2018

Borehole Number: **WS01**

Sheet 1 of 1

Standpipe		Samples and In Situ Testing		Dynamic Probe		Legend	Depth	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Blows/100mm				
J T	0.05						0.00	Topsoil.
D	0.20						0.10	MADE GROUND: Brown and light brown silty clay with occasional gravel of clinker-like material.
J T	0.30							
H	0.40		90				0.35	Stiff light brown silty CLAY. (River Terrace Deposits) becoming firm at 1.00m depth. becoming stiff below 1.10m depth.
H	0.80		115					
D	0.90							
V	1.00		55					
H	1.10		90					
H	1.30		115					Very stiff light brown and orange very gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
J T	1.30							
D	1.60							
H	1.70		140				1.80	
								End of borehole at 3.00m
D	2.60							
							3.00	

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole stable on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: TK



Site Name: Pound Place, Roundstone Lane, Angmering, West Sussex

Job Number: R18-12844

Start Date: 16/02/2018

End Date: 16/02/2018

Borehole Number: WS02

Sheet 1 of 1

Standpipe		Samples and In Situ Testing			Dynamic Probe		Legend	Depth	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Blows/100mm					
	J T	0.05						0.00	Topsoil.
	H	0.20	>250					0.10	Very stiff light brown and orange silty CLAY. (River Terrace Deposits)
	H	0.40	>250						
	D	0.50							
	H	0.60	>250						
	J T	0.60							
	H	0.80	>250						
	J T	1.15						1.10	Medium dense light brown clayey subangular to subrounded fine to coarse GRAVEL of flint. (River Terrace Deposits)
	D	1.50							
	J T	2.30							becoming dense cream sandy GRAVEL at 2.50m depth.
	D	2.50						2.60	
									End of borehole at 2.60m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole stable on completion.

Notes: No further progress below 2.60m depth - too dense.

Excavation Method: WLS

Borehole Diameter: Various

Made By: TK



Site Name: Pound Place, Roundstone Lane, Angmering, West Sussex

Job Number: R18-12844

Start Date: 16/02/2018

End Date: 16/02/2018

Borehole Number: **WS03**

Sheet 1 of 1

Samples and In Situ Testing		Dynamic Probe		Legend		Stratum Description	
Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Blows/100mm	Depth	
	JT	0.10				0.00	Topsoil with some gravel of flint and brick.
	D	0.25				0.15	MADE GROUND: Brown gravelly silty clay. Gravel is subangular to subrounded fine to coarse brick, flint, chalk and charcoal-like material.
	JT	0.30				0.40	
	H	0.40	45				Firm light brown silty CLAY. (River Terrace Deposits)
	D	0.60					becoming stiff below 0.60m depth.
	H	0.60	90				
	H	0.80	90				
	JT	0.80					
	V	1.00	>130				
	H	1.10	90				
	D	1.20					
	H	1.30	100				
	JT	1.50					
	H	1.70	90				
						1.90	Stiff light brown very gravelly silty CLAY. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
							poor sample recovery between 2.00m and 3.00m depth.
	JT	2.50					
	D	2.80					
						3.00	End of borehole at 3.00m

Remarks
Groundwater: Borehole dry on completion.

Stability: Borehole stable on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: TK

Standpipe		Samples and In Situ Testing		Dynamic Probe		Legend	Depth	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Blows/100mm				
J T	0.05	1.00	60				0.00	Topsoil .
D	0.20						0.10	Firm light brown silty CLAY. (River Terrace Deposits)
H	0.30							
J T	0.40							
H	0.50							
D	0.60							
H	0.65							
U	0.70							
H	1.20		90					
H	1.40							
J T	1.40							
H	1.60							
D	1.70							
H	1.80							
J T	2.40						2.00	Stiff light brown very gravelly silty CLAY. Gravel is subangular to subrounded fine to medium flint and shell fragments. (River Terrace Deposits)
D	2.70						2.60	Medium dense brown clayey fine to coarse GRAVEL of flint. (River Terrace Deposits)
							3.00	End of borehole at 3.00m

Remarks

Groundwater: Borehole dry on completion.

Stability: Borehole stable on completion.

Notes: n/a

Excavation Method: WLS

Borehole Diameter: Various

Made By: TK

	Site Name: Pound Place, Roundstone Lane, Angmering, West Sussex									
	Job Number: R18-12844									
	Start Date: 16/02/2018					Borehole Number: WS05				
	End Date: 16/02/2018					Sheet 1 of 1				

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Dynamic Probe						Legend	Depth	Stratum Description		
					Blows/100mm										
					0	5	10	15	20	25	30				
	J T	0.05											0.00	Topsoil.	
	J T	0.25											0.05		MADE GROUND: Brown gravelly silty clay. Gravel is subangular to subrounded fine to medium charcoal-like material, flint and brick.
	D	0.30											0.45		
	H	0.60		>250										Very stiff light brown silty CLAY. (River Terrace Deposits)	
	D	0.80													
	H	0.80		>250											
	J T	1.10													
	H	1.20		>250											
	D	1.40													
	H	1.60		>250										becoming very gravelly at 1.80m depth. Gravel is subangular to subrounded fine to coarse flint.	
	J T	2.10											2.00		
	D	2.80												Medium dense light brown clayey subangular to subrounded fine to coarse GRAVEL of flint. (River Terrace Deposits)	
													3.00	End of borehole at 3.00m	

Remarks Groundwater: Borehole dry on completion. Stability: Borehole collapsed to 2.90m depth on completion. Notes: n/a	Excavation Method: WLS
	Borehole Diameter: Various
	Made By: TK



Site Name: Pound Place, Roundstone Lane, Angmering, West Sussex

Job Number: R18-12844

Start Date: 16/02/2018

End Date: 16/02/2018

Trial Pit Number: TP01

Sheet 1 of 1

Samples and In Situ Testing				Legend	Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result			
J T	0.10				0.00	Topsoil.
D	0.30				0.20	Light brown silty CLAY with frequent roots and rootlets and rare subangular to subrounded fine to coarse gravel of flint. (River Terrace Deposits) becoming very gravelly at 1.20m depth.
J T	0.60					
D	0.90					
J T	1.50					
D	1.60				1.80	Light brown and light grey slightly sandy very gravelly silty CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
J T	2.30					
D	2.40				2.80	End of trial pit at 2.80m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: TP

Pit Length: 1.90m

Pit Width: 0.45m

Made By: ML



Site Name: Pound Place, Roundstone Lane, Angmering, West Sussex

Job Number: R18-12844

Start Date: 16/02/2018

End Date: 16/02/2018

Trial Pit Number: **TP02**

Sheet 1 of 1

Samples and In Situ Testing				Legend	Depth/ Reduced Level	Stratum Description
Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result			
J T	0.10				0.00	Topsoil.
D	0.30				0.20	Light brown silty CLAY with frequent roots and rootlets and rare subangular to subrounded fine to coarse gravel of flint. (River Terrace Deposits) becoming very gravelly at 1.30m depth.
J T	0.70					
D	0.90					
J T	1.60					
D	1.70				1.80	Light brown grey slightly sandy very gravelly silty CLAY. Sand is fine. Gravel is subangular to subrounded fine to coarse flint. (River Terrace Deposits)
J T	2.50					
D	2.60					
					3.00	End of trial pit at 3.00m

Remarks

Groundwater: Trial pit dry on completion.

Stability: Trial pit stable on completion.

Notes: n/a

Excavation Method: TP

Pit Length: 1.90m

Pit Width: 0.45m

Made By: ML

Site Name: Pound Place, Roundstone Lane, Angmering, West Sussex

Job Number: R18-12844

Start Date: 16/02/2018

End Date: 16/02/2018

Trial Pit Number: **TP03**

Sheet 1 of 1

Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth/ Reduced Level	Stratum Description
J T	0.10				0.00	Topsoil with occasional gravel of brick, tile and charcoal-like material.
D	0.30				0.35	
J T	0.40					Firm brown orange slightly gravelly silty CLAY. Gravel is angular to subrounded fine to coarse flint with occasional carbonaceous material. (River Terrace Deposits) with dead roots at 0.40m depth.
D	0.70					
V	0.90		50		0.90	End of trial pit at 0.90m

Remarks

Groundwater: Trial pit dry on completion.

Excavation Method: HDP

Stability: Trial pit stable on completion.

Pit Length: 0.30m

Pit Width: 0.30m

Notes: n/a

Made By: PM

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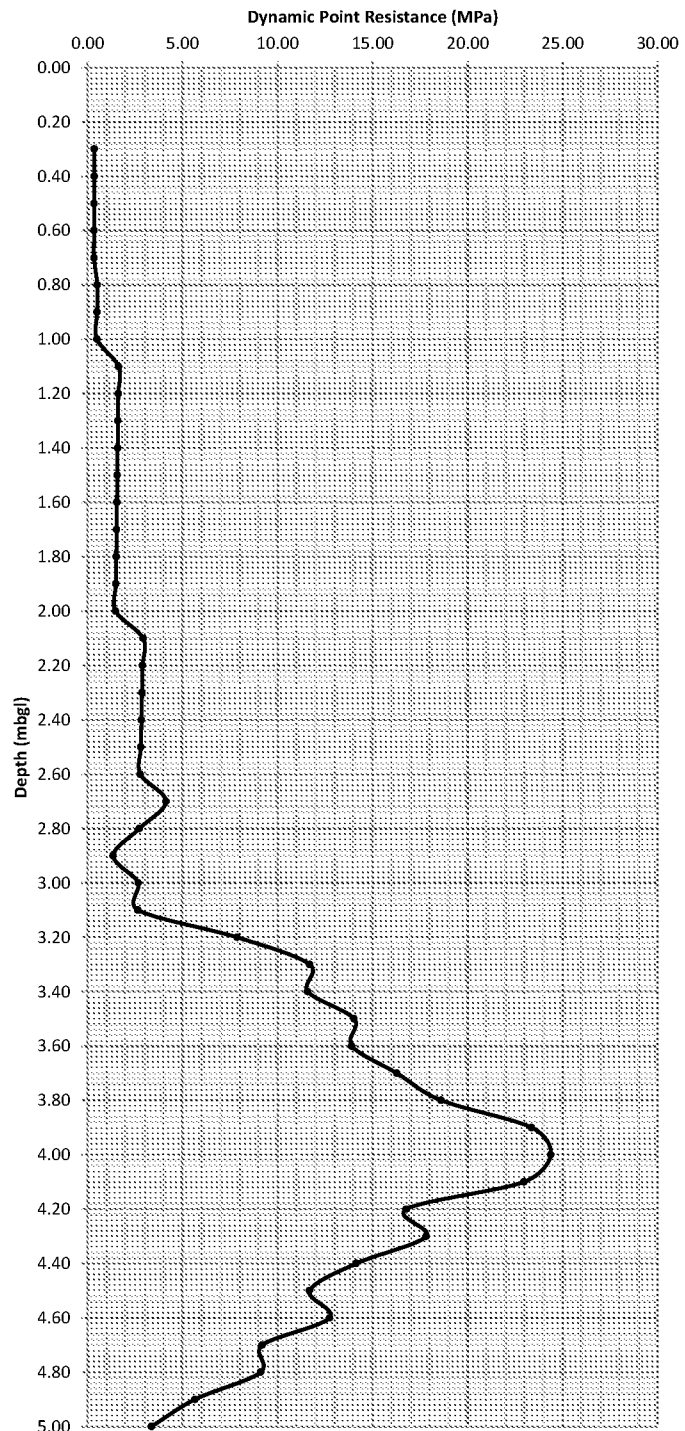
Dynamic Probe Record

SITE Pound Place, Roundstone Lane, Angmering, West Sussex

Report Ref.

R18-12844

Test Location Reference			WS01	
Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30	0.2	0.50	0.38	0.36
0.40	0.2	0.50	0.38	0.36
0.50	0.2	0.50	0.38	0.35
0.60	0.2	0.50	0.38	0.35
0.70	0.2	0.50	0.38	0.34
0.80	0.3	0.33	0.58	0.51
0.90	0.3	0.33	0.58	0.50
1.00	0.3	0.33	0.58	0.50
1.10	1	0.10	1.92	1.64
1.20	1	0.10	1.92	1.62
1.30	1	0.10	1.92	1.60
1.40	1	0.10	1.92	1.58
1.50	1	0.10	1.92	1.56
1.60	1	0.10	1.92	1.55
1.70	1	0.10	1.92	1.53
1.80	1	0.10	1.92	1.51
1.90	1	0.10	1.92	1.50
2.00	1	0.10	1.92	1.48
2.10	2	0.05	3.84	2.93
2.20	2	0.05	3.84	2.90
2.30	2	0.05	3.84	2.87
2.40	2	0.05	3.84	2.84
2.50	2	0.05	3.84	2.81
2.60	2	0.05	3.84	2.78
2.70	3	0.03	5.76	4.13
2.80	2	0.05	3.84	2.73
2.90	1	0.10	1.92	1.35
3.00	2	0.05	3.84	2.67
3.10	2	0.05	3.84	2.65
3.20	6	0.02	11.51	7.87
3.30	9	0.01	17.27	11.70
3.40	9	0.01	17.27	11.59
3.50	11	0.01	21.11	14.03
3.60	11	0.01	21.11	13.91
3.70	13	0.01	24.94	16.29
3.80	15	0.01	28.78	18.62
3.90	19	0.01	36.45	23.38
4.00	20	0.01	38.37	24.39
4.10	19	0.01	36.45	22.97
4.20	14	0.01	26.86	16.78
4.30	15	0.01	28.78	17.82
4.40	12	0.01	23.02	14.14
4.50	10	0.01	19.19	11.68
4.60	11	0.01	21.11	12.74
4.70	8	0.01	15.35	9.19
4.80	8	0.01	15.35	9.12
4.90	5	0.02	9.59	5.65
5.00	3	0.03	5.76	3.36



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.77
Anvil Mass	1.25 kg
Rod Mass	8.79 kg/m

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Dynamic Probe Record

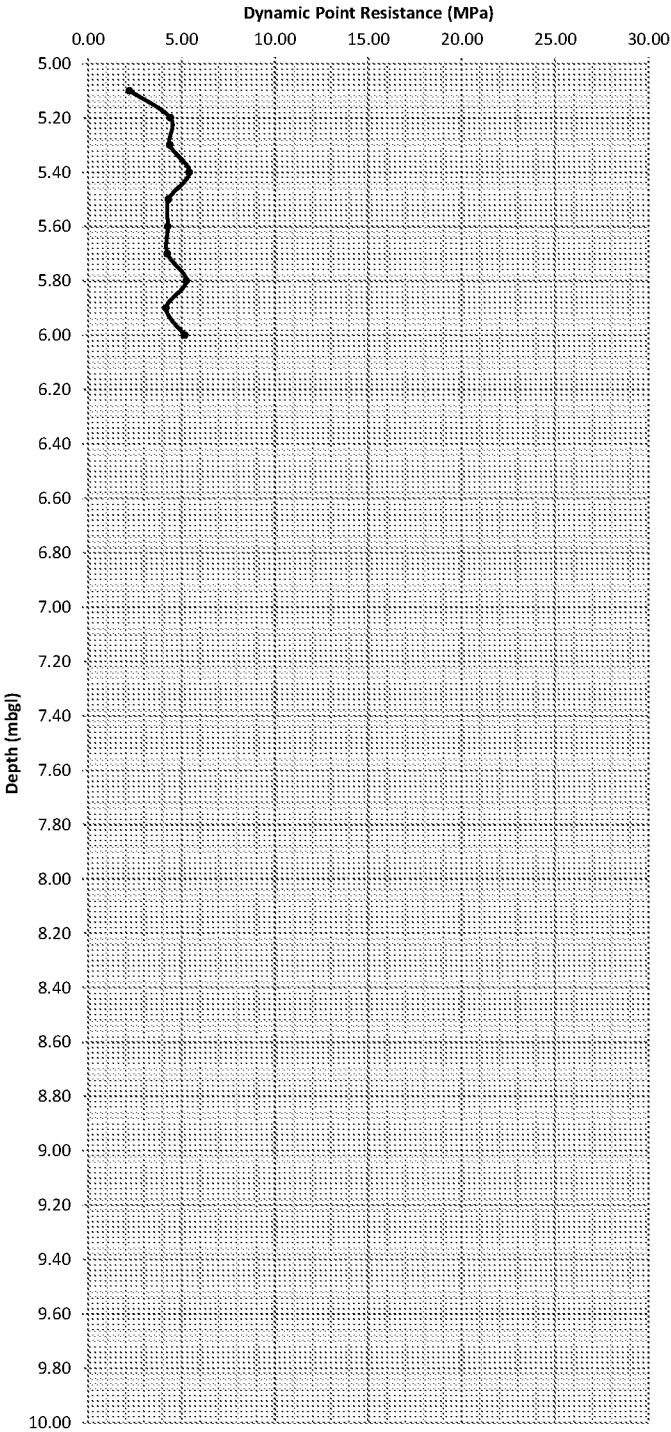
SITE

Pound Place, Roundstone Lane, Angmering, West Sussex

Report Ref.

R18-12844

Test Location Reference			WS01	
Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
5.10	2	0.05	3.84	2.22
5.20	4	0.03	7.67	4.41
5.30	4	0.03	7.67	4.38
5.40	5	0.02	9.59	5.43
5.50	4	0.03	7.67	4.31
5.60	4	0.03	7.67	4.28
5.70	4	0.03	7.67	4.24
5.80	5	0.02	9.59	5.26
5.90	4	0.03	7.67	4.18
6.00	5	0.02	9.59	5.19
6.10				
6.20				
6.30				
6.40				
6.50				
6.60				
6.70				
6.80				
6.90				
7.00				
7.10				
7.20				
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8.90				
9.00				
9.10				
9.20				
9.30				
9.40				
9.50				
9.60				
9.70				
9.80				
9.90				
10.00				



Notes:	Hammer Mass	63.5 kg
	Fall Height	0.76 m
	Cone Area	0.0019 m ²
	E _{theor}	473 J
	Energy Ratio	0.77
	Anvil Mass	1.25 kg
	Rod Mass	8.79 kg/m

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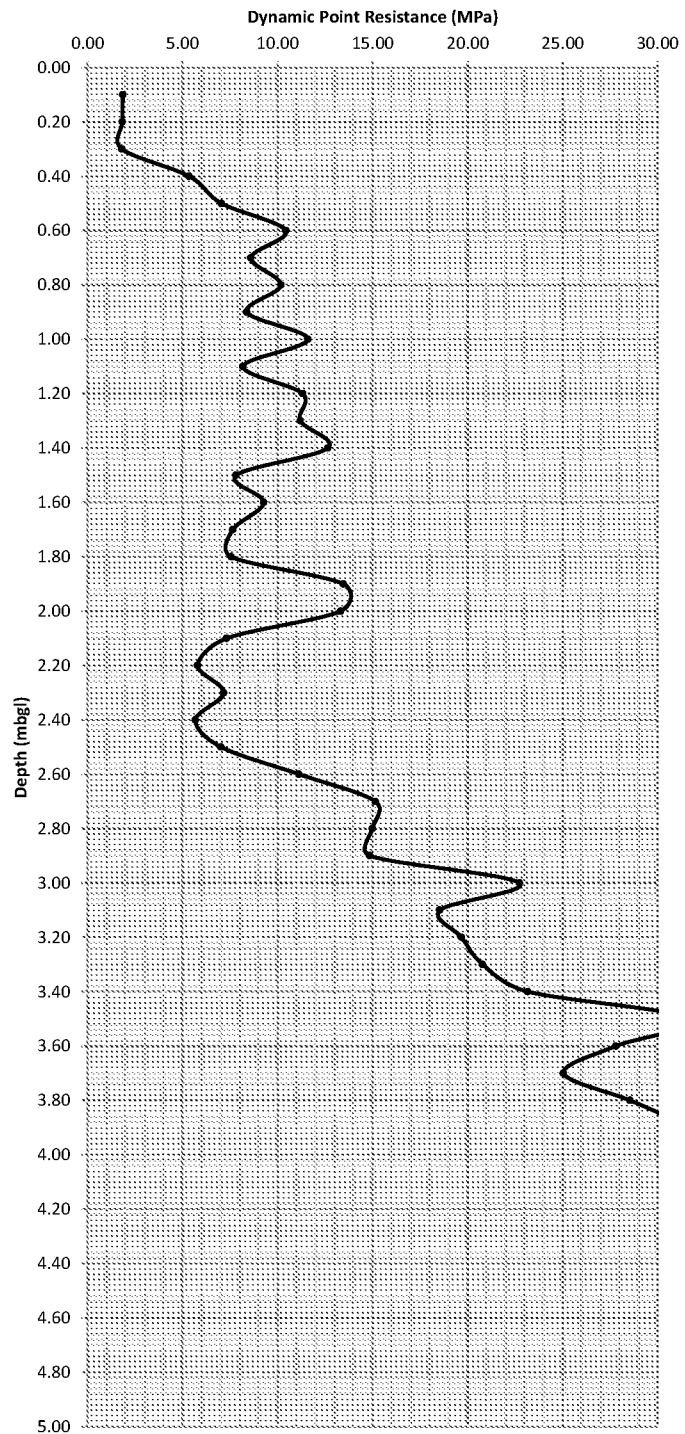
Dynamic Probe Record

SITE Pound Place, Roundstone Lane, Angmering, West Sussex

Report Ref.

R18-12844

Test Location Reference			WS02	
Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10	1	0.10	1.92	1.86
0.20	1	0.10	1.92	1.83
0.30	1	0.10	1.92	1.81
0.40	3	0.03	5.76	5.35
0.50	4	0.03	7.67	7.05
0.60	6	0.02	11.51	10.44
0.70	5	0.02	9.59	8.59
0.80	6	0.02	11.51	10.18
0.90	5	0.02	9.59	8.38
1.00	7	0.01	13.43	11.60
1.10	5	0.02	9.59	8.19
1.20	7	0.01	13.43	11.33
1.30	7	0.01	13.43	11.20
1.40	8	0.01	15.35	12.65
1.50	5	0.02	9.59	7.82
1.60	6	0.02	11.51	9.28
1.70	5	0.02	9.59	7.64
1.80	5	0.02	9.59	7.56
1.90	9	0.01	17.27	13.46
2.00	9	0.01	17.27	13.32
2.10	5	0.02	9.59	7.32
2.20	4	0.03	7.67	5.80
2.30	5	0.02	9.59	7.17
2.40	4	0.03	7.67	5.68
2.50	5	0.02	9.59	7.03
2.60	8	0.01	15.35	11.13
2.70	11	0.01	21.11	15.15
2.80	11	0.01	21.11	15.00
2.90	11	0.01	21.11	14.85
3.00	17	0.01	32.62	22.73
3.10	14	0.01	26.86	18.54
3.20	15	0.01	28.78	19.68
3.30	16	0.01	30.70	20.80
3.40	18	0.01	34.54	23.18
3.50	25	0.00	47.97	31.89
3.60	22	0.00	42.21	27.81
3.70	20	0.01	38.37	25.05
3.80	23	0.00	44.13	28.55
3.90	26	0.00	49.88	31.99
4.00	30	0.00	57.56	36.59
4.10				
4.20				
4.30				
4.40				
4.50				
4.60				
4.70				
4.80				
4.90				
5.00				



Notes:

No further progress below 4.00m depth - hammer bouncing with 20mm remaining on division.

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.77
Anvil Mass	1.25 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

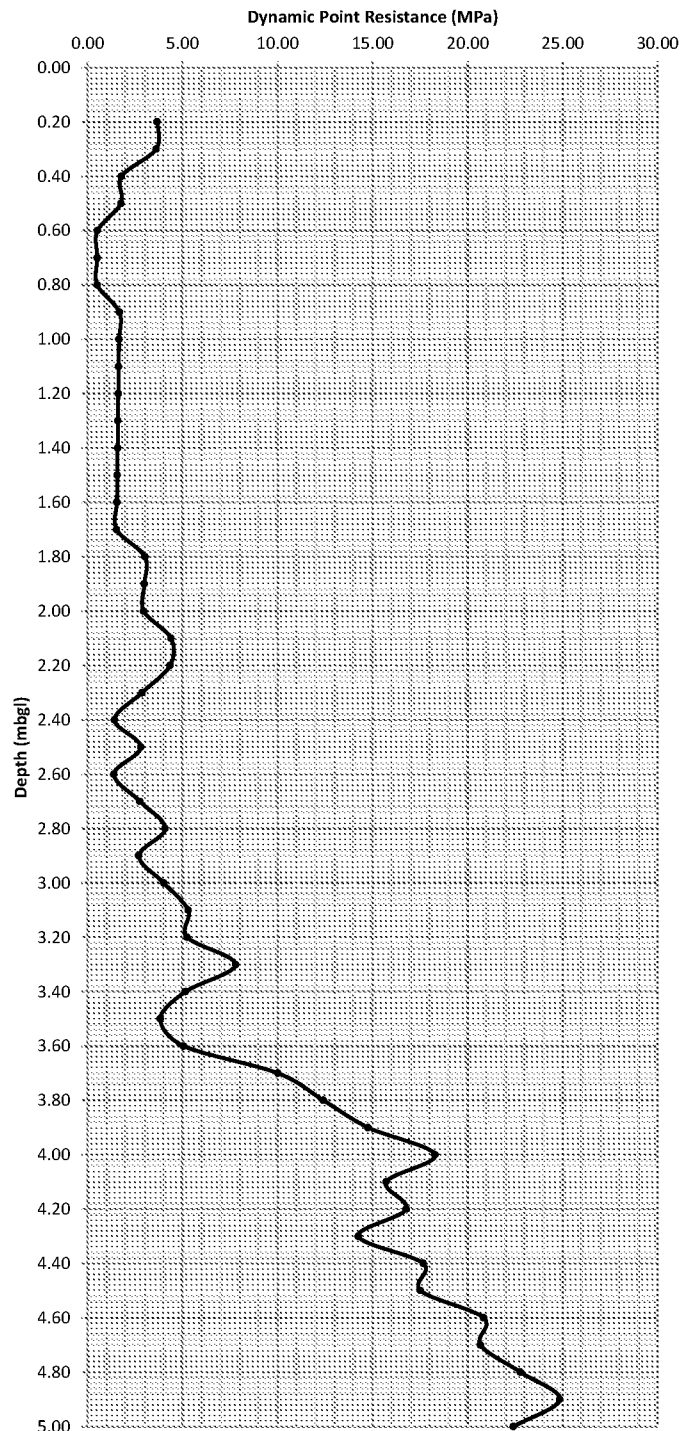
Dynamic Probe Record

SITE Pound Place, Roundstone Lane, Angmering, West Sussex

Report Ref.

R18-12844

Test Location Reference			WS03	
Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20	2	0.05	3.84	3.66
0.30	2	0.05	3.84	3.62
0.40	1	0.10	1.92	1.78
0.50	1	0.10	1.92	1.76
0.60	0.3	0.33	0.58	0.52
0.70	0.3	0.33	0.58	0.52
0.80	0.3	0.33	0.58	0.51
0.90	1	0.10	1.92	1.68
1.00	1	0.10	1.92	1.66
1.10	1	0.10	1.92	1.64
1.20	1	0.10	1.92	1.62
1.30	1	0.10	1.92	1.60
1.40	1	0.10	1.92	1.58
1.50	1	0.10	1.92	1.56
1.60	1	0.10	1.92	1.55
1.70	1	0.10	1.92	1.53
1.80	2	0.05	3.84	3.02
1.90	2	0.05	3.84	2.99
2.00	2	0.05	3.84	2.96
2.10	3	0.03	5.76	4.39
2.20	3	0.03	5.76	4.35
2.30	2	0.05	3.84	2.87
2.40	1	0.10	1.92	1.42
2.50	2	0.05	3.84	2.81
2.60	1	0.10	1.92	1.39
2.70	2	0.05	3.84	2.75
2.80	3	0.03	5.76	4.09
2.90	2	0.05	3.84	2.70
3.00	3	0.03	5.76	4.01
3.10	4	0.03	7.67	5.30
3.20	4	0.03	7.67	5.25
3.30	6	0.02	11.51	7.80
3.40	4	0.03	7.67	5.15
3.50	3	0.03	5.76	3.83
3.60	4	0.03	7.67	5.06
3.70	8	0.01	15.35	10.02
3.80	10	0.01	19.19	12.42
3.90	12	0.01	23.02	14.77
4.00	15	0.01	28.78	18.30
4.10	13	0.01	24.94	15.72
4.20	14	0.01	26.86	16.78
4.30	12	0.01	23.02	14.26
4.40	15	0.01	28.78	17.67
4.50	15	0.01	28.78	17.52
4.60	18	0.01	34.54	20.85
4.70	18	0.01	34.54	20.68
4.80	20	0.01	38.37	22.79
4.90	22	0.00	42.21	24.86
5.00	20	0.01	38.37	22.42



Notes:

Hammer Mass 63.5 kg
 Fall Height 0.76 m
 Cone Area 0.0019 m²
 E_{theor} 473 J
 Energy Ratio 0.77
 Anvil Mass 1.25 kg
 Rod Mass 8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

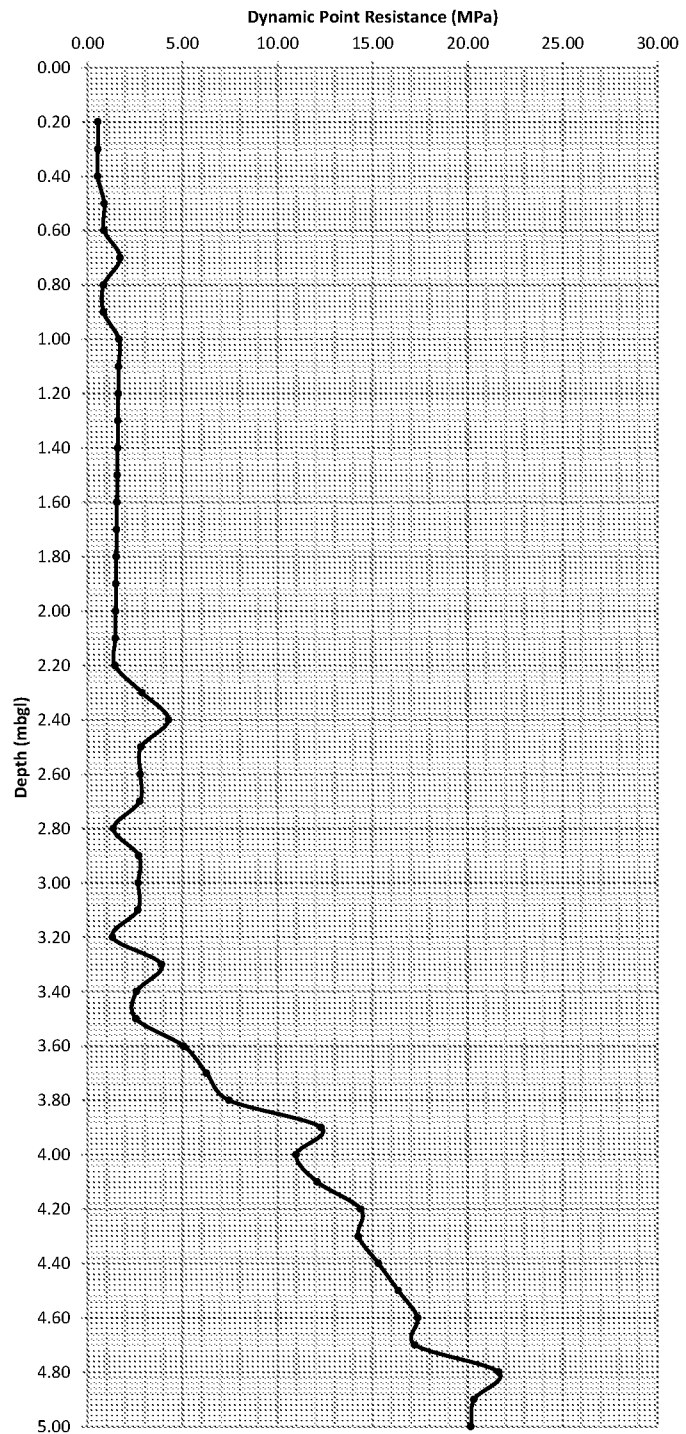
Dynamic Probe Record

SITE Pound Place, Roundstone Lane, Angmering, West Sussex

Report Ref.

R18-12844

Test Location Reference			WS04	
Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20	0.3	0.33	0.58	0.55
0.30	0.3	0.33	0.58	0.54
0.40	0.3	0.33	0.58	0.54
0.50	0.5	0.20	0.96	0.88
0.60	0.5	0.20	0.96	0.87
0.70	1	0.10	1.92	1.72
0.80	0.5	0.20	0.96	0.85
0.90	0.5	0.20	0.96	0.84
1.00	1	0.10	1.92	1.66
1.10	1	0.10	1.92	1.64
1.20	1	0.10	1.92	1.62
1.30	1	0.10	1.92	1.60
1.40	1	0.10	1.92	1.58
1.50	1	0.10	1.92	1.56
1.60	1	0.10	1.92	1.55
1.70	1	0.10	1.92	1.53
1.80	1	0.10	1.92	1.51
1.90	1	0.10	1.92	1.50
2.00	1	0.10	1.92	1.48
2.10	1	0.10	1.92	1.46
2.20	1	0.10	1.92	1.45
2.30	2	0.05	3.84	2.87
2.40	3	0.03	5.76	4.26
2.50	2	0.05	3.84	2.81
2.60	2	0.05	3.84	2.78
2.70	2	0.05	3.84	2.75
2.80	1	0.10	1.92	1.36
2.90	2	0.05	3.84	2.70
3.00	2	0.05	3.84	2.67
3.10	2	0.05	3.84	2.65
3.20	1	0.10	1.92	1.31
3.30	3	0.03	5.76	3.90
3.40	2	0.05	3.84	2.58
3.50	2	0.05	3.84	2.55
3.60	4	0.03	7.67	5.06
3.70	5	0.02	9.59	6.26
3.80	6	0.02	11.51	7.45
3.90	10	0.01	19.19	12.30
4.00	9	0.01	17.27	10.98
4.10	10	0.01	19.19	12.09
4.20	12	0.01	23.02	14.38
4.30	12	0.01	23.02	14.26
4.40	13	0.01	24.94	15.32
4.50	14	0.01	26.86	16.36
4.60	15	0.01	28.78	17.38
4.70	15	0.01	28.78	17.23
4.80	19	0.01	36.45	21.65
4.90	18	0.01	34.54	20.34
5.00	18	0.01	34.54	20.18



Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.77
Anvil Mass	1.25 kg
Rod Mass	8.79 kg/m

ASHDOWN SITE INVESTIGATION LTD

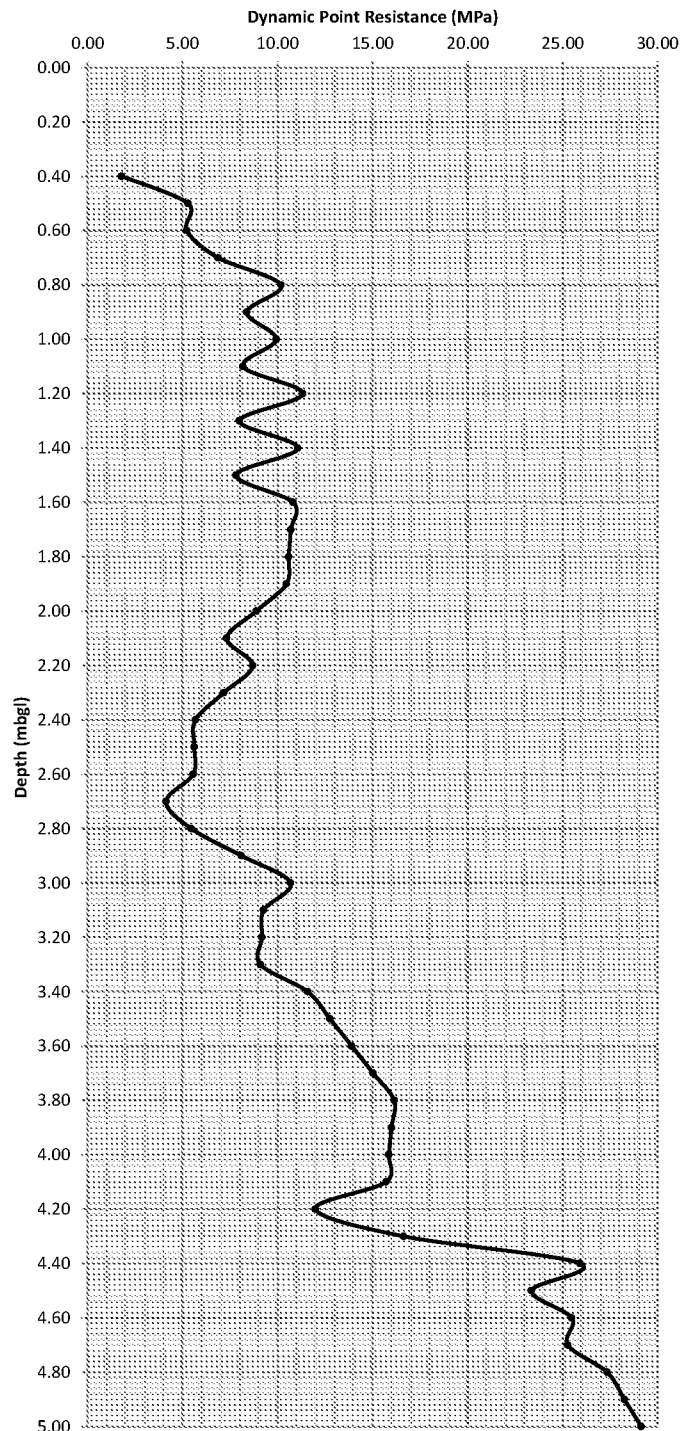
Dynamic Probe Record

SITE Pound Place, Roundstone Lane, Angmering, West Sussex

Report Ref.

R18-12844

Test Location Reference		WS05		
Depth (mbgl)	Blows (per 100mm)	Average Penetration per Blow (m)	Unit Point Resistance (MPa)	Dynamic Point Resistance (MPa)
0.10				
0.20				
0.30				
0.40	1	0.10	1.92	1.78
0.50	3	0.03	5.76	5.29
0.60	3	0.03	5.76	5.22
0.70	4	0.03	7.67	6.87
0.80	6	0.02	11.51	10.18
0.90	5	0.02	9.59	8.38
1.00	6	0.02	11.51	9.94
1.10	5	0.02	9.59	8.19
1.20	7	0.01	13.43	11.33
1.30	5	0.02	9.59	8.00
1.40	7	0.01	13.43	11.07
1.50	5	0.02	9.59	7.82
1.60	7	0.01	13.43	10.82
1.70	7	0.01	13.43	10.70
1.80	7	0.01	13.43	10.59
1.90	7	0.01	13.43	10.47
2.00	6	0.02	11.51	8.88
2.10	5	0.02	9.59	7.32
2.20	6	0.02	11.51	8.69
2.30	5	0.02	9.59	7.17
2.40	4	0.03	7.67	5.68
2.50	4	0.03	7.67	5.62
2.60	4	0.03	7.67	5.56
2.70	3	0.03	5.76	4.13
2.80	4	0.03	7.67	5.45
2.90	6	0.02	11.51	8.10
3.00	8	0.01	15.35	10.70
3.10	7	0.01	13.43	9.27
3.20	7	0.01	13.43	9.18
3.30	7	0.01	13.43	9.10
3.40	9	0.01	17.27	11.59
3.50	10	0.01	19.19	12.76
3.60	11	0.01	21.11	13.91
3.70	12	0.01	23.02	15.03
3.80	13	0.01	24.94	16.14
3.90	13	0.01	24.94	16.00
4.00	13	0.01	24.94	15.86
4.10	13	0.01	24.94	15.72
4.20	10	0.01	19.19	11.99
4.30	14	0.01	26.86	16.64
4.40	22	0.00	42.21	25.92
4.50	20	0.01	38.37	23.37
4.60	22	0.00	42.21	25.49
4.70	22	0.00	42.21	25.28
4.80	24	0.00	46.05	27.35
4.90	25	0.00	47.97	28.26
5.00	26	0.00	49.88	29.15

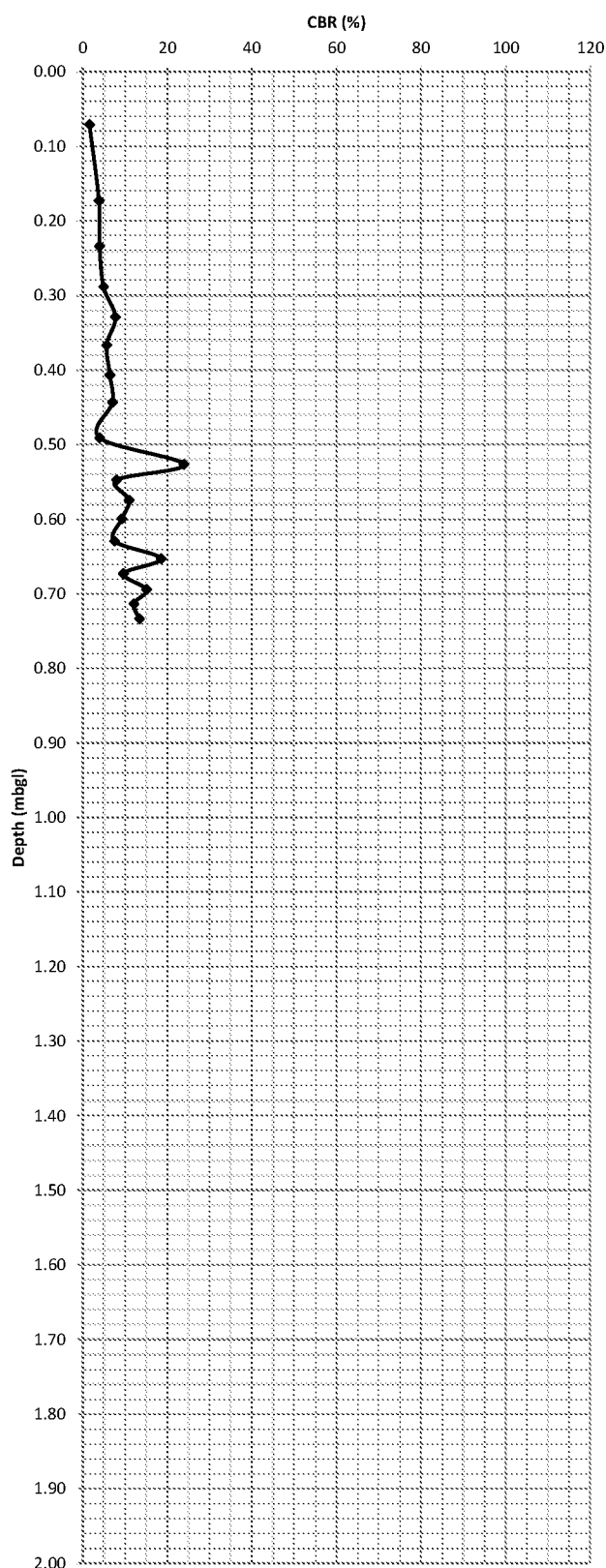


Notes:

Hammer Mass	63.5 kg
Fall Height	0.76 m
Cone Area	0.0019 m ²
E _{theor}	473 J
Energy Ratio	0.77
Anvil Mass	1.25 kg
Rod Mass	8.79 kg/m

TRL Dynamic Cone Penetrometer Record

R18-12844

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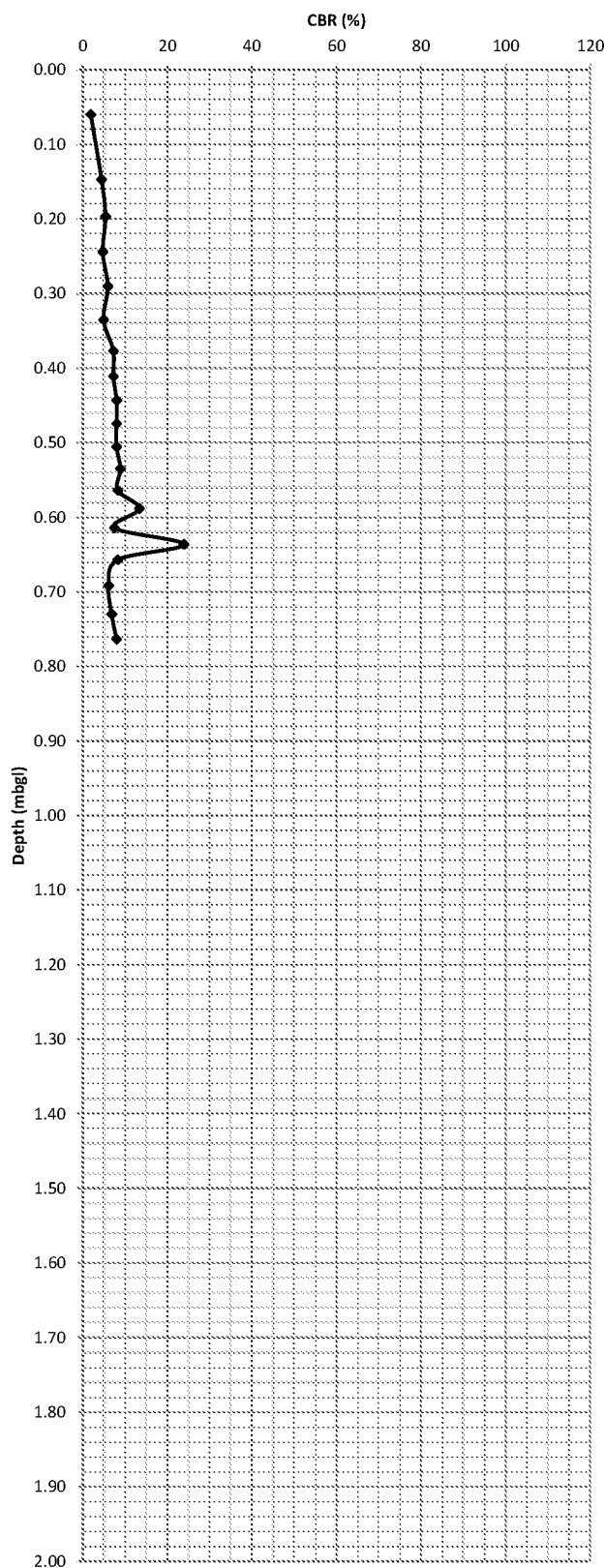
Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

Report Ref.

R18-12844

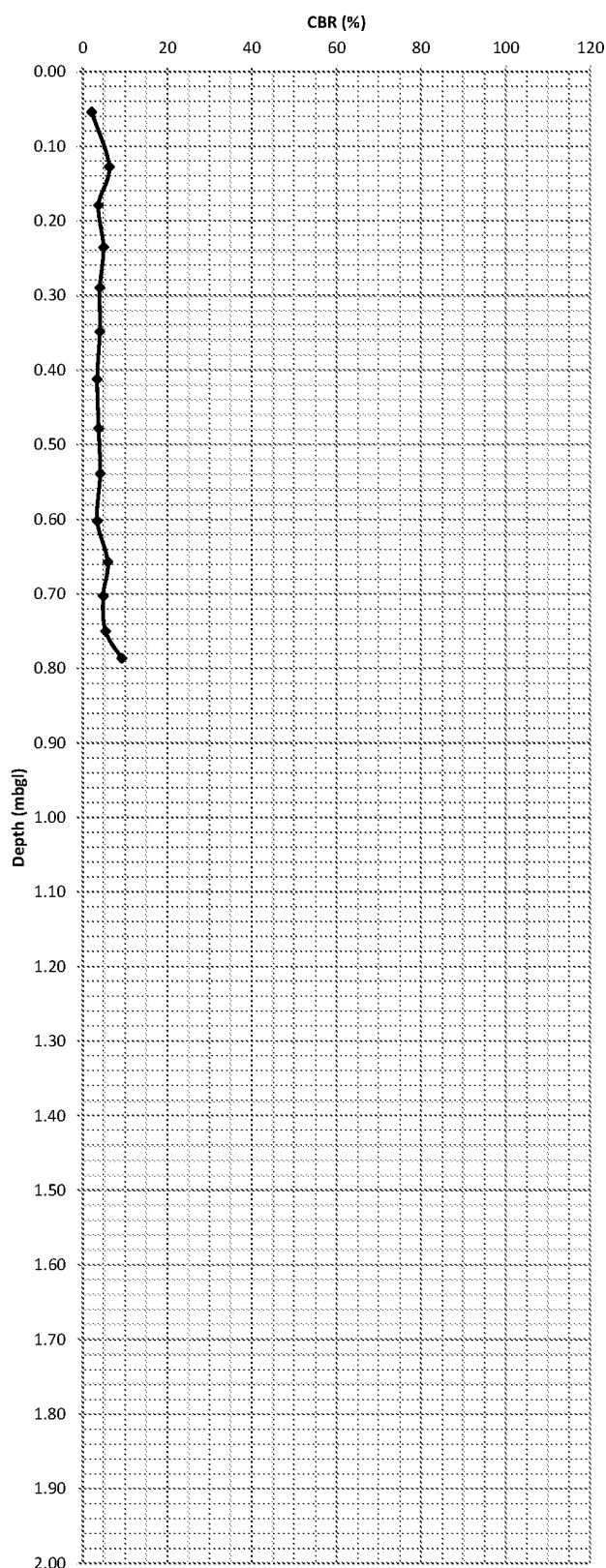
Test Location Reference	TP02
Depth of Start of Test (m bgl)	0.00

[illegible]

Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

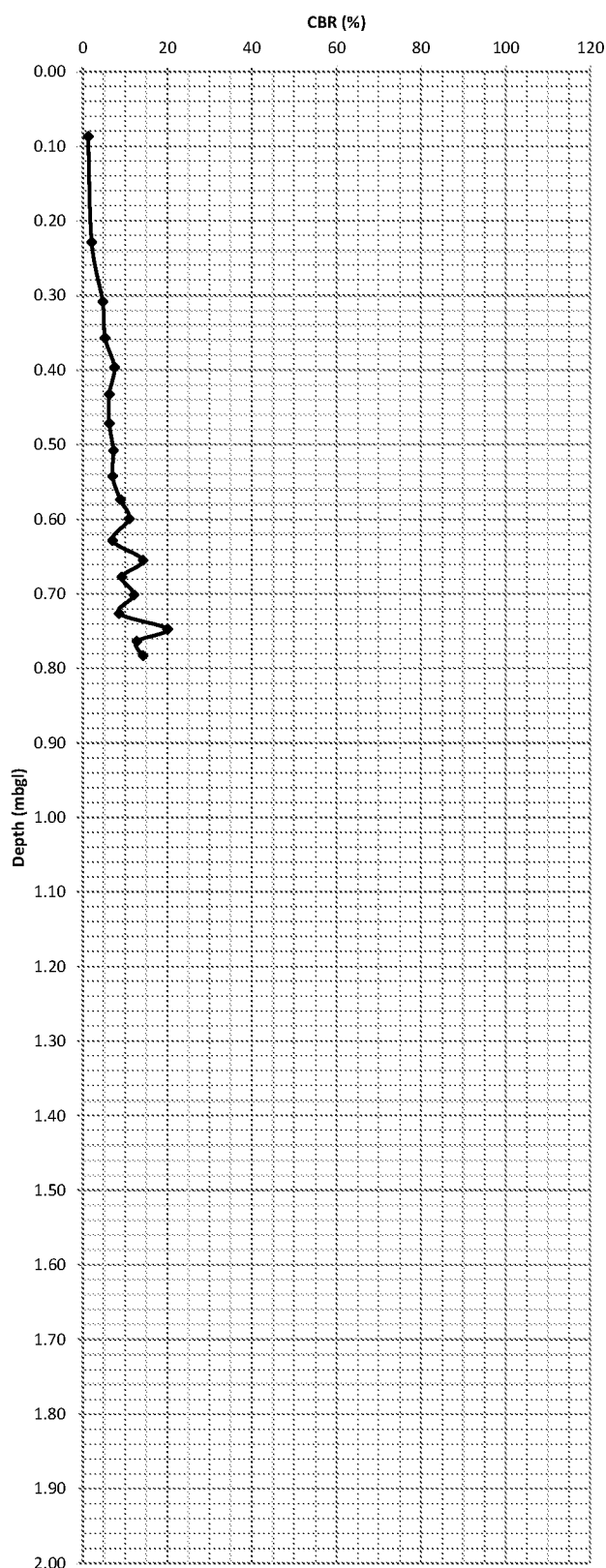
R18-12844



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

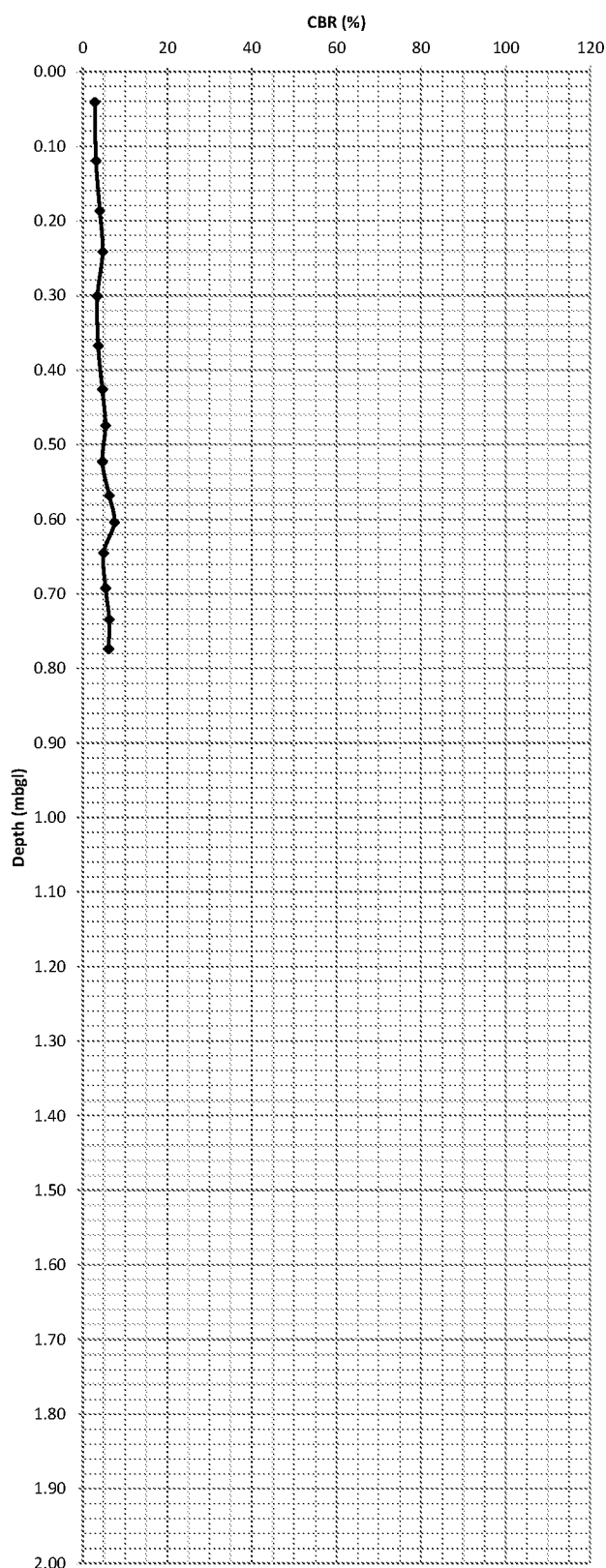
R18-12844

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Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

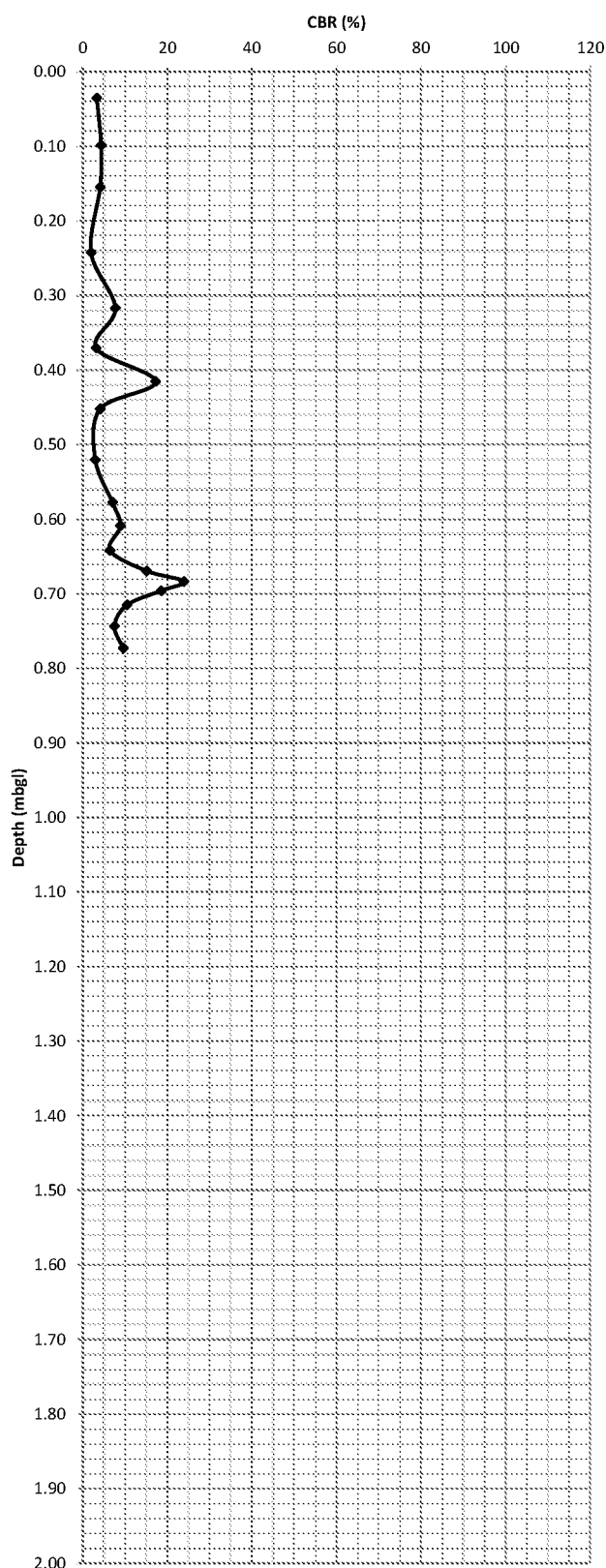
R18-12844



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

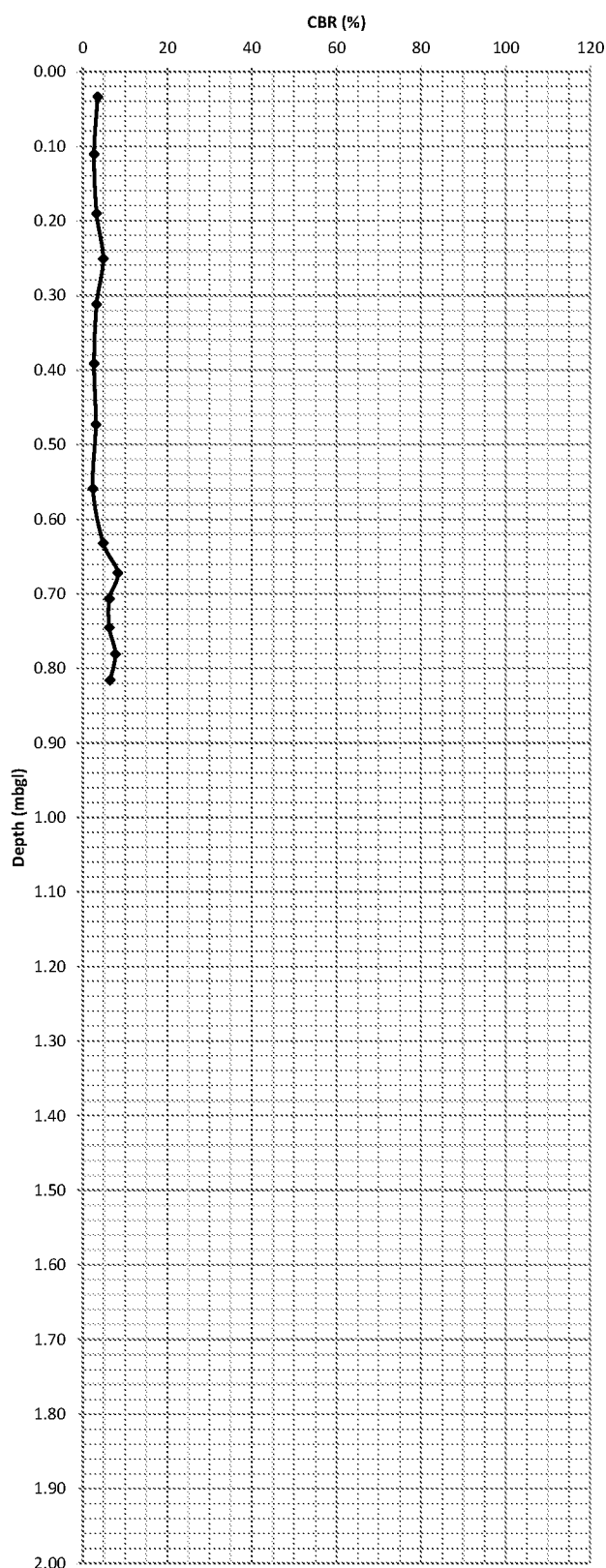
R18-12844



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

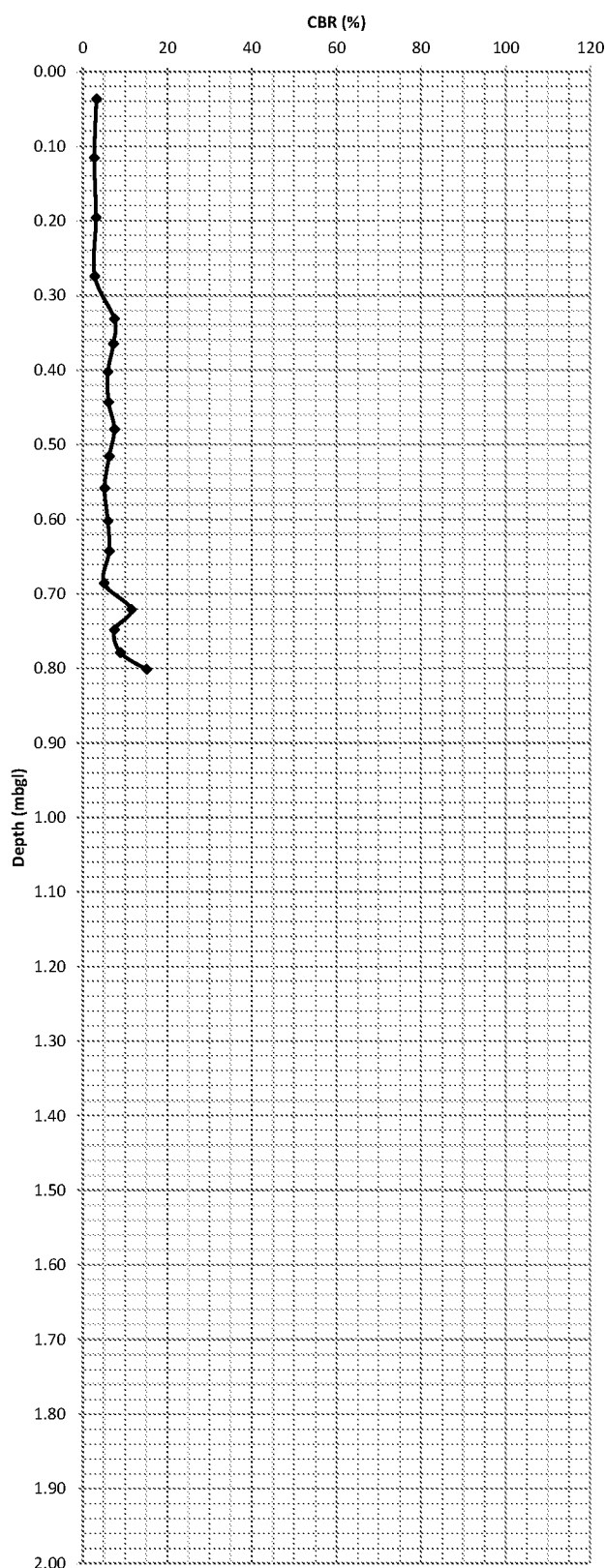
R18-12844

[illegible]

Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

TRL Dynamic Cone Penetrometer Record

R18-12844



Notes: CBR Value calculated in accordance with the TRRL equation given in TRL Road Note 8.

ASHDOWN SITE INVESTIGATION LIMITED

Site: Pound Place, Roundstone Lane, Angmering, West
Sussex

Report No.: R18-12844
Sheet No.: 1 of 1

SUMMARY OF BOREHOLE FALLING HEAD SOAKAGE TEST RESULTS

WS03		WS04	
Time (mins)	Depth to water (m bgl)	Time (mins)	Depth to water (m bgl)
0	*	0	*
Borehole Depth (m bgl)	3.00	Borehole Depth (m bgl)	3.00
Casing Depth (m bgl)	2.00	Casing Depth (m bgl)	2.00
Borehole Diameter (mm)	92.00	Borehole Diameter (mm)	92.00
Casing Diameter (mm)	105.00	Casing Diameter (mm)	105.00

Notes: bgl – below ground level.

*25 Litres of water introduced into the borehole three times which drained away instantly on each occasion.

ASHDOWN SITE INVESTIGATION LIMITED

Site: Pound Place, Roundstone Lane, Angmering, West Sussex	Report No.: R18-12844 Sheet No.: 1 of 3
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SUMMARY OF TRIAL PIT FALLING HEAD SOAKAGE TEST RESULTS

TP01 (Test 1)		TP01 (Test 2)		TP01 (Test 3)	
Time (secs)	Depth to water (m bgl)	Time (secs)	Depth to water (m bgl)	Time (secs)	Depth to water (m bgl)
0	1.90	0	1.10	0	0.96
10	2.13	10	1.54	10	1.40
20	2.33	20	1.85	20	1.67
30	2.54	30	2.13	30	1.84
40	2.73	40	2.34	40	2.00
50	Dry	50	Dry at 2.50*	50	2.16
				60	2.25
				70	Dry at 2.30*
Pit Length – 1.90m Pit Width – 0.45m Pit Depth – 2.80m bgl		Pit Length – 1.90m Pit Width – 0.45m Pit Depth – 2.80m bgl		Pit Length – 1.90m Pit Width – 0.45m Pit Depth – 2.80m bgl	

Remarks: bgl - below ground level.

*Trial pit collapsed during soakage testing.

ASHDOWN SITE INVESTIGATION LIMITED

Site: Pound Place, Roundstone Lane, Angmering, West Sussex	Report No.: R18-12844 Sheet No.: 2 of 3
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SUMMARY OF TRIAL PIT FALLING HEAD SOAKAGE TEST RESULTS

TP02 (Test 1)		TP02 (Test 2)		TP02 (Test 3)	
Time (secs)	Depth to water (m bgl)	Time (secs)	Depth to water (m bgl)	Time (secs)	Depth to water (m bgl)
0	0.95	0	0.85	0	0.87
10	1.43	10	1.25	10	1.16
20	1.73	20	1.48	20	1.32
30	2.05	30	1.70	30	1.50
40	2.22	40	1.96	40	1.70
50	2.36	50	2.05	50	1.85
60	2.43	60	2.16	60	2.00
90	2.55	90	2.33	90	2.20
120	Dry at 2.60*	120	Dry at 2.40*	120	Dry at 2.40
Pit Length – 1.90m Pit Width – 0.45m Pit Depth – 3.00m bgl		Pit Length – 1.90m Pit Width – 0.45m Pit Depth – 3.00m bgl		Pit Length – 1.90m Pit Width – 0.45m Pit Depth – 3.00m bgl	

Remarks: bgl - below ground level.

*Trial pit collapsed during soakage testing.

ASHDOWN SITE INVESTIGATION LIMITED

Site: Pound Place, Roundstone Lane, Angmering, West Sussex	Report No.: R18-12844 Sheet No.: 3 of 3
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SUMMARY OF TRIAL PIT FALLING HEAD SOAKAGE TEST RESULTS

TP03 (Test 1)		TP03 (Test 2)		TP03 (Test 3)	
Time (mins)	Depth to water (m bgl)	Time (mins)	Depth to water (m bgl)	Time (mins)	Depth to water (m bgl)
0	0.50	0	0.54	0	0.51
0.25	0.55	0.5	0.59	1	0.58
0.50	0.60	1	0.61	2	0.60
1	0.63	2	0.64	8	0.66
2	0.63	4	0.68	14	0.70
3	0.64	8	0.74	24	0.74
4	0.65	12	0.79	35	0.77
8	0.68	16	0.82	48	0.79
16	Dry at 0.75*	22	0.85	50	Dry
		28	Dry		
Pit Length - 0.30m Pit Width - 0.30m Pit Depth - 0.90m bgl		Pit Length - 0.30m Pit Width - 0.30m Pit Depth - 0.90m bgl		Pit Length - 0.30m Pit Width - 0.30m Pit Depth - 0.90m bgl	

Remarks: bgl - below ground level.

*Trial pit collapsed during soakage test and cleared to 0.90m before start of second test.

APPENDIX F

Geotechnical Laboratory Testing Notes

Geotechnical Test Results

Contamination Test Results

GEOTECHNICAL LABORATORY TESTING NOTES

1 Soil Description

Description and classification of soils has been carried out using as a general basis the British Standard Geotechnical investigation and testing – Identification and classification of soil, Part 1 Identification and description (BS EN ISO 14688-1:2002+A1:2013) and Part 2 Principles of classification (BS EN 14688-2:2004 +A1:2013) as well as the BS5930:2015 code of Practice for Ground Investigations.

2 Index Tests

Index (Atterberg Limit) tests are undertaken on samples of fine grained soils provide the primary information for the classification of fine grained soils.

Fine grained soil is tested to determine its liquid and plastic limits, which are moisture contents that define boundaries between material consistency states. These tests are used to evaluate indices used for soil identification and to help determine the shrinkage and swelling characteristics of the soil under conditions of changing moisture content. The tests are carried out in accordance with BS1377: Part 2: 1990 + A1:1996 Classification tests.

The consistency index is derived from the Index Tests and is summarized in the following table. These divisions may be approximate, particularly for low plasticity soils. The consistency recorded on the soil classification summary is derived from the consistency index.

Consistency	Consistency Index
Very Soft	<0.25
Soft	0.25 to 0.50
Firm	0.50 to 0.75
Stiff	0.75 to 1.00
Very Stiff	>1.00

3 Particle Size Distribution Tests

Sieve analyses are carried out soil samples to establish their particle size distribution that can assist in the assessment of the permeability and classification of granular soils.

The tests are carried out in accordance with BS1377: Part 2: 1990 + A1:1996 Classification tests.

4 Natural Moisture/ Saturated Moisture Content Determination of Chalk

The results of natural moisture or saturated moisture content tests of disturbed samples of chalk are used to assist in the classification of the chalk to determine key geotechnical parameters of strength, density and crushing properties.

The tests are carried out in accordance with BS1377: Part 2: 1990 + A1:1996 Classification tests.

5 Soil Suction Testing

Soil suction tests are undertaken for the determination of the state of desiccation in clay soils.

The testing is carried out in accordance with the Building Research Establishment Information Paper IP4/93, dated February 1993.

6 Triaxial Compression Tests

Undrained triaxial compression tests are carried out on undisturbed samples of cohesive soil in order to assist in the determination of the undrained shear strength of the soil. The results of moisture content and density determinations are also included.

The tests are carried out in accordance with BS1377: Part 7: 1990 + A1:1994 Shear strength tests (total stress).

7 Shear Vane and Hand Penetrometer Testing

Undisturbed samples are tested in the laboratory using a Geonor Hand Shear Vane for the determination of their undrained shear strength.

The vane tests are carried out in general accordance with BS1377: Part 7: 1990 + A1:1994 Shear strength tests (total stress).

8 One Dimensional Consolidation Tests

One-dimensional consolidation tests are performed on undisturbed soil samples to ascertain their settlement characteristics.

The tests are carried out in accordance with BS1377: Part 5: 1990 + A1:1994 Compressibility, Permeability and Durability tests.

9 Dry Density / Moisture Content Relationship (Compaction) Testing

Compaction testing for the determination of the dry density / moisture content relationship is carried out on using either a 2.5kg, 4.5kg hammer or a vibrating hammer.

The tests are carried out in accordance with the British Standard BS1377: Part 4: 1990 + A1 & A2:2002 Compaction-related tests.

10 California Bearing Ratio

The soil is usually compacted at the as dug "natural" moisture content and often at moisture contents around the natural moisture content.

The California bearing ratio is determined in accordance with the British Standard BS1377: Part 4: 1990 + A1 & A2:2002 Compaction related tests.

11 Chemical Testing

Soil samples are tested for their concentration of water soluble sulphate and pH for use in concrete mix design.

Water samples are tested for total sulphate concentration and pH value.

Where a water soluble sulphate content in soils or a total sulphate content in groundwater exceeds 3000mg/l SO₄ the magnesium sulphate content of the samples is required to be determined (BRE Special Digest 1:2005).

ASHDOWN SITE INVESTIGATION LIMITED

Soil Classification Summary

Site Name:	Pound Place, Roundstone Lane, Angmering, West Sussex	Job No:	R18-12844
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BH/TP No.	Depth (m)	Nat. Moist. Cont. (w %)	Equiv. Moist. Cont. (w _a %)	Atterberg Limits			Class'n	Cons. Index (I _c)	% passing 425 µm sieve	Visual Description of Sample
				W _L %	W _p %	I _p %				
TP01	0.80	25		43	20	23	CI	0.78*	100	Stiff brown silty CLAY.
WS01	2.60	14		46	19	27	CI	1.19*	31	Very stiff brown very gravelly CLAY. Gravel is fine to coarse flint.
WS03	1.20	24		41	20	21	CI	0.81*	100	Stiff brown silty CLAY.
WS04	2.70	9.7		62	20	42	CH		14	Brown clayey GRAVEL. Gravel is fine to coarse flint.
WS05	1.40	13		42	20	22	CI	1.32*	97	Very stiff brown slightly gravelly silty CLAY. Gravel is fine to coarse flint.

Test Method: Classification Tests BS1377: Part 2: 1990: Method 4.4, 5.3 and 5.4	Sheet No. 1
* Consistency index based on natural moisture content and not the equivalent moisture content.	

ASHDOWN SITE INVESTIGATION LIMITED

Moisture Content Summary

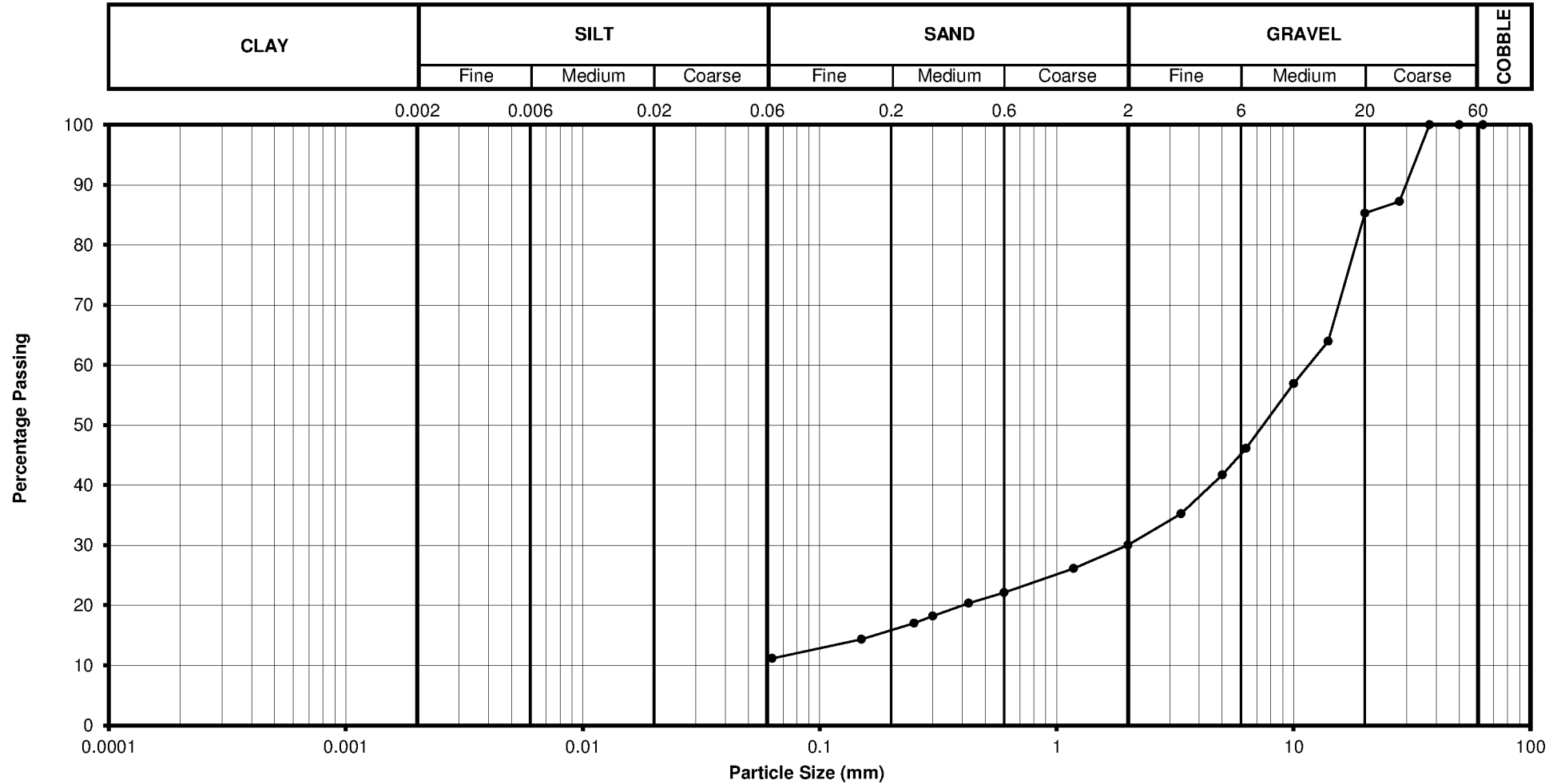
Site Name:	Pound Place, Roundstone Lane, Angmering, West Sussex	Job No:	R18-12844
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BH/TP No.	Depth (m)	Natural Moisture Content (w %)	Visual Description of Sample	Remarks
TP02	0.80	25	Brown silty CLAY.	
WS02	0.50	14	Brown silty CLAY.	

Test Method: Moisture Content BS1377: Part 2: 1990 3.2	Sheet No: 1
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ASHDOWN SITE INVESTIGATION LTD
Geotechnical and Geoenvironmental Engineers

Particle Size Distribution by Wet Sieve; BS1377: Part 2 1990



Job Name	Pound Place, Roundstone Lane, Angmering, West Sussex	BH/ TP No.	WS02	Sample Description	Sandy clayey GRAVEL.
Job No.	R18-12844	Sample Depth (m)	2.50		



Alex Bewick
Ashdown Site Investigations Ltd
Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
West Sussex
BN6 8SG

DETS Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN

QTS Environmental Report No: 18-72685

Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex

Project / Job Ref: R18-12844

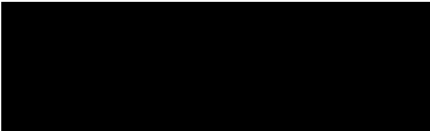
Order No: P18-5885

Sample Receipt Date: 23/03/2018

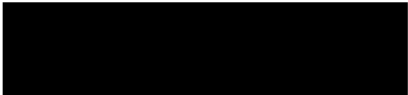
Sample Scheduled Date: 23/03/2018

Report Issue Number: 1

Reporting Date: 29/03/2018


Associate Director of Laboratory

Authorised by:


Deputy Quality Manager

QTS Environmental is the trading name of DETS Ltd, company registration number 03705645



DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN



Soil Analysis Certificate						
QTS Environmental Report No: 18-72685	Date Sampled	16/03/18	16/03/18	16/03/18	16/03/18	16/03/18
Ashdown Site Investigations Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex	TP / BH No	WS02	WS03	WS05	TP01	TP03
Project / Job Ref: R18-12844	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: P18-5885	Depth (m)	0.05	0.30	0.25	0.10	0.10
Reporting Date: 29/03/2018	QTSE Sample No	324051	324055	324056	324057	324058

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected		Not Detected
pH	pH Units	N/a	MCERTS	6.7	7.8	7.7	6.3	7.4
Organic Matter	%	< 0.1	MCERTS	4.5	2.2	1.6	2.7	3.1
Arsenic (As)	mg/kg	< 2	MCERTS	8	8	8	7	9
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	19	15	20	18	18
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	13	14	14	11	19
Lead (Pb)	mg/kg	< 3	MCERTS	32	42	20	21	52
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	12	10	13	12	14
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Zinc (Zn)	mg/kg	< 3	MCERTS	58	47	50	41	101

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 18-72685	Date Sampled	16/03/18	16/03/18	16/03/18	16/03/18	16/03/18
Ashdown Site Investigations Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex	TP / BH No	WS02	WS03	WS05	TP01	TP03
Project / Job Ref: R18-12844	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: P18-5885	Depth (m)	0.05	0.30	0.25	0.10	0.10
Reporting Date: 29/03/2018	QTSE Sample No	324051	324055	324056	324057	324058

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	< 0.1
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.15	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	< 1.6

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - EPH Banded (Type F)						
QTS Environmental Report No: 18-72685	Date Sampled	16/03/18	16/03/18	16/03/18	16/03/18	
Ashdown Site Investigations Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex	TP / BH No	WS02	WS02	WS02	WS02	
Project / Job Ref: R18-12844	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
Order No: P18-5885	Depth (m)	0.05	0.60	1.15	2.30	
Reporting Date: 29/03/2018	QTSE Sample No	324051	324052	324053	324054	

Determinand	Unit	RL	Accreditation					
EPH (>C8 - C10)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
EPH (>C10 - C12)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
EPH (>C12 - C16)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
EPH (>C16 - C21)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	
EPH (>C21 - C40)	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	
EPH (C8 - C40)	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - Sample Descriptions

QTS Environmental Report No: 18-72685

Ashdown Site Investigations Ltd

Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex

Project / Job Ref: R18-12844

Order No: P18-5885

Reporting Date: 29/03/2018

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
324051	WS02	None Supplied	0.05	21.2	Brown sandy clay with vegetation
324052	WS02	None Supplied	0.60	8.5	Brown sandy clay
324053	WS02	None Supplied	1.15	8.4	Brown sandy clay with stones
324054	WS02	None Supplied	2.30	4.1	Light grey sandy gravel with stones and chalk
324055	WS03	None Supplied	0.30	15.2	Brown sandy clay with stones
324056	WS05	None Supplied	0.25	11.4	Brown sandy clay
324057	TP01	None Supplied	0.10	21.6	Brown sandy clay with vegetation
324058	TP03	None Supplied	0.10	18.8	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{1/5}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 18-72685

Ashdown Site Investigations Ltd

Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex

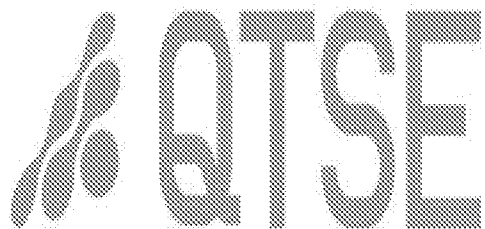
Project / Job Ref: R18-12844

Order No: P18-5885

Reporting Date: 29/03/2018

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 dphenylcarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



Alex Bewick
Ashdown Site Investigations Ltd
Unit 3 The Grain Store
Ditchling Common Business Park
Ditchling Common
West Sussex
BN6 8SG

DETS Ltd
Unit 1
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Rose Lane
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Kent
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QTS Environmental Report No: 18-72794

Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex

Project / Job Ref: R18-12844

Order No: P18-5886

Sample Receipt Date: 26/03/2018

Sample Scheduled Date: 27/03/2018

Report Issue Number: 1

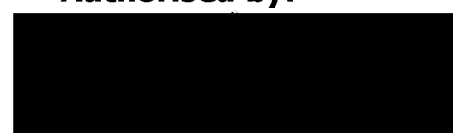
Reporting Date: 04/04/2018

Authorised by:



Russell Jarvis
Associate Director of Client Services

Authorised by:



Dave Ashworth
Deputy Quality Manager

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Soil Analysis Certificate						
QTS Environmental Report No: 18-72794	Date Sampled	16/03/18	16/03/18	16/03/18	16/03/18	16/03/18
Ashdown Site Investigations Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex	TP / BH No	WS01	WS02	WS03	WS04	WS05
Project / Job Ref: R18-12844	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: P18-5886	Depth (m)	0.90	1.50	2.80	0.60	2.80
Reporting Date: 04/04/2018	QTSE Sample No	324567	324568	324569	324570	324571

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	6.1	7.4	7.7	7.6	7.4
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	18	13	< 10	< 10	51
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.02	0.01	< 0.01	< 0.01	0.05

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C
Subcontracted analysis (S)



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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 18-72794	
Ashdown Site Investigations Ltd	
Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex	
Project / Job Ref: R18-12844	
Order No: P18-5886	
Reporting Date: 04/04/2018	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
\$ 324567	WS01	None Supplied	0.90	14.9	Light brown sandy clay
\$ 324568	WS02	None Supplied	1.50	5	Brown sandy clay with stones
\$ 324569	WS03	None Supplied	2.80	9.8	Brown sandy clay with stones
\$ 324570	WS04	None Supplied	0.60	12.2	Brown sandy clay
\$ 324571	WS05	None Supplied	2.80	5	Brown sandy gravel with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/5}

Unsuitable Sample ^{U/5}

\$ samples exceeded recommended holding times



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Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 18-72794

Ashdown Site Investigations Ltd

Site Reference: Pound Place, Roundstone Lane, Angmering, West Sussex

Project / Job Ref: R18-12844

Order No: P18-5886

Reporting Date: 04/04/2018

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

APPENDIX G

Classification of Probability, Consequence and Risk

Probability of risk being realised	
Classification	Definition
High	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution.
Moderate	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Very Low	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

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

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

APPENDIX H

Quantitative Conceptual Model

Pound Place, Roundstone Lane, Angmering, West Sussex				Quantitative Conceptual Model		R18-12844	
Source	Receptor	Contaminants	Pathway	Complete Linkage Present?	Probability	Consequence	Risk
No sources identified	End Users		Dermal contact with soil and dust (indoor & outdoor)	No sources identified			N/A
			Ingestion of soil and indoor dust	No sources identified			N/A
			Consumption of home-grown produce and attached soil	No sources identified			N/A
			Inhalation of soil dust (indoor and outdoor)	No sources identified			N/A
			Inhalation of soil vapours	No sources identified			N/A
			Inhalation of soil gases/ Risk of explosion	No sources identified			N/A
	End Users (via Water Supply Pipework)		Contamination of incoming services	No sources identified			N/A
	Groundwater		Migration to groundwater	No sources identified			N/A