

ASHDOWN SITE INVESTIGATION L·I·M·I·T·E·D

**Land at Arundel Road
Angmering
West Sussex**

Combined Geotechnical and Ground Contamination Risk Assessment

Report Beneficiary:

Mouse Developing
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Document Control			
Report Ref	Date	Notes	
R18-13087	August 2018	Final for issue	
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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 the ground investigation. 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 erect nine new dwellings with associated garages, private gardens and access road on land to the west of Arundel Road, Angmering, West Sussex.

The site currently comprises an overgrown area of land with trees along the northern, eastern and southern boundaries and a coniferous hedge along the western boundary.

The site comprised part of an open field at the time of the earliest inspected historical map, dated 1876. By 1971 three small structures had been erected in the north western part of the site, two of which were demolished post 1979. At the time of the walkover survey no structures were present on the site.

Reference to geological datasets indicates that the site is expected to be underlain by the Head deposits overlying London Clay Formation and in turn, Lambeth Group soils. The ground investigation confirmed the underlying soils to comprise a variable thickness of made ground, overlying the expected geological sequence.

The Head deposits are classified as a Secondary Undifferentiated Aquifer. The London Clay Formation and Lambeth Group are classed as an Unproductive Stratum and a Secondary A Aquifer, respectively. 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. Dataloggers previously installed at the site recorded the equilibrium groundwater table during February and March 2017 at depths of between 2.00m and 2.50m, approximately, in the northern and central parts of the site, rising above this level to close to surface during rainfall events. During the current phase of works, undertaken during a dry summer period, the majority of the boreholes were recorded to be dry on completion.

The preliminary contamination risk assessment identified potential pollutant linkages relating primarily to proposed end users of the site. The ground investigation identified locally elevated concentrations of lead and PAH that are considered to pose a risk to end users of the site.

The design of precautions against shrinkage and heave for any new foundation system should assume a high volume change potential for the fine grained Head/London Clay Formation soils.

A net allowable bearing capacity of 150kN/m² may be assumed for pad or strip foundations up to 1.5m across bearing within the fine-grained London Clay Formation soils of at least stiff consistency.

It is considered that the London Clay Formation and Lambeth Group deposits would provide support to piled foundations by a combination of side adhesion (skin friction) and end bearing. Indicative pile capacities are included in the body of the report.

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 London Clay Formation deposits or derived made ground soils. The subgrade is not likely to be susceptible to frost heave.

The results of the infiltration tests undertaken as part of the previous ground investigation works indicate that the soils possess negligible to poor infiltration characteristics.

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Proposed Development Layout

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Terra Firma TerraSearch Report

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1. INTRODUCTION

It is proposed to erect nine houses with associated garages, private gardens and access road on the site to the west of Arundel Road, Angmering, West Sussex. 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 quantitative ground contamination risk assessment of the site by Noel Boswijk of NB Architects, Unit Five, Level Four, South, New England House, New England Street, Brighton, BN1 4GH. 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 Q18-7170, dated 17th April 2018. The instruction to proceed was received from the client, Mouse Developing, on 5th July 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 foundations, ground floors and road pavement;
- 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.

Previous works have been undertaken by Ashdown Site Investigation Ltd² at the site. The findings of that report have been incorporated into this report.

¹ Geo-Environmental Data and Historical Maps (Ashdown Site Investigation Limited, Report Number R18-13087/map, dated July 2018).

² Groundwater Monitoring and In Situ Infiltration Test Results (Ashdown Site Investigation Limited, Report Number R17-11936, dated March 2017).

2. WALKOVER SURVEY

The site comprises an approximately rectangular shaped plot of land located to the west of Arundel Road, Angmering, West Sussex, and is centred on the approximate Ordnance Survey national grid reference TQ 0671 0537. 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 bounded by Arundel Road to the east, an area of derelict land to the north, a neighbouring residential property and small caravan camping site to the north west, and a small industrial area (comprising a vehicle dismantler's yard, a number of buildings in use as vehicle workshops and a caravan storage yard) to the south west. The access road for the industrial area, the residential property and the camp site runs immediately outside the southern and western boundaries of the site. Beyond the access road to the south is an area of overgrown land with what appears to be a small yard area used for the storage of waste materials.

At the time of the walkover survey the site was generally overgrown with weeds and scrub. An area of compacted crushed surfacing material was present inside the gateway in the north eastern corner of the site. Adjacent to this was a small quantity of waste material.

The site is level and a number of trees line the northern, eastern and southern boundaries, with a coniferous hedge running the length of the western boundary.

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	Head	Secondary Undifferentiated Aquifer
Bedrock	London Clay Formation	Unproductive Stratum
	Lambeth Group	Secondary A Aquifer

The Head deposits are shown on geological mapping data sets to be present only over the southern part of the site. The superficial Head is a polymict deposit generally comprising clay and sandy clay with variable amounts of gravel. The lithology of the Head reflects the nature of the parent solid strata. The material is likely to have been disturbed by intense frost action in a periglacial environment.

The London Clay Formation comprises a blue grey silty clay, which tends to weather to brown near to the upper surface. With depth, the clay becomes very stiff/hard, is frequently fissured and can contain some inclusions and beds of weak mudstone and siltstone.

The Lambeth Group (formerly named the Woolwich and Reading Beds) comprises a complex and laterally variable sequence of sedimentary deposits including clay, silt, sand and gravel. Inter-