

REPORT ON A DESK STUDY

at

**ANGELS NURSERY, YAPTON ROAD, BARNHAM,
WEST SUSSEX, PO22 0AY**

for

WEST SUSSEX COUNTY COUNCIL

Report No 09/8848/GO

November 2009



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FOREWORD

The following notes should be read in conjunction with the report. Any variations on the general procedures outlined below are indicated in the text.

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General

The recommendations made and opinions expressed in the report are based on the strata conditions revealed by the fieldworks as indicated on the boring and trialpit records, together with an assessment of the data from insitu and laboratory tests. No responsibility can be accepted for conditions, which have not been revealed by the fieldworks, for example, between borehole and/or trialpit positions. While the report may offer opinions on the possible configuration of strata, both between the excavations and below the maximum depth achieved by the investigation, these comments are for guidance only and no liability can be accepted for their accuracy. For investigations, which include environmental issues, the data obtained relate to the conditions which are relevant at the time of the investigation.

Boring Techniques

Unless otherwise stated, the light cable percussion technique of soft ground boring has been used. This method generally enables the maximum information to be obtained in respect of strata conditions, but a degree of mixing of some layered soils, for example, thin bands of coarse and fine granular soils, is inevitable. Specific attention is drawn to this occurrence where evidence of such a condition is available.

The penetration resistances quoted on the boring records have been determined generally in accordance with the procedure given in BS1377 : 1990. The suffix '+' denotes that the results have been extrapolated from less than 0.3m penetration into undisturbed soil.

Routine Sampling

During construction of boreholes, sampling and insitu testing will be completed in general accordance with Eurocode EN 1997-2 : 2007 and BS5930 : 1999. Variations to this code of practice will only occur where the strata conditions preclude implementation or the contract specifies alternatives.

Samples which are required for environmental testing will be stored in suitable glass containers in accordance with current guidelines.

Groundwater

The groundwater observations entered on boring and trialpit records are those noted at the time of the investigation. The normal rate of progress does not usually permit the recording of any equilibrium water level for any one water strike. Moreover, groundwater levels are prone to seasonal variation and to changes in local drainage conditions. The table on each boring record shows the groundwater level at the quoted borehole and casing depths usually at the start and finish of a day's work. The word 'none' indicates that groundwater was sealed off by the borehole casing, or that no water was observed in the borehole.

Trialpits

The method of construction employed to form the trialpits is entered in their records. In general, it is not possible to extend machine excavated trialpits to depths significantly below the water table, especially in predominantly granular soils. Except for manually excavated pits, and unless otherwise stated, the trialpits have not been provided with temporary side support during their construction, hence personnel have not entered them and examined the insitu exposed strata.

Window Sampling

Window sampling comprises driving a probe into the ground. On extraction of the probe the strata encountered are logged and representative disturbed samples recovered. In general, window sampling cannot be completed in granular soils, or below the water table.

Laboratory Testing

Unless stated in the tests, all laboratory tests have been performed in accordance with the requirements detailed in BS1377 (1990) : Parts 1-9, or other standards or specifications that may be appropriate.

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1.0 INTRODUCTION

It is understood that West Sussex County Council propose to redevelop the site which comprises Angels Nursery by the construction of a number of two and a half storey residential units with associated access roads, gardens and landscaped areas.

The programme of this investigation comprised the completion of a walkover survey and the preparation of an Envirocheck Report by the Landmark information Group. In addition, a request was made to the Local Authority to establish whether their records held any pertinent information pertaining to the site or the immediate environs.

This report describes the work undertaken, provides a conceptual site model for the site and makes recommendations for intrusive investigatory works. This report is for the benefit of the Client alone and cannot be assigned to a third party without the consent of Albury SI Ltd. Appendix 1 comprises a copy of the order for these works.

2.0 DESK STUDY

A desk study has been completed in accordance with BS:10175 entitled, "The Investigation of Potentially Contaminated Sites - Code of Practice".

2.1 Site Location and Topography

The location of the site is given on drawing no 09/8848/1 and is presented in Appendix 2 to this report. The site is located at Ordnance Survey National grid reference 496260, 104030 and covers an area of approximately 3.51 Ha. The site is currently or has been in the recent past two separate business ventures; Angels Nursery and Hyde Nursery. The Angels Nursery is currently inactive, while Hyde Nursery is occupied, but does not appear to be commercially operational, apart from the small roadside sale of eggs and vegetables.

The site under consideration is outlined in red and shown on drawing 09/8848/3 which is also presented in Appendix 2. It is bounded by nurseries to the south and east with Yapton Road to the north. To the east of the site there is open agricultural land, some residential properties and what appears to be a small holding.

The site is accessed from Yapton Road. There is single building, which was formerly a pair of semi-detached residential dwellings, only one of which is currently occupied by a tenant. In the northern part of Angel's Nursery there are three large polytunnels, which appear to have been in a state of disuse for a number of years due to the amount of overgrown areas.

The site includes a total of four large glass or greenhouses, two at Angel's Nursery and two at Hyde Nursery. The two main glasshouses at Angel's Nursery appear to have been in recent use, while those at Hyde Nursery are heavily overgrown and in a poor state of disrepair. Some overgrown polytunnel frames were present in the south-western corner

of the site, together with some discarded waste, including brick rubble, waste plants and plastic bin bags.

A number of smaller ancillary buildings were present on the centre boundary between the two nurseries. These include a refrigerated storage container, toilet block and a modern storage building. An internal inspection of the locked buildings was not possible at the time of the survey.

The site inspection and walkover survey was undertaken on the Thursday 19th November 2009. During the survey a total of 9 separate above ground storage tanks were observed. One of the tanks was noted to have leaked in the past and visual and olfactory observations indicated hydrocarbon contamination in the vicinity of the tank. It is presumed that, when in operation, the glasshouses would have been heated and the tanks would have been the primary fuel source. However, the main glasshouse of Angel's Nursery had a gas-fired heating unit within it.

During the visit a number of photographs were taken and these are presented in Appendix 2 together with a drawing showing the proposed site layout.

2.2 Envirocheck Report

Messrs Landmark Information Group has completed an Envirocheck Report and this document is presented either as a compact disk or as paper copy in Appendix 3 to this report. This report contains historical map data as well as information regarding the underlying geology, hydrogeology and potential sources of contamination within the site area that could adversely affect this development. A summary of the historical map data obtained from this document is presented in Table 1 below.

Table 1 – Historical Map Data

Date	Scale	Information
1877	1:2,500	The site forms part of open land. There is a Railway Line present 200m north of the site.
1880	1:10,560	No significant change
1897	1:2,500	There is a smithy present 180m north-west of the site and a nursery with a number of tanks & glasshouses to the north & north-east of the site.
1899	1:10,560	No significant change
1912	1:2,500	No significant change
1913-1914	1:10,560	No significant change
1938	1:2,500	The site is now portioned into two plots, with a number of buildings present in the north of the site. The site is bounded by residential gardens to the south and east.
1947	1:10,560 (AP)*	No discernable change
1938-1951	1:10,560	No significant change
1962	1:10,000	No significant change
1967	1:10,000	No significant change
1975	1:2,500	The site is now occupied by a number of glasshouses to the east. There are also a number of smaller buildings present.
1978 (partial)	1:2,500	No significant change
1980	1:10,000	No significant change
1984	1:2,500	No significant change
1987	1:2,500	No significant change
1989	1:2,500	The existing large glasshouse is now present with a tank and a drain identified on site.
1992	1:10,000	No significant change
1994	1:2,500	No significant change
1995	1:2,500	No significant change
2000	1:10,000	There is an outline plot now present in the south-west corner of the site.
2006	1:10,000	An additional outline plot is present in the south of the site.
2009	1:10,000	No significant change

*AP = Aerial Photograph

At the time of the earliest map the site was open land up until sometime between 1913 and 1938 when the site was separated into two plots, with a number of small buildings constructed in the northern part of the site. The site remained unchanged up until sometime between 1967 and 1975 when some glasshouses were constructed in the eastern half of the site. The large existing glasshouse present in the centre of the site appeared between 1987 and 1989 and the site has remaining relatively unchanged up to the present day.

2.3 Geology

An examination of the 1:50,000 British Geological Survey map of the area, sheet no 317/322 Chichester & Bognor, Solid and Drift, indicates that the site is underlain by Aeolian Deposits, formerly the Brickearth, of Quaternary age. These deposits are thought to be underlain by Raised Beach Deposits, which comprise sand and gravel of a similar age. At depth these soils are indicated to be underlain by the London Clay formation of late Eocene age.

2.4 Hydrology and Hydrogeology

The nearest surface water feature is a drain which runs down the centre of the site in a general north to south direction. The site is not within an area at risk from flooding from rivers or sea.

The site is noted to be underlain by a minor aquifer of variable leaching potential, which is most likely associated with the underlying Raised Beach Deposits. The site is not underlain by a Source Protection Zone. The nearest groundwater abstraction is located 279m south-east of the site and is used for spray irrigation.

2.5 Radon

The Envirocheck Report indicates that the site is in a Radon affected area where between 1% and 3% of homes experience radon above the action level. However, consideration of BRE report BR211, 'Radon – Guidance on Protective Measures for New Dwellings',

indicates that no protective measures are required in the construction of new dwellings or extensions.

2.6 Landfill Site/Trade Directory

The course of the former Chichester and Arundel canal is located 240m south of the site and is indicated as being landfill. No other officially recorded landfill sites are present within 250m of the site boundary and no areas of potential infilling were noted on the historic maps.

The trade directory information on land use indicates that there are no contemporary trade directory entries within 100m of the site boundary. However, it is known that the site has been used as a pair of garden nurseries for a number of years.

2.7 Consultations

The Local Authority, West Sussex County Council, was asked to provide information pertaining to the site and its immediate environs with regard to potential sources of contamination. At the time of the issue report no response had been received to the enquiry.

No potential issues were highlighted that warranted consultation with the Environment Agency at the time of the preparation of this report.

The British Geological Survey was asked to provide records for boreholes constructed in the local vicinity. The quality of the documents provided is considered to be poor and copies are presented in Appendix 4.

3.0 DISCUSSION

It has been proposed that the site be redeveloped for residential usage. The site has historically been used for commercial/industrial purposes and as such, it is likely that potentially contaminative activities have occurred within the site area.

3.1 Conceptual Site Model

In accordance with the Code of Practice BS:10175 entitled "Investigation of Potentially Contaminated Sites – Code of Practice", a conceptual site model has been prepared for this site. This model, which is presented in tabular form below, identifies any potential contamination, the receptors and the pathways between the two.

Table 2 – Conceptual Site Model

Contaminant/Source	Pathway	Receptor	Risk
Above ground fuel tanks, abandoned vehicles (hydrocarbons)	Dermal Contact, Ingestion	Site workers, end-users, drain	Moderate
	Surface water migration	Minor Aquifer	Low
Storage and use of Herbicides & Pesticides (organic and inorganic)	Dermal Contact, Ingestion	Site workers, end-users, drain	Low
	Surface water migration	Minor Aquifer	Low
Made ground (landfill gases)	Soil migration	End-users	Low
Potential Asbestos	Inhalation	Site Workers	Low

It is evident from the above table that there a number of potential sources of contamination at the above site. A total of 9 separate above ground storage tanks were observed at the above site, one of which appears to have leaked recently. A number of old agricultural vehicles were noted around the sit, which appeared to use simple petrol engines. An overgrown motor car was also observed on site.

It is likely that fertilisers and pesticides were stored at the above site, both for sale for use during the operations of the nursery. There is also a risk that made ground may be present, as a large amount of discarded waste was apparent at surface in the south-west corner of the site.

In the greenhouses there appeared to be some type of sheeting supporting the worktops, which was suspected to contain Asbestos. Hence, due to the age of the structures on site, it may be prudent to carry out an Asbestos survey at this site. The work must be completed by competent licensed personnel.

3.2 Groundwater

The overlying Brickearth, comprised predominantly of silt or clay, will afford some protection to the underlying minor aquifer. Hence, the risk posed from migration of mobile contaminants, such as hydrocarbons, is considered to be low. Nevertheless, should groundwater be encountered during an intrusive investigation then it will be necessary to obtain samples for testing in order to establish whether the groundwater has been impacted.

3.3 Further Investigation

The Desk Study has noted a number of potential sources of contamination deriving from within the site boundary. Consequently, additional investigation works are recommended at this site.

It is recommended that a series of trial pits are constructed across the site to determine the ground conditions and obtain samples for contamination testing. It may also be prudent to install standpipes, should significant thicknesses of made ground be encountered, to carry out landfill gas monitoring. The standpipes could also be used for groundwater sampling in the event that a water table is identified by the site works.

Prior to the completing of any further investigation or site works it is recommended that the scope and extent of the proposed investigation are discussed with the Local Authority WSCC, Environment Agency and where necessary the NHBC, to ensure that it meets with their approval.