GROUND CONDITIONS DESK STUDY

Site at

37 TIVYDALE ROAD
CAWTHORNE

Report No 2712
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1 Introduction

This Desk Study was carried out on the instructions of the Doyle Partnership dated 1 May 2008

It is proposed to develop an area of land on the east side of 37 Tivydale Road with, initially, a new dwelling, access road, and garage area.

Geotechnical Services have carried out a geological, historical, and mining desk study in order to outline any geotechnical constraints likely to be present in the ground and to advise on further intrusive site investigation works.

The report was produced on the behalf of our Client, Mr and Mrs Watkinson and their advisors, and should not be relied upon or transferred to any other parties without the express written permission of Geotechnical Services (Northern) Limited and our Client. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and the authors owe them no duty of care or skill.

2 The site

2.1 Location

The site is located near the south west end of Cawthorne village and lies about Ordnance Survey National Grid reference SE 28100 07550 as indicated on the **Site Location Map, Fig 2712-1.**

The site comprises a nearly rectangular plot some 45m by 65m in extent bounded by Back Lane along its eastern boundary. The eastern half of the plot lies at an elevation of 100 to 104m AOD. The western half slopes steeply down to about 94m AOD.

The existing property, No 37 Tivydale Road and its gardens, borders the west side of the site and lies within the valley of the Tanyard Beck. The Beck has a bed level of about 89.5m AOD.

An existing access driveway some 40m long from Tivydale Road crossing the Beck will be improved. This driveway also serves a property to the north of the site.

2.2 Historical uses

The development of the site and surrounding area has been assessed from inspection of copies of the full series of historical Ordnance Survey mapping from 1855 to 2008 at scales of 1:10560, 1:10,000, and 1:2500.

Extracts from the 1:2500 scale maps dated 1893, 1906, 1931, 1961, 1976, and 1993 are appended to this report.

There is no development shown on these maps at the main part of the site (but refer to Mining below).

2.3 Current uses of site

At the time of this report the site was mainly overgrown with self seeded weeds. A belt of semi mature sycamore and some oak with much thorn and gorse lay along the eastern quarter of the main site.

2.4 Adjacent uses

Dwellings are shown along Tivydale Road to the north west of the site and just beyond the south west corner from the 1855 mapping onwards.

There is a dwelling shown at the position of the existing No 37 Tivydale Road from at least 1893; this dwelling has been extended or rebuilt by the 1961 mapping. Small outbuildings lie to the north east of this dwelling over most of the period.

The land immediately north of the main site is undeveloped until a dwelling appears on the 2000 mapping.

A dwelling appears on the land immediately south of the site on Back Lane from 1961.

The land to the east of Back Lane contains a sandstone quarry on the 1855 mapping. It is then undeveloped until housing first appears on the 1993 mapping.

3 Geology

3.1 Geological mapping

The geology of the area is detailed on the British Geological Survey (BGS) six inch to one mile scale Yorkshire County Sheet 274NW, and in the Memoirs: *The Geology of the Country around Barnsley*, 1989.

The site lies on Lower and Middle Coal Measures of the Carboniferous Period which have a generally easterly dip.

The Upper Silkstone Coal is shown outcropping parallel to Tanyard Beck at the foot of the steep slope along the west boundary of the main site. This coal passes below the site at a shallow depth.

The Lower Silkstone Coal lies some 3 or 4 metres below the Upper Silkstone in this area.

The upper eastern part of the site lies on a sandstone, the Silkstone Rock. The western half of the site lies on dark shales which overly the Silkstone Coal. These shales contain the Claywood Ironstones, a black shale with ironstone nodules.

3.2 Previous site investigations

No records of previous investigations at the site have been located.

Records of 3 boreholes drilled in 1989 at the site immediately to the north have been obtained from the BGS. These indicate the following sequence of strata:

Made ground of clay, shale, and mudstone	2.0 to 2.5m thick
Mudstones, shaly, with some black shale bands	Down to 9.0 to 9.5m
Intact coal with a thin mudstone parting	1.2 to 1.5m thick
Shaly mudstones to base of holes at 12.0m depth .	

The locations of these boreholes are not recorded with any accuracy; it is assumed they are at the position of the house shown on the 2000 mapping.

3.3 Mining and quarrying

Quarrying of the sandstone to the east of Back Lane is shown on the 1855 mapping and the geological sheets. This quarry was generally backfilled when the A635 Lane Head Road was built prior to the 1935 mapping.

Air shafts are shown on the historical maps and the geological sheet to the north and to the south east of the site.

Mining of the (Upper) Silkstone Coal is shown on the abandonment plan for the **Tivydale Colliery** dated 1928. Part of this plan has been enlarged at **Fig 2712-2** and the positions of the site boundary and the existing house and garages at No 37 Tivydale Road have been superimposed.

The coal was accessed from two adits immediately behind the present garages, and from the shaft immediately south east of the site. Older shafts and old workings are also recorded on the abandonment plan.

The shaft depth shown (70 feet) appears to be deeper than the Upper Silkstone Coal. It is probable that this was sunk to investigate the Lower Silkstone.

The elevations of the Silkstone Coal have been estimated from the abandonment plan and are superimposed on the proposed development plan at **Fig 2712-3**.

There are no records of workings in the Claywood Ironstones. However most of such workings are ancient, even as far back as the Iron Age. The presence of much shaly debris in the surface materials at the site suggests that digging of the ironstones has taken place at some time.

4 Engineering considerations

4.1 Mineworkings

Recorded mineworkings in the Upper Silkstone Coal are present under the proposed house at a shallow depth which would influence development at the surface if collapse of the workings occurs.

It is recommended that these workings are stabilised by means of grout injection under the footprint of the house. The depth and position of the workings is reasonably well recorded, therefore additional borehole investigation is not necessary prior to the grouting operation.

It can reasonably be assumed that once the Upper Silkstone Coal workings are stabilised, any workings in the Lower Silkstone will have sufficient cover over them to protect development at the surface.

It is recommended that the position of the possible future dwelling be investigated. No workings are recorded here and the drilling for the house to the north also revealed solid coal. It would be prudent to check this area by means of rotary openhole boreholes. One borehole could be taken deeper to investigate the condition of the Lower Silkstone Coal at the same time.

The access road can be assumed to be a non-critical structure and less likely to be affected by any movement of the old mineworkings. It is also probable that mine excavations close to the weathered steep slope are most likely to have collapsed and closed up already.

4.2 Excavations

Most excavations will take place in shaly made ground or in intact shales. It should be assumed for design purposes that slopes in such material will be temporarily stable at the angle of repose (friction angle) of the material, and will require vegetation cover as soon as possible to prevent erosion.

Machine dug trial pits should be taken into the shallow soils to sample the materials for the determination of their geotechnical properties.

5 Environmental considerations

At this stage it is considered most unlikely that contamination exists in the ground. The working of a small coal mine prior to the 1920s would involve little heavy machinery or oil and fuel wastes.

Coal wastes however tend to contain elevated arsenic levels and it would be prudent to carry out appropriate analyses as part of a Phase II investigation. Should arsenic be present at levels in excess of acceptable criteria for the proposed domestic end use, then remediation measures comprising capping of such areas with clean soils may be required.

Shallow disturbance of the ground may be present from ancient ironstone workings; it is likely that these areas were backfilled well before modern times.

The sandstone quarry to the east of the site was backfilled during or before the construction of the A635 highway shown by the 1935 mapping. It is not recorded in the Environment Agency or the BGS databases as either a current or historic landfill site.

It is considered unlikely that mine gases will present a hazard because of the proximity of the outcrop and the relative ease of venting to atmosphere. However it would be prudent to install gas monitoring pipes in boreholes or trial pits during a Phase II investigation to confirm the absence of both mine and landfill gases. Should gases be present in unacceptable levels then the dpm for proposed house may be upgraded and passive venting of ground floors be installed.

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Geotechnical Services (Northern) Limited	11/8/2008