

Report No. BC/MB/09.17.02/2.

Site Investigation Report: Land at Goatmill Road, Dowlais, Merthyr Tydfil.

Prepared on behalf of:

M. DeLacey and Sons (Holdings) Ltd.

By:



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Site Investigation Report: Land at Goatmill Road, Dowlais, Merthyr Tydfil.

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BC/MB/09.17.02.01.	<i>General Location Plan.</i>	1:50,000.
BC/MB/09.17.02.02.	<i>Geology Plan.</i>	1:10,560.
BC/MB/09.17.02.03.	<i>Detailed Location Plan.</i>	1:1,250.
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Appendix

Graphic Borehole Logs.

Site Investigation Report: Land at Goatmill Road, Dowlais, Merthyr Tydfil.

1 Introduction

This report has been prepared on behalf of our client: M DeLacey & Son (Holdings) Ltd., Goatmill Road, Dowlais, Merthyr Tydfil, CF48 3TD and relates to a parcel of land adjacent to DeLacey's Offices and yard on Goatmill Road, where it is proposed to erect small industrial units. An earlier coal mining risk assessment (CMRA) prepared for the Site identified a risk from shallow mine workings and recommended exploratory boreholes to examine the shallow geology underlying the Site. This report discusses the findings of the site investigation programme undertaken at the Site.

The following sources of data were used in the compilation of this report:

- i) *The findings of the 'Mining Risk Assessment on Land at Goatmill Road, Dowlais, Merthyr Tydfil' published by Blandford Consulting, reference no. BC/MB/09.17.02;*
- ii) *The findings of the site investigation undertaken at the Site and*
- iii) *the archive records of Blandford Consulting.*

The findings of this report are necessarily based upon the data used in its compilation and may be amended in the future in the light of additional material information. The report must only be used in its entirety for its stated purpose.

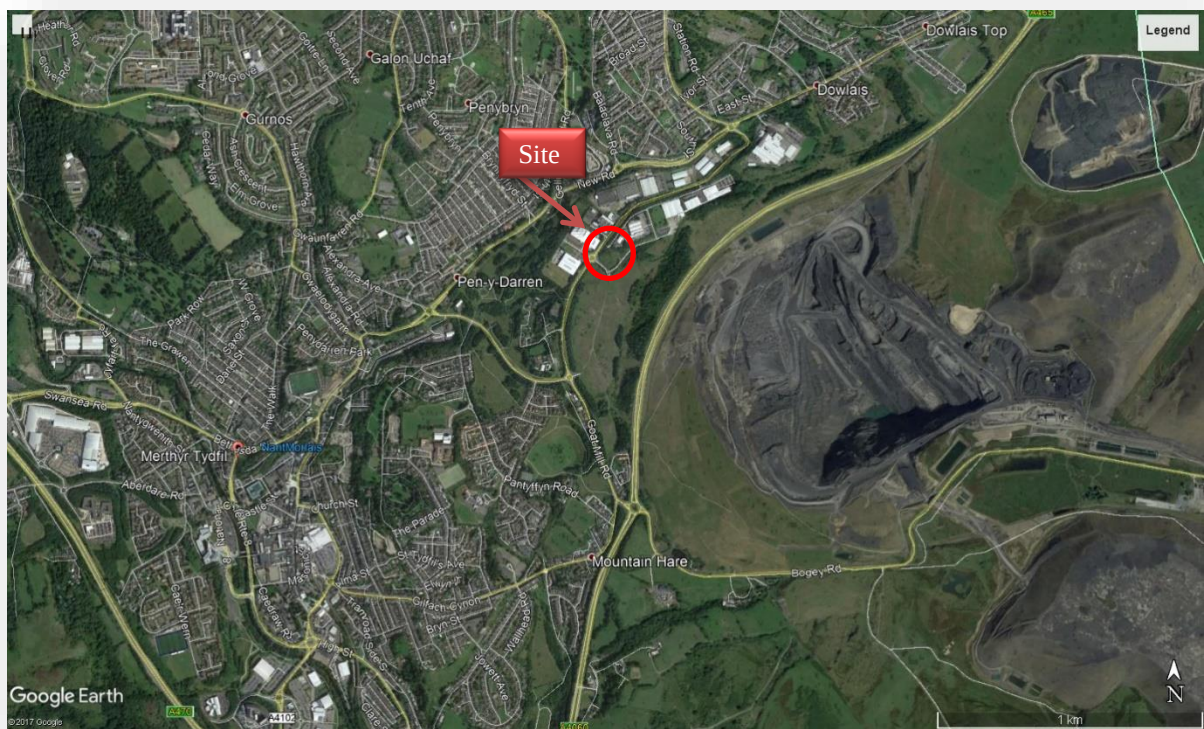
2 Brief Description of the Site

The Site is located in the Dowlais District at the eastern extremity of Merthyr Tydfil, approximately 1.8km north-east of the centre of the town (see *General Location Plan, drawing no. BC/MB/09.17.02.01*). The Site is on the eastern side of Goatmill Road, which is an industrial

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estate. Buildings on the industrial estate occupy land to the north and west of the Site; to the east and south is a relatively level area that is unoccupied in readiness for industrial development. The Site, itself is on the north-west corner of the land designated for industrial development. The Site is irregular in outline and occupies an area of approximately 0.65 hectares. Figure 1 Aerial View of the Site.

Figure 1
Aerial View of the Site



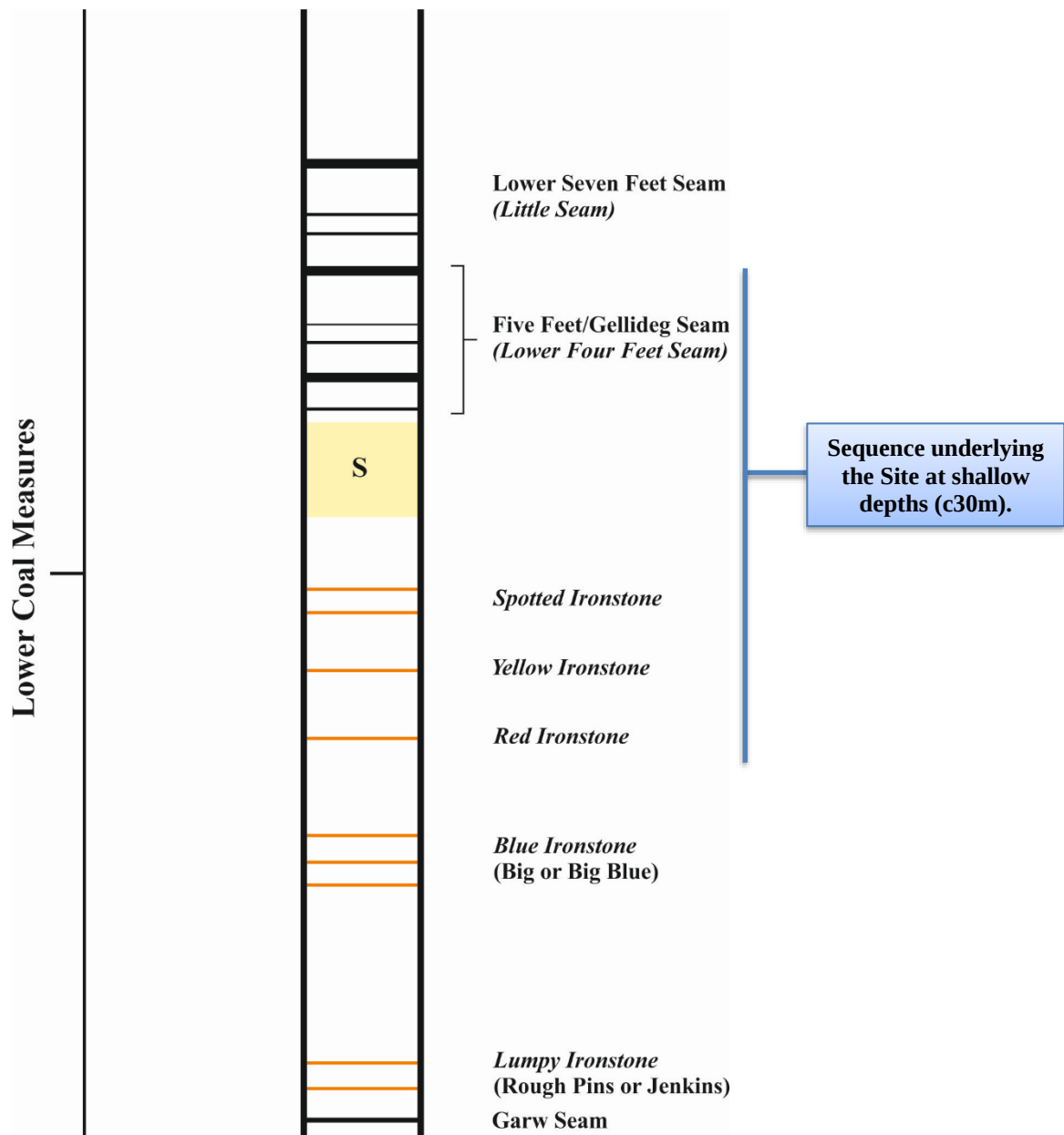
3 Geology of the Site

The Site is underlain at shallow depths with strata assigned to the Lower Coal Measures, a sub-division of the Upper Carboniferous Period. The inferred position of the outcrop of the Gellideg Seam is shown, on the published 1:10,560 scale geological sheet (SO 00 NE), to pass through the Site with a north-eastern trend (see *General Geology Plan, drawing no. BC/MB/09.17.02.02*). Beneath the Gellideg Seam there are a number of ironstone veins and the Garw Seam of coal (see Part of the Stratigraphic Column below), that together with the Gellideg Seam, all underlie the Site at relatively shallow depths. Mining records further suggest that the

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Lower Seven Feet Seam, locally known as the Little Seam and which overlies the Gellideg Seam, may also underlie at least part of the Site at shallow depth.

Figure 2
Part of the Stratigraphic Column.
 (Based on BGS Published Data)



The published geological sheet indicates that no large faults affect the Site; the nearest such fault is the Dowlais Fault, approximately 90m north-east of the Site.

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The published geological sheet shows the coal measures to be overlain with deposits of glacial till, Boulder Clay.

The published geological sheet also identifies that the Site is not affected by landslip.

4 Mining History

The earlier CMRA identified a possible risk of there being ‘potential’ workings underlying the Site, *i.e.* possible shallow old workings for which The Coal Authority holds no plan records. The CMRA recommended exploratory boreholes to determine if the suspected old workings are present.

Otherwise, the CMRA found no recorded disused mine entries within the Site or within 20m of it and found there to be no active coal mines in the locality, either deep mines or opencast, that would affect the structural integrity of the proposed development. The Site has been part of an opencast coal site, but lies outside the excavation area.

5 Mine Gases

The CMRA considered the risk from mine gases to be low but advised that the exploratory boreholes should be monitored for mine gases.

6 Site Investigation

6.1 Site Investigation Programme

A programme of seven boreholes was designed for the Site, each borehole was planned to extend to a depth of 30m; one additional borehole was added to the programme. The boreholes were drilled by Apex Drilling Services under the supervision of a Chartered Geologist and under the terms of The Coal Authority’s permit 24239. The boreholes were monitored for the presence of mine gases.

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6.2 The Findings of the Exploratory Boreholes

Each of the boreholes encountered Made Ground that was found to vary in thickness between 3.5m in Borehole 4 to 6.50m in Borehole 1. Beneath the Made Ground each of the boreholes encountered Sand and Gravel that was found to extend to a maximum depth of 15.40m in Borehole 2. Only in Borehole 6 the driller described the lowest superficial deposits as Boulder Clay, between the depths of 8.80m and 11.20m. Beneath the superficial deposits coal measures comprised of sandstone, mudstone and coal were proved to a depth of 30m.

Three coal seam horizons were encountered in the boreholes. The upper horizon was encountered only in Borehole 8, where 1.30m of soft drilling with no air returns was encountered immediately beneath the base of the Sand and Gravel deposit. It would have been exceptionally difficult to have mined coal up to the base of the Sand and Gravel deposits and the finding is not conclusively backfilled old workings.

The middle coal seam horizon was encountered with its base at depths of between 16.80m and 21.60m, the coal seam was variously found to be a single leaf of coal and elsewhere was found to be made up of two leaves of coal. The seam was found to have been partially or completely worked in Borehole 3, 5, 6 and 7.

The lowest of the three coal seam horizons was encountered only in Borehole 4, 1.20m of coal at 26.40m. The seam was not encountered in other boreholes that were deep enough to have intersected it, the seam may be subject to washout conditions.

6.3 Mine Gases

No mine gases were encountered during the drilling operations.

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7 Discussion and Recommendations

In the upper coal seam horizon suspected old workings were encountered only in Borehole 8, where 1.30m of soft drilling with no air returns was encountered immediately beneath the base of the Sand and Gravel. It is not clear that the soft drilling indicates the presence of backfilled old workings because it would have been exceptionally difficult to have mined coal up to the base of the Sand and Gravel deposits. The horizon was encountered only in Borehole 8, so that the seam would be at outcrop within the Site. Any old workings at this horizon would carry an extremely high risk of them collapsing to the base of the sand and gravel deposits and inducing subsidence at the surface.

The majority of the provings of the old workings at the middle coal horizon have strata: void ratios varying between 1.65:1 and 3.2:1. These ratios are all significantly lower than the 10:1 ratio generally accepted as being the limiting ratio for old workings to collapse to the surface. There is a high risk of the old workings reaching the surface and inducing subsidence. It is recommended either that these old workings are stabilised by means of drilling and grouting or otherwise that further site investigation is undertaken to assess the soils conditions in order to determine if the risk of collapse can be mitigated using a reinforced raft foundation. Any drilling and grouting operation undertaken to stabilise these old workings would deal with any old workings that might be present in the upper coal seam.

Any further assessment of foundation options would also need to take into account the possibility of old workings in the upper coal seam.

Any drilling and grouting exercise planned for the Site will require a permit from The Coal Authority.

The boreholes did not encounter any features that would be associated with a disused shaft or adit on the Site. There remains a low risk of a disused mine entry being present on the Site and future excavations should be carefully monitored for any unusual features that might indicate the presence of a disused mine entry. If anything unusual is encountered then excavation works must be stopped immediately and advice sought from a Chartered Geologist or other competent person or else from The Coal Authority.

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8 Foundation Options

The results of any drilling and grouting exercise carried out at the site, together with the findings of any further site investigation carried out at the Site to examine the soil conditions will be required in order to assess the most appropriate foundation options.



**Dr Malcolm Blandford,
Chartered Geologist.**

Report Date: 21st March 2022.

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PLANS



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Geologists Working With The Environment....

Report on Land at Goatmill Road,
Penyard, Merthyr Tydfil.

General Location Plan.

Plan Scale: 1:50,000.

Key to Symbols:



Approximate Position of Site.

Note:

North is at top of plan.

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Geologists Working With The Environment...



Report on Land at Goatmill Road,
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Geology Plan.

Plan Scale: 1:10,560.

Key to Symbols:



Approximate Position of Site.

Note:

North is at top of plan.

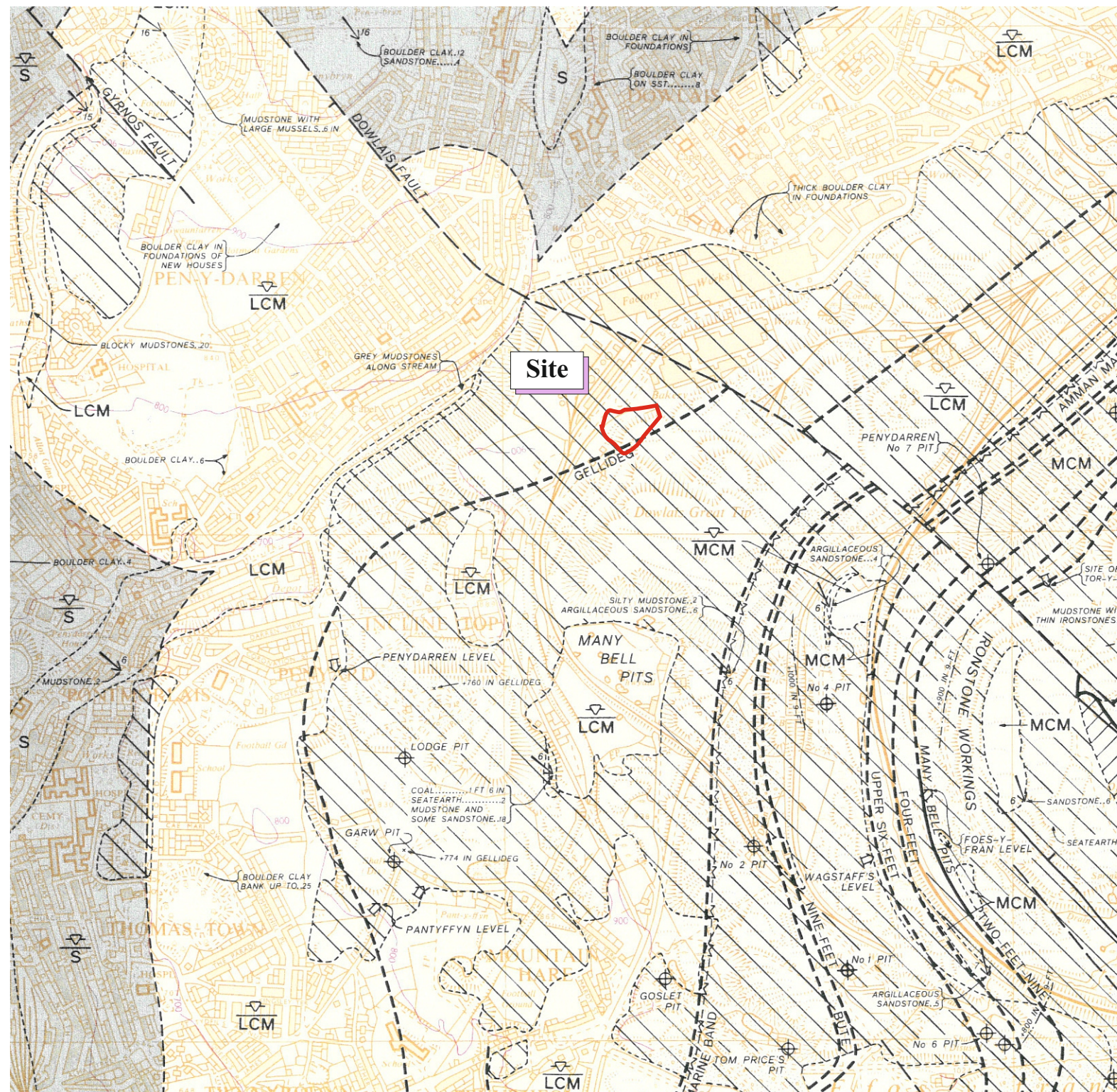
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Drawing No: BC/MB/09.17.02.02.



Report on Land at Goatmill Road,
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Detailed Location Plan.

Plan Scale: 1:1,250.

Key to Symbols:

 **Approximate Site Boundary.**

Note:

North is at top of plan.

*Drawing extracted from documents
provided by the client.*

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Drawing No: BC/MB/09.17.02.03.



Report on Land at Goatmill Road,
Penyard, Merthyr Tydfil.

Borehole Location Plan.

Plan Scale: 1:500.

Key to Symbols:

-  Approximate Site Boundary.
-  Approximate Borehole Position.

Note:

North is at top of plan.

Drawing extracted from documents provided by the client.

Plan is for identification only, do not scale from this plan.

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Drawing No: BC/MB/09.17.02.05.

APPENDIX

COPY OF GRAPHIC BOREHOLE LOGS



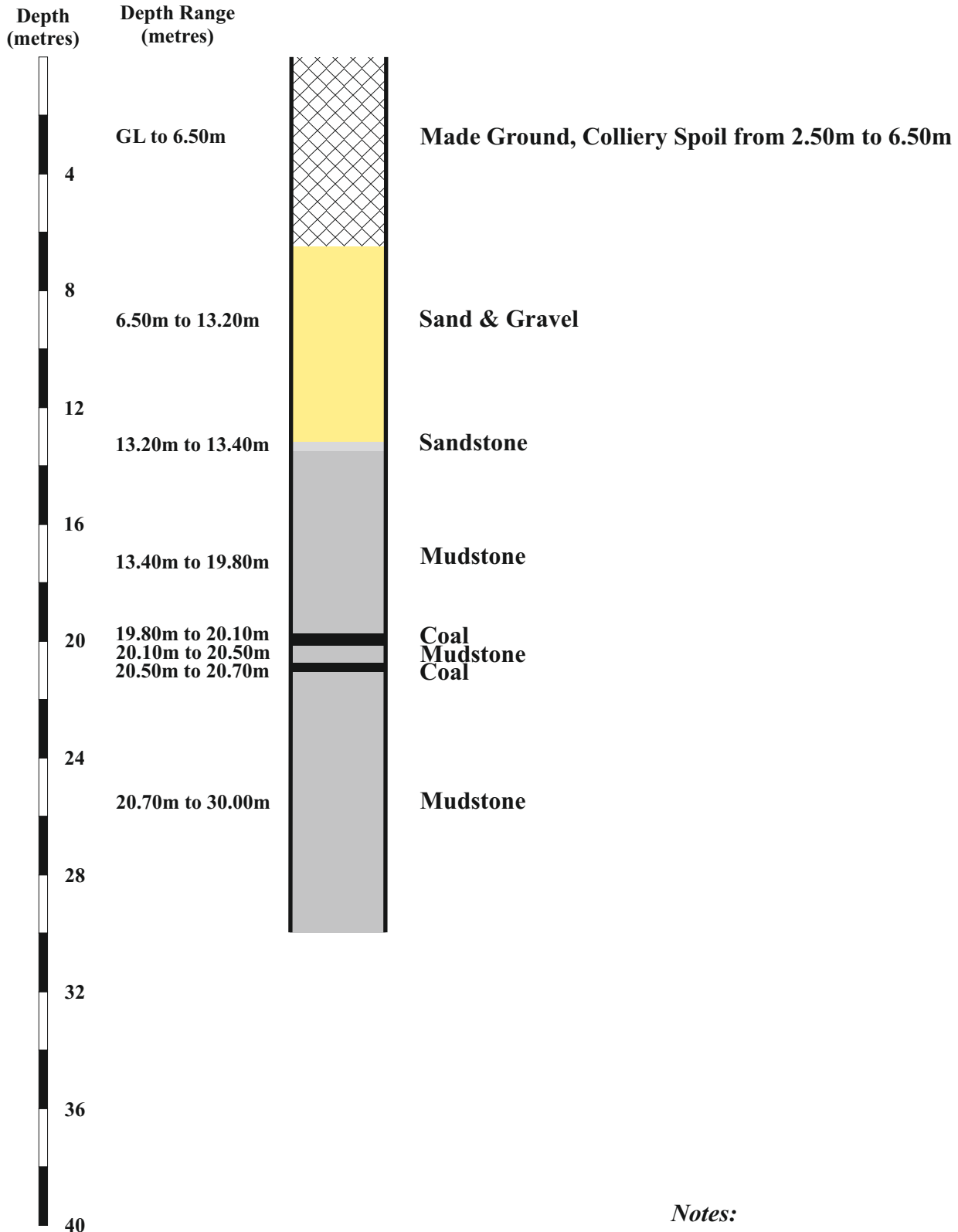
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Geologists Working With The Environment....

Study on Land at Goat Mill Road.

Borehole No. 1

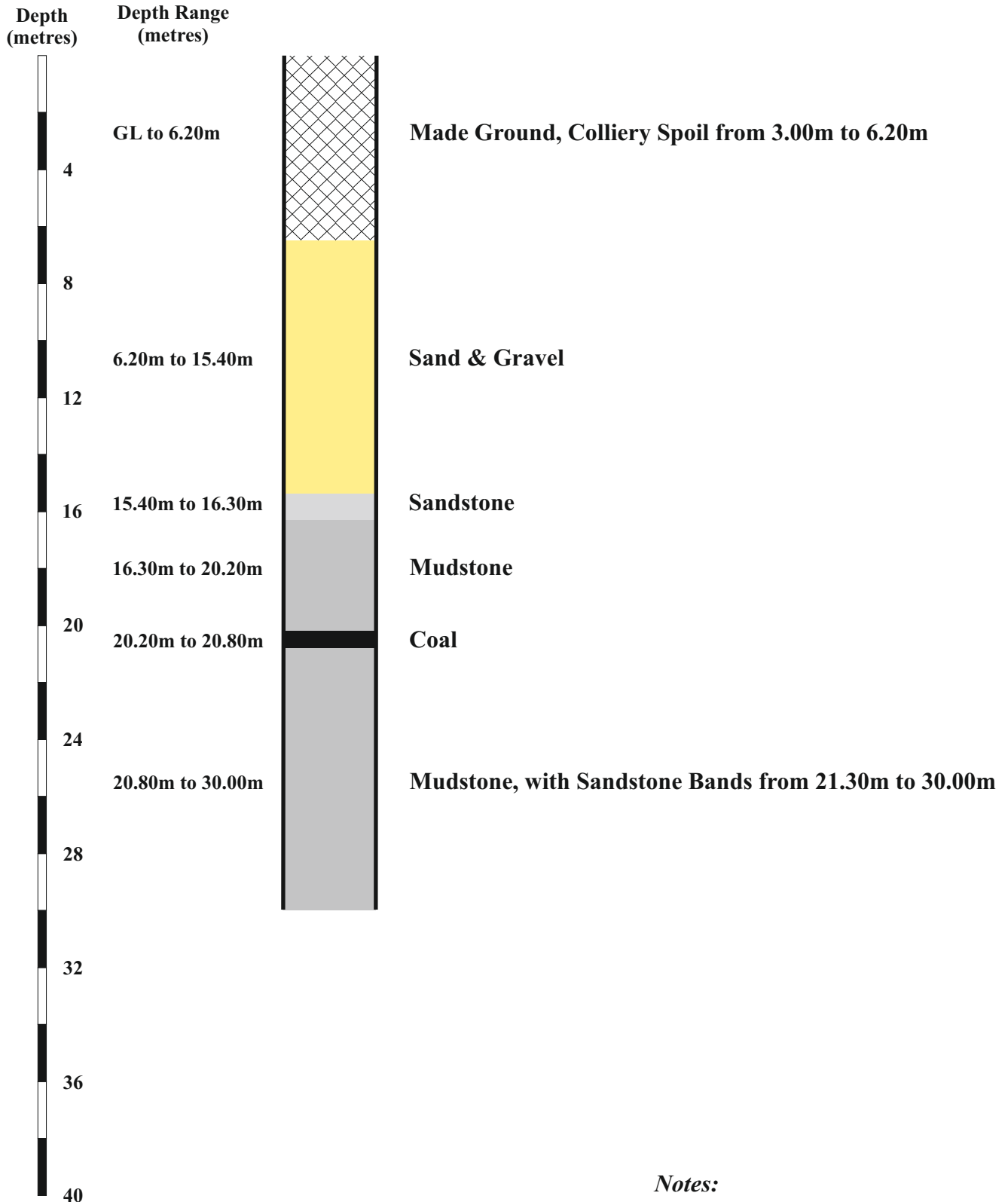


Notes:

1. *Driller's Descriptions.*
2. *Borehole dry.*
3. *Total depth of borehole, 30.00m.*
4. *Cased 14.00m.*

Study on Land at Goat Mill Road.

Borehole No. 2

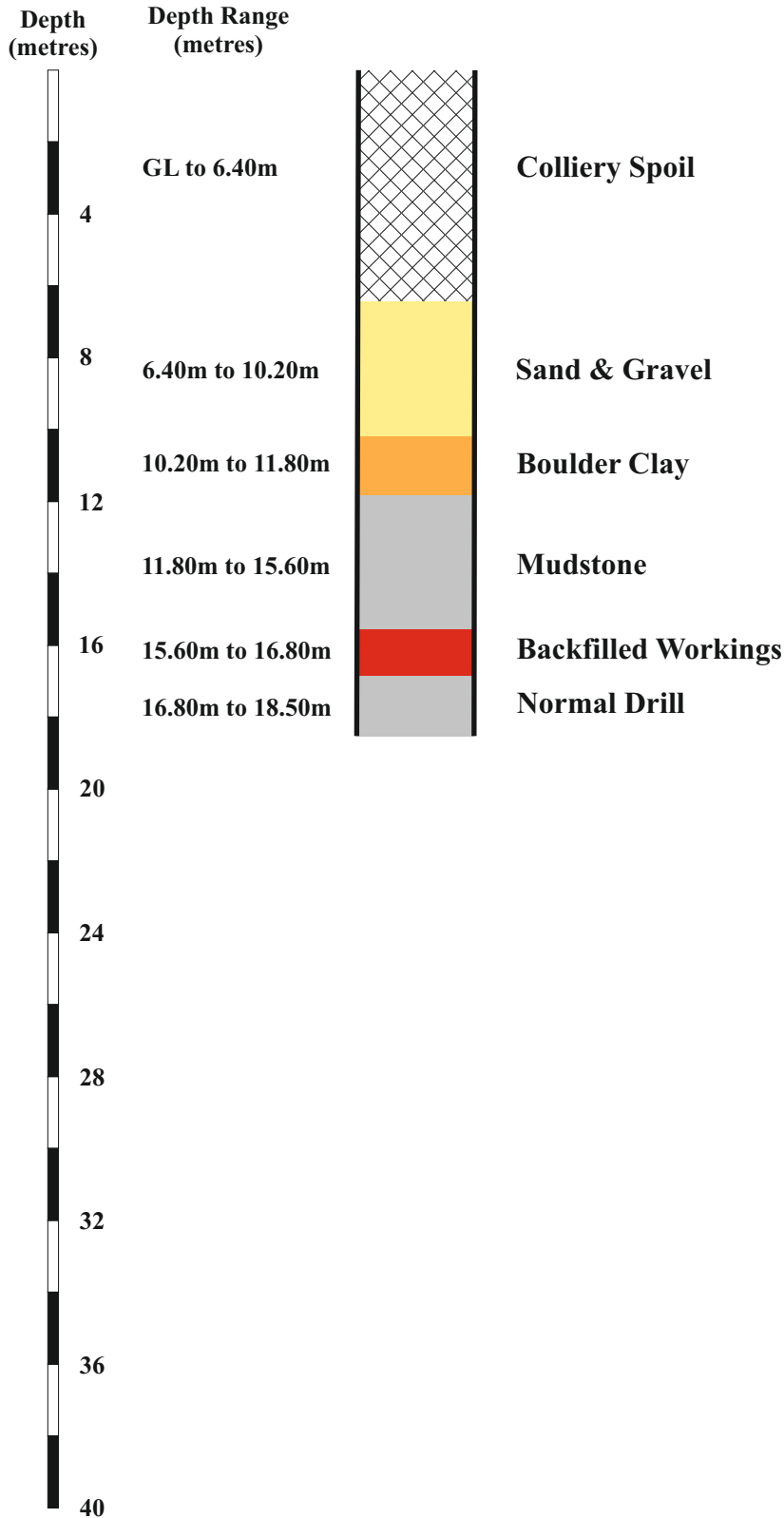


Notes:

1. *Driller's Descriptions.*
2. *Borehole dry.*
3. *Total depth of borehole, 30.00m.*
4. *Cased 16.00m.*

Study on Land at Goat Mill Road.

Borehole No. 3

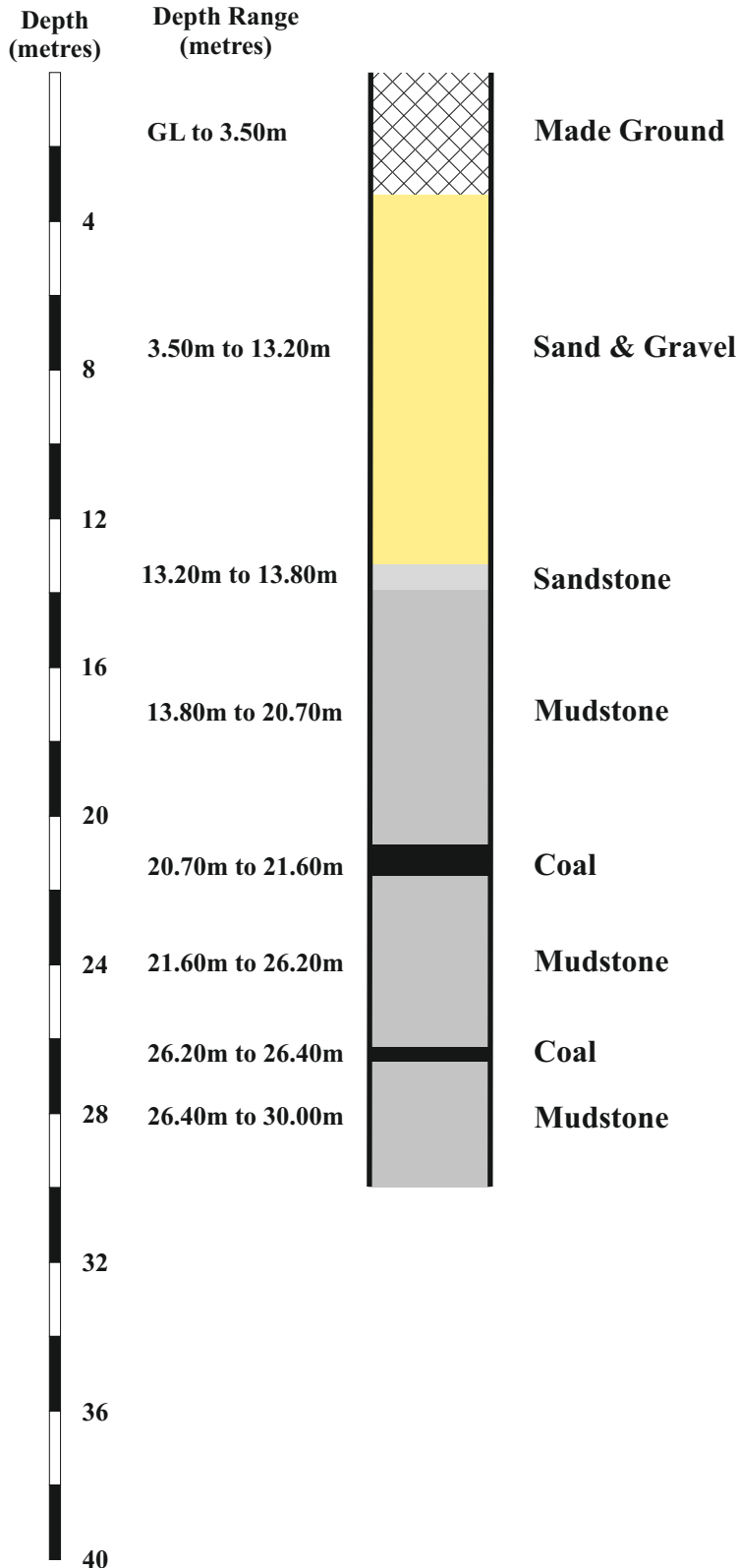


Notes:

1. *Driller's Descriptions.*
2. *Borehole dry.*
3. *Total depth of borehole, 18.50m.*
4. *Cased 5.50m.*

Study on Land at Goat Mill Road.

Borehole No. 4

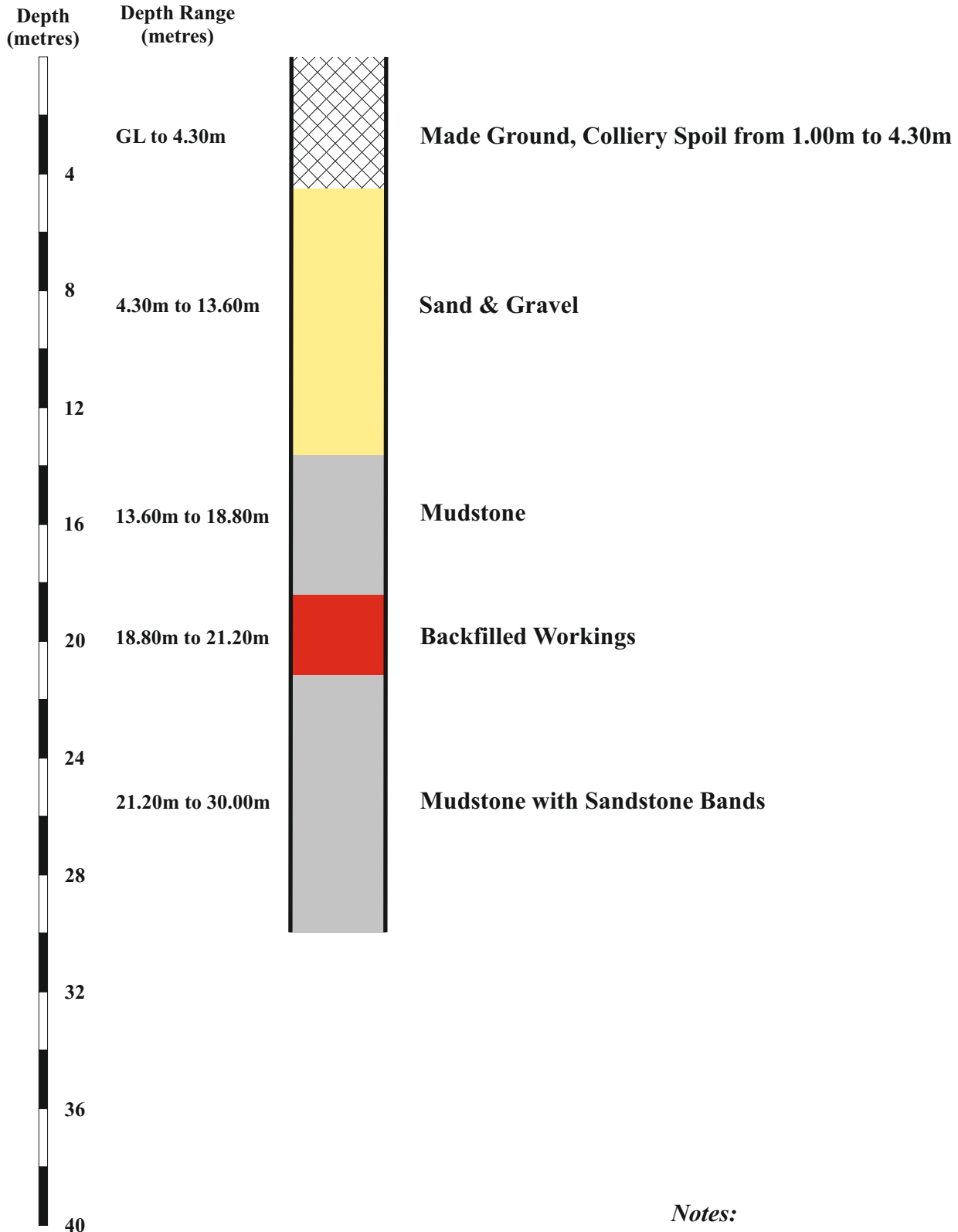


Notes:

1. *Driller's Descriptions.*
2. *Borehole dry.*
3. *Total depth of borehole, 30.00m.*
4. *Cased 14.00m.*

Study on Land at Goat Mill Road.

Borehole No. 5

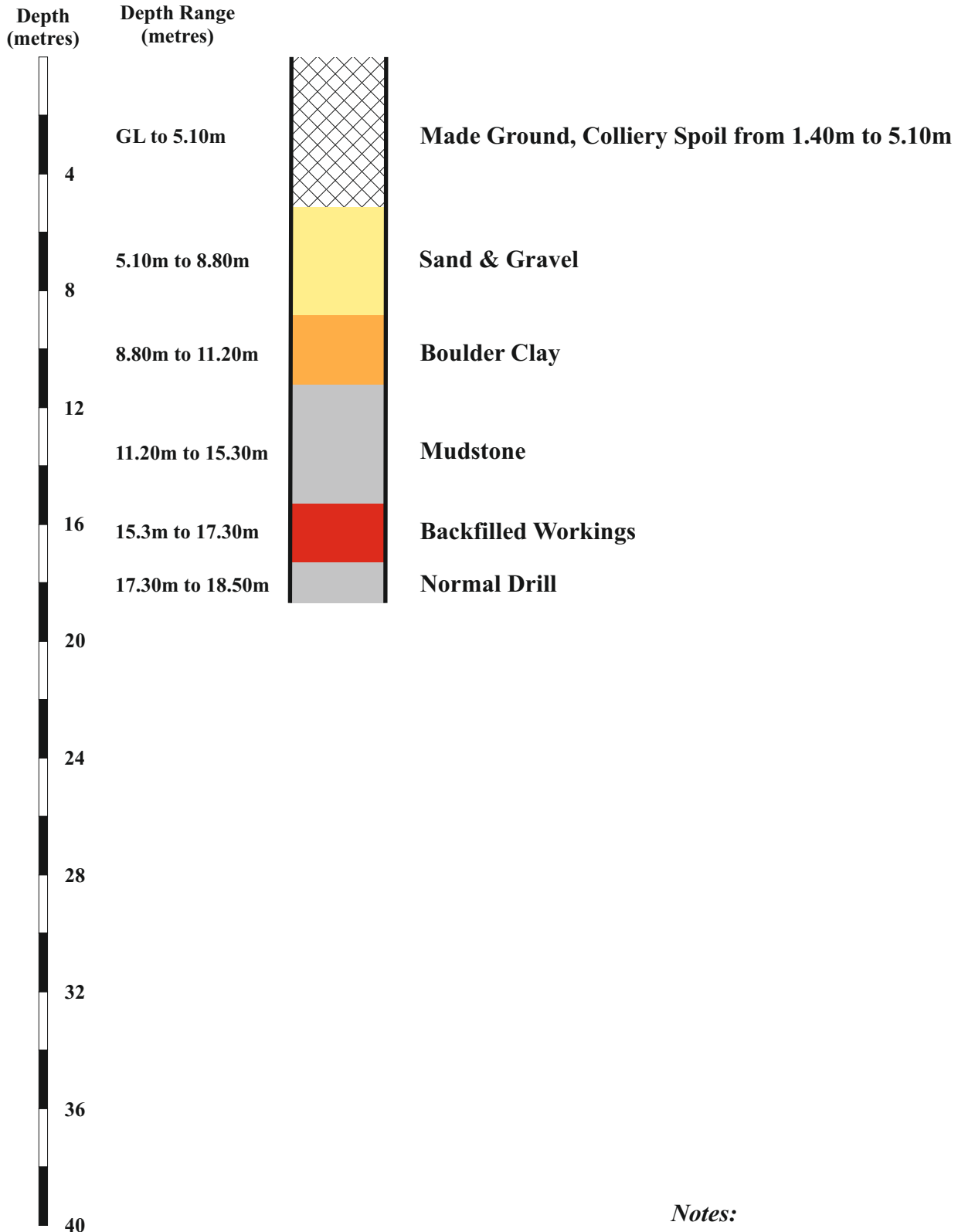


Notes:

1. *Driller's Descriptions.*
2. *Borehole dry.*
3. *Total depth of borehole, 30.00m.*
4. *Cased 14.00m.*

Study on Land at Goat Mill Road.

Borehole No. 6

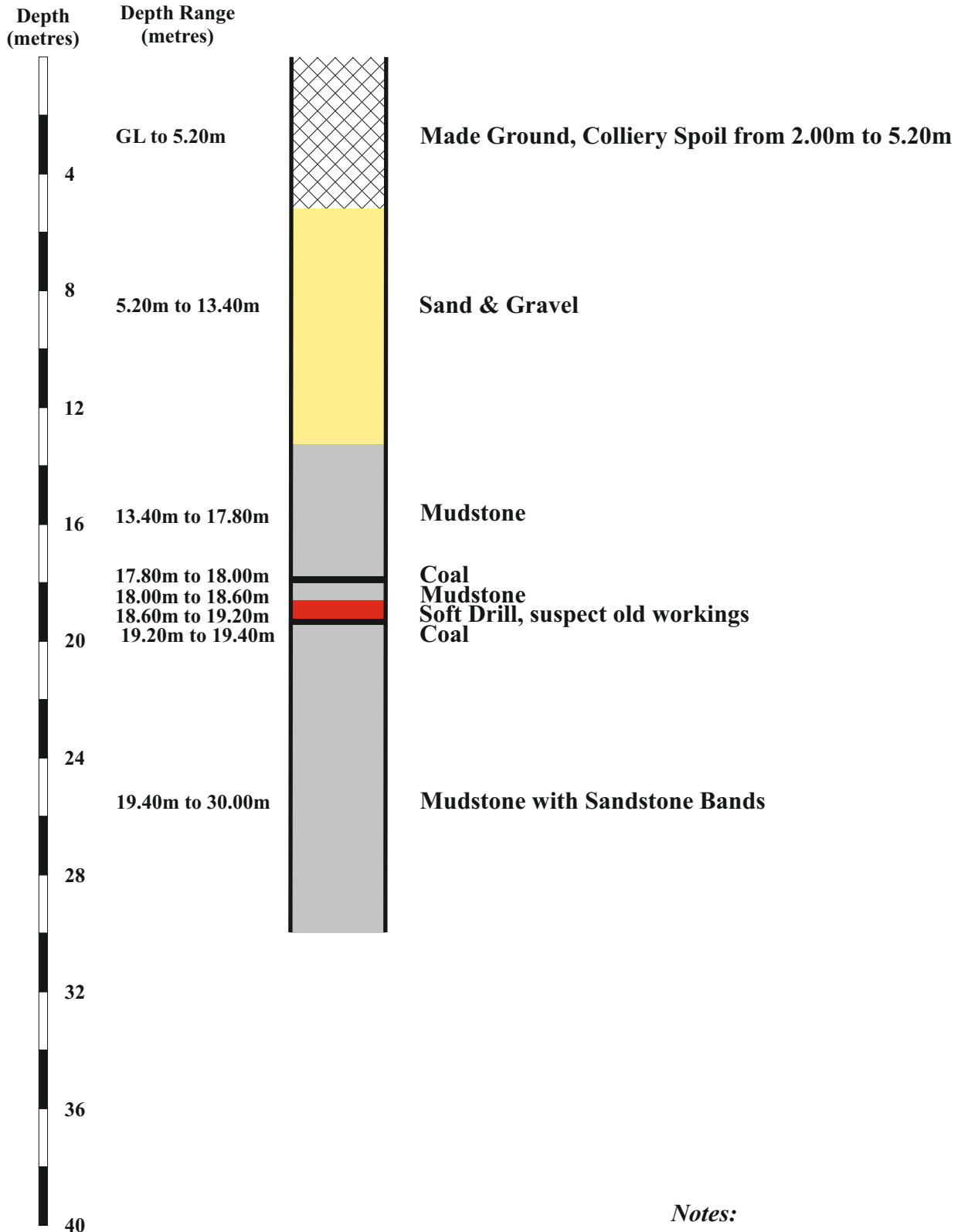


Notes:

1. *Driller's Descriptions.*
2. *Borehole dry.*
3. *Total depth of borehole, 18.50m.*
4. *Cased 5.50m.*

Study on Land at Goat Mill Road.

Borehole No. 7

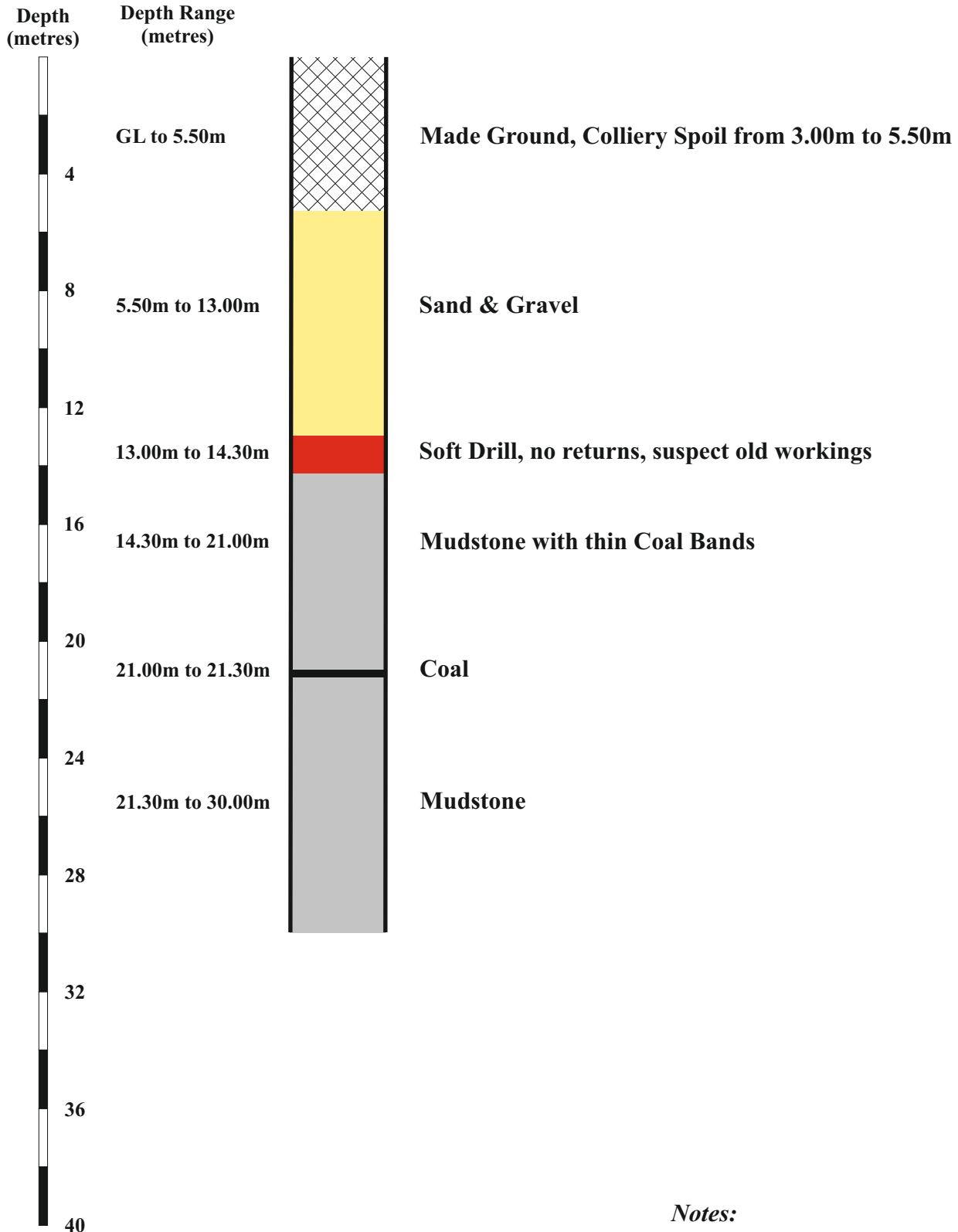


Notes:

1. Driller's Descriptions.
2. Borehole dry.
3. Total depth of borehole, 30.00m.
4. Cased 14.00m.

Study on Land at Goat Mill Road.

Borehole No. 8



Notes:

1. Driller's Descriptions.
2. Borehole dry.
3. Total depth of borehole, 30.00m.
4. Cased 14.00m.



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