



Preliminary Geoenvironmental Investigation

Land south of Cemetery Road, Jump,
Barnsley

For Barratt & David Wilson Homes
Yorkshire West

Report no: 5693/1A

Date: May 2026



SUMMARY OF GEOENVIRONMENTAL ISSUES

Job No.	5693	Site area/ha	9.7
Client:	Barratt & David Wilson Homes Yorkshire West	NGR:	SE 384 011
Site:	Cemetery Road, Jump, Barnsley	Nearest postcode:	S74 0JH

The site is located off Cemetery Road, approximately 6.5km south-east of Barnsley town centre, and comprises three fields for arable farmland with the north-east used as a paddock for horses.

Lithos were commissioned by BDW to provide a Preliminary Geoenvironmental Appraisal of the site, which it is understood is to be redeveloped with housing; an illustrative masterplan has been prepared.

Lithos' investigation included an inspection of historical and geological maps and information provided by the British Geological Survey, Groundsure, the Mining Remediation Authority, and QGIS. In addition, a site inspection has been carried out.

A summary of salient geoenvironmental issues is provided in the table below:

Issue	Remarks
Former uses	The site is essentially greenfield, however, c. 25% of the site has been subject to opencast coal mining of the Abdy Coal seam in 1951.
Anticipated ground conditions	Area of former opencast: Veneer of Made Ground Topsoil over Opencast Backfill up to 13m across the northern third of the site. Outside former opencast: Veneer of Topsoil over Residual Soils (gravelly Clay) with Middle Coal Measures (interbedded Mudstone, Siltstone & Sandstone) at shallow depth. Localised made ground is anticipated adjacent to the stables (easternmost corner).
Anticipated contamination	Possible (likely relatively minor) contamination associated with agriculture, areas of made ground & former opencasting operations (& subsequent backfill & restoration).
Mining & quarrying	About 50% of the total area lies in a Coal Mining Development High Risk Area (in the north and south) with the remaining area being in a Development Low Risk Area. Coal & workings anticipated at shallow (<30m) depths across the north & south. Historic opencast has taken place across c. 25% of the total site area in the north, to a depth of up to c. 13mbgl.
Hazardous gas	The site is underlain by areas of deep made ground (backfilled former opencast) with areas of deep made ground & landfill in the surrounding area. Consequently, risks of hazardous ground gasses migrating beneath the site cannot be discounted and monitoring and risk assessment is required. Between 1% & 3% of plots are estimated to be above the radon action level. Consequently, basic radon protection measures are not required. However, in light of HSA advice, the Developer might consider providing all new dwellings with basic radon protection measures.
Flooding & drainage	The site lies in Flood Zone 1. Beyond areas of former opencast & where gradients are not too steep, soakaways discharging into natural soils/bedrock may provide a suitable drainage solution for surface water run off at the site.
Preparatory works	Topsoil strip & stockpile Earthworks regrade to create development levels & acceptable grades for adoptable highways (subject to proposed layouts & preferred foundation options), excavation of the uppermost 2.0m to 3.0m of Opencast Backfill & re-engineering to: - Improve ground beneath adoptable highways - Improve ground beneath plots to enable the use of shallow heavily reinforced 'grillage' type footings Treatment of any shallow underground mineworkings & associated unrecorded mine entries (notably bell-pits).
Anticipated foundation solutions	Outside opencast: Residual soils or Coal Measures bedrock are expected to provide sufficient bearing capacity to enable the adoption of strip footings for 'traditional' two/three storey plots. Inside opencast: Subject to BDW's preferred foundation solutions, costings & perception or risk, consideration might be given to: - Shallow reinforced footings (grillage or rafts) founded in Engineered Fill. - Piled foundations socketed into bedrock below the base of opencast. - Deepened trench/strip footings with underbuild (where MG is not prohibitively deep). Wherever possible, plots should not be constructed spanning highwalls and the final layout should take account of highwalls and deep made ground following design of final levels.

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Issue	Remarks
	Plots close to/spanning highwalls will require further careful foundation consideration to address risks of differential settlement across the plot footprint.
Recommendations for ground investigation	A thorough ground investigation should be undertaken which aims to characterise the properties of natural soils, determine the depth and extents of any shallow underground workings, and the depth, extents and nature of the former opencast including the line and geometries of buried highwalls. In summary, the works should comprise: c. 50 trial pits to determine shallow ground conditions and enable detailed logging of natural and made ground with 6 soakaway tests. c. 10 trial trenches to determine the location of the highwall. c. 6 cable percussive boreholes to retrieve geotechnical data and samples from depth & install gas & groundwater wells. c. 16 rotary openhole probeholes to confirm shallow underground workings do not pose a significant threat to surface stability, and to determine the depth profile of the former opencast, and to allow installation of shallow gas monitoring wells. c. 10 groups of stitches to determine the line and profile of the highwalls. c. 4 rotary cored boreholes to retrieve samples of rock from the base of the opencast for detailed logging.

At this stage, anticipated significant abnormals relating to geoenvironmental issues at the site are:

- About 25% of the site is underlain by shallow coal with possible workings which will require consolidation (likely Drill & Grout if present) prior to construction taking place.
- About 25% of the site area has been subject to opencast coal mining. Potential issues with deep opencast backfill include:
 - Highways crossing highwalls should include reinforcement for 10m either side of the highwall, to accommodate differential settlements.
Where underlain by deep made ground, the highway footprint should be excavated to a depth of 2.0m and replaced with an Engineered Fill in accordance with an agreed Earthworks Specification and the requirements of National Highways Manual of Contract Documents for Highway Works CP 601/CC 201.
 - Alternative foundation solutions will be required for plots underlain by Opencast Backfill; likely one, or a combination, of: grillage/rafts founded in Engineered Fill; deepened strip/trench footings seated on Coal Measures bedrock below the base of Opencast Backfill (where the depth of MG is not prohibitively deep); or, piled foundations socketed into bedrock at the base of opencast.
Note, if the Opencast Backfill includes a portion of oversized materials (boulders) it may be necessary to pre-bore piles.
 - Plots should not be built close to/spanning highwalls wherever possible. But if this is not possible then additional consideration of foundation and plot designs will be needed to accommodate differential settlement across the highwall.
 - Drainage – likely need for placement at maximum possible gradients using flexible connections to prevent any backfalls should differential settlement of fill occur. There may also be a need for piling of manholes (although this is considered unlikely).
 - New utilities – should be constructed of flexible materials. Electricity and communications cabling should also be laid with sufficient 'slack' to accommodate a degree of movement.
 - The use of flexible joints is recommended where possible, particularly where service connections extend across a rigid/flexible structure interface (e.g. from a piled foundation into a garden area).

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APPENDICES

Appendix A – General notes

01	Environmental setting
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Appendix B – Drawings

Drawing	Revision	Title
5693/1	-	Site Location Plan
5693/2	-	Proposed Site Layout
5693/3	-	Site Features
5693/4	-	Site Photographs
5693/5	-	Preliminary Conceptual Site Model
5693/8	-	Geology & Coal (BGS)
5693/9	-	Geology & Coal (MRA)
5693/10	-	Abandonment Plan NE100 Map 1
5693/11	-	Abandonment Plan NE100 Map 2

Appendix C - Commission

Appendix D – Historical OS plans*

Appendix E – Search responses*

From	Date	Content
Groundsure	30 th January 2026	Environmental search data
Coal Authority	30 th January 2026 4 th February 2026	Consultant's mining report Abandonment plans
British Geological Society	10 th February 2026	Borehole record ref. SE20SE08 (Lundhill Colliery Shaft Record)
Barnsley Metropolitan Borough Council	11 th February 2026	Landfill record reports ref. P2-8946-i24 & P2-293-i24
Environment Agency	17 th February 2026	Landfill record ref. 260212/DJ01

* Some of this data is not included within the paper or PDF copies of this report can be provided on request.

FOREWORD (GEOENVIRONMENTAL APPRAISAL REPORT)

This report has been prepared for the sole internal use and reliance of the Client named on page 1. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Lithos Consulting Limited (Lithos); such authorisation not to be unreasonably withheld. If any unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

This report has been reviewed by a Competent Person, as defined in the National Planning Policy Framework. We ensure that all projects are managed by individuals with necessary experience, relevant qualifications, and current membership of a relevant professional organisation. Records of engineers, project managers and reviewers involved in this project are maintained by us. Lithos QA/QC procedures for all our work forms an integral part of our ISO9001 accreditation and as such is regularly audited.

The report presents observations and factual data obtained during our site investigation and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Lithos prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Lithos cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context. However, it should be noted that in order to keep the number of pages to a minimum, some information (e.g. full copy of the Landmark/Groundsure Report) is not included in the PDF; by request it can be provided.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from a variety of sources as detailed within this report, and which Lithos believes are reliable. Reasonable care and skill has been applied in examining the information obtained. Nevertheless, Lithos cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

Lithos cannot be responsible for the consequences of changing practices, revisions to waste management legislation etc that may affect the viability of proposed remediation options.

The report represents the findings and opinions of experienced geoenvironmental consultants. Lithos does not provide legal advice and the advice of lawyers may also be required.

Lithos standard terms and conditions apply to the report, a copy of the terms and conditions is available on request or can be found with our proposal in Appendix C.

**PRELIMINARY
GEOENVIRONMENTAL INVESTIGATION
OF LAND SOUTH OF
CEMETERY ROAD, JUMP, BARNSELEY**

1 INTRODUCTION

1.1 The commission and brief

- 1.1.1 Lithos Consulting were commissioned by Barratt & David Wilson Homes Yorkshire West to carry out a Preliminary Geoenvironmental Investigation of land south of Cemetery Road in Jump, south of Barnsley.
- 1.1.2 This document is a revision of the Preliminary Geoenvironmental Appraisal (Report 5693/1) issued by Lithos in March 2026; Report 5693/1 is now superseded. It takes account of comments made by BDW.
- 1.1.3 Correspondence regarding Lithos' appointment, including the brief for this investigation, is included in Appendix C. The agreed scope of works included:
- A site walkover and inspection
 - An assessment of land use history
 - Determination of the site's environmental setting
 - A mining risk assessment in accordance with Mining Remediation Authority¹ guidance.
 - Assessment of anticipated ground conditions, including potential contaminants
 - Assessment of anticipated foundation and engineering issues associated with redevelopment for a residential end-use
 - Provision of recommendations for an appropriate ground investigation
- 1.1.4 This Preliminary Investigation comprises an inspection of historical and geological maps and information provided by the British Geological Survey, Groundsure, the Mining Remediation Authority and QGIS². In addition, a site inspection has been carried out by Lithos.
- 1.1.5 Primary aims of this investigation were to identify salient geoenvironmental issues affecting the site to enable design and costing of an appropriate intrusive investigation, and to support the submission of a planning application.

1.2 The proposed development

- 1.2.1 It is understood that consideration is being given to redevelopment of the site with 'traditional' one/two storey domestic dwellings, associated gardens, POS and adoptable roads and sewers.
- 1.2.2 A site layout has been provided by BDW (Drawing reference 2604-SI-01, dated May 2026) which is reproduced as Drawing No. 5693/2 in Appendix B to this report.

1.3 Report format and limitations

- 1.3.1 Standard definitions, procedures and guidance are contained within Appendix A, which includes background, generic information on assessment of the site's environmental setting.

¹ On 28th November 2024, the Coal Authority changed their name to the Mining Remediation Authority.

² An Open Source Geographic Information System used by Lithos to access publicly available Government held digital data.

- 1.3.2 General notes and limitations relevant to all Lithos preliminary investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

2 SITE DESCRIPTION

2.1 General

- 2.1.1 The site's location is shown on Drawing 5693/1 presented in Appendix B to this report. Site details are summarised in the table below:

Detail	Remarks
Location	6.5 km south-east of Barnsley town centre
NGR	SE 384 011
Area	9.7 ha (23.9 acres)
Known services	Underground water/drainage utility (eastern field). Overhead communications (along Cemetery Road, northern boundary).

2.2 Site features

- 2.2.1 Lithos completed a walkover survey of the site on 4th February 2026.
- 2.2.2 Existing salient features, at the time of the walkover are presented on Drawing 5693/3 in Appendix B to this report and summarised in the table below:

Feature	Remarks
Current access	Gated, off un-named farm road (eastern boundary).
Topography	Slopes south in the northern two fields (up to c. 1v in 10v) and south-east and east in the southern field (c. 1v in 20h and up to 1v in 8h within the northeast corner).
Approximate areas	94,300m ² grass/cropped field. 3,300 m ² hedgerow and trees. 300 m ² gravelled/ rough ground. 70 m ² stables & sheds.
Nature of boundaries	North – Combination of hedgerows concrete bollards and barbed wire fencing. East – Palisade fencing & metal mesh fencing adjacent to the railway line. South – Barbed wire fencing with woodland and sporadic hedgerow. West – Combination of Hedgerows, wood panelled fencing and/or brick walls with no physical boundary at the rear of c. 110 Allott Crescent.
Surrounding land uses	North – Cemetery Road, with Hemingfield and Jump Cemetery and housing beyond. East – Peniston Line Railway with residential housing and farmland beyond. South – Woodland and protected green space with Wentworth Road further south. West – Existing houses on Allott Crescent.

- 2.2.3 A selection of site photographs are included on Drawing 5693/4.
- 2.2.4 Topography falls to the south with a typical gradient of around 1v:11h, but locally up to 1v:8h, with the steepest slopes being in the north and the gentler slopes being in the east and south-east. The topography of the wider surrounding area mirrors the gentle fall to the south.
- 2.2.5 Cemetery Road runs east to west along the northern boundary and an un-named access road (running to a nearby farm and yard) runs along the eastern boundary.

- 2.2.6 A two-line railway runs northeast to southwest immediately beyond the south-eastern boundary; to the northeast the railway runs through a **cutting** which lies about 5m lower than site levels, to the southwest the railway runs along an embankment which reaches about 2m higher than site levels.
- 2.2.7 The site comprises **three fields**, divided up by Hawthorne hedgerows; 1.2ha in the northeast, 3.3ha in the northwest and 5.2ha in the centre and south.
- 2.2.8 The **northeastern field** is divided into 6 paddocks by electric fencing and is used for grazing horses. An area of rough hardcore and a number of ad-hoc wooden stables are located in the easternmost corner of the field. A gate at the eastern boundary opens out onto the un-named farm road and provides vehicle access to the northeastern field and wider site.
- 2.2.9 Field boundaries comprise a mix of Hawthorne hedgerows interspersed with brambles and semi-mature trees, a steel palisade fence with semi-mature trees and shrubs, and a mix of garden fences/hedgerows/shrubs/trees.
- 2.2.10 A number of manhole access chambers are present across the east, and a wooden overhead electricity pole with transformer is located at the eastern boundary, although no overhead electrical lines run from the pole.
- 2.2.11 The **northwestern field** comprises rough grasses. A rubble-filled drainage trench with plastic land drains runs along the northern boundary of the field, and a stockpile of coarse gravel of recycled aggregate is located in the northwestern most corner. Some fly-tipping of general waste, including construction materials and a fridge has taken place along the field boundaries. An ad-hoc shed constructed of pallets is located in the south-easternmost corner. Pedestrian access is available into this field from a stile off Cemetery Road at the northern boundary.
- 2.2.12 An overhead communications utility, atop wooden poles, runs along the northern boundary of the northwestern field (and wider site).
- 2.2.13 Field boundaries comprise mature Hawthorne hedgerows interspersed with mature trees and shrubs, and a mix of garden fences/hedgerows.
- 2.2.14 The **southern field** is occupied by an immature arable crop. A Hawthorne hedgerow, with occasional mature trees runs east to west through the centre-south, partly dividing the field into a northern and a southern half.
- 2.2.15 Field boundaries comprise mature Hawthorne hedgerows interspersed with mature trees and shrubs, copse of mature trees, and a mix of garden fences/hedgerows.

3 SITE HISTORY

- 3.1 In order to investigate the development history and previous land uses at the site and immediate surrounding land, site centred extracts from Ordnance Survey (OS) plans dating back to 1855 have been examined. These plans are presented in Appendix D to this report.
- 3.2 The table below provides a summary of the salient points relating to the history of the site with respect to the proposed end use. It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site. Significant former uses/operations are highlighted in **bold** text for ease of reference.

Date	Site	Surrounding land
1855	Agricultural land separated into fields.	Unnamed road immediately north with fields beyond and Skyers (farm) in the northeast. Open fields and a farm to the east. Kir Road Wood and fields immediately beyond southern boundary. Mineral Railway runs east to west c. 170m south. Old Sandstone quarry 450m southwest & gravel pit 500m south-east. Open fields with Halfway Houses (c. 120m beyond).
1890	No significant changes	Two reservoirs shown c. 210m & 240m northwest and northeast. Kir Road Woods replaced with allotments immediately south, with residential development (c. 210m) labelled St Helen's. Farm to the east labelled 'Hemingfield Farm'. Hemingfield Colliery, with associated mineral railway, sidings, buildings & spoil heaps from 650m east. Increased residential development c. 200m east labelled 'Jump'.
1901		Chapeltown Branch extension railway built immediately east and splitting the allotments to the south. Old shaft & shafts at site of Sandstone quarry from 500m southwest. Cemetery built c. 15m north.
1903		Chapeltown branch extension railway in cutting /atop embankment runs along south-eastern boundary.
1929		Residential development immediately north and beyond the road (now labelled Cemetery Road) to the north. Allotments in the south extended to the west (c.170m) up to the northwestern site boundary. Spoil/earth embankment from 50m south. Allotments built c. 110m east. Residential development to within 240m to the south.
1938		Residential development along the northern boundary.
1948		Residential development from 70m west.
1951		Increased residential development immediately west, replacing allotments. Reservoir to the northwest no longer shown.
1955		Increased residential development immediately west and c. 170m south. Allotments to the south now shown as marshy ground with earthworks/embankments (likely spoil tipping/earthworks).
1966		Hemingfield Colliery no longer shown, replaced by extensive refuse tip/spoil heaps.
1987		Residential development from 100m east.
1988		Residential development from 30m east.
2025		No significant changes

4 ENVIRONMENTAL SETTING

4.1 General

- 4.1.1 Notes describing how the site's environmental setting has been assessed are included in Appendix A to this report. Reference has been made to publicly available Government held digital data via QGIS (an Open Source Geographic Information System). The responses received from the Mining Remediation Authority and Groundsure Report are presented in Appendix E.

Issue	Data reviewed	Remarks
Geology	1:50,000 BGS map (Sheet 87) 1:10,000 BGS map (Sheet SE30SE) Geology of Barnsley - BGS Memoir BGS Borehole SE20SE08	Made ground – Area of 'worked out opencast' across c. 25,000m ² in the north. Area of c. 12,500m ² of 'Colliery Waste' immediately beyond southern boundary (plus further colliery Waste <250m to the south). Drift soils – None mapped. Solid (bedrock) – Pennine Middle Coal Measures (interbedded Mudstones & Siltstones with Sandstone bands). Un-named Sandstone units in the far-north, far-east & south. Shallowest coal seams – The Two Foot, Abdy & Top Beamshaw seams outcrop across the north, centre & south respectively. Strata Dip – 4° northeast. Faults – single fault runs northwest to south-east through the centre-southwest, downthrows southwest.
Mining	Mining Remediation Authority BGS maps	The north and south lies in a Coal Mining Development High Risk Area (c. 50% of the total site area); the remaining 50% lies in a Development Low Risk Area. Past and present workings – known areas of opencast, and underground workings from c. 100m depth beneath the site, & coal seams with possible shallow workings. Mine entries – no known mine entries. See further details in Section 5.
Quarrying	Historical OS plans	No known quarries within 250m.
Radon	Public Health England	The site lies in an area where 1-3% of homes are estimated to be above the radon action level. Therefore, no measures are required.
Hydrogeology	Environment Agency electronic open data via QGIS	Source Protection Zone? No Aquifer None mapped (Drift); Secondary A (Solid). Groundwater abstractions? None within 250m. Groundwater vulnerability - High. Pollution incidents? None relevant to the site.
Hydrology	Defra Catchment data explorer Groundsure Report	Nearest watercourse – un-named drain 50m east, flows east to Knoll Beck c. 650m to the east. Catchment of Knoll Beck > R. Dearne > Don & Rother > Humber. Water quality – Moderate (Ecological 2022) Fail (Chemical (2019)). Pollution incidents? None relevant to the site. Abstractions? None relevant to the site. Discharge consents? None relevant to the site.
Flood risk	Environment Agency electronic open data via QGIS	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low. In accordance with Chapter 14 of the National Planning Policy Framework, a site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency).
UXO	Zetica website	Low Risk

4.2 Landfills

4.2.1 Known or suspected areas of landfill in the vicinity of the proposed development site are summarised below:

Location	NGR	Remarks	Source of data
Immediately beyond southern boundary & encroaching into far south of site.	SE 383 009	Wentworth Rd, Jump, Barnsley. Site ref. 4400/(124). No further records of operator, date of deposition, materials accepted etc provided.	Groundsure Report. QGIS.
From 15m south.	SE 383 008	Ground workings & refuse heap, records dated 1930. No further records of operator, date of deposition, materials accepted etc provided.	

4.2.2 The above records of historical landfill do not include the dates of deposition or nature of materials deposited, likely due to the age of material being placed.

4.2.3 There are no current/ongoing landfill/waste licenses in place relating to the above historical landfills.

4.2.4 It is tentatively suggested that the two records both relate to an area of made ground identified on BGS mapping as 'Colliery Waste' and shown on historical mapping as an area of spoil heaps/earthworks from between 1929 and 1955. Based on the extents shown on BGS and OS records, the historical records for landfill encroaching into the south of the site are likely to be erroneous records rather than a reflection of the true extents of historical deposition.

4.2.5 Lithos made enquiries to the Environment Agency and the Local Area Authority (Barnsley MBC) with responses attached in Appendices E.

4.2.6 BMBC reports show the landfill immediately south either encroaching on <10m² of the site or beyond the site's boundary dependant on map age with recent maps showing it as outside the site boundary. The landfill 15m south is confirmed as beyond the sites' boundary. These are both highly likely to be restricted to land beyond the site's southern boundary, showing the true extent compared to the Groundsure report.

4.2.7 Both landfills were active between 1930s until the 1960s with unknown infill material. However, the southern landfills' material is stated as most likely sourced from Hoyland Silkstone Colliery.

4.2.8 The environment agency states the land south of the site is a historic landfill, with operations ceasing in 1996. However, no information is known on the infill material.

4.2.9 Deposits of waste materials beyond the site's boundary will have implications on the risks posed by hazardous ground gasses (See Section 4.3 below). Deposits of made ground/waste materials within the site's boundary will have significant implications on: hazardous gas; geotechnical designs (i.e. foundations, highways, earthworks, slope stability, re-use of site won soils); planning; and, re-use and waste classification of site-won soils.

4.3 Hazardous gas

Methane & carbon dioxide

4.3.1 The site might be affected by sources of hazardous gas generation as it is:

- Located adjacent to an area of historical landfill/made ground deposits
- Underlain by deep made ground associated with former opencasting (see Section 5)

- Underlain by shallow coal and possible workings (see Section 5)

4.3.2 Consequently, monitoring and completion of a Hazardous Gas Risk Assessment is recommended in order to determine appropriate gas protection measures for the proposed dwellings.

Radon

4.3.3 Requirements with respect to radon measures are set out in Building Regulations Approved Document C. Probability bandings (based on the proportion of properties in a given area that exceed the Action Level; currently 200 Bq.m⁻³) are used to determine whether a property requires no, basic or full measures.

4.3.4 At present Approved Document C advocates basic measures for the probability banding 3% to 10% (full measures if >10%). However, the UK Health Security Agency (HSA) would like to see all new build include basic measures.

4.3.5 In December 2022, the British Geological Survey (BGS), deployed a revised dataset which increased accuracy and also the number of properties falling within radon affected areas. This revised dataset is now referenced by maps on the HSA website.

4.3.6 The HSA website indicates that the site is in an area where **1% to 3%** of homes are estimated to be above the radon action level.

4.3.7 Consequently, basic radon protection measures are not required. However, in light of HSA advice, the Developer might consider providing all new dwellings with basic radon protection measures.

4.4 Agriculture

4.4.1 Historical plans show that the site has been occupied by arable farmland. Generally farming is not considered likely to have caused significant ground contamination. However, activities such as slurry spreading, the discharge of chemicals to ground, and unregulated burial are known to have occurred on farmland. Potential contaminants associated with farming activity could include any of the following:

Agricultural activity	Potential contaminant
Slurry pits, manure heaps, septic tanks	Methane, metals, nitrates, oxygen depletion
Tracks (if built up with crushed demolition rubble etc)	Metals, asbestos, hydrocarbons
Plant & animal protection	Pesticides & herbicides
Soil conditioners	Metals, sulphates, PAH
Equipment maintenance	Hydrocarbons, metals
Waste burial, land levelling, backfilling ponds/quarries	Methane, metals, PAH etc
Naturally occurring contaminants	Arsenic, metals

4.4.2 Whilst it is likely that pesticides have been applied during arable use of the land, these are not likely to include the persistent organochloride pesticides such as Dieldrin, Aldrin, DDT etc. Pesticides routinely used on arable crops the UK (Phenoxy Acetic acid herbicide or PAAH) rapidly degrade in soils or leach via rainwater infiltration to groundwater.

4.4.3 The generation of ground gas in quantities with the potential to impact upon the proposed development would only occur with the presence of significant quantities of organic matter. Ground gas monitoring is not considered necessary unless significant quantities of organic matter are identified during the ground investigation.

5 GEOLOGY & MINING

5.1 General

- 5.1.1 In July 2011 the Mining Remediation Authority (MRA)³ formalised their requirements in relation to planning applications and introduced some new terminology relating to coal mining development areas. This Section provides the necessary preliminary mining risk assessment required by the proposed planning application.
- 5.1.2 About 50% of the total site area lies in a Mining Remediation Authority **Development High Risk Area** – an area with specific mining legacy risks to the surface, including mine entries, shallow coal workings, spoil heaps etc. The remaining 50% of the site lies in a Development Low Risk Area – within the defined coalfield, but no known defined risks have been identified (but there may be unrecorded issues). MRA Development risk areas are shown on Drawing 5693/9.
- 5.1.3 This assessment has been carried out based on review of the following information: BGS 1:10,000 geological map sheet SE30SE; 1:50,000 geological map sheet no. 87; Geological Survey Memoir Geology of Barnsley; BGS borehole record no. SE30SE8 (shaft record from Lundhill Colliery); MRA Consultants Mining Report; and relevant Coal Mining Abandonment Plans.
- 5.1.4 Geological and mining features are shown on drawings 5693/8 (from BGS data) and 5693/9 (from MRA data). Information provided by the BGS and the MRA is included in Appendix E, and the mining abandonment plans (see Section 5.3) are reproduced on Drawings 5693/10 and 5693/11.

5.2 BGS information

- 5.2.1 The site is divided into two fault blocks by a fault which runs northwest to south-east through the centre- southwest and which downthrows to the southwest. Local and regional dip is 4° to the northeast.
- 5.2.2 Bedrock comprises Pennine Lower Coal Measures (undifferentiated mudstones, siltstones and sandstones), with un-named Sandstone units in the south and in the far-north. The **Abdy Rock** (a fine grained sandstone unit) runs across the centre-north, but has been predominantly removed by opencasting (see below).
- 5.2.3 An area of about 25,000m² across the north is shown as an area of worked ground associated with opencasting and subsequent backfilling and restoration of excavations.
- 5.2.4 Three coal seams outcrop across the site, with further coals at shallow to intermediate depth, as summarised below:

Seam name	Approximate thickness (m)	Approximate depth/m	Remarks
Two Foot	0.91 to 1.45	Outcrops across far-north & underlies far north at shallow depth.	1.17m thick in Lundhill Colliery (c. 1km northeast but comparable level within stratigraphic column).
Abdy	0.79 to 0.86	5m below Two Foot. Outcrops across centre-north & underlies the north at shallow depth.	0.86m thick in Lundhill Colliery.
Top Beamshaw	0.30	12m below Two Foot. Outcrops along southern boundary & underlies entire site at shallow to intermediate depth.	0.3m thick in Lundhill Colliery.

³ On 28th November 2024, the Coal Authority changed their name to the Mining Remediation Authority.

Seam name	Approximate thickness (m)	Approximate depth/m	Remarks
Low Beamshaw	0.51 to 0.64	20m below Two Foot.	0.51m thick in Lundhill Colliery.
Kents Thin	0.56m to 0.66m	27m below Two Foot Coal.	0.66m thick & noted to be 'very good' in Lundhill Colliery.
Kents Thick Coal	0.86m to 2.26m	38m below Two Foot Coal.	1.02m thick with inferior/superior bands in Lundhill Collier.

5.2.5 Approximate coal **outcrops**, based on BGS information, and the conjectured line of the **faults** is shown on Drawing 5693/8.

5.2.6 It should be noted that outcrops shown on BGS maps have been known to be inaccurate by distances in excess of 100m. Furthermore, information examined later in this Section (a Mining Remediation Authority mining report, abandonment plans has yielded some inconsistencies in terms of lines of outcrop.

5.2.7 The BGS Memoir (87) notes that:

- The Kents Thin Coal 'has been little worked in the district' but is consistently present through shaft and borehole records across the area.
- The Adby Coal has been 'worked in places, mainly from crop and shallow shafts'.
- The Two Foot Coal has been worked to the northeast of Haigh Village (c. 14km northwest) and Carlton (c. 9km north) as well as at a number of small collieries around Barnsley.
- No discussion of workings in the Kents Thick or Beamshaw Coals is included suggesting that working of these seams was not especially common in the area.

5.3 MRA Consultants Coal Mining Report

5.3.1 A Consultants Mining report has been obtained from the Mining Remediation Authority (MRA) which states that:

- Known workings have taken place in 5 seams between 102m to 466m beneath the site from between 1867 and 1972 (*any surface movement associated with these workings should have stopped by now*).
- The site is underlain by probable unrecorded shallow workings (*i.e. the MRA is aware of shallow economic coal which is likely to have been worked historically, but no records exist*).
- There are no known spine roadways at shallow depth.
- There are no known mine entries within 100m of the site.
- Several areas of opencast coal extraction are present (*abandonment plans have been obtained; see Section 5.3 below*).
- There are no MRA managed tips, minewater remediation schemes or known mines gas emissions, within 500m.
- There are no claims for subsidence damages within 50m.

5.3.2 It should be noted that it only became a requirement to record mineworkings in 1872, and therefore there may be mining features, including shallow workings, mine entries and areas of opencast of which the MRA have no record or knowledge of.

5.4 MRA abandonment plans

Opencast workings

- 5.4.1 Opencast coal extraction has taken place across about 25,000m² in the north of the site. Opencast abandonment plans have been obtained from the MRA (ref. NE100, sheets 1 & 2 of 2) which are reproduced in Drawings 5693/10 & 11.
- 5.4.2 Review of the opencast plans shows that the target seam was the Adbry Coal (but not any underlying coals, or the Two Foot Coal). In total an area of 25,600m² was excavated, and the depth of the opencast ranged from between 1.04m and 13.15m below surrounding levels; the area of deepest cut was in the northwest with the shallowest cut being along the opencasts southern edge.
- 5.4.3 The thickness of the Adbry Coal is shown as being 0.74m and the coal is shown as comprising a single leaf.
- 5.4.4 Opencasting commenced in February 1951 and backfill and restoration of the opencast was completed in November 1951, when the area was restored to farmland.
- 5.4.5 An area of hatching is shown on the abandonment plans in the north-easternmost corner; the plans do not include a key, but it is possible that the hatching represents an area of underground workings encountered during excavation (although it could also represent a decrease in coal quality, washout or similar). No information is given regarding the angle or geometry of highwalls.

5.5 Unrecorded mineworkings

- 5.5.1 There are four seams of coal present beneath this site at shallow to intermediate depth: the Two Foot (far north only), the Adbry (mostly removed by opencasting), the Top Beamshaw and the Low Beamshaw.
- 5.5.2 Coal has been mined in Yorkshire for centuries, and there are likely to be unrecorded mine workings which predate the requirement for abandonment plans to be recorded (Coal Mines Regulation Act of 1872). Early mining methods included drifts or adits from outcrop. Where mining extended further from the crop, bell pits were often sunk, and as the coal got deeper still, shafts were used to access gallery workings (Pillar & Stall).
- 5.5.3 The shafts associated with bell pits are typically only about 1.2m in diameter, and the bell pit itself was typically 5m to 10m in diameter (bell pit size would have been constrained by roof stability). Consequently, bell pits are often closely spaced; the most intensive concentration of shafts recorded to date (66 per acre) was at the Middleton Broom Opencast site.
- 5.5.4 As coal was removed during bell pitting, the unsupported strata above assumed an inverted slope of stability, generating a bee-hive shape around the base of the shaft which forms the characteristic vertical section. The depth limit of bell pit mining is almost certainly 15m, and this is considered a deep bell pit; the vast majority were probably less than half this depth.
- 5.5.5 At greater depths, pillar and stall workings appear to have been the preferred method, and such workings were often accessed via a single shaft. Consequently, shafts associated with such workings are more widely spaced; but rarely exceeded one quarter of a mile (400m) shaft to shaft, due to problems with ventilation and underground haulage. It was customary to view the life expectancy of an individual pit as about three to five years and at any one time several new pits would be sinking to replace those currently operating.

- 5.5.6 Up until the last decades of the eighteenth century, coal mining almost always represented a short-term interruption to ongoing use of land for agricultural. The right to sink shafts and extract coal was usually conditional upon restoration of the surface after coal extraction was complete. This not only involved filling the shaft, but also required that any subsequent settlement of shaft fill material did not result in depressions in the field surface. Consequently, it was usual to fill the shaft and heap excess arisings into a dome over the shaft eye. Over subsequent years, the dome supplied material to compensate for settlement of the shaft fill. In the normal course of events, at the conclusion of the recovery period, any remaining spoil accumulations above ground level would have been planed-off to leave a relatively stable, level surface where the shaft had been.
- 5.5.7 Bell pits may be present across the whole of the site near coal outcrops. Given the absence of loose superficial deposits across the majority of the site, it is considered unlikely that any shallow mine entries here would have been lined.
- 5.5.8 A fault is present in the central south and west. Faults are usually bordered by a shatter zone where the coal is degraded. The nature and extent of a shatter zone varies according to the intensity of the faulting. Early and modern mining practice was to leave the coal in the shatter zone untouched as it was of little economic value.
- 5.5.9 Thus there is usually a margin between the workings and the fault, which based on observations elsewhere might be about 60m wide (30m either side of the fault).

5.6 Mining risks

Mining risks – Summary

- 5.6.1 The table below summarises the potential risks associated with coal mining legacy for the proposed development site, identified from list sources of information.

Coal mining issue	Yes	No	Remarks
Coal outcrop(s)	✓		Combustion risk where exposed in gardens/POS.
Coal mining geology (fissures)	✓		Possible reactivation along fault due to mining induced stresses (although movements are likely to have stopped by now).
Recorded mines gas emissions		✓	None recorded within 500m by MRA.
Potential mines gas emissions (unrecorded)	✓		shallow coal (& possible workings) outcrop across the site & deep coal & workings are present. Sandstone beds & the geological fault may act as a pathway for gasses to reach the surface & future receptors.
Mine entries (shafts and adits)		✓	none recorded by the MRA (although unrecorded adits, day holes, shafts or bell pits could be present)
Underground coal mining (recorded at shallow depths)		✓	none recorded by MRA.
Underground coal mining (probable at shallow depths)	✓		Three coal seams outcrop across the site, with further seams at shallow depth which might have been worked in the past.
Surface mining (opencast workings)	✓		Known opencast across the north, up to 13.15m depth; deep made ground & buried highwalls.
Recorded coal mining surface hazard		✓	none recorded by MRA.

- 5.6.2 For those issues identified as “yes” a more detailed discussion and assessment of the risks, both individually and cumulatively, to the application site and the proposed development is provided below.

5.6.3 Risks include:

- Combustion
- Unrecorded mine entries
- Collapse of possible shallow mineworkings, with consequent subsidence affecting surface stability
- Unrecorded workings beneath the opencast backfill
- Potential issues associated with deep opencast backfill & high walls

5.6.4 Current UK guidance, CIRIA C758D⁴, provides information and guidance for engineers and geologists with respect to the design of: mining investigations; foundations; and remedial measures.

Mining risks – gas

5.6.5 Gas monitoring and a hazardous gas risk assessment will be required and is proposed (see Section 8.1).

Mining risks – combustion

5.6.6 Where coal is exposed during any site preparatory earthworks, or within excavations, care should be taken to avoid the potential for spontaneous coal combustion.

5.6.7 If any foundation excavation comes into contact with coal, the foundation should be taken through the coal seam, into underlying natural in-situ strata of adequate bearing. The full thickness of coal should then be sealed with mass concrete fill placed as soon as possible after exposing the seam to prevent the ingress of air.

5.6.8 Where coal outcrops in gardens or areas of POS, it should be isolated beneath a clean cover comprising 1.0m of 'clean' inert Topsoil and Subsoil. Utilities should not be laid in a coal seam; utility trenches crossing through any shallow coal should be backfilled with clean inert low permeability material.

5.6.9 Any ground investigation and/or drilling for grouting purposes should be carried out to HSE and Mining Remediation Authority guidelines to minimise the risk of coal combustion and potential for migration of mine gases into neighbouring properties.

Mining risks – mine entries

5.6.10 It is possible that unrecorded "shallow" shafts (possibly bell pits) are present, and consideration could be given to a geophysical survey. The success of geophysics would be dependent on the "contrast" between shaft backfill and the surrounding ground (i.e. the survey is likely to be more successful if shaft backfill is significantly different material or less dense than the surrounding ground). Follow-up intrusive investigation (pitting) would be recommended to determine the cause of any anomalies identified by the geophysics.

5.6.11 Careful examination of the subsoil surfaces should be allowed for during Topsoil strip and construction works to look for evidence of any unrecorded mine entries.

5.6.12 The MRA would prefer to see Developers revise layouts to avoid building over a known shaft wherever possible. However, they accept that (unrecorded) mine entries might be encountered post-planning and revision of the layout might not be possible (especially where there are a large number of entries per acre, e.g. bell pits).

⁴ CIRIA C758D:2019. *Abandoned mine workings manual*

- 5.6.13 If found, unrecorded mine entries should be accurately located by grid co-ordinates, proved to its base, pressure grouted and then be capped off at rockhead level. A shaft cap is generally required to be twice the shaft diameter and designed to support the depth of fill above plus any surcharge loads. Detailed cap design is beyond the scope of this report but should also include gas venting measures.

Mining risks – shallow underground mineworkings

- 5.6.14 At this stage (in the absence of ground investigation data) it is considered that the Two Foot, Adby, Top Beamshaw and Low Beamshaw coal seams underlie the site at sufficiently shallow depth that underground workings could pose a risk to the surface and the proposed development.
- 5.6.15 Coal is likely to have been extracted by bell pitting and/or pillar & stall methods.
- 5.6.16 In shallow underground workings, individual pillars (pillar & stall workings), or undisturbed ground between bell pits, may collapse at any time, leading to settlement in the overlying strata. As the mine roof degrades and collapse the void migrates upwards, sometimes causing a surface collapse or crown hole.
- 5.6.17 The vertical distance through which a void can migrate is difficult to assess. Made ground and superficial deposits are considered to have no inherent strength and the assumption is generally made that if a void reaches the base of these formations, it will reach the surface.
- 5.6.18 CIRIA C758D⁵ notes that given the limited evidence of structural damage caused by pillar failure, compared with that resulting from roof collapses, engineering assessment of the potential for surface instability has focused on the latter. Failure of roof strata results in the progressive transmission of the void upwards through overlying rock. The extent of 'void migration' can be influenced by factors such as: strata dip; bulking characteristics of the collapsed rock or soil; capability for arching of the collapsed zone; groundwater flow and the presence of strong and intact rock layers with the ability to span that may attenuate the upward movement.
- 5.6.19 The limit height on the void migration, where no appreciable surface subsidence results, is often termed 'acceptable cover', with its determination based upon a criterion reflecting the worked thickness of the seam and the rock cover. The acceptable cover criterion is generally represented as ht , where 'h' is the thickness of rock above the workings expressed as a multiple of t , the worked thickness. This has been a popular approach because the two elements can be reasonably well determined via conventional ground investigation.
- 5.6.20 Most evaluations of required bedrock cover come from the examination of Coal Measures mines. In these, it has been observed that the height of migration in bedrock might, exceptionally, extend to 10 times the height of the original extraction. Consequently, the 10t criterion has, for over 30 years, been adopted by the industry as providing reasonable assurance against surface subsidence resultant from roof collapse in old, room and pillar mines. However, collapses might attenuate within a lesser cover and there will be circumstances where using the 10t criterion could be considered overly conservative.
- 5.6.21 That said, an MRA Technical Guidance Note⁶ which describes a subsidence event that affected a number of properties on a housing estate in north-east England in 2016, concluded that the 10 times rock cover guidance is only a 'rule of thumb' for crown hole collapses. Other subsidence mechanisms can occur, such as pillar failure, for which the 10 times rock cover rule of thumb is not an appropriate guide.

⁵ CIRIA C758D:2019. *Abandoned mine workings manual*

⁶ Mining Remediation Authority, TGN01/2019. *Findings from a large subsidence event on a residential estate.*

- 5.6.22 Mitigation of the risks posed by the shallow mineworkings will be required, and this could be achieved consolidation (drilling & grouting).

Unrecorded workings beneath the opencast backfill

- 5.6.23 The Top and Low Beamshaw Coals are expected to lie c. 12m and 20m below the base of the opencast. At these depths, there is expected to be sufficient competent cover between the opencast base and the coal seams to mitigate the risk of instability caused by underground workings, however this should be confirmed during the proposed ground investigation.
- 5.6.24 But, whilst there might be in excess of 10 times rock cover above any mineworkings, the presence of workings below pile toes can become a concern, especially for end-bearing pile groups. Piling over shallow mineworkings (even after grouting) is not common practice.
- 5.6.25 Founding piles above a system of **untreated** workings is not recommended because collapsed workings are rarely in a permanently stable condition and so have some form of residual settlement potential. Thus, either creep settlement, strata relaxation or collapse migration remain intermittent subsidence possibilities.
- 5.6.26 CIRIA C758D provides advice:
- If workings occur within 20m of surface it would be unusual to find a satisfactorily thick and rigid founding stratum for highly-loaded piles above, and sufficiently isolated from, the workings. When loadings are light (e.g. for houses), a suitable horizon might be available, but often piles will need to penetrate the workings to found in a stable stratum adequately below the disrupted floor of the workings.
 - Whatever the depth of workings, even if they are thought to be fully filled or the roof strata to be rigid, piles should not be terminated immediately above an untreated worked horizon because this could concentrate load on a potentially unstable stratum which may initiate eventual collapse.
 - The objective of a conventionally spaced, over-site grout treatment grid is to ensure against surface settlements. It will not adequately serve below ground support for individual piles. Grid separations exceeding 3m in partially collapsed or back-stowed workings are prone to uneven grout distribution and leaving isolated untreated areas or discrete void pockets.
 - It should be recognised that pressurised grout treatments (even if enhanced) are unlikely to achieve full closure or permeation of randomly distributed or occluded voids, especially if water-filled. This consequence of earthworks treatments is well known, but also it is industry wisdom that grout acceptance maximises at about 90-95% of voidage).
 - When there is a continuing risk of subsidence or residual movements, piles should be taken into competent strata below any seam floor disruption and heave consequential on the workings. Ground treatments should be scheduled to mitigate both installation effects and future settlements.
 - Piling above workings might be possible where sufficiently reliable strata (e.g. a substantial massive and competent bed of sandstone) are present to enable a detachment zone to be defined, or created by enhanced ground treatment. The thickness of this zone will depend on the pile installation method and the size and loading of the pile group.
- 5.6.27 When a prospective horizon is present, the following key issues, should be examined before deciding if the proposal is viable:
- Depths, dip and thickness of the subsidence restricting horizon
 - Geotechnical and geomechanical properties of the restricting horizon
 - Separation between pile toe level and the restricting horizon (i.e. the detachment zone)
 - Establishing that past collapses have arrested at the restricting horizon
 - Specific connectivity arrangements at pile heads/caps.

- 5.6.28 To enable piles to found at a higher level than a significantly stressed worked seam, bulk filling of open workings or grout treatment should be carried out beforehand as standard practice. If grouting, a more comprehensive treatment regime than for spread foundations will be required to produce reliable higher strength characteristics in the intensely stressed zones. These strengths should be specified via the grout mix and validated afterwards.

Potential issues associated with deep opencast backfill

- 5.6.29 At this stage, and subject to the findings of an intrusive ground investigation it is considered likely that the presence of deep opencast backfill beneath this site will have implications for:

- Foundations:
 - Where Opencast Backfill is between c. 1.0m and c. 2.5m thick, 'traditional' strip footings will require deepening, and/or underbuild.
 - Where Opencast Backfill is greater than c. 2.5m thick alternative foundations will be required. At this stage this is most likely to be either: piles, socketed into bedrock at the base of the opencast; or, reinforced/stiffened 'grillage'/rafts founded on Engineered Fill placed carefully to a End Product/Performance Specification following turnover of Opencast Backfill.

Note, the final thickness of Opencast Backfill/Engineered Fill will be subject to final design levels & earthworks regrade.

In addition, if the Opencast Backfill includes a portion of oversized materials (boulders) it may be necessary to pre-bore piles. This is considered likely due to the presence of the Adbry Rock Sandstone, which will have been excavated during opencasting, and replaced as part of the backfilling, with sandstone more likely to result in oversize materials than mudstone or siltstone due to the higher compressive strength.
- Drainage – likely need for placement at maximum possible gradients using flexible connections to prevent any backfalls should differential settlement of the fill occur. Potential need for piling of manholes
- New utilities – should be constructed of flexible materials. Electricity and communications cabling should also be laid with sufficient 'slack' to accommodate a degree of movement. The use of flexible joints is recommended where possible, particularly where service connections extend across a rigid/flexible structure interface (e.g. from a piled foundation into a garden area)
- Highways - a specification will need to be agreed with the adopting authority, but geo-grid reinforcement of the road construction over highwalls will probably be required.

- 5.6.30 Geotechnical characteristics of opencast backfill are related to the nature of the excavated overburden, how it becomes mixed, how it is placed, and any compaction applied.

- 5.6.31 All opencast backfill is subject to some settlement caused by self-weight which is partly governed by initial thickness. The characteristics of each backfill will be unique and its potential capabilities, at the time of development, depend on many factors.

- 5.6.32 The foundation solution should allow for the consequences of recovery of internal groundwater levels within the opencast backfill, however, given the time since the opencast was backfilled (75 years ago) groundwater is expected to have reached equilibrium with pre-opencasting levels. Precautions may also be required to avoid detrimental effects from surface water infiltration. The location and detailing of drains and other trenches, and the provision of hardstanding aprons, requires attention to prevent extraneous waters deteriorating the fill.

- 5.6.33 However, in the context of land that has been subject to opencast coal extraction, this site can be considered moderately low risk given the anticipated depth of backfill (likely <1.5m).

- 5.6.34 If piled foundations are adopted for plots underlain by opencast backfill there should be a reduced need for further significant geotechnical analysis / modelling, although specialist piling contractors will require more data (i.e. cable percussion boreholes, possibly with rotary core follow-on).
- 5.6.35 Conversely, if reinforced strips/grillage (or rafts) are preferred, significant further investigation and assessment will be required. This should commence with a review of the data obtained during Lithos' earlier exploratory investigation, and case study data relating to other deep backfill sites, to enable preliminary estimates of anticipated settlement.

High walls

- 5.6.36 It is generally considered wise not to build over high walls and such areas are usually reserved for non-critical uses such as landscaping. Utility routes in the vicinity of high walls need careful selection.
- 5.6.37 However, building in the crest region might be possible if split foundation types are used to reach undisturbed natural ground.
- 5.6.38 It will be necessary to ensure the construction of a reliable rock socket at the high wall. This could be problematic if there are concerns about slope strata integrity (which can occur where a fault has determined the extraction boundary).
- 5.6.39 Furthermore, if there are unrecorded workings in the coals that were extracted, these could influence surface stability in the vicinity of the highwall.
- 5.6.40 Away from the crest, and over the buried slope, it should be expected that shallow foundations on opencast backfill will tilt due to differential settlement. The zone of potential unacceptably large tilt of foundations will be dependent upon:
- the angle of the opencast slope
 - depth below development level at which the crest is buried
 - depth below development level to the toe of the slope
 - the mass modulus of the fill/made ground.

5.7 Drilling & grouting

- 5.7.1 Assuming intrusive investigation proves the presence of unrecorded workings with the potential to influence surface stability, then it will be necessary to consolidate the mineworkings by drilling and grouting.
- 5.7.2 The necessary consolidation should be achieved by drilling holes on an appropriate grid (likely 3m to 5m spacings). A viscous grout composed of appropriate proportions of OPC, PFA, sand or pea gravel would then be injected into the workings via these holes.
- 5.7.3 Drilling and grouting operations should be carried out with engineering supervision, and be undertaken in accordance with a suitable, approved Specification tailored to the site-specifics associated with this site.
- 5.7.4 Proposals to treat the mineworkings and shafts will need to be discussed with both Barnsley Metropolitan Borough Council (most notably Highways), and the Mining Remediation Authority well in advance of starting works on site.

5.8 Mineral safeguarded areas

- 5.8.1 The site is underlain by Middle Coal Measures, with three coal seams outcropping within the site's boundary (although one of these only underlies the very far-north and one of these has already been exploited by opencasting) and might therefore be considered by the Local Authority to lie within a Mineral Safeguarding Area (MSA).

- 5.8.2 A review of Barnsley Metropolitan Borough Council Local Plan Map suggests that the site does not lie within a Mineral Safeguarding Area.
- 5.8.3 However, the site is underlain by **coal** and might therefore be considered by the Local Authority to lie within a Mineral Safeguarding Area (MSA).
- 5.8.4 MSAs are areas of known mineral resources that are of sufficient economic or conservation value to warrant protection for generations to come. The purpose of MSAs is not to preclude automatically other forms of development, but to make sure that mineral resources are adequately and effectively considered in land-use planning decisions.
- 5.8.5 Specialist guidance on Mineral Safeguarding "A Guide to Mineral Safeguarding in England" has been produced by The Mining Remediation Authority and the British Geological Survey.
- 5.8.6 Chapter 17 of the National Planning Policy Framework (NPPF) requires Local Authorities to facilitate the sustainable use of minerals, and planning policies should:
- Safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas; and adopt appropriate policies so that known locations of specific minerals resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked).
 - Set out policies to encourage the prior extraction of minerals, where practicable and environmentally feasible, if it is necessary for non-mineral development to take place.
- 5.8.7 NPPF Chapter 17 notes that when determining planning applications, local planning authorities should give great weight to the benefits of the mineral extraction.
- 5.8.8 NPPF Chapter 17 states that planning permission should not be granted for the extraction of coal unless:
- a) the proposal is environmentally acceptable, or can be made so by planning conditions or obligations; or
 - b) if it is not environmentally acceptable, then it provides national, local or community benefits which clearly outweigh its likely impacts (taking all relevant matters into account, including any residual environmental impacts).
- 5.8.9 Surface extraction of Coal here is considered **unlikely** to be viable based on the small size of the site, and its proximity to adjacent residential properties. Prior extraction of minerals would have the potential to cause unacceptable impacts on neighbouring properties and infrastructure, including noise, air quality, traffic impacts and land stability. However, it would be prudent to seek further advice from a Minerals Surveyor.

5.9 Incidental coal

- 5.9.1 By virtue of the provisions of the Coal Industry Act 1994 interests in unworked coal and coal mines previously vested in the British Coal Corporation are now vested in the Coal Authority. The Developer will need to contact the Coal Authority to dig or carry away such coal as they encounter in connection with redevelopment of the site (this is often referred to as incidental coal).
- 5.9.2 It would be prudent to liaise with a specialist contractor to determine options for incidental coal excavated during the anticipated earthworks. There would likely be a cost associated with export (possibly around £25/tonne) due to the need for the specialist contractor to obtain a licence from the Coal Authority, excavate the coal from stockpile, load it into wagons and transport it from site. If larger scale extraction were commissioned the cost would likely be nil; there might even be a small credit value.

- 5.9.3 It might be that even poorer quality, weathered coal (recovered from near surface) could be taken off-site by a specialist contractor (such material can be blended with higher quality coal). However, excavated arisings would need to be inspected prior to export. Furthermore, the specialist contractor would need to liaise with the appointed earthworks contractor to ensure the latter adopted an appropriate method of excavation and took care to ensure stockpiles of coal do not become cross-contaminated with dirt.
- 5.9.4 Alternatively, incidental coal could be 'buried' in POS, at least 1m below proposed final levels. It is highly unlikely that coal could be sent to landfill (because of its very high calorific value), nor to an incinerator / waste to energy plant (because coal is not listed on their permits).

6 PRELIMINARY CONCEPTUAL SITE MODEL

6.1 Potential contaminants

- 6.1.1 Whilst the site has not been subject to prior development and is occupied by farmland, (although farming activities may have given rise to some (likely minor) contamination), much of the area has been subject to historical coal extraction by means of opencasting with subsequent backfilling of all excavations and restoration.
- 6.1.2 It is likely that the opencast has been backfilled with site-won natural arisings (i.e. Coal Measures bedrock and Residual Soils), but in the absence of a ground investigation it cannot be discounted that some other materials (possibly including degradable or contaminated materials) has also been deposited.
- 6.1.3 A preliminary conceptual site model, presented as Drawing 5693/5 in Appendix B, has been prepared after consideration of all the data presented in Sections 2 to 5 inclusive of this report.
- 6.1.4 Potential contaminant linkages are shown on the Preliminary Conceptual Site Model.
- 6.1.5 In the context of the proposed development, the most significant potential contaminant **pathways** include:
- Ingestion
 - Dermal contact
 - Inhalation of contaminated particulates
 - Surface water run-off, including existing drainage infrastructure
 - Downward infiltration of leachable/mobile contaminants to groundwater
- 6.1.6 The most significant potential contaminant **receptors** include:
- The environment – Secondary A aquifer and un-named watercourse c. 53m south-east
 - End users of the site (residents)
- 6.1.7 Clearly, the conceptual model will be subject to modification in light of data arising from the proposed intrusive ground investigation.

6.2 Anticipated ground conditions & potential issues

6.2.1 Based on the data reviewed in Section 4 (Environmental Setting) and 5 (Geology & Mining), anticipated ground conditions are expected to comprise:

Anticipated condition	Remarks
Made ground	Opencast Backfill of up to 13.15m depth in north (former opencast). Veneer of made ground around stables in the far-east.
Natural soils	Veneer of Topsoil over Residual Soils (likely gravelly Clay or clayey Gravel).
Bedrock	Middle Coal Measures (interbedded Mudstones & Siltstones) with sandstone units across the north, centre north & south.
Mineworkings	Known mineworkings from 100m depth are unlikely to pose a risk to the proposed development. Shallow coals outcrop across the site & any workings may pose a risk to the surface & the proposed development; if present there may be a need for consolidation by means of Drill & Grout.
Groundwater	Anticipated at depth in bedrock (Secondary A Aquifer).

6.2.2 Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Type of issue	Specific issue	Remarks
Potential on-site contamination sources	1. Contaminants associated with agriculture 2. Former opencasting & backfilling 3. Shallow coal 4. Deep made ground 5. Historical landfill	1. loss of chemicals, fuels/oils, soil improvers, & burial of wastes/ACMs etc all known to have taken place on farmland. 2. Operation of equipment (possible loss of fuels, oils etc) & backfill of excavations with contaminated/degradable materials. 3. Potential generation & migration of hazardous gasses (notably the fault presents a pathway between receptors & deeper sources). 4. Potential generation & migration of hazardous gas. 5. Environmental searches suggest landfill encroaches into southern edge of site (risk = contamination, hazardous gas, settlement etc) although it is considered unlikely that landfill occurred within the site's boundary, and is more likely a mapping error.
Potential off-site contamination sources	1. Off-site deposits of made ground (colliery waste) & landfill	1. Generation & migration of hazardous gasses.
Potential geotechnical hazards	1. Deep made ground (opencast) 2. Buried highwalls (opencast) 3. Steep slopes 4. Unrecorded shallow mineworkings	1. Risks of settlement, differential settlement, & oversized/obstructions. Foundation abnormalities, re-engineering of fill beneath highways & plots (if shallow footings are adopted). 2. Plots should not be built over highwalls were possible. Highways crossing highwalls will require geo-grid reinforcement. 3. Some levels regrade may be required to accommodate the proposed layout. Levels regrade will have an impact on the thickness of made ground (& foundation options) across the former opencast. 4. Unrecorded shallow workings may necessitate consolidation by means of Drill & Grout.

Type of issue	Specific issue	Remarks
Other potential constraints	- Underground and/or overhead utilities - Adjacent railway line	- May require easement or diversion. - Network rail will require further details at an early stage re. general construction works, including placing limitations on operating plant close to the railway tracks. Any earthworks close to the railway line may require further works to justify that they will not have an adverse effect on the railways safe operation. Consolidation of shallow mineworkings close to the railway will require approval from Network Rail before commencing.

7 LAND CONTAMINATION – PART IIA & PLANNING

7.1 Local Authorities have responsibilities with respect to land contamination in the context both of Part IIA of the Environmental Protection Act 1990, and Planning.

7.2 The contaminated land regime in Part IIA was introduced specifically to address the historical legacy of land contamination. It applies where there is unacceptable risk, assessed on the basis of the **current** use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission. This is primarily a task for the planning system, which aims to control development and land use in the **future**.

Planning

7.3 The National Planning Policy Framework (NPPF), supported by web-based planning practice guidance, includes the following with respect to contamination and site investigation:

“Where a site is affected by contamination or land stability issues, responsibility for securing safe development rests with the developer and/or landowner”.

7.4 Planning policies and decisions should ensure that:

- The site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses, and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation
- After remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the environmental protection act 1990
- Adequate site investigation information, prepared by a competent person, is presented'

7.5 Annex 2 of the NPPF states that 'all investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175⁷)'.

This site

7.6 The Middle Coal Measures bedrock is classified as a Secondary A aquifer. The nearest surface watercourse is an un-named drain which flows east about 50m beyond the eastern boundary to Knoll Beck. Therefore, the site's environmental setting is considered to be of moderate sensitivity.

7.7 With respect to human health, the proposed end use (residential) is sensitive.

⁷ BS10175 (2011) - Code of practice for the investigation of potentially contaminated sites

- 7.8 Current use of the site is considered unlikely to have given rise to any significant ground and groundwater contamination, although historical opencast coal extraction and subsequent backfilling may well have.
- 7.9 It is considered that the site should be suitable for the proposed use subject to implementation of appropriate preparatory works.

8 GROUND INVESTIGATION DESIGN

8.1 Ground investigation design & strategy

- 8.1.1 The preliminary conceptual site model has been used as a basis for design of an appropriate ground investigation, the scope of which is summarised below:

Exploratory holes	Purpose
c. 50 trial pits	To determine the general nature of made ground within the opencast, including the: - Nature, distribution and thickness. - Nature, degree and extent of contamination. - Proportion of undesirable elements e.g. biodegradable matter, obstructions etc. - Suitability of the ground for founding structures and highways. To determine the nature, distribution and thickness of shallow natural soils, including suitability of the ground for founding structures and highways.
including 6 trial pits	(outside of footprint of Opencast & away from south-eastern boundary (rail cutting) to determine whether soakaways could be utilised for storm water drainage.
c. 12 trial trenches	To locate & describe the line and nature of buried highwalls around the opencast boundaries.
c. 6 cable percussive boreholes	To determine engineering properties of the made ground within the former opencast, including the extents of obstructions. And to install monitoring wells to: - Monitor for hazardous gases - Determine groundwater levels & flow direction
c. 24 rotary open probeholes	To check for the presence of voids or broken ground associated with possible unrecorded shallow mine workings. And to install monitoring wells (in c. 8no) to: - Monitor for hazardous gases - Determine groundwater levels & flow direction
c. 10 shallow rotary open probeholes	(Inside former opencast) to determine the depth and profile of the opencast base.
c. 10 groups of stitch drilling	To determine the geometry of the opencast highwalls where they are too deep to investigate using trial trenches (the northern edge).
c. 4 rotary cored boreholes	(If piled foundations are being considered) to obtain rock core for detailed logging & geotechnical testing to inform pile design.

- 8.1.2 Proposed exploratory hole locations should be selected to provide a representative view of the strata beneath the site and to target potential areas of interest identified in Section 0 above. A nominal 50m grid spacing should be appropriate, with additional exploratory locations scheduled as necessary in light of the ground conditions actually encountered.
- 8.1.3 Parts of the site were noted to be wet and soft during the site walkover. If ground investigation is not undertaken during drier summer months, it may be necessary to use a tracked excavator.
- 8.1.4 Representative soil samples of natural and any man-made ground should be taken during the works. The number of soil samples taken should be reflective of the geological complexity actually encountered, but in general about 3 samples should be taken from most exploratory holes.

The investigation should be undertaken in general accordance with:

- BS5930:2015 "Code of practice for site investigation"
- BS10175:2017 "Code of practice for the investigation of potentially contaminated sites"
- "Technical Aspects of Site Investigation" – EA R&D Technical Report P5-065/TR (2000)
- "Development of appropriate soil sampling strategies for land contamination" – EA R&D Technical Report P5-066/TR (2001)

8.1.5 **Trial pitting / trenching** will enable determination of:

- Nature, distribution and thickness of shallow soils beyond the former opencast
- Nature of made ground (uppermost 3m to 4m), including:
 - visual/olfactory evidence of potential contamination and the proportion of undesirable elements e.g. biodegradable matter, relict foundations etc
 - the proportion of "oversize", boulder-sized material
 - the location and extent of the opencast, with some trenching to locate the opencast high wall
- Suitability of the ground for soakaways
- Suitability of the ground for founding structures and highways

8.1.6 The mechanical excavator should be equipped with a breaker to enable excavation through bedrock for soakaway tests.

8.1.7 The in-situ shear strengths of any cohesive soils encountered should be determined by use of a hand-held shear vane.

8.1.8 The ground (beyond the opencast) is expected to predominantly Cohesive & Granular Residual soils overlying Pennine Middle Coal measures with sandstone members, and consequently soakaways may work. Testing should be carried out in at least 6 trial pits in order to assess the suitability of soakaways as a solution for the discharge of surface water run-off.

8.1.9 Testing in 6 pits (ideally with a triple fill) would provide an 'initial sweep' at relatively wide spacings. It should be noted that if the initial soakaway tests yield satisfactory results, in order to obtain approvals from the LLFA, Highways etc, the drainage designer is likely to require further testing: (a) within 25m of proposed chamber locations; and (b) to include 3 fills.

8.1.10 About six **Cable percussion boreholes** should be advanced to depths of up to c. 15m in order to retrieve geotechnical data from depth, and also allow the installation of gas/groundwater monitoring wells.

8.1.11 Boreholes should be cased-off during drilling to at least rock head, in order to reduce the possibility of blowing sands, groundwater ingress, mis-sampling etc.

8.1.12 The ability to use temporary steel casing to line the borehole, during drilling of using a cable percussion rig, enables the recovery of more reliable geotechnical data, and the installation of better/deeper monitoring wells (cf. dynamic or window sampling boreholes).

8.1.13 SPT's should be performed in made ground, granular soils and firm\stiff cohesive soils on striking (i.e. change of stratum) and then at intervals of 1m to 1.5m. SPTs allow assessment of the in-situ density of granular soils, enabling determination of allowable bearing capacity and thereby definitive foundation advice.

8.1.14 Undisturbed, thin wall open-tube samples (UT100) should be obtained from natural in-situ cohesive soils on striking and then alternate with SPTs (except in soft clays where only UT100s will be recovered) at intervals of 1m to 1.5m.

- 8.1.15 Given the anticipated nature and thickness of made ground here, piles are likely to be end-bearing in bedrock. In accordance with BS 8004⁸ and EC7⁹, piling contractors may request that boreholes be extended a minimum 5m into competent bedrock using rotary coring techniques. BDW should liaise with their preferred piling contractor(s) in advance of commissioning this investigation and inform Lithos whether or not rotary coring is required.
- 8.1.16 Routine **geotechnical soils analysis** (moisture content, Atterberg limits, pH, water soluble sulphate) should be scheduled on about 50 samples, with some compaction testing on samples of made ground to assess suitability for use in earthworks ground improvement.
- 8.1.17 Given the anticipated opencast backfill, it would be prudent to schedule at least 6 unconsolidated total strength laboratory tests, with one-dimensional analysis to assess the effects of down-drag (negative skin friction) scheduled on 6 undisturbed samples.
- 8.1.18 Appropriate **chemical analyses** based on the findings of this Report should be allowed for. This is likely to comprise 30 samples for a suite including heavy metals, asbestos ID, TOC, banded TPH (with supplementary speciation where appropriate), and speciated PAH. In the event that ground contamination is more significant or different to that anticipated, it might be necessary to carry out additional chemical testing.
- 8.1.19 24 **probeholes** should be sufficient to determine whether or not old mineworkings are present in the shallow coal seams. If present, 24 probeholes should also suffice to determine whether or not mineworkings pose a significant risk to surface stability of the site (via assessment of seam depths, thicknesses and thicknesses of overlying competent bedrock). However, if a potential risk is perceived to exist, further probeholes may be required to delineate the extent of workings in order to obtain fixed price quotations for the necessary consolidation works.
- 8.1.20 In addition 10 stitch lines should be advanced using rotary openhole drilling methods to determine the location and geometry of the buried high walls.
- 8.1.21 It will be necessary to submit an application (with the associated fee) to the Mining Remediation Authority (MRA) for 'Permission to enter MRA mining interests'.
- 8.1.22 Given the proximity of surrounding housing (within 50m of much of the general site area), and in accordance with MRA requirements it should be assumed that some of the probeholes will need to be advanced using water as the flushing medium.
- 8.1.23 Monitoring wells should be installed in about 4 cable percussive boreholes 16 shallower probeholes in order to:
- Monitor for hazardous gas
 - Determine groundwater levels and assess flow direction
- 8.1.24 The generation potential of potential **gas** sources (opencast backfill and colliery spoil/historical landfill) is considered likely to be Low. Therefore, in accordance with CIRIA Report C665¹⁰, it would be prudent to initially allow for 9 visits over a 6-month period. A hazardous gas risk assessment should be issued on completion of monitoring.
- 8.1.25 On completion of the fieldwork and laboratory testing a comprehensive bound, factual and interpretative report should be issued. This should contain detailed engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report should also include qualitative risk assessment with respect to both controlled waters and human health.

⁸ BS 8004 (2015) - Code of practice for foundations.

⁹ BS EN 1997-1:2007. Eurocode 7: Geotechnical design – Part 2: Ground investigation & testing

¹⁰ CIRIA C665: Assessing risks posed by hazardous ground gases to buildings (2007).

9 CONCLUSIONS & RECOMMENDATIONS

9.1 General

- 9.1.1 The site comprises c. 9.7 hectares of land located in Jump about 6.5km south-east of Barnsley town centre. The site is essentially greenfield and has been subject to livestock grazing and arable crop growth. But in 1951 about 25% of the total site area in the north has been subject to opencast coal extraction with subsequent backfilling and restoration.
- 9.1.2 It is understood that BDW are considering acquisition of the site with a view to development with housing.
- 9.1.3 The main issues considered in this report, and in particular in Sections 3 to 5 are based on a review of historical maps and available geological/environmental data. This report provides an assessment of geoenvironmental issues and implications associated with the proposed residential redevelopment of the site, together with any implications for historical use of the site.

9.2 Mining and quarrying

- 9.2.1 This site is underlain at depth by Pennine Middle Coal Measures bedrock, and three coal seams outcrop on the site with a further 4th outcropping c. 20m south.
- 9.2.2 About 50% of the site is located within a Coal Mining Development High Risk Area (in the north and south); the remainder of the site lies in a Development Low Risk Area.
- 9.2.3 Around 25% of the total site area has been subject to opencast coal extraction (depth up to 13.15m) targeting the Abdy Coal Seam.
- 9.2.4 Beyond the former opencast, unrecorded underground workings in the shallow coal seams cannot be discounted. If present, shallow workings may require consolidation by means of Drill and Grout.
- 9.2.5 Should any unrecorded shafts be encountered during the development, they should be made safe by treatment in accordance with an appropriate Specification (Lithos can prepare this) and a Mining Remediation Authority Permit to Enter or Disturb Mining Remediation Authority Mining Interests.
- 9.2.6 Subject to foundation designs (notably if piles are to be used), plots within the opencast might be influenced by workings in the Top Beamshaw (if present) below the base of the opencast and further consideration of drilling & grouting and the impact on pile design might be required.

9.3 Hazardous gas

- 9.3.1 The site is underlain by up to 13.15m of Opencast Backfill (which could include degradable materials) and there are known areas of landfill/Colliery Waste beyond the southern boundary. Consequently, the site is considered to be at potential risk from migrating gasses.
- 9.3.2 As such, wells should be installed in boreholes to allow subsequent monitoring for hazardous gas and completion of a Hazardous Gas Risk Assessment to determine appropriate gas protection measures for the proposed dwellings.
- 9.3.3 The site is in an area where 1-3% of homes are estimated to be above the radon action level. Radon protection is not required, but the Developer might consider providing new dwellings with basic measures in light of UK Health Security Agency advice.

9.4 Foundations

- 9.4.1 At present, no geotechnical ground investigation data is available and consequently it is only possible to estimate the ground conditions. Before firm foundation recommendations can be given, it will be necessary to undertake an appropriate ground investigation. However, tentative recommendations are provided below.
- 9.4.2 Made ground is not generally considered a suitable founding material and foundations should be taken through it, into underlying natural in-situ strata of adequate bearing capacity.
- 9.4.3 About 25% of the site has been subject to opencast coal extraction with subsequent backfilling and restoration resulting in made ground (Opencast Backfill) to depths of between c. 1m and 13m. Outside of the opencast, ground conditions are expected to comprise a veneer of Topsoil and Residual Soils (likely gravelly Clays/sandy clayey gravels) over Coal Measures Bedrock.
- 9.4.4 Any levels regrade to accommodate the proposed development will have an effect on the thickness of made ground beneath the site and may alter the foundations recommendations made herein.

Outside area of opencast

- 9.4.5 Weathered Coal Measures of medium strength should provide sufficient bearing capacity to enable the adoption of strip footings for two/three storey housing.
- 9.4.6 Reinforcement, as a precaution against differential settlement, is recommended only where foundation excavations encounter significant lateral and vertical variations in strata.
- 9.4.7 Foundations in cohesive soils should be deepened near trees in accordance with NHBC Standards Chapter 4.2. It is estimated that up to 15% of the site may be affected by trees.
- 9.4.8 If shallow mineworkings underlie the site, and require treatment, NHBC typically require foundations to be at least 300mm thick and reinforced. If the workings are at a depth of less than 5 times the seam thickness, then raft foundations may be required.
- 9.4.9 If rock is encountered at shallow depth, foundations should be placed entirely on rock and not partially on rock and partially on residual soil. This may, depending on surface gradient, necessitate significant over deepening of foundations.

Inside the area of opencast

- 9.4.10 Subject to final earthworks design it is anticipated that foundations within the backfilled opencasts will comprise either:
- **Piled** foundations, socketed into bedrock in the base of the opencast;
 - Reinforced 'grillage' type/raft **shallow foundations** seated in **engineered fill** following earthworks excavation & controlled placement with careful placement & verification of soil properties; or,
 - Deepened trench fill/strip footings with underbuild seated on the base of the opencast.

Plots spanning highwalls

- 9.4.11 **Pre-bored** piled foundations will be required for dwellings constructed on top of or adjacent to opencast highwalls.
- 9.4.12 There is the potential for **settlement** of the ground in external areas around piled plots, and mitigation should be considered:
- Extend facing brickwork so that ground settlement does not result in exposing the
 - underground portions of walls and foundations. Two additional courses should be more
 - than adequate.
 - Flexible connections in drainage and service pipes passing through the buildings. and,
 - Ensure drainage is laid with generous falls to account for any settlement.

General notes on Piling & grouted mineworkings

- 9.4.13 Ground conditions at this site are considered likely to require provision of a piling mat (working platform) and further advice should be sought from the appointed specialist-piling contractor regarding the proposed plant loadings and resulting pressures.
- 9.4.14 With respect to a piled foundation solution, it cannot be assumed that the properties of opencast backfill are consistent from place to place and they may affect each pile, or pile group, differently. As the opencast excavation was taken through beds of competent sandstone (Abdy Rock Sandstone), there may be a **significant boulder** content that could be obstructive to piling.
- 9.4.15 Settlement of an opencast backfill is a serious concern for piling because of the 'downdrag' (negative skin friction) it can create. The settlement process can be lengthy and may alter in magnitude and rate, dependent on the extent and duration of any inundation.
- 9.4.16 Groundwater recovery can also cause significant effective stress changes and it is important to be able to predict the final level of groundwater recovery, however, given the time since the opencast was backfilled (75 years ago) groundwater is expected to have reached equilibrium with pre-opencasting levels.
- 9.4.17 For piles that will have secure end-bearing, the matter of large backfill settlements creates the possibility that pile caps may become exposed if transitional precautions for the surrounding concourse area are not taken.
- 9.4.18 Piling over shallow mineworkings (even after grouting) is not common practice, and consequently this report provides some further advice. In addition, it would be prudent to discuss proposals with a specialist piling contractor and seek their views.
- 9.4.19 Current UK guidance is provided in CIRIA C758D¹⁰, which provides information and guidance for engineers and geologists with respect to the design of: mining investigations; foundations; and remedial measures. It describes: past methods of mining employed in the UK; their short and long-term effects on surface stability; techniques for the consolidation of old mine workings; and remedial measures for mine shafts.

General notes on shallow foundations in Engineered Fill

- 9.4.20 Determination of an appropriate foundation solution requires input from specialist geotechnical and structural engineers capable of assessing the risks and designing accordingly.
- 9.4.21 For shallow foundation solutions, assessments can be complex, involving characterisation of the ground, optimising building size, structural performance criteria and an assessment of the mechanisms involved.

- 9.4.22 The first of these includes determination of realistic bulk material properties, groundwater influences and future stability matters. An appropriate ground improvement process or full or partial depth re-engineering can then be decided upon.
- 9.4.23 For low-rise buildings, a partial depth replacement with a specified engineered fill of thickness related to purpose may be an option. However, long-term movements of the untreated thicknesses / extents are of particular concern. In predicting these, cognisance should be taken of the nature of surface mining operations, phasing of restoration works, time delay periods and the predicted, as well as prevailing, hydrogeological regimes. The effects of ageing will also be relevant for the treated thickness.
- 9.4.24 As well as the direct performance of the improved ground under foundation loads it is the long-term settlement of the whole backfill 'column' or mass that requires careful analysis. All backfill, whether engineered or non-engineered, is subject to self-weight settlement.
- 9.4.25 Given the potential for ongoing settlement, further investigation will likely be required to assess the need for ground improvement in order to reduce settlements to tolerable levels. However, at this stage, and assuming that ongoing creep settlements are not considered prohibitive, some form of ground improvement may be necessary.
- 9.4.26 Options might include:
- (a): Surcharge - a ground treatment method in which consolidation is achieved by temporary loading of the ground, usually via placement of mounds of material, several metres high above the backfill.
 - (b): Excavation of the uppermost 3m of opencast backfill and replacement in Engineered layers. Fill would need to be compacted to an End Product Specification in accordance with NHBC Chapter 4.6 to achieve >95% of the maximum dry density (4.5kg rammer or vibrating hammer) and less than 5% air voids, although the air voids criteria may need to be flexed if the fill contains coarse granular deposits.
 - (c): In combination with (b) the following ground improvement techniques could include:
 - High energy impact compaction (HEIC) or rolling dynamic compaction (RDC) could be undertaken. This would improve the load settlement performance of the backfill in-situ beneath the engineered fill to c. 1m to 2m depth and create a thicker stiffened crust. HEIC imparts energy to the ground using an asymmetrical roller either hexagonal, square or triangular in shape. Repeated passes occur until the target grounds stiffness or settlement criteria have been achieved.
 - Rapid impact compaction (RIC) could be undertaken at sub-formation level. This would improve the load settlement performance of the backfill in-situ beneath the engineered fill to c. 3m to 4m and create a thicker stiffened crust. With RIC, energy is applied to the ground with repeated blows of 40 to 60 times per minute, by a hammer typically 7 tonnes dropping 1.2m.
 - Deep dynamic compaction (DDC) can be used to densify the fill in-situ. With DDC the ground is subjected to repeated surface tamping using a heavy weight of c. 10 tonnes. This weight is dropped by up to 20m a set number of times on a grid pattern over the site to form a pass. The imprints formed at each drop position are infilled with granular material after each pass. A blanket of imported stone is required where in-situ near surface materials are unsuitable. Dependant on soil types and condition, two to five passes can be required, and treatment depth would likely be in the order of 7m to 10m. Unlikely to be suitable due to proximity of existing buildings (vibration risk).
- 9.4.27 Some further ground investigation and/or settlement monitoring might then include some/all of:
- Installation of extensometers.

- Installation of a grid of survey stations, and subsequent surveying to determine whether ground levels are changing.
- Zone tests via construction of a shallow test pad.

9.4.28 When dependable ground treatment has taken place for light structures, generally it will be preferable to use suitably reinforced strip footings (rather than pads), with independent floor slabs or rafts, in order to reduce bearing pressures.

9.5 Highways and external works

9.5.1 Levels fall to the southwest and it is expected that some significant earthworks regrade will be required in order to create development platform(s), and to create sufficiently shallow gradients for the placement of adoptable highways.

9.5.2 There may be a need for some underbuild and/or tanking of plots to accommodate changes in levels across plot footprints.

9.5.3 Subject to final designs there may be a need for retaining structures across the development.

9.5.4 The earthworks designer should take care to achieve an earthworks balance in the final levels designs.

9.5.5 At this stage it is estimated that natural Residual Soils should yield a CBR value of at least 3%, whilst re-engineering of site-won made ground should yield CBR values in excess of 5% subject to careful management of the works. These values should be verified by in-situ testing prior to highways construction and completion.

9.5.6 Where highways cross highwalls, geo-grid reinforcement will be required to limit differential settlement.

9.5.7 Where underlain by deep made ground, the highway footprint should be excavated to a depth of 2.0m and replaced with an Engineered Fill in accordance with an agreed Earthworks Specification and the requirements of National Highways Manual of Contract Documents for Highway Works CP 601/CC 201.

9.6 Soakaways & drainage

9.6.1 Given anticipated ground conditions, soakaways may provide a viable solution for the disposal of surface water, beyond the footprint of the former opencast and away from the railway cutting at the south-eastern boundary (subject to testing).

9.7 Contamination

9.7.1 The site's environmental setting is considered to be of moderate sensitivity. With respect to human health, the proposed end use (residential) is sensitive.

9.7.2 A significant thickness of made ground is anticipated due to the presence of historical opencasts at this site. Whilst opencast backfill is often relatively 'clean' re-worked natural arisings it cannot be discounted that some more onerous or contaminated materials might have been placed during the opencast reinstatement and some contamination could be present.

9.7.3 Arable farming has historically been carried out. The farming activities may also have given rise to some (likely minor) contamination.

9.7.4 Consequently, a ground investigation is required in order to assess the degree and extent of any ground contamination, and enable the preparation of a Remediation Strategy.

9.8 Potential development constraints

- 9.8.1 The far-south of the site lies within the boundary of an area of historical landfill, although this is thought to be a mapping error. Should any landfill waste/materials be present at this site there will be significant implications for foundations, earthworks options, hazardous gas, waste classification, re-use/export of site-won materials, and planning. At this stage, it is considered unlikely that landfilled waste is present within the site's boundary; the outline presented in the environmental searches likely refers to an area of Colliery Waste and earthworks beyond the southern boundary, and is erroneous in its boundary.
- 9.8.2 Given existing topography (much of the site is sloping, with gradients of up to 1v in 8h in the north-east), some earthworks regrade is anticipated, with the need for underbuild and retaining walls.
- 9.8.3 An area of former opencast coal extraction is present in the north of the site, with made ground to a reported depth of c. 13m. Made ground will require alternative foundation solutions for plots inside the area of opencast.
- 9.8.4 The former opencast is bound by buried highwalls in the un-named opencast shown in Drawing 5693/10 & 11. Any plot close to/ spanning the highwalls will require additional consideration and design of their foundations to allow for differential settlement.
- 9.8.5 When drafting a housing layout, it might be prudent to consider allocation of public open space in these areas.
- 9.8.6 The electrical poles & water utilities may present a potential development constraint unless they can be relocated. Additional enquiries are required to ascertain the feasibility of such diversionary works and the particular easement required by each service undertaker if they remain in-situ.
- 9.8.7 The adjacent railway presents a potential development constraint. Network Rail will require details at an early stage with regards to construction methods close to the railway tracks, notably with restrictions on the use of 'tall' plant (cranes, 360 excavators, drilling rigs etc) and material stockpiles close to the rail tracks.
- 9.8.8 Network Rail will also require further details of any proposed changes in levels close to the rail tracks, and there may be a need for extra slope stability and earthwork assessments to demonstrate that any changes in levels will not have an adverse effect on the safe running of the line.
- 9.8.9 Network Rail will also have an input on any Drill & Grout works where these are located close to the rail tracks (note, Network Rail are notified/consulted by the MRA during an application for permission to treat shallow mineworkings).
- 9.8.10 Some deterioration of the surface is likely to be caused by trafficking, especially after topsoil has been stripped and during/after periods of significant rainfall. Consequently, it would be prudent to consider placement of a minimum 200mm thickness of suitable granular fill (i.e. a "blanket" of 6F2) along the line of proposed highways and any temporary haul roads to protect formation during the construction phase.
- 9.8.11 It would be prudent to allow flexibility in the groundworks programme to take advantage of any prolonged dry/warm weather (typically between May and September) to enable footings to be cast and blockwork brought up to DPC level well in advance of the build programme (i.e. so it is never necessary to dig deep footings in winter/early spring, when the groundwater table is likely to be higher).

9.9 Further investigation

9.9.1 Whilst the site is considered suitable for its current and proposed use, the proposed change in use will require intrusive investigation.

9.9.2 This would include:

- Machine-excavated trial pits to determine near surface ground conditions including depth to bedrock, the presence of obstructions, groundwater and stability
- Trial trenches to locate buried opencast highwall
- Cable percussion boreholes to obtain geotechnical data from depth and allow the installation of monitoring wells
- Rotary open probeholes to determine the line and profile of buried highwalls and depth of the opencast
- Rotary open probeholes to confirm depths and seam thicknesses in order to assess risks associated with possible old mineworkings and surface stability
- Rotary cored boreholes to aid pile design (if required)
- Geotechnical soils analysis with grading and compaction testing to inform the design of appropriate cut & fill earthworks, and to enable foundation recommendations
- Chemical testing on soil and if necessary groundwater, samples to assess the significance of contamination, if any, as a result of former industrial land use
- Gas monitoring and risk assessment

9.9.3 An appropriate ground investigation strategy is presented in Section 8.

Appendix A
General Notes

General

Third party information obtained from the British Geological Survey (BGS), the Coal Authority, the Local Authority etc is presented in the "Search Responses" Appendix of this Geoenvironmental Report.

Geology, mining & quarrying

In order to establish the geological setting of a site, Lithos refer to BGS maps for the area, and the relevant geological memoir. Further information is sourced by reference to current and historical OS plans.

In July 2011, the Coal Authority (CA) formalised their requirements in relation to planning applications and introduced some new terminology. The CA, using its extensive records has prepared plans for all coalfield Local Planning Authorities, which effectively refines the defined coalfield areas into High Risk and Low Risk areas. **High Risk** areas are likely to be affected by a range of legacy issues that pose a risk to surface stability, including: mine entries; shallow coal workings; workable coal seam outcrops; mines gas; and previous surface mining sites. **Low Risk** areas comprise the remainder of the defined coalfield, and are areas where no known defined risks have been recorded; although there may still be unrecorded issues. Where a site lies within either a High or Low Risk area, a mining report is obtained from the CA.

Landfills

Reference is made to publicly available Government held digital data via **QGIS** (an Open Source Geographic Information System), data from Landmark or Groundsure, and sometimes the Environment Agency and the Local Authority with respect to known areas of landfilling within 250m of the proposed development site.

Historical OS plans are also inspected for evidence of backfilled quarries, railway cuttings, colliery spoil tips etc.

Radon

Radon is a colourless, odourless gas, which is radioactive. It is formed in strata that contain uranium and radium (most notably granite), and can move through fissures eventually discharging to atmosphere, or the spaces under and within buildings. Where radon occurs in high concentrations, it can pose a risk to health.

In order to assess potential risks associated with radon gas, Lithos refer to BRE Report BR211¹, and the UK Health Protection Agency (HPA) website. In December 2022, the British Geological Survey (BGS), deployed a revised dataset which increased accuracy and also the number of properties falling within radon affected areas. This revised dataset is now referenced by maps on the HSA website.

Advice on the limitation of exposure of the population to radon in buildings was originally published in 1990 by the National Radiological Protection Board (NRPB), which joined the HPA in 2005; the HPA updated NRPB advice in July 2010².

The HPA recommended that the NRPB radon Action Level for homes be retained, and a new Target Level for radon in homes be introduced. The values of the Action Level and Target Level, expressed as the annual average radon concentration in the home, are 200 Bq m⁻³ and 100 Bq m⁻³ respectively. The Target Level was to provide an objective for remedial action in existing homes and preventive action in new homes.

The term 'radon Affected Area' is defined as those parts of the country with >1% of homes estimated to be above the Action Levels. The level of protection needed is site-specific and can be determined by reference to this mapping on the Public Health England website, which indicates the highest radon potential within each 1km grid square. Each 1km grid square is classified on the basis of the percentage of existing homes within that grid square estimated to have radon concentrations above the Action Level. There are 6 'bands': <1%; 1 to 3%; 3 to 5%; 5 to 10%; 10 to 30%; and >30%.

The NRPB advised that action should be taken to reduce radon concentrations in existing homes if the radon concentration exceeded the Action Level of 200 Bq m⁻³ in room air averaged over a year; ten times the average UK domestic radon concentration. NRPB advice informed changes in the requirements for radon protection in new buildings.

- **Basic** preventive measures are required in new buildings, extensions, conversions and refurbishments if the probability of exceeding the Action Level is **>3%** in England and Wales, and **>1%** in Scotland and Northern Ireland.
- Provision for further preventive (**Full**) measures is required in new buildings if the probability of exceeding the Action Level is **>10%**.

At present Building Regulations Approved Document C advocates basic measures for the probability banding 3% to 10%, and full measures if >10%. However, HPA would like to see all new build include basic measures.

Action & Target Levels should also be applied to non-domestic buildings with public occupancy exceeding 2,000 hrs/yr and to all schools.

Hydrogeology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Groundwater quality
- Recorded pollution incidents
- Licensed groundwater abstractions

From April 2010 the EA's Groundwater Protection Policy uses aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply), but also their role in supporting surface water flows and wetland ecosystems. The aquifer designation data is based on geological mapping provided by the British Geological Survey. The maps are split into two different types of aquifer designation:

- Superficial (Drift) - permeable unconsolidated (loose) deposits. For example, sands and gravels
- Bedrock - solid permeable formations e.g. sandstone, chalk and limestone

The maps display the following aquifer designations:

Principal aquifers: These are layers of rock or superficial deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

Secondary aquifers: These include a wide range of rock layers or superficial deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into three types:

- **Secondary A** - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
- **Secondary B** - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers
- Secondary undifferentiated - In most cases, this is because the rock type in question has previously been designated as both a minor and non-aquifer in different locations due to the variable characteristics.

¹ BRE Report BR211, 2023: "Radon: guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects)".

² Limitation of Human Exposure to Radon, Documents of the Health Protection Agency - Radiation, Chemical and Environmental Hazards, RCE-15. July 2010.

Unproductive strata: These are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

The EA maps only display the principal and secondary aquifers as coloured areas. All uncoloured areas on the map will be unproductive strata. However, for uncoloured areas on the superficial (drift) designation map it is not possible to distinguish between areas of unproductive strata and areas where no superficial deposits are present; to do this, it is necessary to consult the published geological survey maps.

For the purposes of the EA's Groundwater Protection Policy the following default position applies, unless there is site specific information to the contrary:

- If no superficial (drift) aquifers are shown, the bedrock designation is adopted
- In areas where the bedrock designation shows unproductive strata (the uncoloured areas) the superficial designation is adopted
- In all other areas, the more sensitive of the two designations is used (e.g. If secondary superficial overlies principal bedrock, an overall designation of principal is assumed)

The EA have also designated groundwater Source Protection Zones, which are based on proximity to a groundwater source (springs, wells and abstraction boreholes). The size of a Source Protection Zone is a function of the aquifer, volume of groundwater abstracted and the effective rainfall, and may vary from tens to several thousand hectares.

Hydrology

Reference is made to publicly available Government held digital data via QGIS, and Landmark or Groundsure with respect to:

- Surface water quality
- Recorded pollution incidents
- Licensed abstractions (groundwater & surface waters)
- Licensed discharge consents
- Site susceptibility to flooding

The EA have set **water quality** targets for all rivers. These targets are known as River Quality Objectives (RQOs). The water quality classification scheme used to set RQO planning targets is known as the River Ecosystem scheme. The scheme comprises five classes (RE1 to RE5) which reflect the chemical quality requirements of communities of plants and animals occurring in our rivers.

General Quality Assessment (GQA) grades reflect actual water quality. They are based on the most recent analytical testing undertaken by the EA. There are 6 GQA grades (denoted A to F) defined by the concentrations of biochemical oxygen demand, total ammonia and dissolved oxygen.

The susceptibility of a site to **flooding** is assessed by reference to a Flood Map on the Environment Agency's website. These maps show natural floodplains - areas potentially at risk of flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas. There are two different kinds of area shown on the Flood Map:

1. Dark blue areas (Flood Zone 3) could be flooded by the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year, or by a river by a flood that has a 1% (1 in 100) or greater chance of happening each year
2. Light blue areas (Flood Zone 2) show the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Where there is no blue shading (Flood Zone 1), there is less than a 0.1% (1 in 1000) chance of flooding occurring each year.

The maps also show all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods.

The Agency's assessment of the likelihood of flooding from rivers and the sea at any location is based on the presence and effect of all flood defences, predicted flood levels, and ground levels.

It should also be noted that as the floodplain shown is the 1 in 100 year, areas outside this may be flooded by more extreme floods (e.g. the 1 in 1000 year flood). Also, parts of the areas shown at risk of flooding will be flooded by lesser floods (e.g. the 1 in 5 year flood). In some places due to the shape of the river valley, the smaller floods will flood a very similar extent to larger floods but to a lesser depth.

If a site falls within a floodplain, it is recommended that a flood survey be undertaken by a specialist who can advise on appropriate mitigating measures; i.e. raising slab levels, provision of storage etc. In accordance with Chapter 10 of the National Planning Policy Framework, a site-specific flood risk assessment is required for: proposals of 1 hectare or greater in Flood Zone 1, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and any new development in Flood Zones 2 and 3.

COMAH & explosive sites

Lithos obtain information from Landmark or Groundsure with respect to Control of Major Accident Hazards (COMAH) or explosive sites within 1km of the proposed development site. Lithos' report refers to any that are present, and recommends that the Client seeks further advice from the HSE.

Areas around COMAH sites (chemical plants etc) are zoned with respect to the implementation of emergency plans. The HSE are a statutory consultee to the local planning authority for all COMAH sites. The COMAH site may have to revise its emergency action plan if development occurs. This might be quite straightforward or could entail significant expenditure. Consequently, the COMAH site may object to a proposed development (although it is the Local Authority who have final say, and they are likely to place more weight on advice from the HSE).

Preliminary conceptual site model

The site's environmental setting (and proposed end use) is used by Lithos to assess the significance of any contamination encountered during the subsequent ground investigation.

Assessment of contaminated land is based on an evaluation of pollutant linkages (source-pathway-receptor). Contaminants within the near surface strata represent a potential source of pollution. The environment (most notably groundwater), site workers and end users are potential receptors.

Potential pollutant linkages are shown on a preliminary conceptual site model (pCSM). A CSM is essentially a cross-section through a site that reflects both the surface topography and underlying geology, and shows surface features of interest. The most significant sources of contamination are then superimposed onto this cross-section together with potential receptors (human health & controlled waters), and plausible pathways between the two. In addition to environmental issues, the CSM should also highlight geotechnical issues.

A pCSM is prepared after consideration of all available "desk study" data, and before design of the ground investigation. Data reviewed should include historical plans (with superimposition on a current-day plan), previous SI reports, geological maps etc. The pCSM, in conjunction with knowledge of site constraints (buildings, services, slopes etc) is used to design the ground investigation.

The revised CSM takes account of data obtained during the ground investigation, including the distribution of made ground, the nature and distribution of contamination etc.

Appendix B

Drawings



Reproduced from OS Explorer map 1:25,000 scale by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. Crown copyright. All rights reserved. Licence number 100049696.



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CLIENT

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JOB TITLE

CEMETERY
ROAD,
JUMP,
BARNSELY

DRAWING TITLE

SITE LOCATION
PLAN

DRAWN

GW

DATE

30 01 26

CHECKED

AG

DATE

30 01 26

STATUS

FOR COMMENT ☐

DRAFT ☐

FOR APPROVAL ☐

FINAL ☒

SCALE

1:25,000

SHEET

A4

DRAWING NO.

5693/1

REVISION



NOTES

— APPROXIMATE SITE BOUNDARY

REPRODUCED FROM PARKER PEEL
ARCHITECTURALS DRAWING REFERENCE
2604-SI-01, DATED MAY 2026

REV.	DESCRIPTION	DATE
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CLIENT

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DAVID WILSON
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YORKSHIRE WEST

JOB TITLE

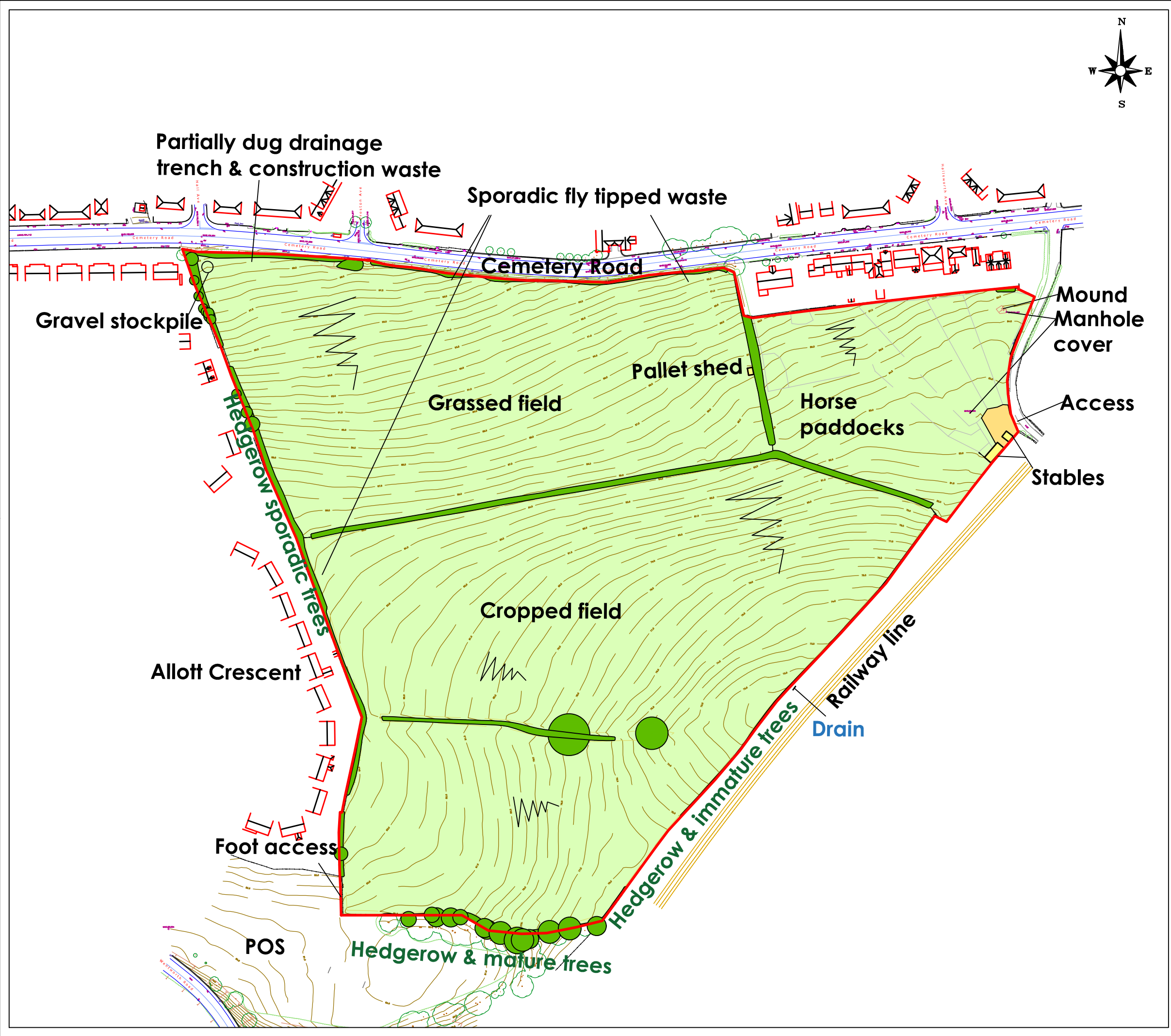
CEMETERY
ROAD,
JUMP,
BARNSELY

DRAWING TITLE

PROPOSED SITE LAYOUT

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CHECKED	AG	DATE	27 05 26	FOR APPROVAL	DRAFT	☐
				FINAL		☒

SCALE	1:1500	SHEET	A3	DRAWING NO.	5693/2	REVISION	
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NOTES

- GRASS & OVERGROWN AREAS
- BUILDING
- GRAVEL OR ROUGH GROUND
- HEDGEROW & WOOLDAND
- APPROXIMATE SITE BOUNDARY

REV.	DESCRIPTION	DATE
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JOB TITLE

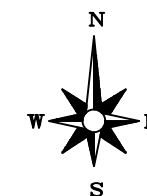
CEMETERY
ROAD,
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BARNSELY

DRAWING TITLE

SITE FEATURES

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CHECKED	AG	DATE	05 02 26	FOR APPROVAL	DRAFT	☐
				FINAL		☒

SCALE	1:2,000	SHEET	A3	DRAWING NO.	5693/3	REVISION	
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 GRASS & OVERGROWN AREAS
 BUILDING
 GRAVEL OR ROUGH GROUND
 HEDGEROW & WOOLDAND
 APPROXIMATE SITE BOUNDARY



LOCATION & ORIENTATION OF PHOTOGRAPH

REV.	DESCRIPTION	DATE
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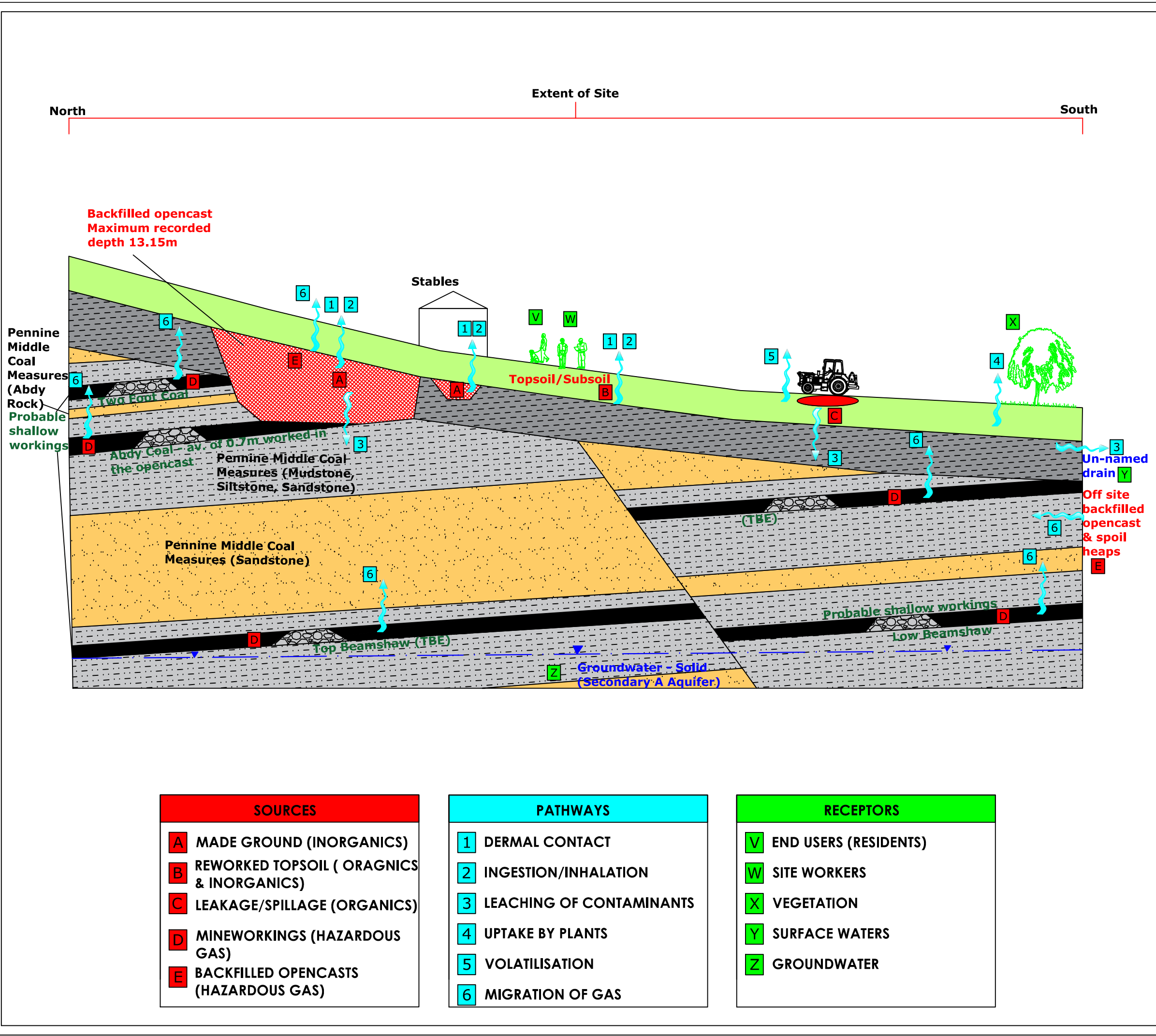
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CEMETERY
ROAD,
JUMP,
BARNSELY

DRAWING TITLE

SITE PHOTOGRAPHS

DRAWN GW		DATE 06 02 26		STATUS FOR COMMENT FOR APPROVAL DRAFT FINAL
CHECKED AG		DATE 06 02 26		
SCALE NOT TO SCALE	SHEET A3	DRAWING NO. 5693/4		REVISION



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REV.	DESCRIPTION	DATE

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YORKSHIRE WEST

JOB TITLE

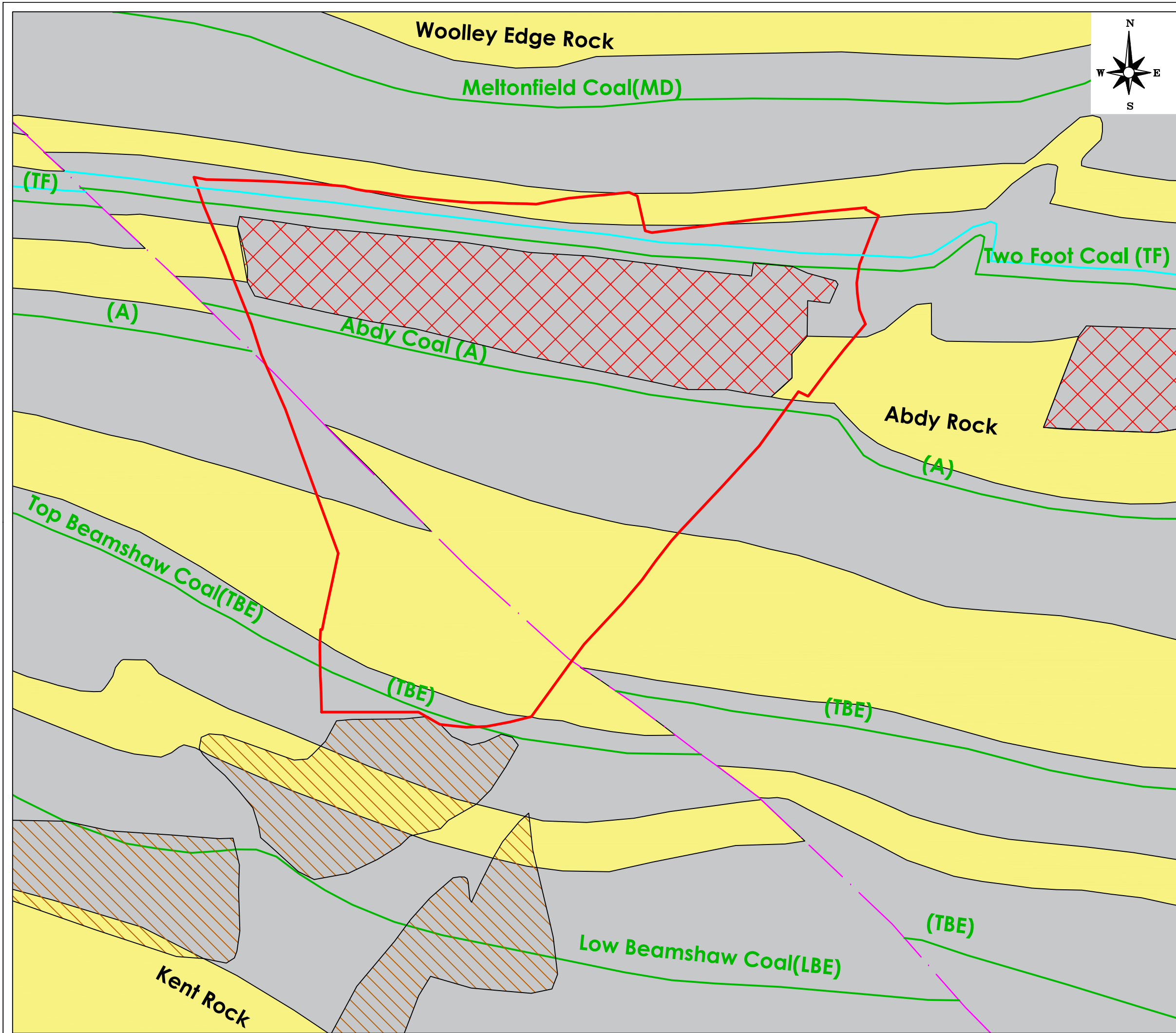
CEMETERY ROAD,
JUMP,
BARNSELY

DRAWING TITLE

PRELIMINARY CONCEPTUAL SITE
MODEL

DRAWN	DATE	STATUS
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AG	03 02 26	FOR APPROVAL ☐
		DRAFT ☐
		FINAL ☒

SCALE	SHEET	DRAWING NO.	REVISION
Not to scale	A3	5693/5	



NOTES

BASED ON BGS INFORMATION

- PENNINE MIDDLE COAL MEASURE (MUDSTONE, SANDSTONE, SILTSTONE)
- PENNINE MIDDLE COAL MEASURE (SANDSTONE)
- INFILLED GROUND (PARTIALLY OR WHOLLY BACKFILLED OPENCAST COAL SITES, PITS & QUARRIES)
- MADE GROUND (MAINLY COLLIERY SPOIL TIPS & EMBANKMENT AREAS)
- FAULT
- TWO FOOT MARINE BAND
- COAL OUTCROP
- APPROXIMATE SITE BOUNDARY

REV.	DESCRIPTION	DATE



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DAVID WILSON
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YORKSHIRE WEST

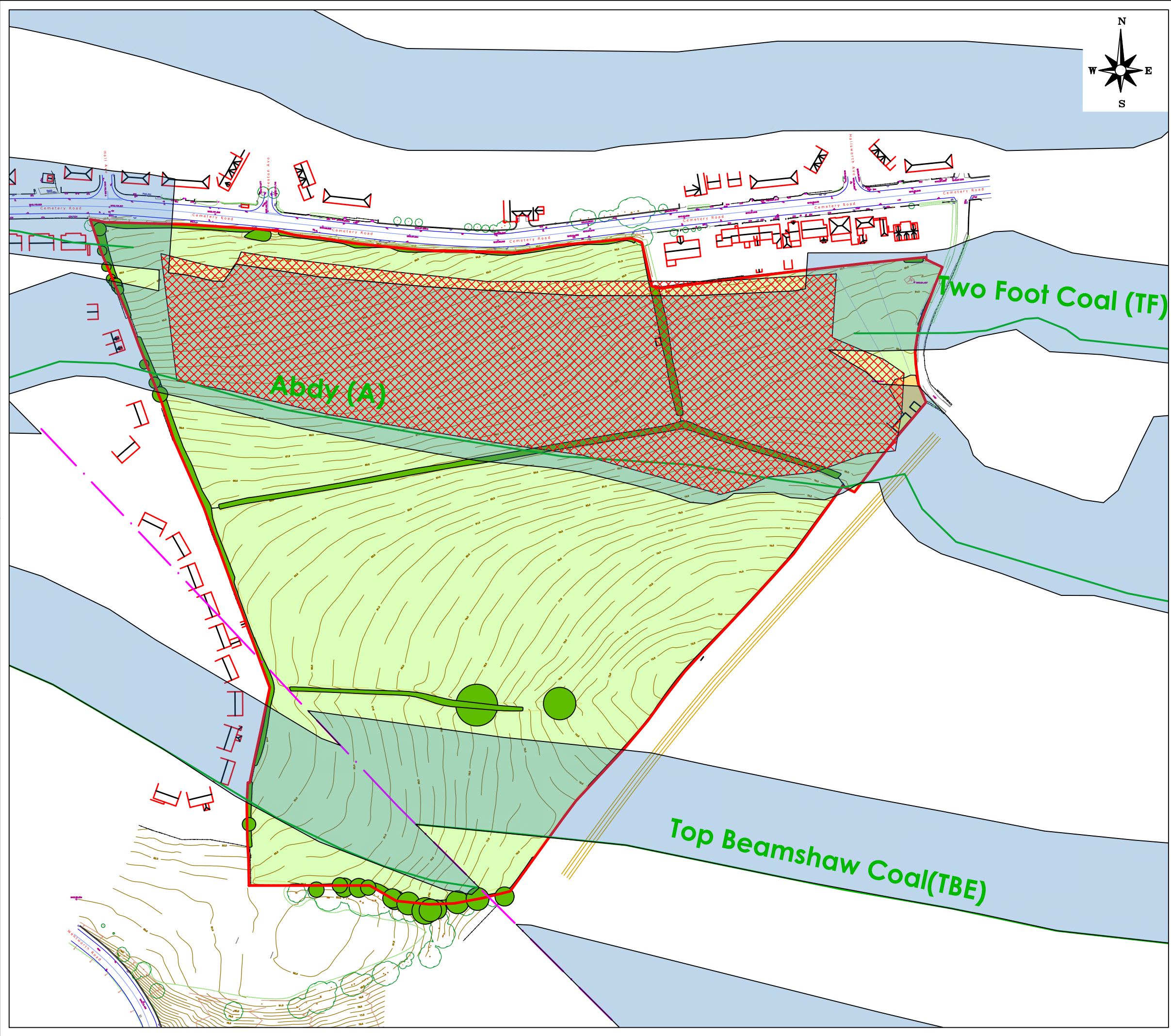
JOB TITLE

CEMETERY
ROAD,
JUMP,
BARNSELY

DRAWING TITLE

GEOLOGY & COAL (BGS)

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CHECKED	AG	DATE	02 02 26	FOR APPROVAL	DRAFT	☐
				FINAL		☒
SCALE	1:2,500	SHEET	A3	DRAWING NO.	5693/8	REVISION



NOTES

BASED ON MRA INFORMATION

- GRASS & OVERGROWN AREAS
- BUILDING
- GRAVEL OR ROUGH GROUND
- HEDGEROW & WOOLDAND
- INFILLED GROUND (PARTIALLY OR WHOLLY BACKFILLED OPENCAST COAL SITES, PITS & QUARRIES)
- DEVELOPMENT HIGH RISK
- FAULT
- COAL OUTCROP
- APPROXIMATE SITE BOUNDARY

REV.	DESCRIPTION	DATE
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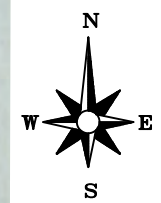
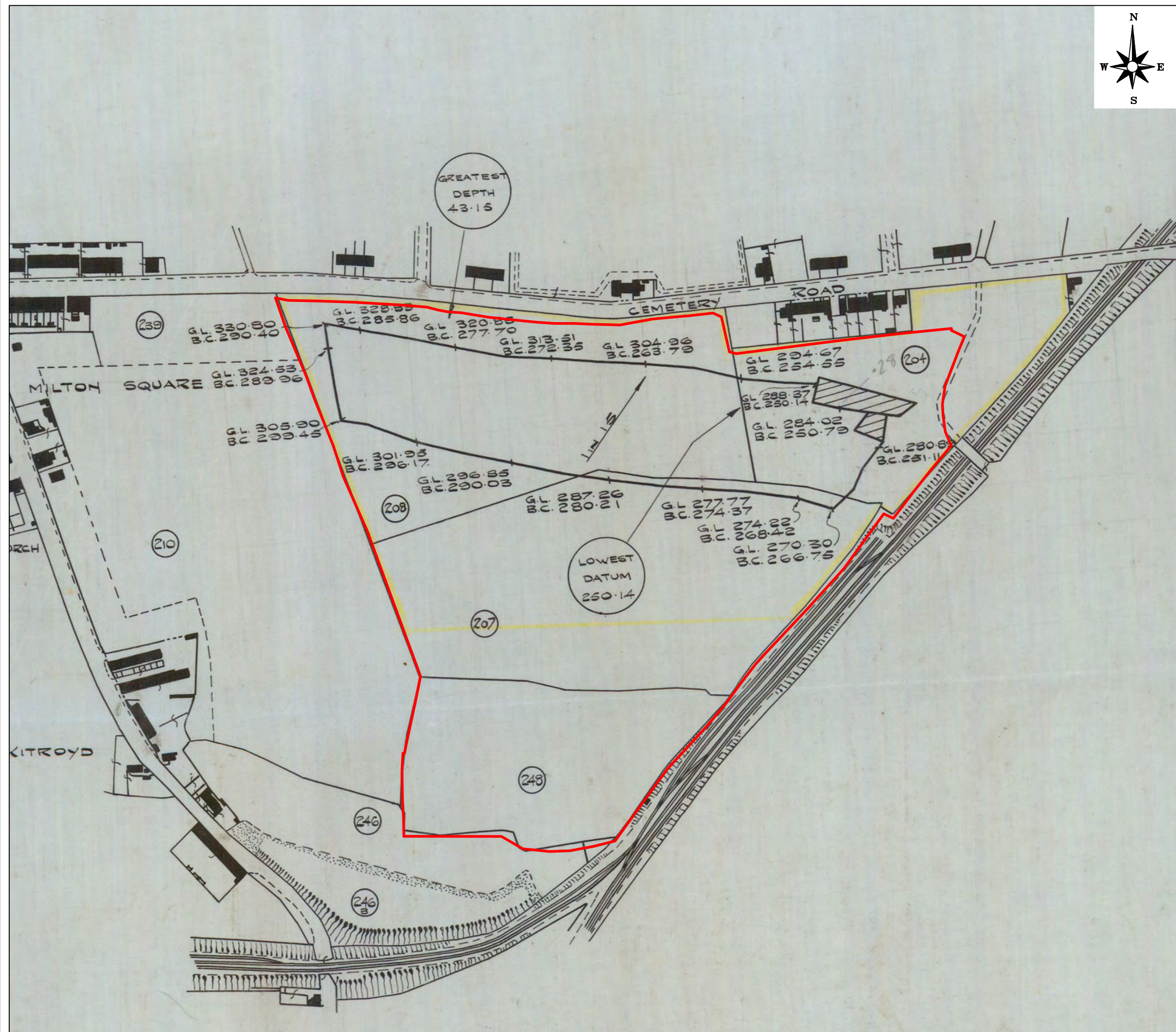
JOB TITLE

CEMETERY
ROAD,
JUMP,
BARNSELY

DRAWING TITLE

GEOLOGY & COAL (MRA)

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CHECKED	AG	DATE	06 02 26	FOR APPROVAL	DRAFT	☐
				FINAL		☒
SCALE	1:2,500	SHEET	A3	DRAWING NO.	5693/9	REVISION



NOTES

— APPROXIMATE SITE BOUNDARY

REPRODUCED FROM ABANDONMENT PLAN
CATALOGUE NUMBER: NE100 MAP 1

NOTE: DEPTHS SHOWN ON PLAN ARE IN FEET

REV.	DESCRIPTION	DATE



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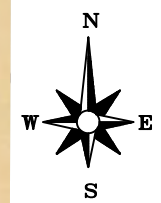
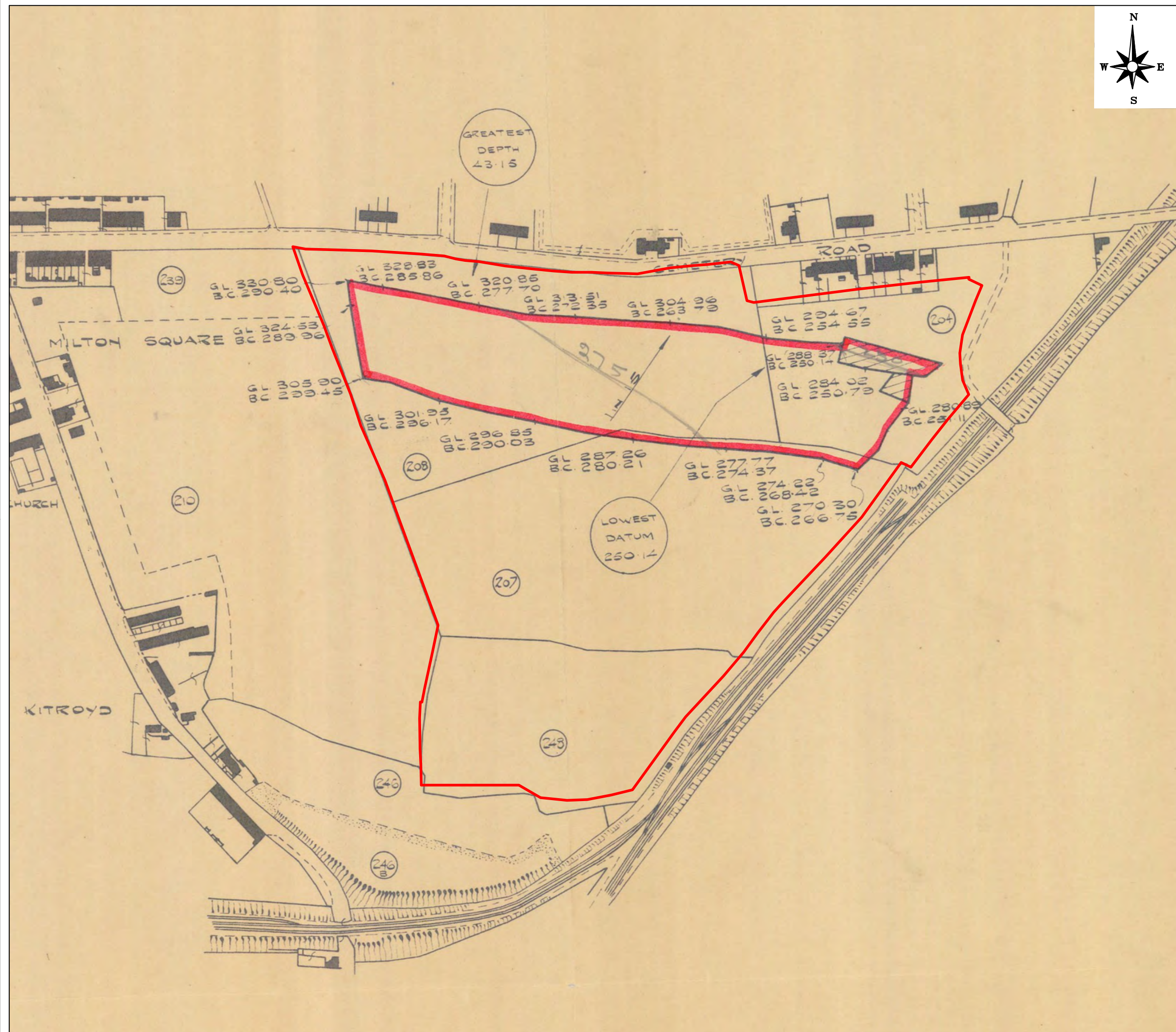
JOB TITLE

CEMETERY
ROAD,
JUMP,
BARNLEY

DRAWING TITLE

ABANDONMENT PLAN NE100 MAP 1

DRAWN	GW	DATE	05 02 26	STATUS	FOR COMMENT ☐
CHECKED	AG	DATE	05 02 26	FOR APPROVAL ☐	DRAFT ☐
SCALE	1:2500	SHEET	A3	DRAWING NO.	5693/10
REVISION					



NOTES

— APPROXIMATE SITE BOUNDARY

REPRODUCED FROM ABANDONMENT PLAN
CATALOGUE NUMBER: NE100 MAP 2

NOTE: DEPTHS SHOWN ON PLAN ARE IN FEET

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JOB TITLE

CEMETERY
ROAD,
JUMP,
BARNSELY

DRAWING TITLE

ABANDONMENT PLAN NE100 MAP 2

DRAWN	GW	DATE	05 02 26	STATUS	FOR COMMENT ☐
CHECKED	AG	DATE	05 02 26	FOR APPROVAL	☐
				DRAFT	☐
				FINAL	☒

SCALE	1:2500	SHEET	A3	DRAWING NO.	5693/11	REVISION	
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Appendix C

Commission

002/5693/AG

07th January 2026



Registered in England 07068066

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LS27 0WH

Parkhill
Wetherby
West Yorkshire
LS22 5DZ

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Dear Lee

Cemetery Road, Jump, Barnsley

Further to your recent invitation, please find below our proposal for preparing a geotechnical and environmental desk study appraisal for the above land. It is understood that the site consists of a single parcel of land of approximately 10 hectares and is currently undeveloped agricultural land.

Brief examination of the relevant geological map suggests the site is underlain by Pennine Middle Coal Measures (mudstone, siltstone & sandstone) which will be weathered near surface to a gravelly clay and clayey gravel.

This site is located within a Coal Mining Development **High Risk Area** (an area with specific mining legacy risks to the surface such as shallow coal workings etc), and therefore a mining report will be obtained. Review of the CA's interactive viewer suggests abandonment plans are available for an area of **former opencast** and we will obtain copies of these plans.

Our report will include a mining risk assessment (desk-based) that should satisfy the Coal Authority.

Environmental search data and historical maps, obtained from Landmark or Groundsure, will be reviewed in order to determine whether any past land uses have had any effect on the proposed development.

Internet data suggests the site lies in an area where the risk of encountering UXO is considered low.

The report will include preliminary recommendations with respect to mining, foundations, contamination and hazardous gas. Our report will be in a format familiar to Barnsley MBC, and therefore suitable for submission in support of an outline planning application.

It is anticipated that a final bound report will be available within 4 weeks of receiving your written instruction to proceed. Our lump sum fee for provision of this report is £*** plus VAT.

We will need a Promap or topo survey in CAD format, to provide a base plan for technical drawings etc. If you do not have one, we could obtain for an E\O of £***.

With respect to the anticipated ground investigation, this is likely vary considerably, depending on the outcome of the Desk Study research. However, the investigation is likely to comprise some or all of the following:

- 5 day's pitting across the site.
- 5 day's trenching to locate the opencast buried highwalls.
- 2 day's soakaway testing (initial sweep to check viability).
- 6 cable percussion boreholes to confirm ground conditions and strength/density of the opencast backfill, assuming base is no greater than 15m depth.
- 4 days rotary stitch drilling to confirm geometry of the opencast highwalls at depth.
- 8 day's rotary openhole drilling to check for the presence of shallow mine workings beneath the site.



- 4 rotary cored boreholes beneath the base of the opencast to aid pile design (if required).
- Appropriate geotechnical (including earthworks classification) and chemical laboratory testing.
- Gas monitoring at least 9-visits in 6-months.

At this stage, the total cost of such an investigation is likely to be in the range £*** to £***. The actual cost would be confirmed on completion of the desk study.

BDW and Lithos have an agreed Appointment document, and this work will be undertaken in accordance with that. However, if the Appointment term expires or remains unsigned, works will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed.

It is hoped the above is sufficient for your present needs. However, should you require any further information, please contact the undersigned.

Yours sincerely

A handwritten signature in black ink, appearing to read "AG", with a long horizontal flourish extending to the right.

Adam Gombocz
Director

for and on behalf of
LITHOS CONSULTING LIMITED

1 DEFINITIONS AND INTERPRETATION

- 1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:

"Agreement" means these Terms (entitled "Terms and Conditions for the Appointment of Lithos Consulting"), the Proposal, any document recording your unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing;

"Documents" means all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films and photographs (including negatives), or any other form of record prepared or provided or received by, or on behalf of us, and whether in paper form or stored electronically or on disk, or otherwise;

"Intellectual Property" includes all rights to, and any interests in, any patents, designs, trade marks, copyright, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed or produced by any person;

"Project" means the project described in the Proposal and any enquiry from you on which we have based our Proposal;

"Proposal" means the offer document prepared by us in response to an enquiry or otherwise, in connection with the proposed provision of the Services;

"Services" means the work and services relating to the Project to be provided by us pursuant to the Agreement and as set out in the Proposal and includes any additions or amendments thereto made in accordance with these Terms;

"Terms" means these terms entitled "Lithos Consulting Terms of Appointment" as amended from time to time.

- 1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.
- 1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.
- 1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.
- 1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.
- 1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.

2 APPOINTMENT

- 2.1 You agree to engage us and we agree to provide the Services in accordance with the provisions of this Agreement.

3 OUR OBLIGATIONS

- 3.1 We shall perform the Services using the reasonable standard of skill and care normally exercised by qualified members of our profession, performing similar services under similar conditions.
- 3.2 We shall use all reasonable endeavours to perform the Services in accordance with relevant environmental and safety legislation.

4 YOUR OBLIGATIONS

- 4.1 Throughout the period of this Agreement you shall afford to us, or procure for our benefit, access to any site where access is required for the performance of the Services.
- 4.2 You accept responsibility for ensuring that we are notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards, which you shall clearly mark on the ground or identify on accurate location plans supplied to us prior to the commencement of the Services. You shall also inform us in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. You shall indemnify us against all costs, losses, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise.
- 4.3 If you discover any conflict, defect or other fault in the information or designs provided by us pursuant to the Agreement, you will advise us in writing of such defect, conflict or other fault and we shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs.

5 COPYRIGHT

- 5.1 The copyright in all Intellectual Property prepared by or on behalf of us in connection with the Project for delivery to you shall remain vested in us.
- 5.2 You shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable you to copy and use the Intellectual Property but solely for your own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any licence to amend any drawing, design or other Intellectual Property produced by us.
- 5.3 Should you wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, you must obtain our prior written consent. The giving of such consent shall be at our absolute discretion and shall be upon such terms as we may require. We shall not be liable to you for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on our behalf.
- 5.4 Ownership of any proposals submitted to you that are not subsequently confirmed as part of the Services to be provided for you remain with us and such proposals must not be used as the basis for any future work undertaken by you or a third party and no liability can be accepted howsoever arising from such proposals.
- 5.5 In the event of you being in default of payment of any fees or other amounts due, we may suspend further use of the licence on giving no less than 2 calendar days' notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts.

6 CONFIDENTIALITY

- 6.1 Neither you nor we shall at any time disclose to any person any confidential information concerning the business, affairs, customers, clients or suppliers of the other party or of any member of the group of companies to which the other party belongs, except as permitted by clauses 6.2 and 6.4.
- 6.2 Each party may disclose the other party's confidential information:
- (a) to its employees, officers, representatives, contractors, sub-contractors or advisers who need to know such information for the purposes of exercising the party's rights or carrying out its obligations under or in connection with this Agreement. Each party shall ensure that its employees, officers, representatives, contractors, sub-contractors or advisers to whom it discloses the other party's confidential information comply with this paragraph 6; and
- (b) as may be required by law, to a court of competent jurisdiction or any governmental or regulatory authority.
- 6.3 Neither you nor we shall use any other party's confidential information for any purpose other than to exercise our rights or perform our respective obligations under or in connection with this Agreement.
- 6.4 Subject to the above and our privacy policy which can be found on www.lithos.co.uk, we shall be permitted to use information related to the Services we provide in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

7 ASSIGNMENT

- 7.1 You may assign the benefit of this Agreement on two occasions with our prior written consent (not to be unreasonably withheld) and any additional assignments shall be with our prior consent.
- 7.2 We may at any time assign, mortgage, charge, subcontract, delegate, declare a trust over or deal in any other manner with any or all of our rights and obligations under this Agreement.

8 INSURANCE

- 8.1 We shall maintain a professional indemnity insurance policy covering our liabilities for negligence under this Agreement, with a limit of indemnity of £5,000,000 (FIVE MILLION POUNDS) any one claim, save for pollution and contamination claims and asbestos claims both of which carry £2,000,000 (TWO MILLION POUNDS) in the aggregate cover. This policy is annually renewable and whilst renewal is not automatic, We shall maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under this Agreement, provided such insurance is available at commercially reasonable rates and terms.

- 8.2 If for any period such insurance is not available at commercially reasonable rates and terms, we shall inform you and shall obtain in respect of such period such reduced level of professional indemnity insurance as is available and as would be fair and reasonable in the circumstances for us to obtain.

9 PAYMENT

- 9.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal.
- 9.2 You shall pay you any VAT properly chargeable on the Services and any amount expressed as payable to us under this Agreement is exclusive of VAT unless stated otherwise.
- 9.3 The due date for payment is the date of the invoice and the final date for payment is 28 days from the date of the invoice.
- 9.4 If you dispute the amount included for payment in an invoice then you must serve a written notice on us no later than 14 calendar days before the final date for payment. If no notice is given within the required timeframe the amount due shall be the amount stated in the invoice.
- 9.5 If you fail to pay any monies in accordance with the foregoing payment provisions, we shall be entitled to charge interest on any monies owed to us, such interest to be at a rate of 4% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis. The parties acknowledge that our liability under this clause 10.5 is a substantial remedy for the purposes of section 9(1) of the Late Payment of Commercial Debts (Interest) Act 1998.

10 LIMITATIONS ON LIABILITY

- 10.1 Unless otherwise agreed in writing, our total liability under or in connection with this Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall be limited to and shall not exceed the lesser of either the level of insurance cover referred to within clause 8.1 above, or 20 times the total value of invoices issued to you for the Services.
- 10.2 No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against us after the expiry of a period of six years from the date of the completion (or termination) of the Services under this Agreement.
- 10.3 Whilst we usually scan for potential exploratory locations with a Cable Avoidance Tool, we shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.
- 10.4 We shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by us or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless we have been advised in writing of the same by you and have been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same.

11 DELAY

We shall comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond our reasonable control and in the event of any such circumstances arising we undertake to complete the Services within a reasonable period, but will not be liable to you for any delay as a result.

12 TERMINATION

- 12.1 The Agreement may be terminated by either of us in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of termination must be given to the party which is insolvent by the other party.
- 12.2 If for any reason our Services are suspended for a period in excess of three calendar months then we shall be entitled to terminate our appointment under this Agreement in respect of the Services by no less than seven days written notice to you.
- 12.3 If you fail to pay in full any sum due under the terms of this Agreement by the final date for payment for that sum and no effective pay less notice is issued, we may serve written notice to you demanding payment within 14 days of such notice. If you fail to comply with such notice, we shall be entitled to terminate our employment under this Agreement forthwith.
- 12.4 Any termination of our appointment howsoever caused shall be without prejudice to our rights to require payment for all Services performed up to the date of such termination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which Lithos has started, but not completed.

13 THIRD PARTY RIGHTS

The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.

14 COLLATERAL WARRANTIES & LETTERS OF RELIANCE

We shall consider and may consent to a request from you for us to enter into a collateral warranty or letter of reliance with a third party with regard to the Services provided under this Agreement. The giving of such consent shall be at our absolute discretion and providing we agree to our standard form of collateral warranty or letter of reliance (subject to any reasonable changes to be approved by us at our absolute discretion) and in return for payment of a fee (to be notified at the time of the request).

15 NOTICES

- 15.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by pre-paid first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to our respective registered office addresses.
- 15.2 Such notice shall be deemed to have been received on the day of delivery if delivered by hand or on the second working day after the day of posting if sent by pre-paid first class post.

16 ENTIRE AGREEMENT

- 16.1 The Agreement constitutes the complete and entire agreement between us with respect to the Services and supercedes any prior oral and/or written warranties, terms, conditions, communications and representations, whether express or implied and any claim against us in respect of the Services can only be made in contract under the provisions of this Agreement and not otherwise under the law or tort or otherwise.
- 16.2 No amendments, modifications or variation of this Agreement shall be valid unless made in writing and agreed to by us; such agreement must be recorded in writing by at least one of us.
- 16.3 We shall not be bound by any standard or printed terms or conditions furnished by you in any of your documents unless we specifically state in writing separately from such documents that we intend such terms and conditions to apply.

17 DISPUTES, JURISDICTION AND GOVERNING LAW

- 17.1 This Agreement shall be governed by and construed in accordance with English law and we irrevocably and unconditionally submit to the jurisdiction of the English Courts.
- 17.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between us may be referred to adjudication in accordance with The Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland and Northern Ireland.

From: Richardson, Lee <lee.richardson@barratthomes.co.uk>
Sent: 27 January 2026 15:53
To: Adam Gombocz
Subject: FW: Material Order HM-9214/0018 Jump Desktop
Attachments: HM-92140018.pdf

Hi Adam,

Please find attached the PO for the above site, could you proceed with the report

Lee

The sender of this e-mail is a member of the Barratt Redrow plc group of companies, the ultimate parent of which is Barratt Redrow plc (company number 00604574). Barratt Redrow plc is registered in England and Wales with its registered office at Barratt House, Cartwright Way, Forest Business Park, Bardon Hill, Coalville, Leicestershire LE67 1UF, together with its principal subsidiaries BDW Trading Limited (03018173), and Wilson Bowden Developments Limited (00948402). Its other principal subsidiaries, Redrow Limited (02877315) and Redrow Homes Limited (01990710) have their registered address at Redrow House, St Davids Park, Flintshire, CH5 3RX. Barratt Homes, Barratt London, David Wilson Homes and Redrow are trading names of BDW Trading Limited. This e-mail message is meant only for use by the intended addressee and may contain privileged and/or confidential information. If you have received this message in error please notify us and remove it from your system. Please view our 'Email Addendum v2.1' at

<https://www.barrattredrowcommercialsupport.co.uk/barratt-developments-plc-email-a>

This message has been scanned by Mailsafe

Appendix D

Historical OS Plans

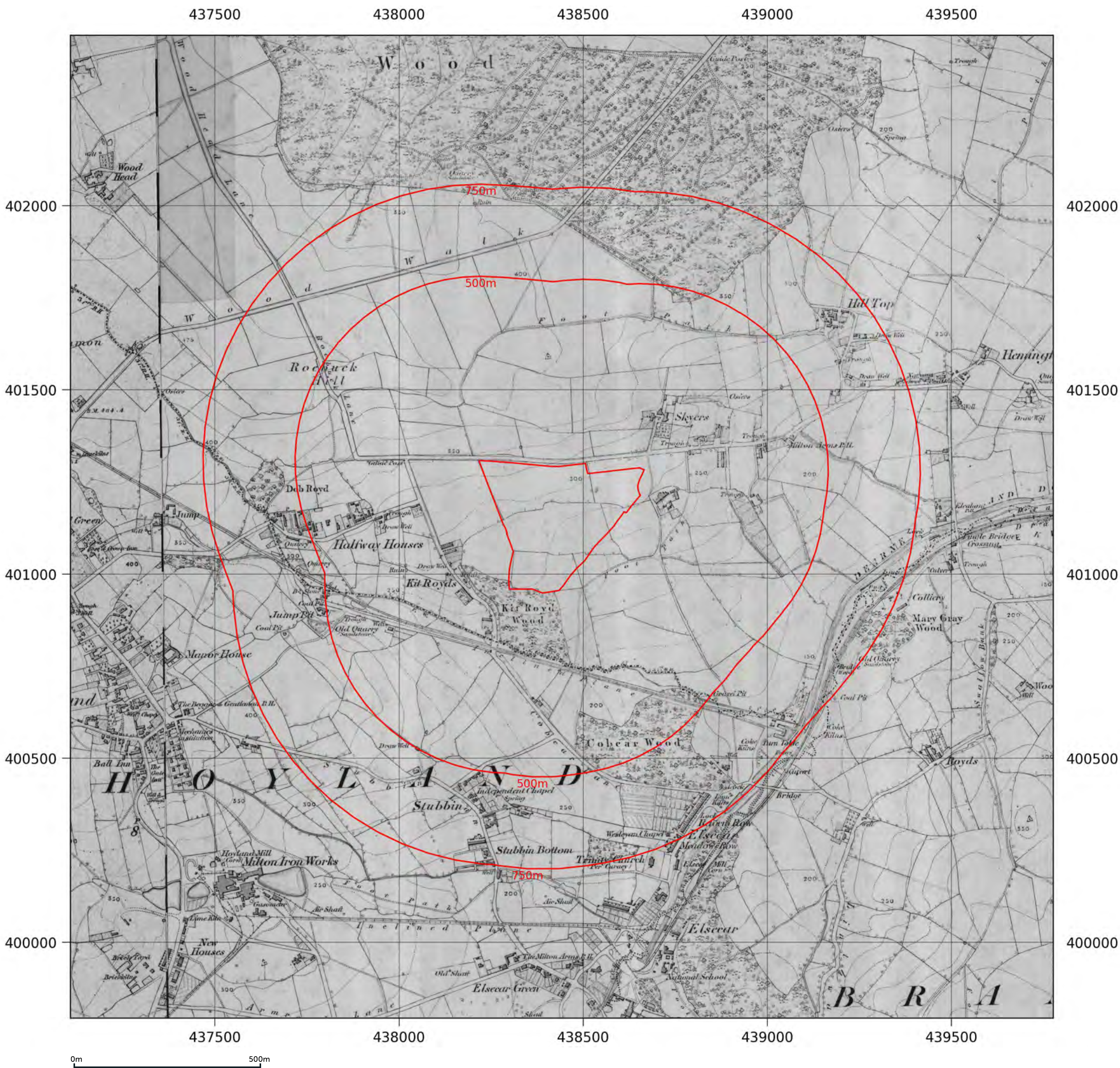
Site details:	Cemetery Road, Jump, Barnsley
Client ref:	PO25898/5693/GW
Report ref:	GS-NK7-31E-1AM-HRE
Grid ref:	438426.81, 401156.79
Production date:	30 January 2026

Map name:	County Series
Map date:	1855
Scale:	1:10,560
Printed at:	1:10,560



Date: 1855 Surveyed: 1851 Edition: 1855	Date: 1855 Surveyed: 1850 Edition: 1855
---	---

Contact us with any questions at:
info@groundsure.com
01273 257 755



Site details: Cemetery Road, Jump, Barnsley
Client ref: PO25898/5693/GW
Report ref: GS-NK7-31E-1AM-HRE
Grid ref: 438426.81, 401156.79
Production date: 30 January 2026

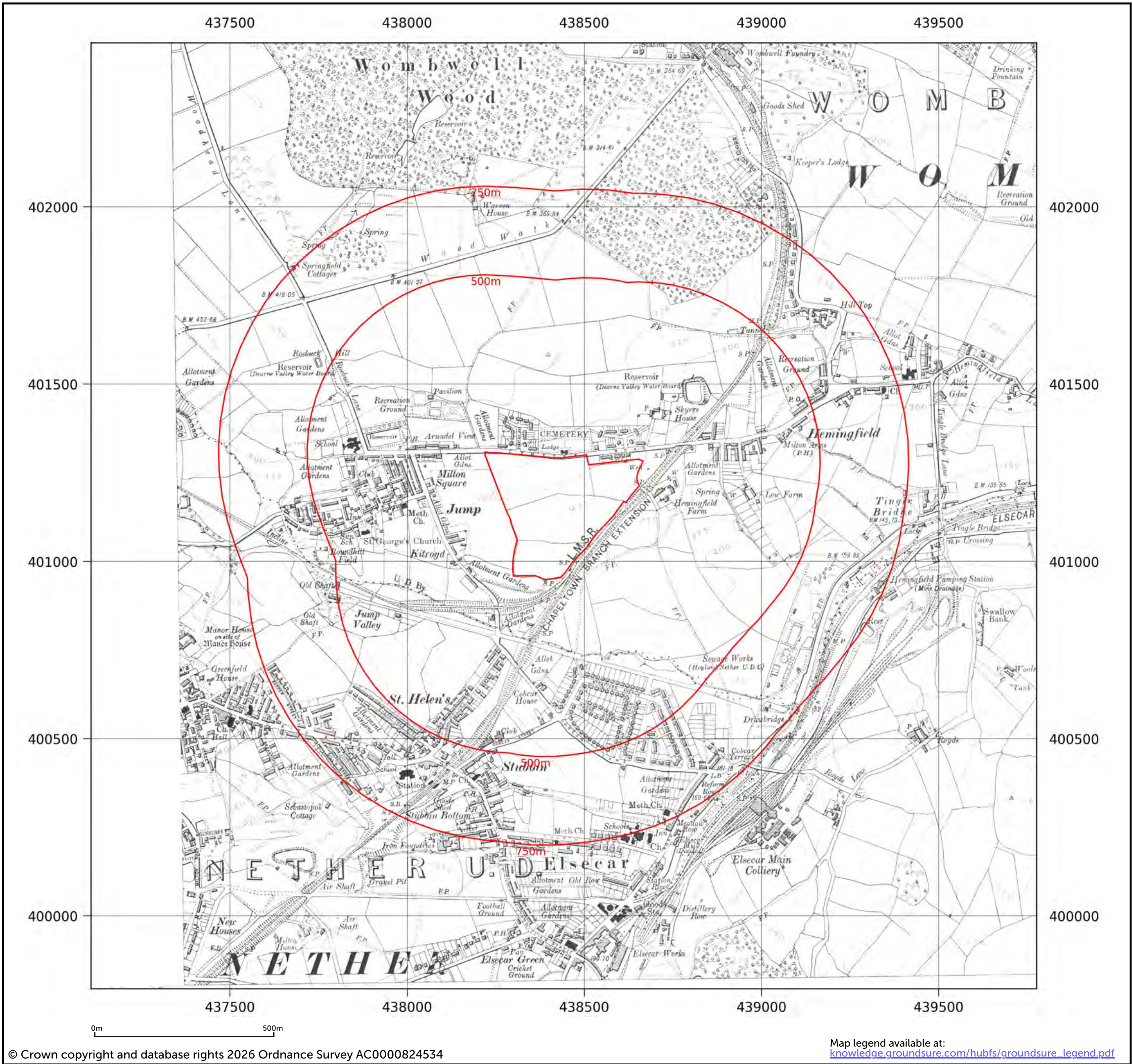
Map name: County Series
Map date: 1929
Scale: 1:10,560
Printed at: 1:10,560



Date: 1929
Surveyed: 1850
Revised: 1929

Date: 1929
Surveyed: 1851
Revised: 1929

Contact us with any questions at:
info@groundsure.com
01273 257 755



Site details:

Cemetery Road, Jump, Barnsley

Client ref:

PO25898/5693/GW

Report ref:

GS-NK7-31E-1AM-HRE

Grid ref:

438426.81, 401156.79

Production date:

30 January 2026

Map name:

County Series

Map date:

1948-1951

Scale:

1:10,560

Printed at:

1:10,560

Date: 1951
Surveyed: 1951
Revised: 1951

Date: 1948
Surveyed: 1851
Revised: 1948
Edition: 1948

Date: 1948
Surveyed: 1850
Revised: 1948

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This figure is a historical map of the Wombwell Urban District (UD) and Hemmingfield area. The map is overlaid with a grid showing Easting coordinates (437500 to 439500) and Northing coordinates (400000 to 402000). A prominent red circular boundary is drawn across the map, with a radius of 500m indicated. The map shows various geographical features including Wombwell Wood, several reservoirs (e.g., Dearne Valley Water Reservoir), a cemetery, and various buildings and roads. Labels for 'WOMBWELL UD & Hemmingfield' and 'ND NETHER UD & PH' are visible. A scale bar at the bottom left indicates 0m to 500m. A map legend is available at knowledge.groundsure.com/hubfs/groundsure_legend.pdf.

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Groundsure

LOCATION INTELLIGENCE

Ordnance Survey

Licensed Data

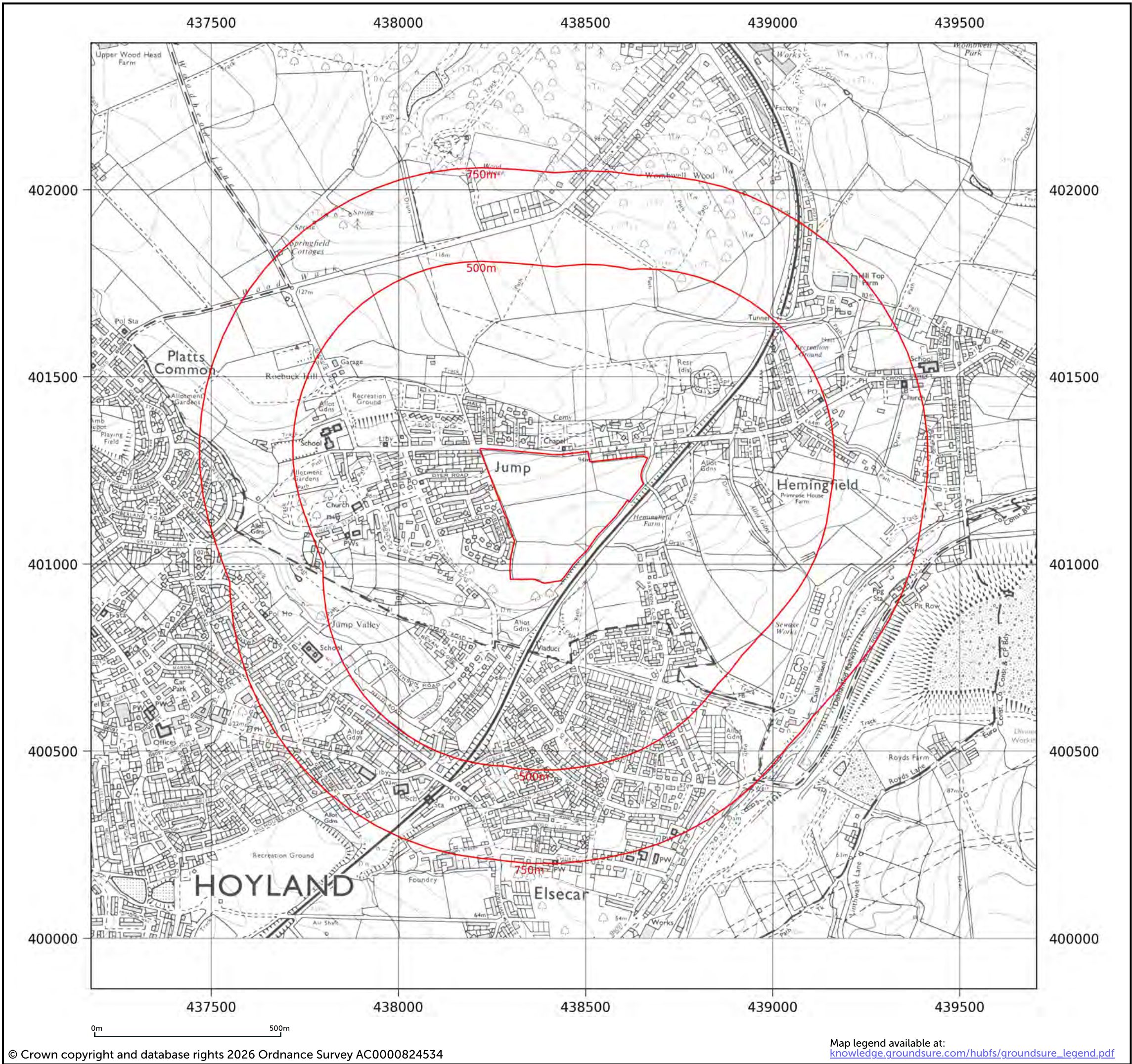
Site details: Cemetery Road, Jump, Barnsley
Client ref: PO25898/5693/GW
Report ref: GS-NK7-31E-1AM-HRE
Grid ref: 438426.81, 401156.79
Production date: 30 January 2026

Map name: National Grid
Map date: 1987
Scale: 1:10,000
Printed at: 1:10,000



Date: 1987
Surveyed: 1986
Revised: 1987

Contact us with any questions at:
info@groundsure.com
01273 257 755



Appendix E
Search Responses & other Correspondence

Cemetery Road, Jump, Barnsley

Order Details

Date: 30/01/2026
Your ref: PO25898/5693/GW
Our Ref: GS-SZX-RFO-I9I-FDD

Site Details

Location: 438426 401156
Area: 9.83 ha
Authority: [Barnsley Metropolitan Borough Council](#)
↗



[Summary of findings](#)

[p. 2 >](#) [Aerial image](#)

[p. 9 >](#)

[OS MasterMap site plan](#)

[p.14 >](#) [Insight User Guide](#) ↗

Contact us with any questions at:

info@groundsure.com ↗

01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	1.1 >	Historical industrial land uses >	10	10	8	27	-
18 >	1.2 >	Historical tanks >	0	0	0	1	-
18 >	1.3 >	Historical energy features >	0	1	2	3	-
19	1.4	Historical petrol stations	0	0	0	0	-
19 >	1.5 >	Historical garages >	0	0	2	1	-
19	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
20 >	2.1 >	Historical industrial land uses >	12	15	12	40	-
23 >	2.2 >	Historical tanks >	0	0	0	1	-
24 >	2.3 >	Historical energy features >	0	2	5	4	-
24	2.4	Historical petrol stations	0	0	0	0	-
25 >	2.5 >	Historical garages >	0	0	3	2	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
26	3.1	Active or recent landfill	0	0	0	0	-
26	3.2	Historical landfill (BGS records)	0	0	0	0	-
27	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
27 >	3.4 >	Historical landfill (EA/NRW records) >	1	0	0	0	-
27 >	3.5 >	Historical waste sites >	0	1	0	0	-
28	3.6	Licensed waste sites	0	0	0	0	-
28 >	3.7 >	Waste exemptions >	0	0	1	0	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
29 >	4.1 >	Recent industrial land uses >	0	1	5	-	-
30	4.2	National Geographic Database (NGD) - Current or recent tanks	0	0	0	-	-
30	4.3	Current or recent petrol stations	0	0	0	0	-
30	4.4	Electricity cables	0	0	0	0	-
30	4.5	Gas pipelines	0	0	0	0	-



31	4.6	Sites determined as Contaminated Land	0	0	0	0	-
31	4.7	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
31	4.8	Regulated explosive sites	0	0	0	0	-
31	4.9	Hazardous substance storage/usage	0	0	0	0	-
31	4.10	Historical licensed industrial activities (IPC)	0	0	0	0	-
32	4.11	Licensed industrial activities (Part A(1))	0	0	0	0	-
32	4.12	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
32	4.13	Radioactive Substance Authorisations	0	0	0	0	-
32 >	4.14 >	<u>Licensed Discharges to controlled waters</u> >	0	2	5	0	-
34	4.15	Pollutant release to surface waters (Red List)	0	0	0	0	-
34	4.16	Pollutant release to public sewer	0	0	0	0	-
34	4.17	List 1 Dangerous Substances	0	0	0	0	-
34	4.18	List 2 Dangerous Substances	0	0	0	0	-
34 >	4.19 >	<u>Pollution Incidents (EA/NRW)</u> >	0	0	3	2	-
35	4.20	Pollution inventory substances	0	0	0	0	-
35	4.21	Pollution inventory waste transfers	0	0	0	0	-
36	4.22	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
37	5.1	Superficial aquifer	None (within 500m)				
38 >	5.2 >	<u>Bedrock aquifer</u> >	Identified (within 500m)				
39 >	5.3 >	<u>Groundwater vulnerability</u> >	Identified (within 50m)				
40	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
40	5.5	Groundwater vulnerability- local information	None (within 0m)				
41 >	5.6 >	<u>Groundwater abstractions</u> >	0	0	0	0	4
42	5.7	Surface water abstractions	0	0	0	0	0
43	5.8	Potable abstractions	0	0	0	0	0
43	5.9	Source Protection Zones	0	0	0	0	-
43	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	<u>Hydrology</u> >	On site	0-50m	50-250m	250-500m	500-2000m

44 >	6.1 >	Water Network (OS MasterMap) >	0	0	21	-	-
46 >	6.2 >	Surface water features >	0	0	14	-	-
46 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
47 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
47 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
48	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
48	7.2	Historical Flood Events	0	0	0	-	-
48	7.3	Flood Defences	0	0	0	-	-
49	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
49	7.5	Flood Storage Areas	0	0	0	-	-
50	7.6	Flood Zone 2	None (within 50m)				
50	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding >					
51 >	8.1 >	Surface water flooding >	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding >					
53 >	9.1 >	Groundwater flooding >	Negligible (within 50m)				
Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
54	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
55	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
55	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
55	10.4	Special Protection Areas (SPA)	0	0	0	0	0
55	10.5	National Nature Reserves (NNR)	0	0	0	0	0
56 >	10.6 >	Local Nature Reserves (LNR) >	0	0	0	0	1
56 >	10.7 >	Designated Ancient Woodland >	0	0	0	4	40
58	10.8	Biosphere Reserves	0	0	0	0	0
58	10.9	Forest Parks	0	0	0	0	0
58	10.10	Marine Conservation Zones	0	0	0	0	0
58 >	10.11 >	Green Belt >	1	0	0	1	1



59	10.12	Proposed Ramsar sites	0	0	0	0	0
59	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
59	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
60	10.15	Nitrate Sensitive Areas	0	0	0	0	0
60 >	10.16 >	Nitrate Vulnerable Zones >	1	0	0	0	0
61 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
62	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
63	11.1	World Heritage Sites	0	0	0	-	-
63	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
63	11.3	National Parks	0	0	0	-	-
63	11.4	Listed Buildings	0	0	0	-	-
64	11.5	Conservation Areas	0	0	0	-	-
64	11.6	Scheduled Ancient Monuments	0	0	0	-	-
64	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
65 >	12.1 >	Agricultural Land Classification >	Grade 3 (within 250m)				
66	12.2	Open Access Land	0	0	0	-	-
66	12.3	Tree Felling Licences	0	0	0	-	-
66	12.4	Environmental Stewardship Schemes	0	0	0	-	-
66	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
67	13.1	Priority Habitat Inventory	0	0	0	-	-
67	13.2	Habitat Networks	0	0	0	-	-
67	13.3	Open Mosaic Habitat	0	0	0	-	-
67	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
68 >	14.1 >	10k Availability >	Identified (within 500m)				
69 >	14.2 >	Artificial and made ground (10k) >	1	2	7	7	-



71	14.3	Superficial geology (10k)	0	0	0	0	-
71	14.4	Landslip (10k)	0	0	0	0	-
72 >	14.5 >	Bedrock geology (10k) >	9	4	12	31	-
75 >	14.6 >	Bedrock faults and other linear features (10k) >	10	3	10	21	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
78 >	15.1 >	50k Availability >	Identified (within 500m)				
79 >	15.2 >	Artificial and made ground (50k) >	2	0	3	2	-
80 >	15.3 >	Artificial ground permeability (50k) >	2	0	-	-	-
81	15.4	Superficial geology (50k)	0	0	0	0	-
81	15.5	Superficial permeability (50k)	None (within 50m)				
81	15.6	Landslip (50k)	0	0	0	0	-
81	15.7	Landslip permeability (50k)	None (within 50m)				
82 >	15.8 >	Bedrock geology (50k) >	7	3	10	20	-
84 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
85 >	15.10 >	Bedrock faults and other linear features (50k) >	10	3	6	22	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
87	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence >					
88 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
89 >	17.2 >	Running sands >	Very low (within 50m)				
91 >	17.3 >	Compressible deposits >	Moderate (within 50m)				
93 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
94 >	17.5 >	Landslides >	Low (within 50m)				
96 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
98 >	18.1 >	BritPits >	1	0	1	6	-
101 >	18.2 >	Surface ground workings >	8	15	21	-	-
103 >	18.3 >	Underground workings >	0	0	0	6	15
104	18.4	Underground mining extents	0	0	0	0	-



104	18.5	Historical Mineral Planning Areas	0	0	0	0	-
104 >	18.6 >	Non-coal mining >	5	0	3	5	24
109	18.7	JPB mining areas	None (within 0m)				
109	18.8	The Coal Authority non-coal mining	0	0	0	0	-
109	18.9	Researched mining	0	0	0	0	-
109	18.10	Mining record office plans	0	0	0	0	-
110	18.11	BGS mine plans	0	0	0	0	-
110 >	18.12 >	Coal mining >	Identified (within 0m)				
110	18.13	Brine areas	None (within 0m)				
110	18.14	Gypsum areas	None (within 0m)				
110	18.15	Tin mining	None (within 0m)				
111	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
112	19.1	Natural cavities	0	0	0	0	-
112	19.2	Mining cavities	0	0	0	0	0
112	19.3	Reported recent incidents	0	0	0	0	-
112	19.4	Historical incidents	0	0	0	0	-
Page	Section	Radon >					
114 >	20.1 >	Radon >	Between 1% and 3% (within 0m)				
Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
116 >	21.1 >	BGS Estimated Background Soil Chemistry >	14	5	-	-	-
117	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
117	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects >	On site	0-50m	50-250m	250-500m	500-2000m
118	22.1	Underground railways (London)	0	0	0	-	-
118	22.2	Underground railways (Non-London)	0	0	0	-	-
119	22.3	Railway tunnels	0	0	0	-	-
119 >	22.4 >	Historical railway and tunnel features >	6	0	0	-	-
119	22.5	Royal Mail tunnels	0	0	0	-	-

120	22.6	Historical railways	0	0	0	-	-
120 >	22.7 >	Railways >	0	9	4	-	-
121	22.8	Crossrail 2	0	0	0	0	-
121	22.9	HS2	0	0	0	0	-

1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

1.1 Historical industrial land uses

Records within 500m

55

Potentially contaminative land use features digitised from historical Ordnance Survey® mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15](#) >

ID	Location	Land use	Dates present	Group ID
1	On site	Railway Sidings	1948	1497457



2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

2.1 Historical industrial land uses

Records within 500m

79

Potentially contaminative land use features digitised from historical Ordnance Survey® mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on [page 20](#) >

ID	Location	Land Use	Date	Group ID
1	On site	Railway Sidings	1948	1497457
2	On site	Railway Sidings	1901	1502597
A	On site	Cuttings	1948	1562147



3 Waste and landfill



- Site Outline
- Search buffers in metres (m)
- Historical landfill (EA/NRW)
- Historical waste sites
- Waste exemptions

3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.



4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

4.1 Recent industrial land uses

Records within 250m

6

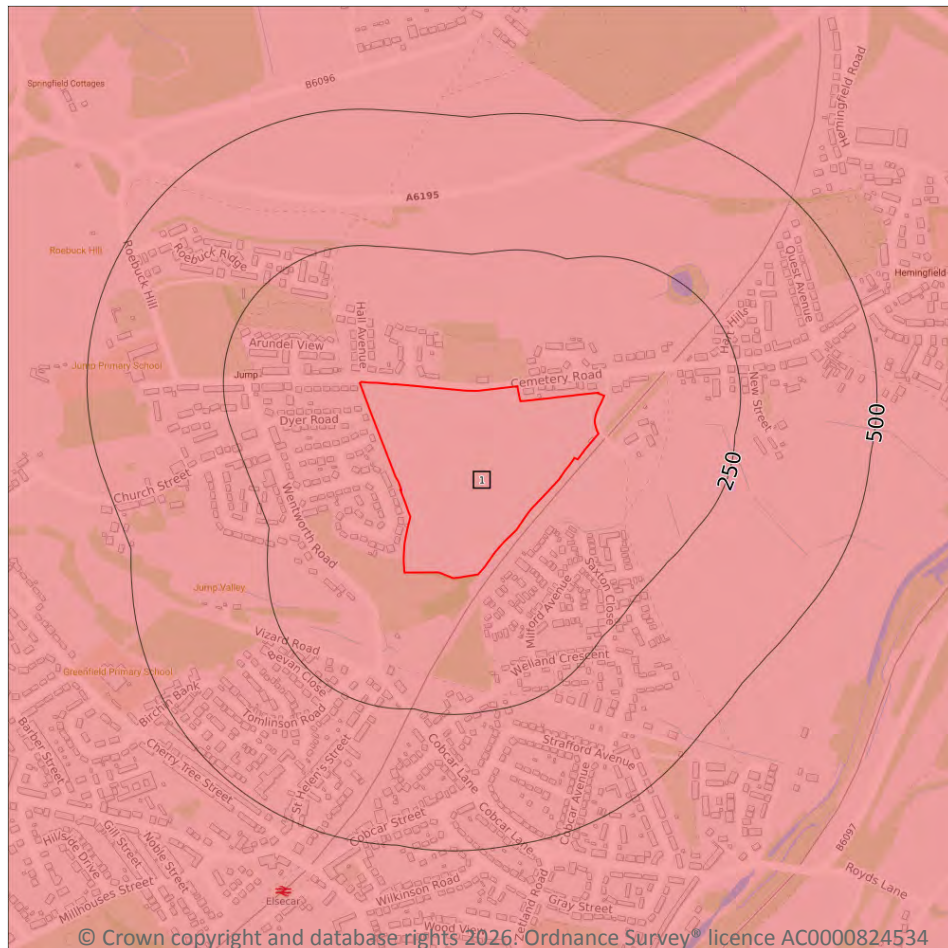
Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on [page 29](#) >

ID	Location	Company	Address	Activity	Category
1	32m NW	Electricity Sub Station	South Yorkshire, S74	Electrical Features	Infrastructure and Facilities
2	142m W	Wentworth Service Station	Wentworth Road, Jump, Barnsley, South Yorkshire, S74 QJX	Vehicle Repair, Testing and Servicing	Repair and Servicing



Bedrock aquifer



- Site Outline
- Search buffers in metres (m)
- Principal
 - Secondary A
 - Secondary B
 - Secondary Undifferentiated
 - Unproductive

5.2 Bedrock aquifer

Records within 500m

1

Aquifer status of groundwater held within bedrock geology.

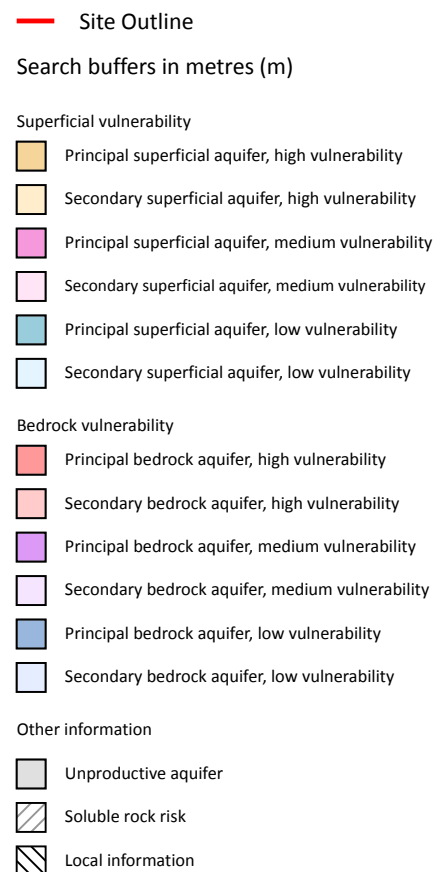
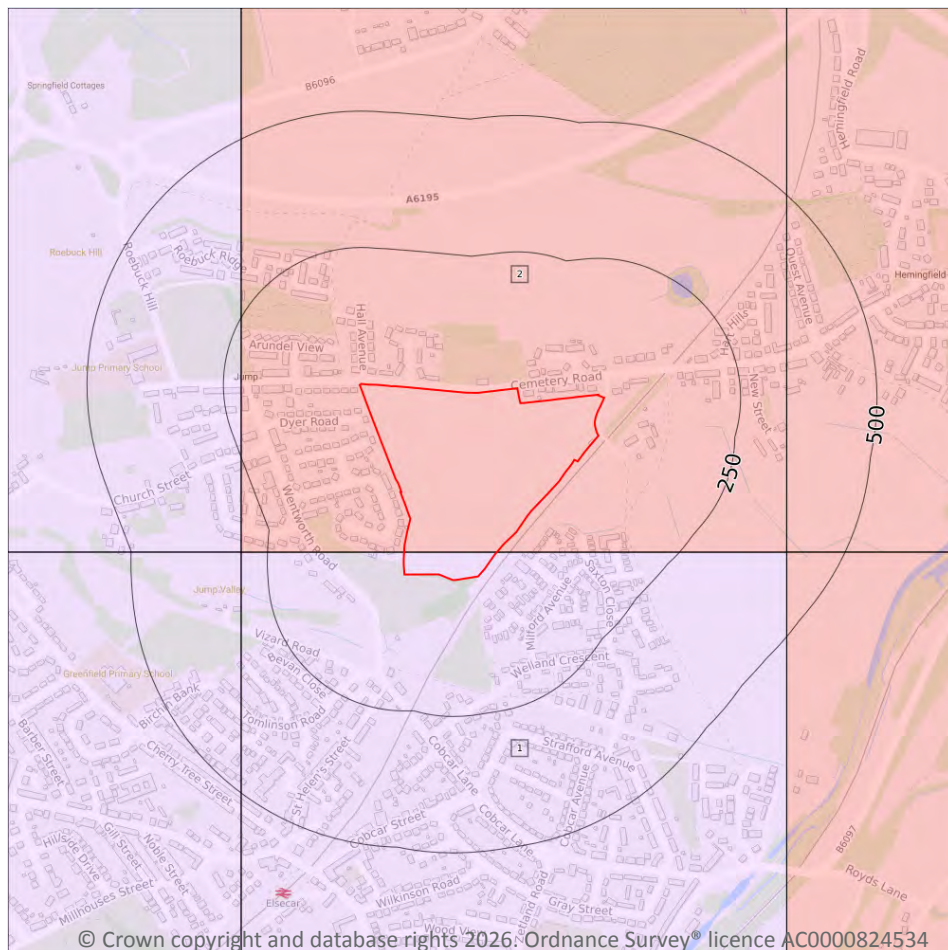
Features are displayed on the Bedrock aquifer map on [page 38](#) >

ID	Location	Designation	Description
1	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.



Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on [page 39](#) >



Abstractions and Source Protection Zones



- Site Outline
- Search buffers in metres (m)
- Source Protection Zone 1
Inner catchment
- Source Protection Zone 2
Outer catchment
- Source Protection Zone 3
Total catchment
- Source Protection Zone 4
Zone of Special Interest
- Source Protection Zone 1c
Inner catchment - confined aquifer
- Source Protection Zone 2c
Outer catchment - confined aquifer
- Source Protection Zone 3c
Total catchment - confined aquifer
- Drinking water abstraction licences
Polygon features
- Drinking water abstraction licences
Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m

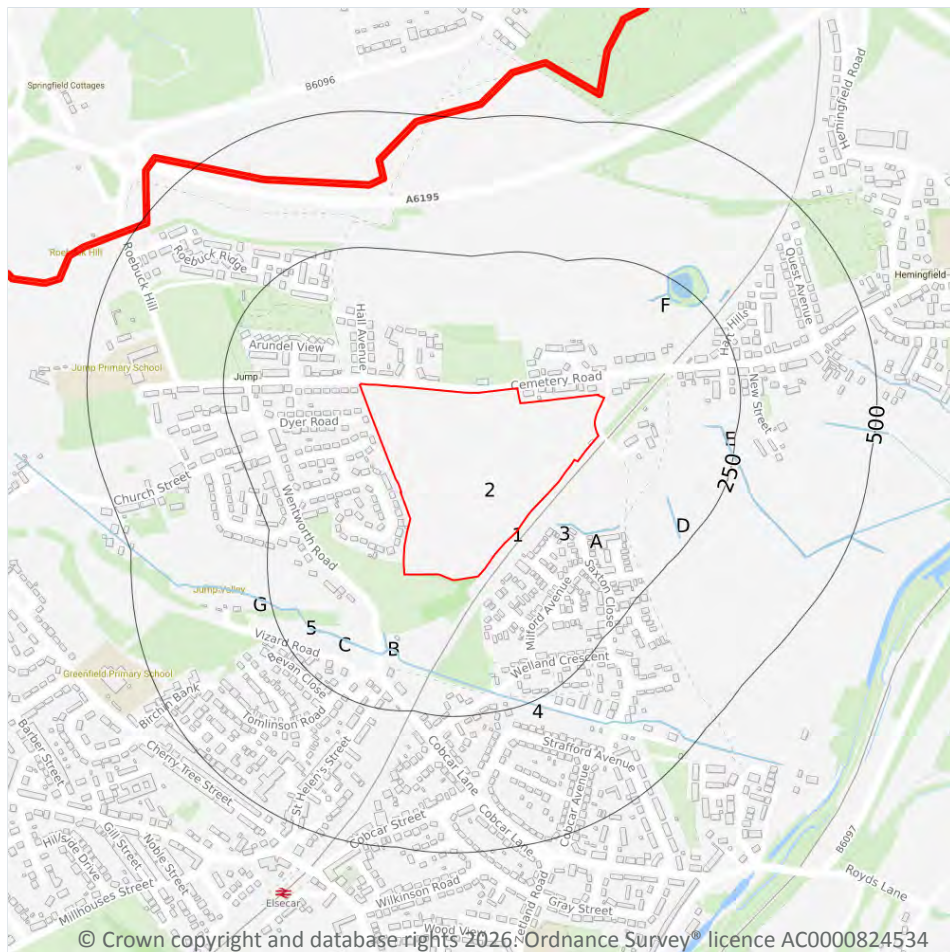
4

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on [page 41](#) >



6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

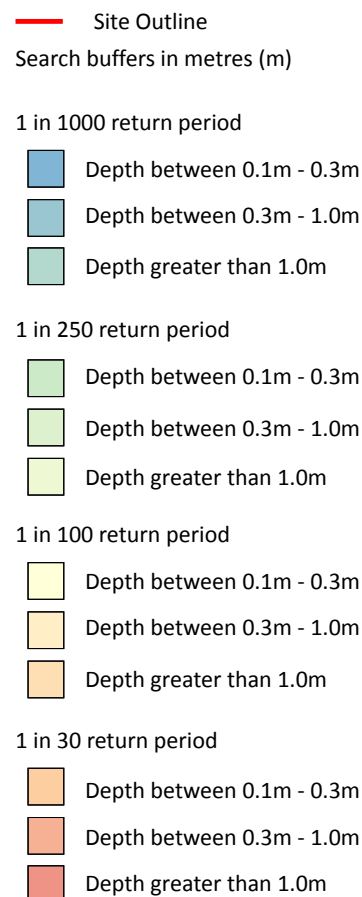
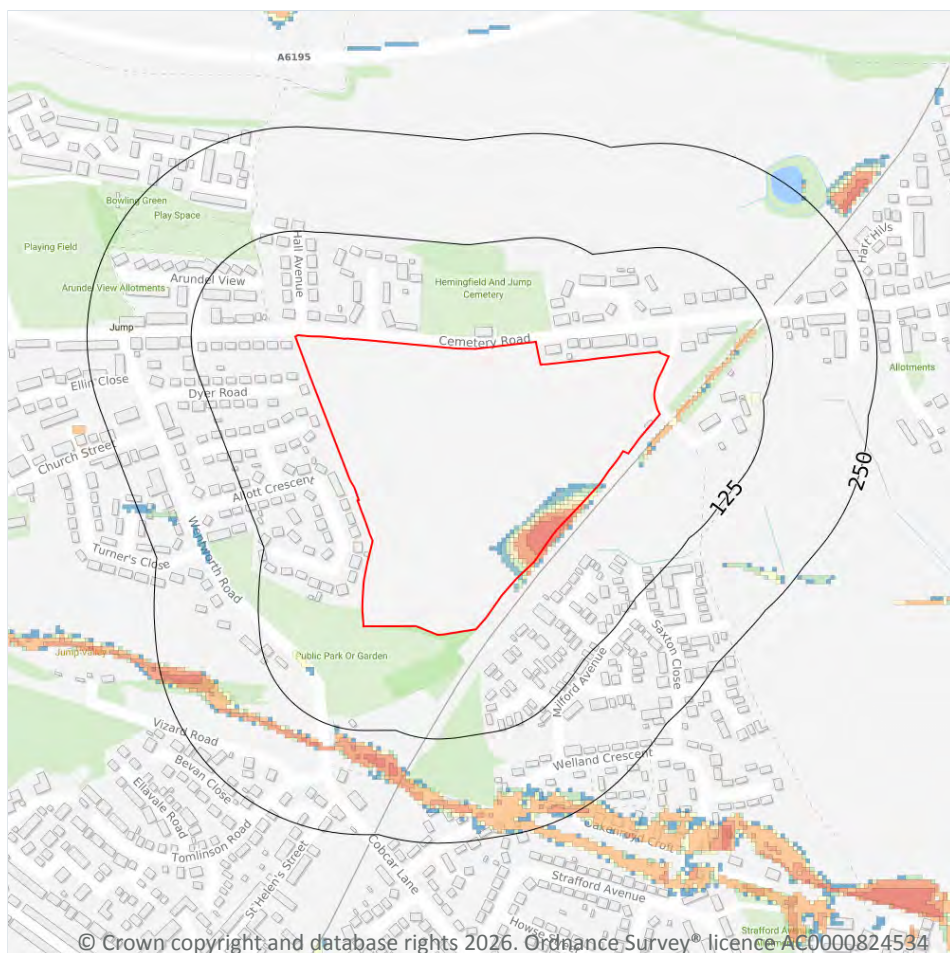
21

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on [page 44](#) >

ID	Location	Type of water feature	Ground level	Permanence	Name
3	51m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

1 in 30 year, Greater than 1.0m

Highest risk within 50m

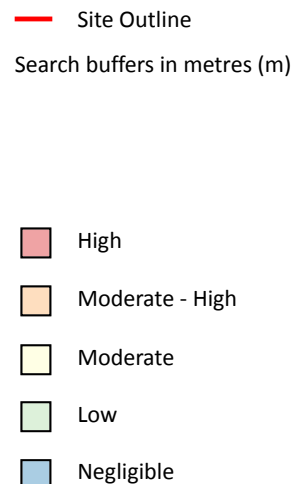
1 in 30 year, Greater than 1.0m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on [page 51](#) >

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

9 Groundwater flooding



9.1 Groundwater flooding

Highest risk on site

Negligible

Highest risk within 50m

Negligible

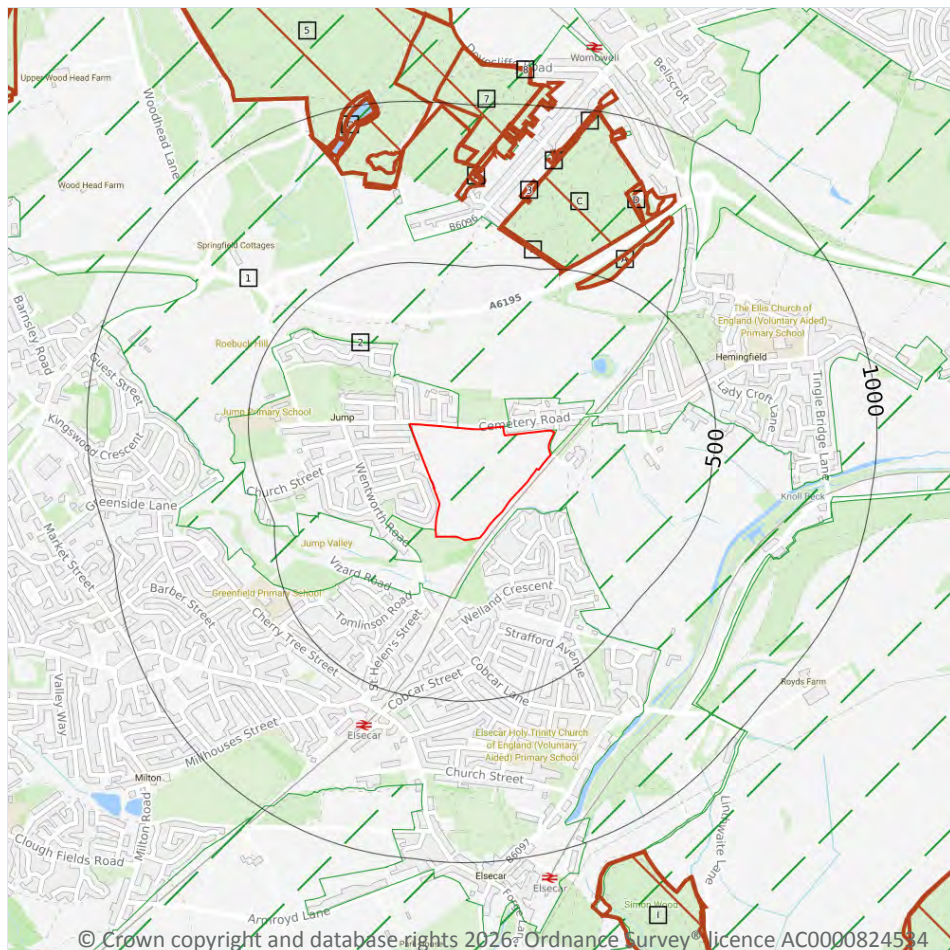
Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on [page 53 >](#)

This data is sourced from Ambiantal Risk Analytics.



10 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Sites of Special Scientific Interest (SSSI)
- + Local Nature Reserves (LNR)
- Designated Ancient Woodland
- Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

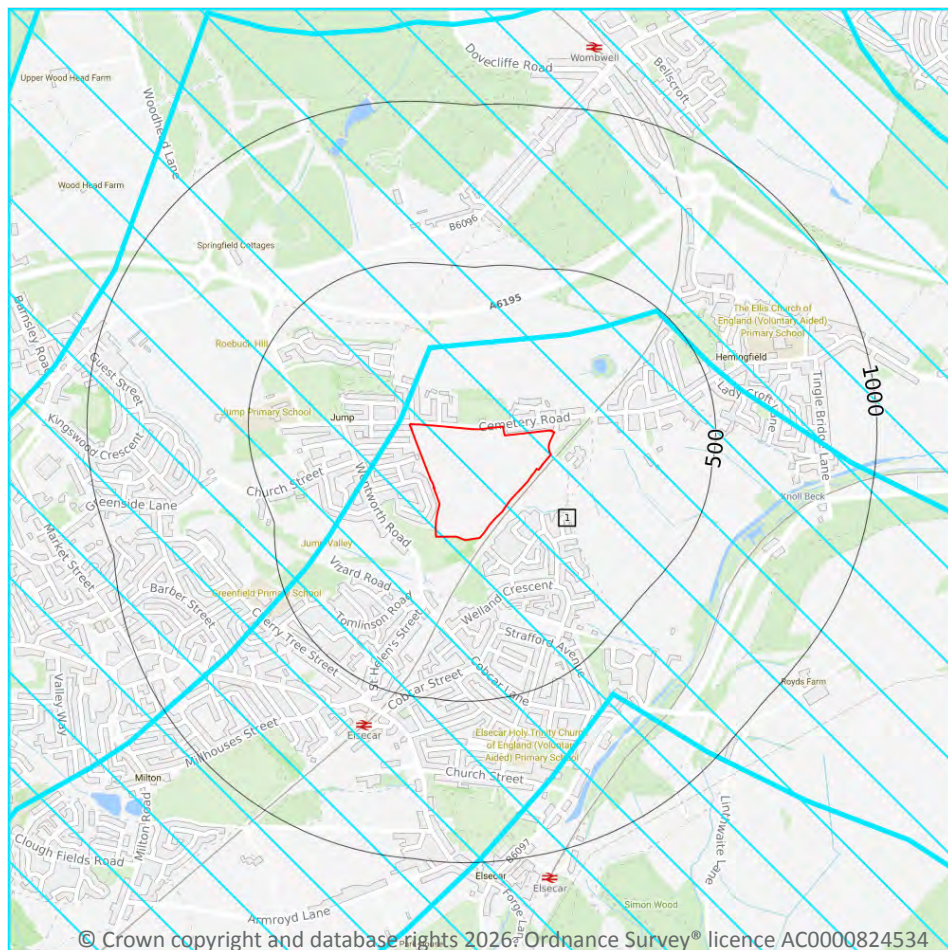
0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.



SSSI Impact Zones and Units



- Site Outline
- Search buffers in metres (m)
- SSSI Impact Risk Zones
- SSSI Units
- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site

1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

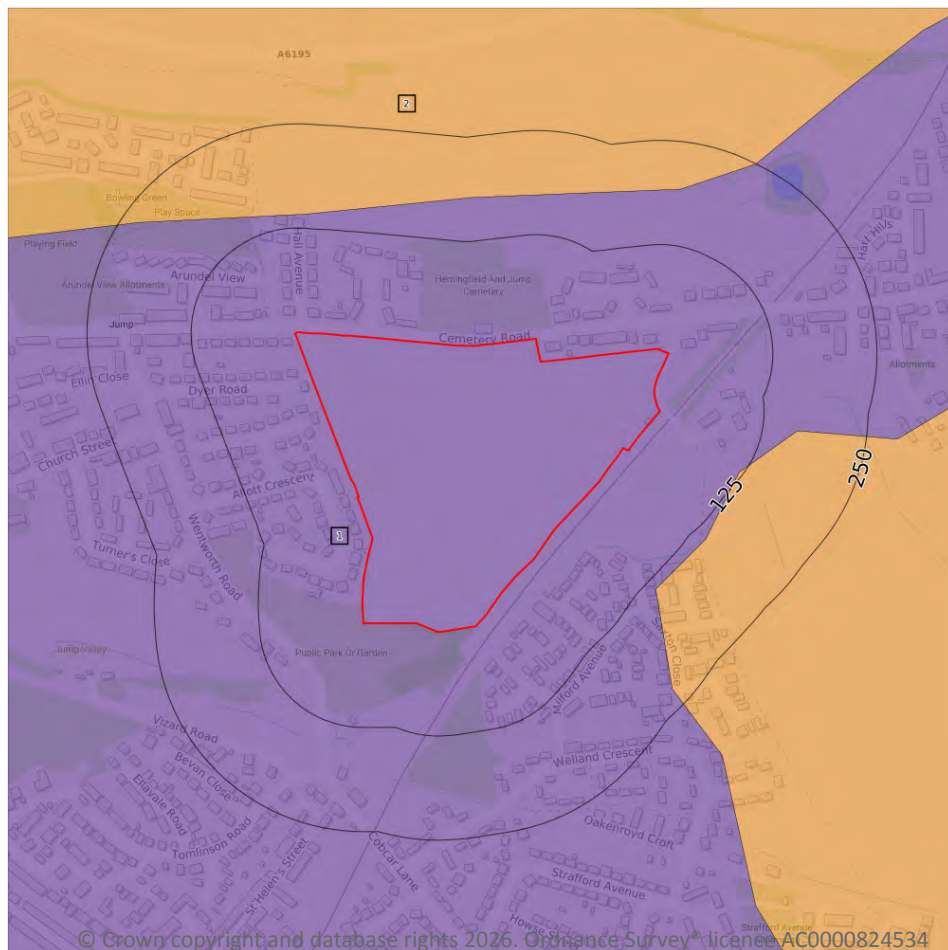
Features are displayed on the SSSI Impact Zones and Units map on [page 61](#) >

ID	Location	Type of developments requiring consultation
1	On site	https://irz.geodata.org.uk/IRZ/step2.html?irzcode=0301000500040&notes=&location=441113,399916%20(IRZ%20polygon%20centre)

This data is sourced from Natural England.



12 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m

2

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on [page 65](#) >

ID	Location	Classification	Description
1	On site	Urban	Non-agricultural/no quality assigned
2	120m SE	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.



14 Geology 1:10,000 scale - Availability



— Site Outline
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

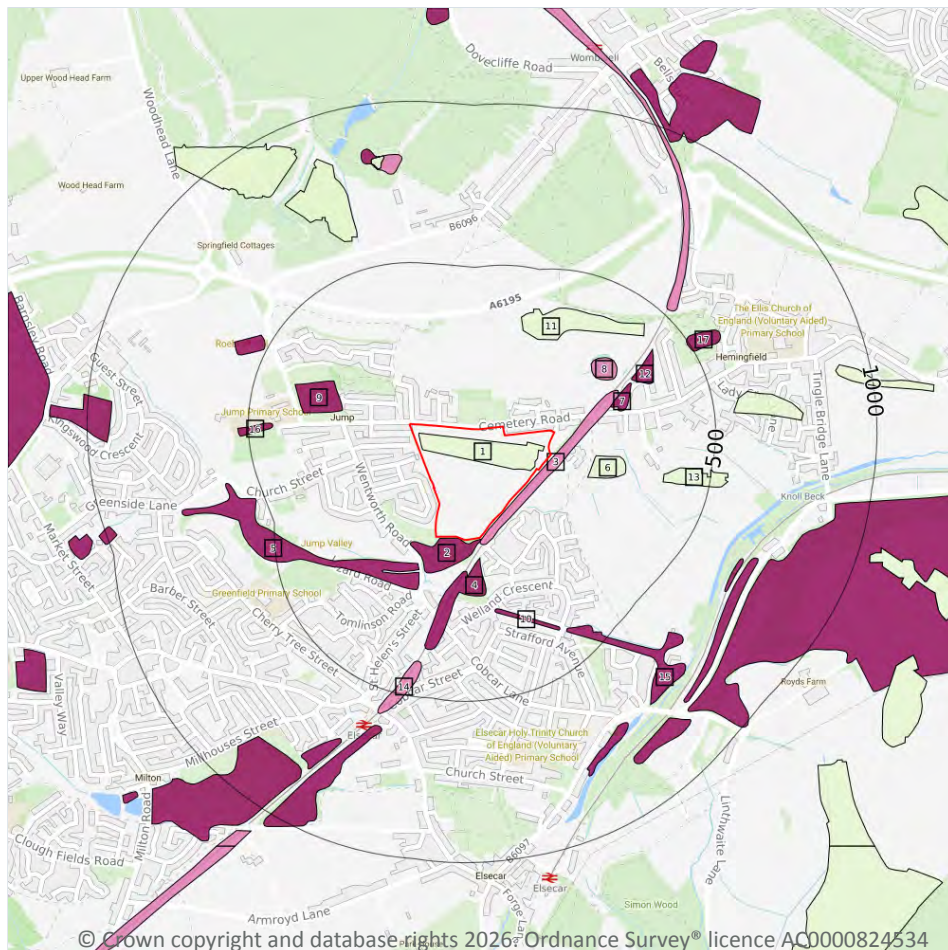
Features are displayed on the Geology 1:10,000 scale - Availability map on [page 68](#) >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	SE30SE

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Artificial and made ground



- Site Outline**
- Search buffers in metres (m)**
- Reclaimed ground
 - Made ground
 - Worked ground
 - Infilled ground
 - Disturbed ground
 - Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m

17

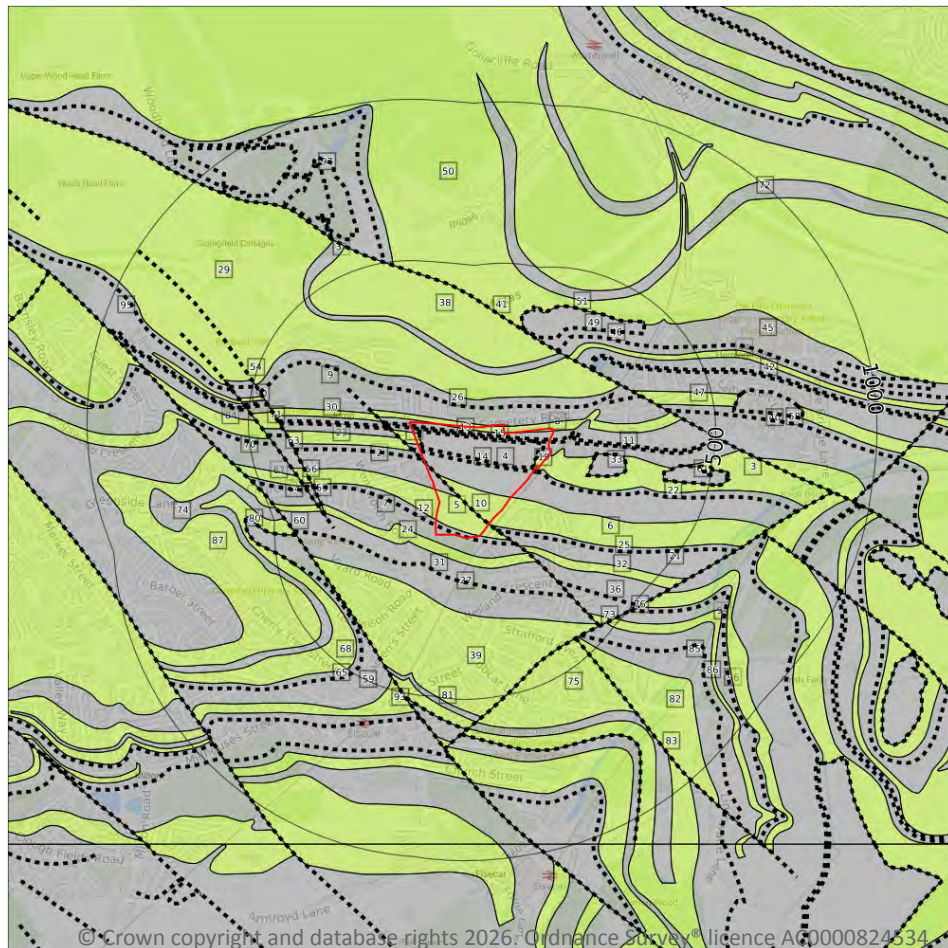
Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on [page 69](#) >

ID	Location	LEX Code	Description	Rock description
1	On site	WMGR-ARTDP	Infilled Ground	Artificial deposit
2	2m S	MGR-ARTDP	Made Ground (Undivided)	Artificial deposit
3	5m SE	WGR-VOID	Worked Ground (Undivided)	Void
4	62m S	MGR-ARTDP	Made Ground (Undivided)	Artificial deposit



Geology 1:10,000 scale - Bedrock



— Site Outline

Search buffers in metres (m)

.... Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

56

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on [page 72 >](#)

ID	Location	LEX Code	Description	Rock age
1	On site	ABR-SDST	Abdy Rock-Sandstone	Westphalian
2	On site	PMCM-MDSS	Pennine Middle Coal Measures Formation-Mudstone, Siltstone And Sandstone	Westphalian
3	On site	ABR-SDST	Abdy Rock-Sandstone	Westphalian



15 Geology 1:50,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

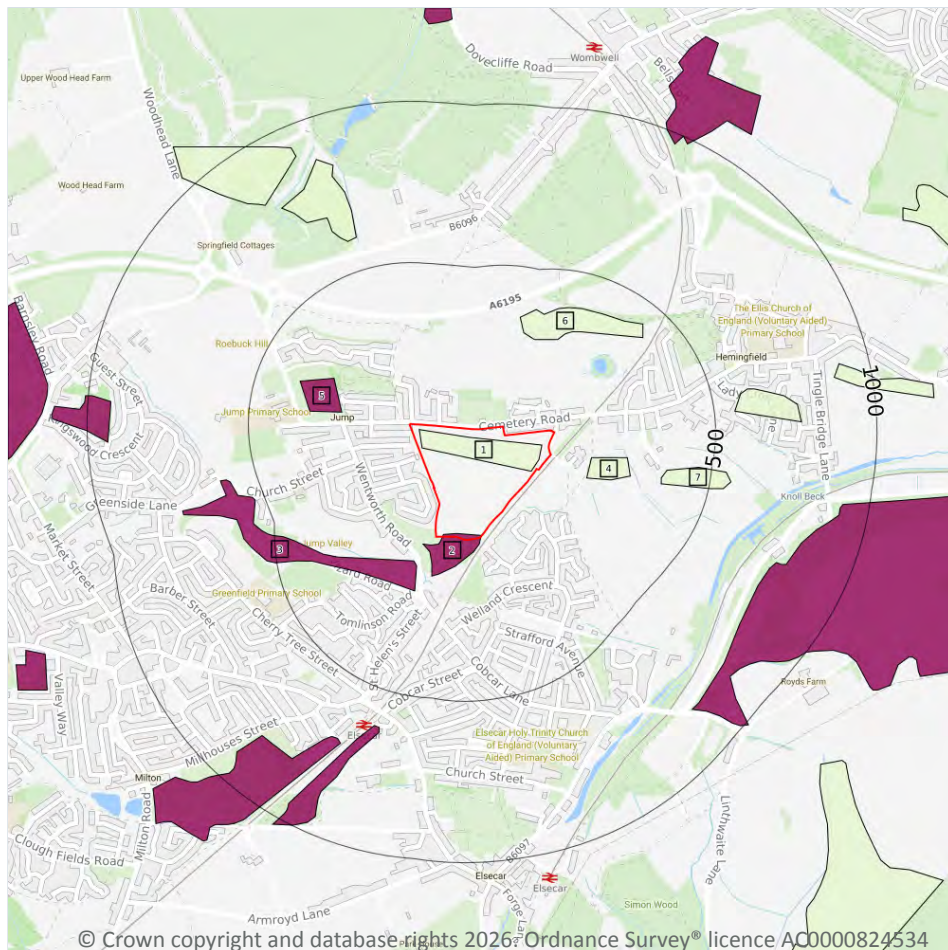
Features are displayed on the Geology 1:50,000 scale - Availability map on [page 78](#) >

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	Full	EW087_barnsley_v4

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Artificial and made ground



- Site Outline**
- Search buffers in metres (m)
- Made ground
 - Worked ground
 - Infilled ground
 - Disturbed ground
 - Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m

7

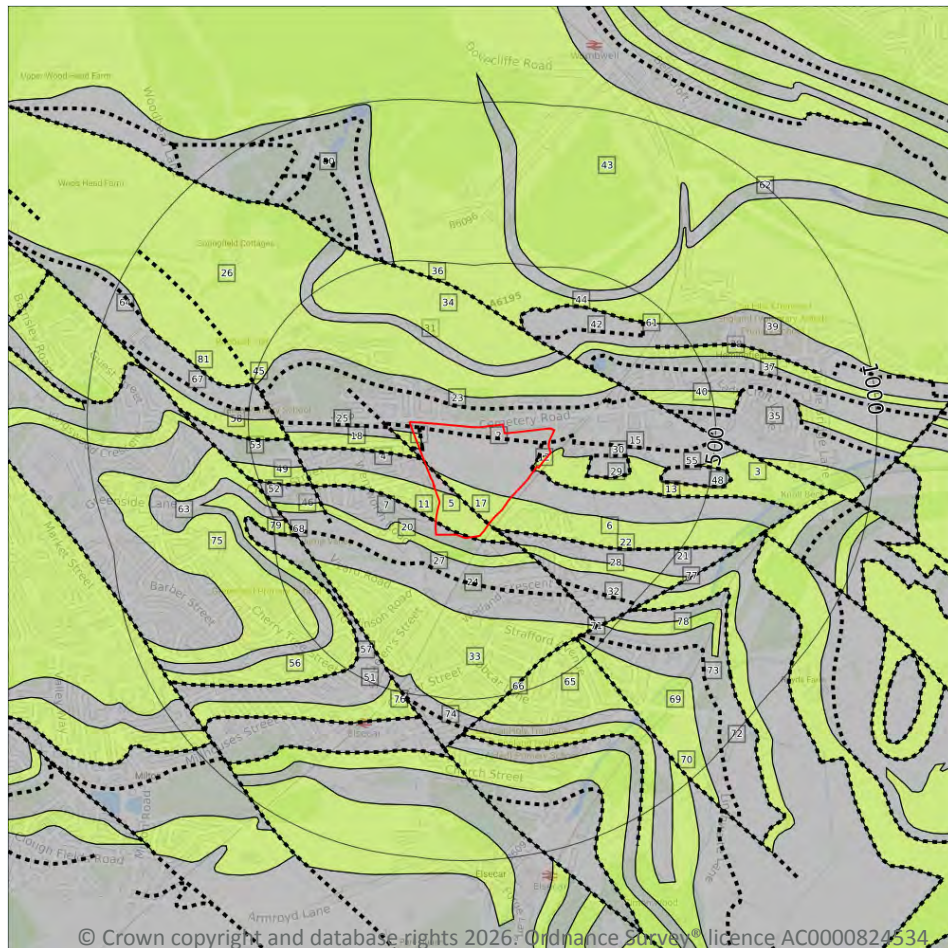
Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on [page 79](#) >

ID	Location	LEX Code	Description	Rock description
1	On site	WMGR-ARTDP	Infilled Ground	Artificial deposit
2	On site	MGR-ARTDP	Made Ground	Artificial deposit
3	102m SW	MGR-ARTDP	Made Ground	Artificial deposit
4	125m E	WMGR-ARTDP	Infilled Ground	Artificial deposit



Geology 1:50,000 scale - Bedrock



— Site Outline

Search buffers in metres (m)

.... Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

40

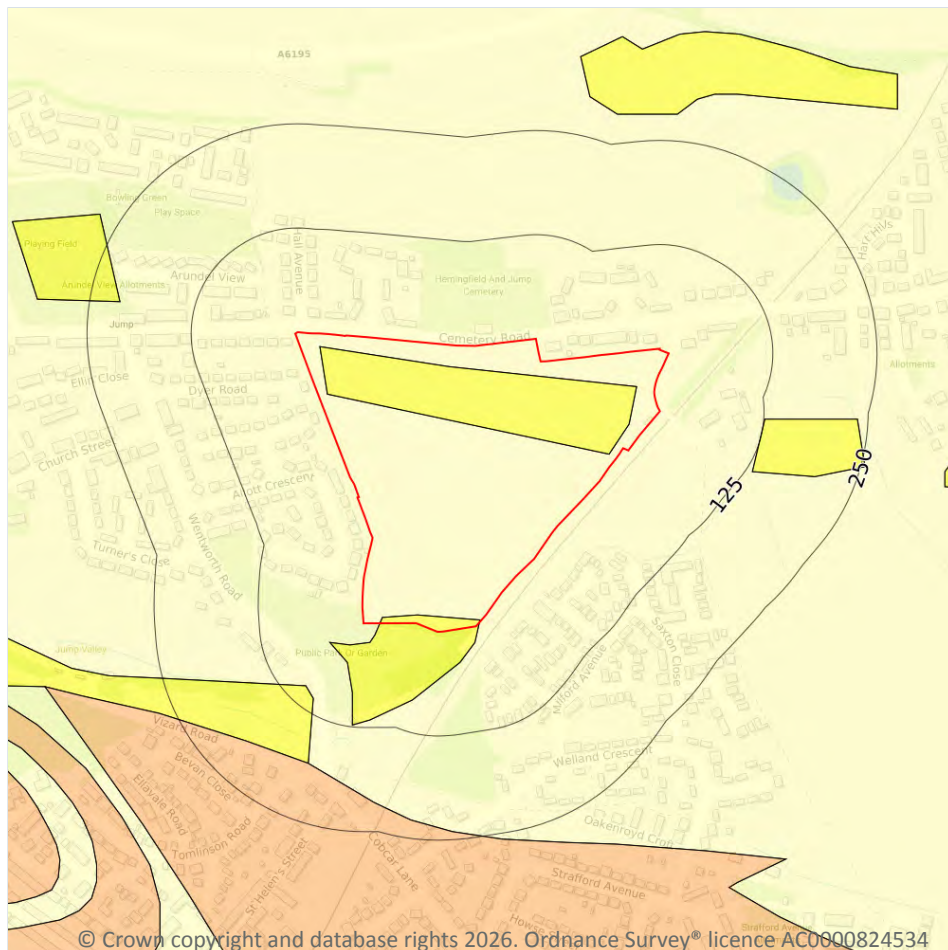
Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on [page 82 >](#)

ID	Location	LEX Code	Description	Rock age
1	On site	ABR-SDST	Abdy Rock-Sandstone	Westphalian
2	On site	PMCM-MDSS	Pennine Middle Coal Measures Formation-Mudstone, siltstone and sandstone	Westphalian
3	On site	ABR-SDST	Abdy Rock-Sandstone	Westphalian



Natural ground subsidence - Running sands



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.2 Running sands

Records within 50m

2

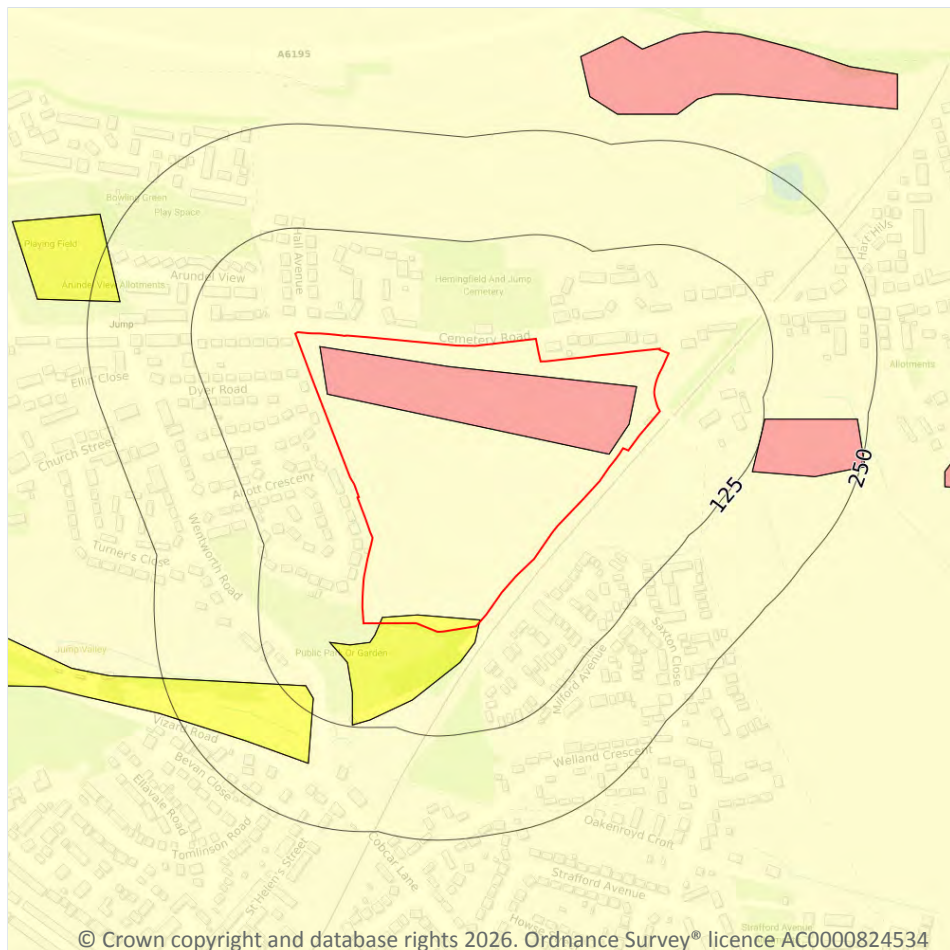
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on [page 89](#) >

Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.



Natural ground subsidence - Compressible deposits



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.3 Compressible deposits

Records within 50m

3

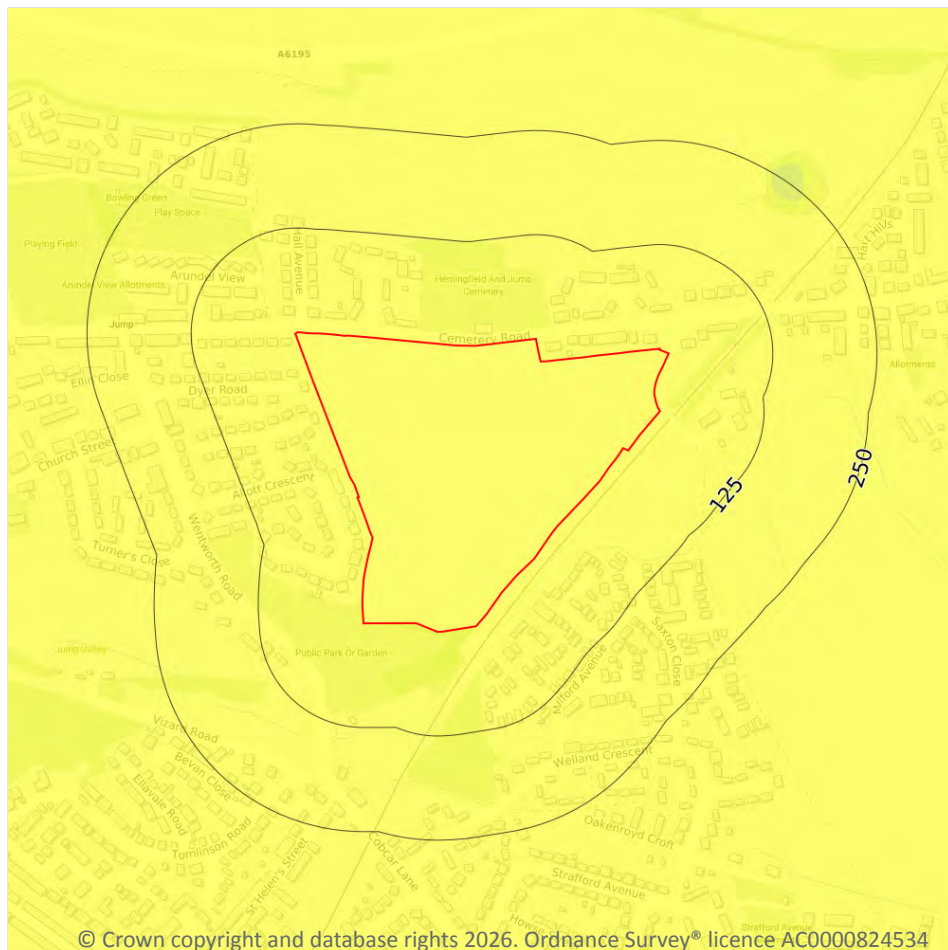
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on [page 91](#) >

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.
On site	Very low	Compressibility and uneven settlement problems are not likely to be significant on the site for most land uses.



Natural ground subsidence - Collapsible deposits



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☒ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.4 Collapsible deposits

Records within 50m

1

The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

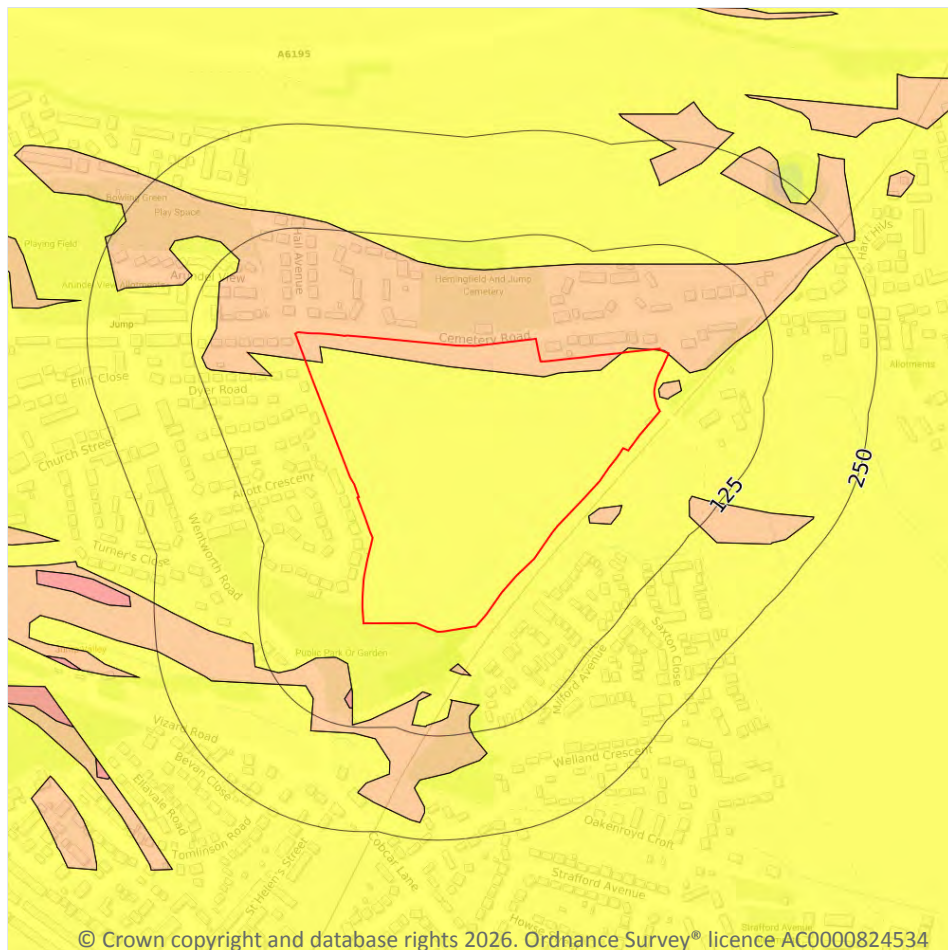
Features are displayed on the Natural ground subsidence - Collapsible deposits map on [page 93 >](#)

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.



Natural ground subsidence - Landslides



- Site Outline
- Search buffers in metres (m)
- ☐ No data
 - ☐ Negligible
 - ☐ Very low
 - ☐ Low
 - ☐ Moderate
 - ☐ High

17.5 Landslides

Records within 50m

5

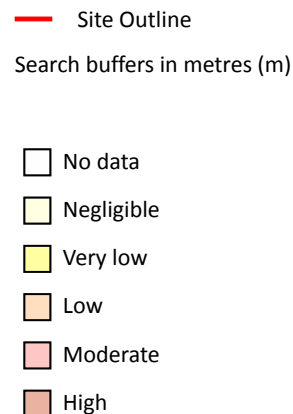
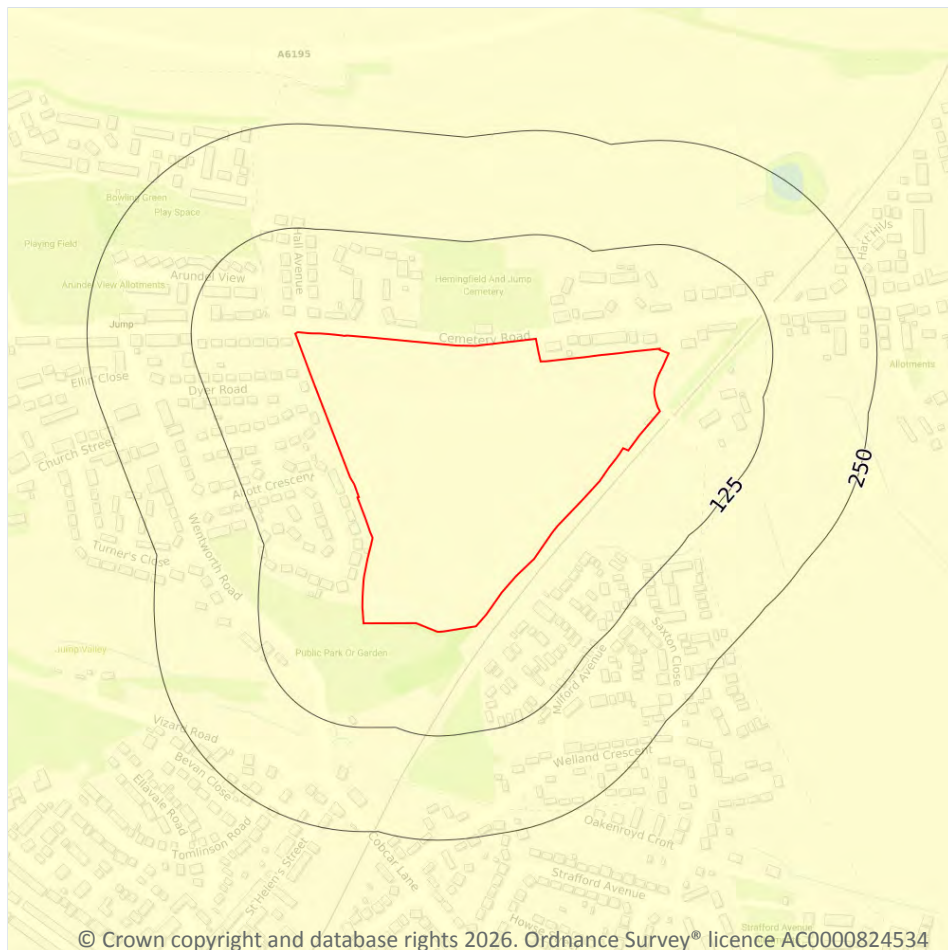
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on [page 94](#) >

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.



Natural ground subsidence - Ground dissolution of soluble rocks



17.6 Ground dissolution of soluble rocks

Records within 50m

1

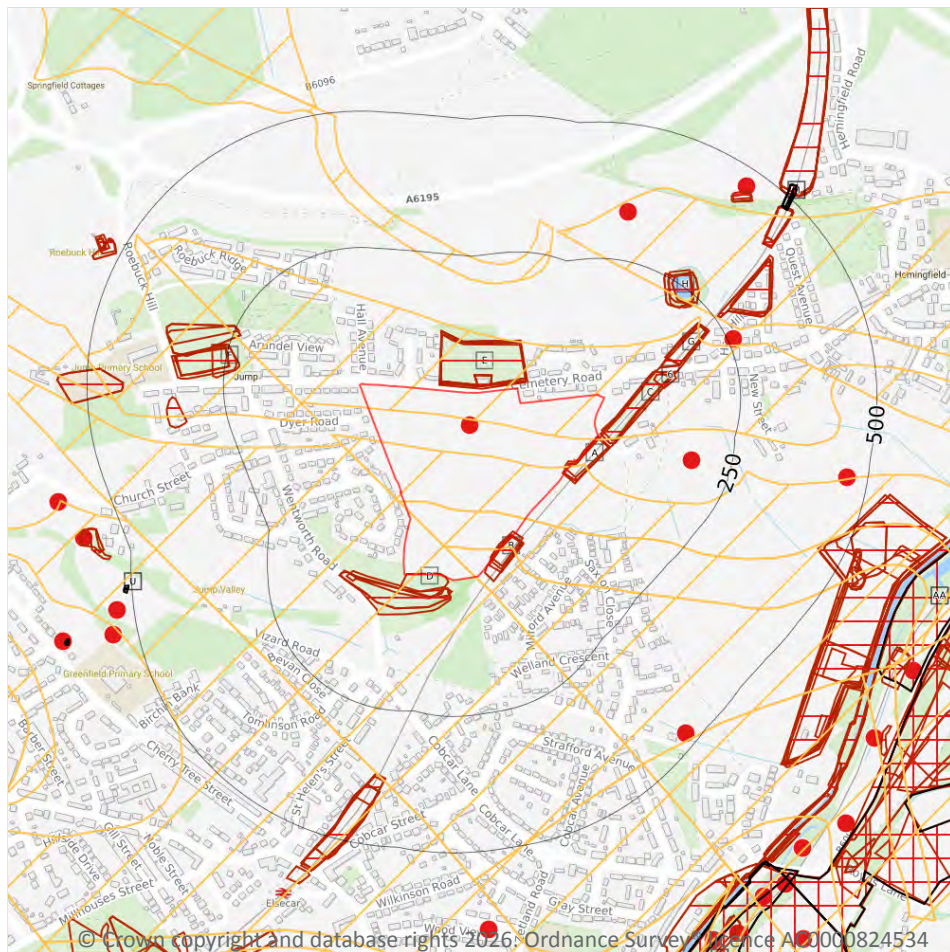
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on [page 96](#)

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.



18 Mining and ground workings



- Site Outline
- Search buffers in metres (m)
- BritPits
- Surface ground workings
- Underground workings
- Underground mining extents
- Historical mineral planning areas
- TCA non-coal mining
- Non Coal Mining
 - Sporadic underground mining of restricted extent possible
 - Localised small scale underground mining possible
 - Small scale mining possible
 - Underground mining known or likely within or in close proximity
 - Underground mining known within or in very close proximity

18.1 BritPits

Records within 500m

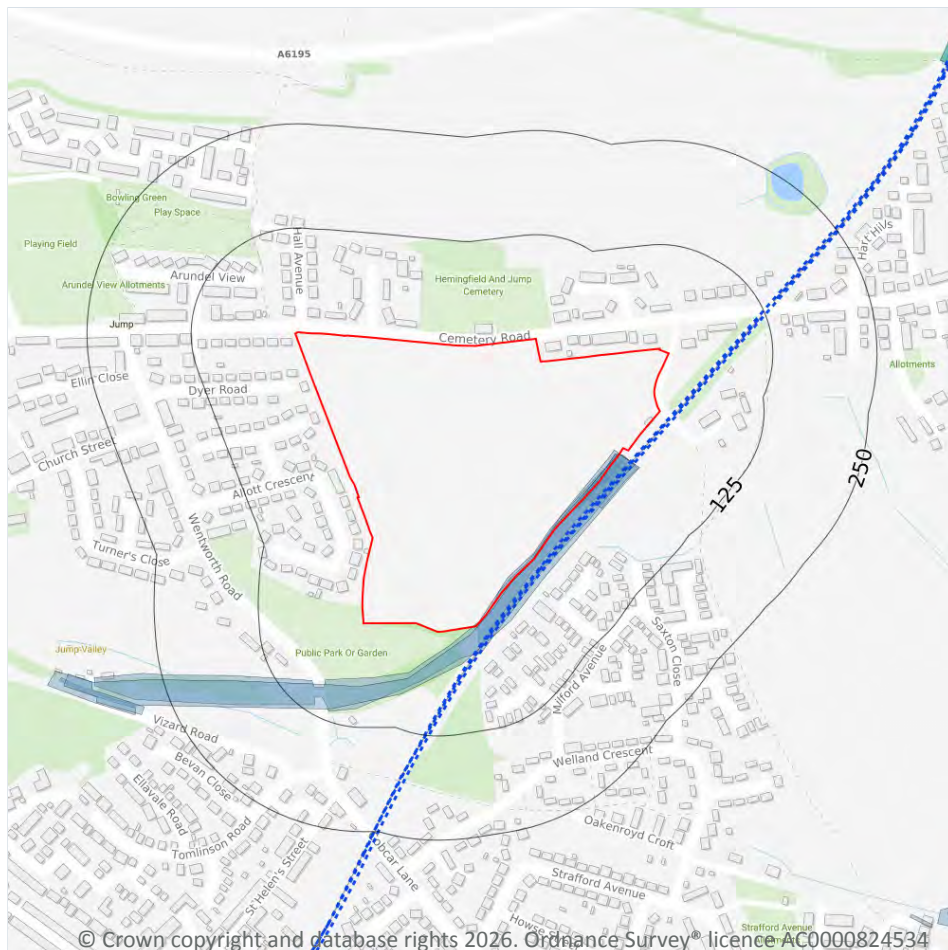
8

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining and ground workings map on [page 98 >](#)



22 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)
- C2 Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- - - Active railways
- - - Active tunnels
- - - Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

22.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

22.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.





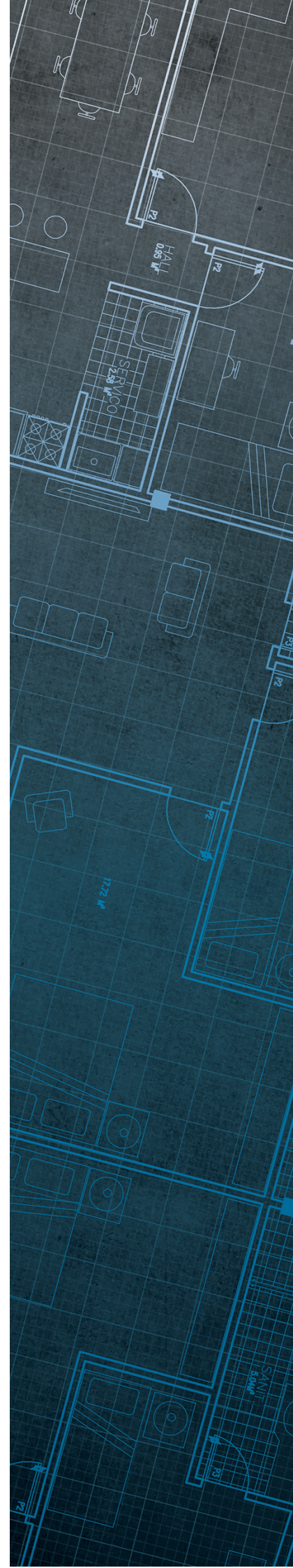
The Coal
Authority

Consultants Coal Mining Report

Cemetery Road
Jump
Barnsley
Barnsley
S74 0JH

Date of enquiry:	30 January 2026
Date enquiry received:	30 January 2026
Issue date:	30 January 2026

Our reference:	51003550274001
Your reference:	PO25901/5693/GW



Consultants

Coal Mining Report

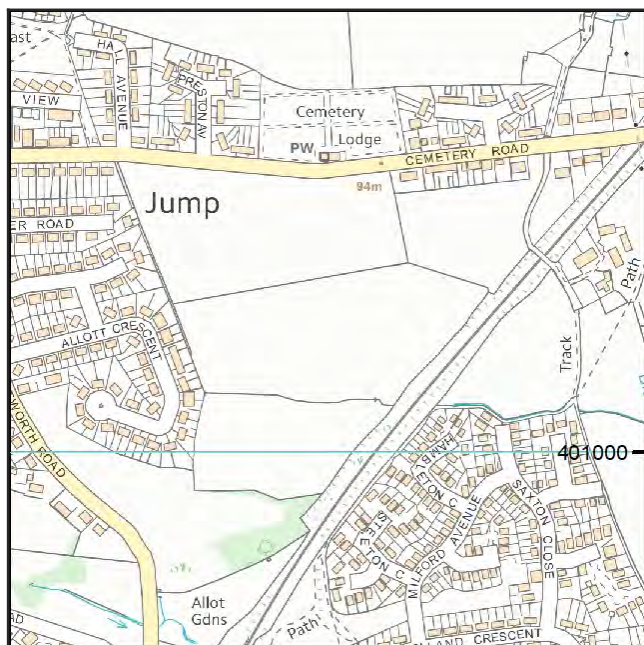
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

LITHOS CONSULTING

Enquiry address

Cemetery Road
Jump
Barnsley
Barnsley
S74 0JH



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NG18 4RG

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Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
ELSECAR	TOP HARD BARNSELY	Coal	4R0G	102	Beneath Property	4.1	North-East	269	1867
LUNDHILL	TOP HARD BARNSELY	Coal	4P5W	129	Beneath Property	4.9	North-East	269	1869
ELSECAR	SWALLOW WOOD	Coal	S40	162	Beneath Property	4.9	North-East	174	1981
ELSECAR	SWALLOW WOOD	Coal	4R0K	167	South-East	2.6	North-East	174	1974
ELSECAR	SWALLOW WOOD	Coal	4R0J	181	South-East	4.1	North-East	174	1974
ELSECAR	SWALLOW WOOD	Coal	S40	182	Beneath Property	5.6	North-East	163	1981
ELSECAR	SWALLOW WOOD	Coal	4P5Y	196	South-East	4.8	North-East	163	1973
LUNDHILL	SWALLOW WOOD	Coal	4P5Z	216	North	4.8	North-East	91	1974
WOMBWELL	TOP FENTON	Coal	4R0U	329	Beneath Property	4.4	North-East	78	1946
WOMBWELL MAIN	FENTON	Coal	4P62	344	Beneath Property	5.1	North-East	78	1946
ELSECAR	PARKGATE	Coal	4R60	349	South-East	7.4	North-East	155	1935
ROCKINGHAM	TOP FENTON	Coal	5NMK	352	West	5.0	North-East	79	1944
HOLYLAND / SILKSTONE	PARKGATE	Coal	4PB6	365	Beneath Property	4.8	North-East	130	1944
unnamed	PARKGATE	Coal	5QDC	366	West	5.1	North-East	145	1939
HOYLAND SILKSTONE	PARKGATE	Coal	4R6Q	367	Beneath Property	6.0	North	137	1941
ELSECAR	PARKGATE	Coal	4PB5	378	South-East	5.6	North-East	150	1931
ELSECAR	PARKGATE	Coal	4PB4	380	North	4.6	North-East	127	1911
HOYLAND	SILKSTONE	Coal	4R56	394	South-West	3.8	North-East	99	1943
WOMBWELL MAIN	THORNCLIFFE	Coal	4P63	405	North	4.8	North-East	72	1951
HOYLAND	SILKSTONE	Coal	4R55	434	West	0.0	East	99	1921
HOYLAND	SILKSTONE	Coal	5OYI	449	West	4.4	North-East	161	1921
HOLYLAND / SILKSTONE	SILKSTONE	Coal	4PAR	453	West	0.0	East	160	1921

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
ELSECAR	SILKSTONE	Coal	4PAQ	465	Beneath Property	4.8	North-East	162	1963
ELSECAR	SILKSTONE	Coal	4R57	466	Beneath Property	4.6	North-East	162	1959
HOLYLAND / SILKSTONE	SILKSTONE	Coal	4PAS	470	North-West	0.0	East	160	1909
CORTENWOOD	SILKSTONE	Coal	4PAP	475	North-East	4.5	North-East	117	1962

Probable unrecorded shallow workings

Yes.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

M432	NE554	M17
NE934	NE965	NE841
17342	NE100	NE263

Our records show we have more plans than those shown above which could affect the enquiry boundary.

For assistance in identifying the specific abandoned mine plans relevant to your requirements, **please contact us at InformationManagers@MiningRemediation.gov.uk**.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
FURNACE	Coal	Yes	Within	N/A	109
FURNACE	Coal	Yes	Within	N/A	250
TOP BEAMSHAW	Coal	Yes	Within	N/A	275
TOP BEAMSHAW	Coal	Yes	Within	N/A	288
TWO FOOT	Coal	Yes	Within	N/A	269
TWO FOOT	Coal	Yes	Within	N/A	277

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Faults under or close to the property recorded.

Opencast mines

Please refer to the "Summary of findings" map (on separate sheet) for details of any opencast areas within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

Distance to site investigation (m)	Direction
1.0	West

See Section 4 for further information.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is in an area where a notice to withdraw support was given in 1981.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please email us at reports@miningremediation.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **email us at reports@miningremediation.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

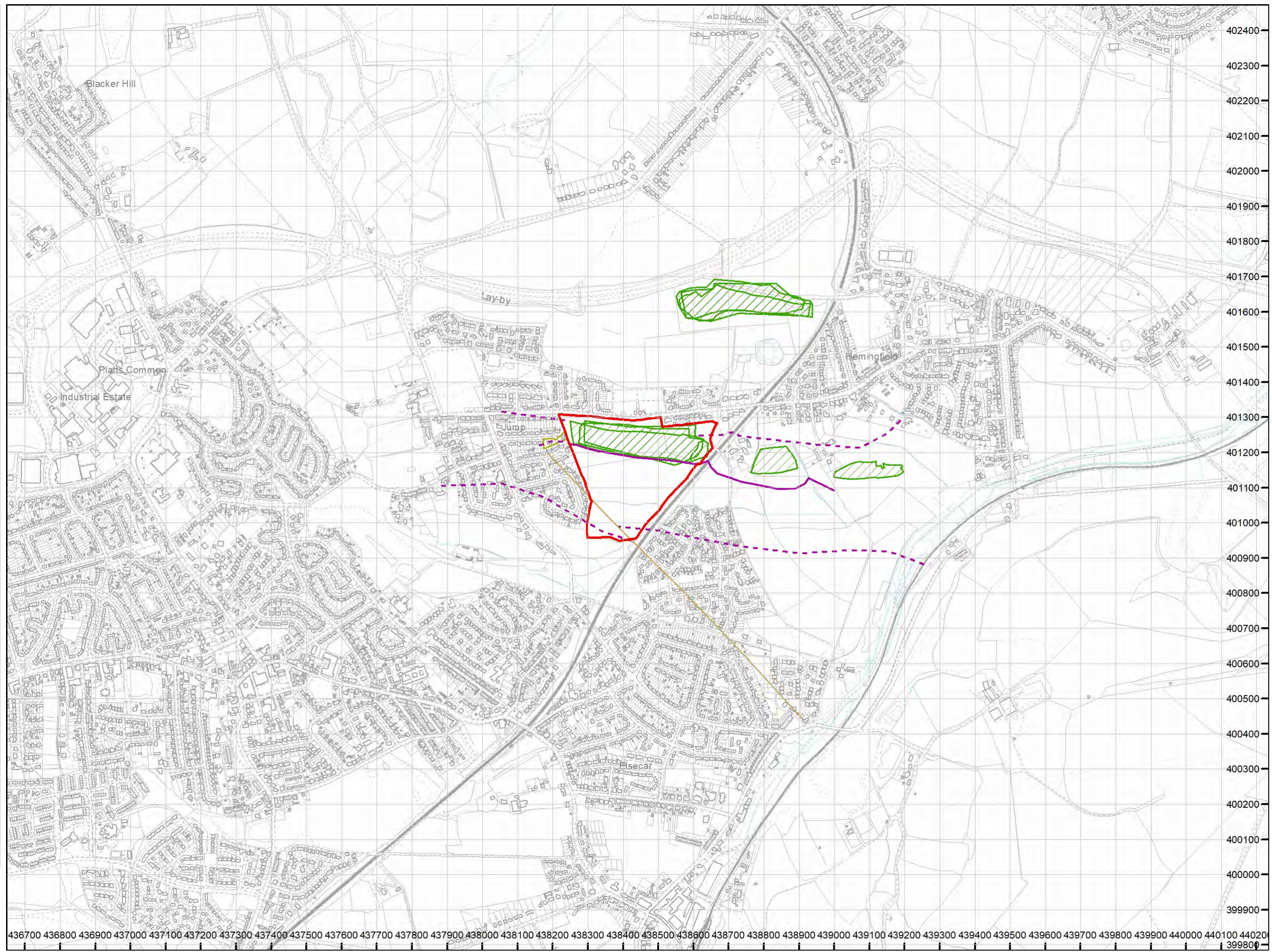
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Outcrop (Proven) 
- Outcrop (Conjectured) 
- Geological faults 
- Unlicensed opencast site 
- Site investigations 

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
reports@miningremediation.gov.uk





SE 30 SE/8

205

87/66



Wt. 17852—8154—5,000 12/26 Gp. 180. O.A.

SECTION OF Lundhill Colliery

at 1000 yds. S.W. of Summer Lane
and Hough Lane, Wombwell.

Maps: One-inch 87 Six-inch 283NW County Yorkshire

Height above O.D. 150 ft. Latitude 53° 30' 40" N Longitude 1° 23' 55" W

Communicated by "Sec. Strata Yks Cylid" 1927 p. 209 Date of Sinking } 1855
} stated.

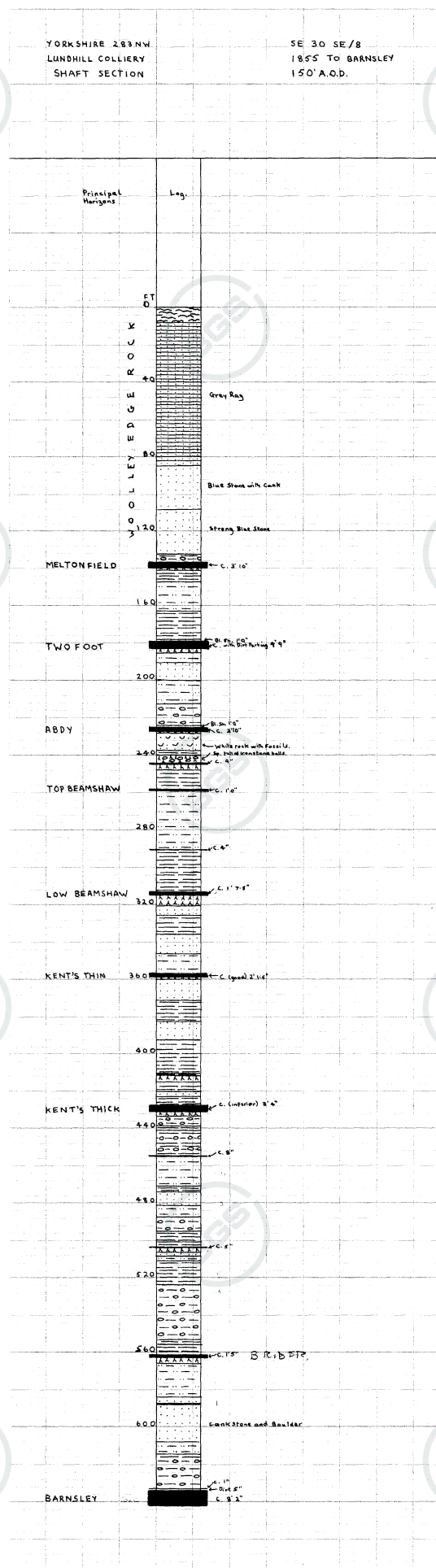
Made by _____ Dip of Strata _____

Summary of published record:

	Thickness.			Depth from Surface.		
Soil	2.44	8	-	2.44	8	-
Grey rag	22.71	74	6	24.15	82	6
Unaltered Blue stone with cask	7.14	23	5	32.28	105	11
beas are Strong blue stone	7.42	24	4	39.70	130	3
Thin ss's Meltonfield Coal	1.17	3	10	42.62	139	10
shales & thin coals. Two Foot Coal (with dirt)	1.45	4	9	53.85	183	3
Strong stone	3.05	10	-	60.78	199	5
Abdy Coal	0.86	2	10	69.27	227	3
White rock with fossils	2.74	9	-	72.24	237	-
Top Beamsheaf Coal	0.30	1	-	78.89	258	10
Low " "	0.51	1	8	95.81	314	4
Rock	1.52	5	-	99.36	326	-
Rock with cask	3.05	10	-	105.61	346	6
Kent's Thin Coal (very good)	0.66	2	2	109.25	358	5
Rock	3.35	11	-	112.90	370	5
Strong bind	3.35	11	-	116.26	381	5
Rock	3.12	10	3	119.38	391	8
Kent's Thick Coal (inferior).	1.02	3	4	131.37	431	-
Canal stone & boulder	6.40	21	-	185.45	608	5
Barnsley Coal	2.49	8	2	195.71	642	1

H. JOHNSON

13. 9. 22





YORKSHIRE WATER AUTHORITY - Survey of Existing Boreholes			
I.G.S. Ref. No SE.30.55/R..		N.G.R. SE.399.020.....	Licence No.
OWNERS NAME			App No
ADDRESS ..hundhill Colliery,.....			Authorised Abstraction
..Nr.. Wombwell.....			g.p.h. g.p.d. m.g.a.
STRATA DETAILS	Thick'ns	Depth	
Soil	8'	8'	
Grey rag	14' 6"	82' 6"	
Blue sand	30' 3"	30' 3"	
Muttonfield coal	3' 16"	134' 10"	
Two foot coal	4' 9"	183' 3"	
Strong stone	10'	199' 5"	
Abby coal	2' 16"	222' 3"	
White rock	9'	237'	
Bearmshaw coal	2' 2"	314' 9"	
Rock	346' 8"	346' 8"	
Kenton thin coal	2' 2"	388' 5"	
Rock	11'	370' 5"	
Strong bind	11'	381' 5"	
Rock	10' 3"	391' 8"	
Coal. thick coal	3' 4"	431'	
Coal. stone. t.	21'	602' 5"	
boulder			
Barnsley coal	8' 2"	692' 1"	

Dia.
Depth 642'
Lining
Well sinker
Date 1927
R.W.L.
R.W.L.

INSPECTION REPORT	WATER QUALITY	DATE OF INSPECTION:-
Present Owner:- Access (Yes or No) ½" Probe 3" Instruments Landrover Access Agreed	Date pH Total hard Temp.hard Alk. Ca Mg Na K	Other Comments:- Sketch Plan of Location
Water Level at time of insp. metres below Date Datum above O.D. R.W.L. above O.D. Date	HCO ₃ SO ₄ Cl NO ₃ Fe	

SE3987 0184
(N11007) Wb. 17862-8154-5,000 12/26 sp. 100. O.A.

SECTION OF Lundhill Colliery

at 1000 yds. S. of Summers Lane
and Hough Lane, Wombwell.

Maps: One-inch 87 Six-inch 283NW County Yorkshire
Height above O.D. 150 ft. Latitude 53° 30' 46" N Longitude 1° 23' 55" W
Communicated by Sec. Strata Yks Cld 1927 p. 209 Date of Sinking } Not
Made by _____ Dip of Strata } stated.

SE 30 26/8

Wombwell

Summary of published record:		Thickness.		Depth from Surface.	
Unaltered beds are thin silt shales & sandstone + thin coals.	Soil	8	-	8	-
	Grey clay	74	6	82	6
	Blue stone with sand	13	5	105	11
	Strong blue stone	24	4	130	3
	Mellonfield Coal	8	10	139	10
	Two Foot Coal (with dirt)	4	9	183	3
	Strong stone	10	-	199	5
	Abby Coal	2	10	227	3
	White rock with fossils	9	-	237	-
	Top Beamsheal Coal	1	-	258	10
	Low	1	8	314	4
	Rock	5	-	326	-
	Rock with sand	10	-	346	6
	Kent's Thin Coal (very good)	2	2	358	5
	Rock	11	-	370	5
Carboniferous Westphalian Barnsley	Strong sand	11	-	381	5
	Rock	10	3	391	8
	Kent's Thick Coal (superior)	3	4	434	-
	Cank stone + boulder	21	-	608	5
	Barnsley Coal	8	2	642	1

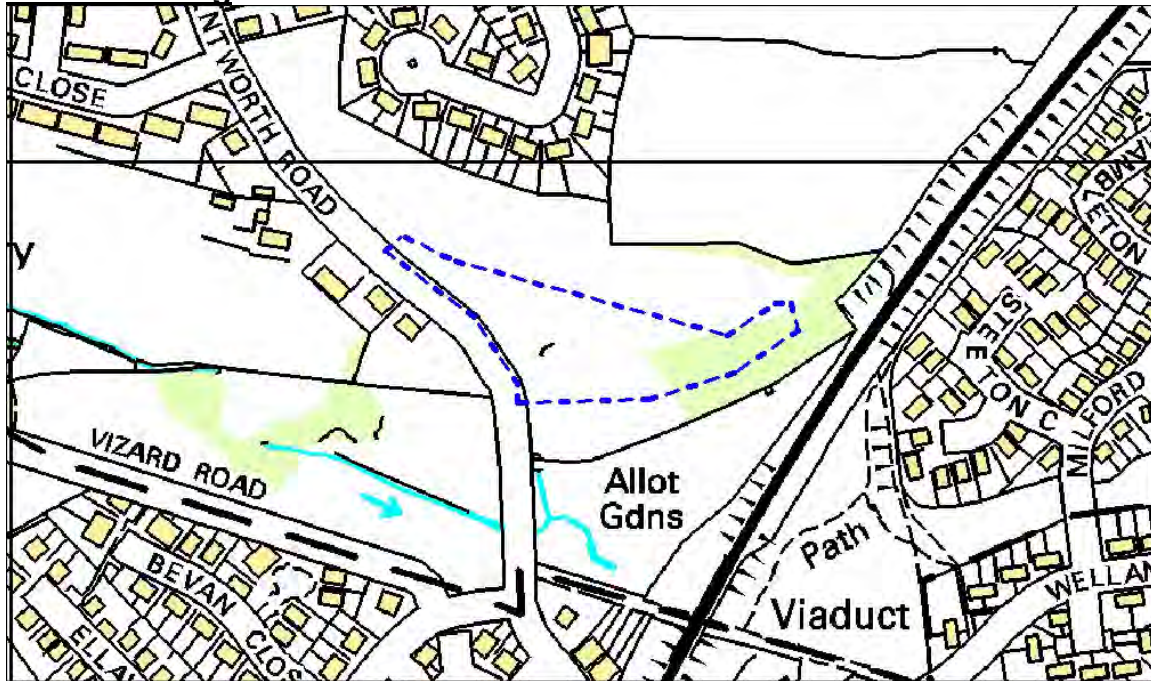
per H. Johnson
13.7.77

P2-293-i24 Phase I

Possible spoil heap, Wentworth Rd, Jump

Active Layer: L_1930_Y283_500

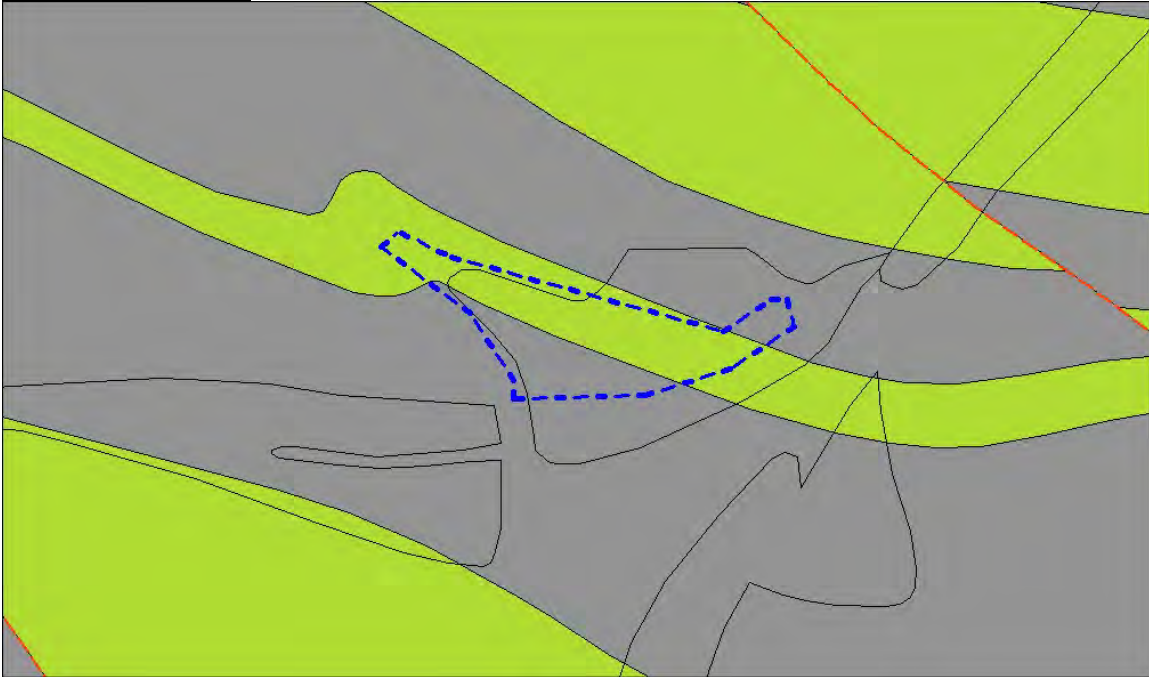
1.0 Site setting



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The site is in open fields just to the east of Wentworth Rd in Jump. To the north are residential areas and to the south an allotment garden leading onto a residential area. To the east is a railway line, beyond which is another residential area. There are several small detached buildings across Wentworth Rd to the west.

2.0 Site Geology



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The site lies above an area of Middle Coal Measures. The undivided Cyclic Sedimentary Rock (marked in grey) is mainly comprised of mudstones and underlies the southern part of the site. These rocks are associated with coal seams, and these are suspected to run to the north and south of the site, running east-west. The top half of the site is above Sandstones (indicated in green). Most of the site is on an area of marked made-ground of unknown composition

3.0 Surface hydrology

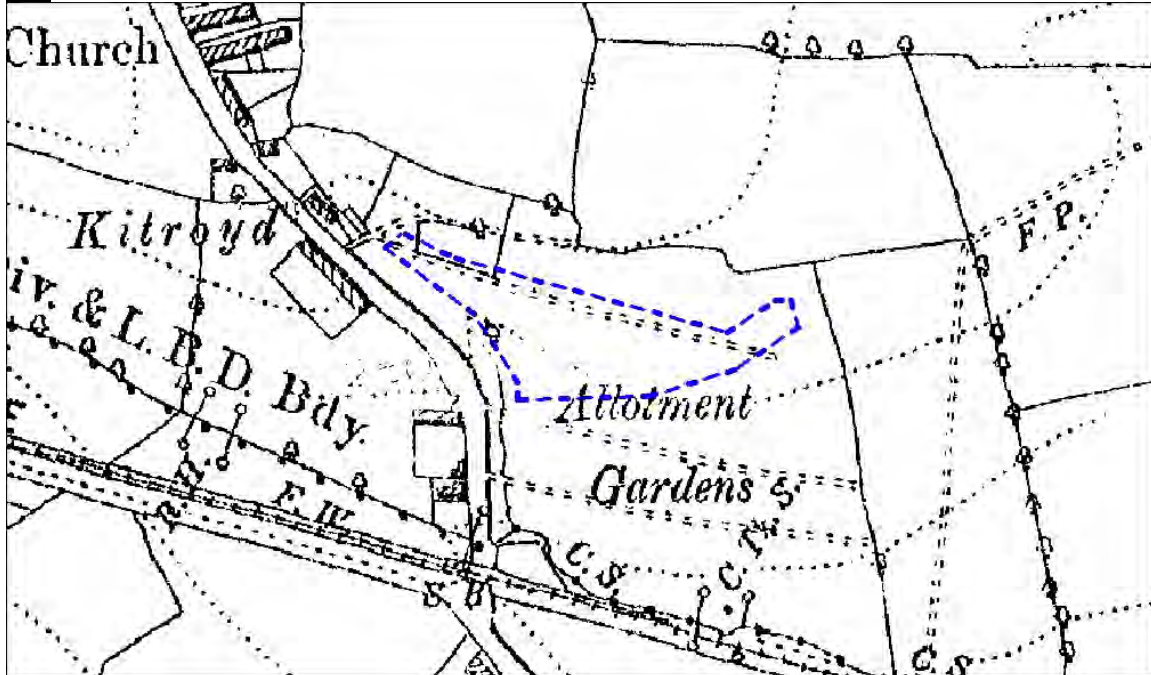
There is no significant surface hydrology on the site itself. There is a small drainage stream which starts approximately 360m to the west of site and runs from west to east, before sinking just to the south

4.0 Site Hydrogeology

The site is on minor aquifer of high vulnerability. This means that while there is a likelihood of contaminants passing to the stored groundwater, this water is of little or no importance outside of the immediate area

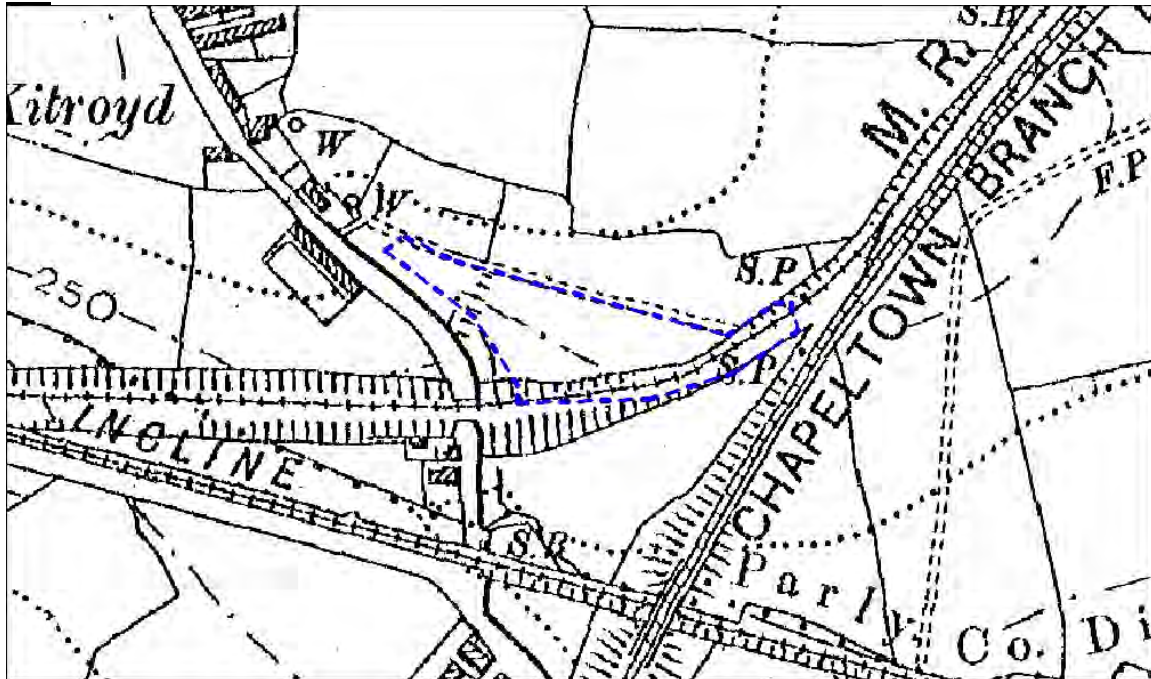
5.0 Site History

5.1 1895



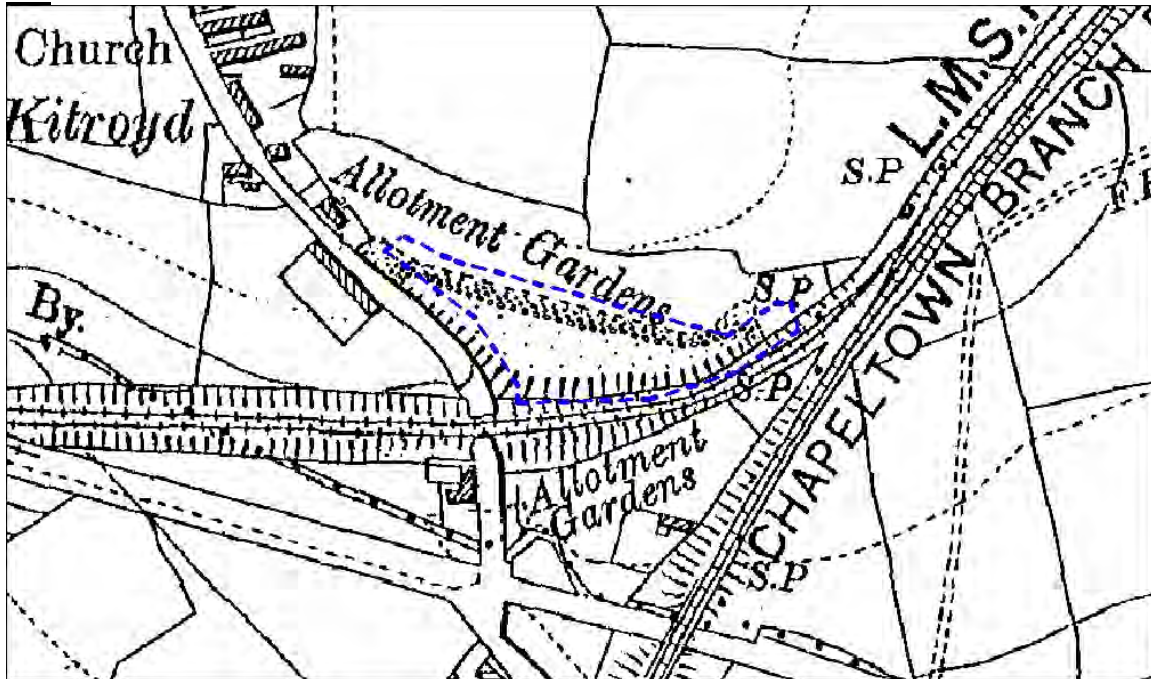
The site is surrounded to the north and east by open fields and farmland. To the south are allotment gardens, beyond which is a railway line running east-west. To the west is a road, along which are several small buildings.

5.2 1910



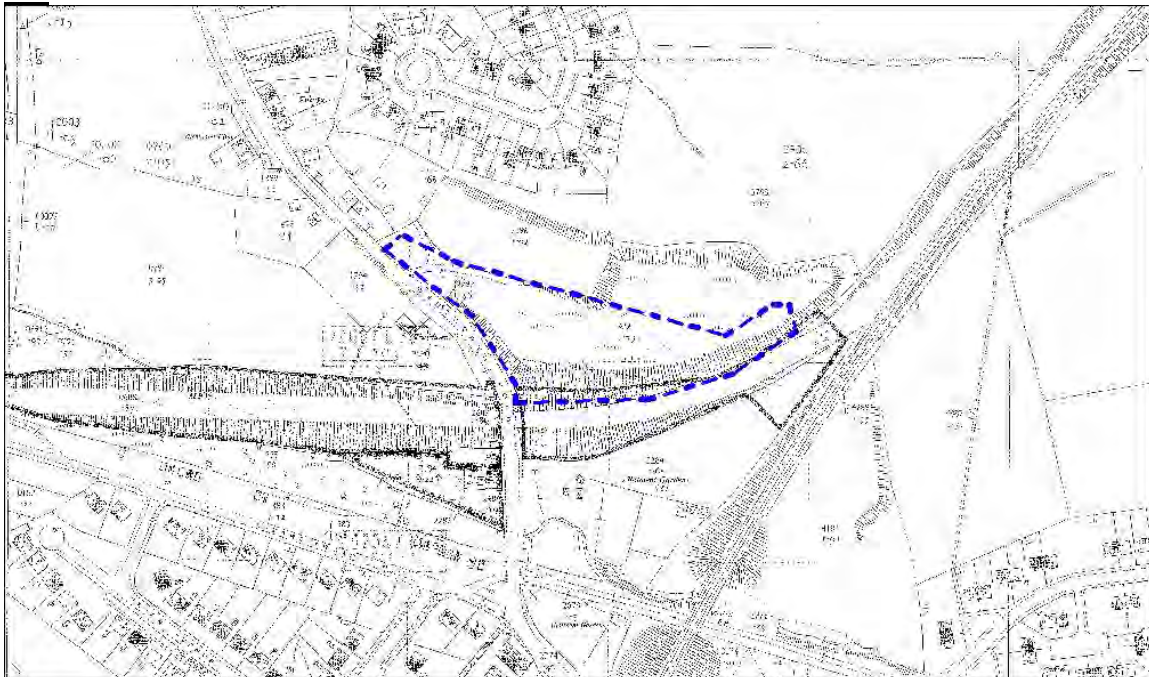
The Chapeltown Branch Extension Railway has been constructed to the east of the site, running north-south. A second, smaller line has been built just to the south, connecting the two larger lines

5.3 1930



The area has now been covered with some kind of spoil heap, although the source of this material is not apparent

5.4 1960s

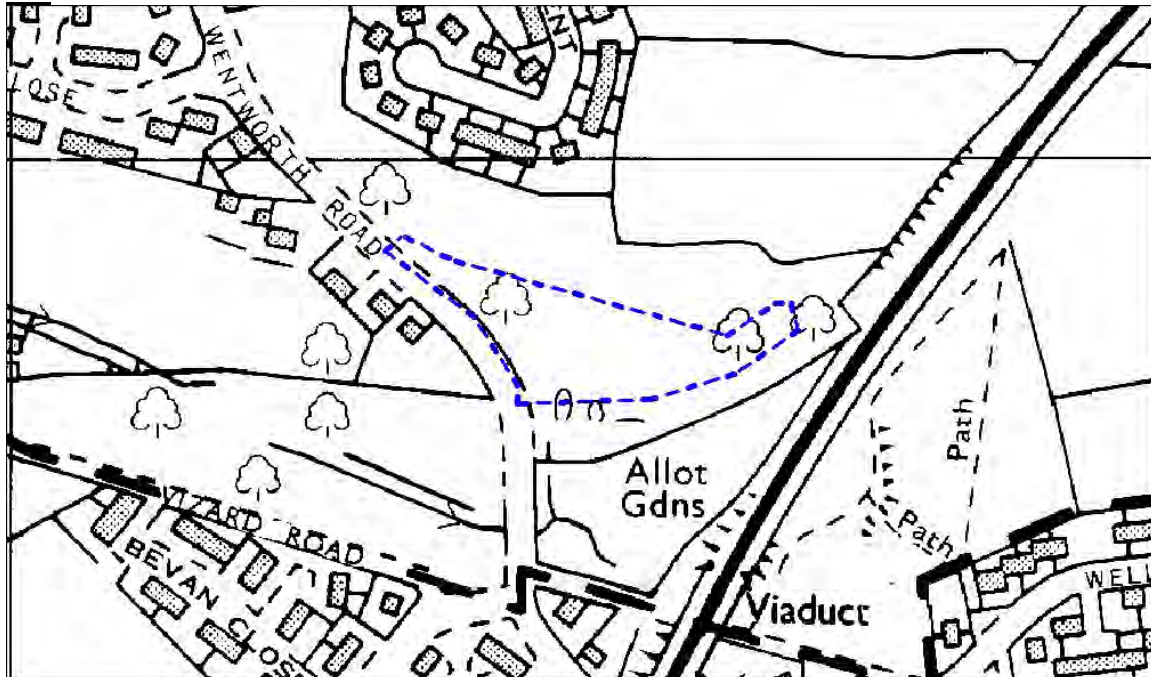


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The spoil heap now seems to extend outside the boundaries of the site. A small track leads onto the spoil heap. Residential housing has been built to the north.

The small link-railway has been dismantled, as has the east-west line to the south.

5.5 1990s



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There is a sparse covering of trees across the site

Summary

The site has obviously been used as a dump or spoil heap, but as there is no obvious source for this in the immediate area, it is very difficult to determine the nature of this material. The most likely source was Hoyland Silkstone Colliery, which was several miles to the west, but the destination of the railway line. It is unclear whether permission was granted for this material to be dumped.

6.0 Conceptual Model

Sources

The material in the spoil heap is most likely colliery spoil from Hoyland Silkstone Colliery. If this is the case then there will most likely be large quantities of arsenopyrites in the spoil. This can create low pH leachates in the subsurface. This in turn can affect the metals which are also likely to be present in the spoil. In low pH conditions many metals (i.e. cadmium, aluminium) will dissolve more readily and therefore become more likely to migrate off site and also become more bioavailable. There may also be problems with hydrocarbons in the soil, both from the degradation of coal products and from the boiler ash often used as bedding material on the railway lines (generally PAH's). There could also be

issues with combustion of the spoil heap if sufficient coal is present, but this is unlikely.

Pathways

Inhalation, ingestion and dermal pathways are all present for all of the potential contaminants. There is also a possibility of migration through the unsaturated zone.

Receptors

There are no onsite receptors, as the land currently has no obvious use. Migration of materials may affect the allotment gardens or, less likely, the residential area to the north. The houses on Wentworth Rd may also be susceptible to migrating pollutants. Contamination of controlled waters is highly unlikely as the only nearby surface water is a small drainage stream, and this most likely flows into a disused canal

Linkages

Source	Receptor	Pathway	Risk	Comments
Low pH leachate	Ecology, Human residents/ allotment users, controlled waters	Unsaturated zone migration	LOW	There is no evidence that this is an issue. Good vegetation cover on the site and surrounding areas indicates that this is not a significant problem
Metals from the spoil material	Human site users and local residents	Ingestion	MEDIUM	There are likely to be metals present in the spoil, but there is no evidence to indicate the concentration or bio-availability. The most vulnerable receptor would be people on the allotment, but the site is greatly elevated above there, lessening the chance of migration
	Controlled waters	Unsaturated zone migration	LOW	No evidence of contaminated groundwater and whilst there is a small drainage channel nearby, the nearest significant water course is over 790 metres away.
Volatilised Hydrocarbons from the decay of spoil material	Human site users	Inhalation	MEDIUM	Whilst hydrocarbon products probably exist within the spoil, there is little to suggest that they pose a significant health risk, and any risk is lessened by potential exposure being in open air

	Controlled waters	Unsaturated zone migration	LOW	May dissolve in the ground water, but unlikely to reach a significant store of water as the nearest river is nearly 800 metres away
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7.0 Conclusion

Part IIA of the Environment Act 1990 defines contaminated land as being;

“any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that-

- (a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) pollution of controlled waters is being, or is likely to be, caused”

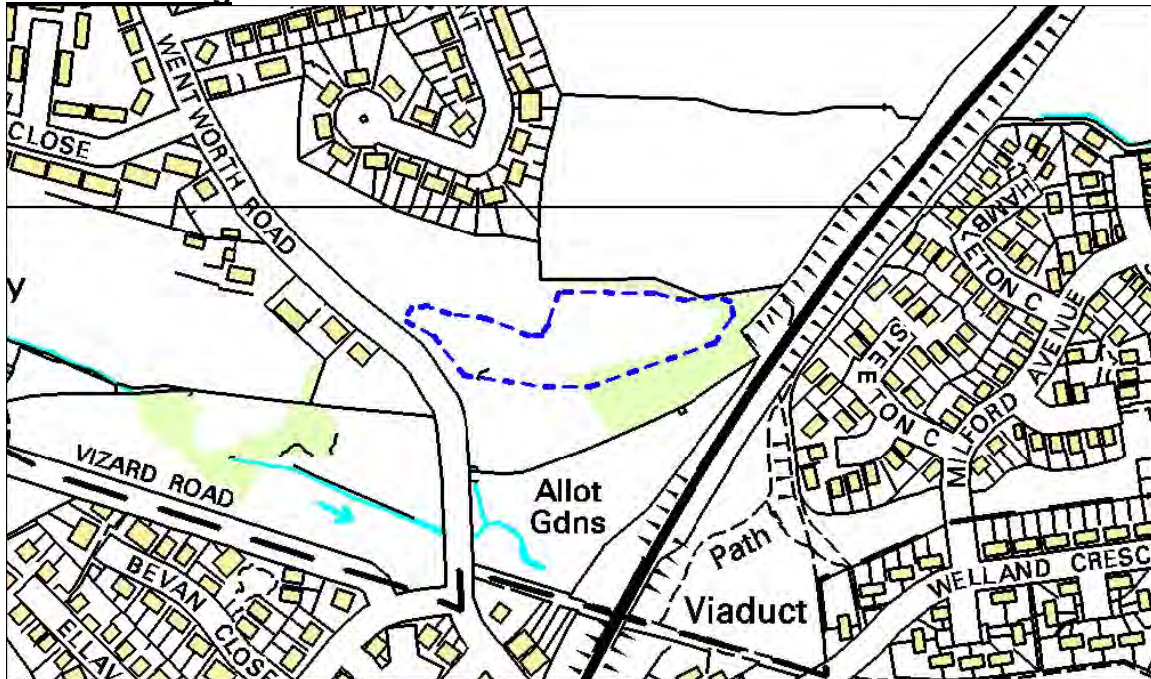
It is unlikely, given the current land use and ground cover, that this statement could be applied to this site. It is also highly unlikely that there will be any issues regarding contaminated land with this site due to the lack of receptors and strong pathways. However, this site should be visited and a walkover conducted because of the unknown nature of the material in the spoil.

P2-8946-i24 Phase I

Former Landfill, Wentworth Road, Jump

Active Layer: Landfill 124

1.0 Site setting



The site is set on an area of recreational grassland along one side of Wentworth Rd. The site slopes gently from southeast towards northwest, and slopes steeply down to allotment gardens along the southern boundary. The greater expanse of the grassland surrounds on all side, but there are residential properties to the north and west and also to the east across the railway lines which pass by the eastern boundary of the site.

2.0 Site Geology



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The site sits upon an area of made ground, which in turn is upon the Middle Coal Measures formation. The Coal Measures consist of alternating bands of sandstone (indicated in green) and an undivided cyclic sedimentary rock i.e. Mudstone (indicated in grey). There are no major faults directly affecting this site.

3.0 Surface hydrology

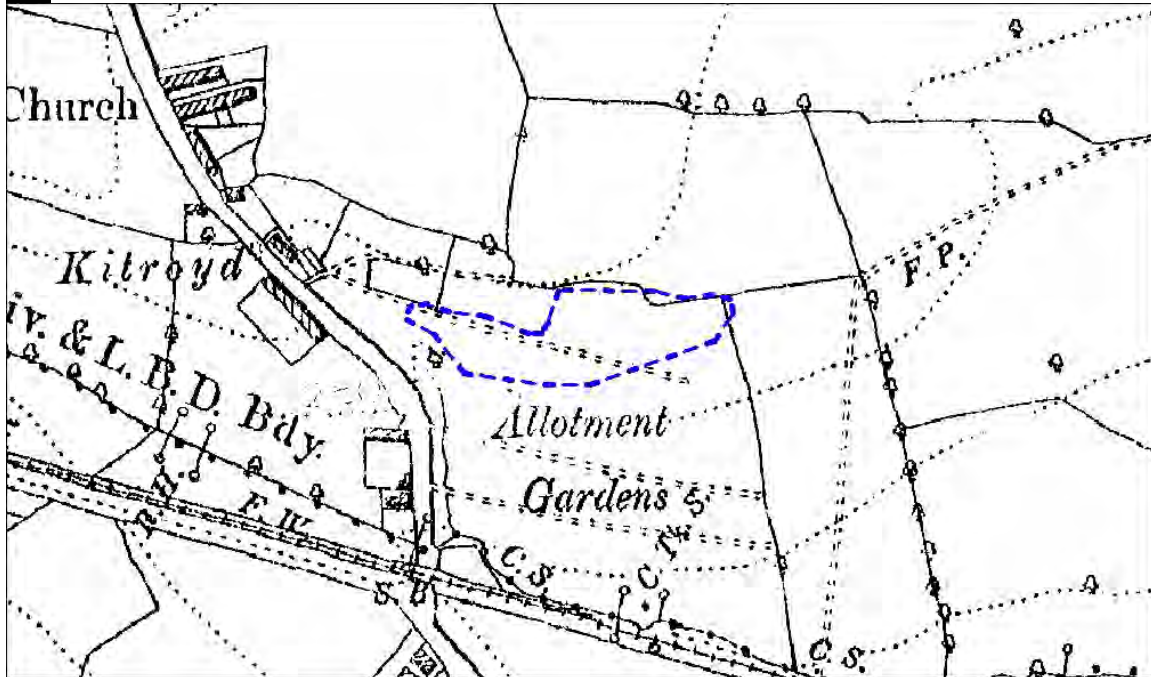
There are no surface hydrology features on the site itself. The nearest surface water feature is a small stream approximately 65 metres to the southeast.

4.0 Site Hydrogeology

This site lies on a minor aquifer of high vulnerability. This means that whilst there is a significant possibility of pollutants migrating into the stored groundwater, this groundwater is of little significance outside the immediate area.

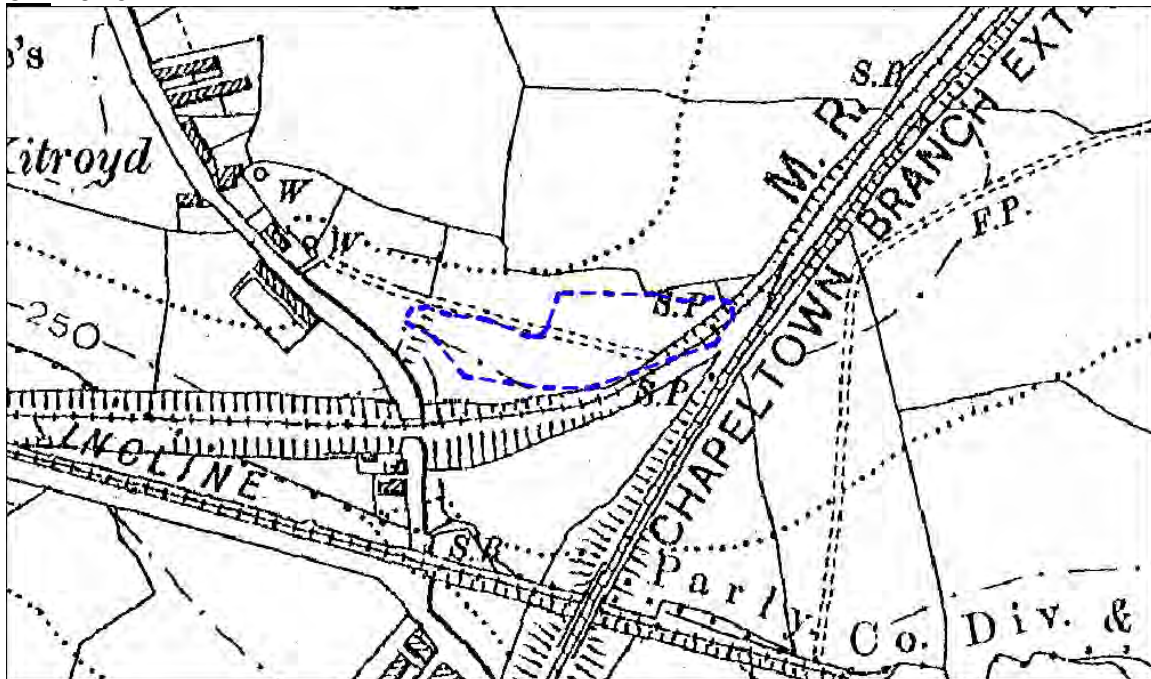
5.0 Site History

5.1 1895



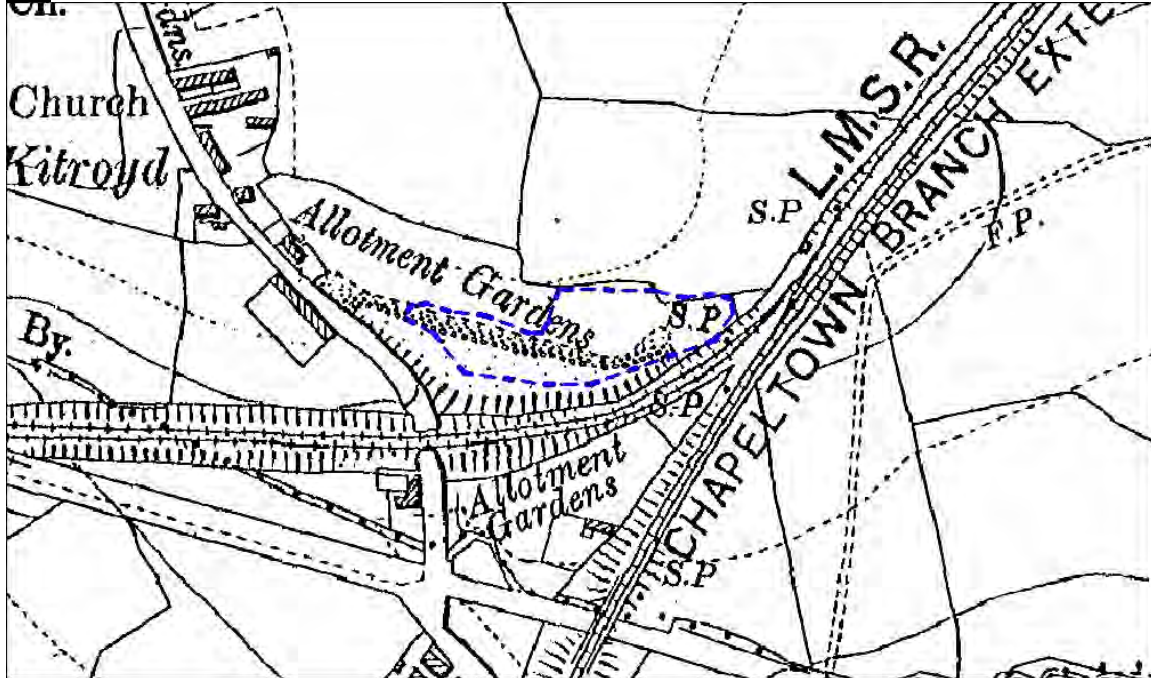
The site occupies part of a large allotment garden and is surrounded by open fields and agricultural land. A road runs close to the western end of the site and a railway line runs east-west approximately 120 metres to the south. A small group of buildings marked as 'Kilroyd' are approximately 90 metres to the northwest

5.2 1910



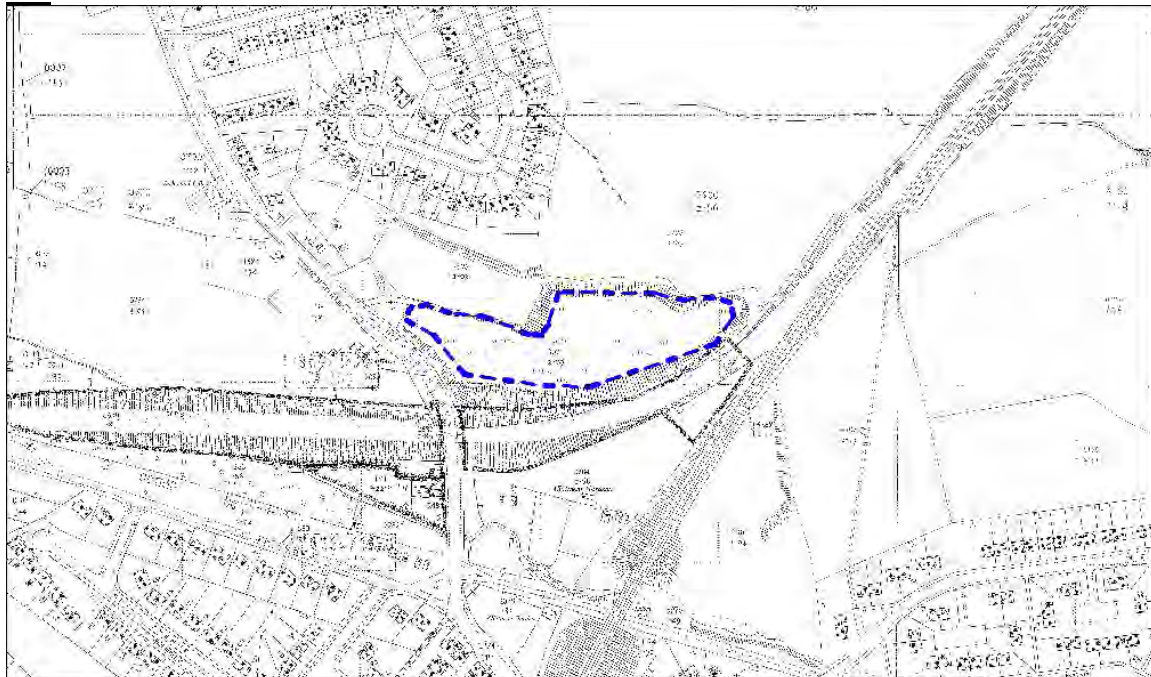
A second railway has been built which runs approximately north-south and passes the eastern edge of the site. A link between this new line and the existing one also runs along the length of the southern boundary of the site

5.3 1930



There is some kind of spoil or waste material covering part of the site.

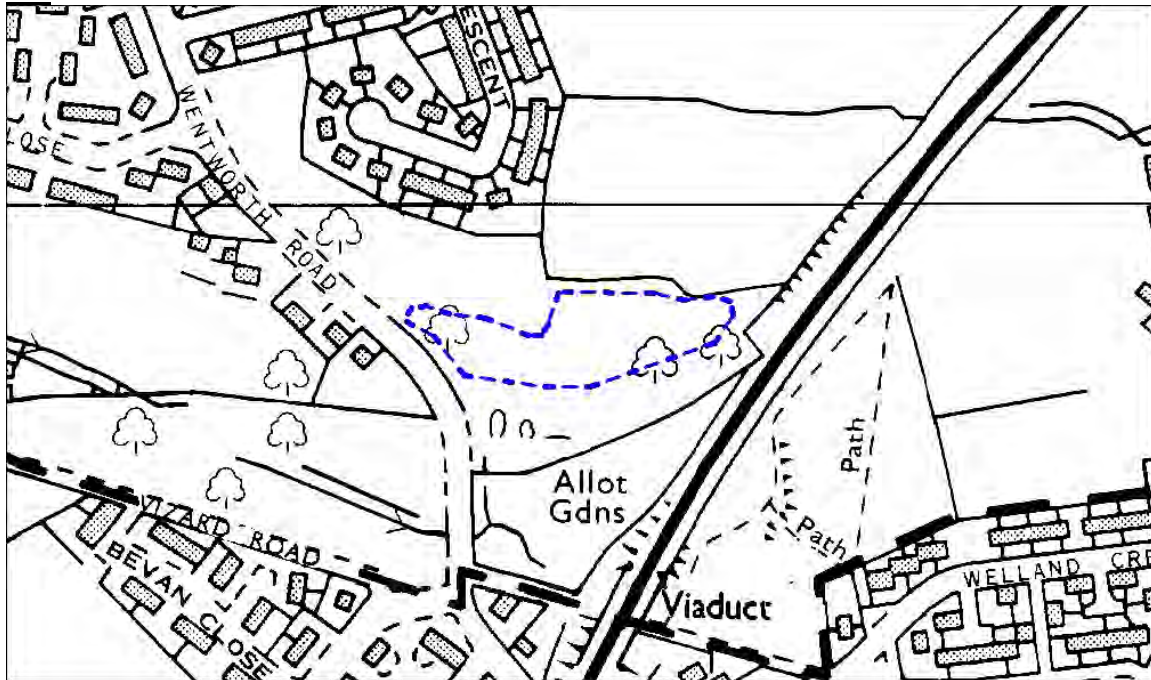
5.4 1960s



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The spoil heap now covers the entire site. A small track leads up to in from Wentworth Rd, indicating that this is possibly some kind of licensed disposal site

5.5 1990s



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The railway line to the south has been removed and only the more recent one remains. The site has become at least partially vegetated and is probably in its current usage by this time

Summary

The site has been used for the dumping of waste materials at some point between 1930 and 1960 but the source or nature of the material is unknown. The landfill activities are not acknowledged in the historic map evidence but are almost certain to have taken place between 1960 and 1990

6.0 Conceptual Model

Sources

The site is listed as a landfill that may be gassing, which means there may be putrescible material emitting methane and carbon dioxide. This gas may also be migrating laterally from the site, assisted by the likely presence of an unsaturated zone in the made ground which covers the site.

The origin of the spoil which covered the site is unknown, but the proximity of Hoyland Silkstone Colliery and the train line which services it means that it is likely to be colliery spoil. This would indicate the presence of high levels of metals such as iron and chromium in the soil. This coupled with acid leachates

created by Arseno-pyrites in the spoil could mean that these metals may be both mobile and bio-available. There may also be hydrocarbon compounds present in both gaseous and aqueous form

Pathways

The presence of landfill gas means that inhalation may be a major pathway. The possible presence of metals means there may also be an ingestion pathway, either directly or through the consumption of vegetables grown in the nearby allotments and gardens. The unsaturated zone coupled with potentially acidic conditions in the soil mean that there is likely to be migration of pollutants through the subsoil.

Receptors

The major receptor here is likely to be the local residents in the housing estate just to the north of site. They would be susceptible to ingestion in their gardens and inhalation within their homes. Migration to the allotments is likely to be insignificant due to topography and there are no controlled waters within the vicinity.

Linkages

Source	Receptor	Pathway	Risk	Comments
Methane & CO2 from the decay of putrescible material	Adjacent residents	Migration, Inhalation, Explosion	LOW	No obvious preferential pathways exist to the residential area and there is no evidence of a current or previous build up of gas in any of the houses
Metals in leachate or groundwater suspension		Ingestion, Dermal	LOW	The residential area is higher up the slope than the site itself, so it is highly unlikely that any metals or metal containing leachate would be able to affect the topsoil layers
		Site users	Ingestion, Dermal	LOW
SVOCs/VOCs from the decay of colliery spoil		Inhalation, Dermal, Ingestion	LOW	Generally an insignificant pathway in open air and there is no evidence that this linkage exists
	Adjacent residents	Inhalation, Dermal, Ingestion, Explosion	LOW	Again, no evidence exists and the topography of the area makes it an unlikely linkage

7.0 Conclusion

Part IIA of the Environment Act 1990 defines contaminated land as being;

“any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that-

- (a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) pollution of controlled waters is being, or is likely to be, caused”

It is unlikely, given the current land use and ground cover, that this statement could be applied to this site. Most of this site has been visited previously as part of investigation into L_1930_Y283_500, which significantly overlaps the landfill area. This found that there was no evidence of a pollutant linkage, and so therefore it is unnecessary to conduct a walkover again. However, due to the uncertainty over possible gassing on this site, it may be necessary to conduct spike-bar gas monitoring in order to confirm or discard the presence of methane and carbon dioxide in the soil.

From: [Emma Edwards](#)
To: [George Morton](#)
Subject: Request for information - Ref: EIR2026/07259
Date: 17 February 2026 10:28:09

Our ref: EIR2026/07259

Your ref:

Dear George Morton,

I am writing in response to your request for information, received 10 February 2026, regarding 260212/DJ01. Request for landfill records - Jump, nr. Barnsley.

We respond to requests for information under the Freedom of Information Act 2000 (FOI) and Environmental Information Regulations 2004 (EIR).

This site is indeed a historical landfill, and we deem it as such because the site stopped operating prior to the Agency coming into operation in 1996. All land that could be classed as contaminated land under section 2A of the Environmental Protection Act (EPA) 1990 are looked after by the Local authority. (Although it does not mean that the land is or is not contaminated). We do not hold any more information on this historic landfill site.

Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Rights of appeal

If you are not satisfied with our decision, you can contact us within two calendar months to ask for the decision to be reviewed. We will then conduct an internal review of our response to your request and give you our decision in writing within 40 working days.

If you are not satisfied with the outcome of the internal review, you can then make an appeal to the Information Commissioner Office, the statutory regulator for the Environmental Information Regulations 2004 and the Freedom of Information Act 2000. Please follow this link to the [ICO online complaints portal](#). The address is: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire. SK9 5AF.

Tel: 0303 123 1113 (local rate) or 01625 545 745 (national rate) | Fax: 01625 524 510
Email: icocasework@ico.org.uk | Website: www.ico.org.uk

Yours sincerely,

Emma Edwards

YOR Area Customers and Engagement Team

Environment Agency

Please tell us how we did

To help improve your experience as a customer we are currently gathering feedback. If you would like to take part in a short customer satisfaction survey, please click the link below:

[Environment Agency FOI Customer Satisfaction Survey](#)

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