Environmental
Geotechnical
Specialists

COAL RISK ASSESSMENT

job number C1468/21/E/2332	date 02/03/2021

site address
Malt Kiln Farm
104 High Street,
Royston,
Barnsley, South Yorkshire

written by C. Mason	checked by R. A Palmer

issued by C. Mason

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GEOTECHNICAL ENVIRONMENTAL

Environmental Geotechnical Specialists

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Environmental Geotechnical Specialists

Report on a Coal Mining Risk Assessment

Location:	Malt Kiln Farm 104 High Street, Royston, Barnsley, South Yorkshire
For:	Mr Craig Robinson
Report No.	C1468/21/E/2332 Report date: March 2021

For and on behalf of **Rogers Geotechnical Services Ltd**

Charlotte Mason BSc FGS
Geo-environmental Engineer

Rob Palmer MSc FGS ACIEH
Senior Geo-environmental Engineer

1. Introduction

It is understood that a planning application has been submitted for the above property which will involve restoring a farmhouse, rebuilding a barn and convert/rebuild a garage (2021/0036). As part of the application process a Coal Mining Risk Assessment has been requested by the planning authority. Consequently, a desktop study was commissioned in order to assess the risk to the development from coal mining. This report presents the findings of the study.

2. Geological Desk Study

The geological desk study has been undertaken using the following sources of information.

- British Geological Survey map sheet[1].
- British Geological Survey *Geology of Britain Viewer*[2].
- Coal Authority Consultants Coal Mining Report[3].
- British Geological Survey *Borehole Records*[4].

2.1 British Geological Survey Maps and Viewer

The appropriate map sheet for the site and the geology viewer has been examined and the following table presents the indicated geology:

[1] Sources: British Geological Survey (NERC) Map Sheet 86; Barnsley Solid and Drift Editions
[2] Sources: British Geological Survey (NERC) Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[3] Coal Authority Reference: 51002383250001 dated 16th February 2021.
[4] Sources: British Geological Survey (NERC) Borehole Records [*online resource from* http://www.bgs.ac.uk//]

Table 1: Geological Data for the Site			
Strata Type	**Strata Name**[5]	**Previous Name**[6]	**Description**[3]
Superficial Geology	None recorded	-	-
Solid Geology	Mexborough Rock		Named sandstone member of the Pennine Middle Coal Measures Formation

On the geological map, there are no dip indicators relevant to the site (i.e. within 500m of the site or within the same fault block). However, based on the topography of the local area and the outcrop patterns, it can be assumed that the solid geology dips at shallow angles towards the east.

There is one coal seam that is shown to outcrop within the local area. This seam is summarised as follows:

Table 2: Summary of Coal Seams Within the Vicinity of the Site.			
Seam Name	**Seam thickness**[5]*****	**Outcrop distance from site**[5]*****	**Anticipated depth below site**
Royston Coal	0 – 0.8m	~100m S	~10m bgl

*All distances are given as approximations only. It should be noted that coal seam thicknesses vary over relatively short distances

It should be appreciated that there is little information given within the regional geological memoirs regarding this coal seam. However, the BGS map would suggest that this seam is discontinuous in nature, and may be local to this area only.

Whilst not shown to outcrop within the local area, the generalised vertical section for the map sheet indicates that a set of discontinuous seams known as the Sharlston coals could be expected at or close to the base of the Mexborough Rock. The Sharlston coals are a variable group of thin coals, important in opencast mining near the northern margin of the Barnsley district. The thickness of the Sharlston Top Coal (aka Cudworth Coal, Double-Smuts Coal) apparently varies inversely with that of the underlying Glass Houghton Rock. It is thickest (over 1 m) in the Frickley area, and is in places thinly split by dirt partings. Generally, this is the best developed unit of the Sharlston coals.

[5] Sources: British Geological Survey (NERC) Map Sheets 86; Barnsley; Solid and Drift Edition, and Geology of Britain Viewer [*online resource from www.bgs.ac.uk*]
[6] Sources: British Geological Survey (NERC) Lexicon of Named Rock Units [*online resource from www.bgs.ac.uk*]

2.2 Coal Authority Mines Report

As part of this study a Coal Authority Consultants Coal Mining Report has been obtained. The report is presented as Appendix 2 and for the purposes of discussion has been summarised below:

Table 3: Summary of the Consultant's Coal Mining Report

Has the report highlighted evidence or potential of:			
Ref	**Mining Feature**	**Yes/No**	**Comments**
1	Underground Coal Mining	Yes	The Low Barnsley Coal has been worked the site at a depth of 403m, has an extraction thickness of 1.61m and was last worked in 1908.
2	Probable Unrecorded Shallow Workings	Yes	No further details offered.
3	Spine Roadways at Shallow Depth	No	No spine roadway recorded at shallow depth.
4	Mine Entries	No	None recorded within 100m of the enquiry boundary.
5	Abandoned mine plans	Yes	Plans of abandoned mine workings below the site are suggested to be available by the Coal Authority.
6	Outcrops	Yes	The Sharston Top Coal outcrops ~50m south of the site, and is recorded to be workable.
7	Geological Faults	No	No faults, fissures or breaklines recorded.
8	Opencast Mines	No	None recorded within 500 metres of the enquiry boundary.
9	Coal Authority Managed Tips	No	None recorded within 500 metres of the enquiry boundary.
10	Site Investigations	No	None recorded within 50 metres of the enquiry boundary
11	Remediated Sites	No	None recorded within 50 metres of the enquiry boundary.
12	Coal Mining Subsidence	No	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 31st 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.
13	Mine Gas	No	None recorded within 500 metres of the enquiry boundary.
14	Mine Water Treatment Schemes	No	None recorded within 500 metres of the enquiry boundary.
15	Future underground mining	No	None recorded.
16	Coal mining licensing	No	None recorded within 200m.
17	Court orders	No	None recorded
18	Section 46 notices	No	No notices have been given.
19	Withdrawal of support notices	No	The property is in an area where a notice to withdraw support was given in 1977. 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.
20	Payments to owners of former copyhold land	No	The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

It should be noted that the Consultants Coal Mining Report makes reference to the Sharlston Top Coal outcropping to the south of the site. This seam has a similar outcrop pattern to the Royston Coal Identified on the 1:50,000 BGS map sheet. As such, it is reasoned that both datasets could represent the same seam.

2.3 Geological Survey Borehole Records

The British Geological Survey (NERC) keeps borehole records from across Britain which are available for public viewing through their website[7]. As part of this study, the records in the area around the site have been reviewed in order to assist in establishing the geological conditions.

Unfortunately, in this instance, there are no borehole scans available within the vicinity of the site that will assist with this assessment. Whilst there are borehole scans present within 500m to the north, south and east of the site, these boreholes do not extend to depths greater than 5m, and therefore do not intersect any coal seams. Furthermore, other borehole scans are available at a greater distance to the site within other faulted blocks. However, these are not anticipated to represent comparable ground conditions to those anticipated to be present below the site.

3. Risk Assessment

The risk to the stability of the proposed residential development has been evaluated from the data obtained and with reference to the following ratings and definitions:

Low - The possibility of instability is unlikely therefore no further action is necessary.

Moderate - The possibility of instability is likely and further investigation or remedial action may be required.

High - The possibility of instability is highly likely and further investigation or remedial action will be necessary.

Table 4: Development Specific Risk Assessment

Item	Risk attributed to	Coal Seam(s) Considered	Risk Rating
3.1	Shallow coal workings	Sharlston Top Coal, or Royston Coal	Moderate
3.2	Coal workings at depth	The Low Barnsley Coal has been worked the site at a depth of 403m, has an extraction thickness of 1.61m and was last worked in 1908..	Low
3.3	Mine gas	Shallow coal workings	Moderate

3.1 Risks Posed by Shallow Coal Workings

On the basis of all of the information provided above, there is some ambiguity as to whether the coal seam outcrop located to the south of the site represents the Royston Coal (as per BGS maps), or the Sharlston Top Coal (as per the Consultants Coal Mining Report). Regardless of this, the possibility of the seam being worked below the site cannot be ruled out. Historic coal mining activity is evident in the nearby area, and therefore it is considered that if coal was known to be close to ground level it could have been removed illicitly via shallow mining methods with relative ease.

It may be noted that guidance available from both the NHBC and the CIRIA publication, SP32 - *construction over abandoned mine workings,* suggests that competent overburden thickness above a coal seam should be greater than 10 times the thickness of a seam plus seam thickness in order that the collapse of workings would pose a low risk to surface structures.

On this basis, assuming a maximum thickness seam, the table below suggests the thickness of competent overburden required above the seam to mitigate instability at the surface.

Table 5: Required Thickness of Competent Overburden

Seam Name	Maximum Seam thickness	Anticipated depth below site	Required thickness of competent overburden.
Royston Coal Sharlston Coal	0.8m 1.9m	Within 10m bgl	8.8m 17.6m

Based on local borehole records and professional judgement, it is reasoned that between 1m and 3m of superficial soils are likely to exist before rockhead representing 'competent cover' is encountered. In light of this, depending on the thickness of the seam, it is considered that there may not be a sufficient thickness of competent overburden above the seam, in order to prevent the risk of instability posed by the presence of any illicit workings. Therefore, a moderate risk rating has been placed on these seams, and further investigation is recommended to prove or disprove the presence of illicit mining activity.

3.2 Risks Posed by Coal Workings at Depth

In regard to deeper mining which could affect the site, the site underlain by workings within the Low Barnsley Coal at a depth of 403m, and was last worked in 1908. However, given the depth of these features, and the time passed since mining operations ceased, it is reasoned that collapse of these workings is unlikely to have significant effects on the proposed development.

3.3 Risks Posed by Mine Gas

This assessment has identified that there is potential for shallow mine workings to be present beneath the proposed development. Whilst the Consultants Coal Mining Report has not reported any incidents of mine gas within the vicinity of the development, shallow mining activity represents a credible source of ground gas. As such, a moderate risk rating has been assigned, and further assessment may be required.

Should evidence of workings be proven via further intrusive works, it is strongly recommended that a detailed gas risk assessment is undertaken in accordance with relevant guidance. The risk assessment should take into consideration the current site conditions, and should be subject to reassessment after the formulation and/or completion of any remedial measures and proposed foundation solution. These documents should be prepared by a suitably experienced and qualified specialist. Such assessments may stipulate that a regime of gas monitoring is undertaken to quantify the risks posed by mine gas.

4. Conclusions

In light of the potential risks of instability at the site from the working of shallow coal, it cannot be recommended that development takes place without further investigation to conclusively determine the presence of such workings. This work should include physical drilling methods to explore the ground conditions.

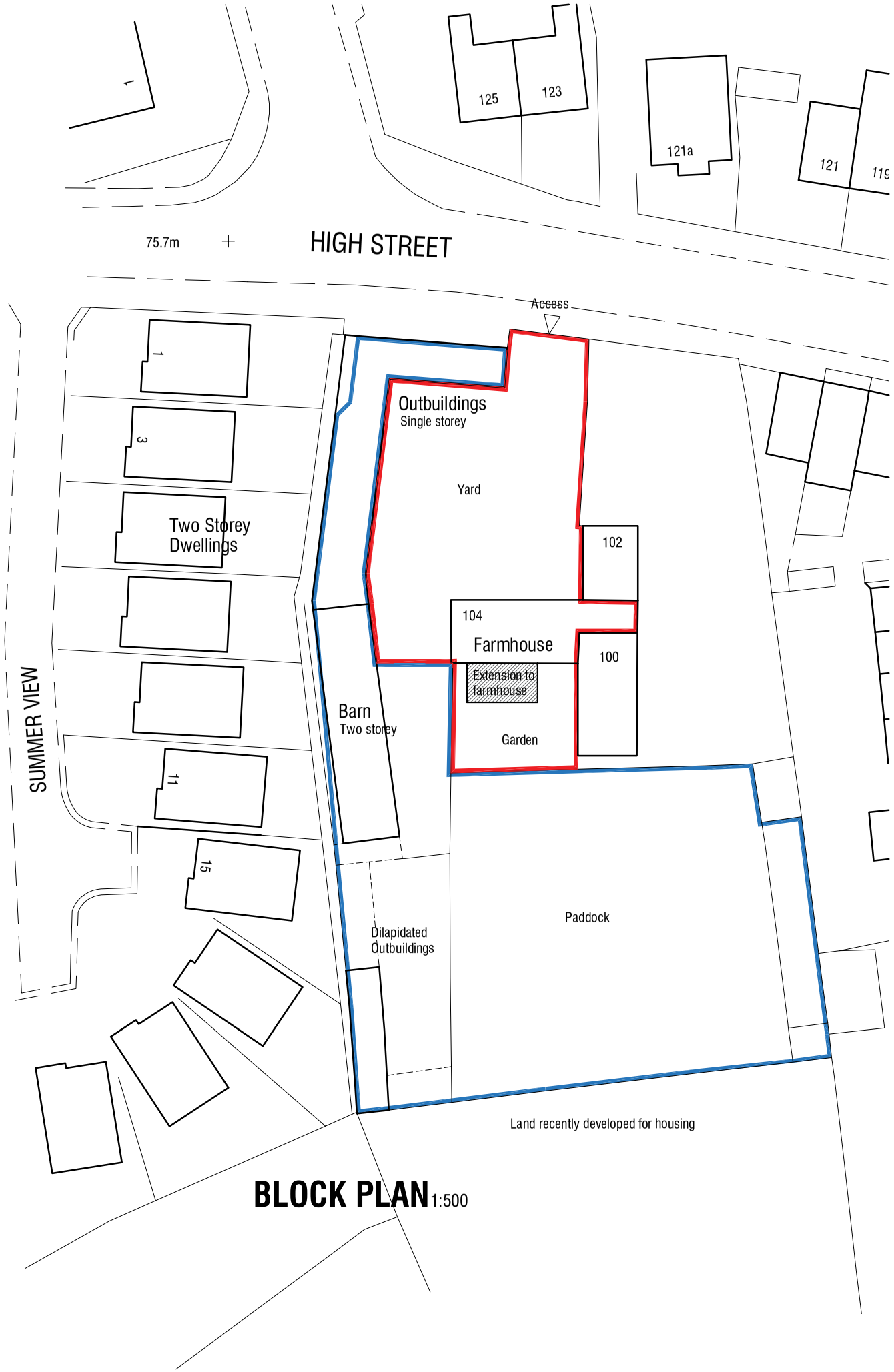
General practice is to undertake rotary openhole boreholes at three locations across the site to mitigate against the potential for drilling through intact columns associated with pillar and stall workings. In this case, boreholes should be targeted in areas of the site where new buildings, or extensions are to be constructed.

It is normal to investigate the ground to 30m below ground level; any workings below this depth are unlikely to result in significant instability. However, in this case, the risk of instability is due to shallow workings, therefore, drilling to these depths may not be necessary and the objective should be to ensure that the shallow seams are un-worked or have sufficient competent cover. It may therefore be possible, in the first instance, to undertake one borehole to 30m below the top of the rockhead, with the remaining boreholes proving the depth and continuity of the coal seam(s). In any event, it is considered that approval should be sought with the Local Authority as to the efficacy of this approach.

It is of note that Rogers Geotechnical Services would be happy to assist in any further intrusive investigation that may be required.

Appendix 1

Site Plan



BLOCK PLAN 1:500

SITE LOCATION PLAN 1:1250

North

Malt Kiln Farm
104 High Street
Royston
Barnsley

SURVEY

BLOCK PLAN & LOCATION PLAN

mboothdesign
architectural design and building consultants
Fairfield House
Berneslai Close Barnsley
S70 2FL
T: 01226 286256
M: 07881898300
E: mark@mboothdesign.co.uk

Scale	1:500 @ A3	Drawn	MJB
Date	AUG 2019	Ref.	17.14
Dwg No.	**BP02**	Rev.	

0cm | 2cm | 4cm

SITE LOCATION PLAN 1:1250

Malt Kiln Farm
104 High Street
Royston
Barnsley
S71 4RN

LOCATION PLAN

Scale 1:1250

Date Jan 20

Ref 17.27

Drwg No OS1

mboothdesign
architectural design and building consultants

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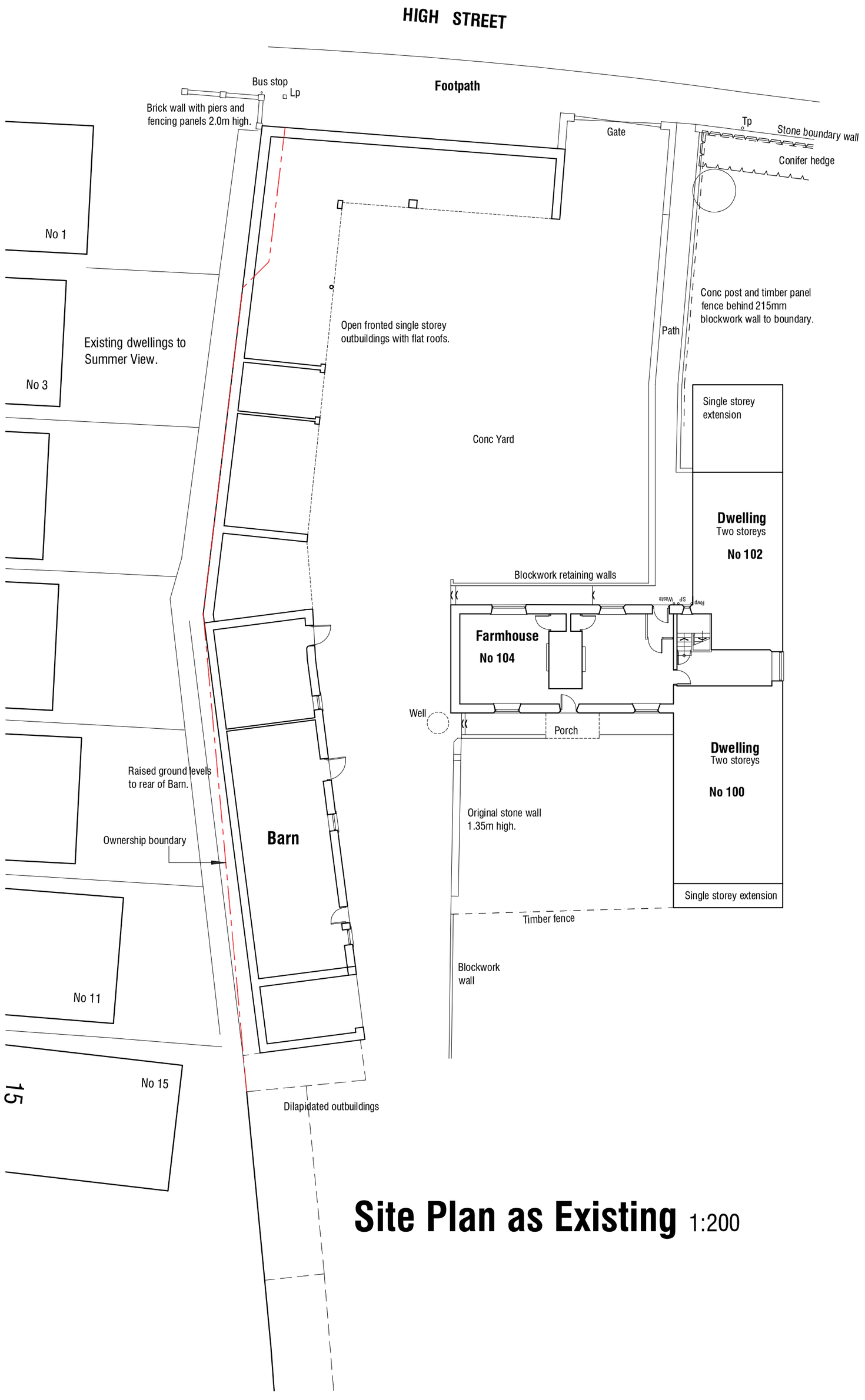
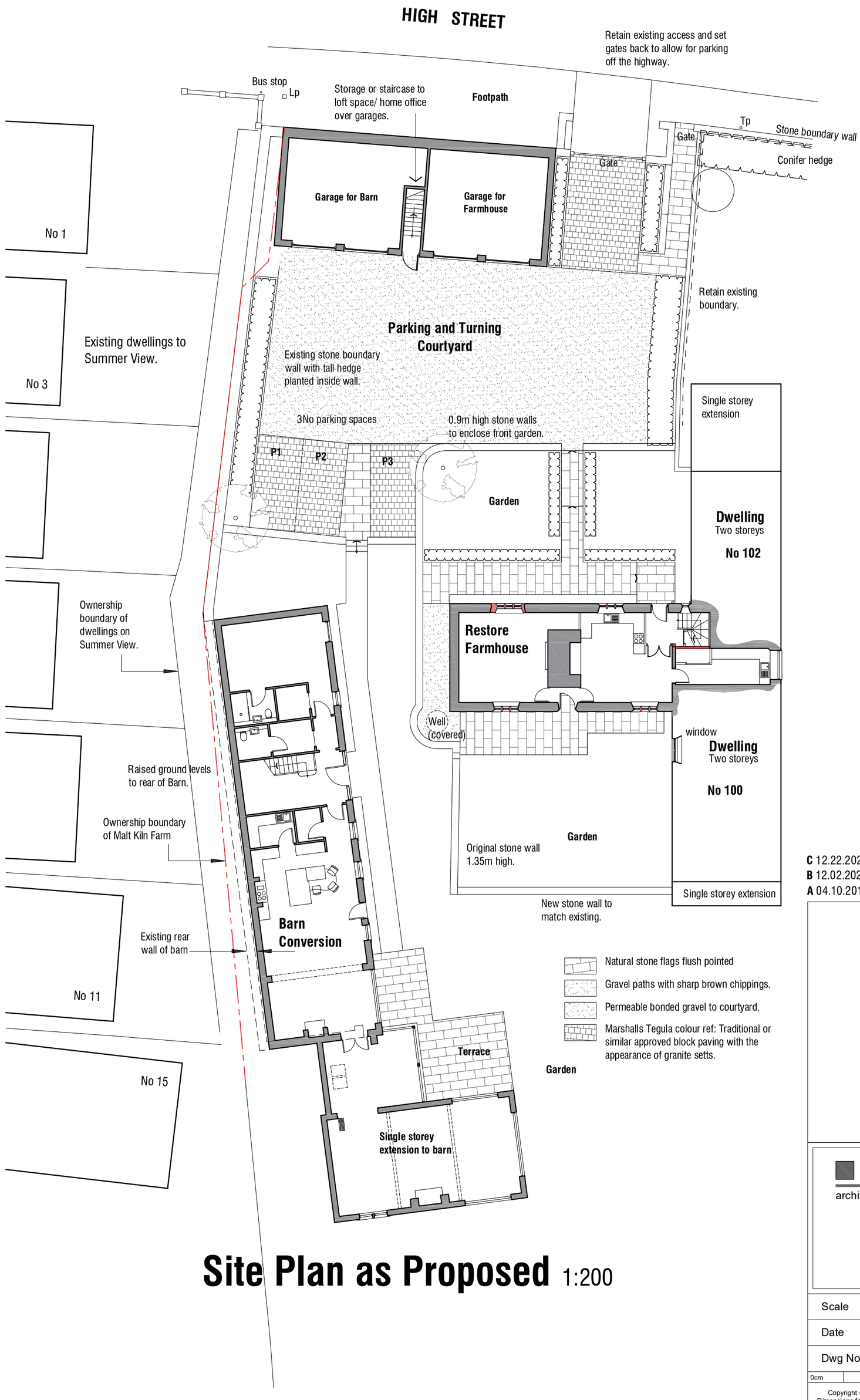


Site Plan as Existing 1:200

North



Site Plan as Proposed 1:200

C 12.22.2020 - Update for planning submission.
B 12.02.2020 - Update with Farmhouse and Garage details.
A 04.10.2019 - Update barn to match revised layout.

Malt Kiln Farm
104 High Street
Royston
Barnsley

EXISTING AND PROPOSED

SITE PLAN

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Scale	1:200 @ A2	Drawn	MJB
Date	AUG 2019	Ref.	17.27
Dwg No.	**P1**	Rev.	**C**

0cm | 2cm | 4cm | 6cm

Appendix 2

Coal Authority Report

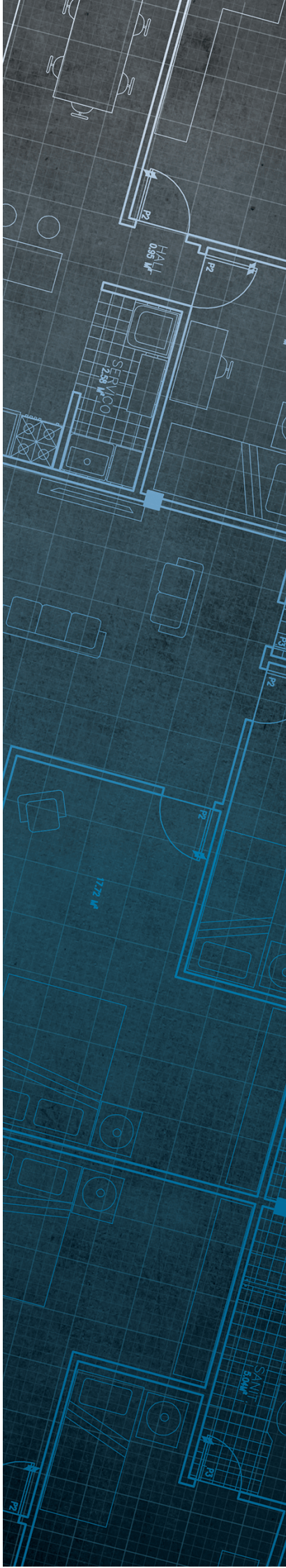
The Coal Authority

Consultants

Coal Mining Report

Malt Kiln Farm
104 High Street
Royston
Barnsley
S71 4RN

Date of enquiry:	**16 February 2021**
Date enquiry received:	**16 February 2021**
Issue date:	**16 February 2021**
Our reference:	**51002383250001**
Your reference:	**C1468/21/E/2332**



Consultants

Coal Mining Report

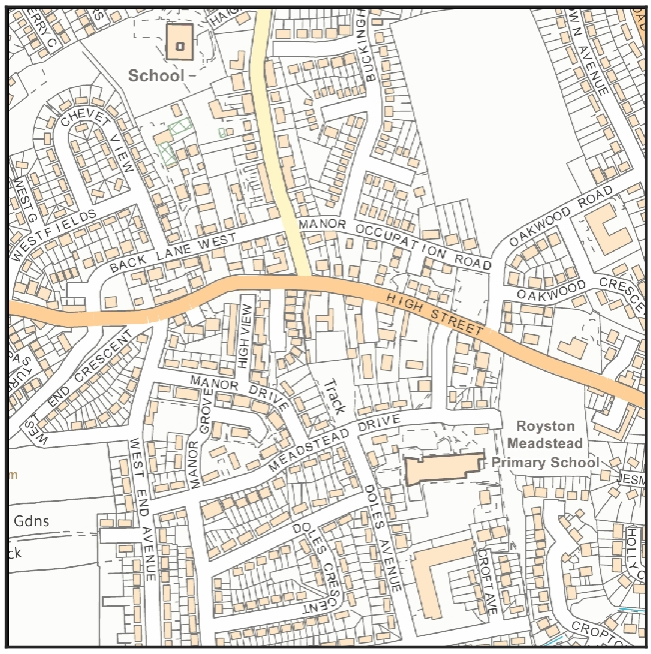
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

ROGERS GEOTECHNICAL SERVICES LTD

Enquiry address

Malt Kiln Farm
104 High Street
Royston
Barnsley
S71 4RN



Approximate position of property

Map data

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Mansfield
Nottinghamshire
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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
unnamed	LOW BARNSLEY	Coal	652K	276	North-West	1.2	East	157	1916
unnamed	LOW BARNSLEY	Coal	652J	403	Beneath Property	4.9	North-East	161	1908
unnamed	LIDGETT	Coal	6530	417	North-West	4.6	North-East	82	1944
unnamed	LIDGETT	Coal	652Z	417	South-East	4.6	North-East	71	1945
unnamed	LIDGETT	Coal	6531	424	North	5.0	East	79	1950
unnamed	LIDGETT	Coal	6532	432	North	5.0	South-East	82	1946
unnamed	FENTON	Coal	6533	512	West	4.1	North	180	1977
WOOLLEY	FENTON	Coal	R47	523	North	4.1	South-East	161	1980
WOOLLEY	FENTON	Coal	R46	529	North-West	4.1	South-East	185	1980
unnamed	MIDDLETON MAIN	Coal	6535	564	North-West	6.1	South-East	84	1972

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:

NE158	NE534	NE491
SY72	SY73	SY69
NE695	NE1033	SY71

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

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
SHARLSTON TOP	Coal	Yes	49.9	South	101

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded 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
None recorded within 50 metres of the enquiry boundary.

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 1977.

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.

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.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.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 **call us on 0345 762 6848** or **email us at groundstability@coal.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.

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.

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The Coal Authority

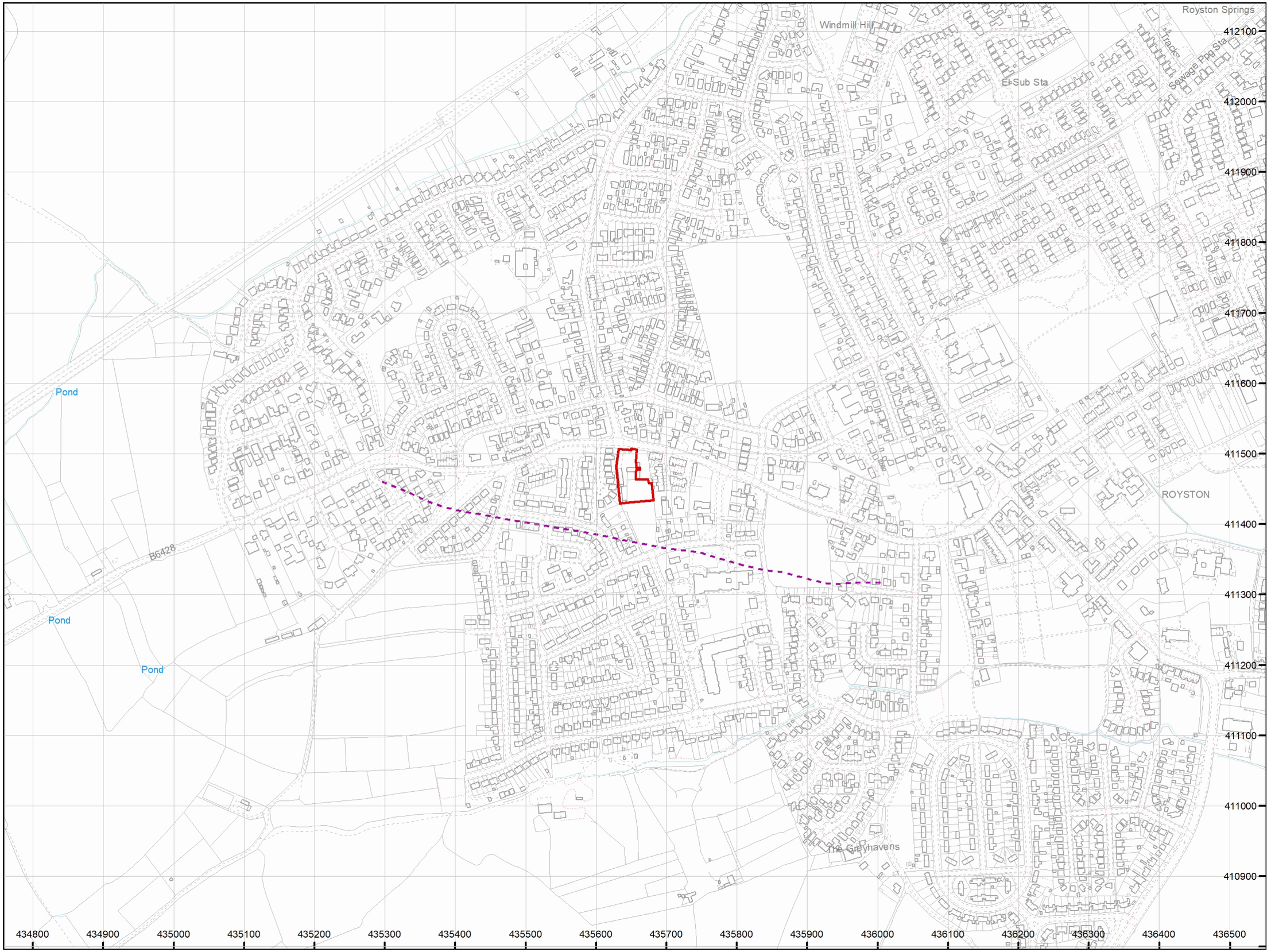
Summary of findings

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 (Conjectured)



How to contact us
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