SLADEN ASSOCIATES

COAL MINING RISK ASSESSMENT
Proposed New Porch
Dilhorne Recreation Centre
New Road
Dilhorne
Staffordshire

Prepared for

Hewitt & Carr Architects

Date : August 2023 **Job No : 23 2607**

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Proposed New Porch
Dilhorne Recreation Centre
New Road
Dilhorne
Staffordshire

Prepared for: **Hewitt & Carr Architects**

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REPORT No 23 2607

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1 INTRODUCTION

1.1 GENERAL

Hewitt & Carr Architects have instructed Sladen Associates to carry out a Coal Mining Risk Assessment for a proposed new porch at the existing Dilhorne Recreation Centre.

The assessment included a study of publicly available documentary sources concerning site history, geology and mining activities in the area but included no intrusive investigation. This report presents the results of the assessment together with recommendations for precautions that should be taken as part of the site re-development.

The present report is concerned only with precautions related to potential mining legacy issues. Other geotechnical issues, such as assessment of bearing capacity of near surface soils and potential geo-environmental issues, are not considered.

1.2 LOCATION AND PROPOSED DEVELOPMENT

The site lies to the east of New Road, some 4 km west of Cheadle town centre at National Grid Reference 3973 3435, see Figures 1 and 2. The site is currently occupied by the existing recreation centre building, which will remain. The site is accessed off a long driveway from New Road. It is proposed to construct a new porch on the eastern site of the existing building. The currently proposed layout is shown in Figure 3. No other development is currently envisaged.

2 SOURCES OF INFORMATION

Sources of information consulted for the present study included the following:

- Coal Authority Report.
- Historical Ordnance Survey Mapping.
- Geological Mapping published by the British Geological Survey at 1:10,000 and 1:50,000 scales.
- The Geology of the North Staffordshire Coalfields. Memoirs of the Geological Survey. 1905.
- The Geology of the Country around Ashbourne and Cheadle. Memoir of the Geological Survey, 1989.
- Online mapping published by the Coal Authority
- Chester, H A. 2002. The History of the Cheadle Coalfield Staffordshire. 2nd Ed. Landmark Publishing Ltd.

3 THE SITE

3.1 HISTORY

Copies of selected relevant early historical Ordnance Survey (OS) maps are included in Appendix A, for reference.

At the time of the first Ordnance Survey in 1880, the site lay within the curtilage of Dilhorne Hall and included several outbuildings. A short escarpment is shown along the southern site boundary, with ground levels rising to the south. No evidence of underground mining activity is apparent in the vicinity of the site.

The route of New Road was already an established thoroughfare to the west.

The hall and most of the outbuildings were removed between 1924 and 1945, by which time a club building had been constructed on site, part of a Welfare Institute. Two hydraulic rams are shown a little way to the north of the site, presumably for irrigation purposes.

3.2 GEOLOGY

Large-scale mapping published by the British Geological Survey shows the site to be underlain by solid strata of the Chester Formation, part of the Sherwood Sandstone Group, of Permo-Triassic Age. The Chester Formation comprises mainly sandstones and conglomerates. The Sherwood Sandstone at this location forms part of an outlier and is underlain unconformably by Coal Measures Strata. Based on the record of a borehole a little way to the north of the site, the thickness of the Permo-Triassic strata is about 30 m. Locally the Chester Formation is underlain by the Pennine Lower Coal Measures of Carboniferous Age. The Lower Coal Measures strata would be expected to comprise mainly weak mudstones with some sandstone units and coal seams.

Based on the available mapping, the following downward sequence of coal seams would be anticipated below the site.

Seam	Approximate Depth (m)		Thickness (m)
	Below Base of Permo-Triassic Sandstone	Below Ground Level at Proposed Porch Location	
Little Dilhorne Coal	10	40	0.7
Dilhorne Coal	20	50	1.5
Alecs (or Bullhurst) Coal	85	115	1.0 to 2.4
Foxfield Coal	95	125	0 to 0.5
Mans Coal	115	145	0 to 0.6
Cobble Coal	145	175	0.1 to 0.8
Woodhead Coal (King)	200	230	0.9

There are further, deeper seams.

The solid strata in the area are shown to be overlain by natural superficial soils comprising glacial clay till but the drift cover is likely thin, and some sandstone outcrops are marked in the area.

3.3 MINING

There is record of mining in two seams of coal below the site at 115 m depth (Bullhurst or Alecs Coal) and at 216 m depth (King or Woodhead Coal0, the last date of working being 1957. The Coal Authority have no records of shallow workings below the site but have indicated that the property is in an area where it is possible that there could be

unrecorded shallow workings. This is not consistent with the anticipated geology as discussed above. Although there may be workings at relatively shallow depth below the base of the Permo-Triassic strata, the local thickness of the Permo-Triassic rocks would mean that depths to seams of potential economic interest would exceed 30 m.

Mining in the local area required pumping, 'water engines', to maintain dry conditions (Chester 2002).

The Coal Authority has no record of mine entries on or within 20 m of the site area, however, there is some potential for unrecorded mine entries in the area.

4 SITE SPECIFIC RISK ASSESSMENT

4.1 KNOWN AND POTENTIAL HAZARDS

There are no known shallow underground mineral workings below the site. There is record of deep workings in two seams, but any significant ground movements associated with known or potential unrecorded workings deeper than about 25 m should have stopped by now. Given the expected thicknesses and anticipated depths of any shallower seams of potential economic interest, unrecorded workings in those seams would also not represent a significant hazard.

There is no evidence of mine entries within 20 m of the site. The possibility of old unrecorded mine entries in the general area cannot be completely discounted.

The property does not lie within 500 m of any former or current opencast mining sites.

The Coal Authority is not aware of any evidence of damage arising in the area due to geological faults or other lines of weakness that have been affected by coal mining. No faulting is shown in the area of the site on the available geological mapping.

The Coal Authority has no record of mine gas emissions in the area requiring action but given the possible presence of relatively shallow workings, mine gas should be considered a potential hazard for more detailed risk assessment.

There are no recorded claims for mining subsidence related damage within 50 m of the site.

4.2 ASSOCIATED RISKS

4.2.1 SUBSIDENCE RISKS

The proposed small footprint new porch would not be highly sensitive to minor ground movements. There are no records of shallow mining below the site reported by the Coal Authority and assessed depths to seams of potential economic interest that could possibly have been worked in the past are such that the associated risks of future subsidence sufficient to cause significant damage to the new porch are judged to be very low.

There is some potential for unrecorded mine entries to be present in the area. Abandoned mine entries can potentially include large voids, for example where timber staging within a shaft has prevented fill materials from falling to the base of the shaft. Subsequent collapse of any overlying fill can lead to a void at the surface, which could be a significant hazard to users of the immediate area. Collapse of shaft lining materials can potentially result in subsidence over an area larger than the original shaft diameter and which could potentially cause damage to nearby structures. The maximum credible radius of such a feature is usually assumed to be less than the depth of unconsolidated deposits surrounding the shaft plus the shaft radius. In the present case, based on published mapping, depth to bedrock is likely to be relatively shallow. In view of this and

given the relatively low frequency of such events the associated risk level is judged to be low.

Local differential subsidence due to fault or other discontinuity activation by mining would be expected to occur during or shortly after the mining operations. Given the time since any known workings were undertaken or unrecorded workings would have been undertaken below the site, the risk of fault reactivation by mining subsidence related to past mining is judged to be very low. The potential for new deep mining in this area is very low.

4.2.2 MINE GAS RISKS

The proposed non-residential porch structure would not be sensitive to ground gas emissions as ventilation would be high during occupation. There is expected to be a significant thickness of mudstone above any unrecorded mine workings. Any workings in this area would have subsequently become flooded following abandonment. . The general absence of open dry voids reduces the potential for accumulation of significant volumes of oxygen-depleted gas and gas emissions. The saturated mudstone would be effectively impermeable to advective gas flow both vertically from underground workings and horizontally from any nearby mine shafts or fault zones. Given the temperate climate, mudstones would be effectively saturated, even above the groundwater table.

In view of these factors, risks associated with mine gas to the present proposed development are judged to be very low.

4.2.3 RISK SUMMARY

Based on a consideration of the anticipated depths, thicknesses and potential age of workings associated with the main mineral seams below the site, the following presents a summary of assessed risks related to the mining legacy:

Hazard	Potential Consequence	Resultant Risk of Future Surface Ground Movements/Gas Emissions Sufficient to Cause Significant Damage or of Explosion or Significant Risk to Site Users
Possible unrecorded workings.	Differential subsidence due to void migration or collapse/consolidation of old workings	Very Low
Recorded workings.	Differential subsidence due to void migration or collapse/consolidation of old workings	Very Low
Unrecorded Mine Entries	Collapse resulting in damage or harm	Low
Faults and Fissures	Local differential subsidence	Very Low
Mine Gas	Emissions leading to explosion or acute health effect.	Very Low

5 PROPOSED MITIGATION STRATEGY

Based on this assessment, no additional intrusive investigation is considered necessary to mitigate risks associated with potential shallow mine workings.

The possibility of old un-recorded mine entries being present on site cannot be ruled out. Care should be taken during ground works to observe conditions encountered during site

works. Any local areas of unusually deep made ground or other evidence of potential mine entries, such as brick or timber lining materials, should be investigated. If any unrecorded mine entries are encountered, following further risk assessment, the potential need for some further precautions, such as drilling and stabilisation of the entry and/or relocation of the structures, should be assessed by a suitably qualified engineer.

6 CONCLUSIONS

There are no known shallow workings below the site and anticipated depths to seams of potential economic interest and potential dates of mining are such that any known or unrecorded workings below the site would pose very low risk to the proposed new porch. No further intrusive investigation is considered warranted.

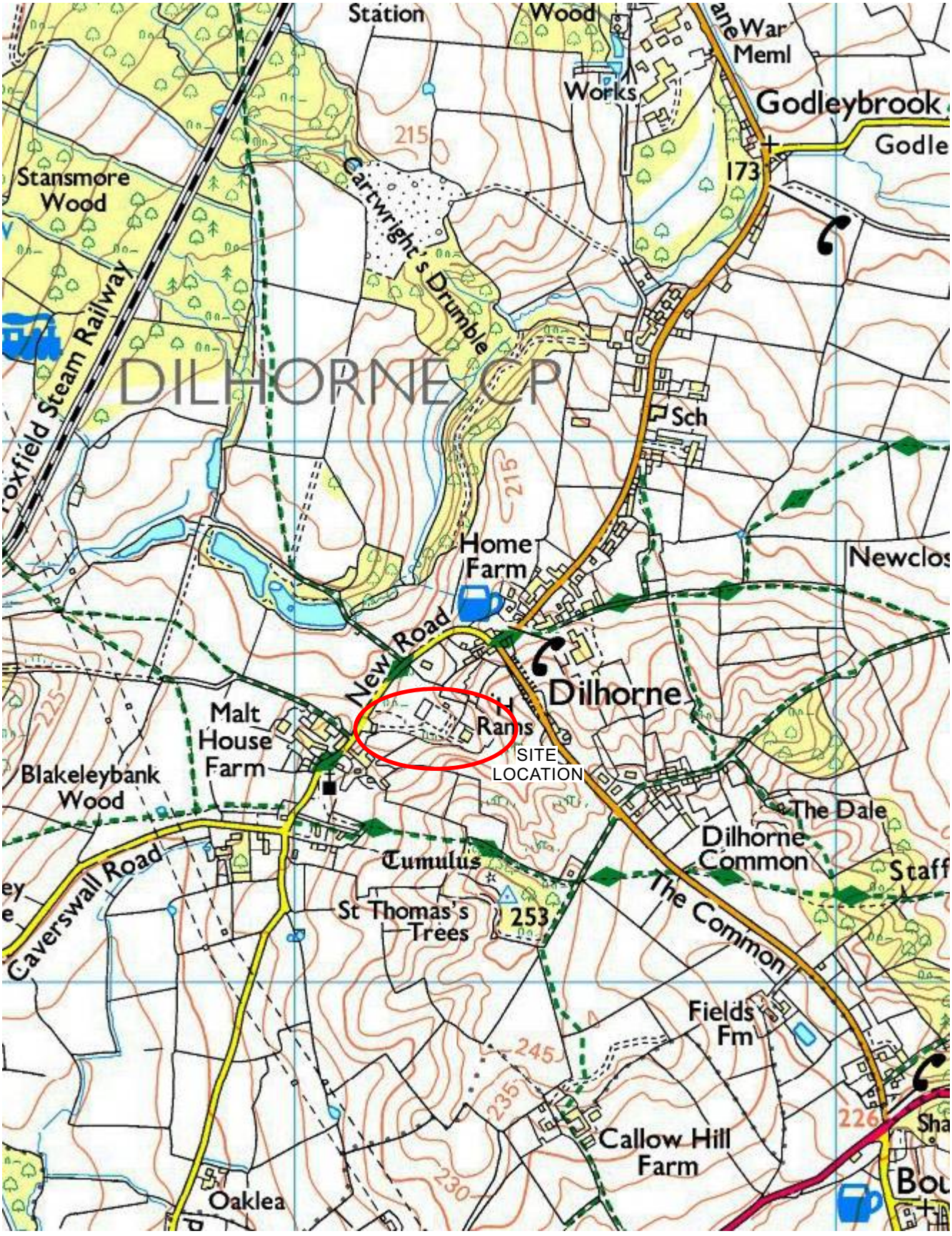
Risks associated with mine gas are also judged to be very low and no special precautions are considered warranted.

The present study has shown no reason why mining legacy issues would preclude safe development of the site for the proposed usage.

Report Prepared by:

J A Sladen BSc, MSc, CEng, CEnv, MICE, FGS

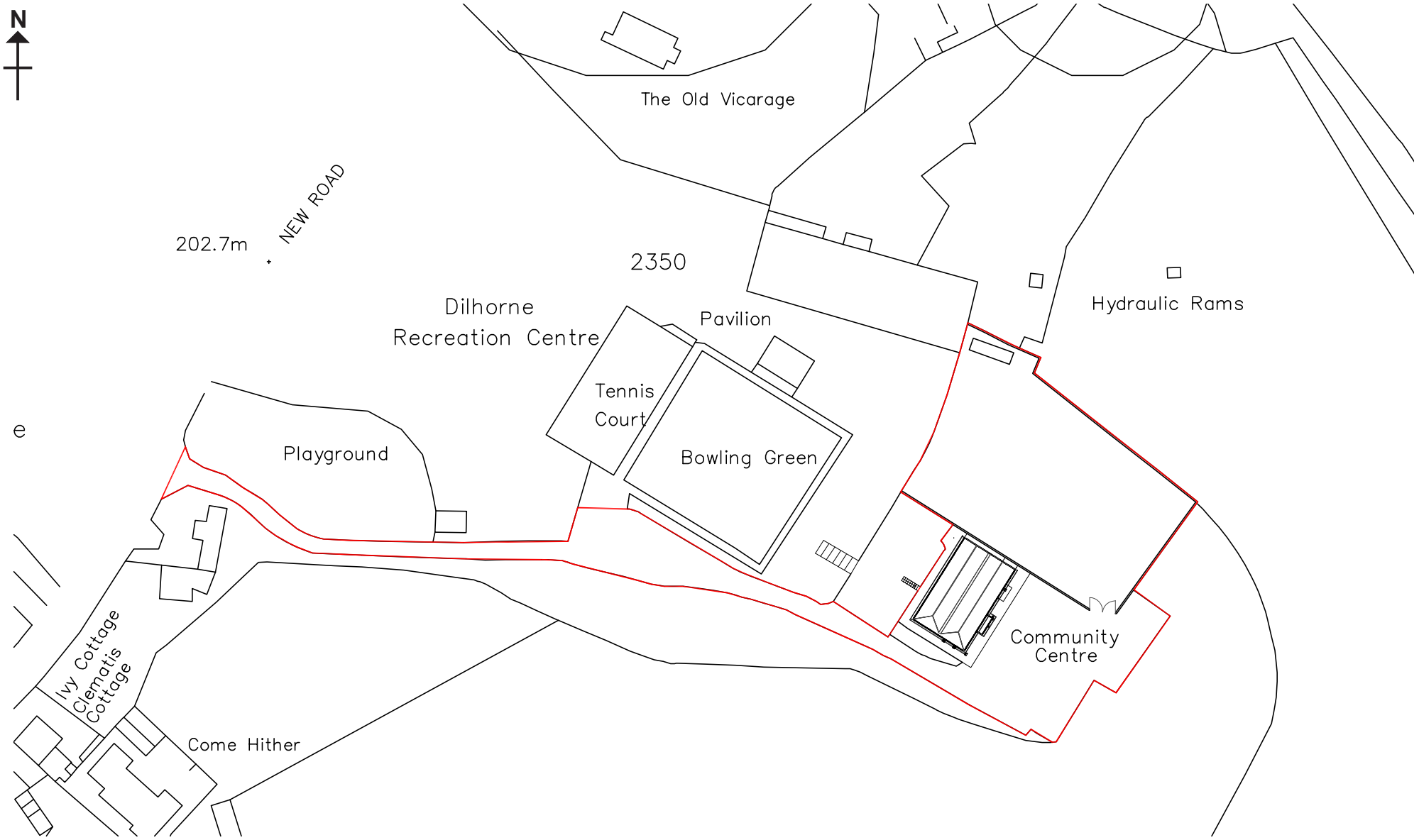
FIGURES



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SITE LOCATION PLAN

SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre New Road Dilhorne	Figure **1**



SITE LAYOUT PLAN

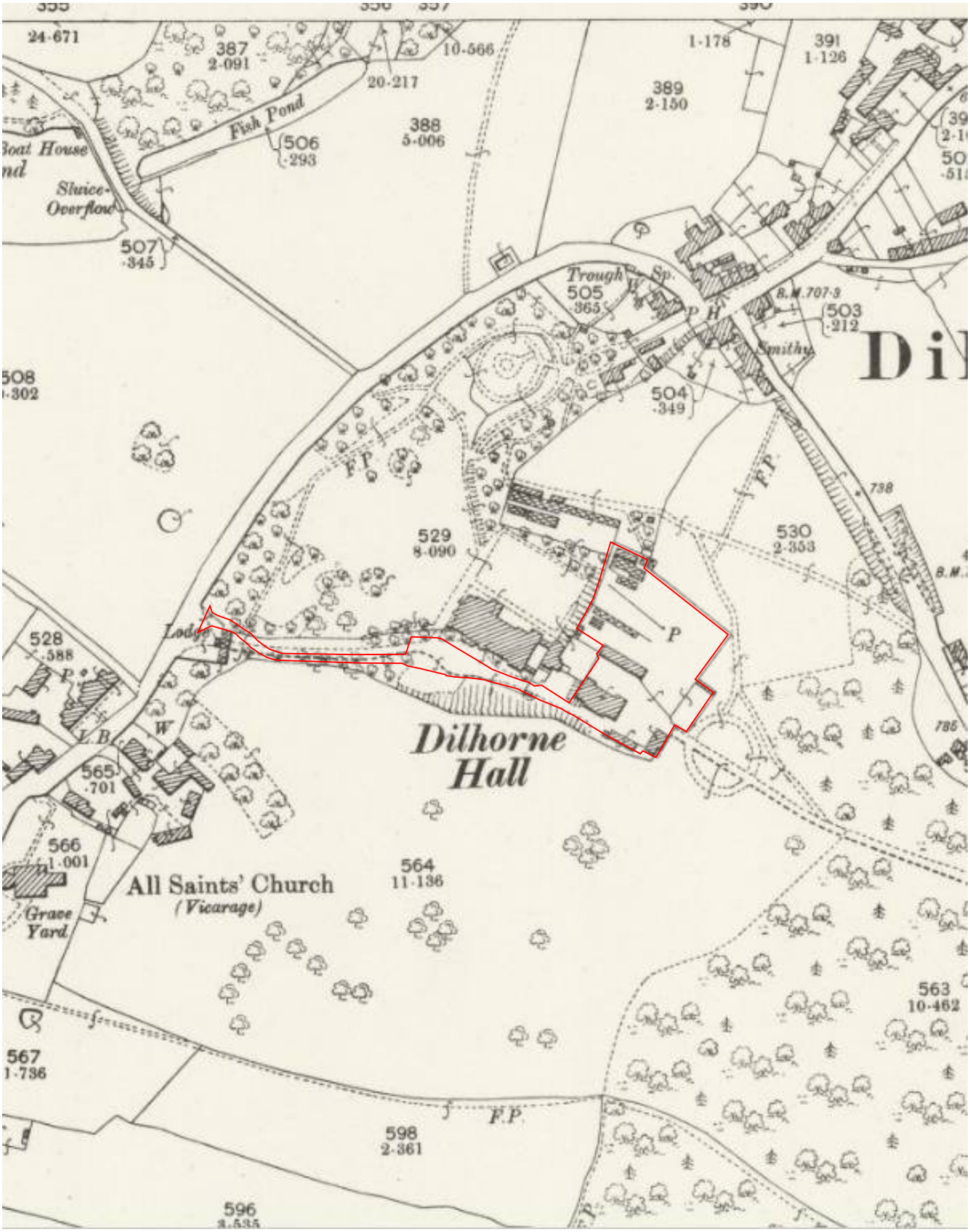
SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre, New Road, Dilhorne	Figure **2**



PROPOSED SITE LAYOUT PLAN

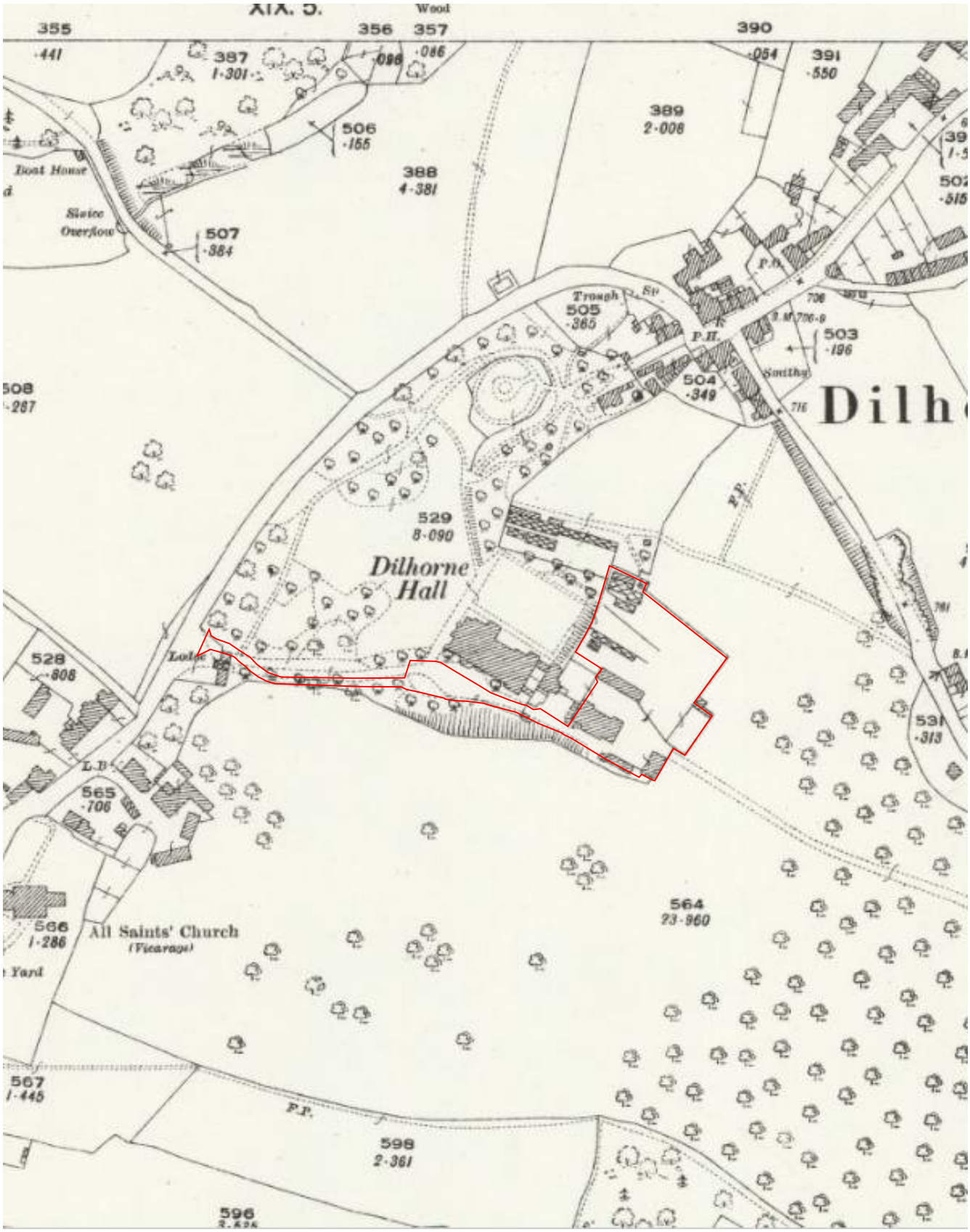
SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre, New Road, Dilhorne	Figure **3**

APPENDIX A
HISTORICAL MAPS



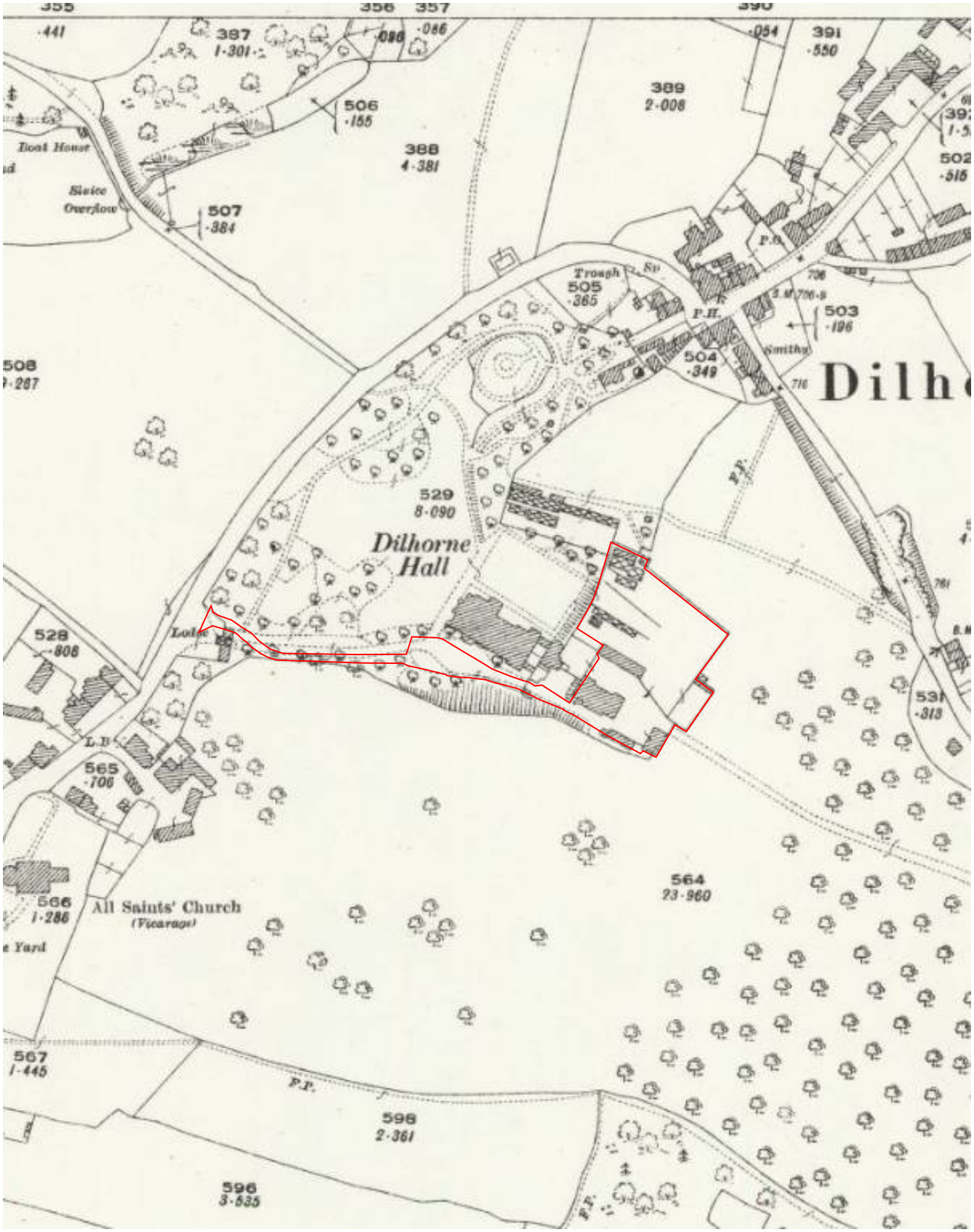
THE SITE AREA IN 1880

SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre New Road Dilhorne	Figure **A1**



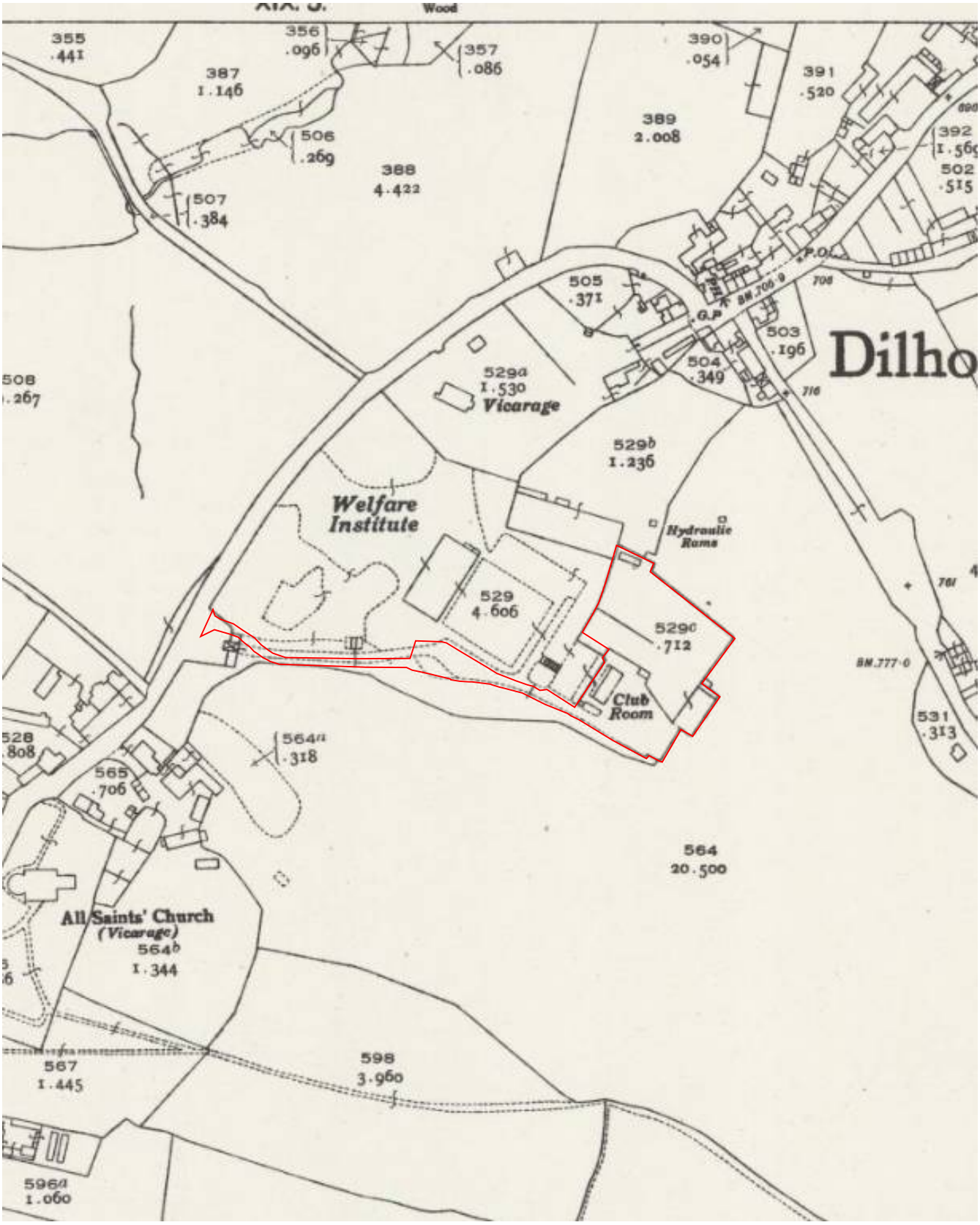
THE SITE AREA IN 1899

SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre New Road Dilhorne	Figure **A2**



THE SITE AREA IN 1924

SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre New Road Dilhorne	Figure **A3**



THE SITE AREA IN 1939 - 1945

SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre New Road Dilhorne	Figure **A4**



THE SITE AREA IN 1954

SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre New Road Dilhorne	Figure **A5**



THE SITE AREA IN 1966

SLADEN ASSOCIATES	Report No 23-2607	Project Dilhorne Recreation Centre New Road Dilhorne	Figure **A6**

APPENDIX B
COAL AUTHORITY REPORT

The Coal Authority

Consultants

Coal Mining Report

Dilhorne Recreation Centre
New Road
Dilhorne
Staffordshire
ST10 2PQ

Date of enquiry:	**1 August 2023**
Date enquiry received:	**1 August 2023**
Issue date:	**1 August 2023**
Our reference:	**51003369966001**
Your reference:	**23-2607**



Consultants

Coal Mining Report

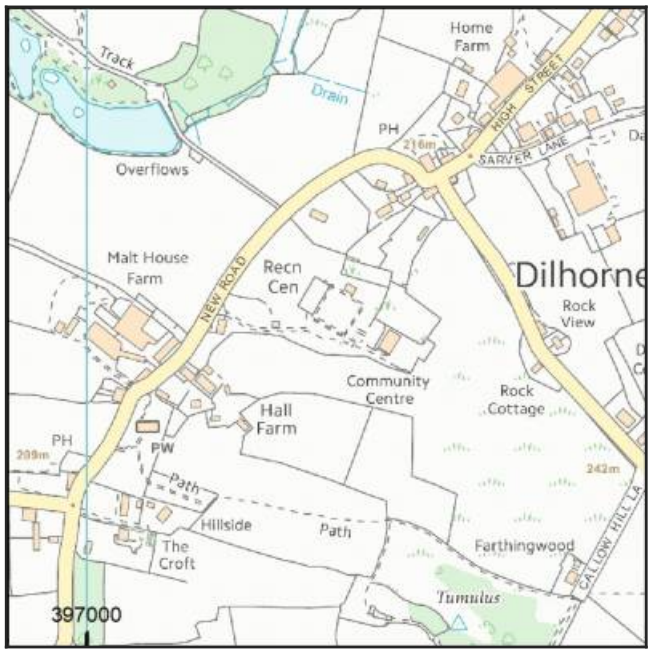
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

SLADEN PARTNERSHIP LTD

Enquiry address

Dilhorne Recreation Centre
New Road
Dilhorne
Staffordshire
ST10 2PQ



Approximate position of property

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Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

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	BULLHURST	Coal	PR79-241	115	Beneath Property	7.6	East	130	1957
unnamed	KING	Coal	PR79-30	216	Beneath Property	8.2	East	91	1937

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:

WM353		

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

Outcrops

No outcrops recorded.

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.

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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.

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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 not in an area where a notice to withdraw support has been given.

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.

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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.

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.

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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.

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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.

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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

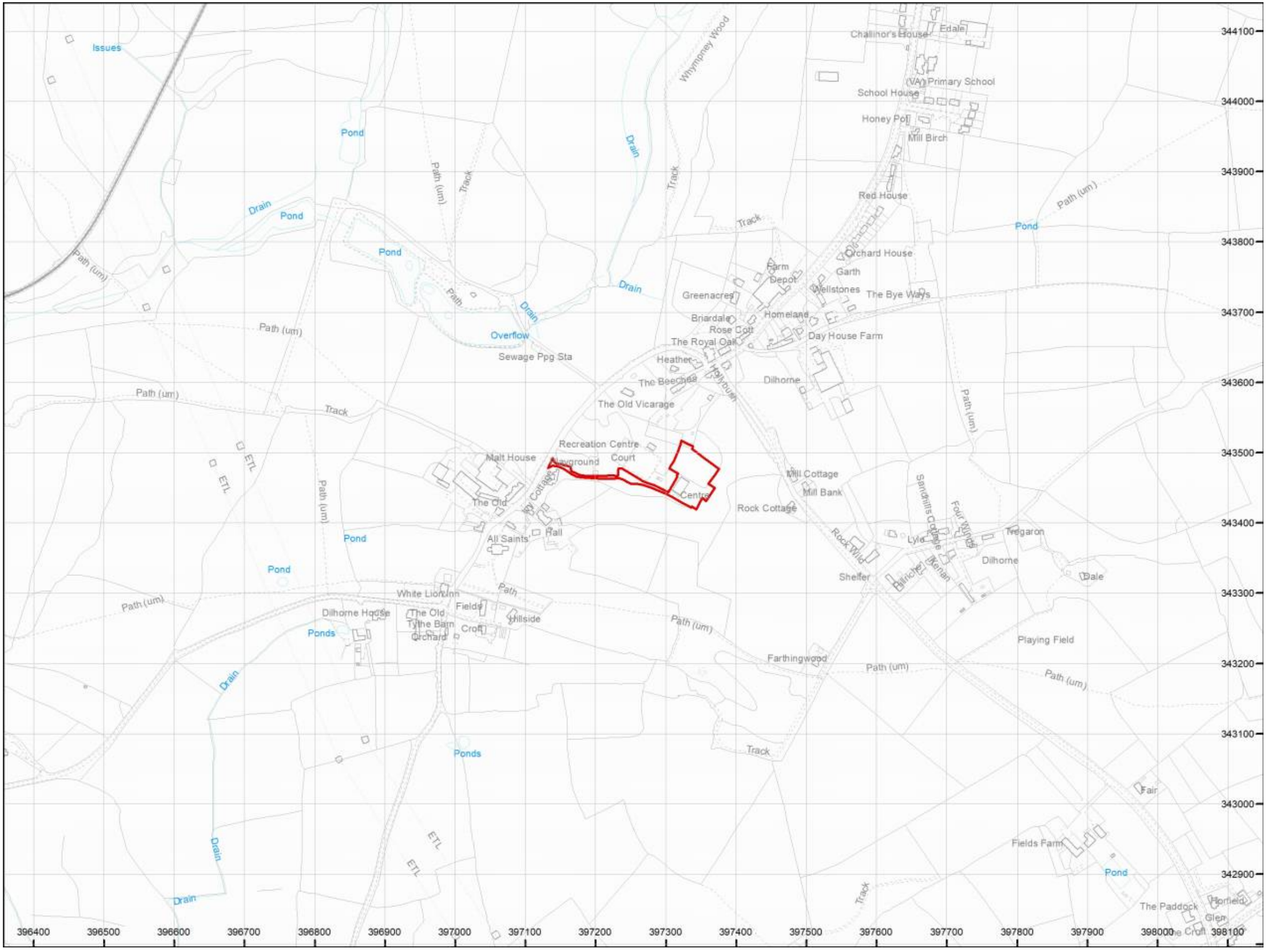
Summary of findings

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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



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+44 (0)1623 637 000 (International)
www.groundstability.com