



Coal Mining Risk Assessment

Little Cedars Montessori Nursery

42 Cedar Road

Whiston

L35 2XA

Date: 4th August 2025

Version 1

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Document Verification

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Report Title	Coal Mining Risk Assessment		
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1 Introduction

1.1 Site Location and Description

The site for the proposed outbuilding/ extension for storage and office use is located at Little Cedars Montessori Nursery, 42 Cedar Road, Whiston, L35 2XA. The British National Grid Reference for the approximate site centre is GR: 346845 391440.

The site is rectangular in shape and covers an area of approximate 620 square metres, although the size of the extension is considerably smaller. The site is currently occupied by a single storey children's nursery which is present in the southern half, with an outdoor play area in the northern half.

The site slopes gently towards the north from 46m aOD to 44m aOD.

The surrounding land use is predominantly residential in nature.

A plan showing the location of the site is shown in **Figure 1**.

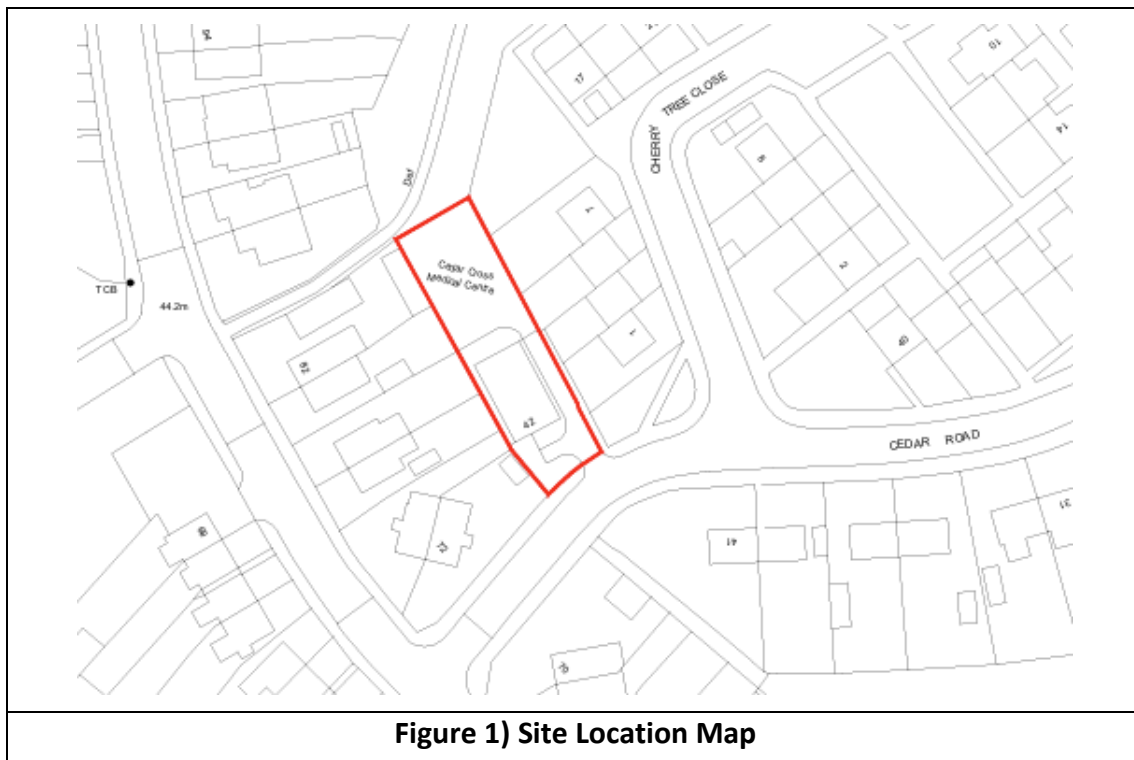


Figure 1) Site Location Map

1.2 Development Proposal

It is understood that the development proposal includes the construction of a single storey rear extension to include an indoor play space and toilet/ changing facility.

The proposed development plans are included in **Figure 3 in Appendix A**.

1.3 Scope of Coal Mining Risk Assessment

EnviroSolution Ltd has been commissioned to prepare a Coal Mining Risk Assessment Report (CMRA) for the proposed development site, in order to provide the Local Planning Authority with information on the coal mining legacy risk(s), an assessment of their potential impact on land stability, and provide recommendations for the need to carry out any further investigations (including intrusive boreholes) to address these risk(s).

The CMRA has been undertaken in accordance with the principles of best practice including the Mining Remediation Authority's guidance document "Risk Based Approach to Development Management - Resources for Developers Version 3" (2014) (Ref. 1), CIRIA "SP32 Construction over Abandoned Mine Workings" (2002) (Ref. 2) and CIRIA "C758D Abandoned Mine Workings Manual" (2019) (Ref. 3), CIRIA, Publication C665, Assessing risks posed by hazardous ground gases to buildings (Ref. 4) and CL:AIRE "Good Practice for Risk Assessment for Coal Mine Gas Emissions", October 2021 (Ref. 5).

The purpose of the CMRA Report is to:

- present a desk-based review of available information on the coal mining issues that are relevant to the application site;
- use that information to identify and assess the risks to the proposed development from coal mining legacy, including the cumulative impact issues;
- set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development; and
- demonstrate to the Local Planning Authority that the application site is, or can be made, safe and stable to meet the requirements of National Planning Policy with regard to development on unstable land.

1.4 Sources of Information

This report is based on current information of past mining activities relevant to the site. The following information sources have been used:

- Consultants Mining Report dated 24th June 2025 (Ref: 51003513768001 **Appendix B**);
- BGS Geoindex geological map;
- BGS geological 1:50,000 England and Wales Sheet 97 Runcorn;
- Mining Remediation Authority Interactive Website;
- Historical Ordnance Survey maps;
- Planning Authority records;
- Third party reports.

2 Environmental Setting

2.1 Historic Coal Mining Activity

The development site and surrounding area has been reviewed with reference to historical Ordnance Survey (OS) maps and other sources including the Knowsley Council Archive Resources and Collieries of Britain, Northern Mine Research Society. The history of the site and immediate surrounding area are summarised in Table 1. Copies of the historical OS maps are included in **Appendix C**.

Records show that coal mining began as early as the mid-16th century in the Whiston area. During the 17th century more than 4000 tonnes were mined annually from surface and shallow pit operations. Shaft deepening took place during the late 18th century as railways and canals led to improved transport of mined coal.

Carrs Colliery, some 200m south of the site opened in 1769.

At the time, Whiston and Prescott were home to numerous small and changing pits — some opened and closed within a short span as they exhausted shallow seams. This probably included Stank and Prescott Collieries. Mining in the area was already well established by the mid-1800s with collieries like Whiston (1802), Halsnead (1802), and later Croston starting in 1915.

Carrs, Whitson and Halsnead Collieries all closed in the 1890s while Croston Colliery expanded and continued operation until 1984.

Table 1 - Historic Mapping Review

Date	Scale	Historic Mining Activity
1845	1:10,560	- The site is undeveloped and lies within a vacant plot of land. - Stank Colliery 260m east of the site.
1891	1:10,560	- Stank colliery demolished. - Carrs Colliery 200m southwest of the site. - Prescott Colliery 410m south of the site. - Colliery 750m southwest of the site. - Old quarry 560m southeast of the site.
1925	1:10,560	- Carrs and Prescott Colliery disused. - Quarry no longer marked on map. - Tushingham Metallic Brick Works located 730m south of the site.
1947	1:10,560	- Old shafts marked 200m southwest and 350m south of the site.

2.2 Geological Context

The BGS geological mapping (Geoindex and BGS Sheet 97 Runcorn) show that the site is underlain by superficial diamicton (till) sheet, which are of Quaternary age. Diamicton generally consists of overconsolidated unsorted clays, silts, sand and gravels.

The underlying bedrock consists of the Ravenhead Rock Member (sandstone facies) of Pennine Lower Coal Measures Formation, which is of Carboniferous age. The Pennine Lower

Coal Measures Formation generally consists of interbedded grey mudstones and siltstones with pale grey sandstones and numerous coal seams. According to the BGS, the bedrock has a regional dip of about 8-10° towards the south – **See Appendix D.**

The nearest geological fault is located approximately 370m west of the site boundary with an approximate trend of 040° (Whole Circle Bearing). The fault downthrows towards the west.

A number of BGS borehole records (SJ49SEB and SJ49SE336) has been obtained from BGS online records, located 170m southwest and 910m northwest of the site.

- Borehole SJ49SE8 shows mine records relating to Carrs Colliery and shows the recorded depths of several coal seams. The shallowest of which is the Tenlands Coal recorded at 50m bgl.
- Borehole SJ49SE336 shows 1.60m of Made Ground overlying stiff brown clay.

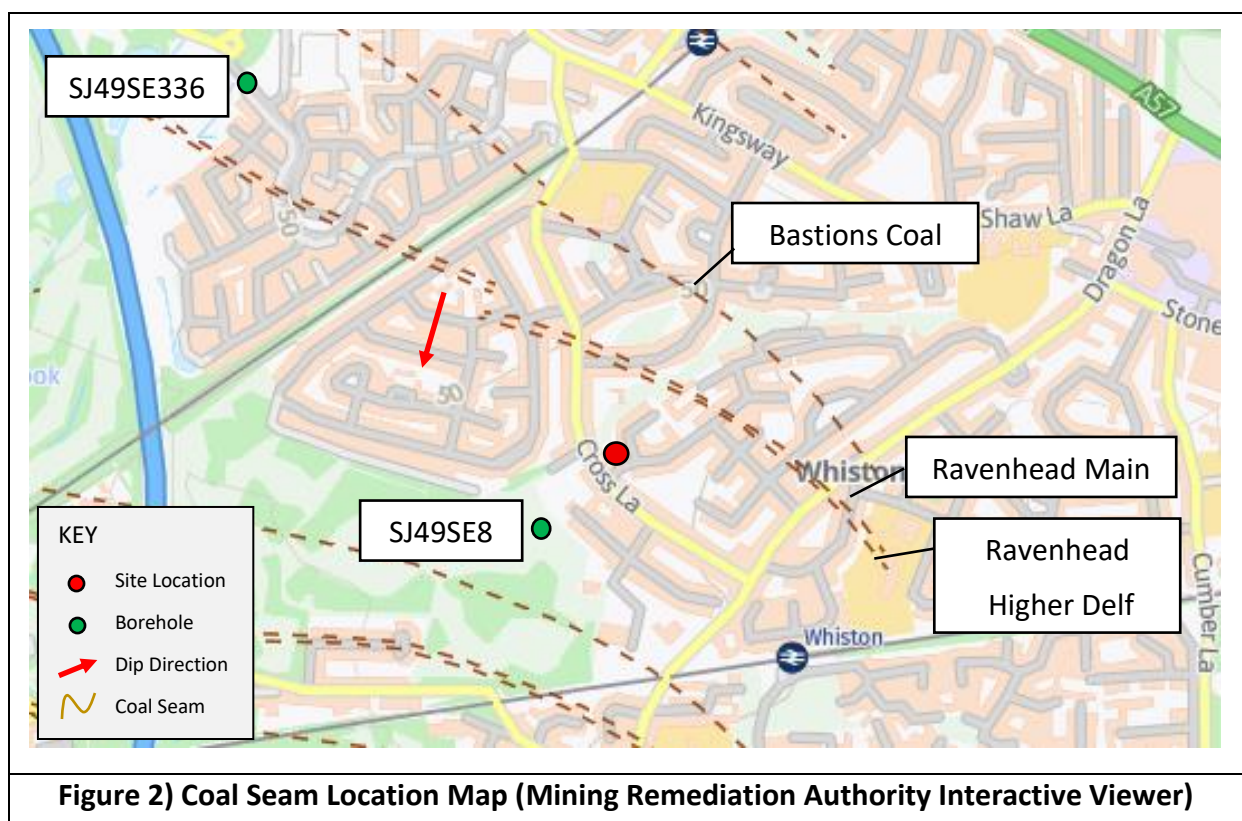
Coal outcrops are shown to be located to the northwest of the site (see **Figure 2**) that may be encountered at shallow depths beneath the site and could potentially have unrecorded abandoned workings.

The Tenlands Mine coal seam comprises of two leaves of coal. A BGS memoir covering the area indicated states that the Tenlands Mine comprises of the:

- Higher Ravenhead Delf - ≈1.20m thick; over
- A shale band - ≈1.30m thick; over the
- Main Ravenhead Delf - ≈2.15m thick.

Using the trigonometric relationship below, the depth of the Tenlands Mine Coal beneath the development site can be estimated:

$$\tan 9^\circ \times 150\text{m} + 4.5\text{m (superficial thickness)} = 28.25\text{m bgl}$$



The site is situated within a Primary Opencast Coal Resource Area (**Appendix F**). The Primary Opencast Coal Resource Area is defined by the BGS as “an area that constitutes the main target for opencast coal extraction and comprises a relatively closely spaced succession of variable but generally thick coals”. Notwithstanding this, it is considered to be very unlikely that there will be any interest in developing open cast coal mining operations at this location in the short or medium-term.

3 Third Party Reports

A number of third party ground investigation reports have been obtained from planning portal records.

The report referenced below can be found under planning application reference 24/00582/FUL with Knowsley Council.

- *24/00582 - CC Geotechnical Ltd, Phase I / Phase II Ground Investigation, Cross Lane / Carrs Terrace, CCG-C-18-10096, May 2024.*

The site area investigated includes a plot of land approximately 40m west of the site considered in this report. The reason for investigation was for a residential development. The area covered by this investigation is indicated in **Figure 3** below.

The site investigation included 13 no. window sample boreholes to depths of up to 5m bgl. Monitoring wells were installed in a total of 8 no. boreholes. A total of 6 no. rounds of monitoring were undertaken over 3 months.

The salient conclusions with regard to ground conditions are summarised below:

- Made ground is present in the majority of locations with a thickness between 1.0m and 5m. This Made Ground is associated with the sites previous use as a petrol filling station.
- Diamicton was recorded beneath the Made Ground extending to depths of approximately 4.50m bgl. The diamicton comprised grey slightly sandy clay.
- Bedrock was encountered at a depth of approximately and comprised sandstone in the eastern half and mudstone in the western half.
- Monitoring detected carbon dioxide concentrations ranging from 0.1% to 4.2%. No methane was detected. The site was classified as Characteristic Situation 1, and no gas protection measures were required.

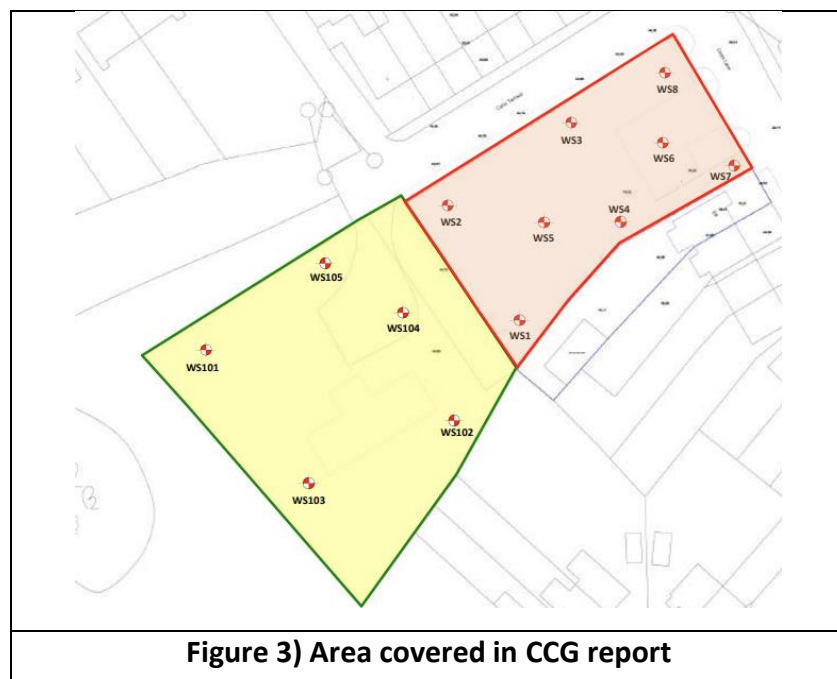


Figure 3) Area covered in CCG report

The report referenced below and can be found under planning application reference 16/00319/FUL with Knowsley Council.

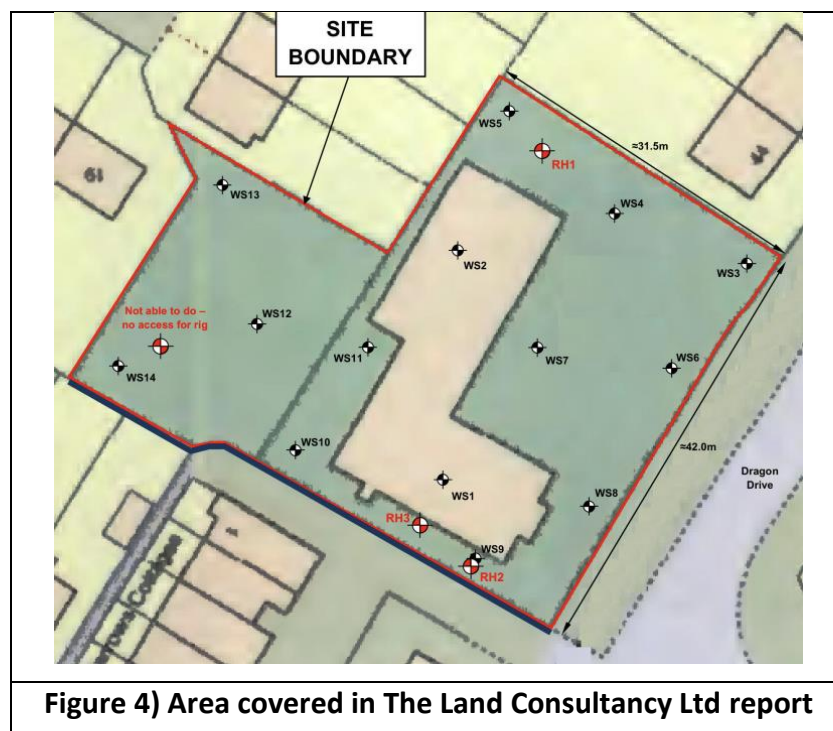
- 16/00319/FUL – *The Land Consultancy Ltd, Phase II Geo-Environmental Ground Investigation Works, Whiston Methodist Church, TLC714, June 2016.*

The site area investigated includes a plot of land approximately 270m southeast of the site considered in this report. The reason for investigation was for a residential development. The area covered by this investigation is indicated in **Figure 4** below.

The site investigation included 14 no. window sample boreholes to depths of up to 7m bgl and rotary boreholes to depths of up to 40m bgl. Monitoring wells were installed in a total of 3 no. boreholes.

The salient conclusions with regard to ground conditions are summarised below:

- Made ground is present in the majority of locations with a thickness between 0.90m and in excess of 7m. The localised area of significant Made Ground could be a mine entry or crown hole.
- Bedrock of the coal measures was encountered at depths of between 0.90m and 1.70m directly beneath the Made Ground.
- Very loose drilling, small voids and a complete loss of the water flush drilling medium were recorded by the rotary driller beneath the sandstone in RH1 (15.20-18.00m) and RH2 (24.20- 27.00m). The driller interpreted this zone as probable collapsed shallow coal workings. The geological map evidence indicates that the coal seam which would have been worked will have been the Tenlands Mine seam.
- Monitoring detected carbon dioxide concentrations ranging from 0.3% to 3.9%. No methane was detected.



4 Identification and Assessment of Site-Specific Coal Mining Risks

Table 2 below summarises the potential risks associated with coal mining legacy for the proposed development site, which have been identified from list sources of information.

Table 2 - Coal Mining Hazards Summary

Coal Mining Issues	Yes	No
Coal outcrops		X
Underground coal mining (recorded at shallow depths)		X
Underground coal mining (probable at shallow depths)	X	
Recorded mine entries (shafts and adits)		X
Unrecorded mine entries (shafts and adits)	X	
Coal mining geology (fissures)		X
Record of past gas emissions		X
Recorded coal mining surface hazard		X
Surface mining (opencast workings)		X

The Mining Remediation Authority Interactive Map Viewer (**Appendix G**) has identified that the site lies within a Development High Risk Area associated with the potential presence of unrecorded mine workings.

The report obtained from the Mining Remediation Authority (Consultants Mining Report, reference 51003513768001, dated 24th June 2025) revealed the property is in a surface area that is affected by recorded underground mining in 4 no. coal seams at depths of between 101m and 269m. The mine workings were last worked in 1895.

Using the generally accepted 'rule-of-thumb' guidance that a competent rock strata thickness equivalent to at least ten times the extraction thickness provides adequate protection against crown-hole development and surface instability (Refs 2 and 3), the mine workings will not present a risk of surface instability. A solid rock cover of at least 10 times the extraction thickness is achieved.

As presented in Section 2.2, a coal seam (Tenlands Mine in two separate leaves) located northeast of the site is likely to be present at shallow depths (estimated at 28.25m bgl). The potential extraction thickness is 4.65m and therefore, a competent rock cover above the workings would not be achieved and they could present a risk to surface stability.

The Mining Remediation Authority report states that they are not aware of any recorded mine entries within 100m of the development site boundary. Notwithstanding this, there may be mine entries in the vicinity that have not been recorded.

The Mining Remediation Authority report states that they are not aware of opencast coal mining within the immediate surrounding area.

There are no recorded past mining gas emissions recorded in the surrounding area, however, coal seams and coal mine workings pose a potential gas risk which should be considered in any future investigations and development. At development sites with shallow coal workings, probable shallow coal mine workings, or pathway features such as mine entries and geological disturbances on or nearby the site, it is recommended that a detailed gas risk assessment is undertaken in accordance with relevant guidance such as the CL:AIRE “Good Practice for Risk Assessment for Coal Mine Gas Emissions”, October 2021. However, nearby gas monitoring shows no indication of elevated concentrations of mine gases.

5 Proposed Mitigation Strategy

- The possibility of unrecorded mine shafts has been highlighted in the Mining Remediation Authority report. The potential risk can be dealt with through vigilance during the earthworks stage of construction.
- Given the limited nature of the development (single storey extension), the implementation of a suitable foundation solution (e.g., reinforced raft) should be sufficient to deal with the risk.

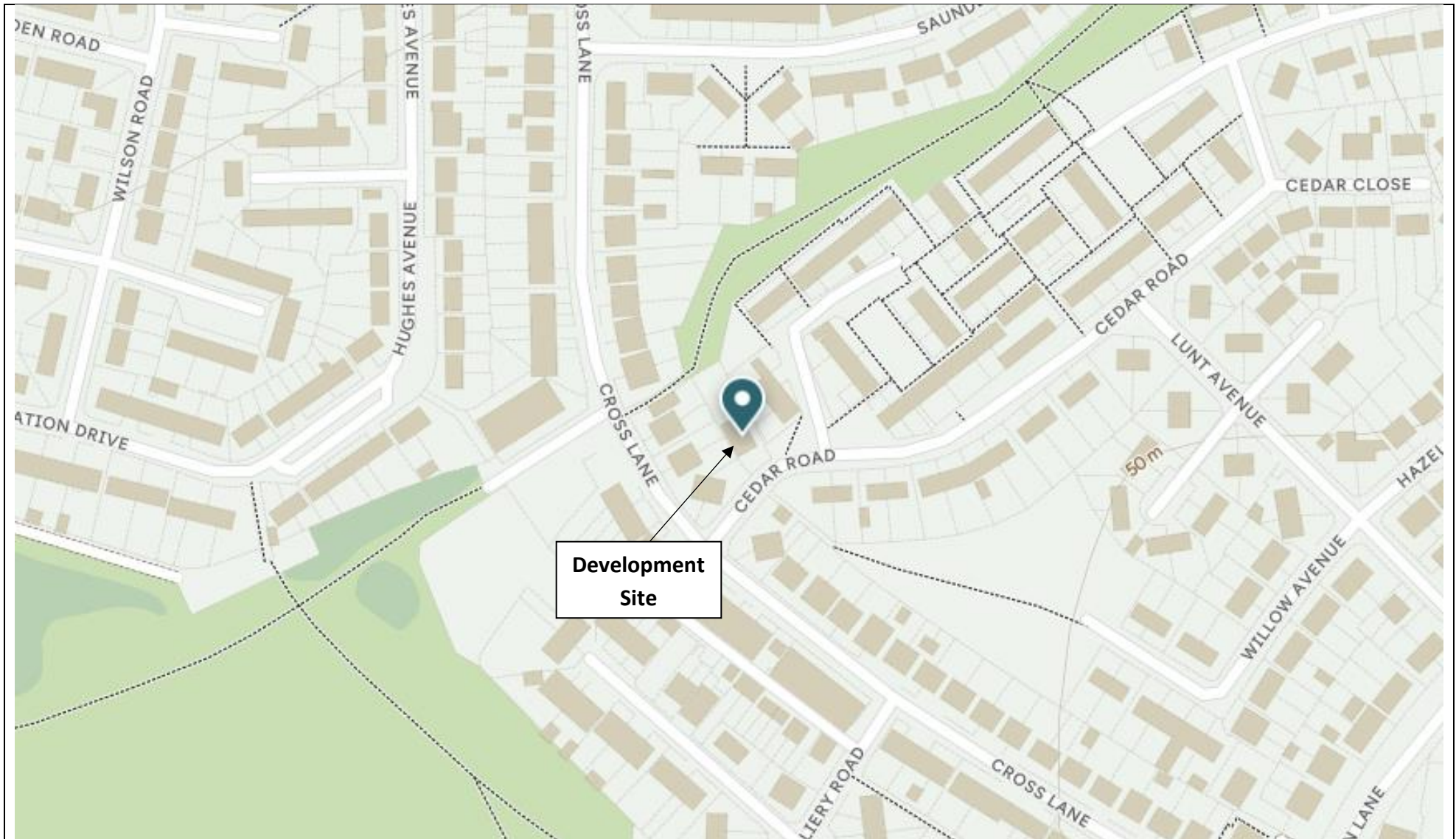
6 Conclusions

The Coal Mining Risk Assessment for the site at Little Cedars Montessori Nursery in Whiston has concluded that the risk associated with coal mining related stability issues cannot be ruled out based on information from the Mining Remediation Authority and geological interpretation but can be suitably mitigated through informed professional practice, vigilance during earthworks and the implementation of a suitably reinforced raft foundation to mitigate the effects of any future minor differential settlement.

7 References

1. Coal Authority, 2014, Risk Based Approach to Development Management Resources for Developers, Version 3.
2. CIRIA, 2002, SP32 Construction over Abandoned Mine Workings.
3. CIRIA, 2019, C758D Abandoned Mine Workings Manual.
4. CIRIA, Publication C665, Assessing risks posed by hazardous ground gases to buildings.
5. CL:AIRE, 2021, Good Practice for Risk Assessment for Coal Mine Gas Emissions.

Appendix A – Site Location



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Site Location Map



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Existing Site Plan



Appendix B – Mining Remediation Authority Report



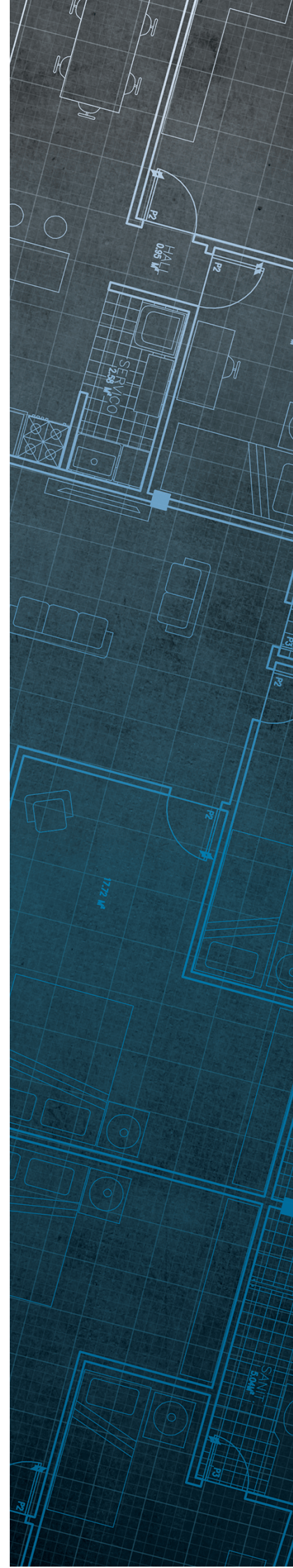
The Coal
Authority

Consultants Coal Mining Report

Little Cedars Montessori Nursery
42 Cedar Road
Whiston
Knowsley
L35 2XA

Date of enquiry: 24 July 2025
Date enquiry received: 24 July 2025
Issue date: 24 July 2025

Our reference: 51003513768001
Your reference: Little Cedars Montessori



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

EnviroSolution Limited

Enquiry address

Little Cedars Montessori Nursery
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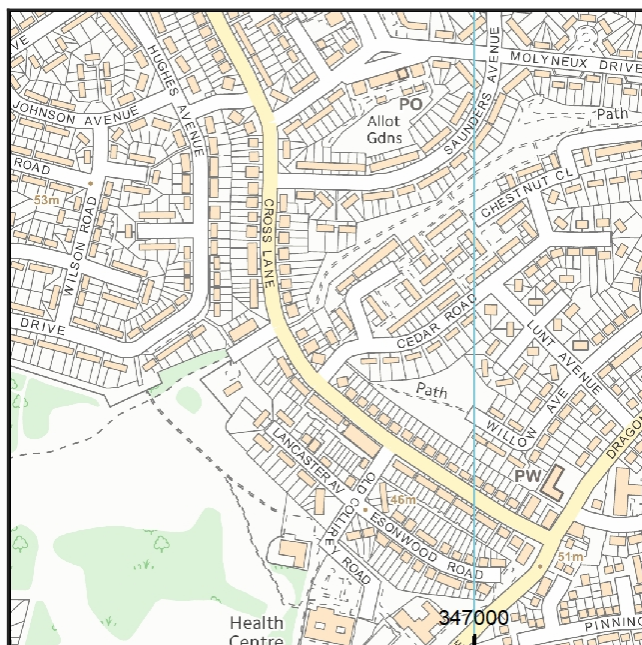
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 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



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
unnamed	SIR JOHN	Coal	300E	101	Beneath Property	9.3	South-West	60	1895
unnamed	PLODDER	Coal	300D	125	Beneath Property	9.5	South	240	1895
unnamed	RUSHY PARK	Coal	300F	224	Beneath Property	9.4	South	130	1892
unnamed	ARLEY	Coal	300K	269	Beneath Property	9.4	South-West	70	1895

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:

NW849	3466	16820
14928	3671	3612
NW822	NW315	2378

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.

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 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.

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.

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. 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

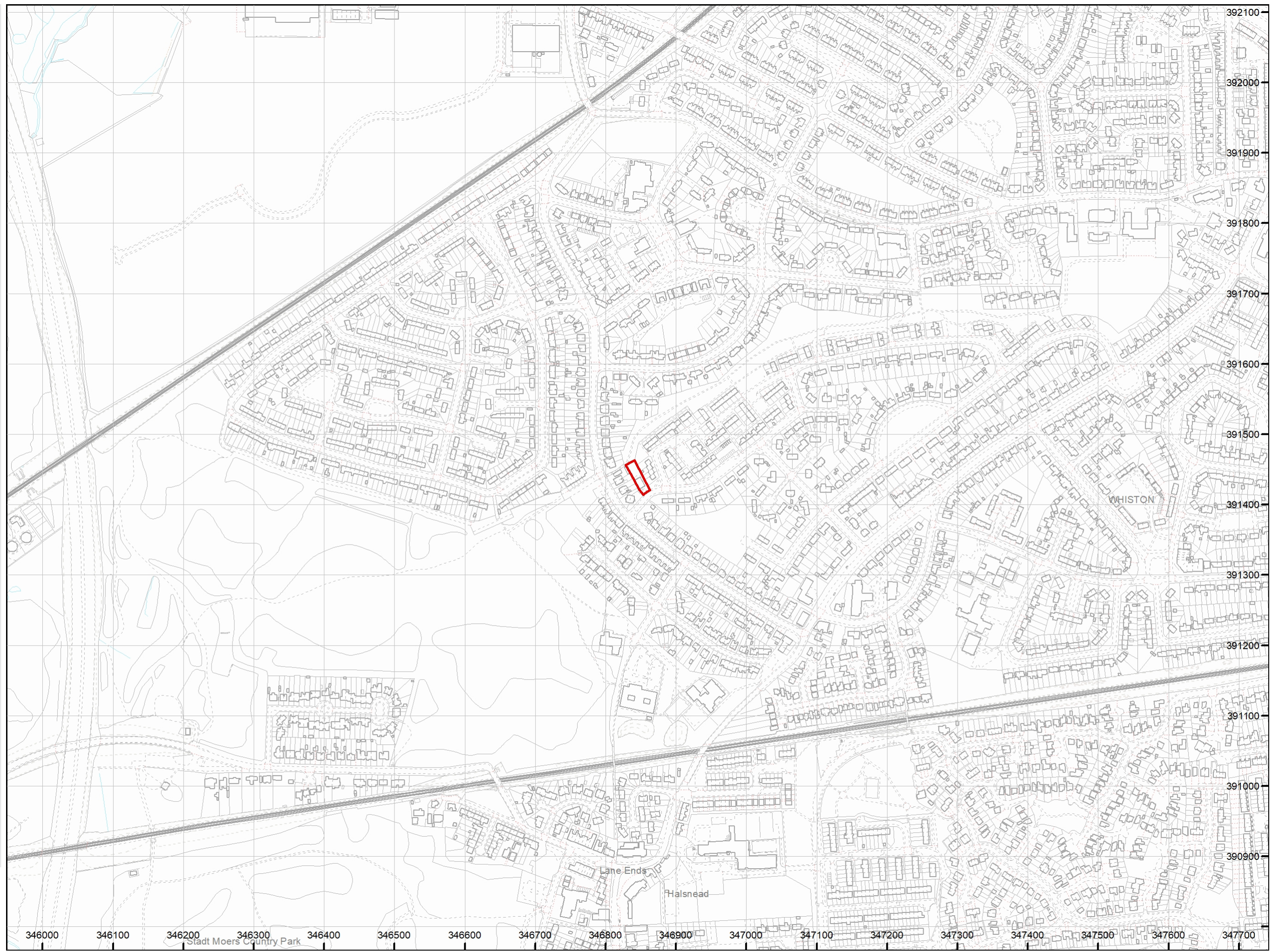
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

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 

How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com



Appendix C – Historic Maps



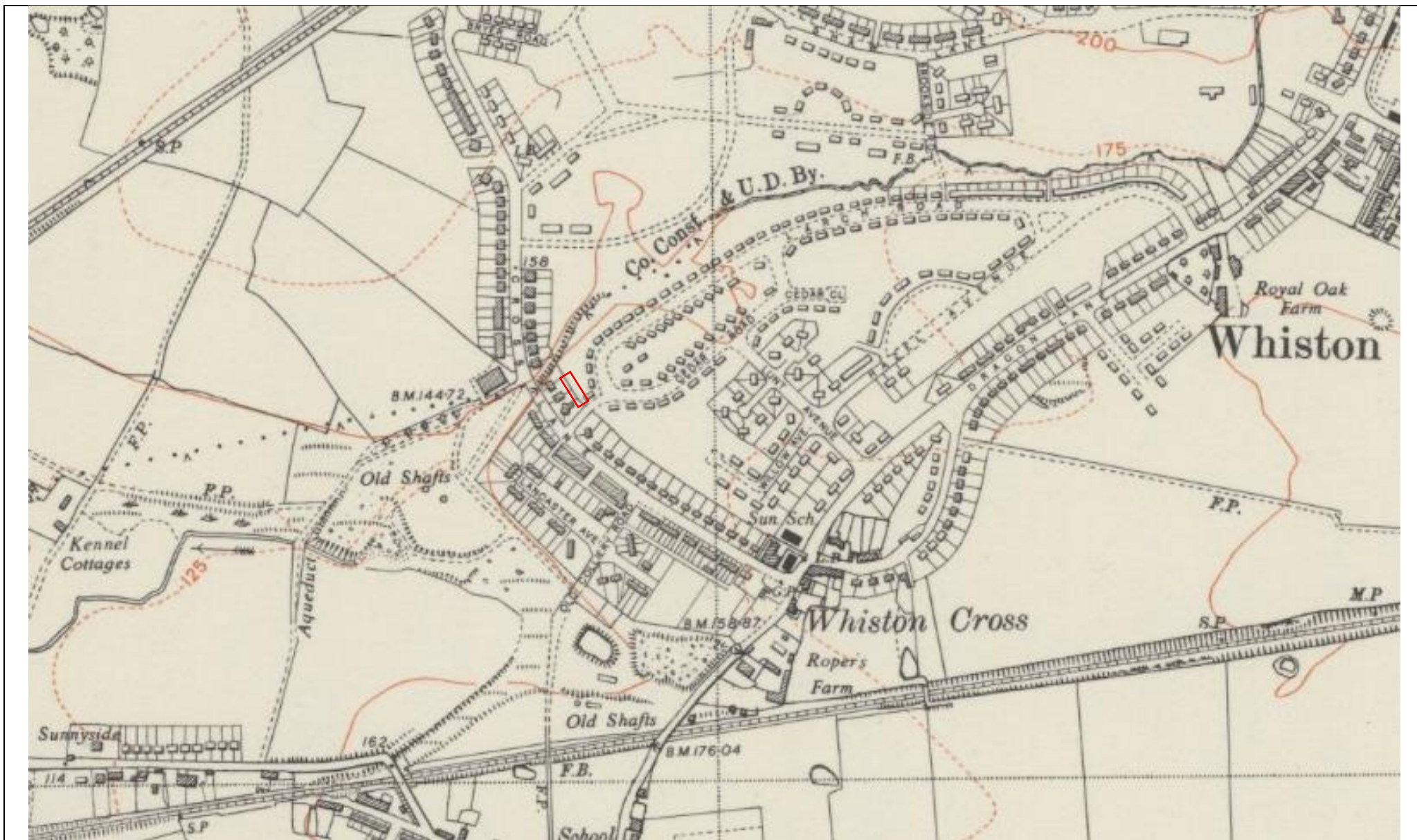
Date: 1845



Date: 1891



Date: 1925



Date: 1947

Appendix D – Geological Maps

Artificial Geology



Artificial ground 1:50,000 scale

-  MADE GROUND (UNDIVIDED) - ARTIFICIAL DEPOSIT
-  WORKED GROUND (UNDIVIDED) - VOID
-  INFILLED GROUND - ARTIFICIAL DEPOSIT

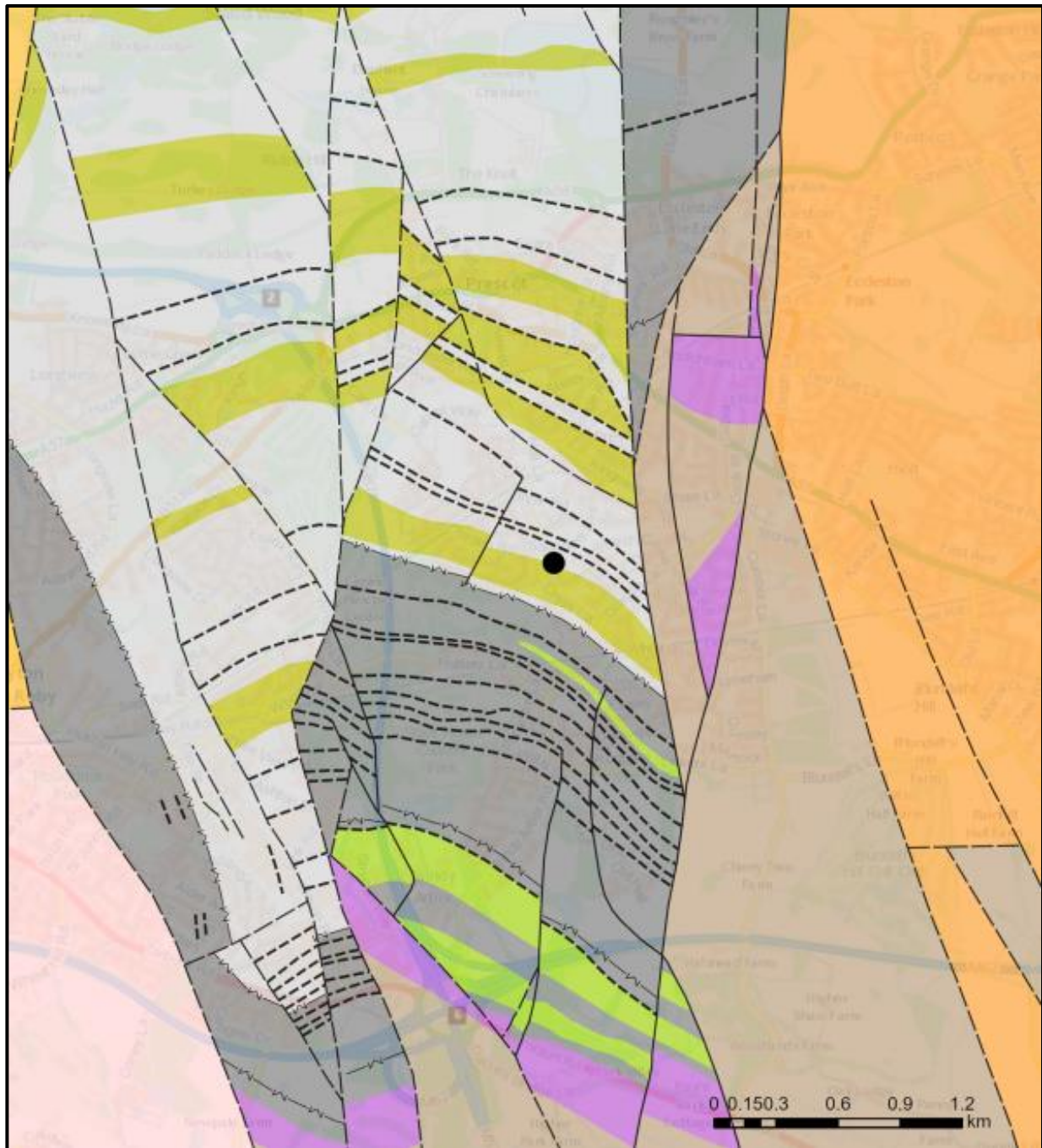
Superficial Geology



Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- TILL, DEVENSIAN - DIAMICTON
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- SHIRDLEY HILL SAND FORMATION - SAND

Bedrock Geology

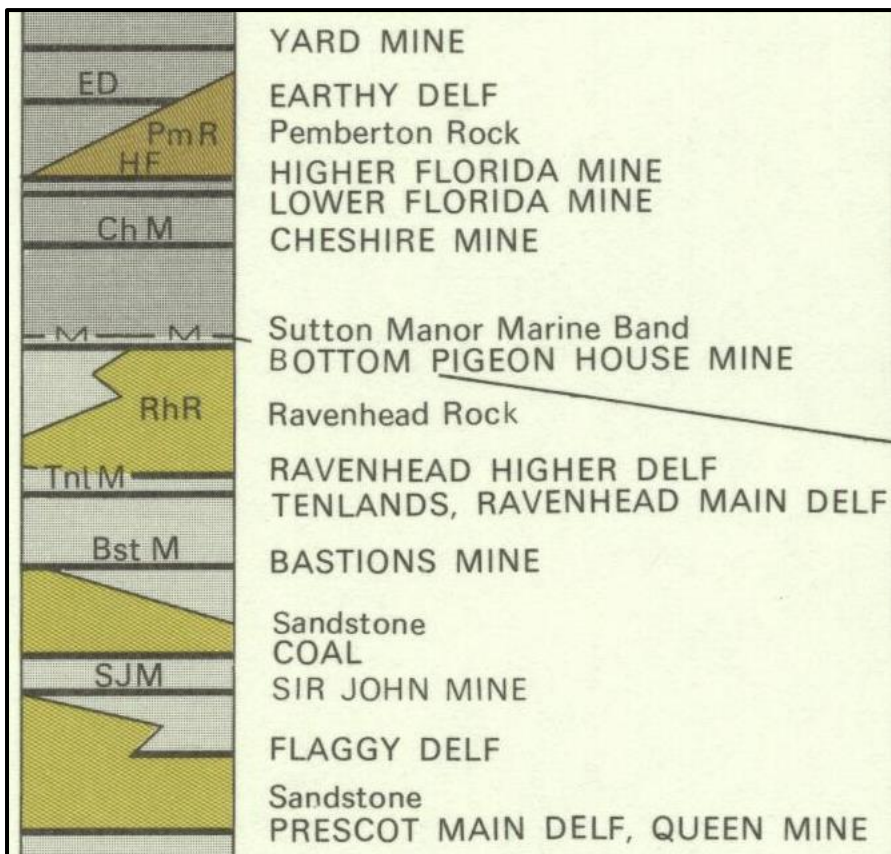
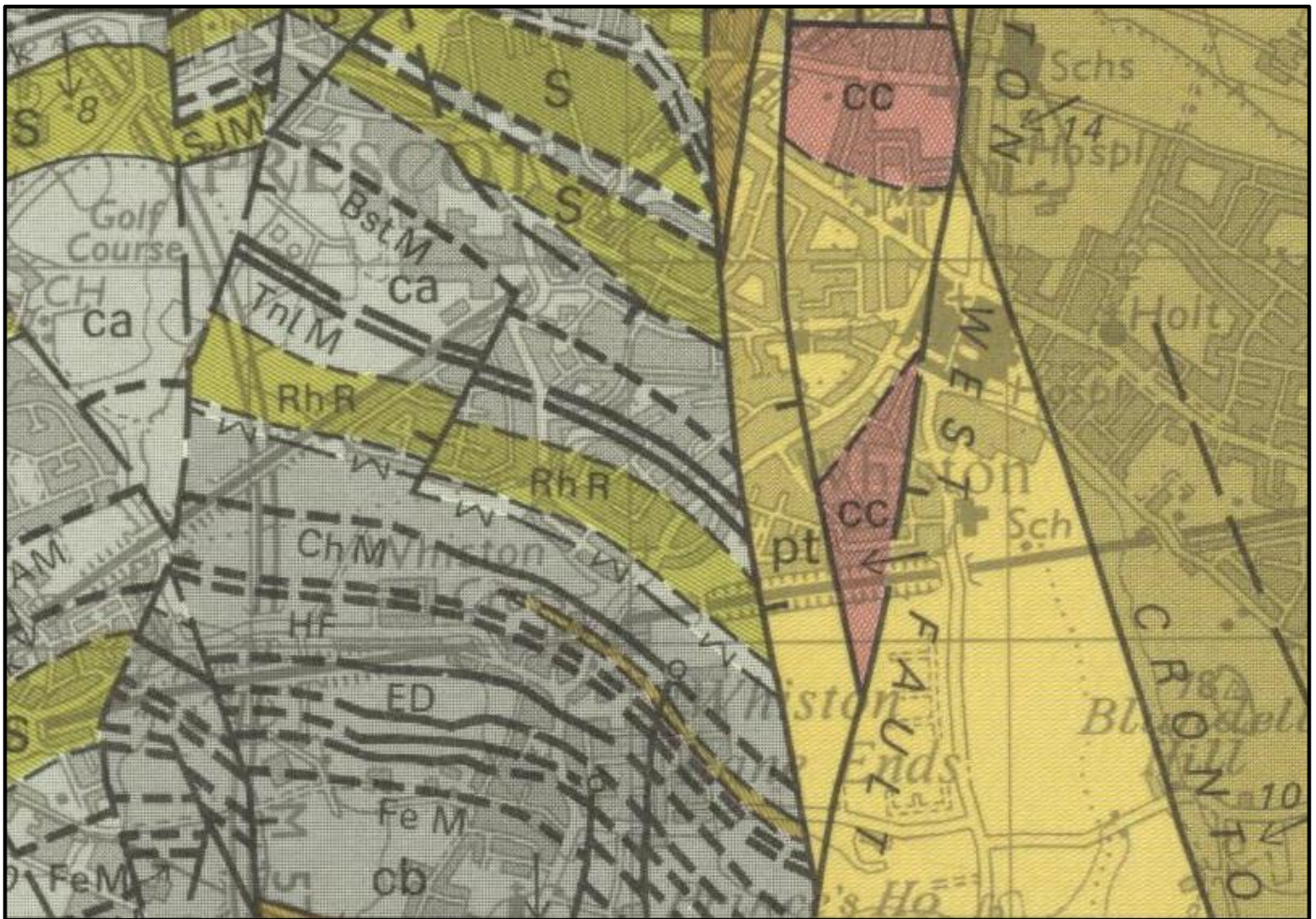


Bedrock geology 1:50,000 scale

- [WILMSLOW SANDSTONE FORMATION - SANDSTONE](#)
- [PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE](#)
- [ETRURIA FORMATION - MUDSTONE, SANDSTONE AND CONGLOMERATE](#)
- [KINNERTON SANDSTONE FORMATION - SANDSTONE](#)
- [PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE](#)
- [CHESTER FORMATION - SANDSTONE](#)
- [CHESTER FORMATION - SANDSTONE, PEBBLY \(GRAVELLY\)](#)
- [OLD LAWRENCE ROCK - SANDSTONE](#)
- [PENNINE LOWER COAL MEASURES FORMATION - SANDSTONE](#)
- [RAVENHEAD ROCK - SANDSTONE](#)
- [NOB END ROCK - SANDSTONE](#)
- [PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE](#)
- [PEMBERTON ROCK - SANDSTONE](#)

Linear features 1:50,000 scale

- Coal_seam_Inf
- Fault_Inf_Crossmark_on_downthrow_side
- Fault_Inf_Downthrow_unspecified
- Fault_Obs_Crossmark_on_downthrow_side
- Marine_band



Appendix E – BGS Borehole Logs

SJ49SE8

118

On Section paper
On lining 062
30.12.37
Rab. J.
7

SJ 49 SE 8

GEOLOGICAL SURVEY AND MINES DEPARTMENT BOREHOLES AND SHAFTS.

NGR 4668 9133 County Lancs
6-in. Map 10752W

BORE-SHAFT Casson Colliery
Prescot.

GSM

No. 1 Pit.

Surface level _____ O.D. _____ One-inch Map 97Communicated Copied from Mine Plan No. 2378.

Date of sinking _____ Borer _____

Specimens _____

Description.	THICKNESS.		DEPTH.	
	Feet.	Inches.	Feet.	Inches.
				<u>NOTES</u>
Tenlands Mine	at		165	- 50-29
Bosthams Mine	at		231	- 70-41
Roger Mine	at		390	- 118-27
Sid John Mine	at		432	- 131-67
Main Delf	at		480	- 146-30
Bottom of Pit	at		513	- 156-36

TRIAL PIT RECORD

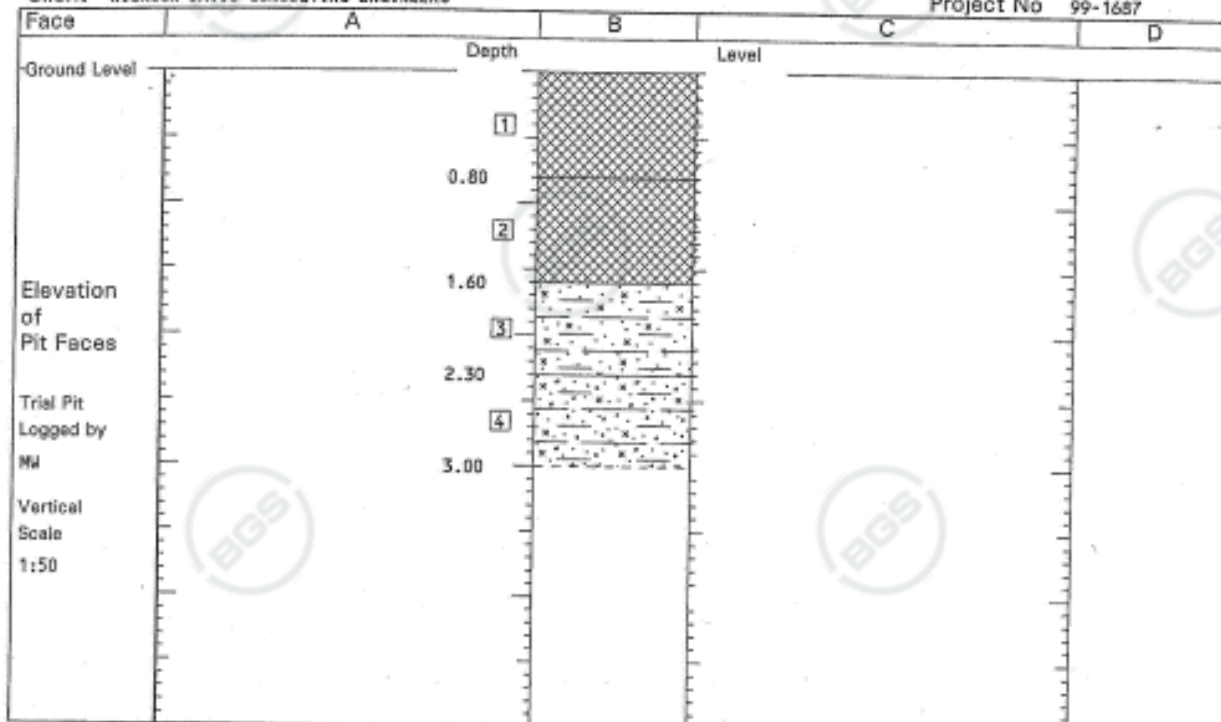
Project PRESCOT, LIVERPOOL

Engineer

Trial Pit TP4
Coordinates

Client NICKSON DAVIS CONSULTING ENGINEERS

Project No 99-1687



Samples and Tests			Strata			Geological Classification
Depth	Type	Strength kN/m ²	Face B Depth	Stratum Number	Description	
0.30	B		0.80	1	Grass over MADE GROUND: Brown silty fine to coarse sand and angular to subrounded fine to coarse gravel, with many bricks, blocks/small boulders of sandstone/concrete with occasional pieces of pottery and wood.	MADE GROUND
0.90	B		1.60	2	MADE GROUND: Firm dark brown mottled grey sandy silty clay with some angular to subrounded fine and medium gravel, occasional brick fragments.	MADE GROUND
1.70	B		2.30	3	Soft greyish-brown mottled grey, occasionally black very sandy silty CLAY, occasional pockets, <90mm of very clayey silty fine medium sand. Locally very soft.	
2.40	J		3.00	4	Stiff brown mottled grey slightly sandy silty CLAY, with a little subangular to subrounded fine and medium gravel.	

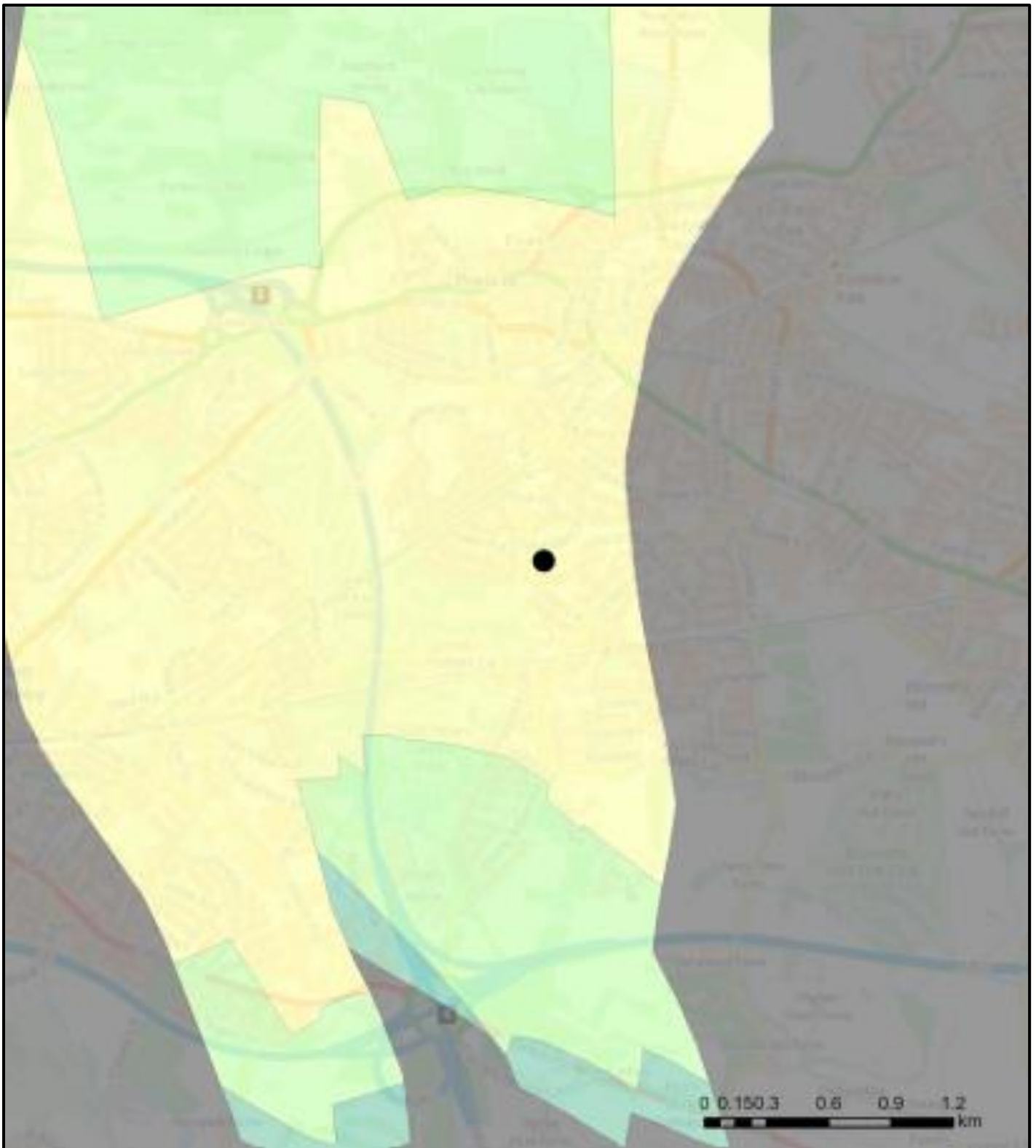
Excavation				Dimensions		Groundwater
Date Excavated	17/08/99	Date Backfilled	17/08/99	B = 0.60 A C = 2.60 D		Dry.
Plant	JCB 3CX					
Shoring	None					
Stability	Slight spalling Face A 1.4m-1.8m.					

Remarks

Symbols and abbreviations are explained on the accompanying key. All linear dimensions are in metres.

geotechnics

Appendix F – Coal Resource Map



Shallow Coal

- Buried coal resource overlain by up to 50m overburden
- Primary opencast coal resource area
- Secondary opencast coal resource area
- Tertiary opencast coal resource area

Deep Coal

- Deep coal at more than 1200m
- Deep coal between 50m and 1200m

Appendix G – Coal Mining Summary Map

Mine Entry

-  Shaft
-  Adit

Development High Risk Area



Surface Mining (Past and Current)



Past Shallow Coal Mine Workings



Probable Shallow Coal Mine Workings



Coal Outcrops

