

COAL MINING RISK ASSESSMENT

Chestnut Way

Littleborough

Rochdale

OL15 8RW

Author: Daniel Slattery
Client: Clive Rainford Homes
Reference: rep-tjba-CRH-chestnut way-CMRA-160523.docx

Revision	Date	Reason
0	May 2021	Original to support planning application.
1	May 2023	Updated with site investigations.
2	Jun 2023	Minor edits, SI plan & proposed plan update.

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1. INTRODUCTION.

T. J. Booth Associates were previously appointed by Mr Bob Elhage to undertake a Coal Mining Risk Assessment (CMRA) to assess for the potential coal mining legacy local to a proposed residential development at Chestnut Way.

The Application Site is for a residential housing development comprising 9No. executive detached 2-storey dwellings, with associated shared access road, private driveways & gardens.

The revision 0 version of this document was undertaken to accompany a planning application for development in May 2021, reference No. 21/00282/FUL: 'Erection of 9 no. detached dwellings with associated landscaping and access from Chestnut Way.'

The report findings noted a disparity between local geological information, stratigraphy & coal seams; and recommendations were for rotary borehole investigations to confirm Site geology, and to assess whether there were any seams or workings that could influence the development proposals.

The approved decision notice was issued in January 2023, and comprised condition No.18 which related to the investigation of coal mining legacy at the Site, refer to excerpt below:

18 No development shall take place until a scheme of intrusive investigations has been carried out on site to establish the risks posed to the development by past shallow coal mining activity, and the findings have been submitted to and approved in writing by the Local Planning Authority. The development shall thereafter be undertaken in full accordance with any remediation works and/or mitigation measures to address land instability arising from coal mining legacy, as may be identified in the scheme of intrusive investigations and be retained as such thereafter.

Reason: To ensure the site is made safe and stable for the development and to accord with policy G9 of the adopted Rochdale Core Strategy and the National Planning Policy Framework.

Reason for pre-commencement condition: It is important to ensure that the ground conditions are structurally sound prior to any construction works.

T J Booth Associates were re-employed to undertake the site investigations and subsequent risk assessment to ensure safe development within Coal Authority guidelines and in strict accordance with CIRIA Report SP32 & the subsequent C758.

2. HISTORIC MAPS.

DATE	ON-SITE	OFF-SITE/SURROUNDING AREA
c1850	Site is part of agricultural land.	2 coal pits noted approximately 250m south west and 300m north west.
c1890	No change.	Old coal and air shaft noted 100m west. Coal shaft and air shaft noted to Starring Brick Works 250m west. Middlewood Colliery noted 250m north. Coal pit 300m north west no longer noted.
c1910	No change.	Middlewood Colliery no longer shown with small areas of made ground noted in close proximity. Shafts remain to Starring brickworks.
c1930	No change.	Shafts remain to Starring brickworks.
c1937	No change.	Shafts remain to Starring brickworks.
c1960	No change.	Shaft no longer noted at the Starring Brickworks, and the site indicated as being disused. Extensive made ground/spoil heaps locally.

3. BGS GEOLOGY.

Superficial Geology:	Glacial clay till underlies the area local to Site.
Bedrock Geology:	The site is underlain by undifferentiated Carboniferous Westphalian Coal Measures, generally comprising interbedded sandstone and mudstone. The 1:50000 scale map suggests a south to south-east dipping stratigraphy, however, older more detailed 1:10000 scale maps show identified seams dipping nominally 10degrees south-southwest, and coal shafts to the west of these specific seams are annotated to show the shafts intercepted the seam at depth – which would suggest the older map is more accurate. See below Coal Seam Section for relevant maps.
Coal Seams/Faults.	There are a number of coal seams in the local area but there is ambiguity as to whether these underly the Site or not. The 1:50000 scale map (top) identifies the Lower Mountain seam subcropping beneath the east corner of the Site. The dip direction is to the southwest so the Lower Foot and the Bassey/Yard would both underly the Development Site. The 1:10000 scale map (bottom) identifies local stratigraphy dipping SW. However, subcropping seam positions as identified on the map place the lowest seam in the stratigraphy (the Yard/Bassey), to the west corner which would suggest no seams actually exist below the majority of the Site.  

4. BGS BOREHOLE RECORDS.

There are no borehole records within a close or relevant proximity to the Site.

5. COAL AUTHORITY

Mine Shafts, Pits, Adits/Entries:	No coal entries within 20m of the site boundaries. Closest is 100m east.
Past Recorded Underground Mining.	No workings noted beneath the Site. There are workings in the local area to the east and south east nominally 100m from the Site boundaries.
Present/Future Underground Mining.	Not known to be a risk.
Unrecorded Probable/Potential Shallow Underground Workings:	No potential or probable shallow underground workings noted beneath the Site, although there are potential workings to the east.

Past/Present/Future Mining/Opencast:	Surface	None noted locally.
Mining Geology and Subsidence:		No issues noted locally.
Hazards and Mine Gas:		No issues noted locally.
Development High Risk Area:		The majority of the Site is not within a Development High Risk Area, although it does encroach on to the very west corner where outside of where the dwellings will be located.
Abandonment Plan Data:		Abandonment data not required.

6. IDENTIFICATION OF SITE SPECIFIC RISKS.

Recorded Workings:		No risk from recorded seams, however, much historic mining was unrecorded in the local area.
Probable/Potential Workings:	Shallow	There is significant ambiguity on the different BGS maps, and in the Coal Authority data. The 1:10000 detailed map makes the most sense given the seam positions annotated on the maps in accordance with the topographic data for the area. In addition the coal shafts annotated on the same maps identify seams at depth where they would be expected. The Coal Authority and BGS 1:50000 maps do not appear to be correct. However, due to the different sources of data, confidence in the dataset cannot be guaranteed and as there is the chance of shallow seams beneath the Site, it would be prudent to undertake site investigations to assess the potential for shallow seams, workings, and characterisation independently. There are three seams locally that could have an impact on Site: Lower Mountain seam, Lower Foot (Little) seam, and the Bassey (Yard) seam.
Opencast Workings:		No risk.
Coal Pits/Shfts/Adits:		No risk noted on Site. No shafts or unaccounted for made ground noted on trial hole investigations or subsequent Site strip.
Mine Gas or subsidence:		Currently no risk identified.

7. MITIGATION STRATEGY

Due to the ambiguity of the geological datasets, and the potential risk of shallow seams and/or workings beneath the Site; site investigations must be undertaken to classify the risk and identify further mitigation measures as required depending on the outcome.

To mitigate the risk to development, site investigations should comprise rotary boreholes with waterflush to assess the geology to a max depth of 30m bGL. Borehole logs should identify seams, depth, thickness and state of working. Boreholes should be sealed once complete with bentonite cap to rockhead, and may be filled to surface using arisings.

Once results of the geology beneath the Site has been proven, the risk can be quantified, and remediation proposed if necessary.

8. SITE INVESTIGATION RECOMMENDATIONS.

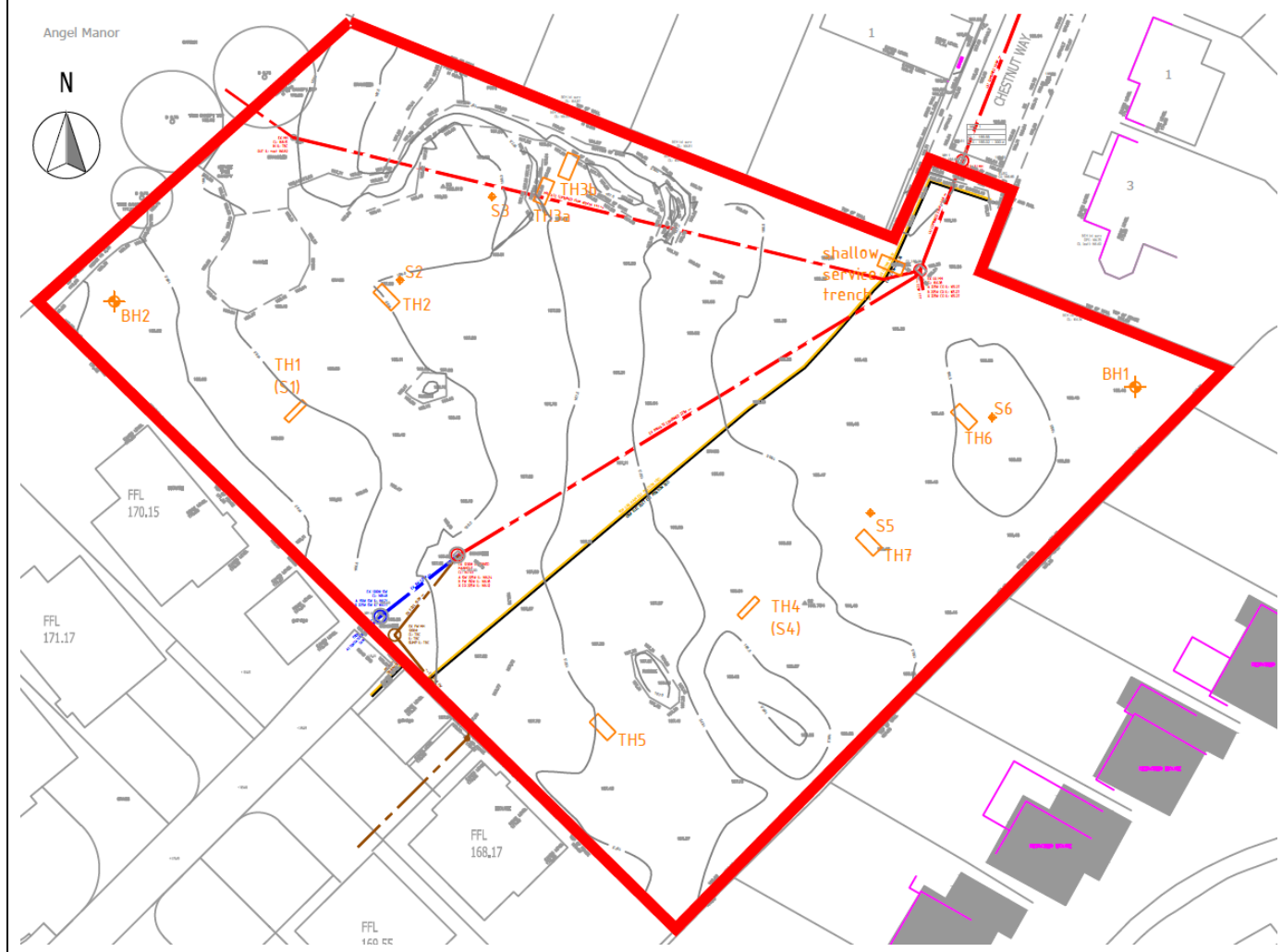
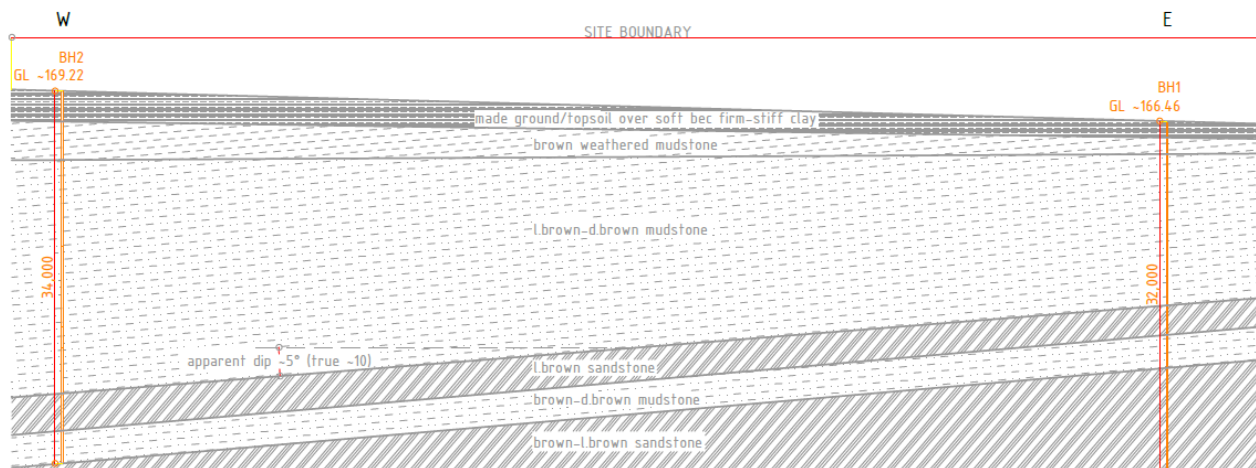
3No. rotary boreholes were proposed to assess the local geology and to investigate whether shallow seams underly the Site, and if so whether these had been worked.

A Coal Authority 'Permit to Enter or Disturb Coal Authority Interests' (permit No. 25736), was obtained by Danbar Ltd/T J Booth Associates on the 23rd November 2022 for investigation over the full Site boundary for up to 3No. boreholes, refer to Appendix for permit.

9. SITE INVESTIGATIONS.

Site investigations were undertaken by Site Investigation Services Ltd on the 16th & 17th of May 2023, and comprised 2No. boreholes (BH1 & 2) undertaken with a rotary drill rig with water flush method as required by the Coal Authority permit.

The local/regional geology dips to the southwest. Due to the shape of the Site, BH1&2 were positioned to encounter both up & down dip bedrock strike planes. Boreholes were sunk to ~30m & the Site stratigraphy is illustrated below:



Both boreholes encountered MADE GROUND & glacial CLAY up to 3m depth, over interbedded mudstone and sandstone beds to a depth of up to 34m. The stratigraphy in the two boreholes matched up as expected, resulting in an apparent dip of approximately 5 degrees in Site section.

No coal seams were encountered in the investigation.

10. CONCLUSIONS & FINAL RECOMMENDATIONS.

The Coal Mining Risk Assessment has found a low risk to development from coal mining legacy at the Application Site.

No shallow coal seams <34m have been encountered.

From the results of the investigation, it would appear that the current local BGS mapping is incorrect, and the borehole results fit more closely with the historic local scale 1:10000 BGS maps which suggests that shallow seams do not underly the Site.

As a result of the risk assessment, no further investigations need to be undertaken.

This report should be submitted to Planning as part of the discharge of conditions process, to address condition 18.

Signed.....

D.S.Slattery BSc (Hons).

T J Booth Associates.

Authorised.....

T J Booth BSc (Hons), C. Eng. C. Env. MICE.

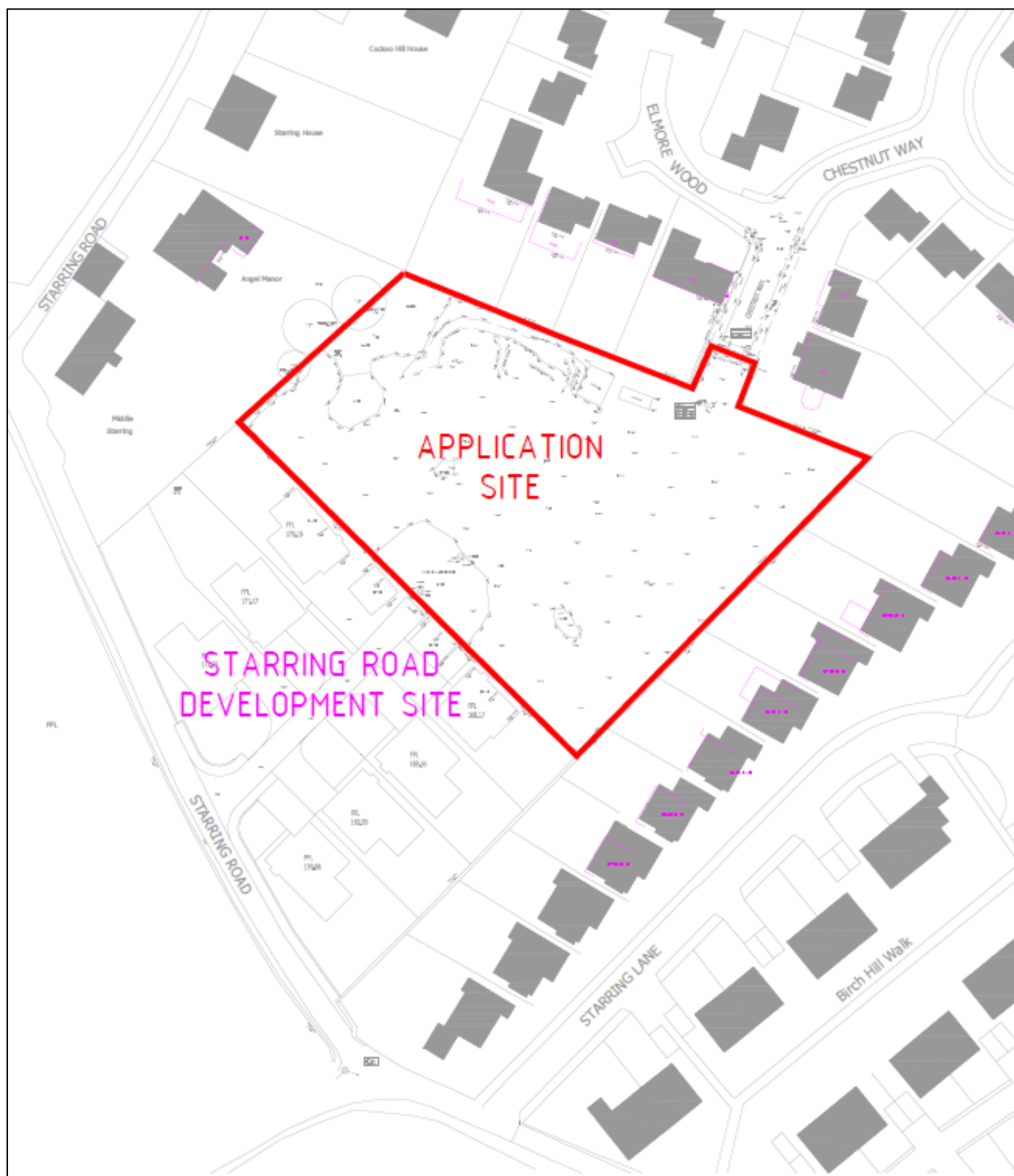
T J Booth Associates.

11. REFERENCES.

- CIRIA. Report C758.
- CIRIA. Report SP32.

12. APPENDIX

12.1. Location Plan.



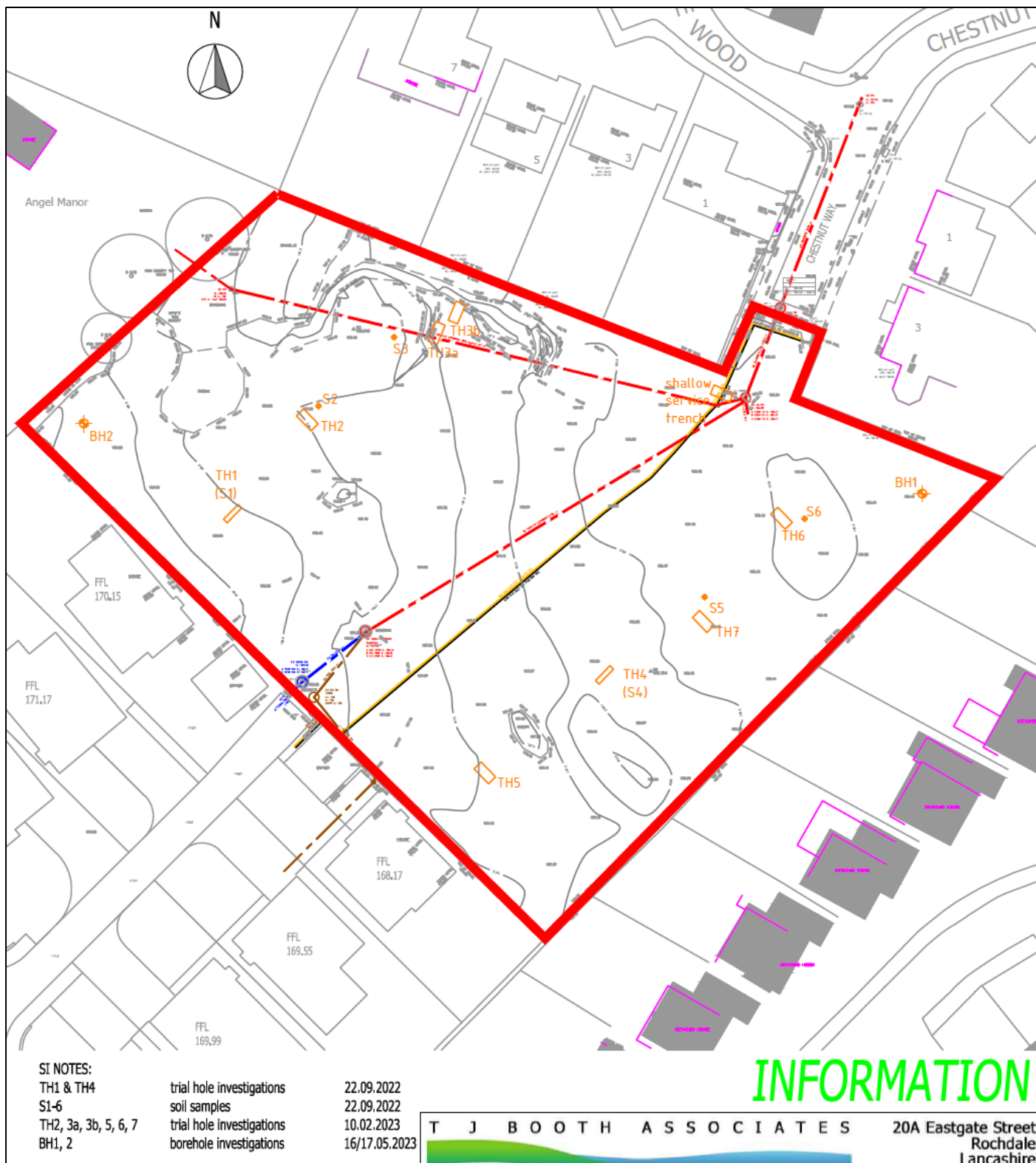
12.2. Existing Site Plan.



12.3. Proposed Site Plan.



12.4. Site Investigation Plan.



12.5. Borehole Logs.

on behalf of		T J Booth Associates										Rotary Drilling Log										SIS DRILL		
Depth of Stratum Top (m)	Driller's Stratum Description	Sample / Hole / Test Details					Drilling Details					Standard Penetration Test										Water flush level (m)		
		No	Type	Insitu test	From (m)	To (m)	Liner Dia (mm)	Core run time (h:mm)	Total core Recovery (%)	Flush Return %	Flush Colour	Self Weight Pen (mm)	75 mm	150 mm	Sealing Pen (mm)	75 mm	150 mm	225 mm	300 mm	Main Pen (mm)	N value		Casing Depth (m)	
0.00	Brick Crushed concrete Topsoil brownish MADE GROUND																							
1.50	Soft to firm becoming firm to stiff brownish CLAY cobbles are sandstone																							
3.00	Weak weathered brown MUDSTONE																							
12.00	becoming Medium strong brown MUDSTONE																							
14.60	Weak-medium strong, light brown MUDSTONE																							
16.20	becoming Medium strong brown MUDSTONE																							

Shift details				Drilling Equipment Details										Ground Water Record										Backfill (m)			
Start time (hh:mm)	Hole (m)	Water (m)	Casing (m)	Sealing (C) Open Hole (RC) Sealing (RC)	Dia. (mm)	From (m)	To (m)	Barrel	Liner Type	Core Dia (mm)	Bit Type	Casing Type	Bit serial No	Flush	Polymer	Time of strike	Depth struck (m)	Casing (m)	Inflow	6 min	10 min	16 min	20 min	Depth Sealed (m)	Type	From (m)	To (m)
0800																											
Finish time (hh:mm)	Hole (m)	Water (m)	Casing (m)																								
1600	0.00																										

Time from	Duration (hh:mm)	Remarks or details of any additional testing information, Dayworks	SPT I.D. Number	xl140	Calibration Date	14/09/2019	Project Title	
0800		CAT Scanned: Yes	SPT Rod Type	Sonic	SPT Energy Ratio	79.00	Chestnut Way, Littleborough	
0800		Permit Completed: Yes	Drilling Crew Details		CSCS No		Weather Sunny	
1100	0100	Had to Mobilise a bowser to site as unable to get van to location due to site entrance	Support Operative	Dylan Williamson	6562606		Date	16/05/2023
1215	0030	Dayworks: Filling water bowser	Lead Driller	Reece Bray	4691177		Day	Tuesday
1345	0030	Dayworks: Filling water bowser	Site category	Green			Rig type	ML DUO SONIC
1430	0030	Dayworks: Filling water bowser	Project Engineer	dan			Inclination	Orientation
			Lead Driller's signature				Sheet	1 of 2
							Completed	Y

on behalf of		T J Booth Associates										Rotary Drilling Log										SIS DRILL			
Depth of Stratum Top (m)	Driller's Stratum Description	Sample / Hole / Test Details					Drilling Details					Standard Penetration Test										Water flush level (m)			
		No	Type	Insitu test	From (m)	To (m)	Liner Dia (mm)	Core run time (h:mm)	Total core Recovery (%)	Flush Return %	Flush Colour	Self Weight Pen (mm)	75 mm	150 mm	Sealing Pen (mm)	75 mm	150 mm	225 mm	300 mm	Main Pen (mm)	N value		Casing Depth (m)		
16.80	Weak brown MUDSTONE																								
18.00	Strong SANDSTONE																								
19.30	Medium strong brown MUDSTONE																								
22.50	Strong brownish orangish SANDSTONE																								
32.00	END																								

Shift details				Drilling Equipment Details										Ground Water Record										Backfill (m)			
Start time (hh:mm)	Hole (m)	Water (m)	Casing (m)	Sealing (C) Open Hole (RC) Sealing (RC)	Dia. (mm)	From (m)	To (m)	Barrel	Liner Type	Core Dia (mm)	Bit Type	Casing Type	Bit serial No	Flush	Polymer	Time of strike	Depth struck (m)	Casing (m)	Inflow	6 min	10 min	16 min	20 min	Depth Sealed (m)	Type	From (m)	To (m)
0800																									Bertrite Points	32.00	0.00
Finish time (hh:mm)	Hole (m)	Water (m)	Casing (m)																								
1600	0.00																										

Time from	Duration (hh:mm)	Remarks or details of any additional testing information, Dayworks	SPT I.D. Number	xl140	Calibration Date	14/09/2019	Project Title	
			SPT Rod Type	Sonic	SPT Energy Ratio	79.00	Chestnut Way, Littleborough	
			Drilling Crew Details		CSCS No		Weather Sunny	
			Support Operative	Dylan Williamson	6562606		Date	16/05/2023
			Lead Driller	Reece Bray	4691177		Day	Tuesday
			Site category	Green			Rig type	ML DUO SONIC
			Project Engineer	dan			Inclination	Orientation
			Lead Driller's signature				Sheet	2 of 2
							Completed	Y

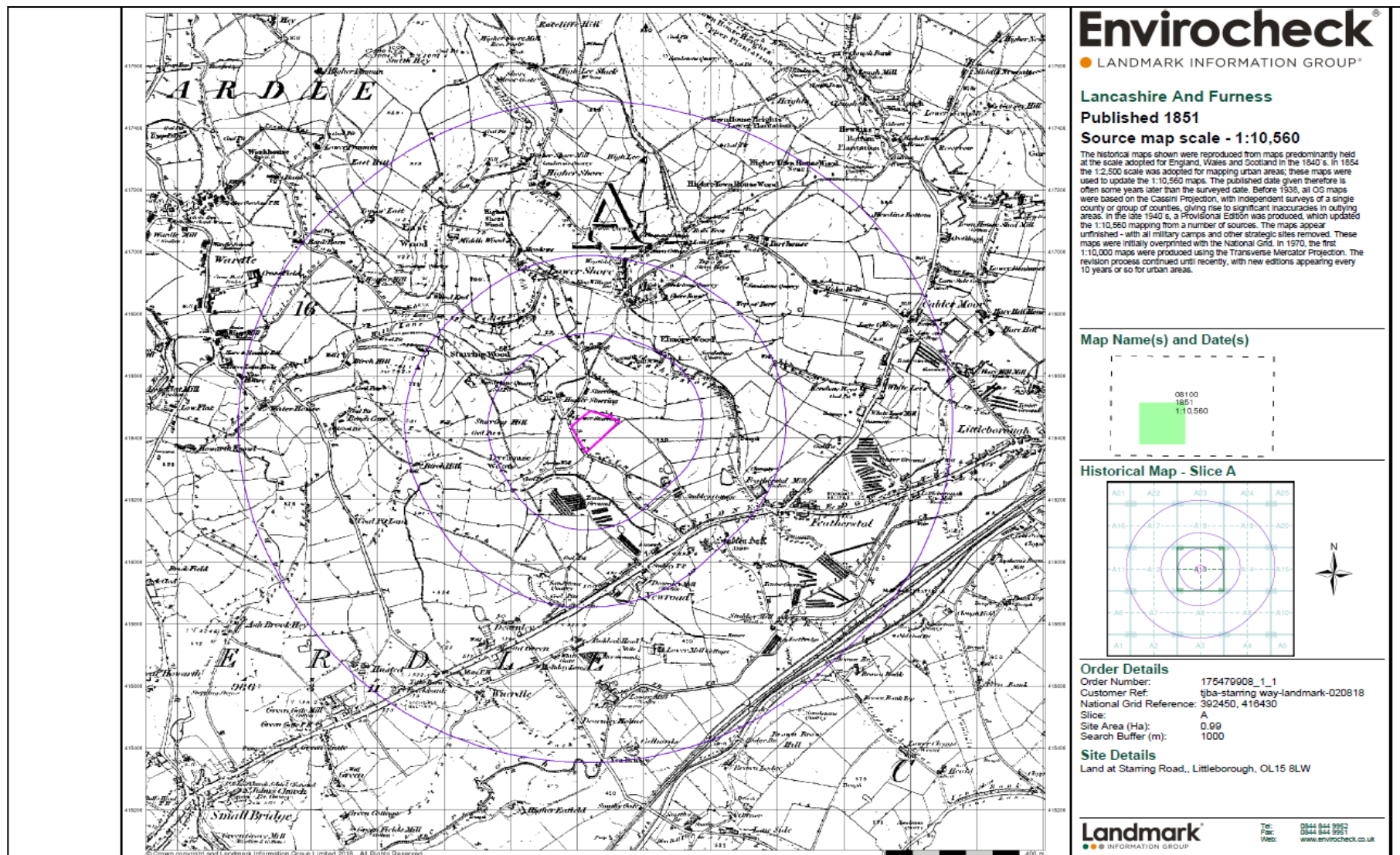
		on behalf of						T J Booth Associates							Rotary Drilling Log										
Depth of Stratum Top (m)	Driller's Stratum Description	Sample / Hole / Test Details						Drilling Details						Standard Penetration Test											
		No	Type	Insitu test	From (m)	To (m)	Liner Dia (mm)	Core run time (hh:mm)	Total core Recovery (m)	Flush Return %	Flush Colour	Self Weight Pen (mm)	75 mm	150 mm	Seating Pen (mm)	75 mm	150 mm	225 mm	300 mm	Main Pen (mm)	N value	Casing Depth (m)	Water/ flush level (m)		
0.00	Crushed concrete ash and brick clayey MADE GROUND over soft to firm becoming firm to stiff brown CLAY																								
2.80	Weak (weathered) brown MUDSTONE																								
6.30	becoming Medium strong brown MUDSTONE																								
14.20	Strong dark brown MUDSTONE																								
21.50	Medium strong brown MUDSTONE																								
23.40	Strong light brown MUDSTONE																								

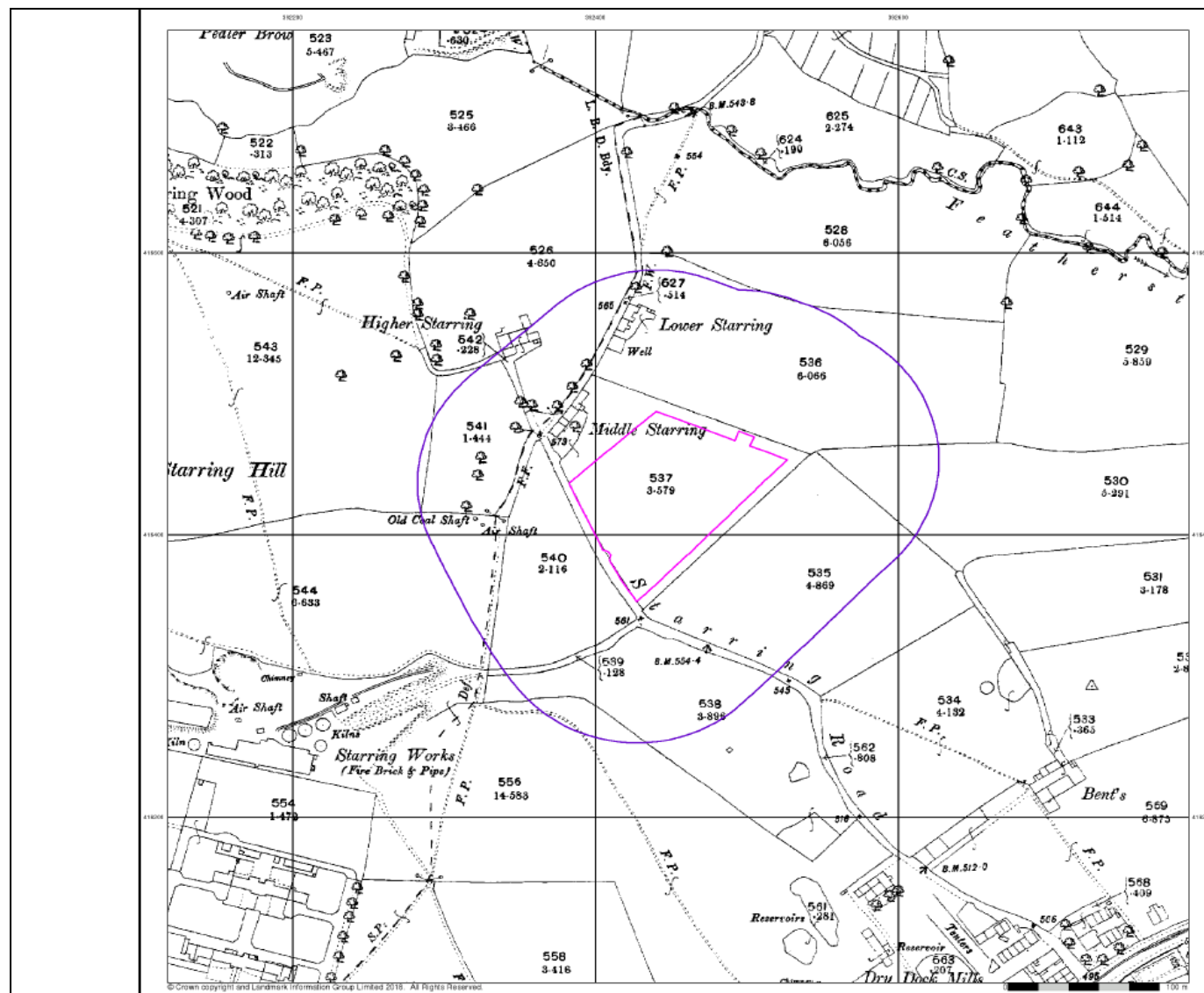
Shift details				Drilling Equipment Details												Ground Water Record										Backfill (m)		
Start time (hh:mm)	Hole (m)	Water (m)	Casing (m)	Coring (IC) Open Hole (HC) Coring (BC)	Dia. (mm)	From (m)	To (m)	Barrel	Liner Type	Core Dia (mm)	Bit Type	Casing Type	Bit serial No.	Flush	Polymer	Time of strike	Depth (Block (m))	Casing (m)	Inflow	6 min	10 min	15 min	20 min	Depth (second (m))	Type	From (m)	To (m)	
0800																												
Finish Time (hh:mm)	Hole (m)	Water (m)	Casing (m)																									
1500	0.00																											

Time from	Duration (hh:mm)	Remarks or details of any additional testing information, Dayworks	SPT I.D. Number	x1140	Calibration Date	14/09/2019	Project Title Chestnut Way, Littleborough	
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0800		Permit Completed: Yes	Drilling Crew Details			CSCS No		
0900	0030	Dayworks: Collecting water bowser Filling water bowser	Support Operative	Dylan Williamson	6562606	Weather		Sunny
1100	0030	Dayworks: Filling water bowser	Lead Driller	Reece Bray	4691177	Date		17/05/2023
General: 100% flush all the way down			Site category	Green		Rig type	ML DUO SONIC	
			Project Engineer	dan		Inclination	Borehole Number	
			Lead Driller's signature			Sheet	1 of 2	
						Completed	Y	

[illegible]

12.6. Landmark Historic Plans.





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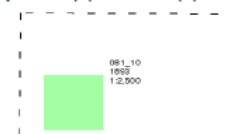
Lancashire And Furness

Published 1893

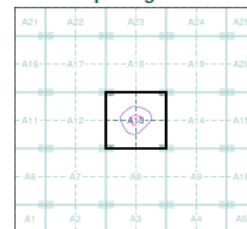
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Map Name(s) and Date(s)



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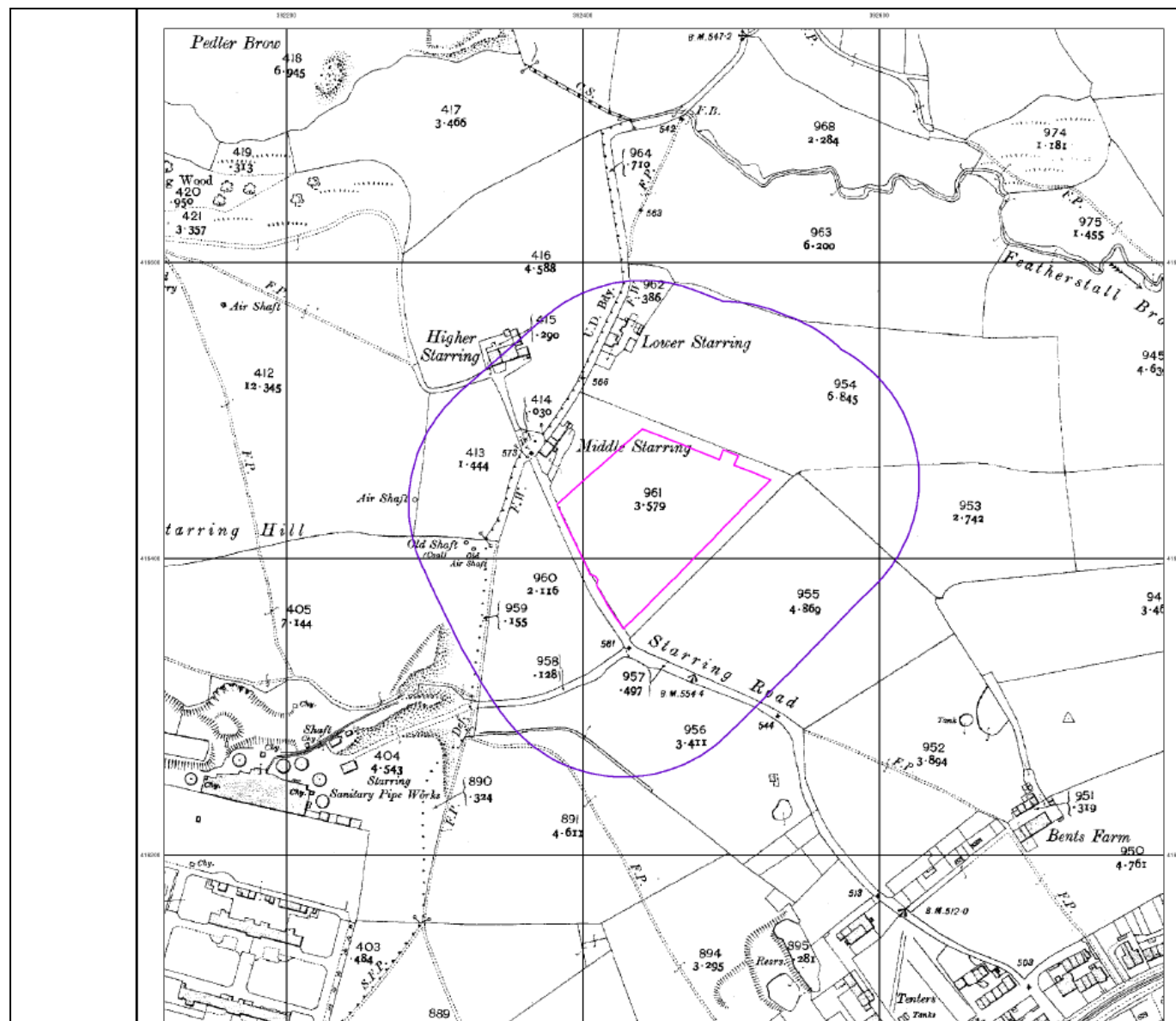
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Sheet: A
Site Area (Ha): 0.99
Search Buffer (m): 100

Site Details

Land at Starring Road, Littleborough, OL15 8LW

Landmark

Tel: 0844 944 9952
Fax: 0844 944 9951
Web: www.envirocheck.co.uk



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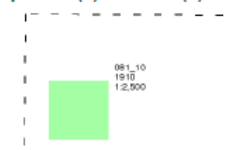
Lancashire And Furness

Published 1910

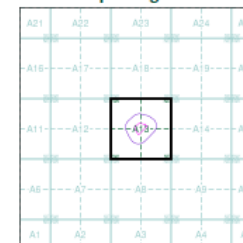
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Map Name(s) and Date(s)



Historical Map - Segment A13



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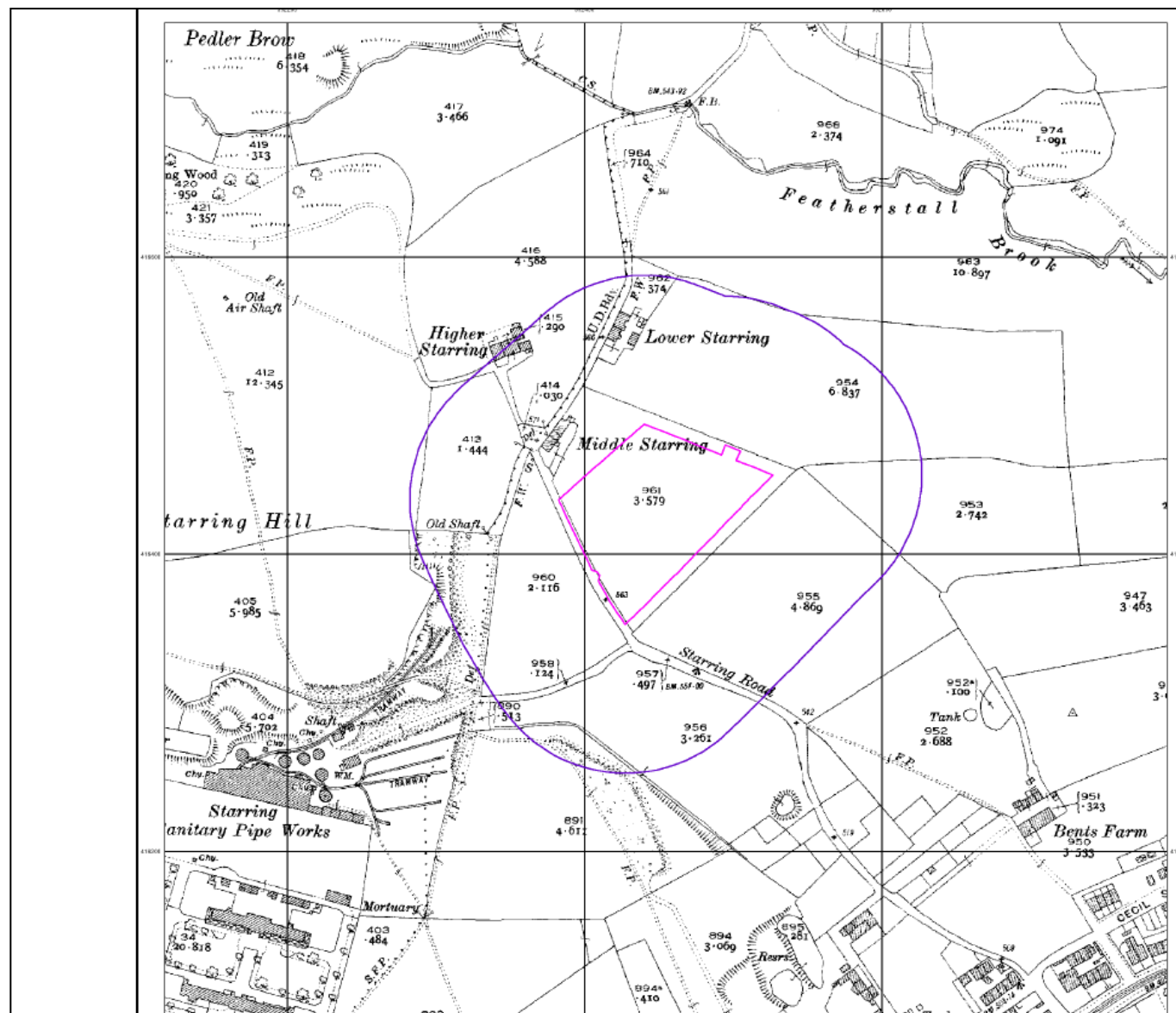
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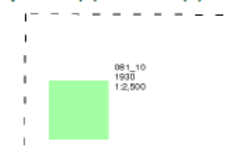
Lancashire And Furness

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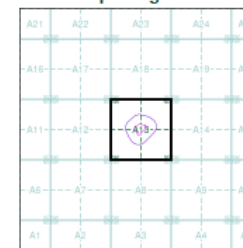
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Map Name(s) and Date(s)



Historical Map - Segment A13



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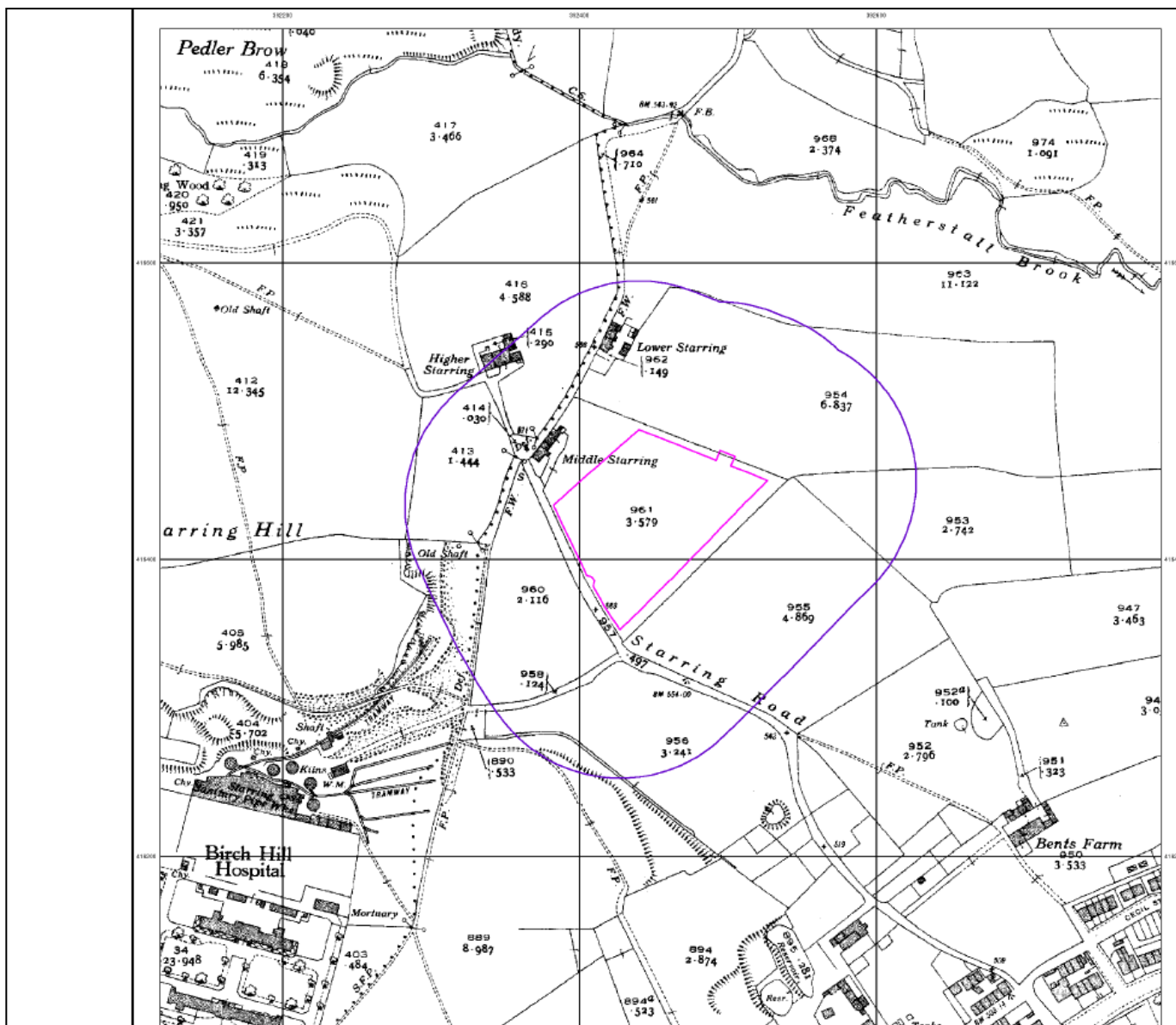
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Site Area (Ha): 0.99
Search Buffer (m): 100

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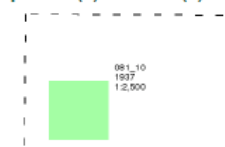
Lancashire And Furness

Published 1937

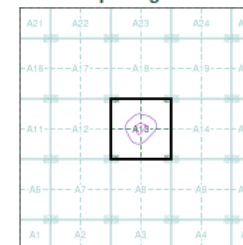
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Historical Map - Segment A13



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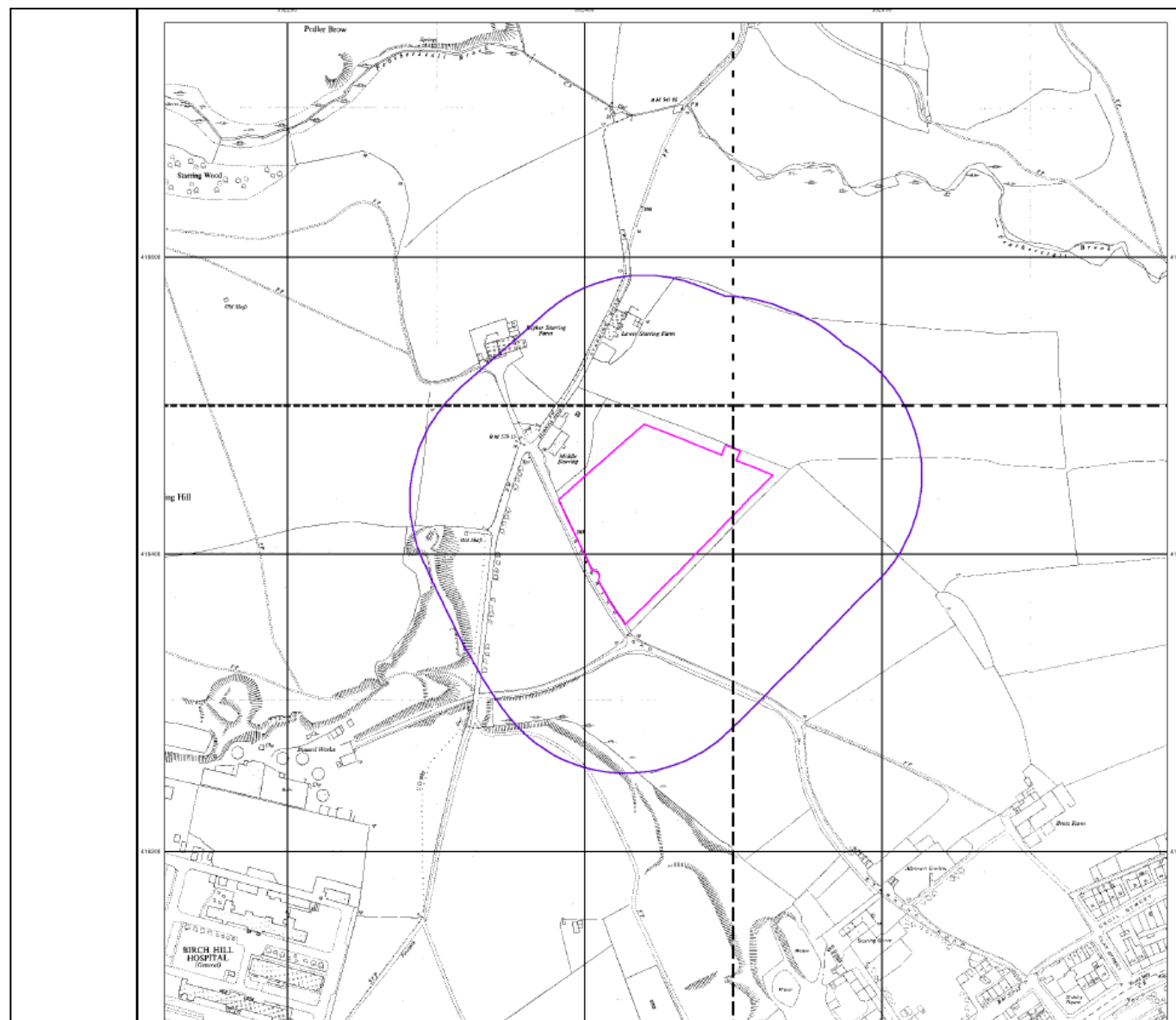
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 Slice: A
 Site Area (Ha): 0.99
 Search Buffer (m): 100

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Ordnance Survey Plan

Published 1960

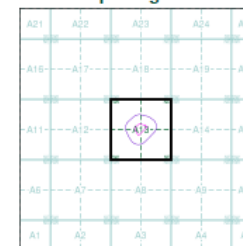
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Map Name(s) and Date(s)

SD9216NW	SD9218NE
1960	1960
1:1,250	1:1,250
SD9216SW	SD9218SE
1960	1960
1:1,250	1:1,250

Historical Map - Segment A13



Order Details

Order Number: 175479908_1_1
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 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



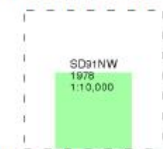
Envirocheck[®]

LANDMARK INFORMATION GROUP[®]

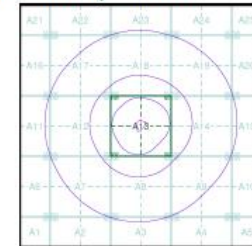
Ordnance Survey Plan
Published 1978
Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940's, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)



Historical Map - Slice A

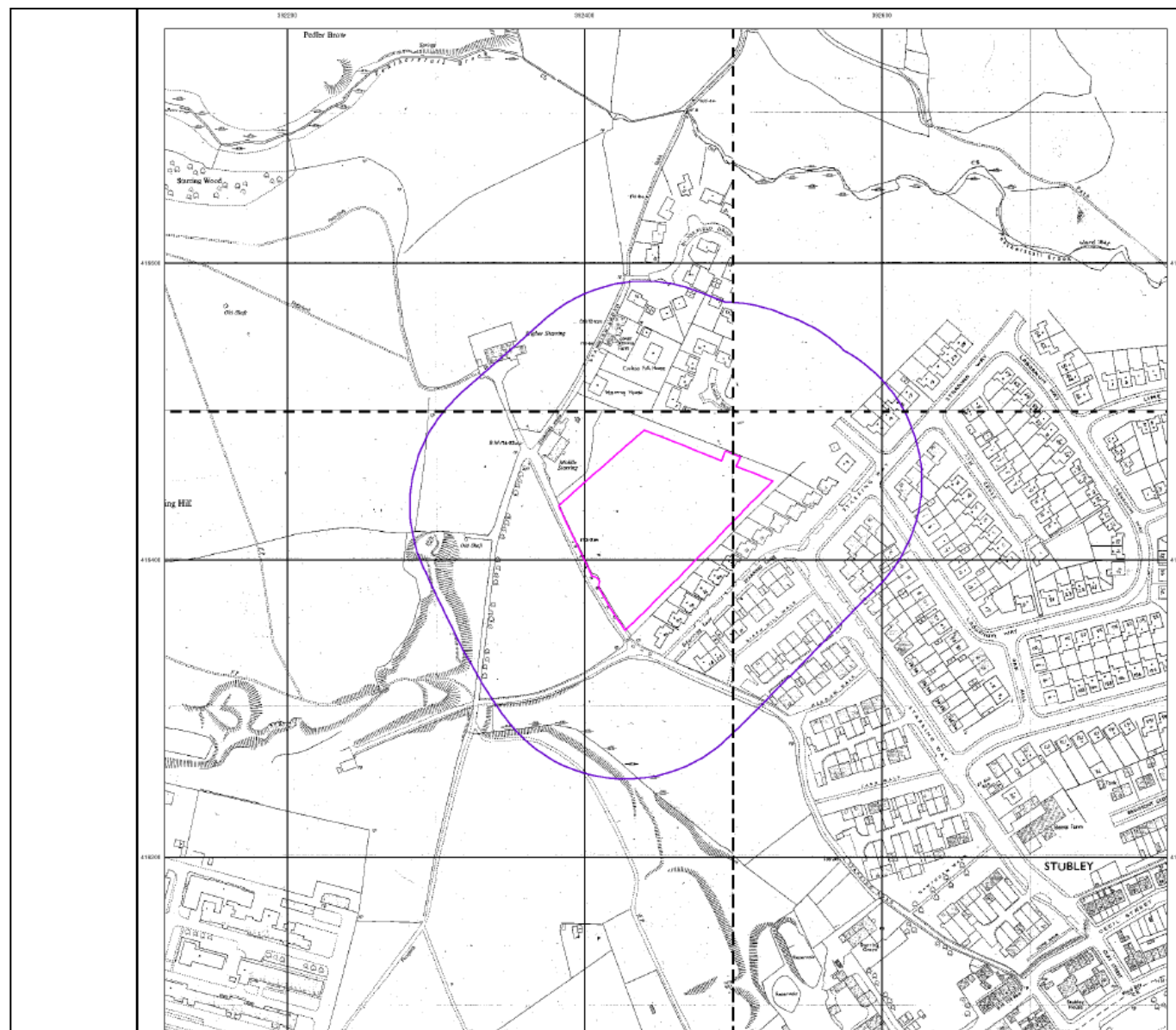


Order Details

Order Number: 175479908_1_1
 Customer Ref: tjba-starning way-landmark-020818
 National Grid Reference: 392450, 416430
 Slice: A
 Site Area (Ha): 0.99
 Search Buffer (m): 1000

Site Details

Land at Starning Road., Littleborough, OL15 8LW



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Additional SIMs

Published 1978 - 1988

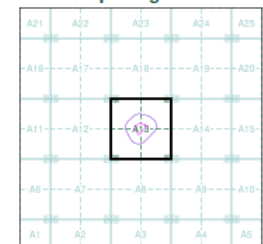
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SD9216NW 1988 1:1,250	SD9216NE 1984 1:1,250
SD9216SW 1980 1:1,250	SD9216SE 1978 1:1,250

Historical Map - Segment A13



Order Details

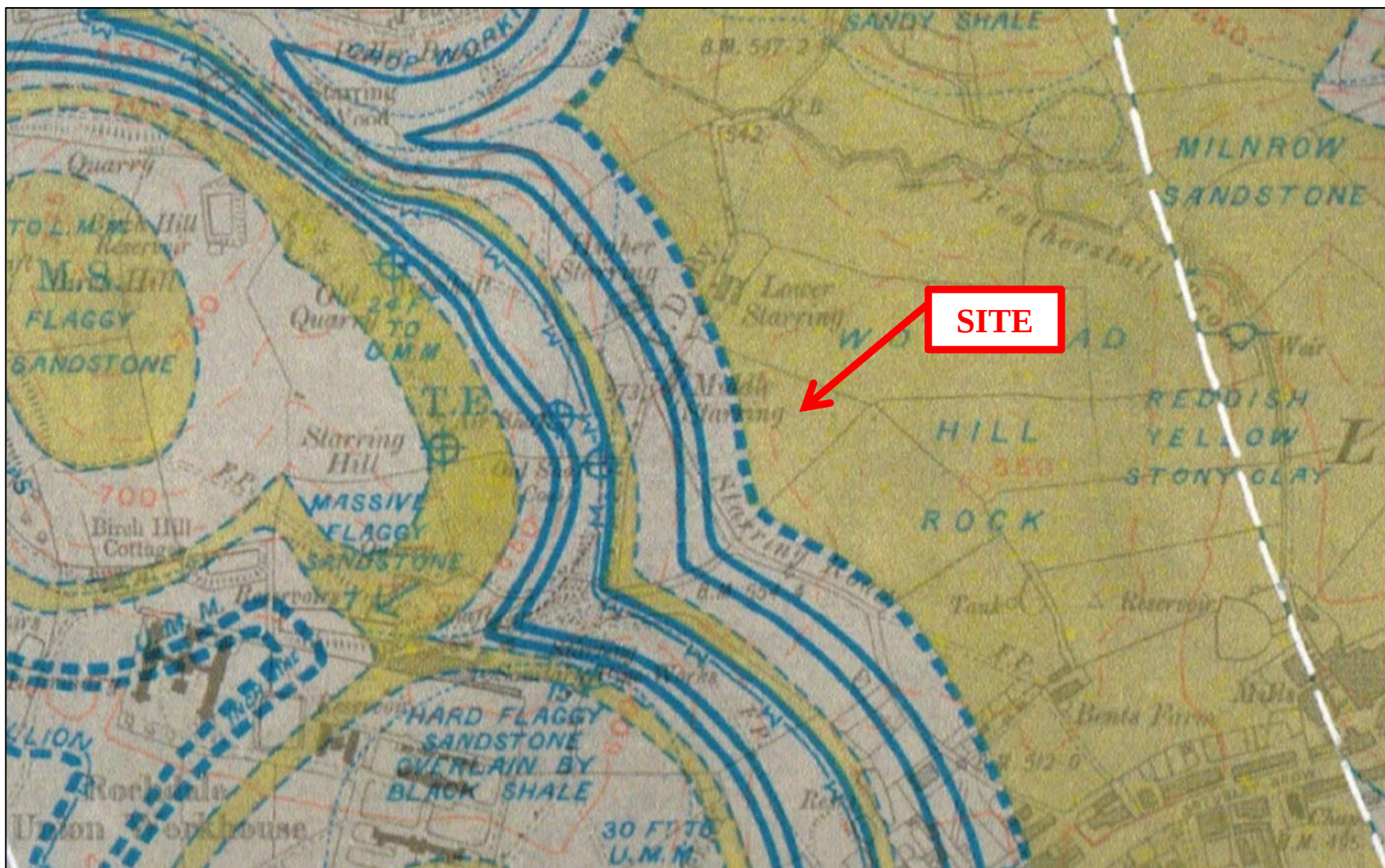
Order Number: 175479908_1_1
 Customer Ref: tjba-stalling way-landmark-020818
 National Grid Reference: 392450, 416430
 Slice: A
 Site Area (Ha): 0.99
 Search Buffer (m): 100

Site Details

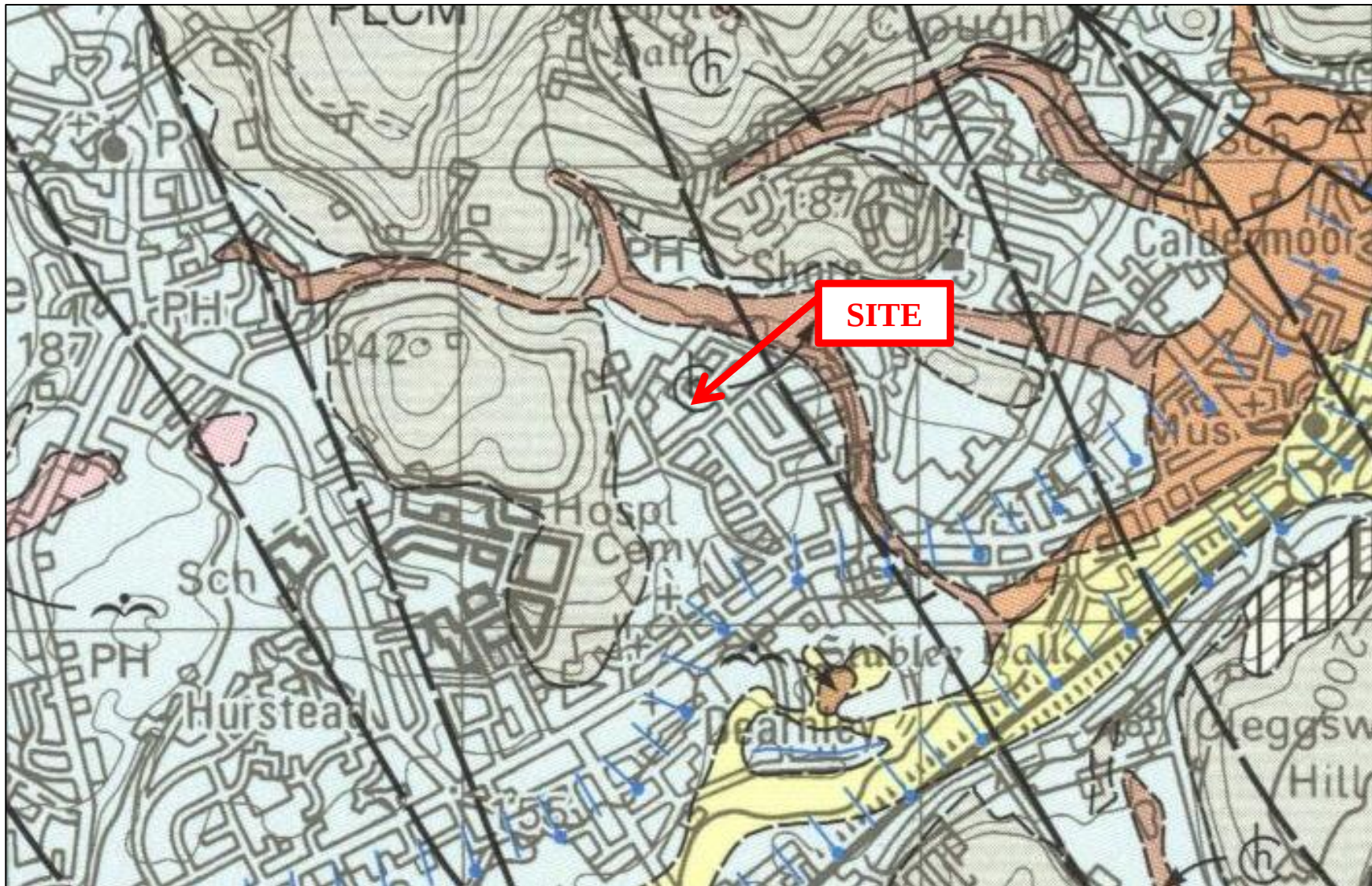
Land at Stalling Road., Littleborough, OL15 8LW

12.7. BGS Geological Maps





12.8. BGS Geological Map 1:50000 (Superficial)



12.9. Coal Authority/Google Earth Overlay

