



Meridian Geoscience Ltd

99 Serpentine Road
Kendal
Cumbria
LA9 4PD

t/f: 01539 741 122
m: 07836 382 563
e: md@meridiangeoscience.co.uk

**Hensingham House, Whitehaven,
Phase 3 Development**

Phase 1 Desk Study

Thomas Milburn (Property) Limited



Contents

1	Introduction	1
	1.1 <i>Terms of Reference</i>	1
	1.2 <i>Desk Study Requirements</i>	1
	1.3 <i>Sources of Information</i>	2
2	The Site	2
	2.1 <i>Site Location</i>	2
	2.2 <i>Site Description</i>	3
3	Development Proposals	4
	3.1 <i>Structures</i>	4
4	Ground Conditions	4
	4.1 <i>Geology</i>	4
	4.2 <i>Hydrogeology</i>	4
	4.3 <i>Coal Mining</i>	5
5	Site History	5
	5.1 <i>Historical Maps</i>	5
	5.2 <i>Satellite Images</i>	5
6	Environmental Data	6
	6.1 <i>Flooding</i>	6
	6.2 <i>Landfill and Waste</i>	6
	6.3 <i>Radon</i>	6
	6.4 <i>Environmental Designations</i>	6
7	Hazard Assessment	7
	7.1 <i>Sources</i>	7
	7.2 <i>Further Investigations and Uncertainties</i>	7
8	Conclusions and Recommendations	12

Figures

- 1 Site Location Map
- 2 Site Plan
- 3 Phase 3 Development Plan
- 4 - 6 Site Photographs

Appendices

- A Development Proposals
- B Archive Borehole and Trial Pit Logs
- C Historical Ordnance Survey Maps
- D Groundsure Enviro Insight Report
- E Radon Report
- F Risk Assessment Method

1 Introduction

1.1 Terms of Reference

- 1.1.1 At the request of David Shankland, and on behalf of Thomas Milburn (Property) Ltd, a Phase 1 Desk Study has been undertaken for Phase 3 of the Hensingham House redevelopment scheme, Whitehaven.
- 1.1.2 The redevelopment of Hensingham House is divided into three phases. Phase 1 focuses on the redevelopment of the existing residential properties, Hensingham House and Hensingham Hall. Phase 2 is a new-build development in the garden areas to the west of Phase 1. Phase 3, the subject of this desk study, is a larger new-build development of undeveloped land to the west of Hensingham House.

1.2 Desk Study Requirements

- 1.2.1 The UK approach to managing contaminated land is risk-based. Risk management principles underlie the legislative requirements of Part IIA of the Environmental Protection Act and the 'suitable for use' approach used in planning and development control.
- 1.2.2 The process of identifying, estimating and evaluating the risks associated with contaminated land was originally described in the Model Procedures for the Management of Contaminated Land (Environment Agency 2004). This has now been replaced with new guidance from the Environment Agency in the form of the online publication 'Land Contamination Risk Management' (LCRM) which was first published on the gov.uk website in October 2020. LCRM describes three tiers of risk assessment comprising (i) Preliminary Risk Assessment, (ii) Generic Quantitative Risk Assessment and (iii) Detailed Quantitative Risk Assessment. The desk study forms part of the preliminary risk assessment (Tier 1), the aim of which is to identify and assess potential hazards that could be present on a particular site.
- 1.2.3 The steps involved in the desk study are described below, and are based on the concept of identifying a pollutant linkage that connects a pollutant *source*, via a *pathway* to a *receptor* (for example people, buildings, rivers):
 - (i) Gathering of information about a site to determine its

industrial past, or discover other uses or location-specific factors that might have led to contamination, and to obtain other physical information including geology and hydrogeology.

- (ii) Identification of contaminants associated with former uses of the site or its geographical location, and the development of a list of those to be investigated.
- (iii) Identification of receptors that could be at risk from exposure to contaminants.
- (iv) Identification of pathways through which exposures could occur.
- (v) Development of a conceptual model describing plausible pollutant linkages.
- (vi) Hazard assessment.

1.3 Sources of information

1.3.1 The desk study is based on the following sources of information;

- Historical Ordnance Survey Maps (Appendix C)
- Groundsure Enviro and Geo Insight Report (Appendix D)
- Site visit 16th December 2021 and 17th February 2022

1.3.2 The source information, including the historical maps and the Groundsure report, cover all three phases of the Hensingham development.

2 The Site

2.1 Site Location

2.1.1 The site is located 1.2 miles south-east of Whitehaven in Hensingham between the A595 Hensingham Bypass and Egremont Road (Figure 1). The national grid reference of the site is NX 985 167, and the postcode is CA28 8QB.

2.2 Site Description

- 2.2.1 The Phase 3 site forms an approximately rectangular shaped plot of some 16,500 m² and measures 180 m north to south and up to 110 m east to west (Figure 2).
- 2.2.2 The site is bounded to the west by the A 595 Hensingham Bypass, and to the east by properties fronting onto Egremont Road and Phases 1 and 2 of the current development. The southern site boundary is a field boundary and the northern boundary is shared with the wooded slopes of a stream gully.
- 2.2.3 The site is an unoccupied field, which in the past may have been grazed, but has been untended and become overgrown with brambles. Ground levels fall westwards across the site at a gradient of about 1 in 10.
- 2.2.4 Access to the site is limited to a concrete track from the A595 which leads to the north-west corner of the site. A dense thicket of brambles prevented access into the field from the access track and from the Phase 2 development area on the east side of the site. Illustrative photographs are included in Figures 4 and 5.
- 2.2.5 Historical maps (see section 5.1) show that the western site boundary was formed with the construction of the Hensingham Bypass in the 1980s. The site boundary is about 45 m from the centreline of the bypass, which is a single carriageway road. Between the site boundary and the road there is a wooded slope, approximately 25 m wide, and a steep cutting slope adjacent to the highway (see photograph, Figure 6). The cutting is estimated to be some 5 m high and cut in to rocks of the Hensingham Formation at an angle of 45°.
- 2.2.6 Land use in the vicinity of the site is mostly agricultural fields and woodland, with residential land use to the east and north-east.

3 Development Proposal

3.1 Structures

- 3.1.1 The current development plan provided by the Architect for all three phases of development is included in Appendix A. An extract from this plan is given in Figure 3 to illustrate the

proposals for Phase 3, which shows 29 dwellings with associated hardstandings and garden areas, access roads and an area of public open space with children's play area.

4 Ground Conditions

4.1 Geology

- 4.1.1 The 1:50,000 scale geological map (British Geological Survey, Sheet 28, Whitehaven 2004) shows the site to be underlain by mudstones, siltstones and sandstones of Carboniferous age belonging to the Hensingham Formation. There are thin coal seams within this formation, and one such seam, the Bedlam Gill Coal, is conjectured to crop out along the eastern side of the site and dip westwards beneath the site.
- 4.1.2 The geological drift map shows the rock strata to be overlain by superficial deposits of glacial till (boulder clay).
- 4.1.3 The borehole archive of the British Geological Survey has been examined, and the records of two boreholes and two trial pits have been identified. The works were undertaken in 1985 for the construction of the Hensingham Bypass and show the ground conditions to comprise glacial till, typically 2 – 2.5 m thick, overlying beds of siltstone, sandstone and mudstone. Copies of the borehole and trial pit logs are included in Appendix B.

4.2 Hydrogeology

- 4.2.1 The nearest controlled water to the site is an unnamed stream, which flows westwards down the narrow stream valley adjacent to the northern site boundary. Another stream, Snebra Beck, follows a similar route and lies 120 m beyond the northern site boundary (page 40 Appendix D).
- 4.2.2 There are no groundwater source protection zones within the study area. The aquifer designation for the bedrock is 'Secondary A' (formerly classified as minor aquifers), and the designation for the superficial materials is 'Secondary Undifferentiated' (formerly classified as minor or non-aquifer). The groundwater vulnerability classification for the site is 'high'.

4.3 Coal Mining

- 4.3.1 The geological map shows the Bedlam Gill coal seam dipping westwards beneath the site. However, the Coal Authority interactive map indicates that the site is not within a development high risk area. There are no mine entries, and no past shallow coal mine workings or probable shallow coal mine workings within influencing distance of the site. The Bedlam Gill Coal is part of the Hensingham Group which lies beneath the productive Coal Measures. The geological memoir (Akhurst et.al., 1997, Geology of the West Cumbria District) states that the coal seams in the Hensingham Group are generally only a few centimetres thick. It is therefore unlikely that there would be any mining related hazards in connection with this coal seam.

5 Site History

5.1 Historical Maps

- 5.1.1 Historical Ordnance Survey maps at 1:2,500 scale dating back to 1865 have been obtained to provide an interpretation of site history (Appendix C).
- 5.1.2 The maps show no changes at the site until the Hensingham Bypass is first recorded on a 1994 edition map that was surveyed in 1992. This map also shows that the western site boundary is a new boundary that was created by the construction of the bypass.

5.2 Satellite Images

- 5.2.1 A series of satellite images dating from 1999 are provided in the Groundsure report (Appendix D), and do not show any activities at the site that could give rise to a contaminative hazard.

6 Environmental Data

6.1 Flooding

- 6.1.1 The Groundsure Enviro Insight report (Appendix D) indicates the site does not stand within an area at risk from river flooding (pages 44 and 46 Appendix D). Similarly, there is no risk of surface water flooding (page 48, Appendix D). The groundwater flooding risk is classified as 'low' (page 50, Appendix D).

6.2 Landfill and Waste

- 6.2.1 The Groundsure Enviro Insight report (Appendix D) identifies one historical landfill site within influencing distance of the site (< 250 m). The landfill was 120 m north of the site and was licenced to Eden Construction Ltd for the deposition of inert waste from 1991 to 1993. The other historical landfills identified in the Groundsure report form part of the Hensingham Open Space 350 m to the east of the site and are considered to be beyond influencing distance.

6.3 Radon

- 6.3.1 The Building Research Establishment (BRE) offers guidance on the requirements for new buildings to manage the hazards from naturally occurring radon gas. Three levels of radon protection are recommended, which are referred to as 'full', 'basic', or 'none required'. The maps in the BRE guidance indicate that the site stands within a 1 kilometre square where the probability of the property being above the action level is between 10 % and 30%. However, a more refined assessment based on postcode addresses has been obtained from the UK Health Security Agency, and this report concludes that the radon risk is between 1% and 3%, for which no radon protection measures are required (Appendix E).

6.4 Environmental Designations

- 6.4.1 Reference to the MAGIC website (Multi Agency Geographic Information for the Countryside, www.magic.defra.gov.uk) has been made to identify any nearby environmentally sensitive sites. There are no significant environmental designations within the site area, for example sites of special scientific interest (SSSI) or special areas of conservation (SAC).

7 Hazard Assessment

7.1 Sources

7.1.1 The following potential sources of contaminated land can be associated with agricultural land use:

- products associated with fuelling, servicing and repair of mechanised plant, for example, petrol, diesel, oil, brake fluids, anti-freeze, battery acid etc.
- pesticides
- farmyard slurry
- silage leachate

7.1.2 The site is overgrown with brambles and it has not been possible to directly inspect the site area. However, satellite imagery indicates that the site has not been in use for at least 20 years, and it is concluded that there is little likelihood of there being significant hazards from agricultural plant and associated activities.

7.2 Further Investigations and Uncertainties

7.2.1 Following the identification of potential sources, the desk study normally continues with the identification of pathways and receptors and describes the resulting pollutant linkages. A qualitative risk assessment is then undertaken to determine if further investigatory work is needed to clarify the nature and extent of risk. However, in this case, no significant potential sources of contamination have been identified that require further assessment.

7.2.2 There remains the possibility that some previous occupation of the site has not been identified, which could lead to unforeseen ground contamination. It is therefore recommended that professional advice be sought if evidence of land contamination is encountered during construction.

8 Conclusions and Recommendations


8.1 The desk study has not identified any potential sources of contamination.

8.2 The desk study completes Tier 1 of the Land Contamination

Risk management Guidelines, comprising hazard identification and hazard assessment. Further investigation, leading to Tier 2 Risk Estimation and Evaluation, is normally required where *moderate, high, or very high* risks are identified. No further ground investigation is considered necessary.

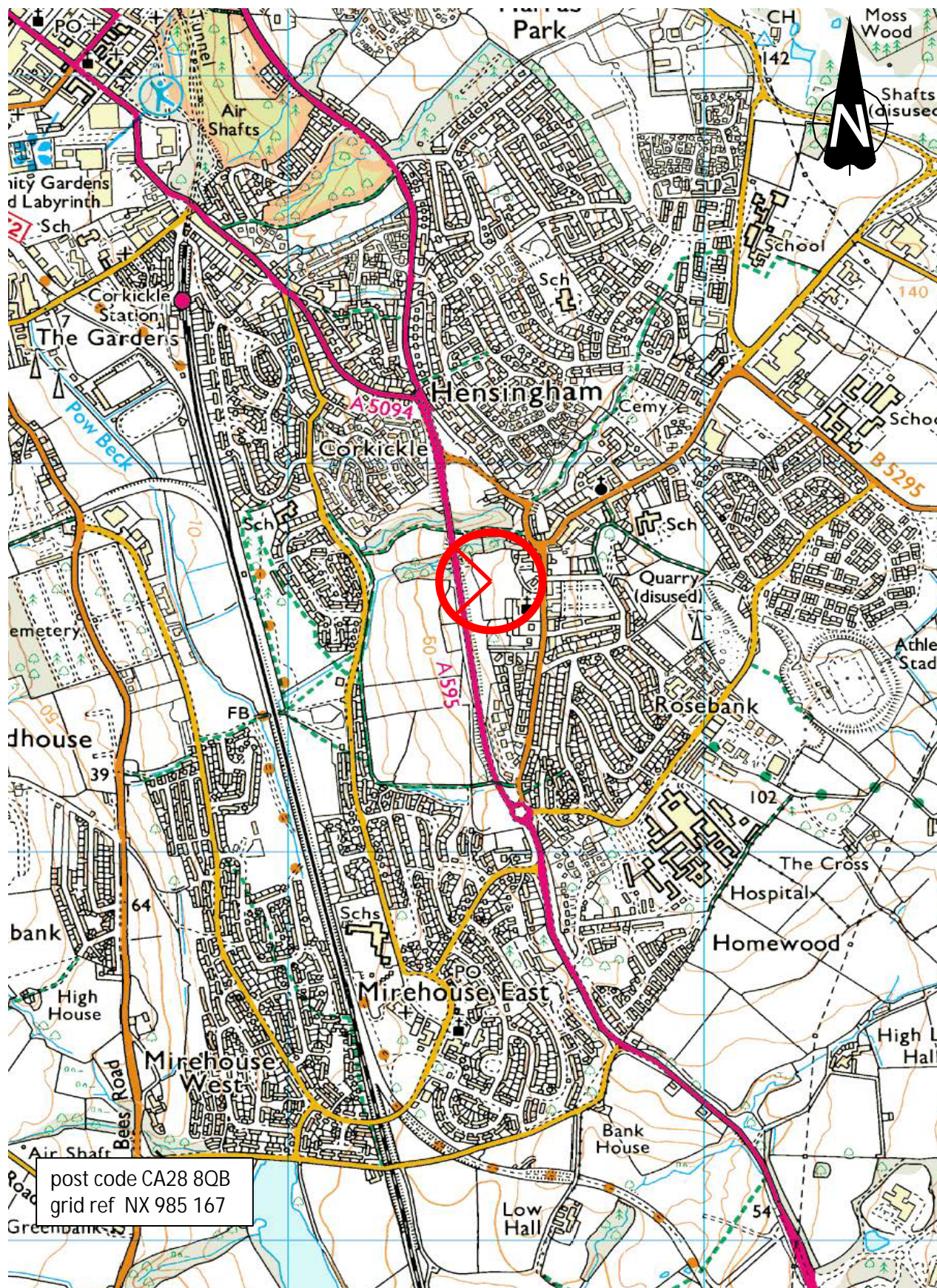
- 8.3 There remains a potential risk of contamination from unrecorded activities and we therefore recommend that the developers should seek professional assistance if they encounter significant quantities of unforeseen Made Ground materials, or if they find evidence (visual or olfactory) of soil or groundwater
- 8.4 No soils should be removed from the site or brought to the site without approval from the statutory authorities.

For and on behalf of Meridian Geoscience Ltd
18 February 2022

A handwritten signature in purple ink, appearing to read 'Richard Lote', is positioned above the printed name.

Richard Lote
BSc, MSc, FGS, CGeol

Figures



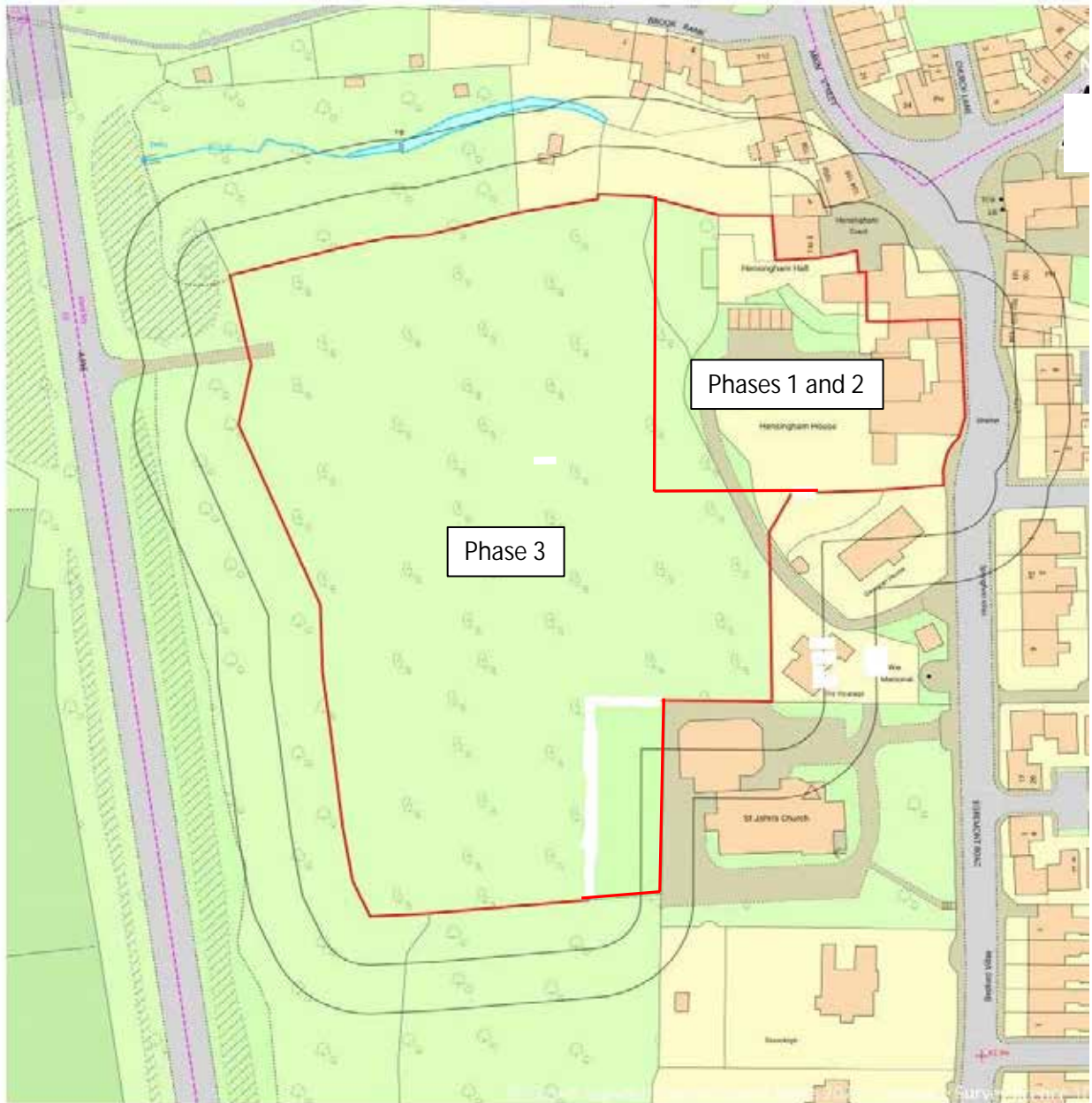
Reproduced from the 2021 Ordnance Survey 1:25,000 Explorer map with permission of The Controller of Her Majesty's Stationery Office, © Crown Copyright Meridian Geoscience Ltd 100014625



project
client
drawing

Hensingham House, Phase 3, Whitehaven
Thomas Milburn (Property) Ltd
Site Location Map

scheme
scale
figure
1661.3
nts
1



Hensingham House, Phase 3, Whitehaven
Thomas Milburn (Property) Ltd
Site Plan

scheme	1661.3
scale	nts
figure	2





Photo 1: View looking south towards St John's Church along eastern boundary of site.



Photo 2: View looking westwards across site. Trees in middle distance border the bypass just beyond western site boundary.



Photo 3: View looking up concrete access track from bypass towards north-west corner of site.



Photo 4: Thicket of brambles preventing access onto site from track at north-west corner.



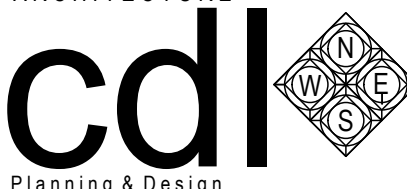
Photo 5: Cutting slope on Hensingham Bypass to west of site.

Appendix A

Development Proposals



This drawing is copyright, reproduction of this drawing is only with consent from C.D.L. Figured dimensions are to be followed in preference to scaled dimensions, and all measurements to be checked on site, and to be taken from the actual work where possible. Any discrepancy must be notified immediately, and before proceeding. All drawings and associated specifications to be returned on request. DO NOT SCALE FROM THIS DRAWING

ARCHITECTURE		CORBRUND DEVELOPMENTS LTD		
		<p>Mob : 07786991404 The Studio 26 Corporation Rd Carlisle Cumbria CA3 8XB E Mail : cdlarcdesign@gmail.com</p>		
Client :	THOMAS MILBURN PROPERTY LTD			
Drwg No :	DS/TMS/2/21			
Date :	October 21			
Checked By :	DS			
		REVISION A		
Scales :	Elevations :	Detail : PLANNING		
	Floor Plans :	Title : CONVERSION OF HENSINGHAM HOUSE		
	Block Plan : 1 : 500	AND ASSOCIATED BUILDINGS		
	Location Plan :	Address : HENSINGHAM HOUSE, HENSINGHAM, WHITEHAVEN		
	Sections :	CUMBRIA .		

Appendix B

Archive Borehole and Trial Pit Logs

298 565 516729

Geotechnical Engineering (Northern) Ltd.

NK 91NE

101

**BOREHOLE LOG**

CLIENT DEPARTMENTS OF THE ENVIRONMENT AND TRANSPORT.

SITE ASDS HENSINGHAM BY-PASS, CUMBERA.

BOREHOLE NO. 8.

SHEET 1 OF 2

DATE 6-16 JULY 1985 GROUND LEVEL 74.30 m O.D. SCALE 1:50

geology	progress and water level	depth	description	SPT / RPT	core / sample	depth	level	legend
	6.7.85		Dark grey/black slightly sandy silty clay - Torsoil with rootlets			0.45 0.50	73.85	
			Fine mid orange, brown, mottled buff and veined mid grey, very close to extremely closely fissured slightly sandy silty clay with abundant fine subangular gravel of orange and brown very weak siltstone. Gravel becomes fine to medium with depth, very weak and weak.	N=10	RECORDED CABLE TOOL RIG (SHELL AND AUGER)	0.85 1.10 1.25		
			HW, extremely closely fissured, very weak, friable dark grey, slightly micaceous, argillaceous SILTSTONE. Brown rust staining on discontinuities.	R ₁₀ = 10 (N=85) R ₂₀ = 20 (N=600)		1.75 2.20 2.35 2.60	71.85 71.70	
	Water strike in SPT at 2.35m. Rose to 2.50m after 1 hour.		SW, medium bedded (SSO), dip 20°, off-white/pale grey moderately strong and strong, highly calcareous SILTSTONE. Below 3.15m becomes MW, thinly bedded, though core generally not intact, friable and stained mid brown and orange grading down into very weak to weak silty MUDSTONE.		WATERFURN DIAMOND CORE DRILLING. CORE LINE TO BOREHOLE. 17m of core.	4.30 4.48	70.00	
	15.7.85		MW to HW, extremely closely fissured, dark grey, very weak and weak, silty MUDSTONE weathered to clay along fissures. Below 4.85m becomes generally F to SW (though MW to HW on joints above 5.25m), generally very thin to thinly bedded, occasionally medium bedded (25-50-230), dip 20°, medium to widely spaced 70° and subvertical joints, very closely fissured, dark grey weak and moderately weak silty MUDSTONE. Slight greenish discoloration on outside of core. Occasionally poorly current bedded with pale grey siltstone bands. Core generally not intact above 5.90m.	R = 225 (N=67) I.R. = 100mm (N=100) I.R. = 240mm (N=175) I.R. = 160mm (N=250)		5.75 6.37 7.83 9.35		
	pm: 1.85m 16.7.85 am: 4.00m							
			Continued on sheet 2 in same stratum to 11.02m.			(10.50)		
<div> <div> <div>undisturbed sample, open-drive or prepared from drill core</div> <div>disturbed sample taken</div> <div>standard pen. test</div> </div> <div> <div>water sample</div> <div>rock pen. test. R - penetration for 50 blows</div> </div> </div>								
GEL JOB No. 1404N							FIGURE 15	

**BOREHOLE LOG**

CLIENT DEPARTMENTS OF THE ENVIRONMENT AND TRANSPORT.

SITE A555 HENSINGHAM BY-PASS, CUMBRIA.

BOREHOLE No. 8.

SHEET 2 OF 2.

DATE 6-16 JULY 1985 GROUND LEVEL 74.30m O.D. SCALE 1:50

geology	progress and water level	description	SPT/ RPT	core/ sample	depth	level	legend
	(16.7.85)	Continued from sheet 1 in same stratum.			(10.50)		
		Description as on sheet 1 from 4.30m.			10.87	63.28	
		Generally F, though SW on some discontinuities, very thin to thickly bedded (25-150-800), dip 10°, pale/mid grey moderately strong and strong, calcareous SILTSTONE, slightly current bedded with white shell fragments.	I R = N-24	68 72mm DIAMETER CORE	11.02		
		SW, very thin to thinly bedded (30-70-110), dip 10°, dark grey, weak and moderately weak silty MUDSTONE. 13.17m to 13.23m NW extremely closely fissured, fragmented, very weak.	- R = 0m		12.15		
		Generally F to SW, medium to thickly bedded (200-750), dip 10°, subvertically jointed with dark pink haematite? deposits, pale grey moderately strong and strong fine grained slightly calcareous, silty SANDSTONE. Current bedded with dark grey-black wisps. Slightly micaceous.	- R = 0m		13.01	61.29	
		F to SW, very thin to thinly bedded (40-60-80) dip 10°, 80° joint, dark grey-black weak and moderately weak slightly silty MUDSTONE with some white calcitic shell fragments. 15.24m to 15.51m - SW, bright blackily fissured purituous COAL trace of pinkish grey silty clay at base.			13.64	60.66	
		F to SW, medium to thickly bedded (350-400-670) dip 5-10°, pale grey, moderately weak and moderately strong, fine to medium grained, slightly calcareous SANDSTONE. Partly current bedded in parts with black coaly silty wisps. Stained pale orange brown in parts. 2mm coal parting at 17.54m.	- R = 10mm (N-1500)	41 72mm DIAMETER CORE DRILLING	14.46 14.55	59.75	
		F to SW, thin to medium bedded (25-110-350) dip 10-15°, off-white/pale grey slightly current bedded, moderately weak and moderately strong, fine grained SANDSTONE. Slight orange-brown discoloration in parts. Current bedded with dark grey micaceous silt and black purituous coaly wisps. Occasional subvertical incipient calcite filled fissure. Becomes fine to medium grained between 18.04m and 18.25m.	- R = 0m	36 75 WATERFLUSH DIAMOND CORE	15.24 15.49 15.51	59.06 58.73	
	standpipe installed at 19.50m.				17.01		
	pm 18.00m				17.89	56.41	
					18.53		
					19.08		
					20.05	54.25	
		END OF BOREHOLE AT 20.05m					

■ undisturbed sample, open-drive or prepared from drill core
 ◆ disturbed sample taken.
 ▲ water sample
 □ standard pen. test
 I rock pen. test, R - penetration for 50 blows

GEL JOB No.

H04N

FIGURE

16

298485 516643

Geotechnical Engineering (Northern) Ltd.

BOREHOLE LOG

11K 91 NE / 112



CLIENT DEPARTMENTS OF THE ENVIRONMENT AND TRANSPORT.

SITE ASDS HENSINGHAM BY-PASS, CUMBRIA.

BOREHOLE No. 19.

DATE 29 JULY 1985 GROUND LEVEL 76.05 M OD SCALE 1:50

geology	progress and water level	description	SPT/ RPT	core/ sample	depth	level	legend
	29.7.85	Dark brown, clayey, silty, fine grained sand- pason and organic siltstone with rootlets. Little fine subangular to rounded gravel.					
		Firm, mid to dark orange-brown slightly sandy silty CLAY with little fine, occasionally medium gravel including coal.	H=8"		0.90 1.15	75.15	
		Stiff, dark olive-brown, mottled orange and banded dark grey in parts, silty CLAY some fine to medium subangular gravel of mudstone, siltstone and sandstone becoming more frequent with depth.	H=15"		1.80 2.15 2.50	74.25 73.55	
		Hv, extremely closely fissured, shaley, dark grey though generally stained rusty orange-brown, very weak silty mudstone. CR is hard, friable silty clay along fissures.	H=2.5" 294mm (N=52)	REMARKS: ONLY SELLING PROBABLY CONTAMINATED DISTURBED SAMPLE 900mm SAMPLE.	3.00 3.45	73.55 72.60	
		END OF BOREHOLE AT 3.45m. Borehole back-filled on completion.					
		R* extrapolated from SPT at 3.00m:- 10/13/14/13/15 for 300mm penetration.					
<div> <div>■</div> undisturbed sample, open-drive or prepared from drill core <div>▲</div> water sample </div> <div> <div>□</div> standard pen. test <div>⊥</div> rock pen. test, R - penetration for 50 blows </div>			GEL JOB No. 1404N		FIGURE 32		

29x471 516678

Geotechnical Engineering (Northern) Ltd.

127

NX 91 NE



TRIAL PIT LOG.

CLIENT DEPARTMENTS OF THE ENVIRONMENT & TRANSPORT.

TRIAL PIT 12.

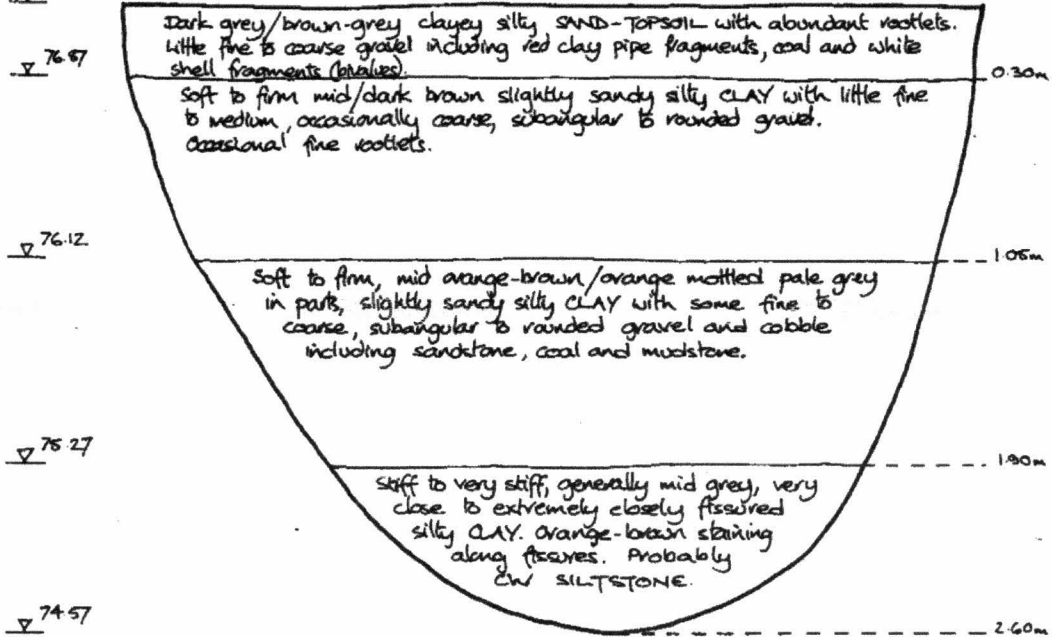
SITE HENSINGHAM BY-PASS

DATE 10 JULY '85 SCALE 1:25

REDUCED
LEVEL
(m)
▽ 77.17

W

E



Dry and stable on completion.

Bag samples taken:

0.30m to 1.05m
1.05m to 1.90m
1.90m to 2.60m.

Excavated using JCB 3CX 600mm wide bucket.

HAND VANE TEST RESULTS

DEPTH - m	C_u - kN/m ²
0.30 - 1.05	64, 64, 47, 66, 54
1.05 - 1.90	57, 50, 56, 48, 55, 26, 30, 36

298441 516657

Geotechnical Engineering (Northern) Ltd.

TRIAL PIT LOG

NK91NE

128



CLIENT DEPARTMENTS OF THE ENVIRONMENT & TRANSPORT.

TRIAL PIT 13.

SITE HENSINGHAM BY-PASS

DATE 10 JULY '86 SCALE 1:25

REDUCED
LEVEL
(m)

▽ 72.15

▽ 71.85

▽ 70.95

▽ 70.00

▽ 69.85

W

E

Dark grey-brown/black clayey silty SAND-TOPSOIL with abundant rootlets. Little fine to coarse gravel. Occasional glazed pottery fragments.

Firm, pale/mid grey, mottled buff/brown/orange silty clay, many dark grey/black very silty clay pockets - up to medium gravel sized. Some fine, subangular gravel sized fragments of weak dark grey silty mudstone.

0.30m

MW to HW, thin to thickly laminated, very close to extremely closely fissured, dark grey/black, weak and moderately weak carbonaceous MUDSTONE. Stained dark rusty brown along fissures. Some ironstone nodules up to coarse gravel size. Weathered to stiff clay along some fissures.

1.20m

2.15m

2.30m

MW, very thinly bedded, closely fissured, dark grey, moderately weak and moderately strong, argillaceous SLTSTONE. Stained rusty orange and brown along discontinuities. Occasional ironstone nodules up to coarse gravel size.

Dry and stable on completion.

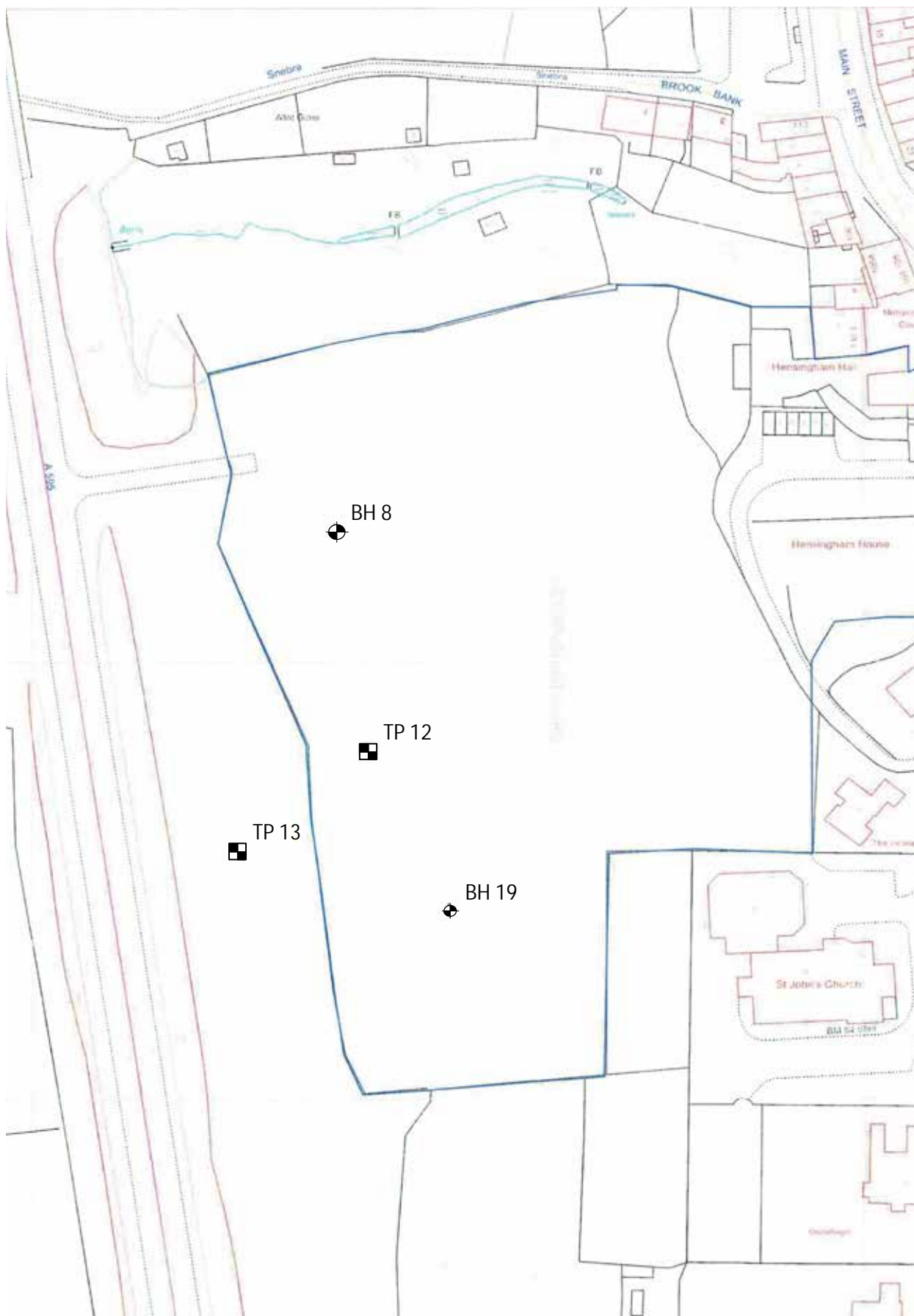
Bag samples taken: 0.50m to 0.80m
1.50m to 1.80m
2.15m to 2.30m

Excavated using JCB 3CX. 600mm wide bucket.

HAND VANE TEST RESULTS.

DEPTH - m C_u - kN/m²
0.30 - 1.20 38, 42, 58, 44, 58, 54.

GEL JOB No.	FIGURE
1404N	48



Appendix C

Historical Ordnance Survey Maps

Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: County Series

Map date: 1863-1865

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1865
Revised 1865
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1863
Revised 1863
Edition N/A
Copyright N/A
Levelled N/A

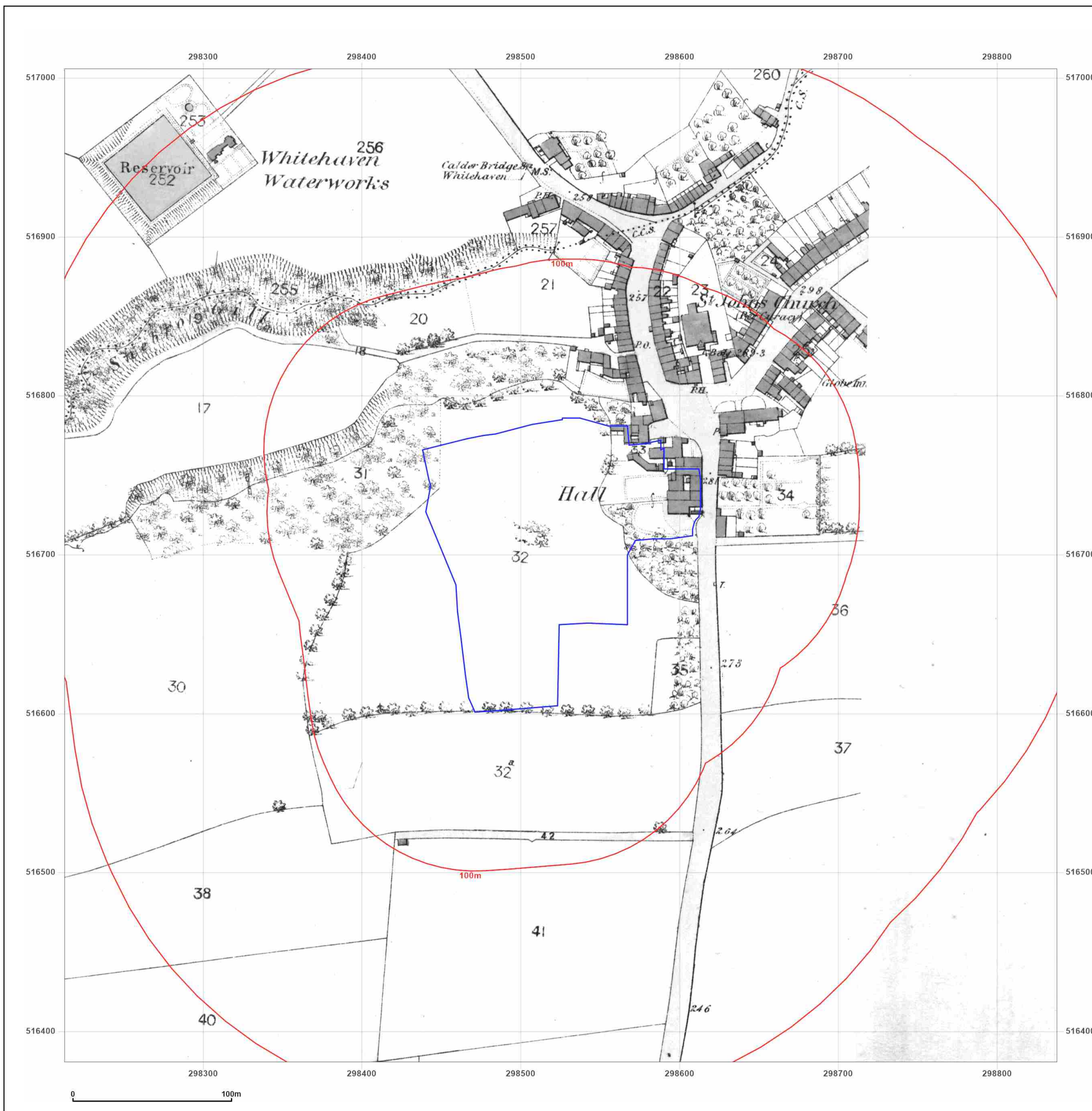


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: County Series

Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1899
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1899
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

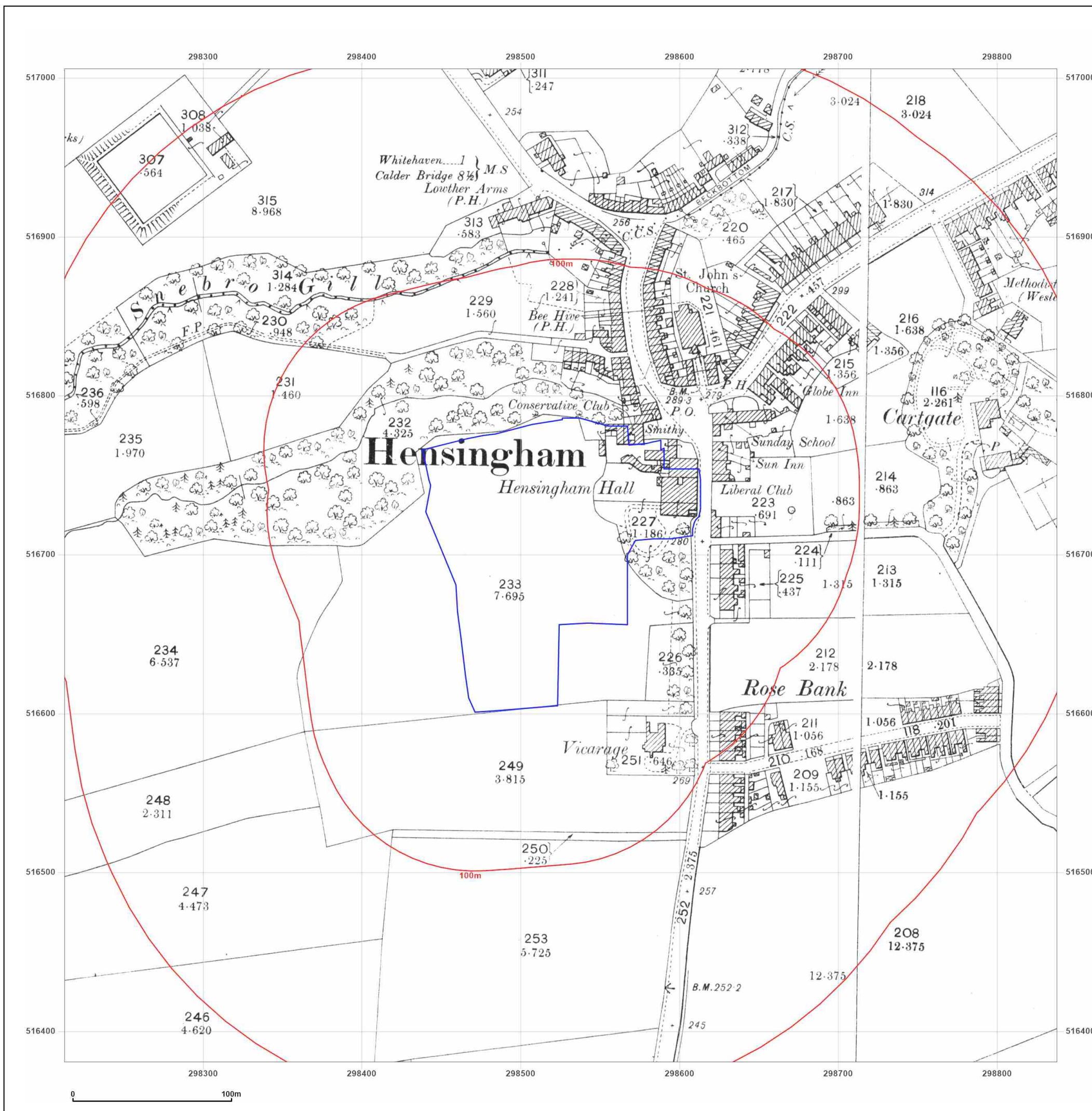


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: County Series

Map date: 1925

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

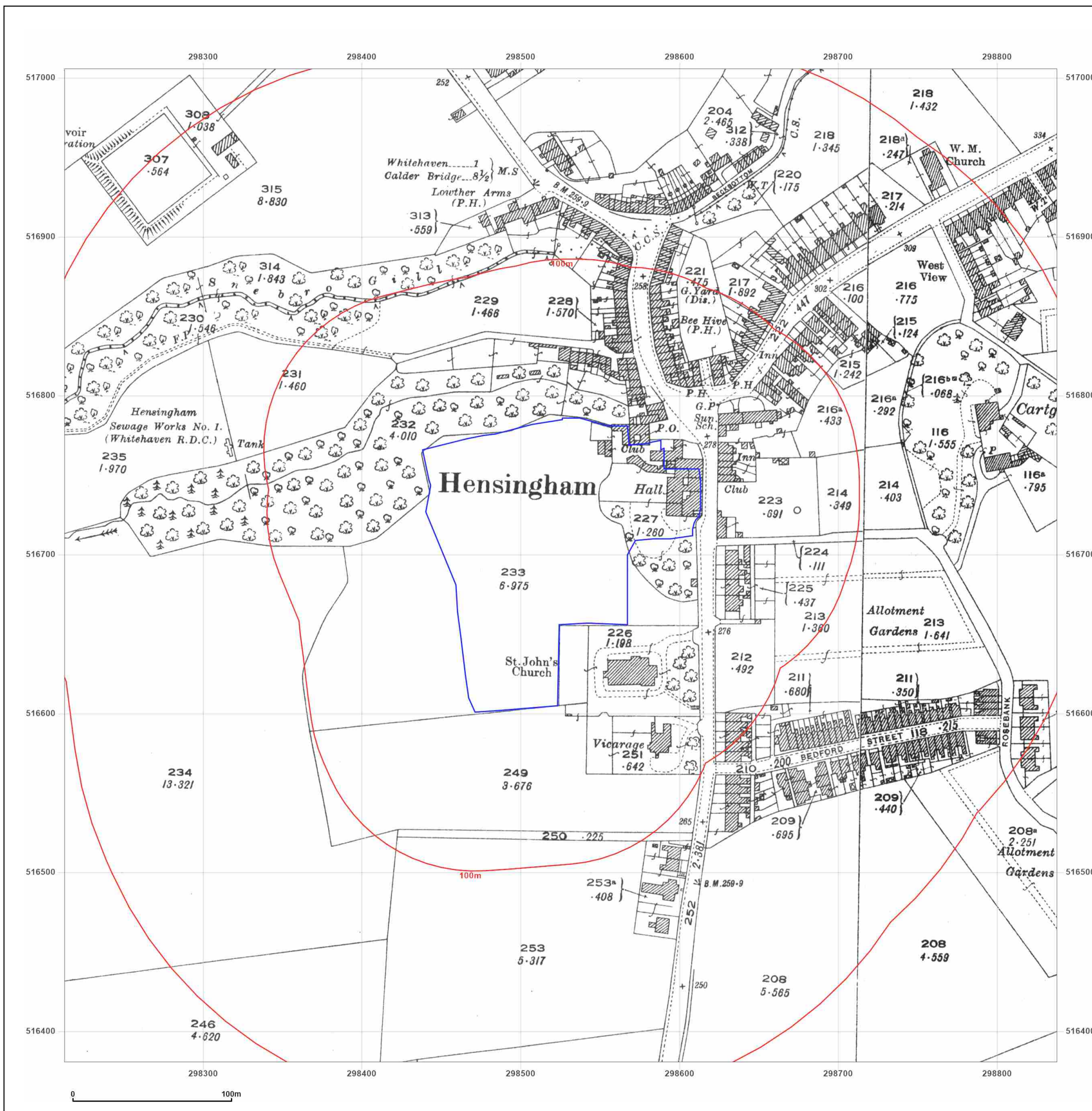


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: County Series

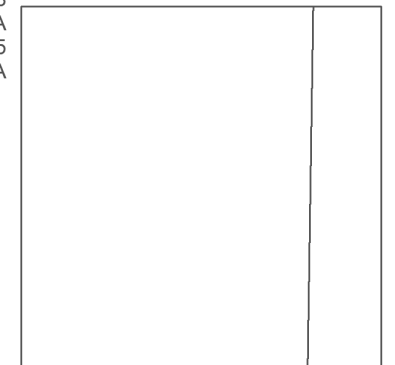
Map date: 1945

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1938
Revised 1938
Edition N/A
Copyright 1945
Levelled N/A

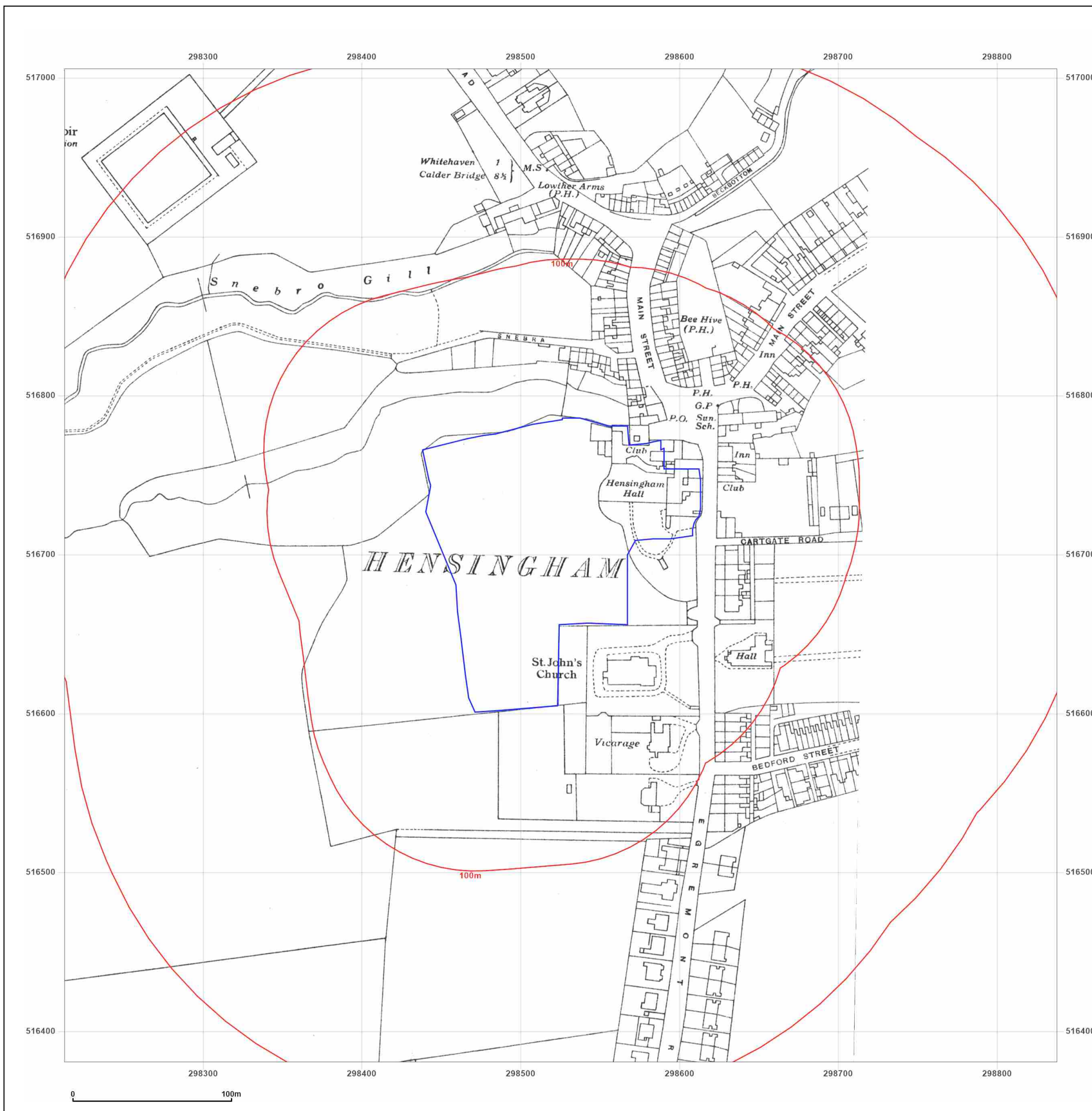


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: National Grid

Map date: 1960

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1956

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1956

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1956

Surveyed 1960
Revised 1960
Edition N/A
Copyright 1961
Levelled 1956

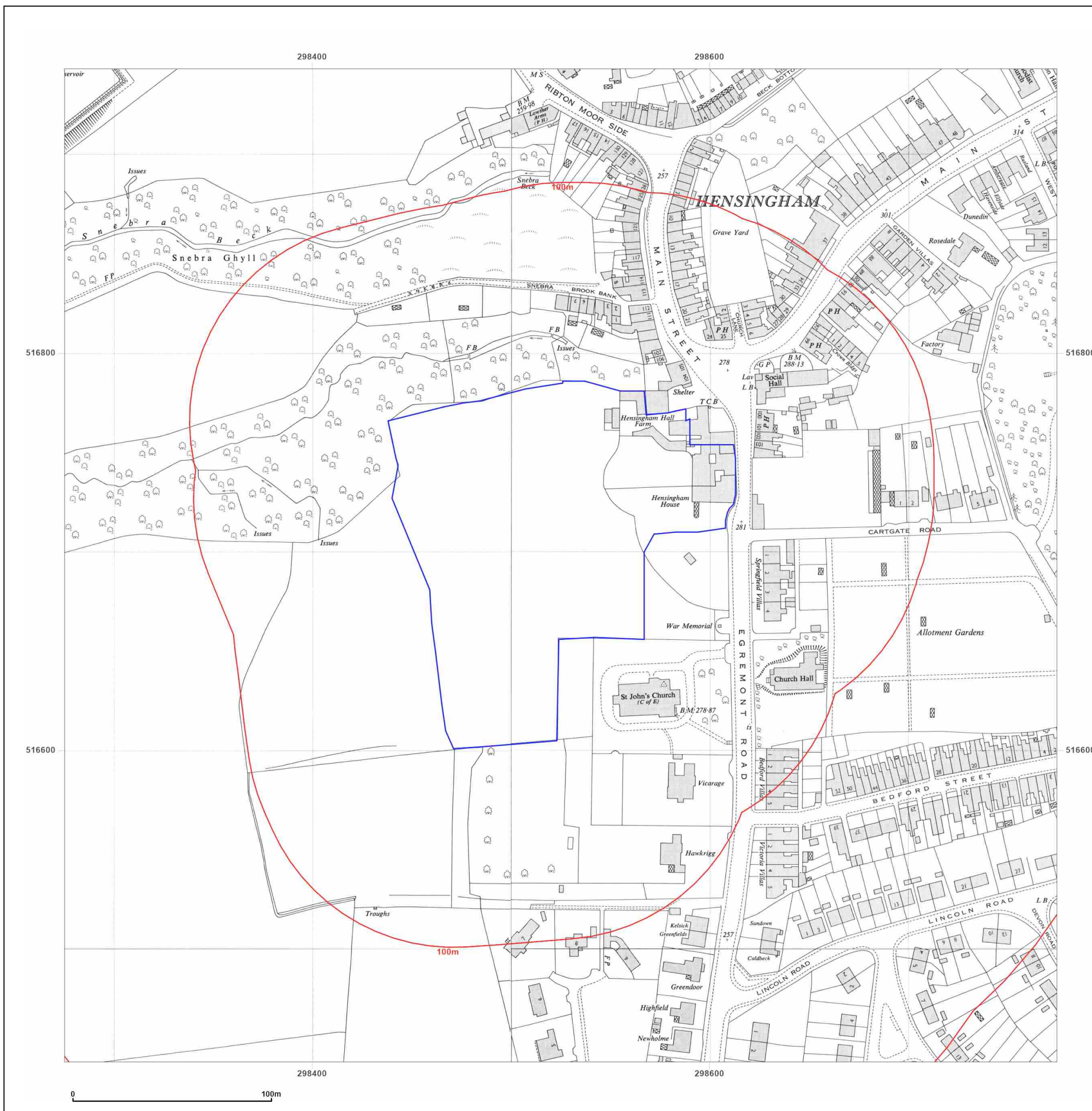


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: National Grid

Map date: 1961

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

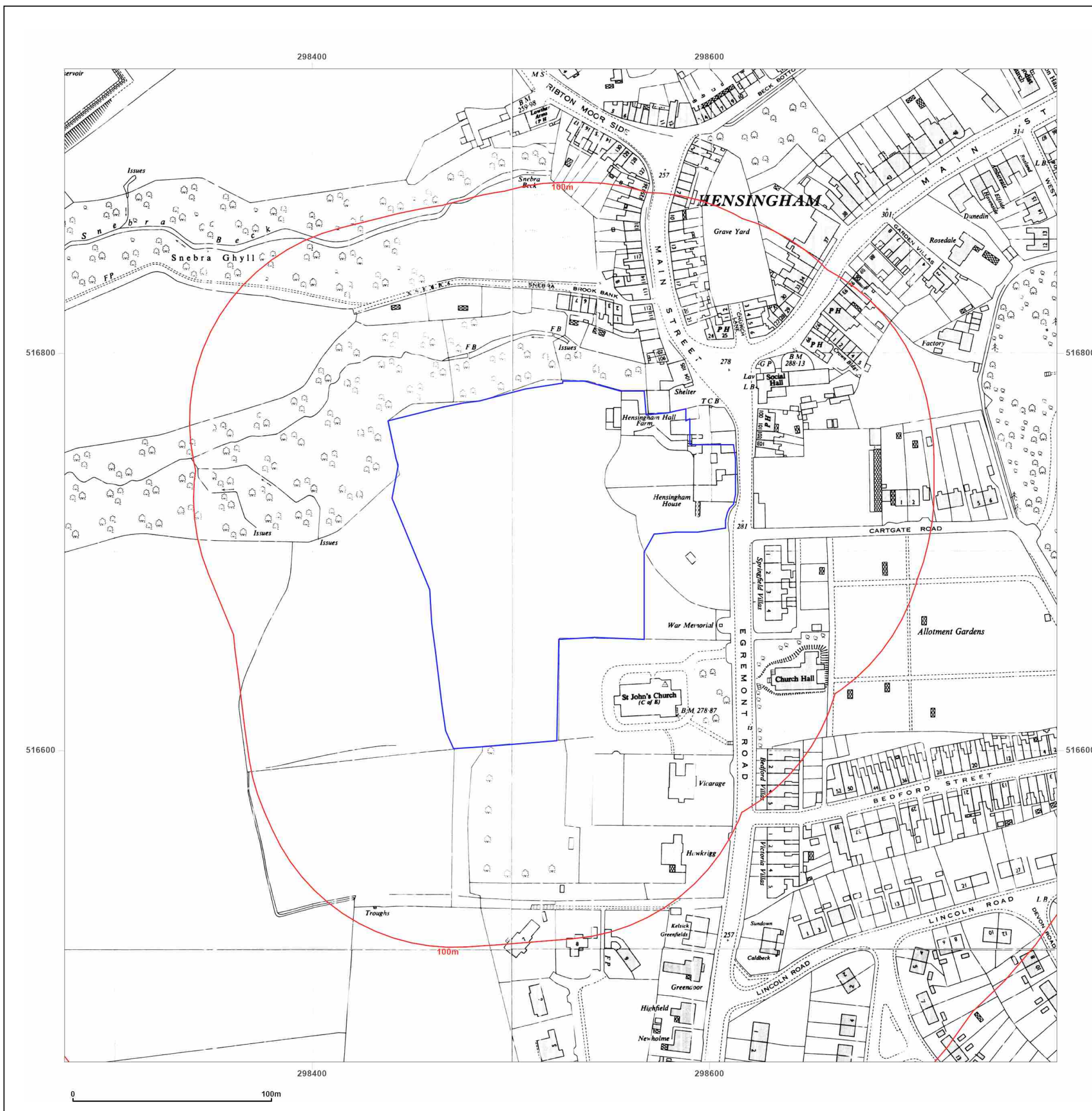


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: National Grid

Map date: 1963

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1961
Revised 1961
Edition 1963
Copyright 1963
Levelled 1956

Surveyed 1961
Revised 1961
Edition 1963
Copyright 1963
Levelled 1956

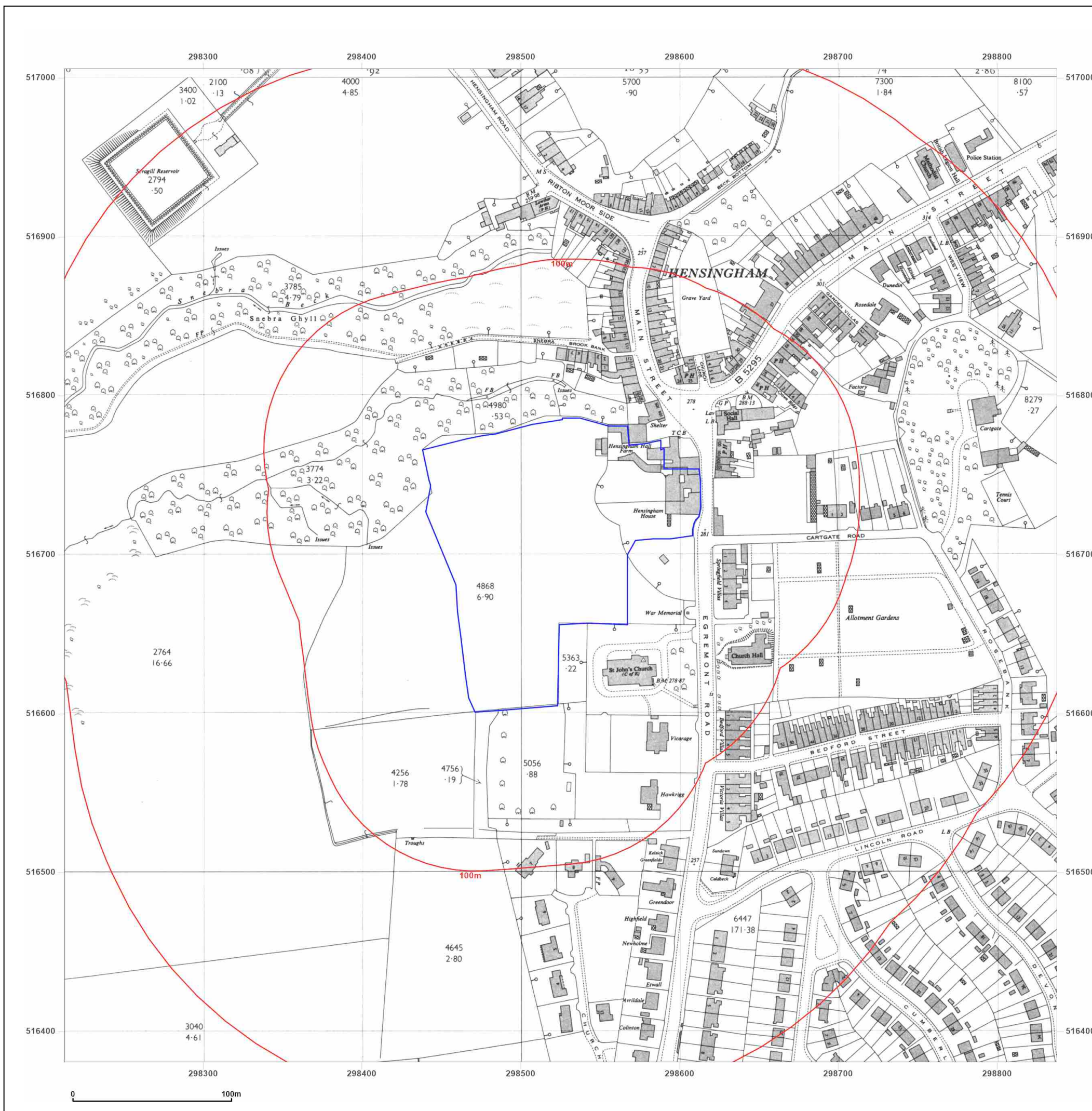


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: National Grid

Map date: 1969-1970

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1968
Revised 1968
Edition N/A
Copyright 1969
Levelled 1965

Surveyed 1968
Revised 1968
Edition N/A
Copyright 1970
Levelled 1965

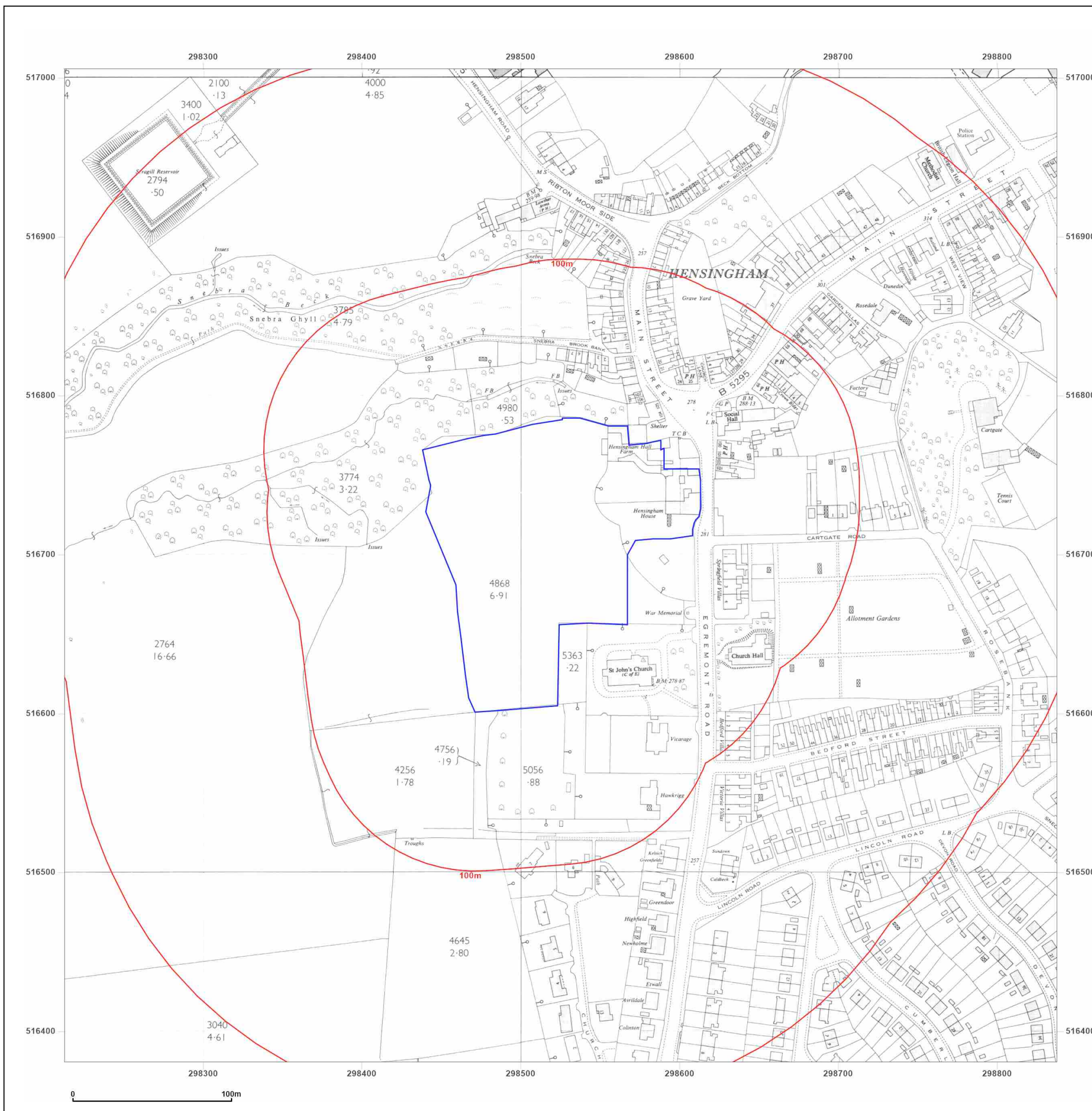


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: National Grid

Map date: 1970

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

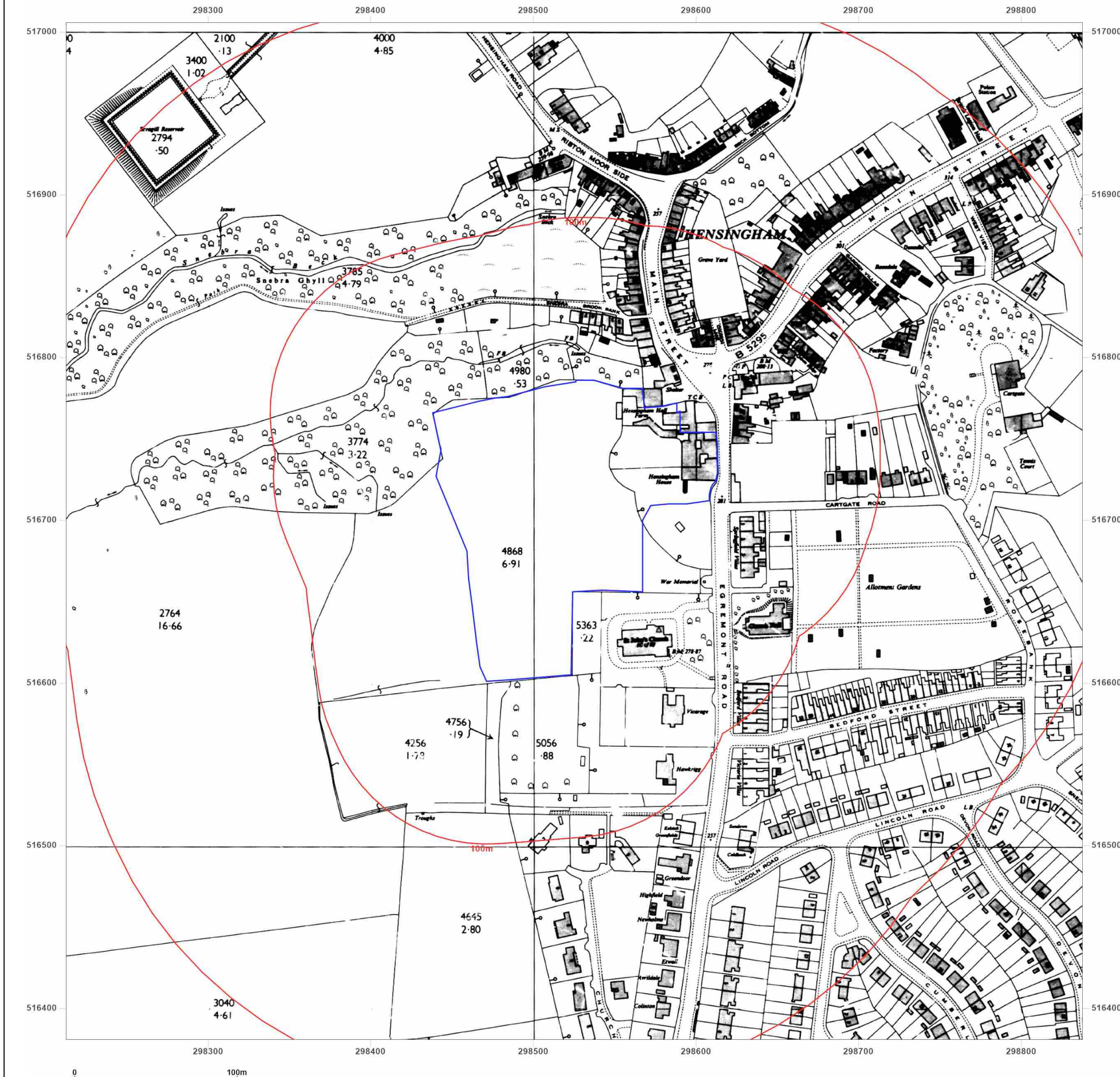


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: National Grid

Map date: 1989-1994

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1989
Revised 1989
Edition N/A
Copyright 1989
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

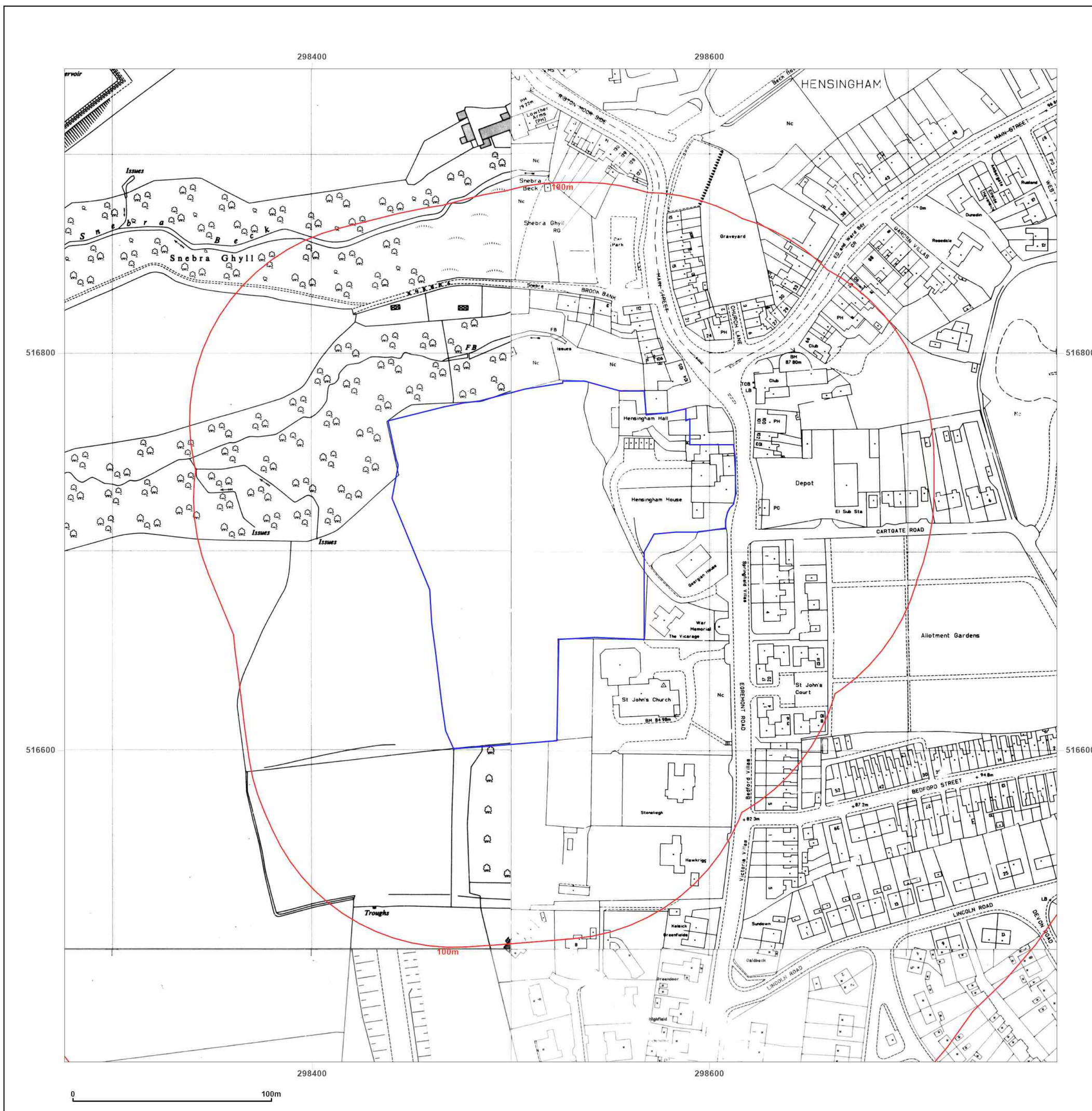


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: National Grid

Map date: 1992-1994

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

Surveyed 1994
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

Surveyed 1992
Revised 1992
Edition N/A
Copyright 1992
Levelled N/A

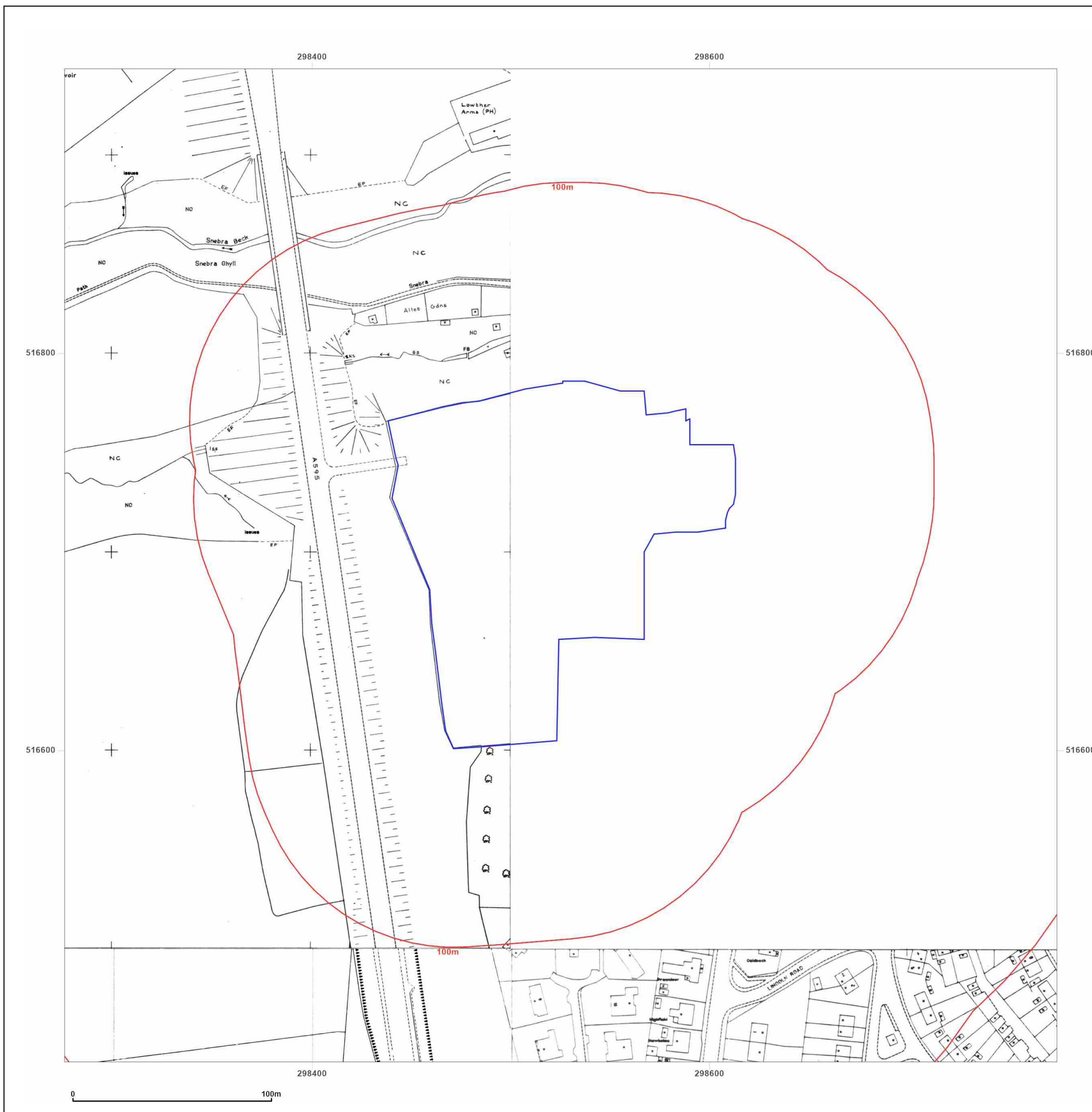


Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

Hensingham House,
Hensingham, Whitehaven,
CA28 8QB

Client Ref: MGL_1661
Report Ref: GS-8409785
Grid Ref: 298525, 516693

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250



2003



Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 20 December 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf

