PHASE 1 ENVIRONMENTAL SITE ASSESSMENT REPORT

1 – 5 CAUSEY DRIVE,

MIDDLETON,

MANCHESTER,

M24 5PN

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Executive Summary
The preliminary environmental site assessment indicates that the site can be classified as moderate risk in terms of contamination and the risks to the identified receptors (e.g. human health, controlled waters, buildings) following redevelopment is considered to be moderate. This classification is due to the potential for Made Ground to be present in the shallow soils, resulting from the demolition of the former on-site buildings. Potential contaminants could include heavy metals, polyaromatic hydrocarbons (PAHs) and asbestos. Additionally, an electrical substation is located close to the site which could be a source of polychlorinated biphenyls (PCBs) contmaination. It is recommended a Phase 2 intrusive ground investigation is undertaken prior to site redevelopment to obtain additional information on the ground conditions and the contamination status. The investigation should be carried out by qualified and competent persons. The scope of works for the investigation will need to be submitted and approved by the local authority prior to the commencement of the Phase 2 intrusive works.

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1 Introduction

1.1 Background

EnviroSolution Ltd was commissioned to undertake a Phase 1 Environmental Site Assessment at a site located at Causey Drive in Manchester. This report was commissioned to support the planning application for the construction of a new residential development.

1.2 Objectives

The objective of the preliminary environmental site assessment was:

1. To provide a summary of the environmental setting and historical land use of the site and immediate surrounding area.
2. To obtain information on the ground conditions present beneath the site.
3. To develop a conceptual site model and complete a generic quantitative risk assessment to identify any environmental risks and liabilities associated with ground conditions at the site.

1.3 Scope of Work

To achieve the objectives, the following scope of work was completed:

1. A desk-based study of the site comprising a review of available environmental information for the site such as geological and hydrogeological data and historical land use information.
2. A site walkover survey.
3. Assessment of potential hazards and constraints during construction and longer term.

This work has been devised to generally comply with the relevant principles and requirements of the following legalisation and guidance:

- Part IIA of the Environmental Protection Act, 1990 and Section 57 of the Environmental Act 1995;
- Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, April 2012);
- National Planning Policy Framework (Ministry of Housing, Communities and Local Government, February 2019);
- BS10175: 2011 +A2:2017 “Investigation of Potentially Contaminated Sites- Code of Practice”; and
- DEFRA/Environment Agency (2004) Report CLR11 “Model Procedures for the Management of Land Contamination”.

1.4 Information Sources

Historical Ordnance Survey maps have been obtained from historical records, ranging from 1848 to 2019. These maps provide high quality information on historical site use.

The British Geological Survey Geoindex database has been used to provide information on geo-environmental aspects of the site and the immediate surrounding area such as geological, hydrogeological and hydrological data.

The Environment Agency website (www.gov.uk/government/organisations/environment-agency) and Magic website (www.magic.gov.uk) was also used to obtain environmental information.

Industry Profiles produced by the Department of the Environment were utilised to obtain information on processes, materials and wastes associated potential contaminative land uses near the site.

Readily available information sources have been used to produce this desk-based study. Additional information may be requested by the Local Planning Authority (e.g. local authority environmental information request).

2 The Site

2.1 Site Location

The site is located at 1-5 Causey Drive, Middleton, Manchester, M24 5PN. The British National Grid Reference for the approximate site centre is GR: 385823 407159.

The site location is shown on **Figure 1** in **Appendix A**.

2.2 Site Description

The site photographs are included in **Appendix B**.

The site is rectangular in shape and covers an approximate area of 450 square metres. The site is currently a vacant plot of green space which lies to the south of existing residential properties.

The entire site is covered in grass lawn.

A single small tree is located in the south-eastern corner of the site.

The topography of the site is generally flat with little change in elevation from 122m aOD to the east and 121m aOD to the west.

The site boundaries are open on all sides except for the northern side which is bounded by a 2m tall wooden panel fence. The site is bounded by existing residential properties to the north and west, Causey Drive to the south and Windermere Road to the east.

Land use in the surrounding area is predominantly residential.

There are no petrol filling stations located within a 250m radius of the site.

The existing site plan is shown on **Figure 2** which is included in **Appendix A**.

2.3 Development Proposals

It is understood that the development proposal includes the construction of 3 no. new residential terrace dwellings. The final plans include areas of soft landscaping and areas for vehicle parking.

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

2.4 Site History

The development site and surrounding area has been reviewed with reference to historical Ordnance Survey (OS) maps. The history of the site and immediate surrounding area is summarised in Table 1. Copies of the historical OS maps are included in **Appendix C**. A search buffer of 250m has been used.

Table 1 - Historic Mapping Review

Date	Scale	On Site	Off Site
1848	1:10,560	Site is undeveloped and lies within a large open field.	Small pond 60m west and 240m south of the site. Langley Brook 200m northwest of the site. Well 250m northeast of the site.
1893	1:2,500	No significant change.	No significant change.
1909	1:2,500	No significant change.	No significant change.
1922	1:2,500	No significant change.	Well located 95m northeast of the site. Small pond 130m northeast of the site.
1932	1:10,560	No significant change.	No significant change.
1955	1:1,250	Site developed with three residential terraced houses.	Large residential development in the surrounding area on all sides. Electrical substation built 80m north of the site.
1966	1:1,250	No significant change.	Large residential development 230m south of the site.
1993	1:1,250	No significant change.	No significant change.
2020	1:10,000	Houses on site demolished. Site now used as small open green space.	Houses and pub directly south of the site demolished and replaced with housing.

3 Environmental Setting

3.1 Geology

Geological maps of the area indicate the site is directly underlain by superficial diamicton deposits which are of Quaternary age. Diamicton generally consists of over-consolidated and unsorted clays, silts, sands and gravels.

The underlying bedrock consists of the Pennine Lower Coal Measures Formation which is of carboniferous age. The coal measures generally consist of interbedded grey mudstone, siltstone and pale grey sandstone with thick coals in the upper part.

The nearest known geological fault has been identified 550m northeast of the site.

A single BGS borehole log (Ref: SD80NE297) has been obtained from BGS online records 120m south of the site. The log shows 1.40m of Made Ground overlying interbedded glaciofluvial deposits (silts, sands and gravels) and glacial till (clay).

A copy of the geological maps is included in **Appendix D.** A copy of the BGS borehole records is included in **Appendix E**.

3.2 Radon

The site lies within the lowest band of radon potential where it is estimated that less than 1% of the properties are above the action level (low probability). Basic radon protective measures are not deemed necessary for the development.

3.3 Coal Mining Activity

The site lies within the Lancashire coalfield, a coal mining area described as having minable coal deposits but does not lie within a 'Development High Risk Area' for coal mining, as defined by the Coal Authority. As such, it is considered that there are no coal mining related hazards which could affect the site.

A copy of the coal mining summary map is included in **Appendix F**.

3.4 Hydrogeology

The superficial diamicton material is designated as a Secondary Undifferentiated Aquifer, defined as; cases where it has not been possible to assign either A or B to a soil type due to the variability in material properties.

The underlying coal measures are designated as a Secondary A Aquifer, defined as; permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

The site is not located within Source Protection Zone and there are no groundwater abstraction licences located within a 1km radius of the site.

A copy of the hydrogeological maps is included in **Appendix G**.

3.5 Hydrology

There are no significant surface water features (rivers, lakes, reservoirs) located within a 1km radius of the site.

Langley Brook is located 210m northwest of the site.

Whittle Brook is located 500m north of the site.

3.6 Flood Risk

The site lies within a Flood Zone 1, land assessed as having less than a 1 in 1,000 annual probability of river flooding (0.01%) in any year (low risk). The completion of a detailed Flood Risk Assessment is not deemed necessary for this site.

3.7 Waste Management Facilities

There are 3 no. records of historic landfill sites located within a 1.5km radius of the site. The landfill site information is summarised below.

Table 2 – Historic Landfill Summary

Landfill Site	Operation Dates	Waste Type	Distance From Site
Higher Wood Street	No Information	No Information	910m SE
Mellalieu Street Playing Fields	No Information	Inert, Industrial	1,150m SE
Mirfield Drive	No Information	No Information	1,200m SE

A copy of the historic landfill map is included in **Appendix H**.

There are no sites located within a 1km radius of the site operating under an environmental permit for waste operations.

3.8 Environmental Permits, Incidents and Registers

There are several records of sites located within a 1km radius of the development site operating under an environmental permit for discharges to water and groundwater. The nearest is held by United Utilities Water Limited approximately 460m north of the site for a sewage network.

There is a single record of a pollution event having occurred within a 1km radius of the site. The pollution event occurred 620m northeast of the site in 2006 and had a significant impact to land.

3.9 Designated Environmentally Sensitive Sites

Records of designated environmentally sensitive sites located within a 1km radius of the site are summarised in Table 3 and shown on plans included in **Appendix I**.

Table 3 – Environmental Designations Summary

Features	Distance	Comments
Nitrate Vulnerable Zone	580m	A Nitrate Vulnerable Zone is located 580m southeast of the site.
Green Belt	700m	Green Belt land is located 700m north of the site.

4 Preliminary Conceptual Site Model

4.1 Introduction

In order to assess the environmental risks present, a preliminary conceptual model has been developed for the site. This model has been developed using best practice guidelines in conjunction with the current assessment framework taking into account the development proposals. This preliminary conceptual model is based on the gathered desk-based information (e.g. historical OS data and data sourced from the EA, Geoindex and Magic databases).

The conceptual site model is a representation of the hypothesised relationships between sources, pathways and receptors which allows the identification of potential pollutant linkages and whether these linkages have the potential to comprise significant harm and/or pollution of controlled waters in relation to the site. This model comprises three elements:

Source – the key pollutant hazards associated with the site

Receptor – the key targets at risk from the sources

Pathway – the means by which the contaminant can cause harm to the receptor

If all three elements are present, then a potential pollutant linkage exists, and this may require further assessment.

4.2 Potential Contamination Sources

Historically, the site was occupied by three residential properties until around 2008, when the properties were demolished. Given the previous on-site development, there is the potential for Made Ground to be present beneath the site. Potential contaminants could include heavy metals, polyaromatic hydrocarbons (PAHs) and asbestos.

The Made Ground is likely demolition fill resulting from the demolition of the former houses and is not considered to have a high putrescible material content. Therefore, the risk of ground gases is low.

In addition to the above, an electrical substation is located 80m north of the site. Electrical substations built prior to the 1970s are associated with polychlorinated biphenyls (PCBs).

4.3 Receptors

The potential receptors considered to be at risk from soil and groundwater contamination associated with the site are summarised in Table 4 below:

Table 4 - Receptor Description

Receptor	Details
Human (On Site)	- Construction workers - Future site users - Site visitors
Human (Off Site)	- Adjacent site users
Controlled Waters	- Secondary A Aquifer - Secondary Undifferentiated Aquifer - Langley Brook
Building/ construction materials	- Foundations and buried services
Environmental Receptors	- Green Belt - Nitrate Vulnerable Zone

4.4 Pathways

The potential exposure pathways linking contamination with the receptors identified above are summarised in Table 5 below:

Table 5 - Exposure Pathways Summary

Receptor	Details of Exposure Pathway
Human (on-site)	- Direct ingestion of contaminated soil/groundwater - Dermal contact with soil/groundwater - Inhalation of gases and vapours
Human (off-site)	- Inhalation of fibres and particulates - Inhalation of migrating gases and vapours
Controlled waters	- Vertical and lateral migration of dissolved phase contaminants via preferential pathways to groundwater aquifers - Direct surface water run-off to surface water features
Building/construction	- Buried materials/services - Contact with contaminated soil and/or groundwater

4.5 Potential Pollution Linkages

4.5.1 Human Health

The development comprises construction of a new residential development. Plans include areas of soft landscaping to be used as a garden. This is considered to be a sensitive end use.

The presence of buildings and hardstanding would eliminate the risk of exposure, via the dermal contact and ingestion pathways to future site users to any ground contamination that may remain following development.

There could be a potential risk of exposure to any ground contamination that remains following redevelopment in the proposed areas of soft landscaping (i.e. gardens), to future site users, via all possible exposure pathways.

Any ground gases (i.e. methane and carbon dioxide) and vapours that are present within the soils beneath the site could potentially ingress into the buildings through preferential pathways (e.g. service entry points). Therefore, there would be a risk of exposure via inhalation to future site users.

There is the potential for construction workers and adjacent land users to be exposed to soil and groundwater contamination during site redevelopment. However, the use of appropriate PPE and the adoption of suitable Health and Safety methods will help to reduce the risks posed to human health during this work.

4.5.2 Controlled Waters

The site is immediately underlain by superficial deposits which are predominantly cohesive and of low permeability. The diamicton will act as an impermeable barrier, preventing contaminant migration from any Made Ground at the surface to the underlying aquifer.

Langley Brook is considered to be a sufficient distance from the site to not be affected by direct surface water run-off (>210m).

The site does not lie within a Source Protection Zone and there are no groundwater abstraction licences held nearby.

The risk to controlled waters is deemed to be low.

4.5.3 Building/ Construction Materials/ Buried Services

The presence of any soil and groundwater contaminants beneath the site could potentially impact on construction materials for the new development, such as below ground structures and services. Concrete foundations are particularly sensitive to aggressive ground conditions, i.e. sulphate attack.

If ground gases and vapour are present in the soil beneath the site, then there would be the potential risk of ingress into the new properties which could present a risk of explosion.

4.6 Environmental Designations

It is considered that the planned future development will not affect the identified environmental designations.

4.7 Preliminary Hazard Assessment

A preliminary hazard assessment is presented in Table 7. The preliminary hazard assessment is a qualitative assessment of the risks posed by each potential pollutant linkage described above and is used to identify the requirement for additional work (e.g. intrusive ground investigation).

Table 7 – Preliminary Hazard Assessment

Source 1	Pathway	Receptor	Likelihood	Effect	Risk	Assessment
Contaminated soil	Ingestion (via soil dust), inhalation (via soil dust and vapours), ingestion through dirty hands, dermal contact with soil/water.	Future site users Adjacent site users Construction workers	3	3	Moderate	On-site and off-site source potential identified.
Contaminated soil groundwater	Direct contact	Buildings/ services	3	3	Moderate	On-site source potential identified.
Contaminated groundwater	Downward or lateral migration Surface water run-off	Secondary A Aquifer Langley Brook	1	3	Low	Impermeable diamicton will limit contaminant migration.
Ground gas / vapours Radon	Inhalation, ingress into buildings	Buildings / services Future site users Adjacent site users Construction workers	1	4	Low	No significant ground gas source identified. The site lies within a low probability area for radon.

Using Risk Matrix (Table 7) Degree of Risk (R) = Likelihood (L) x Effect (E)

Table 7 - Risk Matrix, Degree of Risk (R) = Likelihood (L) x Effect (E)

Likelihood	Description	Probability	Effect (E)	Description
5	Almost certain	>70%		
4	Probable	50-70%	4	Severe
3	Likely	30-50%	3	Medium
2	Unlikely	10-30%	2	Mild
1	Negligible	<10%	1	Minor
Risk (R)	**Risk Level**	**Action**		
1-5	Low	None required		
6-10	Moderate	Further assessment via Phase 2 intrusive ground investigation.		
>10	High	Further assessment via Phase 2 intrusive ground investigation.		

5 Conclusions and Recommendations

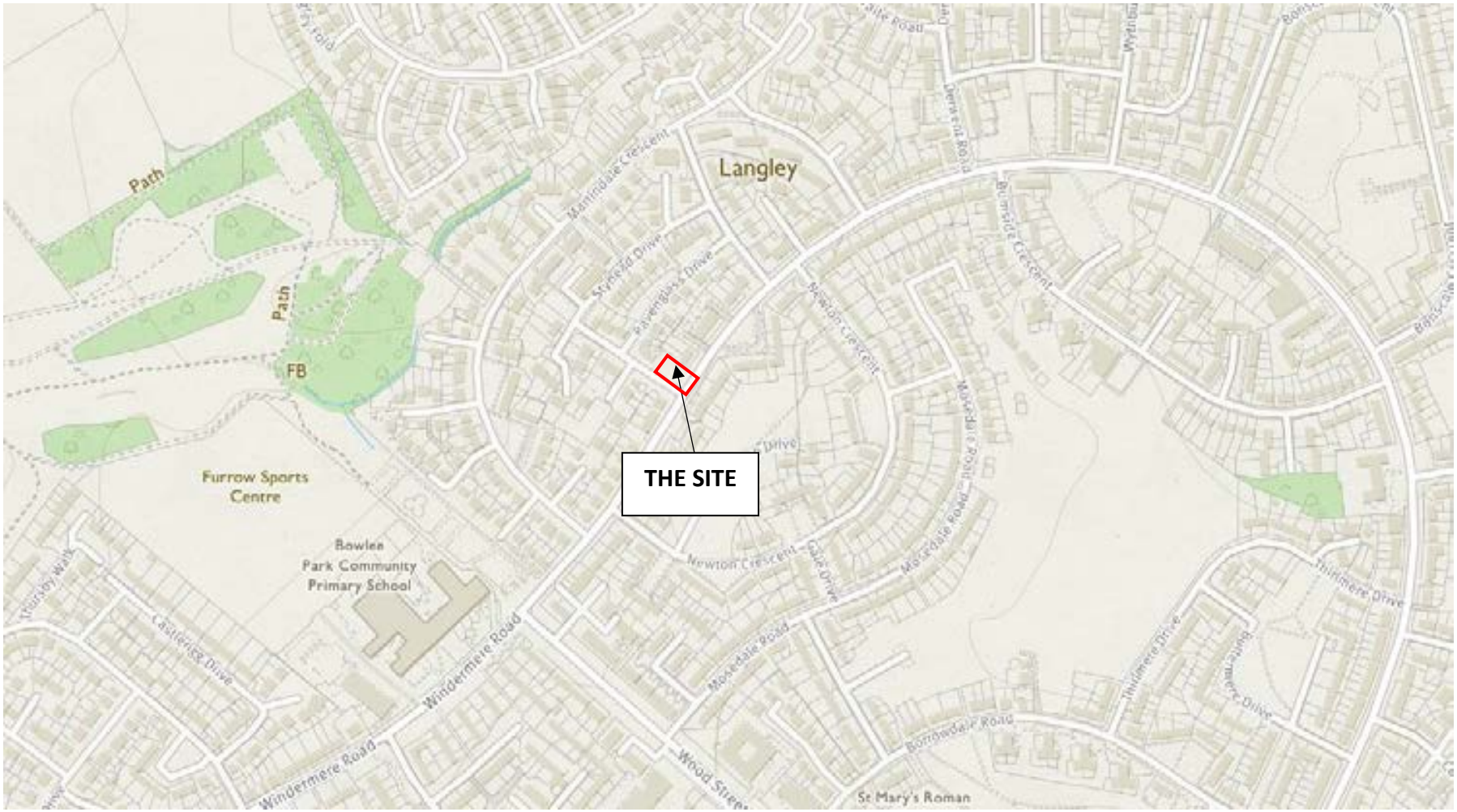
The preliminary environmental site assessment indicates that the site can be classified as moderate risk in terms of contamination and the risks to the identified receptors (e.g. human health, controlled waters, buildings) following redevelopment is considered to be moderate.

This classification is due to the potential for Made Ground to be present in the shallow soils, resulting from the demolition of the former on-site buildings. Potential contaminants could include heavy metals, polyaromatic hydrocarbons (PAHs) and asbestos. Additionally, an electrical substation is located close to the site which could be a source of polychlorinated biphenyls (PCBs) contamination.

It is recommended a Phase 2 intrusive ground investigation is undertaken prior to site redevelopment to obtain additional information on the ground conditions and the contamination status. The investigation should be carried out by qualified and competent persons. The scope of works for the investigation will need to be submitted and approved by the local authority prior to the commencement of the Phase 2 intrusive works.

APPENDICES

Appendix A – Site Location and Site Plan



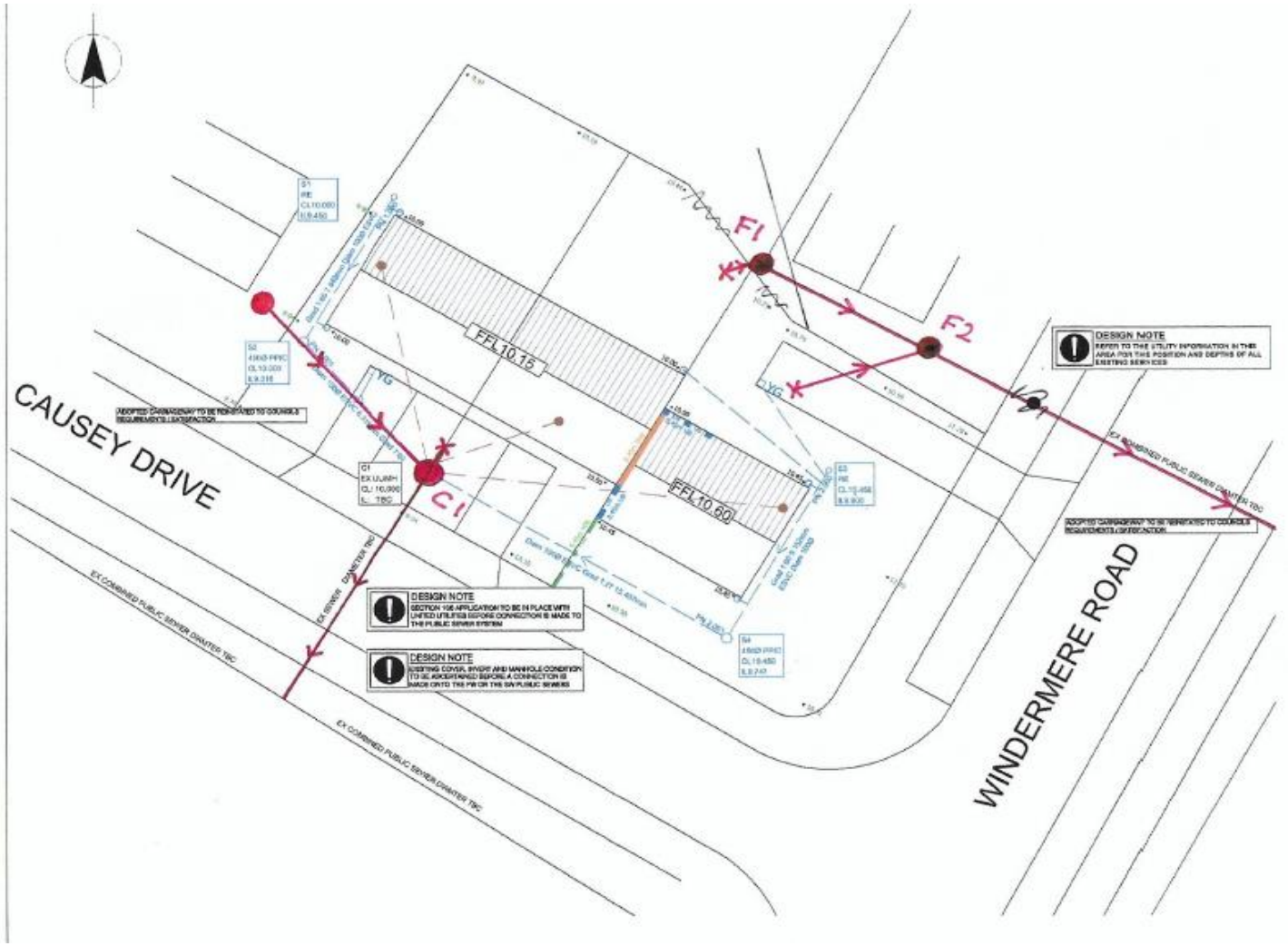
enviro | solution	**Site Location Map**

Figure 1



enviro | solution	**Existing Site Plan**

Figure 2



enviro | solution

Proposed Development Plan

Figure 3

Appendix B – Site Photographs



enviro | solution	**View looking south along Windermere Road**



enviro | solution	**Northern site boundary**



enviro | solution	**View of site looking northwest**



enviro | solution	**View of site looking east**



enviro | solution	**View looking north**

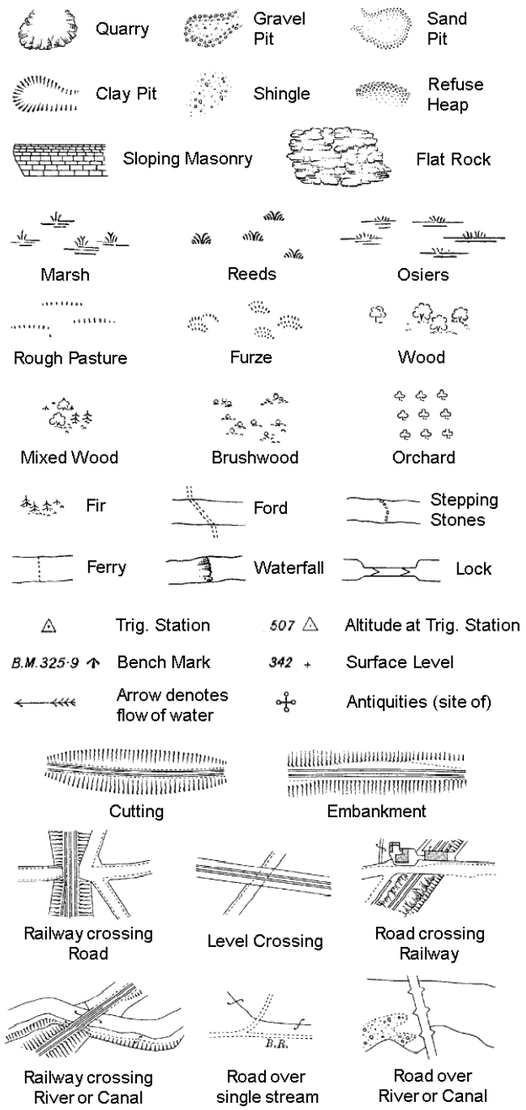


enviro | solution	**Adjacent residential property**

Appendix C - Historical Maps

Historical Mapping Legends

Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



County Boundary (Geographical)

County & Civil Parish Boundary

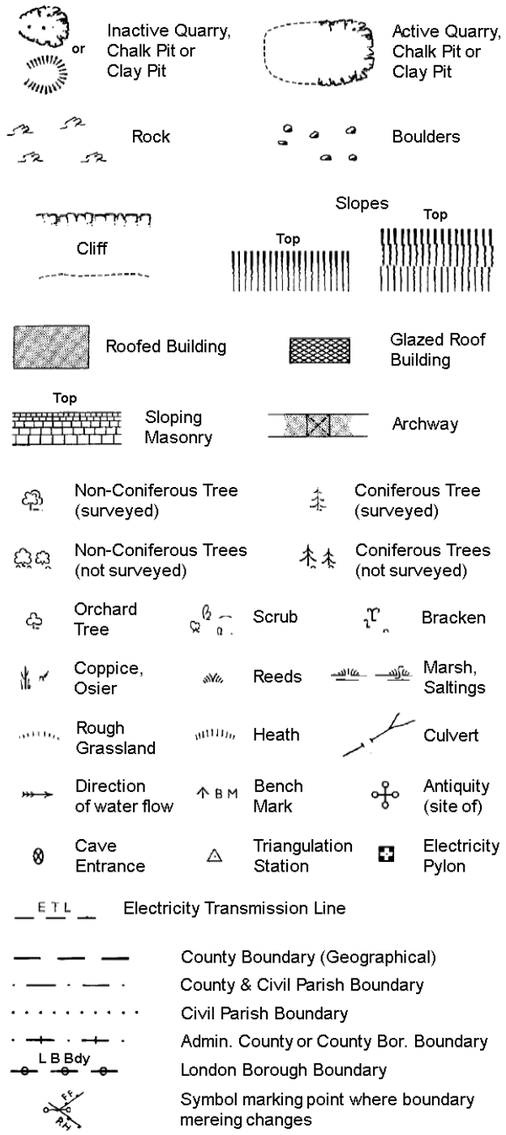
Administrative County & Civil Parish Boundary

Co. Boro. Bdy. County Borough Boundary (England)

Co. Burgh Bdy. County Burgh Boundary (Scotland)

B P B S	Boundary Post or Stone	P.C.B	Police Call Box
B.R.	Bridle Road	P	Pump
E.P	Electricity Pylon	S.P	Signal Post
F.B.	Foot Bridge	St.	Sluice
F.P.	Foot Path	Sp.	Spring
G.P	Guide Post or Board	T.C.B	Telephone Call Box
M.S	Mile Stone	Tr.	Trough
M.P M.R	Mooring Post or Ring	W	Well

Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



County Boundary (Geographical)

County & Civil Parish Boundary

Civil Parish Boundary

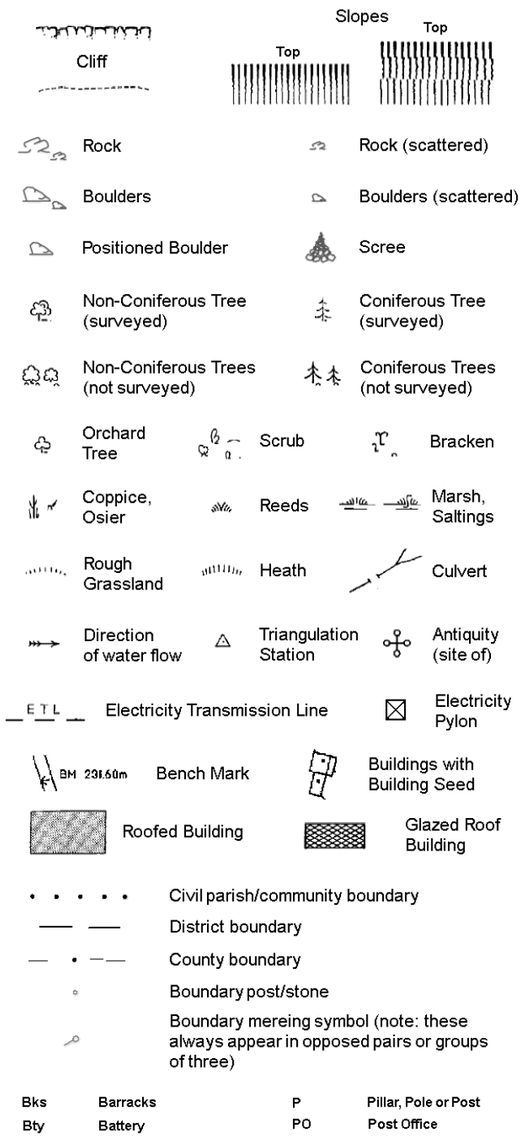
Admin. County or County Bor. Boundary

L B Bdy London Borough Boundary

Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
NTL	Normal Tidal Limit	Wd Pp	Wind Pump

Large-Scale National Grid Data 1:2,500 and 1:1,250



Civil parish/community boundary

District boundary

County boundary

Boundary post/stone

Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governer	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well

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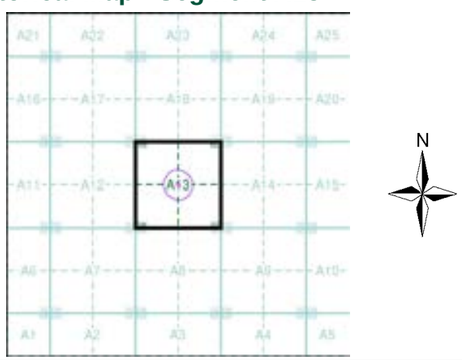
Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Lancashire And Furness	1:2,500	1893	2
Lancashire And Furness	1:2,500	1909	3
Lancashire And Furness	1:2,500	1922	4
Ordnance Survey Plan	1:1,250	1955	5
Ordnance Survey Plan	1:2,500	1955	6
Ordnance Survey Plan	1:1,250	1960 - 1966	7
Ordnance Survey Plan	1:2,500	1968	8
Additional SIMs	1:1,250	1983 - 1991	9
Large-Scale National Grid Data	1:1,250	1992	10
Large-Scale National Grid Data	1:1,250	1993 - 1994	11
Large-Scale National Grid Data	1:1,250	1994	12
Large-Scale National Grid Data	1:1,250	1995	13
Large-Scale National Grid Data	1:1,250	1996	14

Historical Map - Segment A13



Order Details

Order Number: 243665666_1_1
Customer Ref: ES020620
National Grid Reference: 385820, 407160
Slice: A
Site Area (Ha): 0.05
Search Buffer (m): 100

Site Details

4, Causey Drive, Middleton, MANCHESTER, M24 5PN

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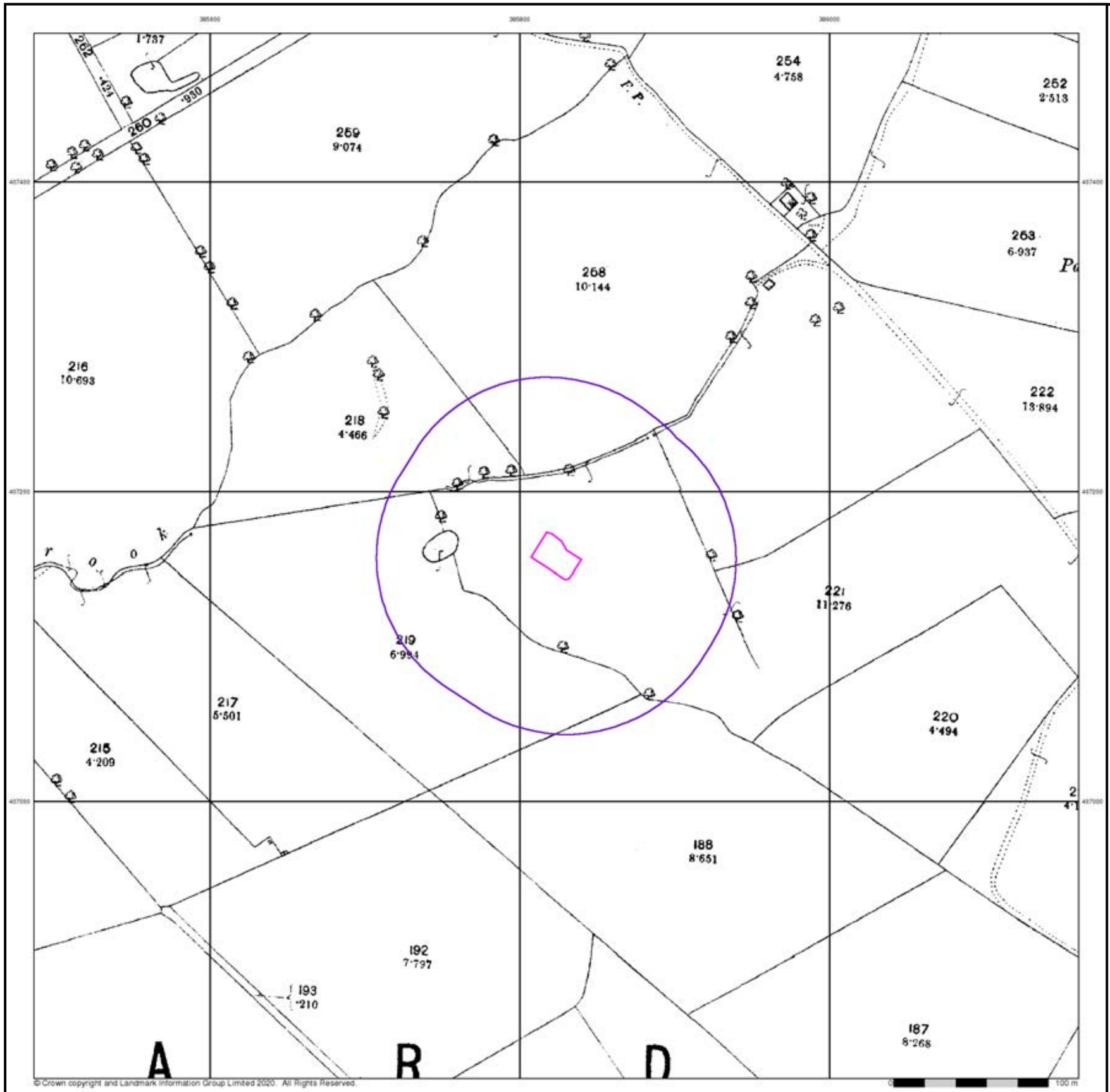
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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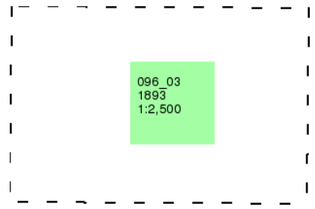
Lancashire And Furness

Published 1893

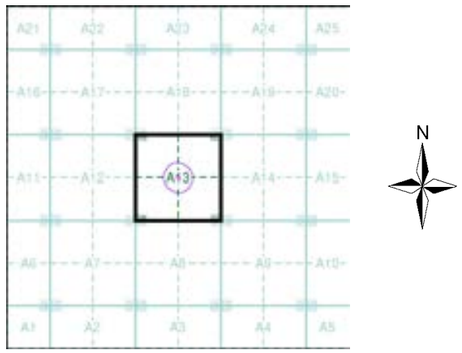
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



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Order Number:	243665666_1_1
Customer Ref:	ES020620
National Grid Reference:	385820, 407160
Slice:	A
Site Area (Ha):	0.05
Search Buffer (m):	100

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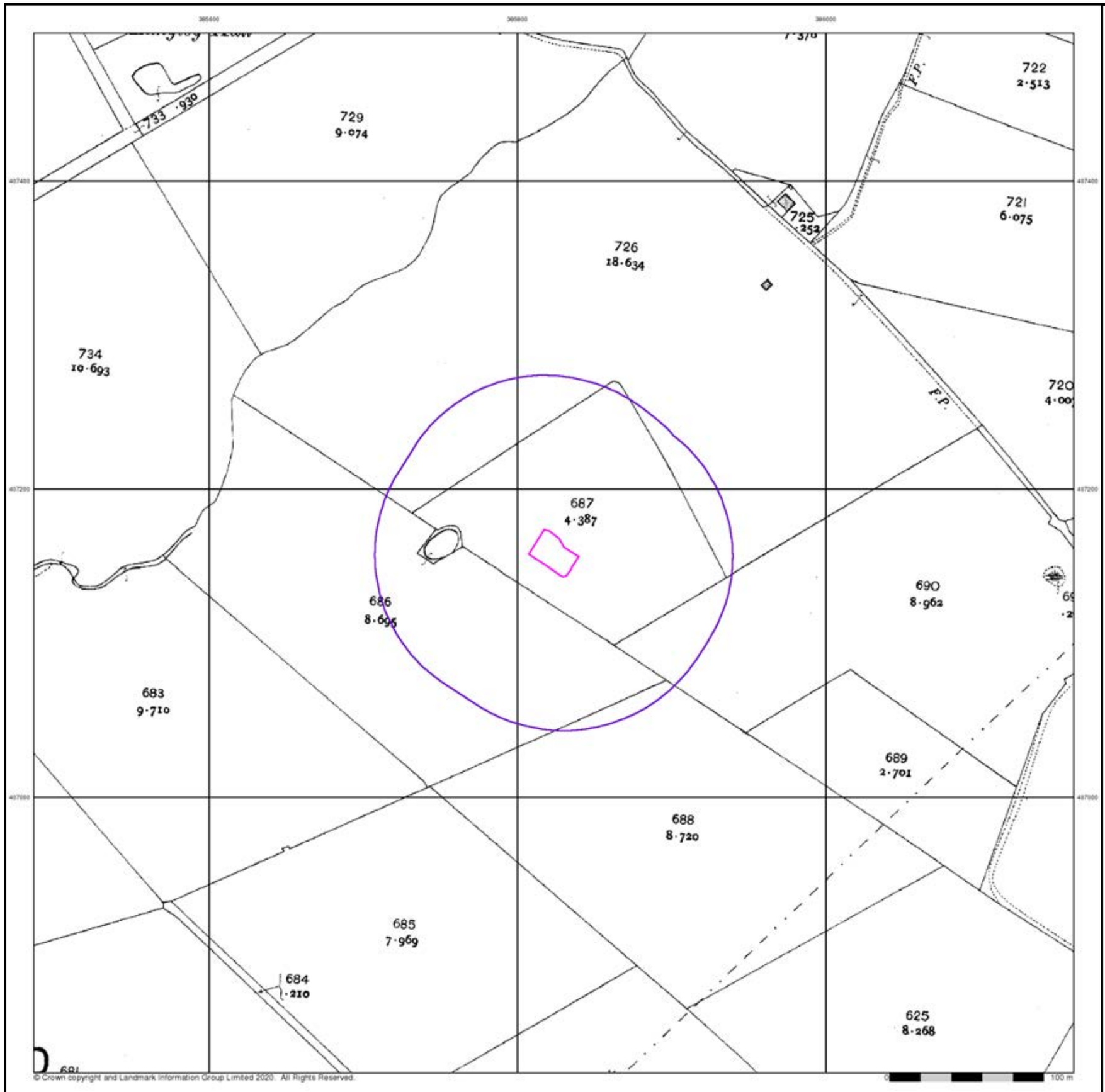

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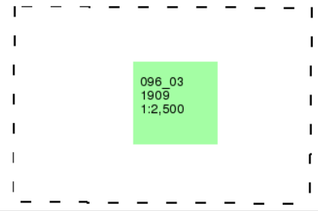
Lancashire And Furness

Published 1909

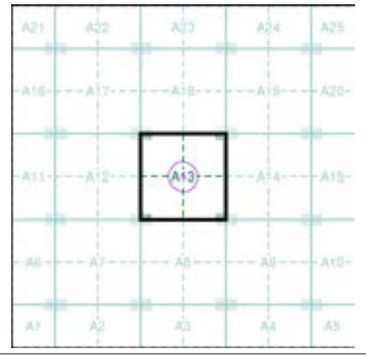
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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Customer Ref:	ES020620
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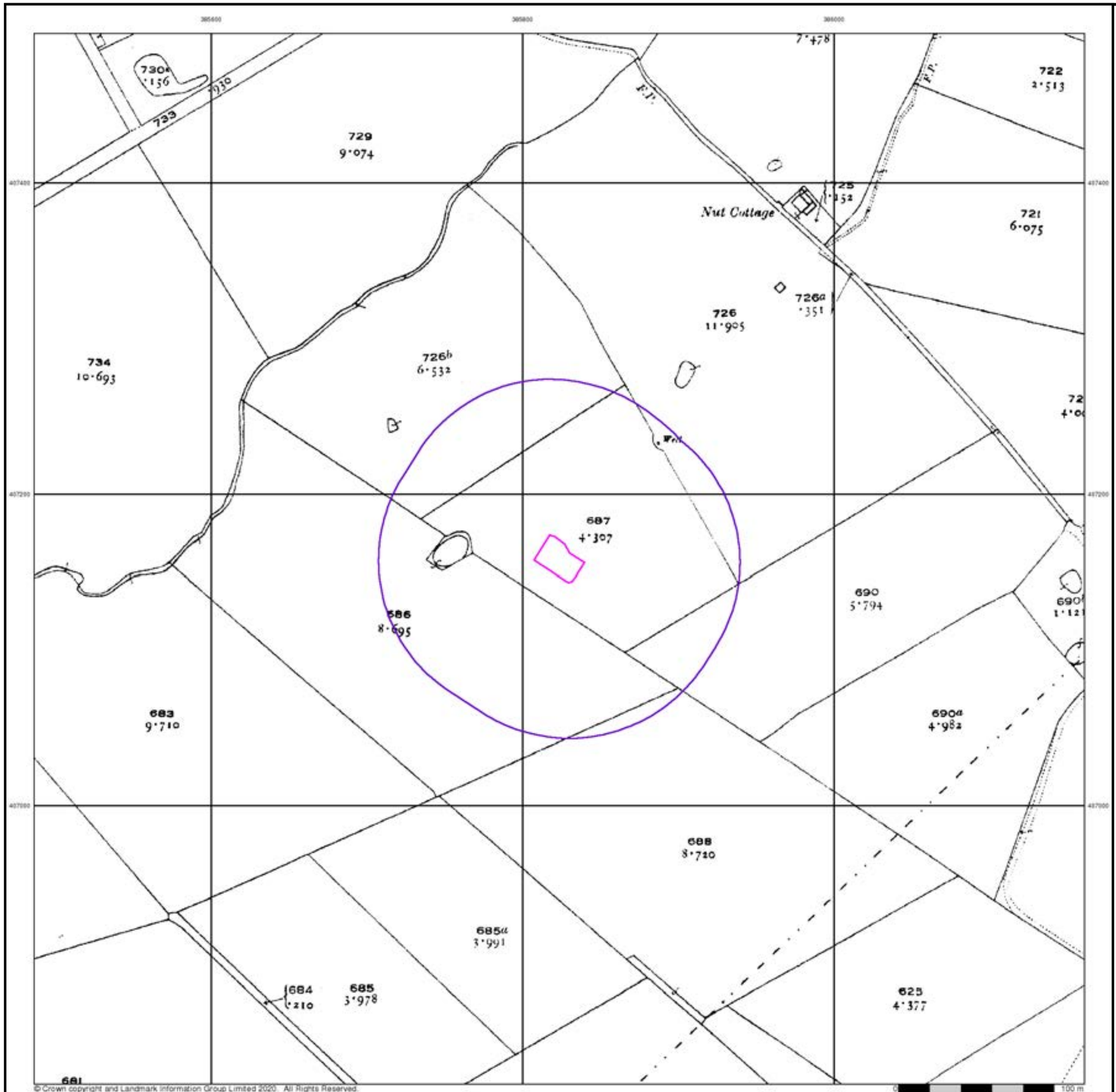
Slice:	A
Site Area (Ha):	0.05
Search Buffer (m):	100

Site Details

4, Causey Drive, Middleton, MANCHESTER, M24 5PN



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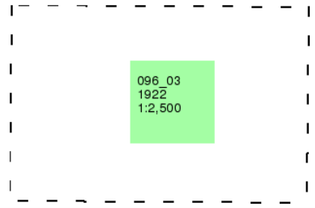
Lancashire And Furness

Published 1922

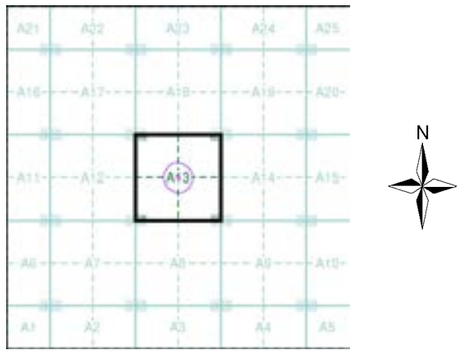
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



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Slice:	A
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Search Buffer (m):	100

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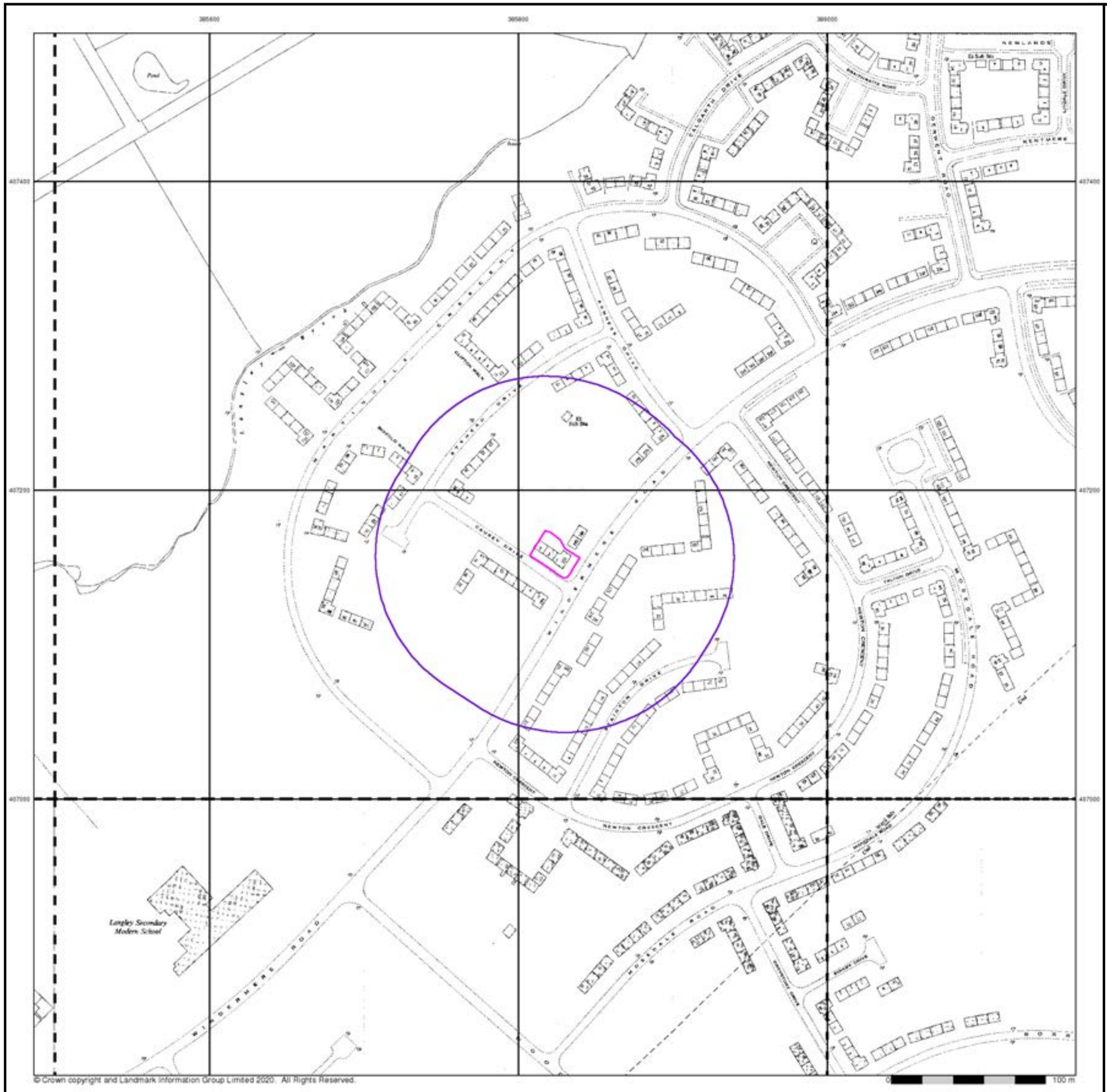

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Ordnance Survey Plan

Published 1955

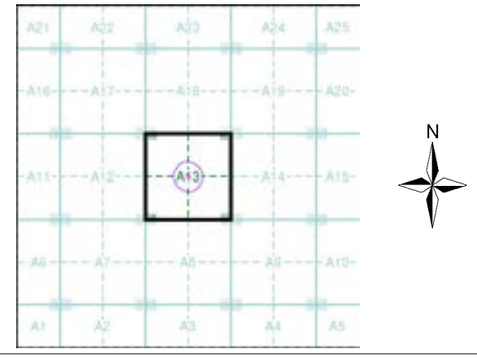
Source map scale - 1:1,250

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

SD8507SW 1955 1:1,250	SD8507SE 1955 1:1,250	SD8607SW 1955 1:1,250
SD8506NW 1955 1:1,250	SD8506NE 1955 1:1,250	SD8606NW 1955 1:1,250

Historical Map - Segment A13



Order Details

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Customer Ref:	ES020620
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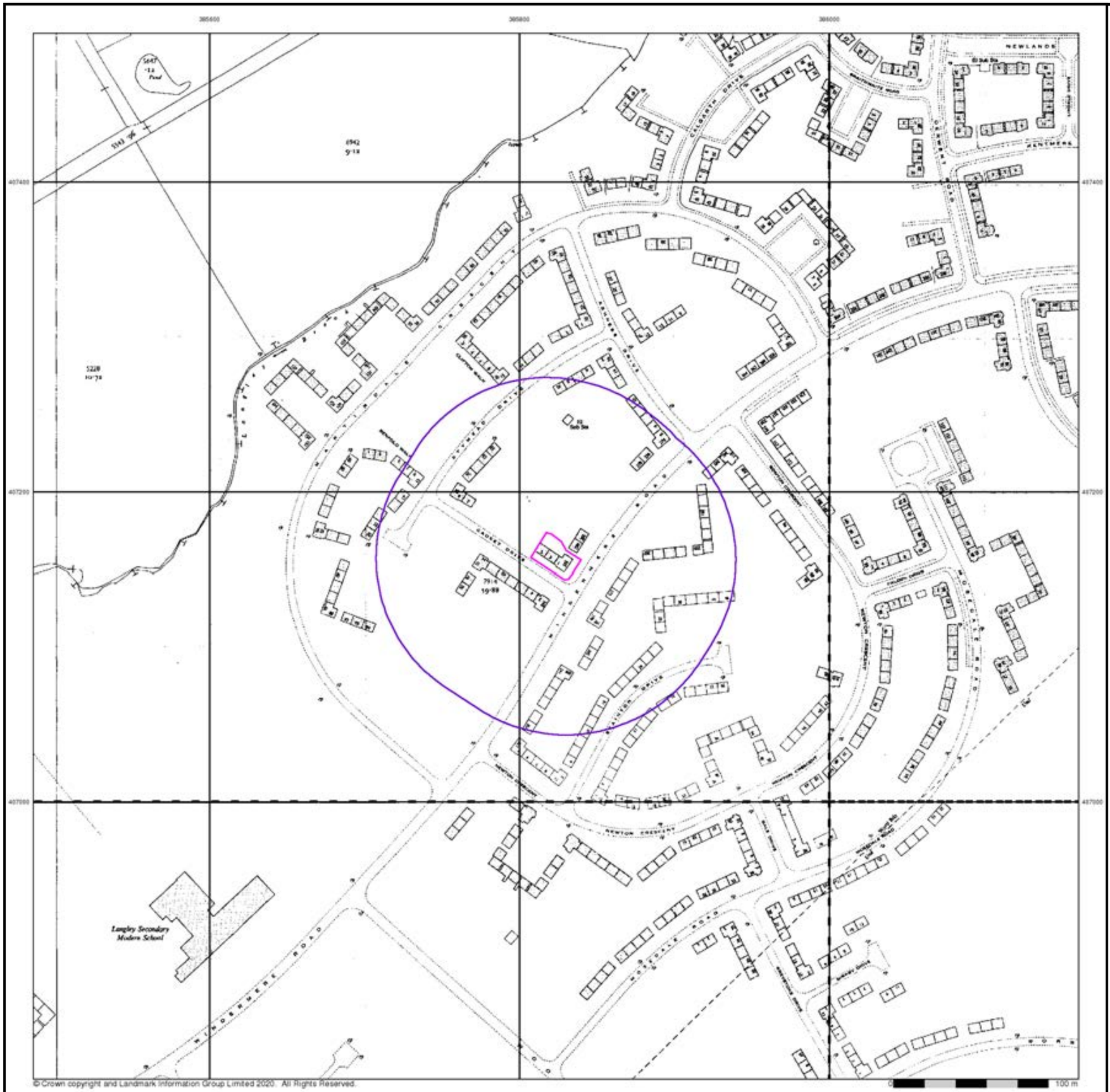
Search Buffer (m):	100

Site Details

4, Causey Drive, Middleton, MANCHESTER, M24 5PN



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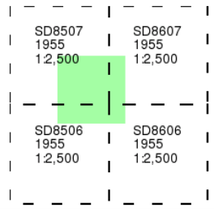
Ordnance Survey Plan

Published 1955

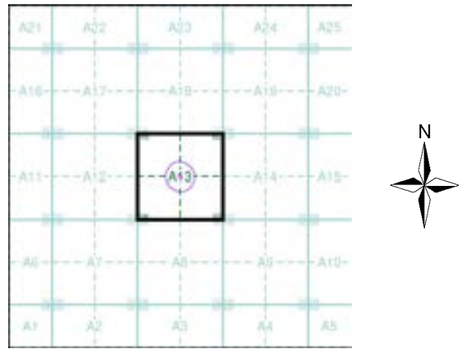
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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Search Buffer (m):	100

Site Details

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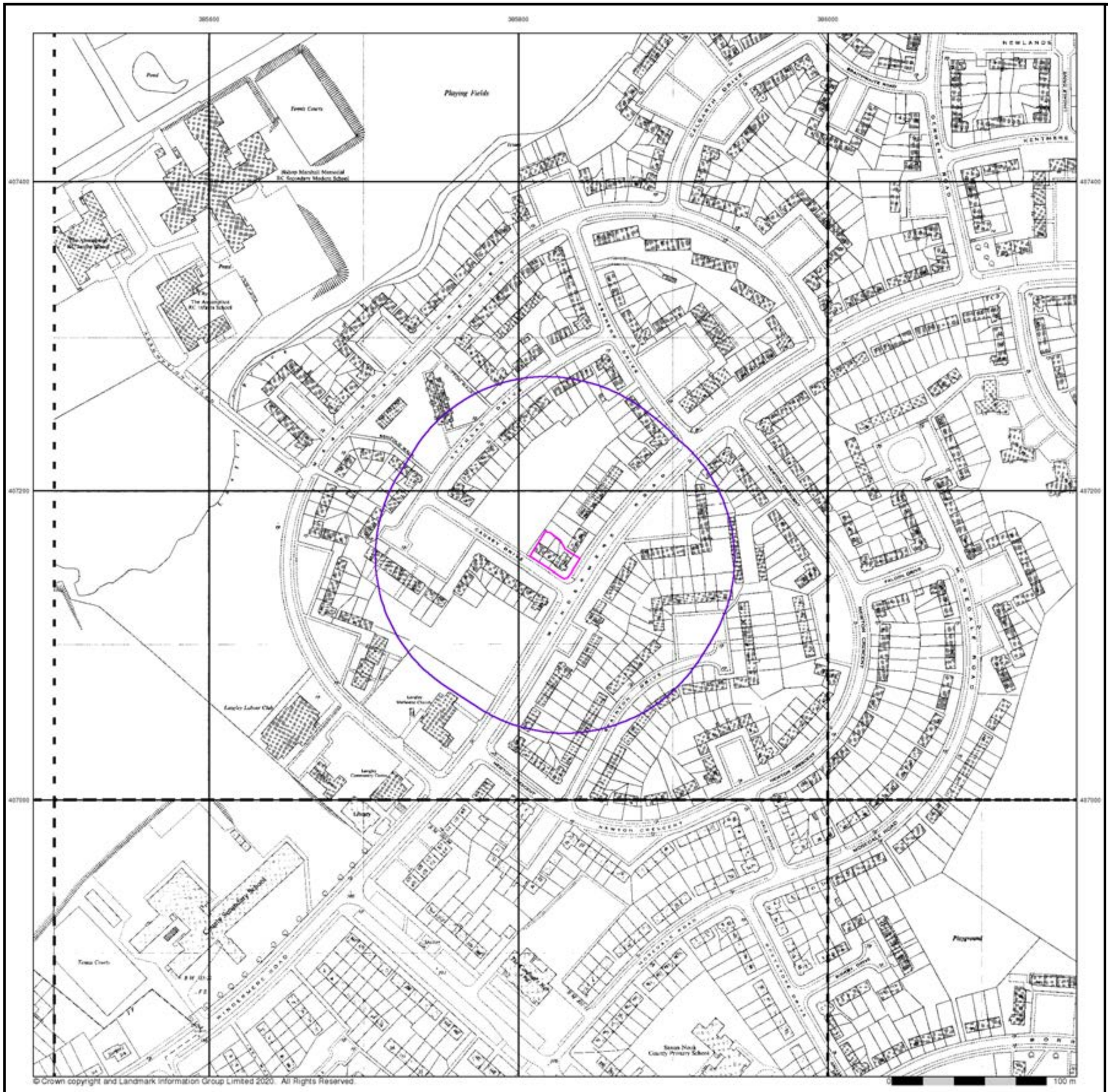

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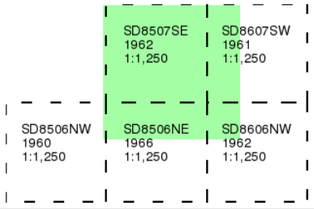
Ordnance Survey Plan

Published 1960 - 1966

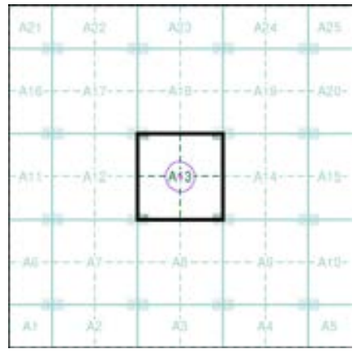
Source map scale - 1:1,250

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	243665666_1_1
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Slice:	A
Site Area (Ha):	0.05
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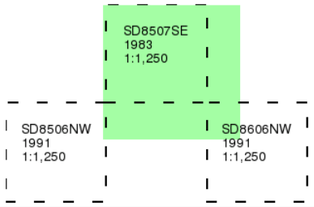
Additional SIMs

Published 1983 - 1991

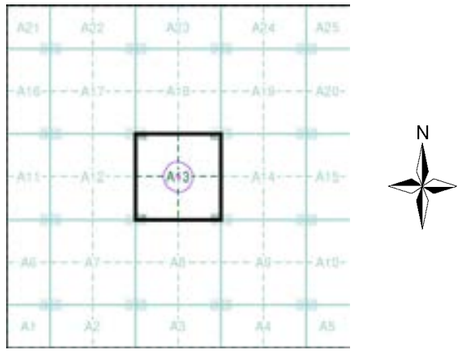
Source map scale - 1:1,250

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)



Historical Map - Segment A13



Order Details

Order Number:	243665666_1_1
Customer Ref:	ES020620
National Grid Reference:	385820, 407160
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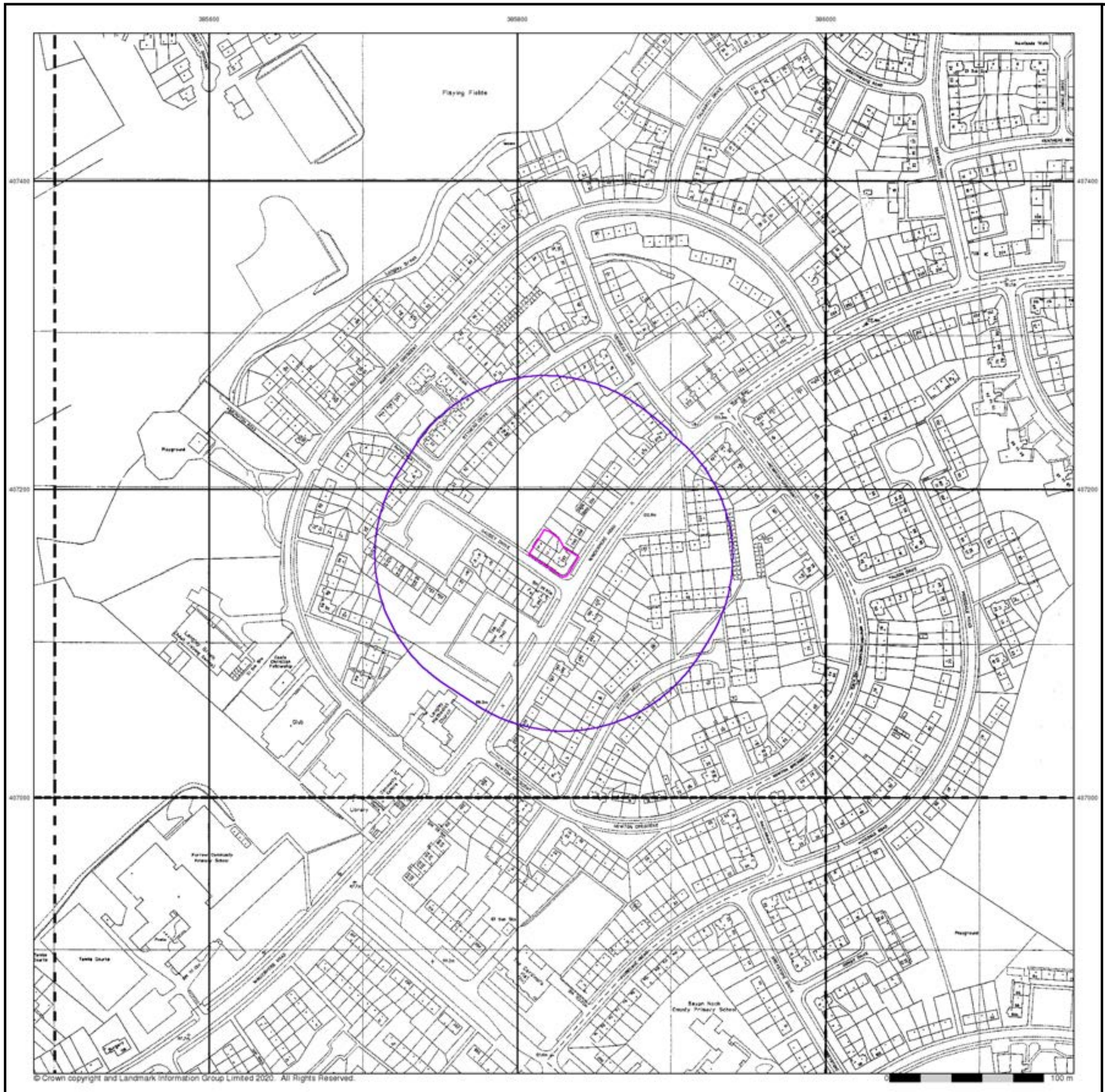

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Large-Scale National Grid Data

Published 1992

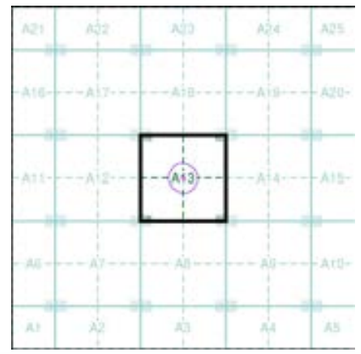
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SD8507SW 1992 1:1,250	SD8507SE 1992 1:1,250	SD8607SW 1992 1:1,250
SD8506NW 1992 1:1,250	SD8506NE 1992 1:1,250	SD8606NW 1992 1:1,250

Historical Map - Segment A13



Order Details

Order Number:	243665666_1_1
Customer Ref:	ES020620
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Search Buffer (m):	100

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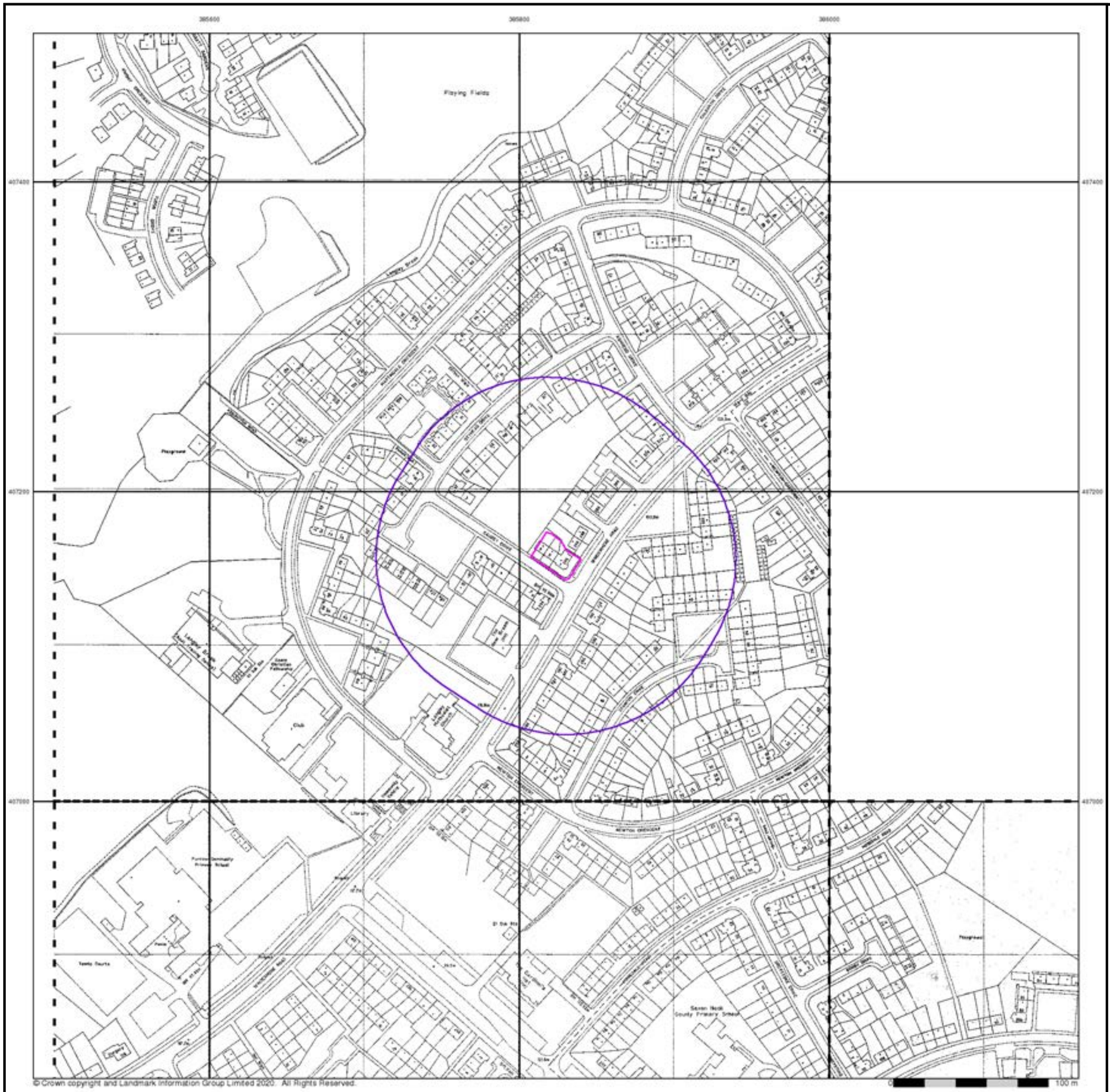

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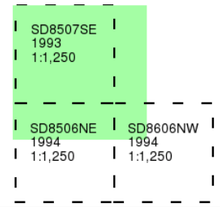
Large-Scale National Grid Data

Published 1993 - 1994

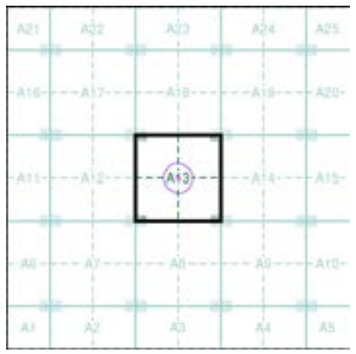
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	243665666_1_1
Customer Ref:	ES020620
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Slice:	A
Site Area (Ha):	0.05
Search Buffer (m):	100

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385600
385800
386000
407400
407200
407000
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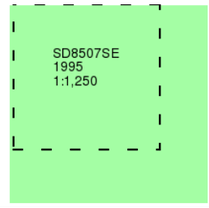
Large-Scale National Grid Data

Published 1995

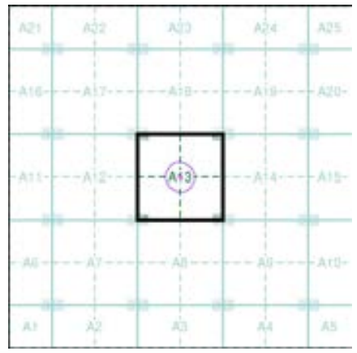
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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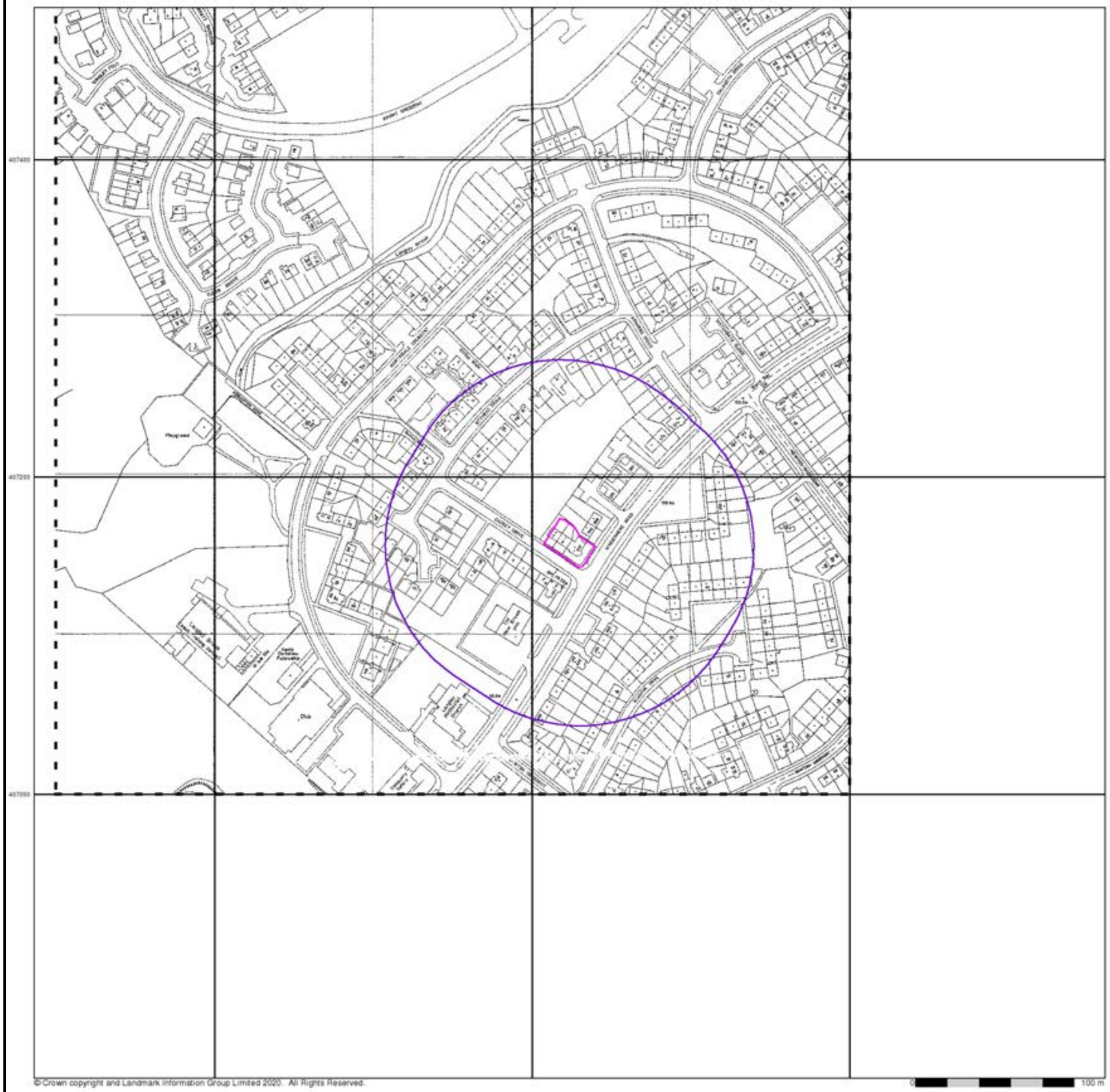

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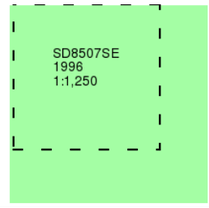
Large-Scale National Grid Data

Published 1996

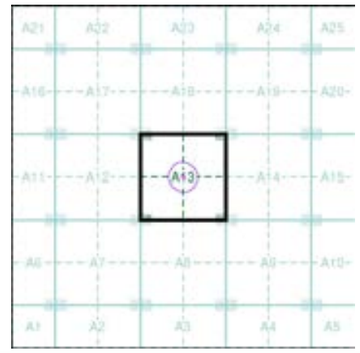
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



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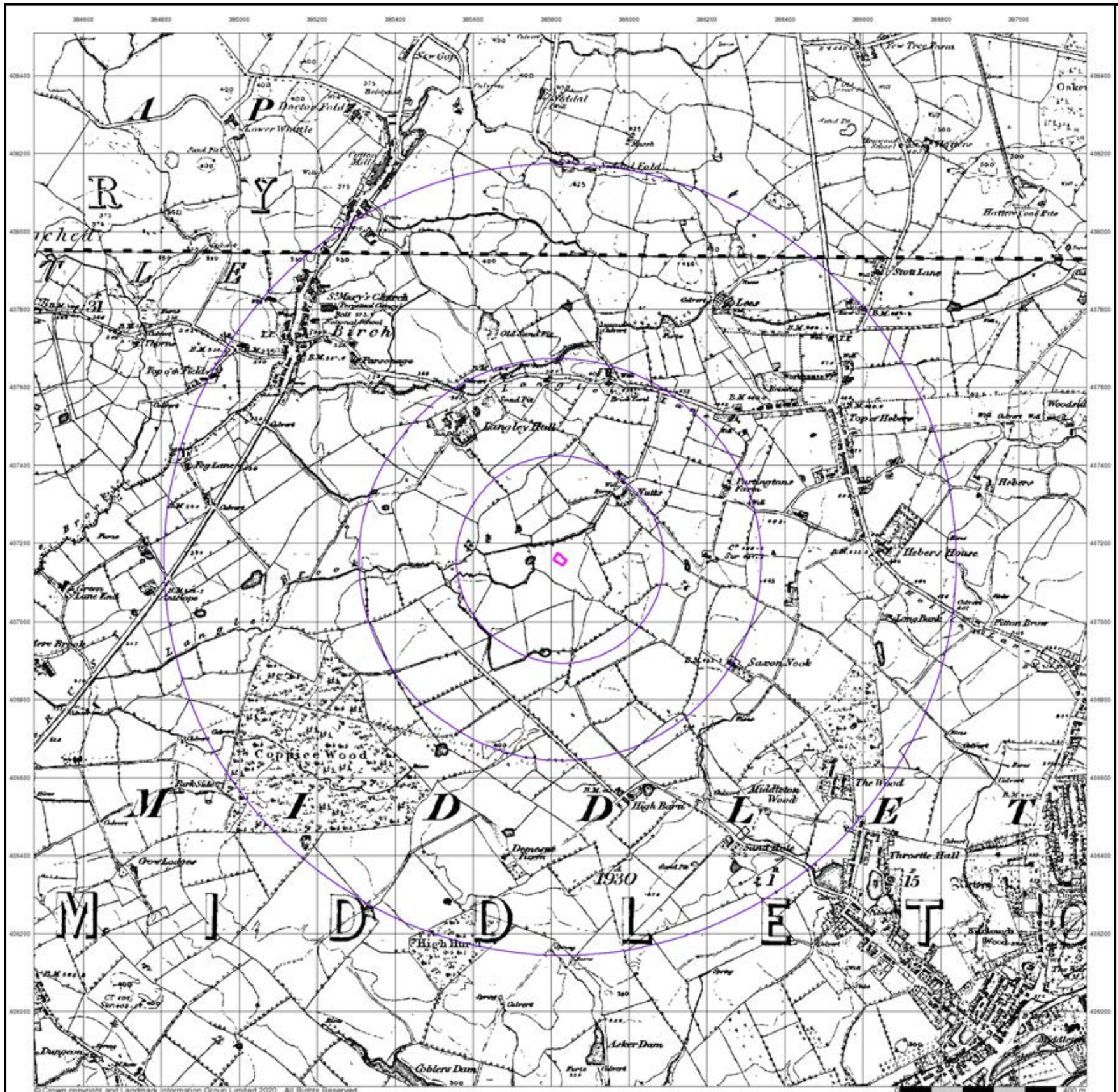

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Lancashire And Furness

Published 1848 - 1851

Source map scale - 1:10,560

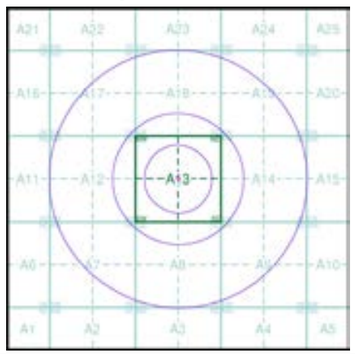
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

08800
1851
1:10,560

09600
1848
1:10,560

Historical Map - Slice A



Order Details

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Site Details

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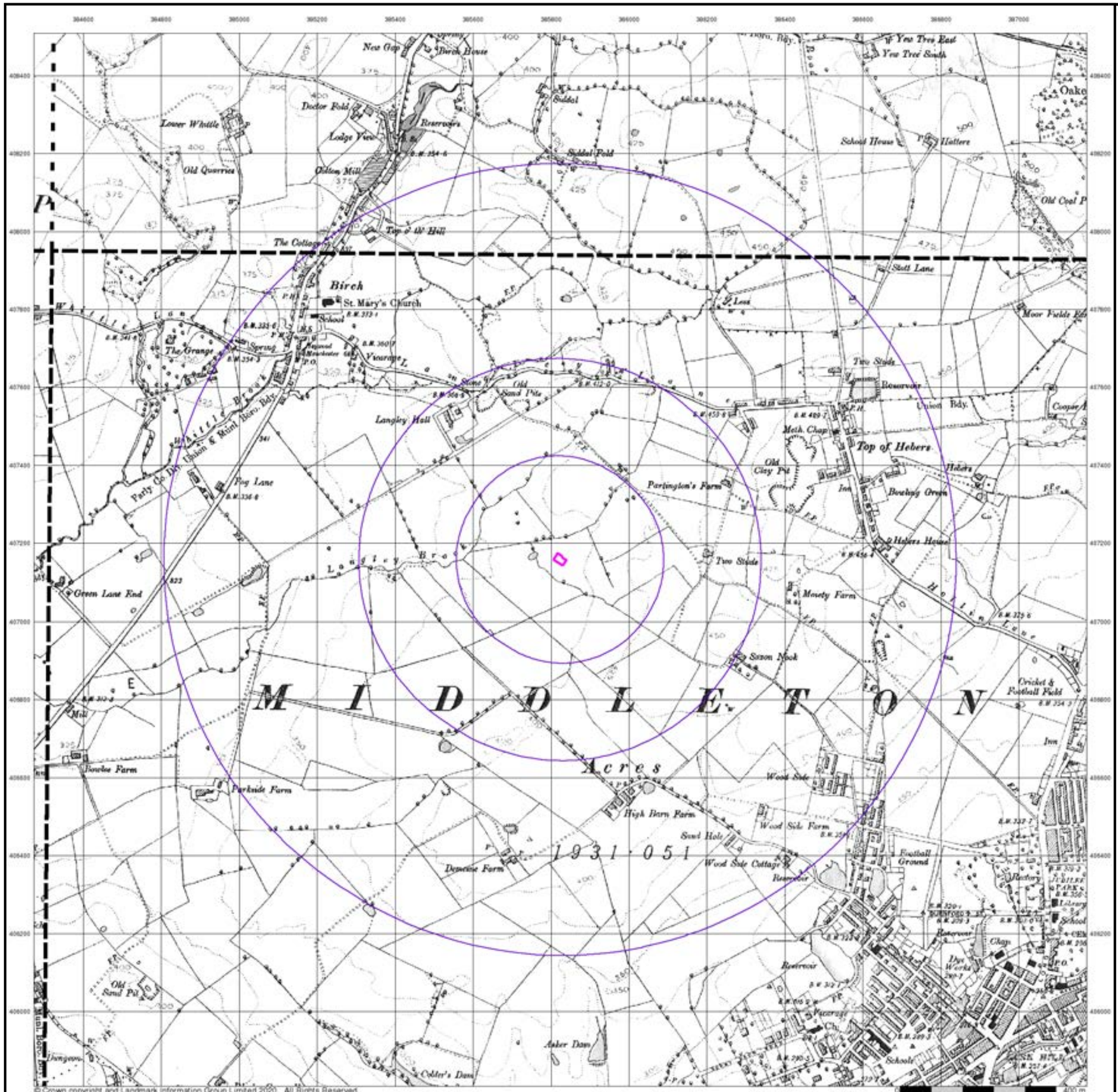

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Lancashire And Furness

Published 1894

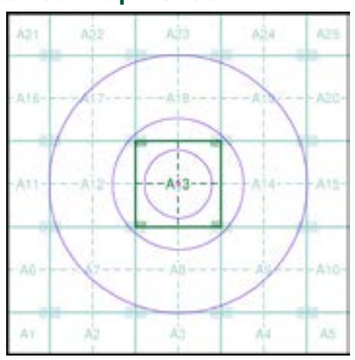
Source map scale - 1:10,560

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)

088SW 1894 1:10,560	088SE 1894 1:10,560
096NW 1894 1:10,560	096NE 1894 1:10,560

Historical Map - Slice A



Order Details

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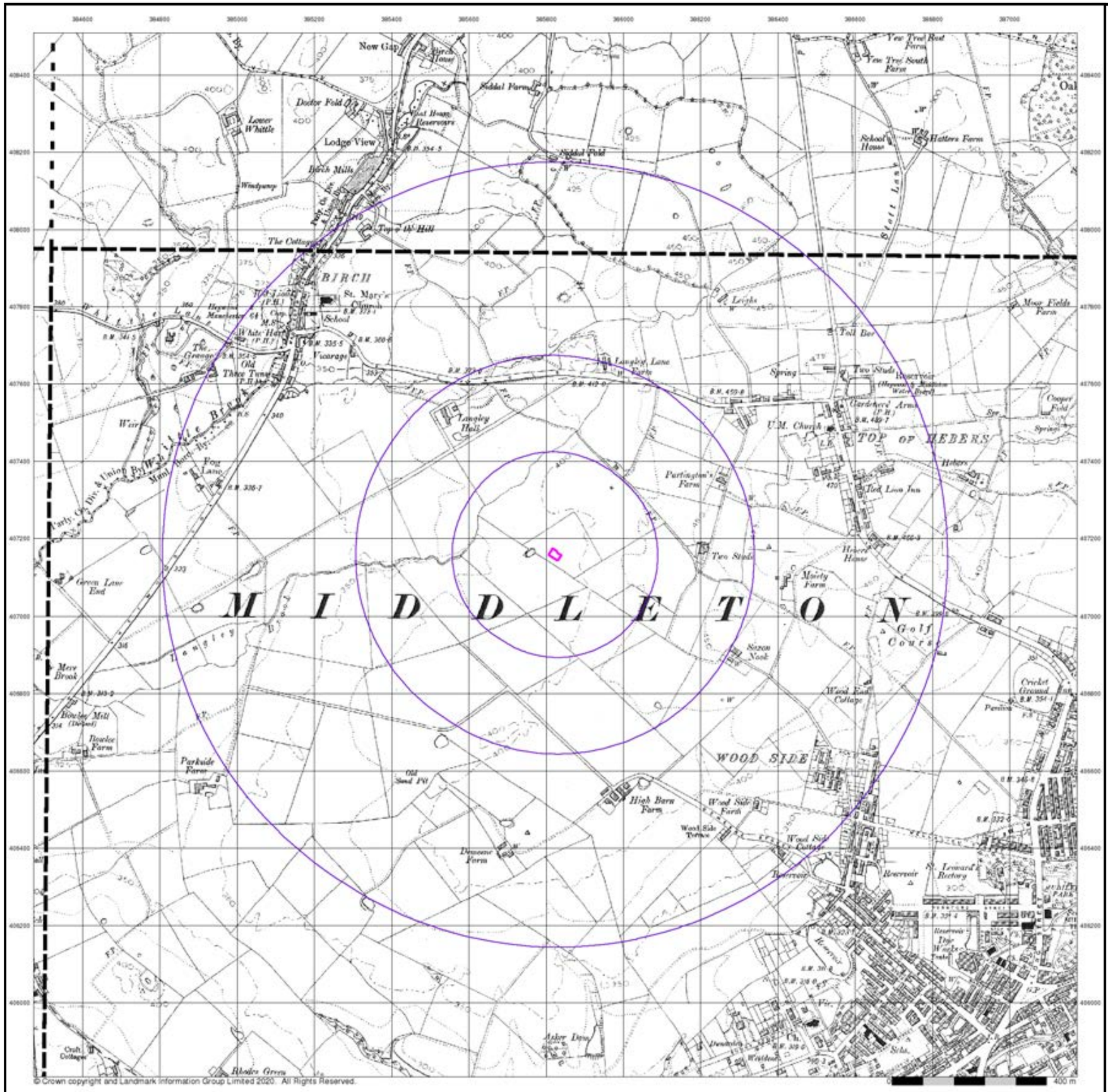
MIDDLETON
BIRCH
WOOD SIDE
TOP OF HEBERS
New Gap
Lodge View
Birch Mills
Lower Whittle
Windyway
The Cottage
Top of the Hill
Langley Lane
Langley Hall
Fog Lane
Two Studs
Tollbar
Spring
Vicarage
Parkside Farm
High Barn Farm
Dingle Farm
Mere Brook
Bearlee Mill
Bearlee Farm
Green Lane End
Rhodes Green
Croft Cottage
Saxon Nook
Golf Course
Rectory
Pension
Cricket Ground
Tied Lion Inn
Gardeners Arms
Partington's Farm
Moor Fields Farm
Oldham Corporation Waterworks
Hatters Farm
School House
Woodside Farm
Woodside Cottages
Woodside Terrace
Old Sand Pit
Reservoir
Heberes
Heberes House
Merely Farm
Wood End Cottage
Leonard Rectory
Cooper Field
Ashlor Drive
Parkside Drive
Langley
Wood Side
Heywood Manchester Old Road
Manchester Bury Old Road
Bury, Clo. Dirs. & Union Bye Wash
Bury, Clo. Dirs. & Union Bye Wash
Mere Brook
Birch Hall
Birch Hall Farm
Doctor Fold
Riddal Farm
Riddal Fold
Birch Hall Reservoirs
Yew Tree Road Farm
Yew Tree South Farm
Oak
Slate Lane
Leighs
Moor Fields Farm
Cooper Field
Spring
Two Studs
Reservoir
Gardeners Arms
Tied Lion Inn
Heberes
Heberes House
Merely Farm
Wood End Cottage
Saxon Nook
Golf Course
Cricket Ground
Pension
Leonard Rectory
Reservoir
Parkside Farm
Old Sand Pit
High Barn Farm
Wood Side Farm
Woodside Terrace
Woodside Cottages
Dingle Farm
Ashlor Drive
Rhodes Green
Croft Cottage
Bearlee Farm
Bearlee Mill
Mere Brook
Green Lane End
Partington's Farm
Fog Lane
Langley Hall
Langley Lane
Vicarage
Old Three Tuns (P.H.)
White Hart (P.H.)
Top of the Hill (P.H.)
Gardeners Arms (P.H.)
Tollbar
Two Studs
Spring
Reservoir
Leighs
Moor Fields Farm
Hatters Farm
School House
Yew Tree Road Farm
Yew Tree South Farm
Oak
Slate Lane
Riddal Farm
Riddal Fold
Birch Hall Reservoirs
Lodge View
Lower Whittle
Windyway
Birch Mills
Doctor Fold
New Gap
Birch Hall
The Cottage
Top of the Hill
Langley Lane
Langley Hall
Fog Lane
Two Studs
Tollbar
Spring
Vicarage
Parkside Farm
High Barn Farm
Dingle Farm
Mere Brook
Bearlee Mill
Bearlee Farm
Green Lane End
Rhodes Green
Croft Cottage
Saxon Nook
Golf Course
Rectory
Pension
Cricket Ground
Tied Lion Inn
Gardeners Arms
Partington's Farm
Moor Fields Farm
Hatters Farm
School House
Yew Tree Road Farm
Yew Tree South Farm
Oak
Slate Lane
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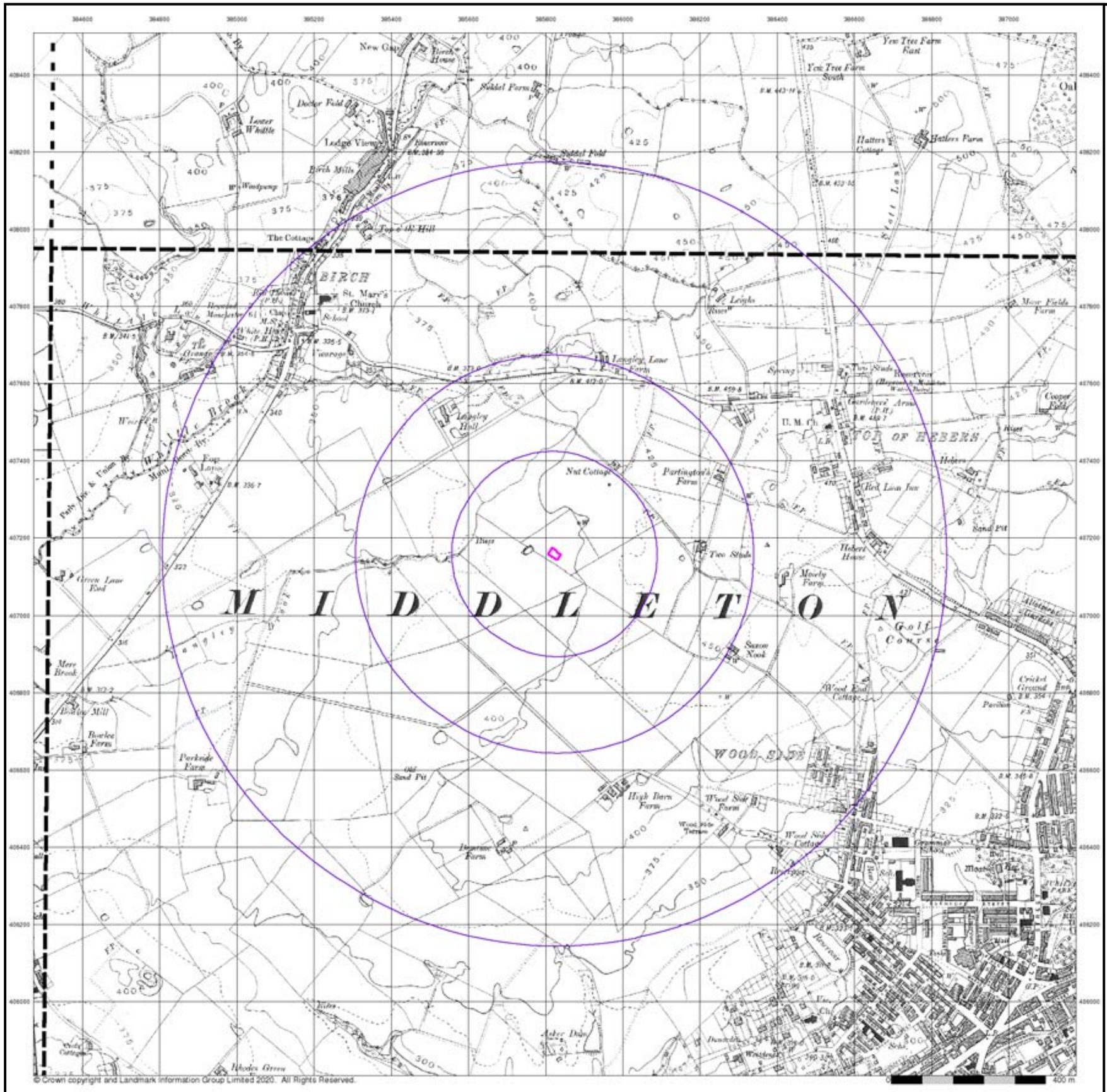
Heberes
Heberes House
Merely Farm
Wood End Cottage



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Lancashire And Furness

Published 1923 - 1932

Source map scale - 1:10,560

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Map Name(s) and Date(s)

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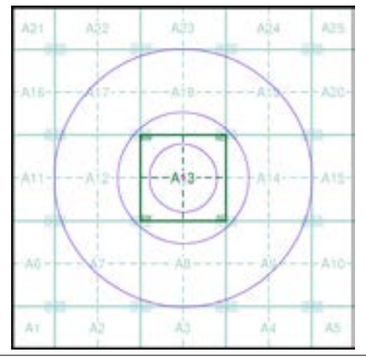
096NW 1923 1:10,560	096NE 1923 1:10,560

Historical Map - Slice A



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Customer Ref:	ES020620
National Grid Reference:	385820, 407160
Slice:	A
Site Area (Ha):	0.05
Search Buffer (m):	1000

Site Details

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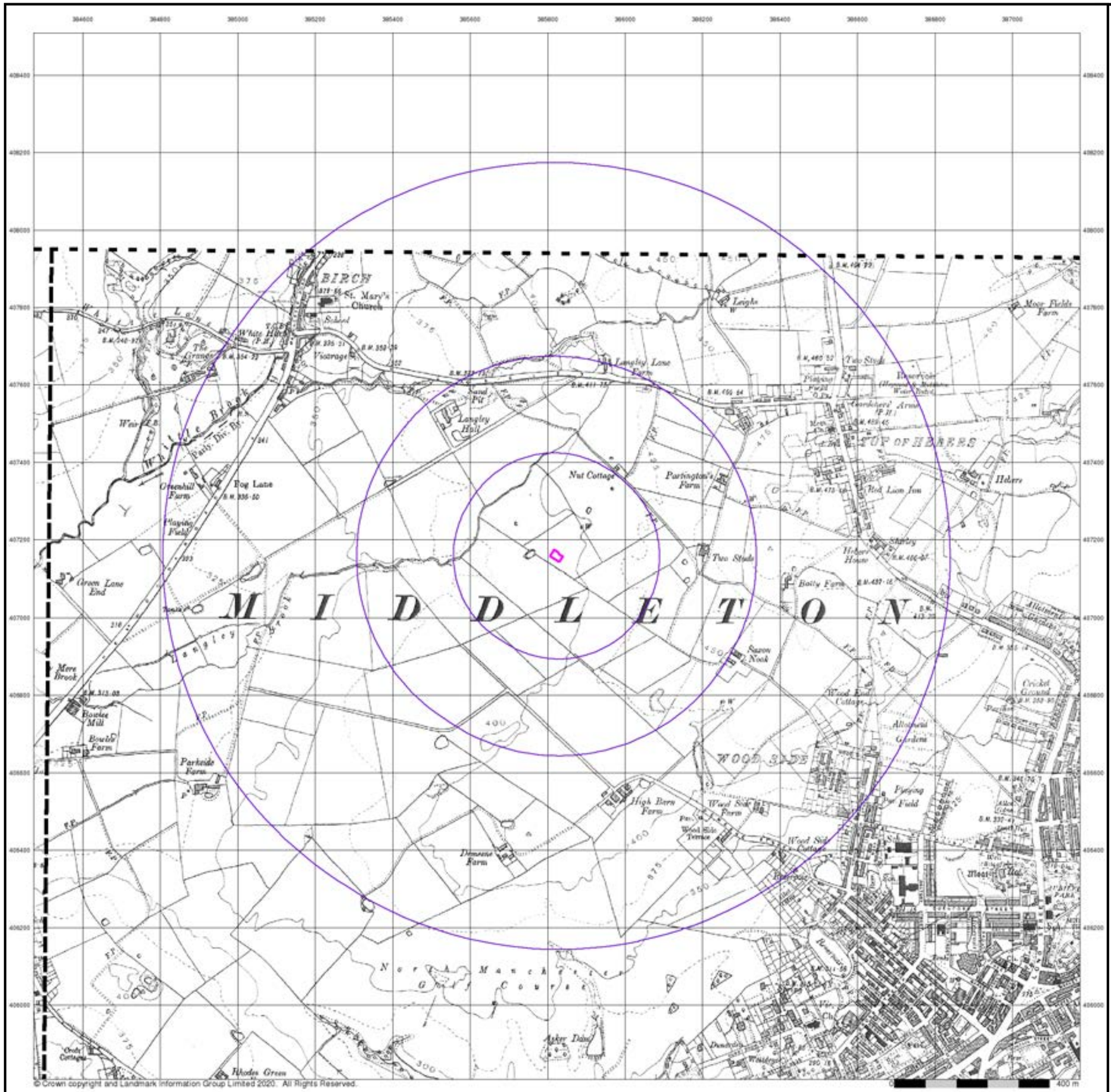
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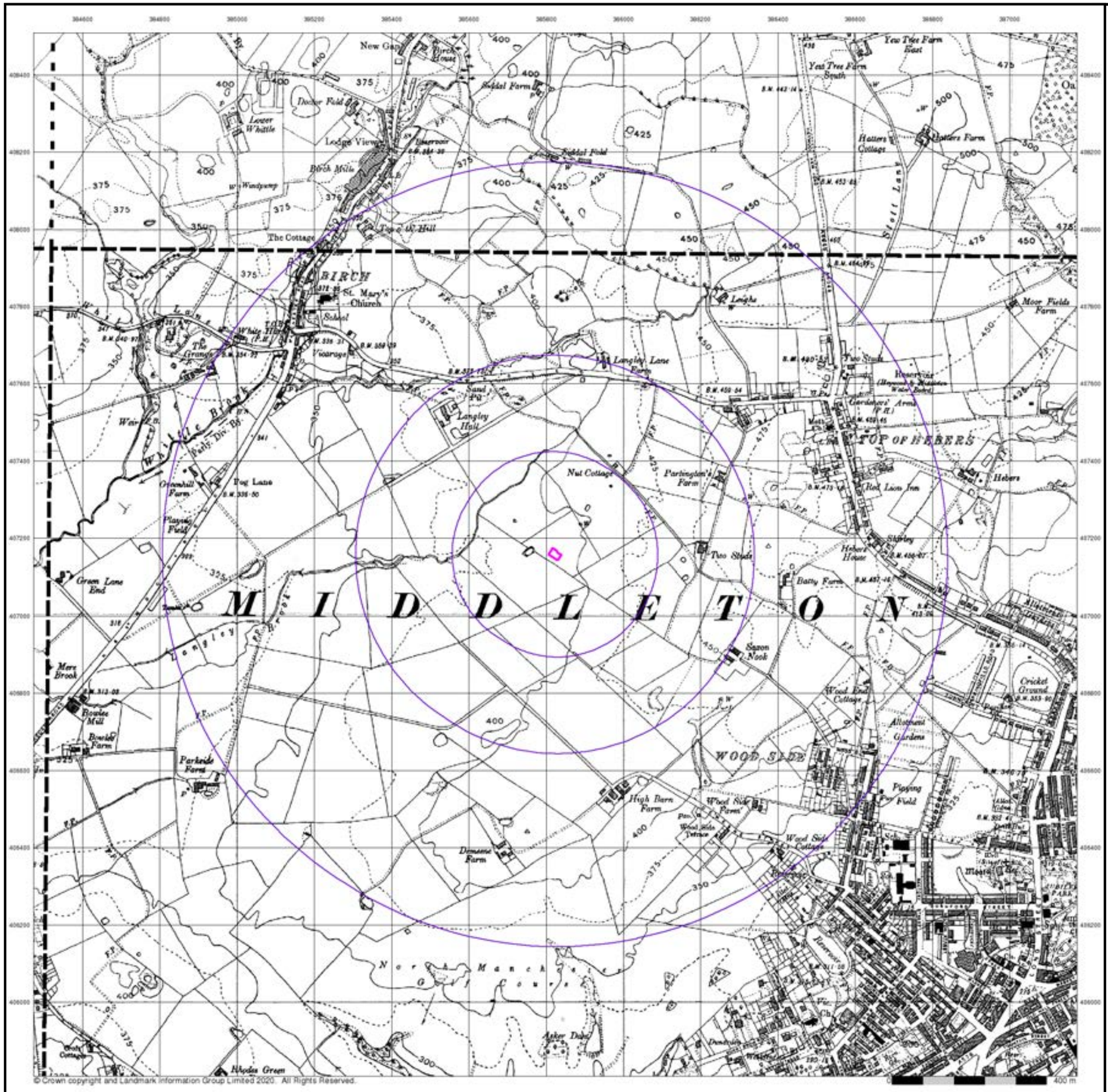
St. Mary's Church
School
The Grange
Vicarage
Langley Lane Farm
Sand Pit
Langley Hall
Leighs
Moor Fields Farm
Two Steds
Reservoir
Gamekeepers' Arms P.H.
Meeting Room
CUP OF HEAVEN
Hebers
Nut Cottage
Purvington's Farm
Red Lion Inn
Stanley
Heber's House
Two Steds
Bailey Farm
Saxon Nook
Cricket Ground
Allotment Gardens
Wood Side Cottages
Playing Field
Wood Side Farm
Wood Side Terrace
High Barn Farm
Demesne Farm
Nor'th Manchester Golf Course
Ashes Dam
Whodes Green
Green Lane End
Greenhill Farm
Fog Lane
Mere Brook
Boarden Mill
Bowld Farm
Parkside Farm
Langley
Wood Side
MIDDLETON
Weir
Path
Div. Br.
Ch.
Sch.
F.P.
P.H.
Sta.
Cott.
Farm
Hall
Lane
Brook
Mill
Green
Hill
Dam
Course
Field
Fields
Gardens
Ground
Nook
Terrace
Cottages
Inn
Arms
Room
Meeting
Reservoir
Two Steds
Allotment
Cricket
Saxon
Bailey
Heber's
Stanley
Red Lion
Purvington's
Nut
Gamekeepers'
CUP OF HEAVEN
Leighs
Moor Fields
Langley Lane
Sand
Langley Hall
High Barn
Wood Side
Demesne
Ashes
Whodes
Green Lane
Greenhill
Fog Lane
Mere
Boarden
Bowld
Parkside


BIRCH
St. Mary's Church
School
The Cottage
Lodge Views
Birch Mills
Windpump
Lower Whittle
Docker Field
Fiddel Farm
Fiddel Field
Yew Tree Farm East
Yew Tree Farm South
Hatters Cottage
Hatters Farm
Stott Lane
Leighs
Moor Fields Farm
Langley Lane Farm
Langley Hall
Sand Pit
Two Stacks
Gardeners' Arms (P.H.)
TOP OF HEBERS
Hebers
Red Lions Inn
Partington's Farm
Nut Cottage
Hebers House
Batty Farm
Saxon Nook
Cricket Ground
Allotment Gardens
WOOD SIDE
Wood End Cottage
Wood Side Farm
Wood Side Terrace
Wood Side Cottages
Piggins Field
High Barn Farm
Demesne Farm
Parkside Farm
Bowden Mill
Bowden Farm
Mary Brook
Longley Brook
Green Lane End
Playing Field
Ogden Hill Farm
Fog Lane
Ogden Cottage
Hydes Green
Vicarage
The Grange
White Hill (P.H.)
Weir
Weir Brook
Parish Div. Bdy.
Nut Cottage
Partington's Farm
Two Stacks
Batty Farm
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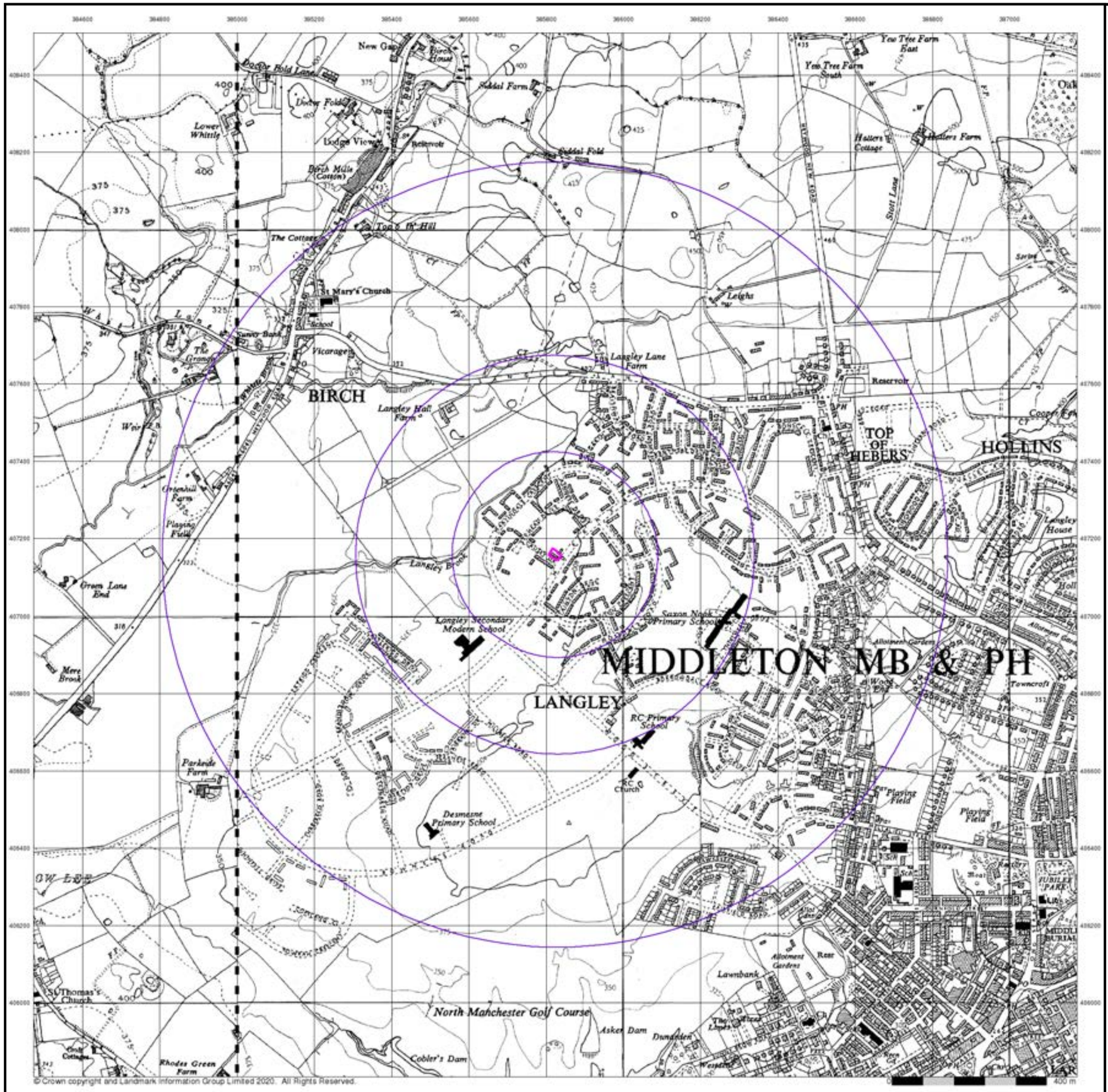
Saxon Nook
Wood End Cottage
Allotment Gardens
Cricket Ground



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Ordnance Survey Plan

Published 1955 - 1956

Source map scale - 1:10,000

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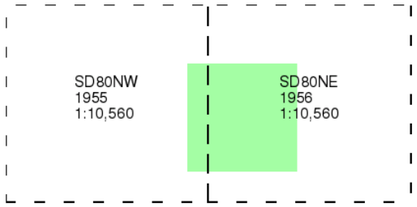
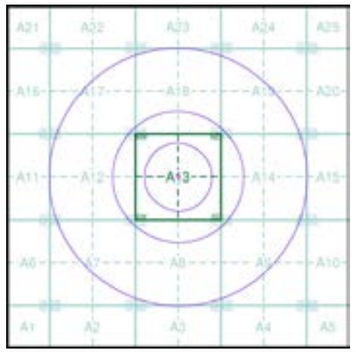
Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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Customer Ref:	ES020620
National Grid Reference:	385820, 407160
Slice:	A
Site Area (Ha):	0.05
Search Buffer (m):	1000

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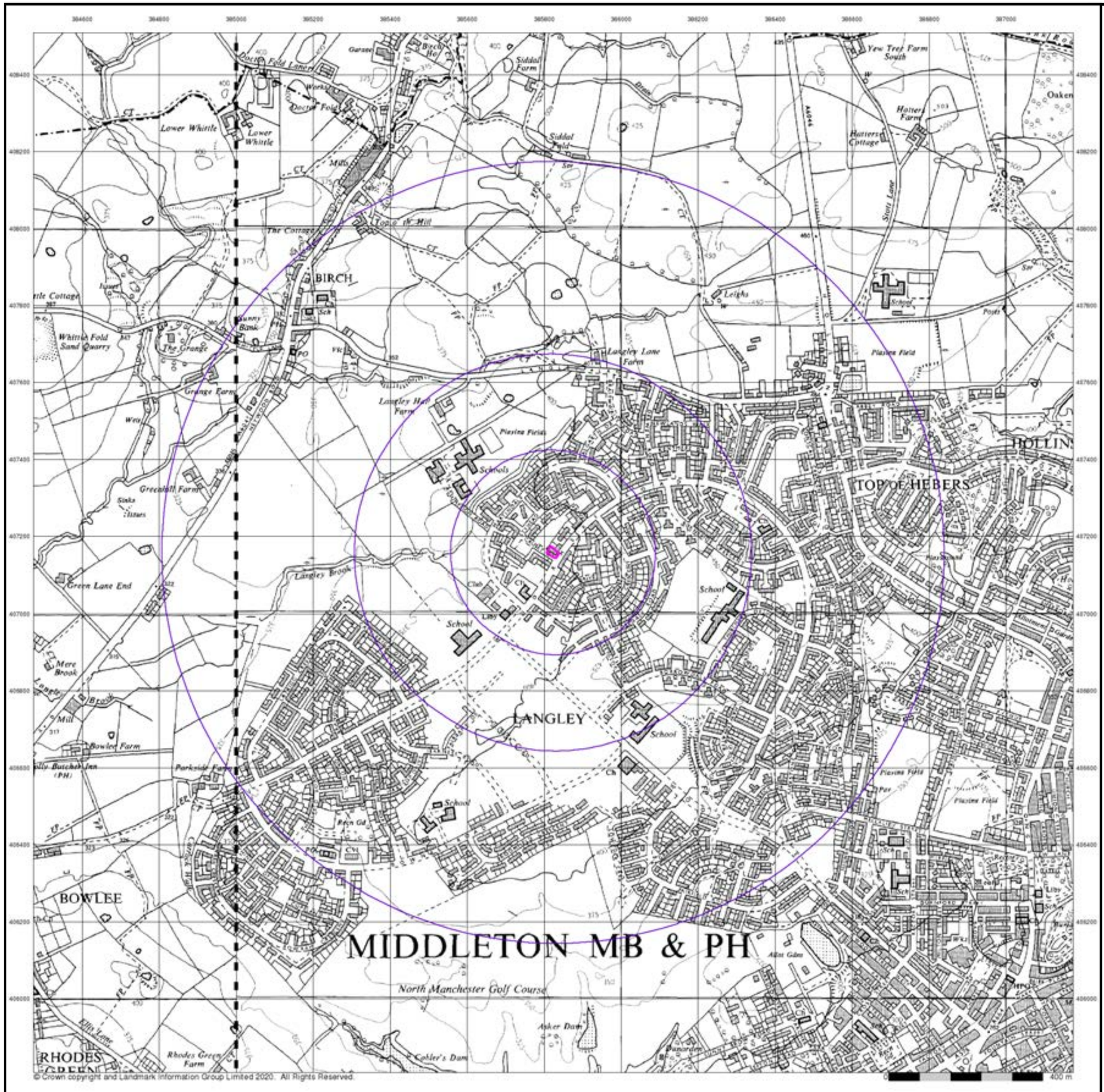

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Ordnance Survey Plan

Published 1965

Source map scale - 1:10,000

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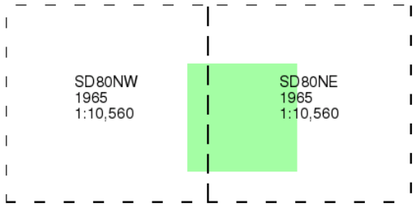
Map Name(s) and Date(s)



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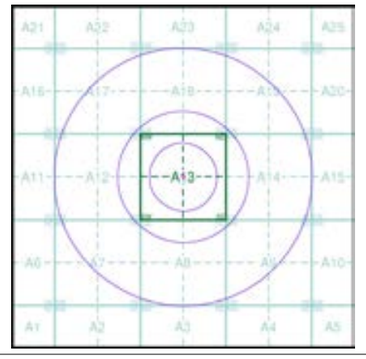

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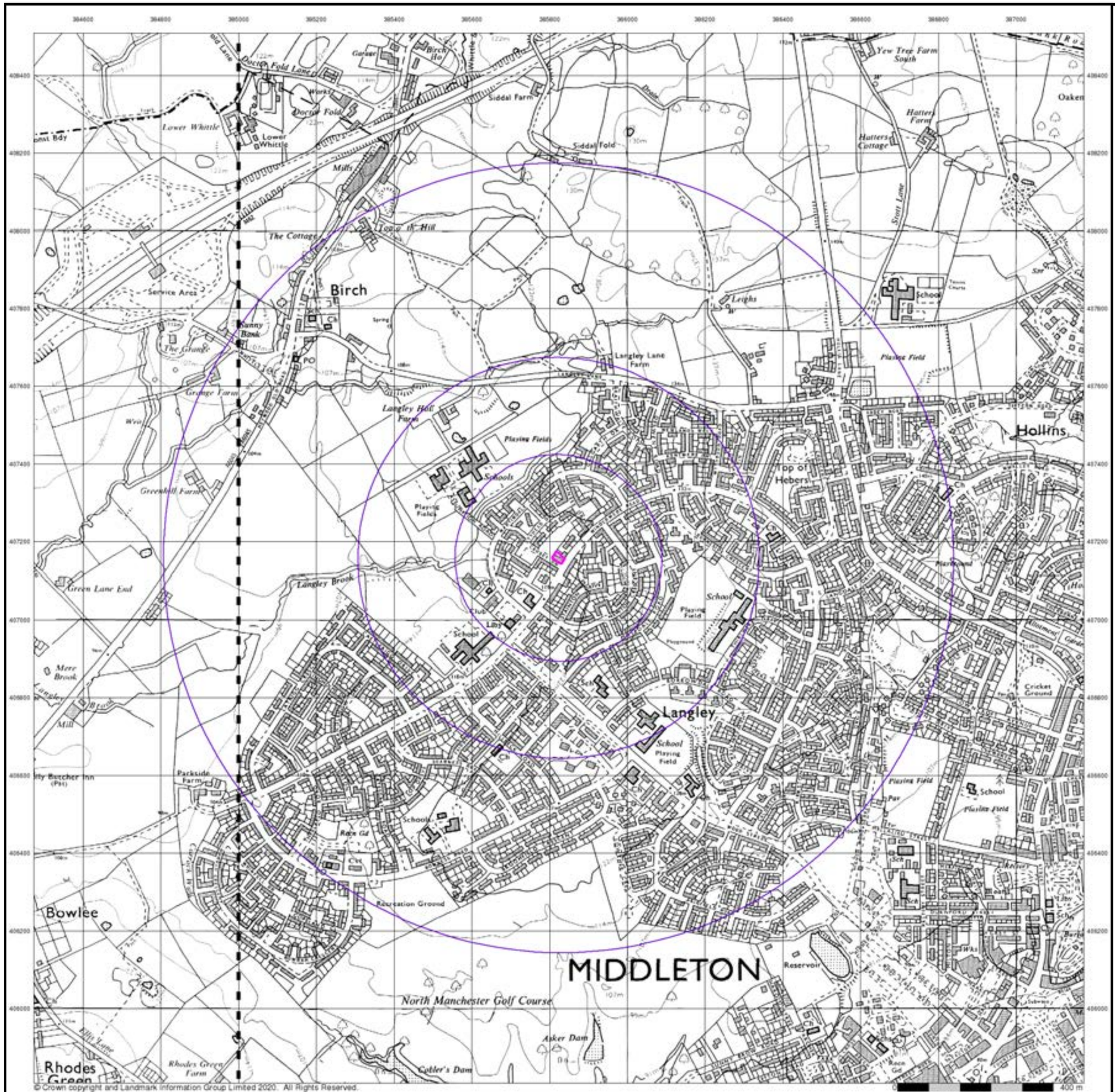
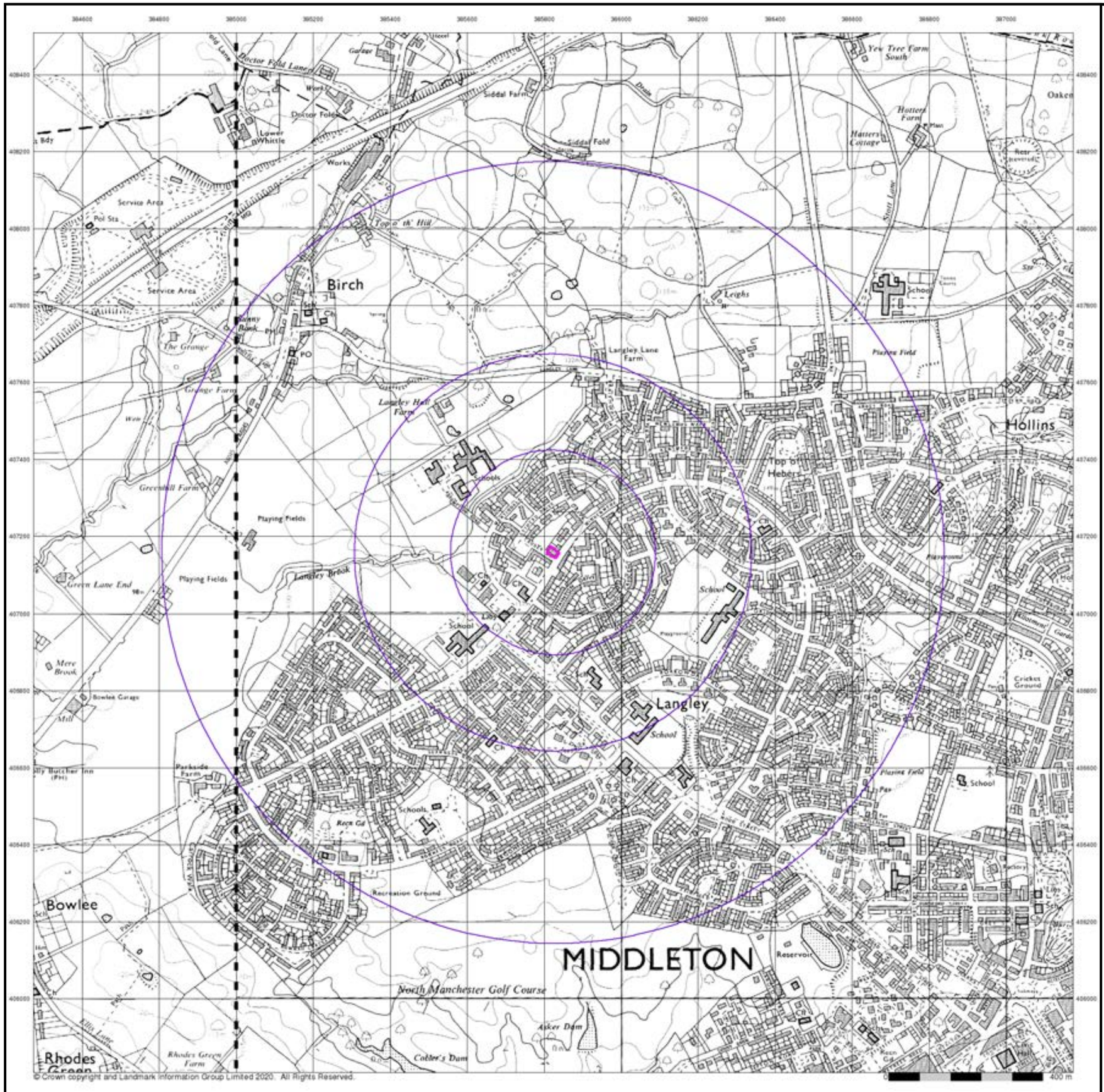

Birch
Hollins
Langley
MIDDLETON
Bowlee
Rhodes Green
Lower Whittle
Siddal Farm
Siddal Fold
Hatters Farm
Hatters Cottage
Yew Tree Farm South
Oaken
Scott Lane
Service Area
The Cottage
Leigh Hill
Leighs
School
Playing Field
Langley Lane Farm
Langley Hall Farm
Grange Farm
Greenhill Farm
Schools
Top of Hebers
Green Lane End
Langley Brook
Mere Brook
Packside Farm
Recreation Ground
North Manchester Golf Course
Asker Dam
Cobler's Dam
Rhodes Green Farm
Reservoir
Cricket Ground
Tennis Courts
Sch
Par
Lily
Club
Mill
Pond
Works
Garage
Birch Ho
Doctor Fold Lane
Doctor Fold
Mills
Spring
Wks
Sub Sta
PO
Ch
Cas
Race Gd
Baths
Subway
Footpath
Playground
Allotments
Gdns
Boat
Boathouse
Bridge
Rifle Butts
Rifle Range
Boundary Stone
Tennis Courts
Cricket Ground
Playing Fields
Playing Field
Playground
Allotments
Gardens


Birch
Hollins
Langley
MIDDLETON
Bowlee
Rhodes Green
Doctor Fold Lane
Lower Whistle
Service Area
Top o' th' Hill
Leighs
Langley Lane Farm
Langley Hall Farm
Greenhill Farm
Playing Fields
Green Lane End
Langley Brook
Mere Brook
Bowlee Garage
Parkside Farm
Recreation Ground
North Manchester Golf Course
Asker Dam
Cobler's Dam
Rhodes Green Farm
Reservoir
Cricket Ground
Yew Tree Farm South
Hatters Farm
Hatters Cottage
Siddal Farm
Siddal Fold
Scott Lane
Pearoyd Field
Playing Field
Oaken
Rear
School
Works
Factory
Sch
Ch
PO
Pol Sta
Granny Bank
The Grange
Grange Farm
Wen
Still
Rock Cd
Recn Gd
Factory
Hall
Pav
Playground
Cricket Ground
Garage
Mill
Ellis Lane
Bdy
Top of Heber
Pearoyd Field
Playing Field
Langley Brook
Siddal Fold
Scott Lane
Yew Tree Farm South
Hatters Farm
Hatters Cottage
Oaken
Rear
Doctor Fold Lane
Lower Whistle
Service Area
Pol Sta
Top o' th' Hill
Leighs
Langley Lane Farm
Langley Hall Farm
Greenhill Farm
Playing Fields
Green Lane End
Langley Brook
Mere Brook
Bowlee Garage
Parkside Farm
Recreation Ground
North Manchester Golf Course
Asker Dam
Cobler's Dam
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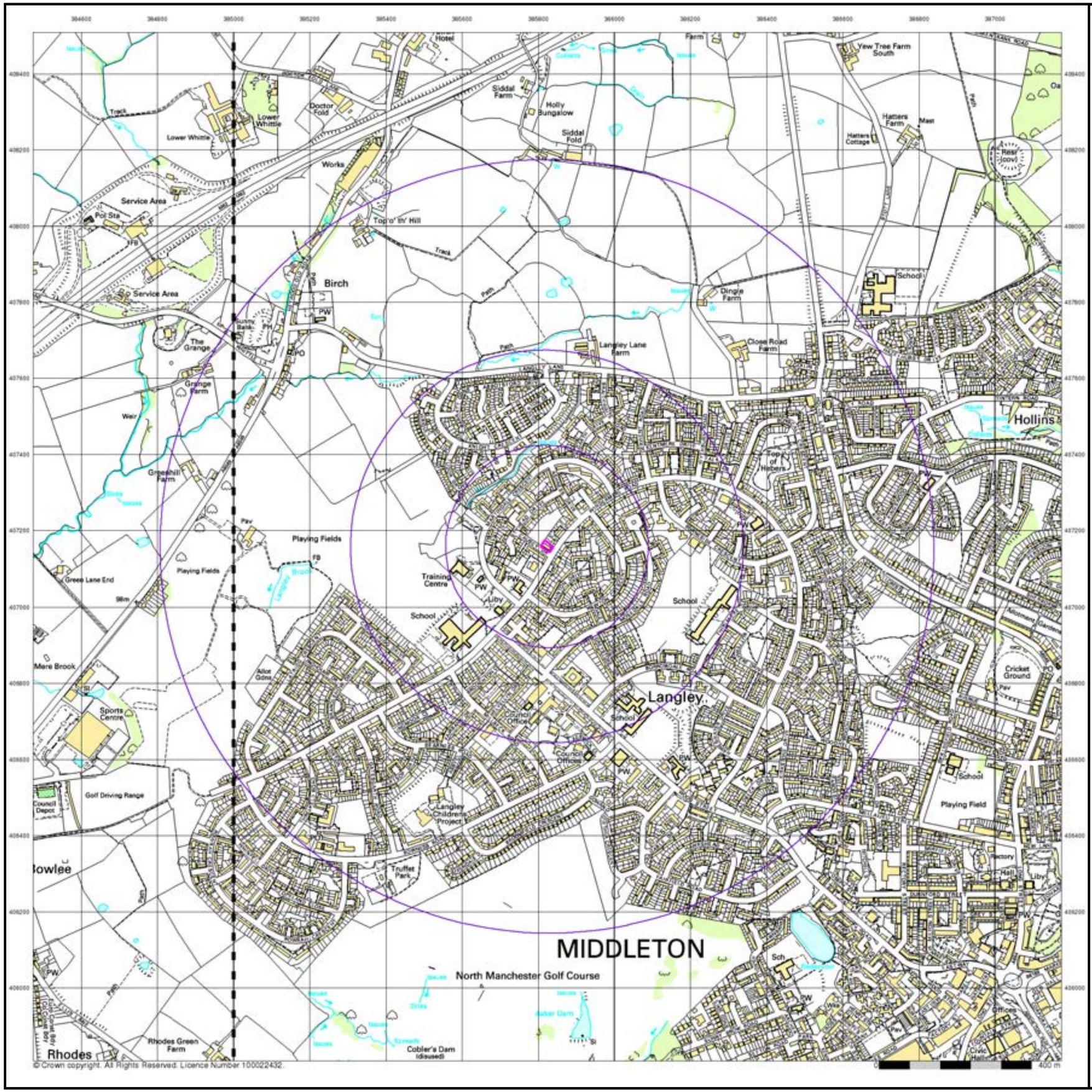
Scott Lane
Pearoyd Field
Oaken
Rear



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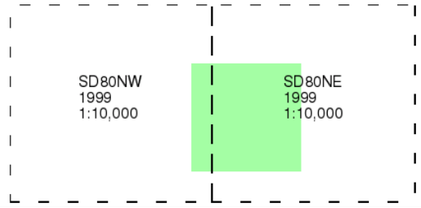
10k Raster Mapping

Published 1999

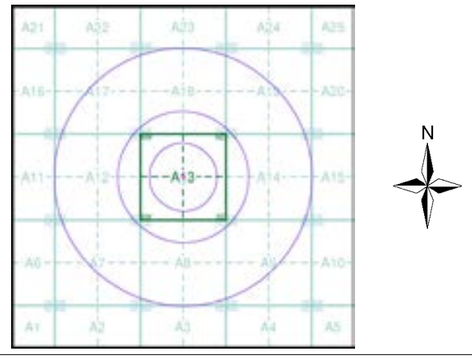
Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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Slice:	A
Site Area (Ha):	0.05
Search Buffer (m):	1000

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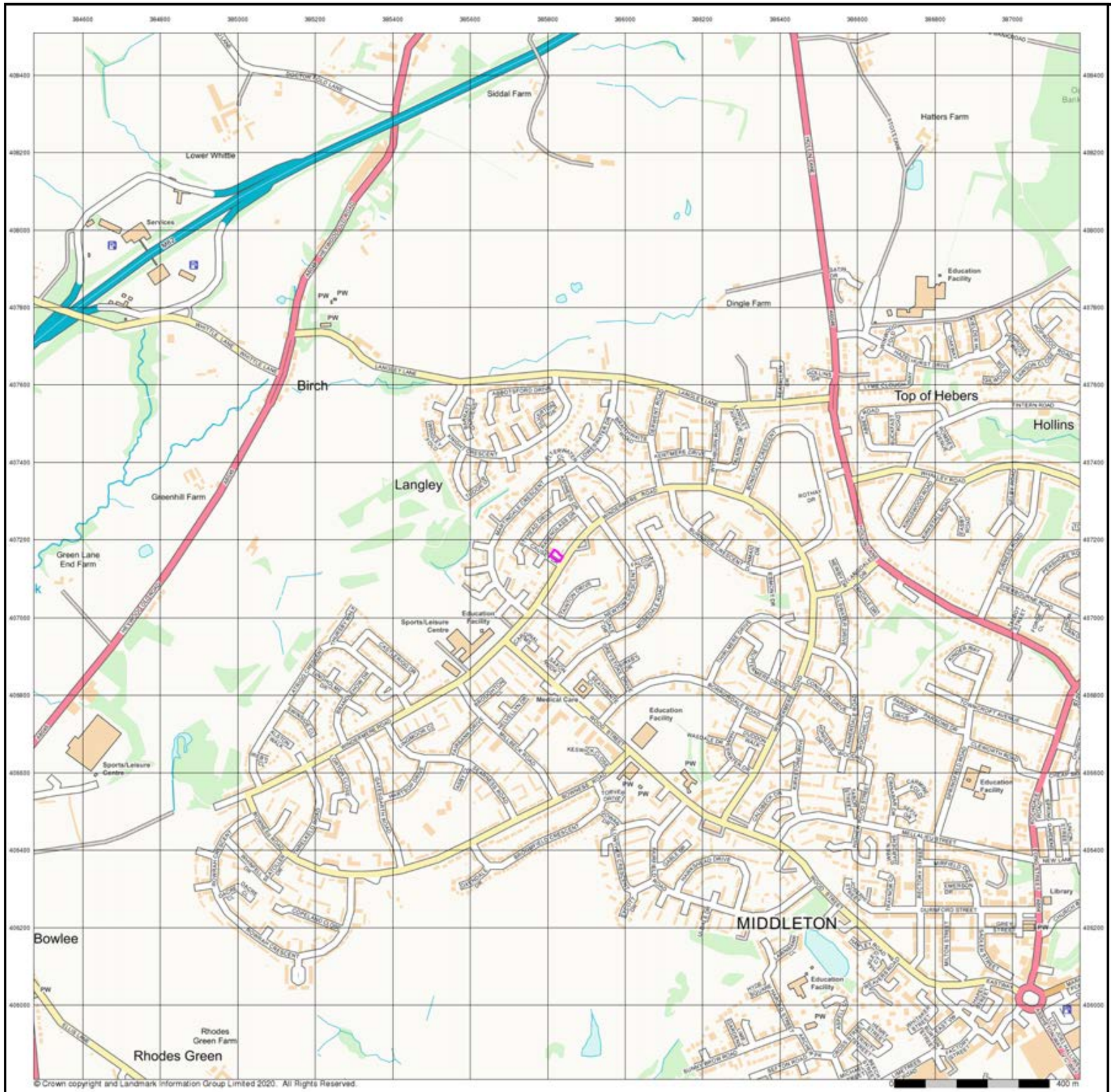

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Street View

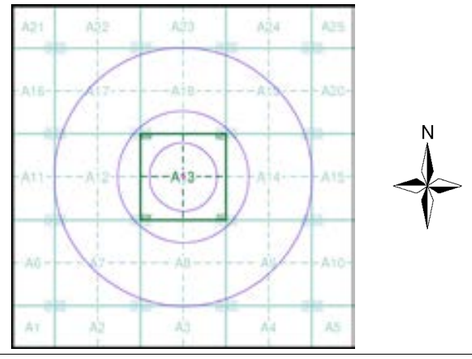
Published 2020

Source map scale - 1:10,000

Street View is a street-level map for the whole of Great Britain produced by the Ordnance Survey. These maps are provided at a nominal scale of 1:10,000

Map Name(s) and Date(s)

Street View Map - Slice A



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Slice:	A
Site Area (Ha):	0.05
Search Buffer (m):	1000

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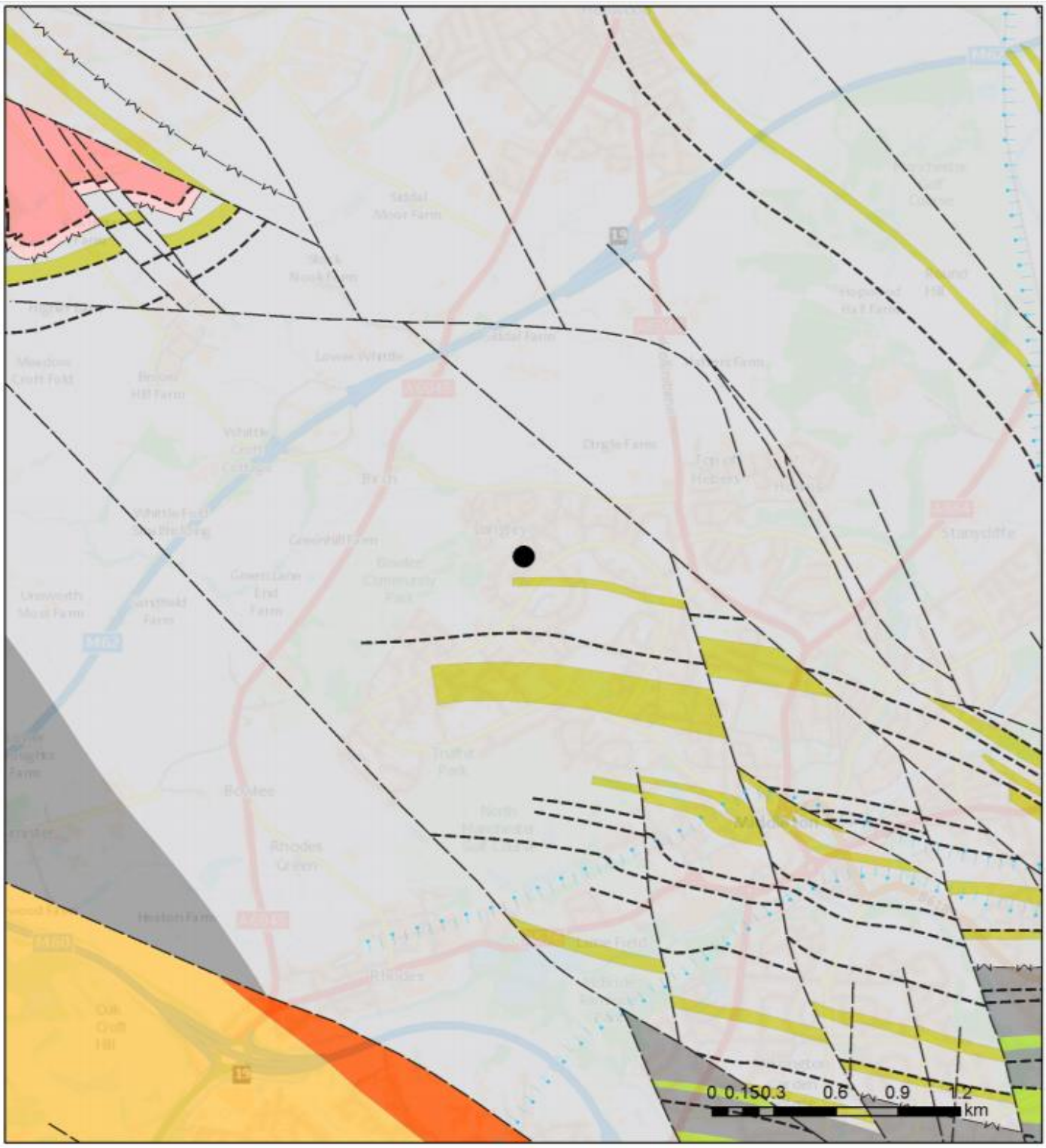
Appendix D – Geological Maps

Bedrock Geology



Bedrock geology 1:50,000 scale

- PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- ROSSENDALE FORMATION - MUDSTONE AND SILTSTONE
- ROUGH ROCK - SANDSTONE
- PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- CHESTER FORMATION - SANDSTONE
- COLLYHURST SANDSTONE FORMATION - SANDSTONE
- BLENFIRE ROCK - SANDSTONE
- NOB END ROCK - SANDSTONE
- MANCHESTER MARLS FORMATION - MUDSTONE

Superficial Geology



Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- TILL, DEVENSIAN - DIAMICTON
- GLACIOLACUSTRINE DEPOSITS, DEVENSIAN - CLAY AND SILT
- HUMMOCKY (MOUNDY) GLACIAL DEPOSITS, DEVENSIAN - DIAMICTON
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- HEAD - CLAY, SILT, SAND AND GRAVEL
- LACUSTRINE DEPOSITS - CLAY
- PEAT - PEAT

Appendix E – BGS Borehole Logs

SD80NE297

Manchester Smart Motorway M60 BH21362AZ CP

X: 385835.23 Y: 407014.99 Level: 97.11

Start: 2014-09-18 End: 2014-09-18

Client: Manchester Smart Motorways

Contractor:

Engineer: Hyder

Page 1

DEPTH METRES	Depth	Level	Log	Description
				Loose dark brown silty fine and medium SAND TOPSOIL
	0.60	96.51		MADE GROUND Medium dense light grey angular medium and coarse GRAVEL of limestone
1.0	1.00	96.11		
	1.40	95.71		MADE GROUND Medium dense light orangish brown gravelly fine and medium SAND Gravel is angular fine to coarse of sandstone and limestone
2.0				
				Medium dense light brown silty fine SAND with orangish brown thinly laminated fine to coarse sand bands GLACIOFLUVIAL DEPOSITS
	2.90	94.21		
3.0	3.20	93.91		
				Firm light brown sandy SILT Sand is fine GLACIOFLUVIAL DEPOSITS
4.0				
				Firm brown slightly sandy slightly gravelly CLAY Sand is fine and medium Gravel is subangular to rounded fine and medium of mudstone sandstone and coal GLACIAL TILL

IMPORTANT: This is a basic log auto-generated from AGS data held by the National Geoscience Data Centre (NGDC) and does not necessarily include all of the information supplied in the original AGS file. If you wish to deposit AGS files to the NGDC please see www.bgs.ac.uk/services/ngdc. Generated 19-05-2020 at 11:41 by BGS Groundhog (BETA). BGS Reference 20200203120349441688

Manchester Smart Motorway M60 BH21362AZ CP

X: 385835.23 Y: 407014.99 Level: 97.11

Start: 2014-09-18 End: 2014-09-18

Client: Manchester Smart Motorways

Contractor:

Engineer: Hyder

DEPTH METRES	Depth	Level	Log	Description
	5.40	91.71		Firm brown slightly sandy slightly gravelly CLAY Sand is fine and medium Gravel is subangular to rounded fine and medium of mudstone sandstone and coal GLACIAL TILL
6.0	6.10	91.01		Soft light brown sandy SILT Sand is fine GLACIOFLUVIAL DEPOSITS
7.0				Firm brown slightly sandy becoming sandy slightly gravelly CLAY Sand is fine to coarse Gravel is subangular to rounded fine and medium of mudstone siltstone sandstone and coal GLACIAL TILL
8.0				Soft light brown sandy SILT Sand is fine GLACIOFLUVIAL DEPOSITS
	8.80	88.31		Firm brown slightly sandy slightly gravelly CLAY with silty fine sand partings Sand is fine and medium Gravel is subangular to rounded fine of mudstone siltstone sandstone and coal GLACIAL TILL
9.0				
	9.30	87.81		Medium dense brown silty fine and medium SAND GLACIOFLUVIAL DEPOSITS
	9.80	87.31		

IMPORTANT: This is a basic log auto-generated from AGS data held by the National Geoscience Data Centre (NGDC) and does not necessarily include all of the information supplied in the original AGS file. If you wish to deposit AGS files to the NGDC please see www.bgs.ac.uk/services/ngdc. Generated 19-05-2020 at 11:41 by BGS Groundhog (BETA). BGS Reference 20200203120349441688

Manchester Smart Motorway M60 BH21362AZ CP

X: 385835.23 Y: 407014.99 Level: 97.11

Start: 2014-09-18 End: 2014-09-18

Client: Manchester Smart Motorways

Contractor:

Engineer: Hyder

DEPTH METRES	Depth	Level	Log	Description
				Medium dense brown silty fine and medium SAND GLACIOFLUVIAL DEPOSITS
	10.50	86.61		
11.0				
12.0				
13.0				
14.0				

IMPORTANT: This is a basic log auto-generated from AGS data held by the National Geoscience Data Centre (NGDC) and does not necessarily include all of the information supplied in the original AGS file. If you wish to deposit AGS files to the NGDC please see www.bgs.ac.uk/services/ngdc. Generated 19-05-2020 at 11:41 by BGS Groundhog (BETA). BGS Reference 20200203120349441688

Appendix F – Coal Mining Summary Map

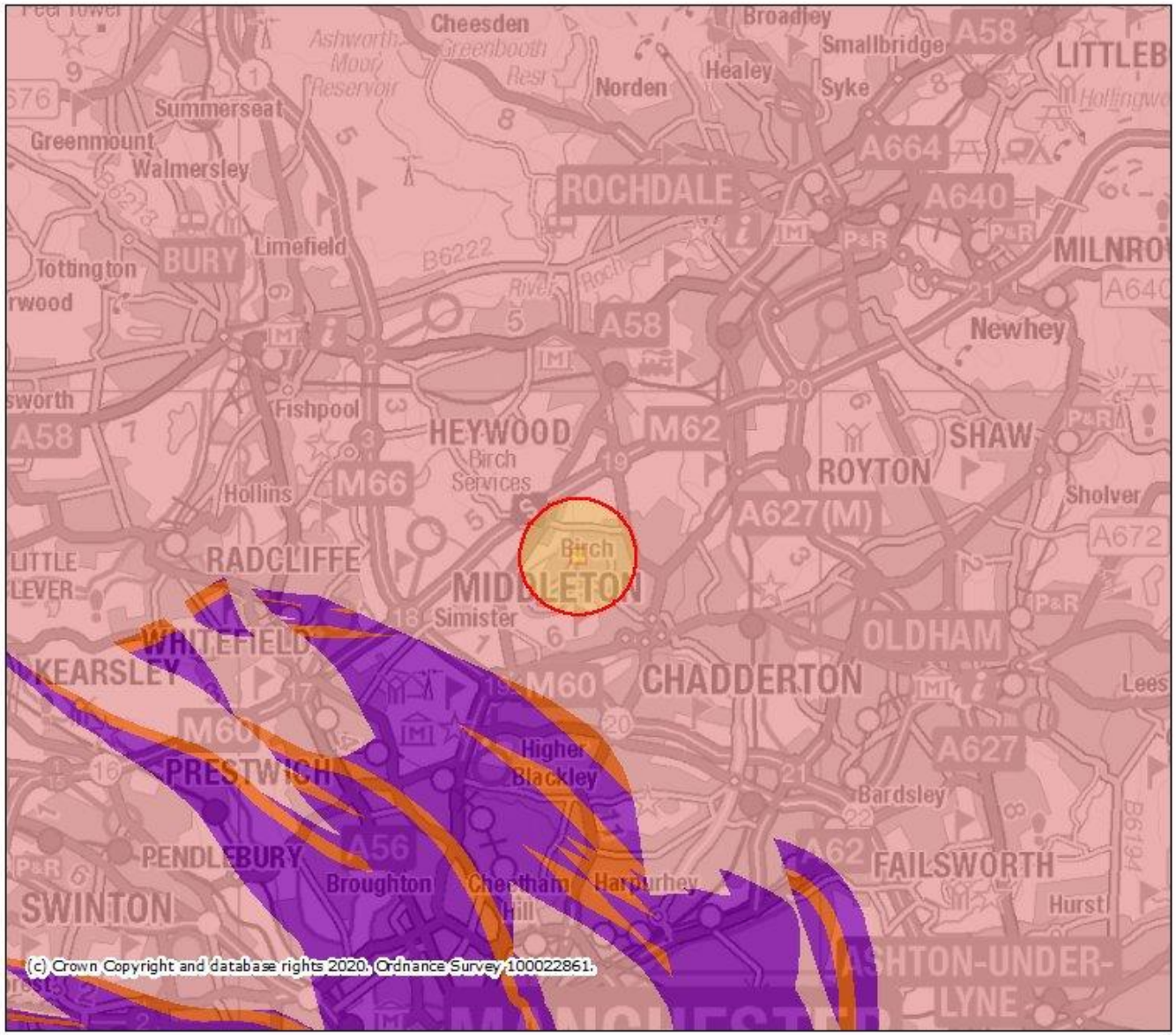


enviro | solution

Coal Authority Interactive Viewer Map

MAGiC

Bedrock Aquifer



Legend

Aquifer Designation Map (Bedrock) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unproductive

Projection = OSGB36
xmin = 368700
ymin = 399600
xmax = 403200
ymax = 416100

0 2 4
km

Map produced by MAGIC on 19 May, 2020.

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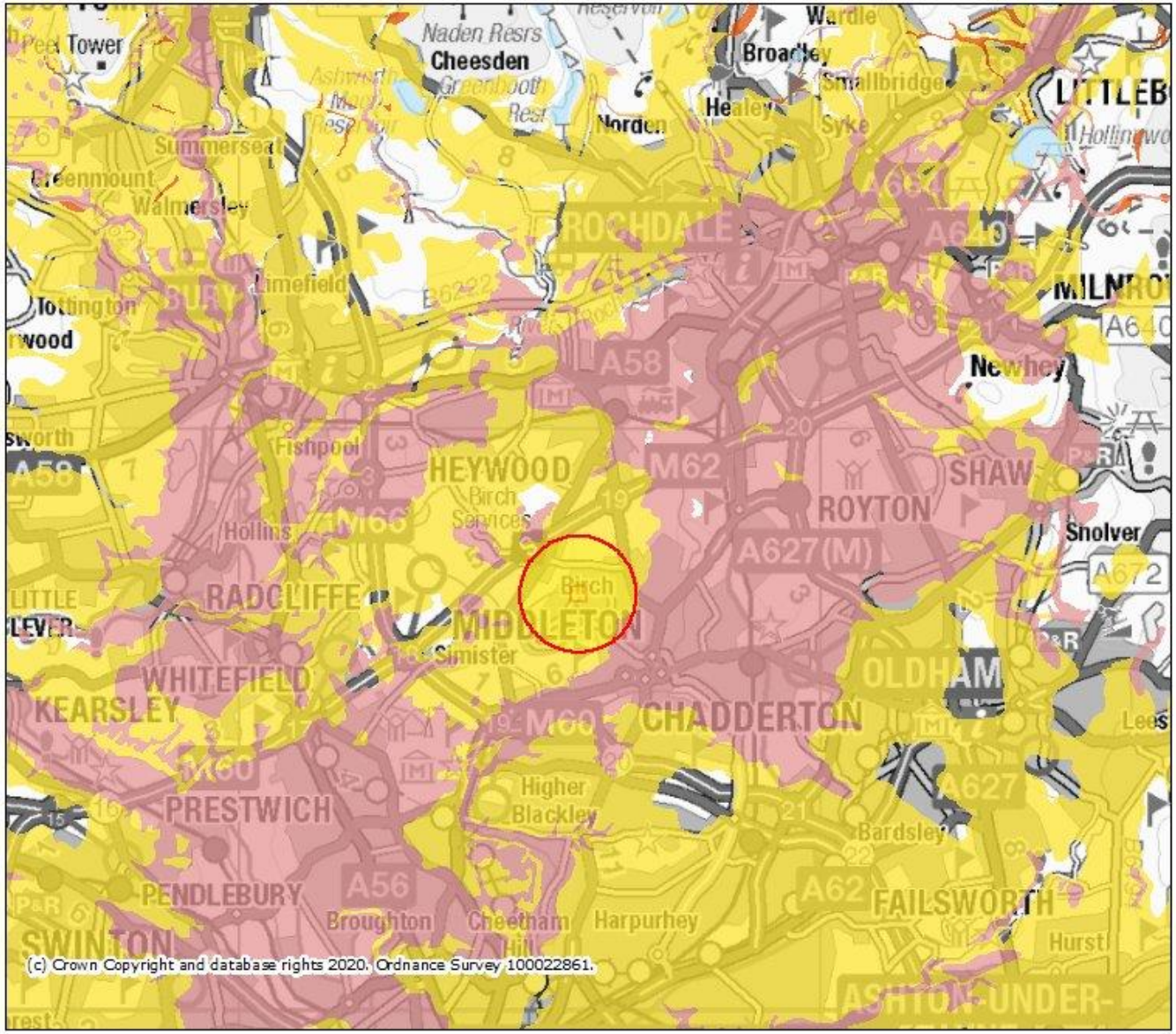
MAGiC

Superficial Aquifer



Legend

Aquifer Designation Map (Superficial Drift) (England)

- Principal
- Secondary A
- Secondary B
- Secondary (undifferentiated)
- Unknown (lakes+landslip)
- Unproductive

Projection = OSGB36
xmin = 368700
ymin = 400900
xmax = 403200
ymax = 416100

0 2 4
km

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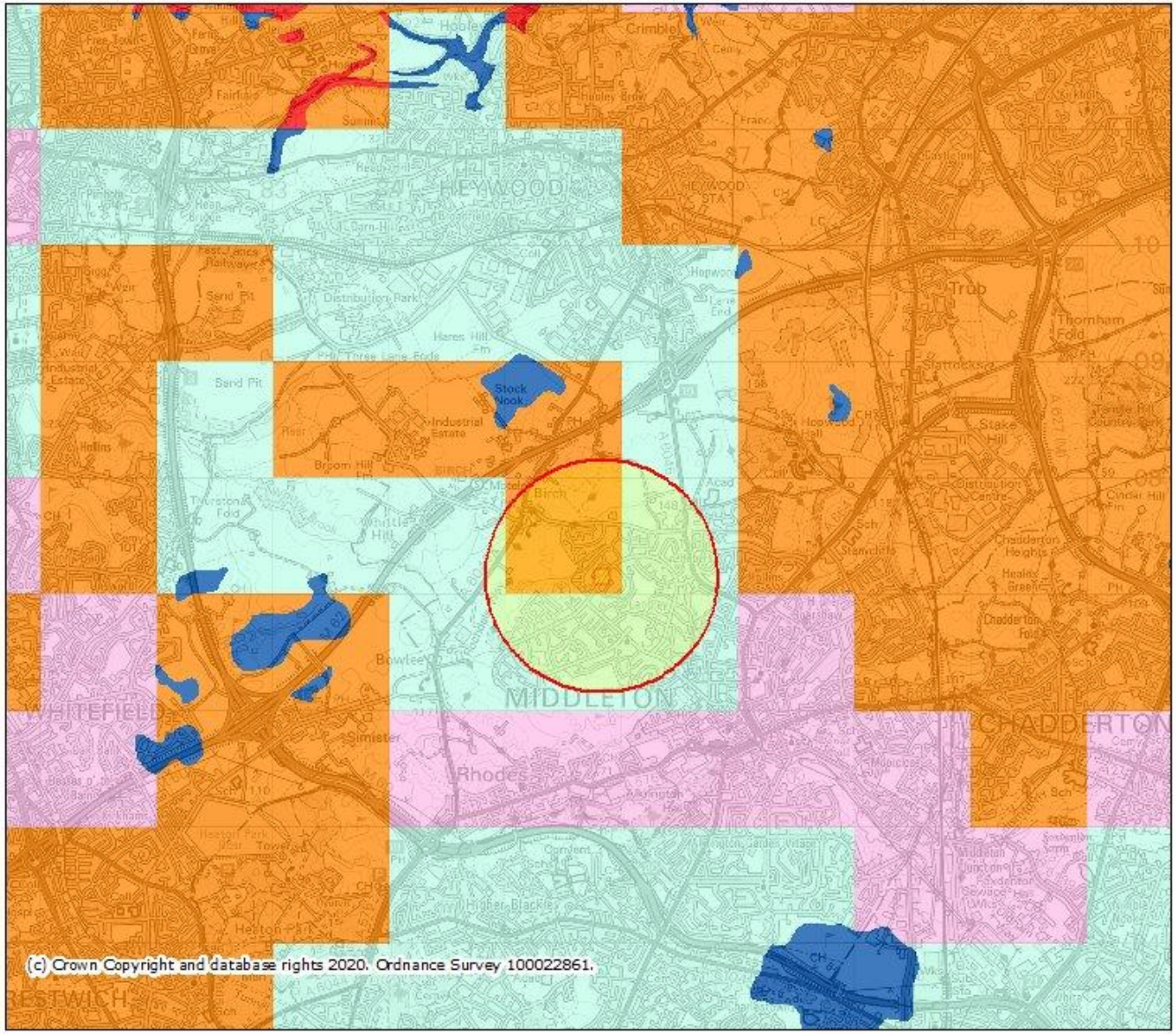
MAGIC

Groundwater Vulnerability



Legend

Groundwater Vulnerability Map (England)

- Local Information
- Soluble Rock Risk
- High
- Medium - High
- Medium
- Medium - Low
- Low
- Unproductive

Projection = OSGB36
xmin = 377100
ymin = 403900
xmax = 394300
ymax = 411500

0 1 2
km

Map produced by MAGIC on 19 May, 2020.

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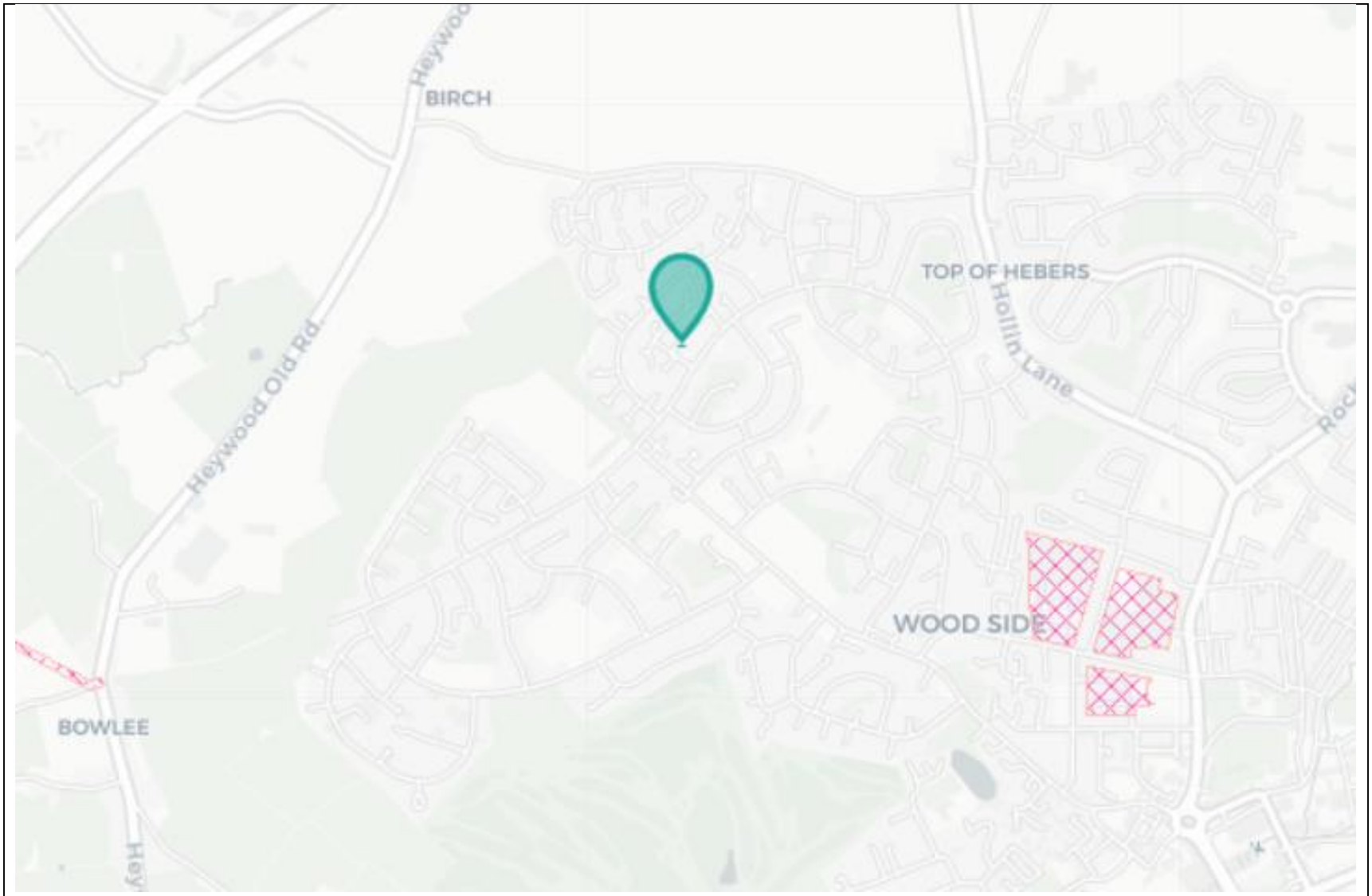
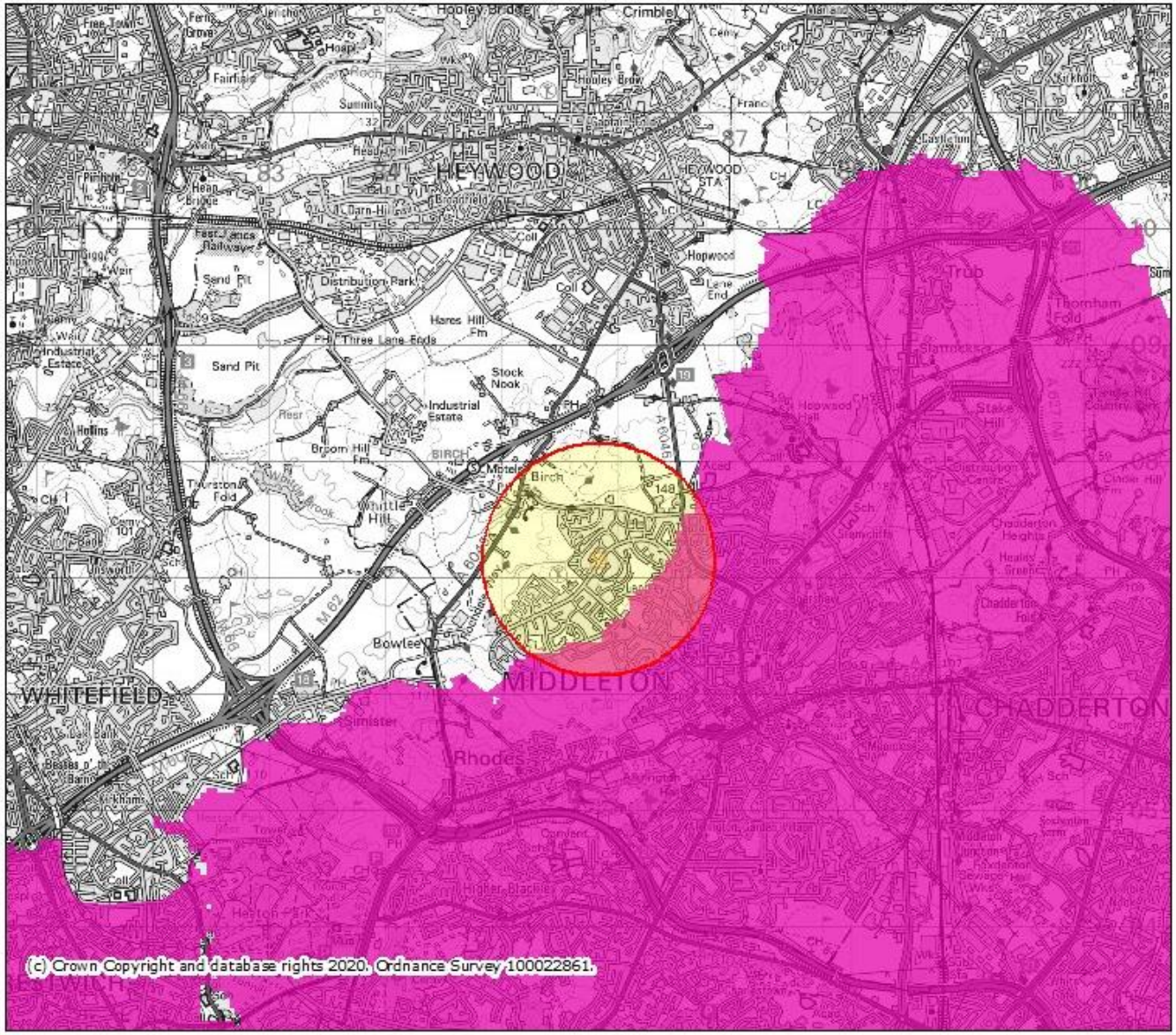
Appendix H – Historic Landfill Map



enviro | solution	**Groundsure Historic Map**

MAGIC

Nitrate Vulnerable Zones



Legend

Nitrate Vulnerable Zones
2017 Designations
(England)

Projection = OSGB36
xmin = 377100
ymin = 403700
xmax = 394400
ymax = 411300

0 1 2
km

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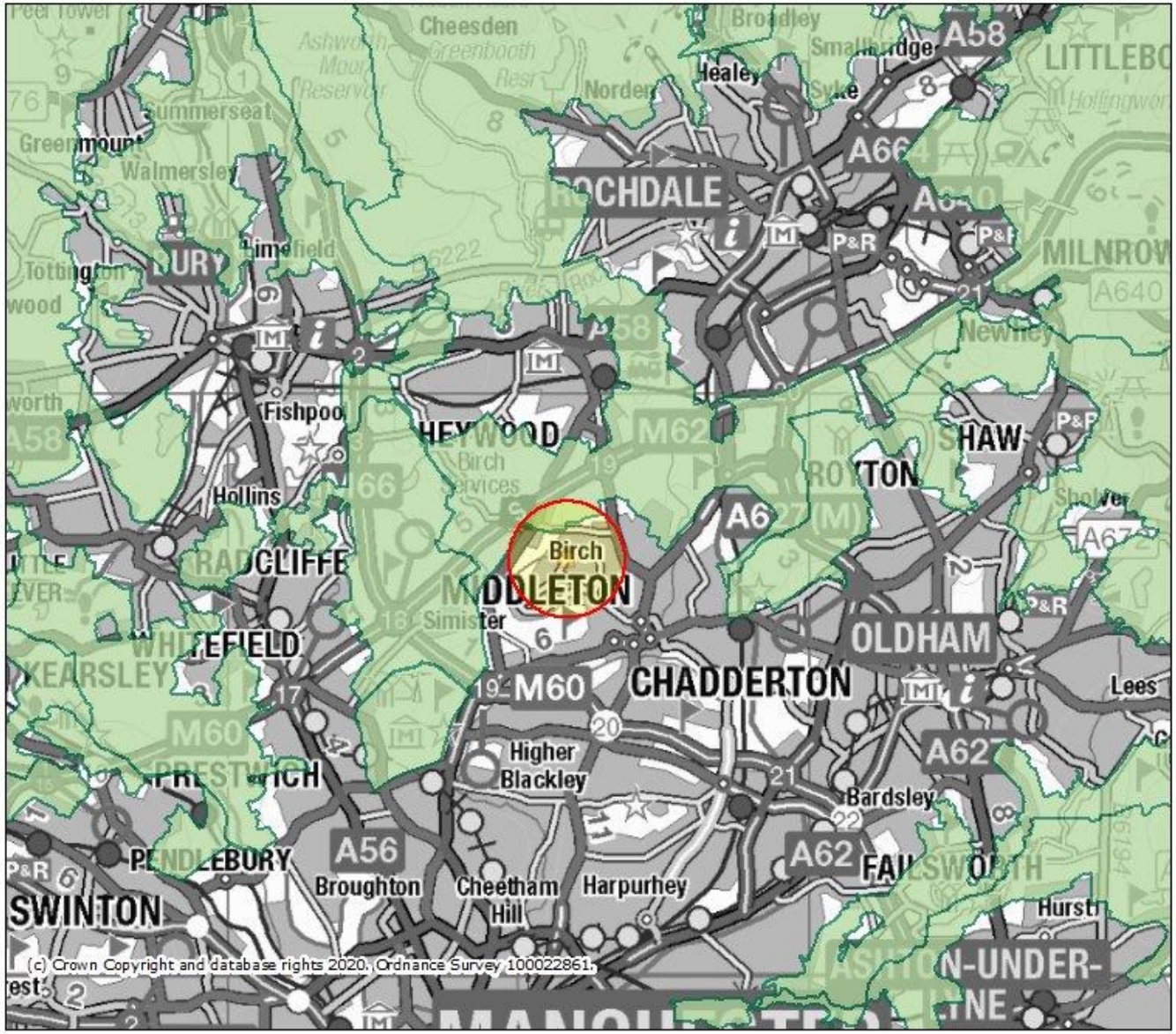
MAGiC

Green Belt



Legend

Green Belt (England)

Projection = OSGB36
xmin = 368900
ymin = 400300
xmax = 403400
ymax = 415500

0 2 4
km

Map produced by MAGIC on 19 May, 2020.

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