



Report
Title:

Phase 1 Geo-Environmetal Desk Study

Project
Name:

Bartons Road, Havant



Report
Reference:

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Date:

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REPORT CONTROL SHEET

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PROJECT	BARTONS ROAD, HAVANT
CLIENT	STONEBOND

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BRD Environmental Limited

Geotechnical and Environmental Services

- Ground Investigation
- Japanese Knotweed Removal
- Soil, Water and Gas Testing
- Contamination Assessment
- Geotechnical Advice
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Phase 1 Geo-Environmetal Desk Study
Bartons Road, Havant
BRD4469-OR1-B Havant DS

REPORT LAYOUT

This report is divided into the following four sections: Summary Report, Technical Report, Supporting Information and Appendices.

SUMMARY REPORT

This expanded executive summary provides the main findings of the work undertaken in brief non-technical language. This section provides an overview of the key outcomes for the benefit of non-specialists and concludes with the main recommendations. This section should only be relied upon in the context of the whole report and the Technical Report should be referred to with respect to any design decisions.

TECHNICAL REPORT

The main report section is intended to provide the technical detail of the investigation and is intended to provide the level of information required by current guidance documents and practice. The Technical Report is written in a language that, in part, assumes knowledge of subject matter so that it can be written in as concise a form as possible. Its intended audience is peers, regulators and other professionals in related disciplines.

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SUPPORTING INFORMATION		
<p>This section of the report provides background details of a generic nature together with specific technical approaches adopted by BRD and details of the guidance documents that are commonly referenced in the report. The section also includes explanations of technical terms to assist non-specialist readers in understanding the Technical Report. It should be noted that not all the information within this section is necessarily applicable to this specific report.</p>		
APPENDICES		
<p>The final section of the report presents the factual data collected and employed as part of the investigation.</p>		
APPENDIX 1	SITE PLANS & PHOTOGRAPHS	
	Site Location Plan	Ref. BRD4469-OP2-A
	Site Walkover Photographs	Ref. BRD4469-OP3-A
	Initial Conceptual Site Model	Ref. BRD4469-OP4-B
APPENDIX 2	HISTORICAL PLANS	
	Order No. 353460273_1_1	43 x A3 pages
APPENDIX 3	ENVIROCHECK REPORT	
	Order No. 353460273_1_1	75 x A4 pages & 6 x A3 pages
APPENDIX 4	MINING AND GROUND STABILITY REPORT	
	Order No. 353460273_1_1	15 x A4 pages & 2 x A3 pages

SUMMARY REPORT

SUBJECT	COMMENTS
CURRENT SITE CONDITION	The site is currently unoccupied and derelict. The former SSE offices have been demolished leaving a surface of demolition rubble across the site in the location of the former offices. A large stockpile of crushed concrete is also located in the centre of the site.
PROPOSED DEVELOPMENT	The proposed development is for 90No. residential dwellings, comprising 32No. apartments and 58No. houses.
HISTORICAL SUMMARY	The site was agricultural in the first available map from 1867. Two of the field boundaries incorporated a small stream. The stream is no longer evident by 1957. By 1972, the office buildings have been constructed on site and a petrol station and electricity substation were present adjacent to the site. The offices were extended by 1991 and demolished at some point between 2016 and 2019 with crushed material still remaining.
PUBLISHED GEOLOGY	<p>No superficial deposits indicated to be present. However, Head Deposits are shown adjacent to the site. River Terrace Deposits are also within close proximity of the site. Both deposits can be composed of clay, silt, sand or gravel.</p> <p>The shallowest bedrock is shown to be the Bognor Sand Member, which is typically described as a glauconitic bioturbated or cross-bedded fine- and medium-grained sand.</p>
RADON GAS	Radon gas protection measures are not required.
HYDROGEOLOGY	<p>No superficial deposits present. However, the adjacent Head Deposits are designated as a Secondary Undifferentiated Aquifer.</p> <p>The Bognor Sand Member is designated as a Secondary A Aquifer.</p> <p>The site is located within a groundwater Source Protection Zone 1 (Inner Protection Zone) - Subsurface activity only (1c). This means the aquifer is confined and would only be affected by subsurface activity such as deep drilling.</p>
HYDROLOGY	<p>The closest surface water feature to the site is a small stream approximately 311m east of site. A large stream is approximately 523m east of site. Both are orientated in a southerly direction.</p> <p>The site is not in an area indicated to be at risk of flooding.</p>
PREVIOUS GROUND REPORTS	<p>The site has been subject to two previous ground investigations. The first was completed prior to the demolition of the onsite buildings and the second was completed after the demolition. These are referenced as follows:</p> <ul style="list-style-type: none"> • 'Ground Investigation Report', Soiltechnics, ref. STM3168D-GD1, dated May 2016. • 'Interpretive Site Investigation and Remedial Strategy Report', Forge Environmental Management Ltd, ref. HAV164.D/SI/002, rev. 1, Dated March 2020.

PRELIMINARY CONTAMINATION RISK ASSESSMENT

A number of potential contamination sources are listed below:

- The Made Ground on site presents a moderate to low risk due to the potential contaminative soils and a potential gas risk from the deep Made Ground.
- The stockpile, although would not be left in-situ but may be reused on site, has the potential to contain asbestos fibres and could presents a moderate risk to human health.
- The previous use of the site as offices is unlikely to present a significant risk, however, the company was an electricity supplier and could have had some electrical equipment on site. There was also a tank with unknown contents adjacent to the offices. Combined with the neighbouring electrical substation, a moderate to low risk is presented from this former land use.
- The backfilled stream on site could also present a moderate to low risk from the potential waste materials and/or organic content of the soils. The potential presence of organic content creates a potential gas risk to the future users.

PRELIMINARY GEOTECHNICAL ASSESSMENT

In general, the anticipated ground conditions are likely to be suitable for conventional foundations. However, the near surface ground conditions are likely to be variable with some deeper Made Ground and superficial deposits present as well as possible disturbance from the removal of below ground structures. This may therefore complicate the foundation design.

Based on previous soakage testing, the site is unsuitable for surface water disposal to soakaways.

RECOMMENDATIONS

PHASE 2 CONTAMINATION ASSESSMENT

A Geo-Environmental Site Investigation is currently being undertaken by BRD and will be reported separately.

GEOTECHNICAL GROUND INVESTIGATION

For any form of development, BRD recommend that an intrusive ground investigation is undertaken in order to confirm ground conditions and allow design of the new structures. An intrusive ground investigation incorporating a geotechnical assessment is being undertaken by BRD and shall be reported separately.

1. INTRODUCTION TO TECHNICAL REPORT

1.1. CONTRACT DETAILS

CLIENT	Stonebond Properties (Guildford) Limited trading as Stonebond.
SITE	Land situated off Bartons Road at the former Scottish and Southern Energy (SSE) Office in the town of Havant.
CLIENT'S ADVISORS	BRD Environmental Limited (BRD) has been commissioned directly by the Client.
REPORT CONTEXT	It is understood that the Client intends to purchase the site and develop it for residential housing.
REPORT TYPE	Factual and interpretative geo-environmental desk study.
REPORT OBJECTIVES	The purpose of the report is to undertake a preliminary geo-environmental assessment of the site.

1.2. SCOPE OF WORKS

The agreed scope of works was:

- Desk based research through the purchase of an Envirocheck report, including:
 - Environmental database search.
 - Environment Agency data.
 - BGS radon maps.
 - Mining and natural cavities database search.
 - Available historical Ordnance Survey plans.
- Interpretation of the geological, hydrogeological and hydrology setting of the site from published sources.
- A site walkover will be undertaken to identify any potential sources of contamination or indication of other ground related hazards at the site and its surroundings.
- Prepare a Phase 1 desk study report including copies of the purchased information, interpretation of the collected data to identify and assess contamination hazards together with any other environmental/geotechnical issues.

1.3. REPORT LIMITATIONS

Any site boundary lines depicted on plans included within this report are approximate only and do not imply legal ownership of land. Any observations of tree species, asbestos containing materials within structures or invasive weeds, does not constitute a formal survey of such features. The identification of such features is therefore tentative only. In the case of Japanese Knotweed, BRD can undertake separate surveys for this plant undertaken by a Property Care Association qualified surveyor.

The report does not consider whether sensitive ecology or archaeology is present as these require consideration by professionals specialising in these matters. It should be recognised that the

collection of desk study information may not be exhaustive and that other information pertinent to the site may be available.

It is emphasised that a desk study and walkover can only indicate the potential for contamination on the site. This study aims to highlight potential pollutant linkages in line with current guidance. The plausibility of these linkages can only be proved by an intrusive ground investigation.

It should be noted that a desk study and walkover can only reveal the potential for certain types of ground conditions and geotechnical hazards. For any form development an intrusive ground investigation is recommended. The scope of this investigation excludes a formal slope stability study and any observations made regarding slopes are for information only.

2. SITE CHARACTERISTICS

2.1. SITE SETTING

SITE ADDRESS AND POST CODE	Former SSE Offices, Bartons Road, Havant, PO9 5TH.
NATIONAL GRID REFERENCE	472160E, 108010N.

2.2. SITE DESCRIPTION

INSPECTION DATE	25 th July 2024.
CURRENT USE	The site is currently unoccupied and derelict. The former SSE offices have been demolished leaving a surface of demolition rubble across the site in the location of the former offices. A large stockpile of crushed concrete from the demolition is also located in the centre of the site.
AREA	Approximately 1.68 hectares.
SHAPE	The site is irregular in shape.
ACCESS	Access is gained off Bartons Road through locked metal gates. The main entrance is in the north east corner where there is a pedestrian and vehicular access gate. In the north west corner of site is another vehicular access gate but this is more overgrown.
BOUNDARIES	The northern and western boundaries are marked by a brick wall with metal palisade fencing. The eastern boundary with the adjacent football ground appeared to be marked by Heras style fencing, but this area was very overgrown. The eastern boundary with the adjacent electrical substation is marked with a high metal mesh security fence. The boundary with the garage is largely overgrown but appears to be marked with Heras style fencing. The southern boundary with the road is marked with a high metal mesh security fence which is also overgrown.
TOPOGRAPHY	<p>The site slopes by just over 3m from the north to the south. However, the natural slope of the site has been changed due to the presence of the former structures and recent demolition.</p> <p>Along the northern edge is a retaining wall. The retaining wall is around 3m off the site boundary. The top of the wall is in line with the adjacent road level, which is around 1m higher than the site.</p> <p>The site starts to slope from the north, however the centre of the site has been regraded with demolition arisings. The northern extent of the demolition arisings is around 0.20m higher than the ground along the northern edge. The demolition area slopes by around 0.60m over around 90m. The southern edge of the demolition arisings has a steeper slope down to the southern area of site, which is around 1m lower.</p> <p>The southern area gradually slopes by around 1m to the southern edge of the site.</p>

SURFACING	The site is generally surfaced with Made Ground. The eastern edge has a tarmac track with some weeds growing through and onto it. There is also some brick paving along the eastern edge in places. The southern half of site is surfaced with a vegetated Made Ground. The remainder of the site consists of demolition arisings. This material mostly includes crushed concrete with other materials such as brick fragments.
BUILDINGS	No buildings are present on site.
VEGETATION	<p>The boundary of the site is overgrown with vegetation. The rest of the site also has vegetation such as grasses, weeds and young trees.</p> <p>The trees found within the site include cherry, willow, oak, pine, beech, sycamore, poplar and maple. Buddleia and brambles are also prevalent throughout the site.</p> <p>Offsite but bordering the northern boundary are a number of mature maple trees.</p>
NOTABLE FEATURES AND OBSERVATIONS	<p>There is a large stockpile of crushed concrete in the centre of the site. It is approximately 40m by 40m and is just over 3m high.</p> <p>There are a large number of manhole covers and gulleys observed along the eastern edge of site. They are typically located with the tarmac track. It is unknown if other subsurface structures, such as foundations, were wholly removed during the demolition process.</p> <p>Two drainage chambers are located along the western edge of the demolition arisings. The manhole covers for these were missing. One of them contained rubbish, whilst the other have brick and concrete.</p> <p>A waterpipe was observed to be sticking out the ground in the north west corner of site.</p> <p>It is likely that underground fuel tanks were present south west of site in the location of the present day garage as it was a former fuel station. However, there is no visible evidence of active above or below ground fuel or oil tanks at the time of the walkover.</p>

SURROUNDING LAND USE	The site is set in a mixed residential and commercial area within Havant.
TO THE NORTH	Directly north of the site is Bartons Road, beyond which are residential houses.
TO THE EAST	Directly east of the site is a football ground (Westleigh Park) with associated club house and parking. Also directly east of the site is a large electric substation and a large office building operated by SSE. There is a tank shown next to the electric substation, the contents of which is unknown.
TO THE SOUTH	Directly south of the site beyond Martin Road are residential houses and a small electric substation.
TO THE WEST	Directly west of the site is the B2149, beyond which are residential houses and flats.

2.3. SITE HISTORY

MAPPED HISTORY		
DATE RANGE	SITE	SURROUNDING AREA
1867 to 1938	<p>The site comprises parts of three agricultural fields. The two fields making up most of the site are shaded on several of the maps as though they belong to Leigh Park, which is a large estate extending to the north.</p> <p>A stream is shown crossing the north eastern section of the site. The stream flows south until it reaches the road parallel to the site and changes to a westerly direction. The stream crosses beneath the road and returns to a southerly direction.</p> <p>A few trees are shown along the western edge of site.</p>	<p>The surrounding area is made up of agricultural fields.</p> <p>Directly west and south of the site are two roads.</p> <p>Approximately 100m south west of site is a well, which is parallel to the stream. By 1897, there are three wells in this area. These wells are no longer shown by 1932.</p> <p>Small allotment gardens are located around 50m south of site by 1932.</p>
1956 to 1967	<p>The site remains undeveloped.</p> <p>The stream is no longer evident but a field boundary is shown in the same location.</p>	<p>Directly north, west and south of site are roads, beyond which are new extensive residential developments.</p> <p>Directly east of site is the remainder of the field the site is part of.</p> <p>Approximately 80m south east of site are commercial / industrial buildings. These stretch further to the east, south of the road adjacent to the site.</p> <p>Approximately 200m east of the north east corner of site is a church. No graveyard is noted.</p>
1972 to 2006	<p>The 1972 map edition only shows the southern half of site. A track and two small buildings have been constructed by this time.</p> <p>The map edition from 1973/1974 shows the site has been developed into offices. There is one large 'L' shaped building in the northern half of site and two smaller buildings in the southern half of site. In between the buildings is a large parking area.</p> <p>By 1991, the large office building has been extended in the south.</p> <p>The aerial imagery from 1999 shows the site with the original large 'L' shaped building and the extension in the south. It also shows the two</p>	<p>The surrounding area remains largely the same.</p> <p>Directly east of site is an electrical substation.</p> <p>Directly south west of the site is a garage.</p> <p>Approximately 20m south of site is a large electrical substation. The substation halves in size by 1996. Some of the land has been developed with residential properties.</p> <p>By 1991, a football ground has been constructed directly east of the site. The garage west of the site has also increased in size.</p>

MAPPED HISTORY		
DATE RANGE	SITE	SURROUNDING AREA
	smaller buildings in the southern half of site. A large parking area is shown to the east of the northern buildings and south of the southern buildings.	The aerial imagery from 1999 still shows the surrounding area to comprise of both residential and commercial buildings.
2024	The buildings on have been demolished by 2024 and the site remains vacant.	A new building has been constructed directly east of site, next to the electric substation (current SSE offices). The remainder of the surrounding area remains largely the same.

AERIAL IMAGERY	<u>Historic England</u>
	Aerial photographs from 1946 and 1959 show the site belonging to three open fields with a few trees in the middle. In the 1946 photo, the site is mostly surrounded by arable land, with a few residential and farm buildings. The 1959 imagery shows new residential and commercial development to the north, south and west of the site.
	<u>Google Earth Imagery</u>
	Google Earth imagery between 1999 and 2006 show the site as the aerial imagery in the history maps. The site comprises office buildings and car parking spaces. There is also an unknown tank on the front lawn, adjacent to the offices. This tank is removed sometime between the 2007 imagery and the 2011 imagery. The concrete pad for the tank remains in place until the buildings are demolished. The surrounding area also mirrors the aerial imagery from the historical maps being both residential and commercial. The football pitch and electric substation are east of the site and the garage to the south west. By 2011, the electrical substation building has been redeveloped and a new building constructed next to it. By the 2019 Google Earth imagery, the offices and car park on site have been demolished as at the present time. There is a stockpile of concrete in the centre of the site. The southern half of site, in the location of the southern car park, the ground appears to have some low-level vegetation.
INTERNET SEARCH	No information specific to the site was identified.
ANECDOTAL	No anecdotal evidence of site history was gained during the study.

2.4. GEOLOGY

GEOLOGICAL CONTEXT	<p>The local area is dominated by superficial deposits laid down during the Quaternary Period under fluvial or subaerial conditions.</p> <p>The local area is also dominated by bedrock deposits during the Palaeogene Period within a marine environment.</p>
SUPERFICIAL DEPOSITS	<p>No superficial deposits indicated to be present. However, Head Deposits are shown adjacent to the site. River Terrace Deposits are also within close proximity of the site. Both deposits can be composed of clay, silt, sand or gravel.</p>
BEDROCK GEOLOGY	<p>The shallowest bedrock is shown to be the Bognor Sand Member, which is typically described as a glauconitic bioturbated or cross-bedded fine- and medium-grained sand.</p> <p>The London Clay Formation is also shown adjacent to the site. It typically comprises bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt.</p>
BGS BOREHOLE RECORDS	<p>There is one British Geological Survey shell and auger borehole record located on site. The record states the location as 'Leigh Park, Havant' but there are no co-ordinates or drilling date.</p> <p>The borehole found 0.15m of Topsoil, which was underlain by the Bognor Sand Member. The first layer was described as a 'light brown medium dense to dense silty fine sand' and was found to 6m bgl. The second layer was described as 'bluish grey medium dense silty fine sand' and was found to 9.1m bgl. Underlying the Bognor Sand Member, the London Clay Formation was encountered to 12.10m, where the borehole was terminated. The soil was described as a 'stiff to very stiff bluish grey sandy clay'.</p> <p>Groundwater was encountered at 1.50m bgl. However, some of the groundwater data is has been cut off the page so some information is missing.</p>
SOIL GEOCHEMISTRY	<p>The site is not situated in an area where the natural background concentrations of metals is elevated.</p>

2.5. RADON

The site is not situated within an area where radon gas protection measures are required in new buildings.

2.6. HYDROGEOLOGY

SUPERFICIAL AQUIFER	No superficial deposits present. However, the adjacent Head Deposits are designated as a Secondary Undifferentiated Aquifer.
BEDROCK AQUIFER	The Bognor Sand Member is designated as a Secondary A Aquifer.
AQUIFER PROPERTIES	<p>Based on the BGS borehole indicated on site, groundwater is at around 1.50m bgl within the Bognor Sand Member.</p> <p>The flow of groundwater is likely to be in a southerly direction based on the local streams and the slope of the local topography. However, there is also the potential that the dip of the underlying London Clay (aquitard) and interactions with any superficial deposits could also affect the groundwater flow direction.</p>
LICENSED GROUNDWATER ABSTRACTIONS	None within 250m from the site.
GROUNDWATER SOURCE PROTECTION ZONE (SPZ)	<p>Zone 1 (Inner Protection Zone) - Subsurface activity only (1c). This means the aquifer is confined and will only be affected by subsurface activity such as deep drilling. As the aquifer is confined at depth, the risk to the SPZ from surface activities would typically be negligible, unless subsurface activity exposing the aquifer is to occur.</p> <p>Based on the BGS maps for the area, this will relate to the deeper Chalk aquifer which forms a drinking water resource. However, this is present at a significant depth beneath the site and is confined by the overlying Reading Formation (Lambeth Group) and London Clay Formation.</p> <p>Therefore in relation to near surface activities, the site is not within an SPZ.</p>

2.7. HYDROLOGY

SITE DRAINAGE CHARACTERISTICS	The site is surfaced with Made Ground, which will likely be permeable enough for the surface water to infiltrate vertically into the underlying soils. Some gulleys were noted along the eastern edge of site where some of the surface water is likely to migrate to.
SURFACE WATER FEATURES	The closest surface water feature to the site is a small stream approximately 311m east of site. A large stream is approximately 523m east of site. Both are orientated in a southerly direction.
SURFACE WATER ABSTRACTIONS	None within 250m from the site.
DISCHARGE CONSENTS	None relevant to consideration of the site.
FLOODING	Zone 1 area and is highly unlikely to be affected by flooding. As the site is greater than one hectare in area, a Flood Risk Assessment will still have to be undertaken for the site.

2.8. ENVIRONMENTAL ASPECTS

LANDFILL	<p>There are no recorded landfill sites within 250m of the site.</p> <p>However, there is a record for potentially infilled land on site. One of the records corresponds with the historical stream along the former field boundaries. It is likely that the stream was backfilled prior to the development of the site in the 1970s.</p> <p>The second record lies within the southern half of site. The record seems to correspond with a historical tree / group of trees rather than a pond or other surface water feature and is not therefore of concern.</p>
CONTEMPORARY TRADE DIRECTORY ENTRIES	<p>There are five contemporary trade directory entries within 250m of site. These include an inactive electrical goods sales, manufacturers and wholesalers, an inactive petrol filling station, an inactive car dealership, an inactive washing machine servicing and repair company and an inactive scrap metal merchants.</p> <p>The inactive petrol filling station is stated as being approximately 34m south west of site. The address for the former filling station is stated as West Leigh Service Station, Petersfield Road, Havant, PO9 5HA, which is the location of the present-day garage adjacent to the site. The name of the petrol station is given as Motorwork. No further information is given.</p>
REGISTERED HAZARDOUS SITES	None within 250m of the site.
POLLUTION INCIDENTS TO CONTROLLED WATERS	There have been no recorded pollution incidents within 250m of the site.
ECOLOGICALLY SENSITIVE LAND USE	None identified within 250m.

2.9. PREVIOUS GROUND INVESTIGATIONS

The site has been subject to two ground investigations. The first was completed prior to the demolition of the onsite buildings and the second was completed after the demolition. These are referenced as follows:

- 'Ground Investigation Report', Soiltechnics, ref. STM3168D-GD1, dated May 2016.
- 'Interpretive Site Investigation and Remedial Strategy Report', Forge Environmental Management Ltd, ref. HAV164.D/SI/002, rev. 1, Dated March 2020.

2.9.1. Soiltechnics Ground Investigation Report

This investigation was completed prior to the demolition of the on-site buildings and was for the development of a steel framed retail type unit, an apartment block and low housing units. The site at the time of this investigation was predominantly occupied by a substantial disused three-storey office block with surrounding landscaped areas, concrete hardstanding and parking areas. A single storey building and adjacent storage bays were located to the south of the office building with a large concrete car park beyond. Adjacent to the office building within the lawn was an area of concrete hardstanding with plinths associated with a former tank. The content of the tank was unknown.

The investigation comprised three trial pits, nine boreholes and seven dynamic probe tests. They encountered Made Ground overlying Head Deposits, which in turn overlaid the Bognor Sand Member. The Made Ground extended to depths between 0.40m and 1.00m bgl and comprised gravelly clays and sandy gravel. The Head Deposits comprised of firm to very stiff, gravelly clays and extended to depths in the range of 1.00m to 2.60m bgl. The Bognor Sand Member consisted of medium dense becoming dense, light brown and orange brown, silty fine to medium sand and was proven to 4.00m bgl. Groundwater was measured between 1.30m and 2.40m bgl.

Soiltechnics subjected 14No. soil samples to chemical testing. All of the test results were below the relevant generic assessment criteria (GAC) at the time of the investigation. It should also be noted that these results are below the threshold for the present GACs for residential with plant uptake. 4No. samples of groundwater were also subjected to chemical testing and did not record any values above the respective GACs.

The clayey head deposits were classified as high volume change potential with the sands from the Bognor Sand Member being classified as non-shrinkable.

2.9.2. Forge Environmental Management Ltd Site Investigation Report

This investigation was completed after the onsite buildings were demolished and was for the development of around 174No. apartments over three 4.5 storey blocks together with a care home. The investigation comprised 7No. trial pits and 4No. soakage tests. The site was in a similar condition to the present day.

The shallow ground conditions differed to the previous investigation due to the demolition of the buildings. A crushed concrete layer around 0.35m thick was encountered in the northern area of the site. Beneath, a Made Ground layer around 1m thick was found comprising a gravelly clay with brick fragments. The lower lying southern section differed slightly as there was no crushed concrete and a layer around 0.30m thick of Type 1 material was encountered.

Beneath the Made Ground, a gravelly clay, or locally a gravelly sand, was encountered. As with the previous investigation, this was described as being superficial Head Deposits. Beneath, a yellow fine sand from the Bognor Sand Formation was encountered. This was found to the base of the investigation up to 3.00m bgl. Groundwater was found at a similar depth to the previous investigation between 1.10m and 2.30m bgl.

The preliminary conceptual model identified a number of sources of contamination. This includes Made Ground, PCB's from either the former electrical equipment on the site or the adjacent substation and fuel from either the former petrol station south west of the site or the tanks noted adjacent to the south eastern boundary.

Based on an end use of residential without the consumption of home-grown vegetables, no elevated levels of contamination were identified across the site. It should also be noted that the test results also have no concentrations elevated above the generic assessment criteria for residential with plant uptake, which is the end use of concern in this report.

The groundwater beneath the site did contain elevated levels of hydrocarbons. However, Forge Environmental Management Ltd stated that due to the site's setting and absence of any mechanisms for it to impact upon the identified receptors, the site is not considered to pose a risk to controlled waters. However, only a single sample was analysed and this was noted as being from perched water in a trial pit, so BRD would question whether this would be representative of the site as a whole.

Forge Environmental Management Ltd concluded a low risk to human health, building materials and the surface water and groundwater environments. A moderate risk to the water supply pipes was given due to the concentrations of Total Petroleum Hydrocarbons (TPH) within the Made Ground.

Soakage testing was completed in 4No. trial pits. The reduction in water level within all the pits was less than 50% of the level put and therefore infiltration rate could not be calculated. As a result, the soils are not suitable to support soakaway drainage for surface water.

Based on the soils tested, they stated that the site would not pose a risk to subsurface concrete and a DS1 design mix should be suitable. No other geotechnical assessment was made within the report.

3. PRELIMINARY CONTAMINATION RISK ASSESSMENT

3.1. HAZARD IDENTIFICATION

INVALID CONTAMINATION SOURCES	
HISTORIC LAND USE	DISCUSSION AS TO WHY THE HISTORICAL USE IS NOT CONSIDERED TO PRESENT A PLAUSIBLE HAZARD
Nearby residential properties	The nearby residential properties are not considered a contamination hazard to the site and are therefore not considered further.
Neighbouring football ground	The football grounds include a football pitch, public house and car park. It is unlikely that contamination would have arisen from these uses and therefore they are not considered further.

POTENTIAL ON SITE SOURCES		
HISTORIC LAND USE	DESCRIPTION OF POTENTIAL CONTAMINATION HAZARD	POTENTIAL CONTAMINANTS OF CONCERN
Made Ground.	Based on previous investigations, the site is underlain by two layers of Made Ground. The upper layer consists of a crushed concrete from the demolition of the onsite buildings. The second layer appeared to vary slightly across the site but typically included concrete and brick. Deep Made Ground (below 2m bgl) was found in one location only, it is possible that deep Made Ground will be present in other parts of the site too. Deep Made Ground could lead to a gas risk on the site if there is enough organic material, however, the previous investigation did not suggest the presence of high organic content.	Metals. Hydrocarbons. Asbestos containing materials. Landfill gases (mainly carbon dioxide and methane).
Stockpile of Crushed Concrete.	There is a large pile of crushed concrete in the centre of the site. The previous investigation did not test any soils from the stockpile. There is a small chance that asbestos fibres are present in the stockpile if asbestos was poorly managed during the demolition process.	Asbestos containing materials.

POTENTIAL ON SITE SOURCES		
HISTORIC LAND USE	DESCRIPTION OF POTENTIAL CONTAMINATION HAZARD	POTENTIAL CONTAMINANTS OF CONCERN
Previous use by SSE.	The previous use of the site was primarily offices for SSE. Offices are unlikely to present a contamination risk to the site. However, it is evident from the historical imagery and previous investigations that there was a tank present on site, albeit the tank contents are unknown. It is also possible that small transformers and substations were present within the site.	Petroleum hydrocarbons (diesel, petrol or heating oil). Petroleum hydrocarbons (dielectric mineral oil). Polychlorinated biphenyls (PCBs no longer used after 1977).
Backfilled stream.	The historic maps show a stream crossing the north eastern section of the site prior to being infilled by the 1970s. This stream has likely been backfilled prior to the construction of the buildings on site in the 1970s. The nature of the backfill is unknown. The backfill could be contaminated or contain organic material and the base of the stream is also likely to have had organic material. The burial of organic material under anaerobic conditions can form hazardous gases.	Metals. Hydrocarbons. Asbestos containing materials. Landfill gases (mainly carbon dioxide and methane).

POTENTIAL OFF SITE SOURCES		
HISTORIC LAND USE	DESCRIPTION OF POTENTIAL CONTAMINATION HAZARD	POTENTIAL CONTAMINANTS OF CONCERN
Electrical sub-station.	<p>There is an electrical sub-station directly east of site. This may have caused contamination by the spillage of the dielectric oils contained therein.</p> <p>The original substation was built by 1972. This was redeveloped into a new substation and offices by 2011. Spills and leaks of insulating oils from the substations or storage tanks can occur.</p> <p>Another substation is also present around 20m south of site. It was built in 1972 and halved in size by 1996. Due to the distance and slope of the local area in a southerly direction, it is unlikely that any local contamination would have migrated to site.</p>	Petroleum hydrocarbons (dielectric mineral oil). Polychlorinated biphenyls

POTENTIAL OFF SITE SOURCES		
HISTORIC LAND USE	DESCRIPTION OF POTENTIAL CONTAMINATION HAZARD	POTENTIAL CONTAMINANTS OF CONCERN
Former fuel station and present-day garage.	<p>There was a fuel station around 34m south west of site. The dates the fuel station was active are unknown, but there is a Local Authority Pollution Prevention and Control record for the fuel station in 1998. The historical maps only show a 'garage' from 1972 onwards, it is likely the fuel station was part of the garage from development.</p> <p>The fuel station is in the location of the present-day second-hand car dealer and garage. The fuel from the tanks may have leaked or spilled over the duration of the fuel station and migrated to the site. However, there was no evidence of these tanks in the present day. If still in-situ, these are likely they have been decommissioned.</p> <p>The current garage is operation is small compared to the second-hand car dealership section. The garage is likely to only undertake minor work on cars they buy and sell. Oils may be stored on site, but likely small quantities only.</p>	<p>Petroleum hydrocarbons (diesel, lubricating oils, greases and/or petrol).</p> <p>Lead.</p> <p>Methyl tert-butyl ether.</p>

3.2. RECEPTOR ASSESSMENT

CONTEXT	
ASSESSMENT LAND USE CATEGORY	Residential.
DESCRIPTION OF PROPOSED LAND USE	The proposed development is for 90No. residential dwellings, comprising 32No. apartments and 58No. houses.

RECEPTORS	
RECEPTOR	DISCUSSION
HUMAN HEALTH	Residents with zero to 6-year-old child most sensitive receptor.
CONTROLLED WATERS GROUNDWATER	Secondary A Aquifer within the upper bedrock aquifer. The site is in a SPZ1C which relates to the underlying chalk aquifer, but this is protected by the overlying Reading Formation (Lambeth Group) and London Clay Formation and is very unlikely to be impacted by near surface activities at the site. Therefore, only the near surface aquifer is considered as a valid receptor.

CONTROLLED WATERS SURFACE WATER	There are no nearby surface water receptors, but ultimately, any significant groundwater contamination could migrate to the stream 500m to the south of the site.
BUILDING MATERIALS AND SERVICES	Water service pipes. Buried concrete.

3.3. INITIAL CONCEPTUAL MODEL

POLLUTANT LINKAGES	The pollutant linkages are best presented in a diagrammatic form and therefore the initial conceptual site model plan is presented in Appendix 1. The individual pollutant linkages as numbered on the plan are described further in Section 3.4.
INVALID POLLUTANT LINKAGES	There are no invalid pollutant linkage.
LIMITATIONS AND UNCERTAINTIES	The preliminary conceptual model has been developed based solely on desk based research and assessment. The only way to conclusively determine the presence or absence of contamination is with intrusive site investigation.

3.4. PRELIMINARY ASSESSMENT OF CONTAMINATION RISKS

The following table identifies the potential risks that exist to the receptors through each of the identified pollutant linkages in the conceptual site model. It should be noted that the numbers referred to for each of the pathways refers to the numbered pollutant linkages from the Initial Conceptual Site Model Plan, as presented in Appendix 1.

POTENTIAL SOURCES AND CONTAMINANTS	PATHWAYS (REFERENCE FROM MODEL)	RECEPTORS	HAZARD SEVERITY	PROBABILITY OF OCCURRENCE	POTENTIAL RISK
Made Ground. <ul style="list-style-type: none"> Metals. Hydrocarbons. Asbestos containing materials. Landfill gases (mainly carbon dioxide and methane). 	Direct contact Inhalation Ingestion [1]	Future residents	Human health effects [Medium]	Based on the previous investigations it is unlikely that the Made Ground will contain any significant contamination. However, asbestos fibres may be present. The deep Made Ground also has the potential to create a gas risk to the site. [Low Likelihood]	Moderate/low risk
	Vertical and horizontal migration [2]	Groundwater and surface water	Secondary A Aquifer [Medium]		Moderate/low risk
	Direct contact [3]	Building materials and services	Minor degradation of subsurface structures [Mild]		Low risk

POTENTIAL SOURCES AND CONTAMINANTS	PATHWAYS (REFERENCE FROM MODEL)	RECEPTORS	HAZARD SEVERITY	PROBABILITY OF OCCURRENCE	POTENTIAL RISK
Stockpile of Crushed Concrete. <ul style="list-style-type: none"> Asbestos containing materials. 	Inhalation of fibres [4]	Future residents	Human health effects [Medium]	It is possible that asbestos has been incorporated into the crushed concrete during the demolition process. [Low likelihood]	Moderate / low risk
Previous use by SSE. <ul style="list-style-type: none"> Petroleum hydrocarbons (diesel, petrol or heating oil). Petroleum hydrocarbons (dielectric mineral oil). Polychlorinated biphenyls. 	Direct contact Inhalation Ingestion [5]	Future residents	Human health effects [Medium]	The use as offices is unlikely to present a significant contamination risk. However, there was an unknown tank of site, which could create localised contamination. [Likely]	Moderate risk
	Vertical and horizontal migration [6]	Groundwater and surface water	Secondary A Aquifer [Medium]		Moderate risk
	Direct contact [7]	Building materials and services	Minor degradation of subsurface structures [Mild]		Moderate/low risk
Backfilled stream. <ul style="list-style-type: none"> Metals. Hydrocarbons. Asbestos containing materials. Landfill gases (mainly carbon dioxide and methane). 	Direct contact Inhalation Ingestion [8]	Future residents	Human health effects [Medium]	The backfill material could have waste materials (although unlikely) or organic material. The organic material could create gases when buried under anaerobic conditions. However, the channel would likely be shallow and therefore not a significant gas source. [Low likelihood]	Moderate/low risk
	Vertical and horizontal migration [9]	Groundwater and surface water	Secondary A Aquifer [Medium]		Moderate/low risk
	Direct contact [10]	Building materials and services	Minor degradation of subsurface structures [Mild]		Low risk
Offsite electrical sub-station. <ul style="list-style-type: none"> Petroleum hydrocarbons 	Direct contact Inhalation Ingestion [11]	Future residents	Human health effects [Medium]	There has been a substation next to the site since at least 1972. The dielectric oils may	Moderate/low risk

POTENTIAL SOURCES AND CONTAMINANTS	PATHWAYS (REFERENCE FROM MODEL)	RECEPTORS	HAZARD SEVERITY	PROBABILITY OF OCCURRENCE	POTENTIAL RISK
(dielectric mineral oil). <ul style="list-style-type: none"> Polychlorinated biphenyls (PCBs no longer used after 1977). 	Direct contact [12]	Building materials and services	Minor degradation of subsurface structures [Mild]	have been spilled and possibly migrated onto the site. However, it is likely to be fairly local to the vicinity of the substation rather than the entire site as they are not very mobile. [Low likelihood]	Low risk
Offsite former fuel station and present-day garage. <ul style="list-style-type: none"> Petroleum hydrocarbons (diesel, lubricating oils, greases and/or petrol). Lead. Methyl tert-butyl ether. 	Direct contact Inhalation Ingestion [13]	Future residents	Human health effects [Medium]	The fuel station is no longer present; however, the tanks may still be in-situ, albeit sitting empty. Any contamination that could have migrated to the site is likely to be residual only. The garage is also only a small operation and unlikely to present significant contamination. In addition, the topography suggests any potential contamination will flow south, away from the site, reducing the risk. [Low likelihood]	Moderate/low risk
	Direct contact [14]	Building materials and services	Minor degradation of subsurface structures [Mild]		Low risk

3.5. RECOMMENDATIONS

Several potential contamination risks have been identified by this Phase 1 Desk Study and therefore a Phase 2 Contamination Assessment is recommended to assess the significance of these potential pollutant linkages. An intrusive ground investigation incorporating a Phase 2 Contamination Assessment is being undertaken by BRD and shall be reported separately.

4. IMPLICATIONS FOR CONSTRUCTION

4.1. GEOTECHNICAL CONSIDERATIONS

The following is a checklist summary of geotechnical hazards and their likelihood to have an impact on the proposed development of the site.

GEOTECHNICAL HAZARD	LIKELY TO AFFECT SITE?	COMMENT
Removal of existing sub-structures affecting new foundations.	✓	It is unclear if all former structures remain in place or are yet to be removed from the ground. However, removal of the former buildings on site will still have disturbed the ground. The ground has also been levelled with the demolition arisings (crushed concrete). The disturbance caused by removal of former structures may complicate the foundation design.
Deep Made Ground.	✓	Deep Made Ground was identified in one trial pit during a previous investigation. It is possible that more deep Made Ground is present across the site. This may complicate the design and construction of foundations.
Historic wells.	✗	
Soft or compressible natural deposits such as Alluvium or Peat.	✓	It is possible that alluvial soils could be present due to the historic streams within the former field boundaries. This may complicate the design and construction of foundations.
Changes in ground conditions within short distances.	✓	The thickness of Made Ground and natural soils appears to vary across the site based on the previous ground investigations. This may complicate the design and construction of foundations.
Fine soils that have a volume change capacity.	✓	The previous investigation has identified a thin layer of clayey soils above the bedrock sands. This clay may have a volume change potential and as suggested by the first ground investigation, this potential is high. This could impact on foundation design and depths. Existing and proposed trees will further complicate foundations.
Dissolution features or 'swallow holes'.	✗	

GEOTECHNICAL HAZARD	LIKELY TO AFFECT SITE?	COMMENT
Cambering of valley sides with possibility of 'gulls'.	✗	
Risk of slope instability.	✗	
Shallow groundwater.	✓	Groundwater has been proven between 1.10m and 2.40m bgl within the two previous ground investigations. The groundwater is likely to fluctuate with the seasons and could be higher in the wetter winter months. Shallow groundwater could present construction difficulties and have implications for the design of sub-surface structures.
Underground mining.	✗	
Geological faults.	✗	
Aggressive chemical environment for concrete e.g. expansive slag or high sulphate soils.	✗	The previous investigation suggests that the soils are not an aggressive chemical environment.

4.2. PRELIMINARY GEOTECHNICAL ASSESSMENT

In general, the anticipated ground conditions are likely to be suitable for conventional foundations. However, the ground conditions are likely to be variable with some deeper Made Ground or weaker superficial deposits so some foundations will need to be reinforced to guard against differential settlement, or alternatively deepened to found within the same soil type. It is unclear if all former structures remain in place or are yet to be removed from the ground. In any case, the removal of former structures will further complicate future foundation design.

Theoretically, the soils may be suitable for surface water disposal to soakaways into the Bognor Sand Formation. However, the previous ground investigation included soakage testing and concluded that the soils are relatively low permeability and are not suitable to support soakaway drainage for surface water.

For any form of development, BRD recommend that an intrusive ground investigation is undertaken in order to confirm ground conditions and allow design of the new structures. An intrusive ground investigation incorporating a geotechnical assessment is being undertaken by BRD and shall be reported separately.

4.3. CONSTRUCTION CONSIDERATIONS

As with any construction site, if any anomalous material is encountered during the redevelopment then expert environmental advice should be sought.

REPORT SPECIFIC REFERENCES

- British Geological Survey sheet 316 “Fareham” Solid and Drift edition (1:50,000) published 1972.
- ‘Ground Investigation Report’, Soiltechnics, ref. STM3168D-GD1, dated May 2016.
- ‘Interpretive Site Investigation and Remedial Strategy Report’, Forge Environmental Management Ltd, ref. HAV164.D/SI/002, rev. 1, Dated March 2020.



SUPPORTING INFORMATION

SITE CHARACTERISTICS

The site characteristics are collated from various information sources, including but not limited to Ordnance Survey, British Geological Survey (BGS), Environment Agency (EA) and local authorities.

BRD generally commission the Landmark Information Group to produce an Envirocheck Report for study sites and where employed this is included in the Appendices. It should be noted that some of the data provided in the Envirocheck report is not considered within BRD's interpretation for the site characteristics as it is not relevant. Examples of this are:

- Nitrate Sensitive Zones and Nitrate Vulnerable Zones are ignored as these are only applicable to agricultural activities relating to the application of manure and fertilisers to land.*
- River Quality is ignored as at this preliminary stage of risk assessment as all surface water bodies are considered equally sensitive to contamination risks.*

In assessing site characteristics, BRD also consider the area within a surrounding 250m buffer zone extending from the site boundary.

HISTORY

Mapped History

The site history summarises the changes in use or layout of the site over time and is largely developed from a study of available Ordnance Survey maps. It should be noted that changes to the site may have occurred between the editions of the maps employed to assess the history of the site. Historical information of relevance within the 250m surrounding the site is also discussed in a separate section. The historical plans referred to in the text are generally included in an Appendix.

Aerial photography

As a minimum, current and historical aerial images of the site and surrounding areas are studied from the Google Earth program. Where additional historic aerial photographs have been purchased then these are referenced within the technical report.

Internet Searches

A simple search of the internet for relevant material relating to the use or history of the site is made. Information obtained from internet searches has been accepted as fact without validation by BRD except for ensuring the source is reputable. It should be recognised that due to programme and budgetary constraints the search conducted may not have revealed all the information available.

GEOLOGY

The geology of the site is assessed by reference to the relevant British Geological Survey (BGS) 1:50,000 scale sheet in Bedrock and Superficial (historically Solid and Drift) edition. Many of these geological maps are relatively old with superseded terminology and descriptions. BRD therefore employ the BGS Open Geoscience website to determine current nomenclature of strata and to assist in determining geological boundaries against current topographic features. BRD also employ BGS Regional Geology Guides to assist in understanding the geological context of the site.



Ground Stability Hazards

Ground stability hazards caused by mining, ground dissolution, landslide potential, collapsible ground and natural cavities are identified by the Envirocheck database search of records held by The Coal Authority, British Geological Survey and studies completed by Ove Arup and Peter Brett Associates.

The Envirocheck database ground stability hazard entries for compressible ground, running sands and shrinking or swelling clays are not discussed directly. This is because these hazards are very common and are considered within the preliminary geotechnical assessment where necessary.

Radon

Radon is a naturally occurring colourless and odourless gas that is radioactive. It is formed by the radioactive decay of radium which in turn is derived from the radioactive decay of uranium, both of which are minerals that can be found in many soil types. Whilst it is recognised that the air inside every house contains radon, some houses built in certain defined areas of the country might have unacceptably high concentrations and require special precautions to be taken during construction to reduce this risk.

Radon can move through cracks and fissures in the soil into the atmosphere or into buildings via basements and/or underfloor voids. If radon enters the living space of buildings its concentration can potentially increase and provide a risk to human health as the inhalation of the radioactive decay products of radon gas can increase the risk of developing lung cancer.

The maps contained within ‘Radon: Guidance on protective measures for new buildings’ (2015) identify areas where no radon protection measures are necessary or where higher concentrations are present that either basic or full radon protection measures are required to be fitted to all new buildings together with supplementary advice concerning extensions, conversions and refurbishments. However, some local authorities have local bylaws, that BRD may not be aware of, that insist on radon protection to all new dwellings within their area regardless of the recommendations of the ‘Radon: Guidance on protective measures for new buildings’ (2015) report.

Basic radon protection measures comprise incorporation of a continuous gas resistant membrane sealed at joints and around service entries into the floor construction and extended across the cavity tray.

Full radon protection measures comprise incorporating a continuous gas resistant membrane into the floor construction together with a ventilated sub-floor void through either the use of suspended floor construction or a ‘radon sump’. The membrane is sealed at joints and around service entries into the floor and extended across the cavity tray.

‘Radon: Guidance on protective measures for new buildings’ (2015) should be referred to for detail on the construction of the protective measures.

HYDROGEOLOGY

Aquifer Designations

The Environment Agency's Groundwater Protection Policy uses designations that reflect the importance of aquifers in terms of groundwater as a drinking water resource, but also their role in supporting surface water flows and wetland ecosystems.

In defining groundwater vulnerability, both the superficial (drift) deposits and bedrock (solid) geology are considered separately with the following aquifer designations:

- *Principal Aquifers: These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.*
- *Secondary Aquifers: These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types:*
 - *Secondary A - 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.*
 - *Secondary B - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.*
- *Secondary Undifferentiated - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type.*
- *Unproductive Strata: These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.*

Source Protection Zones

The Environment Agency (EA) has defined Source Protection Zones for groundwater sources, such as boreholes and springs, that are used for public water supply. The EA uses the zones to target pollution prevention measures and monitor the activities of potential polluters within the affected area. There are three types Source Protection Zone:

- *Zone 1 (Inner Protection Zone) is the most sensitive area within which pollution could reach the borehole within 50 days. Alternatively it is defined by a minimum 50m radius around the borehole.*
- *Zone 2 (Outer Protection Zone) are defined by the area within which pollution could reach the borehole within 400 days or 25% of the total catchment area.*
- *Zone 3 (Total Catchment) are defined by the total area required to support the removal of water from the borehole.*

HYDROLOGY

Flooding

The Environment Agency has zoned England and Wales in respect of the risk from flooding from 'highly unlikely' in Zone 1 to 'likely' in Zone 3. The zones ignore the presence of flood defences or certain other manmade structures and channel improvements.

National Planning Policy Framework, Department for Communities and Local Government, dated March 2012 states "A site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding".

ENVIRONMENTAL ASPECTS

Landfill

The database of the Environment Agency of active and historic landfills is searched for all sites. Sometimes additional historic landfill data is available from the British Geological Society and local authorities to identify nearby landfill sites. It should be noted that landfill sites that closed prior to 1974 and unlicensed disposal activities will not necessarily be revealed by this search.

Pollution Incidents

The Environment Agency ceased recording 'Pollution Incidents to Controlled Waters' in 2000, when they commenced the replacement 'Substantiated Pollution Incident Register'. BRD do not consider any 'Category 3 - Minor Incident' on the 'Pollution Incidents to Controlled Waters' database as relevant to assessing the site due to the time elapsed and the low level of impact that occurred. Again due to the time elapsed and the fact that remedial measures would have been undertaken at the time, 'Category 1 - Major Incident' and 'Category 2 - Significant Incident' are only considered relevant if the impacted controlled water was on or immediately adjacent to the site.

On the 'Substantiated Pollution Incident Register', BRD approach to this information in the following manner:

- Pollution incidents impacting 'air' only are not considered relevant.
- Pollution incidents to 'water' are only considered where the surface water impacted is either on, flows through or is immediately adjacent to the site.
- Pollution incidents to 'land' are only considered where these are on or immediately adjacent to the site unless there are grounds to consider that the incident had the potential to impact groundwater that may have migrated beneath the site.
- Category 4 potential pollutant incidents are recorded, but upon investigation were found to have had no impact and accordingly are not considered relevant.

Ecologically Sensitive Land Use

The land uses that are identified as ecologically sensitive are those identified as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation, Special Protection Areas, Ramsar sites, Natural Parks, Natural Nature Reserves, Marine Nature Reserves, Local Nature Reserves, Green Belt, Forest Parks, Environmentally Sensitive Areas, or Areas of Outstanding Natural Beauty.



CONTAMINATION ASSESSMENT METHODOLOGY

UK Policy

The UK Government's policy in relation to land affected by historic contamination is based on a 'suitable for use' approach. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Contamination risks therefore need to be assessed on a site-by-site basis. The 'suitable for use' approach limits requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to either the current use or future use of the land.

The three main drivers for contamination assessment and remediation are:

- Voluntary action.
- Development as part of the planning regime.
- Regulatory action to mitigate unacceptable risks e.g. Part 2A of the Environmental Protection Act 1990.

Pollutant Linkages

For a contamination risk to exist there must be a 'pollutant linkage' from the contaminant (source) via a pathway (the route from contaminant to receptor) to a receptor (the entity that could be harmed). The absence of a contaminant, pathway or receptor breaks the pollutant linkage and therefore no contamination risk exists.

Contamination is typically present at a site (in the ground and/or in the underlying groundwater) as a result of a historic or current industrial use, usually as a result of leaks, spills or disposal of residues, wastes and excess raw materials from the industrial processes. Contamination may also be present due to:

- The deliberate application of chemicals e.g. the spraying of herbicide/pesticide.
- Migration of pollutants from adjacent land.
- Naturally occurring processes e.g. elevated concentrations of particular heavy metals associated with specific geological strata.

Conceptual Site Model

The conceptual site model can be defined as a textual or graphical representation of the identified pollutant linkages for a given site. The model forms the basis for designing the investigation as the aim will be to target all of the potential pollutant linkages to determine, through the subsequent phases of risk assessment, whether or not they pose an actual risk.

It is important that the conceptual site model is updated with new information as the various investigation, risk assessment and remediation works are completed.

Technical Guidance

The technical and legal framework for contamination assessment is complex. The process adopted through this report for assessing contamination risks is in general accordance with the following guidance, as listed below:

- 'Investigation of Potentially Contaminated Sites - Code of Practice - BS 10175: 2011', BSi, 2011.
- 'Model Procedures for the management of Land Contamination - CLR Document No. 11', Environment Agency, 2004.
- 'Guidance for the safe development of housing on land affected by contamination - R&D66: 2008', NHBC/Environment Agency, 2008.

Risk Assessment Methodology

In line with the technical guidance, the contamination risk assessment follows a series of phased stages for each particular site:

PHASE	DESCRIPTION	RISK ASSESSMENT STAGE
PHASE 1	Generally limited to desk based research and a site walkover survey to develop an initial conceptual site model and identify what risks, if any, are likely to be presented by the site.	Hazard Identification and Assessment A preliminary stage of risk assessment concerned with identifying and characterising the hazards that may be associated with a particular site and identifying potential pollutant linkages.
PHASE 2	This phase is concerned with establishing whether contamination is present, usually through intrusive ground investigation, and then evaluating the degree and magnitude of the associated risks.	Risk Estimation A stage concerned with estimating the likelihood that receptors will suffer adverse effects if they come into contact with, or are otherwise affected by, a hazardous substance or agent under defined conditions. Risk Evaluation A stage of risk assessment concerned with evaluating the acceptability of estimated risks, taking into account the nature and scale of the risk estimates, any uncertainties associated with the assessment and the broad costs and benefits of taking action to mitigate risks.
PHASE 3	The appraisal and selection of remediation techniques, their implementation and verification.	Risk Management The process whereby decisions are made to accept a known or assessed risk and/or the implementation of action to reduce the consequences or probabilities of occurrence.

Risk Classification

The objective of risk assessment is to identify the nature and magnitude of the potential risks and should be based on a consideration of both:

- The likelihood/probability of an event [taking into account both the presence of the hazard and receptor and the integrity of the pathway].
- The severity of the potential consequence [taking into account both the potential severity of the hazard and the sensitivity of the receptor].

There is a need for a logical, transparent and repeatable system in defining the categories of severity of consequence and likelihood as well as for the risk itself and therefore the following risk rating matrix is employed:

		SEVERITY OF CONSEQUENCE			
		SEVERE	MEDIUM	MILD	MINOR
PROBABILITY	HIGH LIKELIHOOD	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	LIKELY	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	LOW LIKELIHOOD	Moderate Risk	Moderate/Low Risk	Low Risk	Negligible Risk
	UNLIKELY	Moderate/Low Risk	Low Risk	Negligible Risk	Negligible Risk

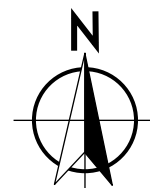
These risk classifications are defined as follows:

- **Very High Risk** - There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action.
- **High Risk** - Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action.
- **Moderate Risk** - It is possible that without appropriate remediation action harm could arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild.
- **Low Risk** - It is possible that harm could arise to a designated receptor from an identified hazard. It is likely that, at worst if any harm was realised any effects would be mild.
- **Negligible Risk** - The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

This preliminary risk assessment matrix and classification system is based on guidance produced by Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency in connection with contaminated land assessment.

APPENDIX 1

Site Location Plan



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Not to scale.

Project Title: Bartons Road, Havant
Client: Stonebond
BRD Reference: BRD4469-OP2-A
Date Issued: July 2024



01295 272244
info@brduk.com

Site Walkover Photographs



Plate 1: Access to the site is through the gate in the left of the image. Viewed west along Bartons Road at the northern end of the site.



Plate 2: Access to the site viewed from the site. Viewed north towards Bartons Road.

Project Title: Bartons Road, Havant
Client: Stonebond
BRD Reference: BRD4469-OP3-A
Date Issued: July 2024

Site Walkover Photographs



Plate 3: The tarmac track along the eastern edge of site. Viewed south from the site entrance.



Plate 4: The tarmac track viewed north from the centre of the eastern edge of site. The offsite electric substation is in the right of the image.

Project Title: Bartons Road, Havant
Client: Stonebond
BRD Reference: BRD4469-OP3-A
Date Issued: July 2024

Site Walkover Photographs



Plate 5: Many manhole covers and gulleys were located along the eastern edge of site. The south eastern corner was also overgrown with vegetation.



Plate 6: The site viewed north from the southern boundary of site. The large stockpile of concrete is evident.

Site Walkover Photographs



Plate 7: Two open manhole covers were located along the western edge of site.



Plate 8: Rubbish was observed inside one (above), brick and concrete rubble in the other.

Site Walkover Photographs



Plate 9: The concrete stockpile viewed from the open manhole covers.



Plate 10: Example of the Made Ground observed at surface.

Site Walkover Photographs



Plate 11: The western edge of site was overgrown (viewed south). A waterpipe was observed sticking out the ground in the north west corner of site.



Plate 12: The northern edge of site was vegetated. The right hand side of the image is slightly higher than the left. There is a brick retaining wall along the north with some vegetation on the top.

Site Walkover Photographs



Plate 13: The concrete stockpile viewed south from the northern half of site.



Plate 14: Example of rubbish found on the site.

Site Walkover Photographs



Plate 15: The garage and used car sales south west of site.



Plate 16: The SSE offices and electrical substation east of site are in the background of the image.

Project Title: Bartons Road, Havant
Client: Stonebond
BRD Reference: BRD4469-OP3-A
Date Issued: July 2024

Site Walkover Photographs



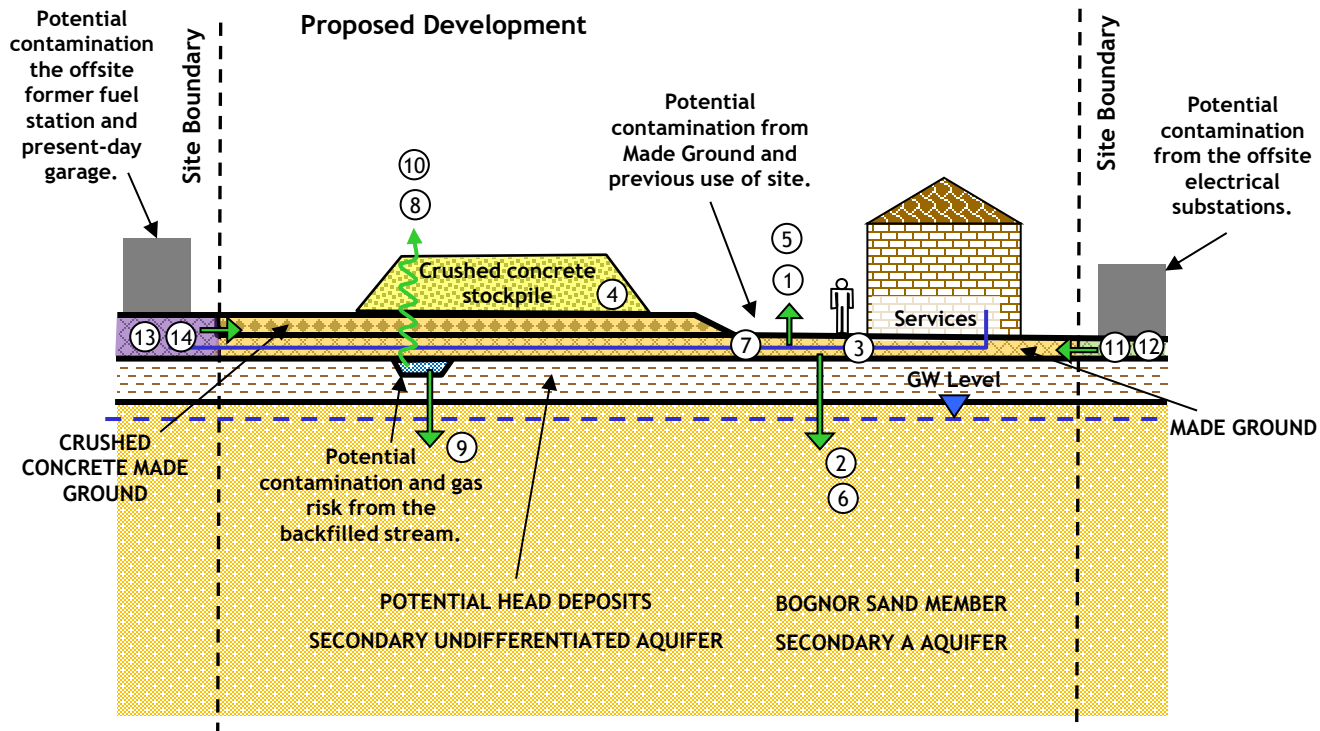
Plate 17: The neighbouring football pitch and associated public house.



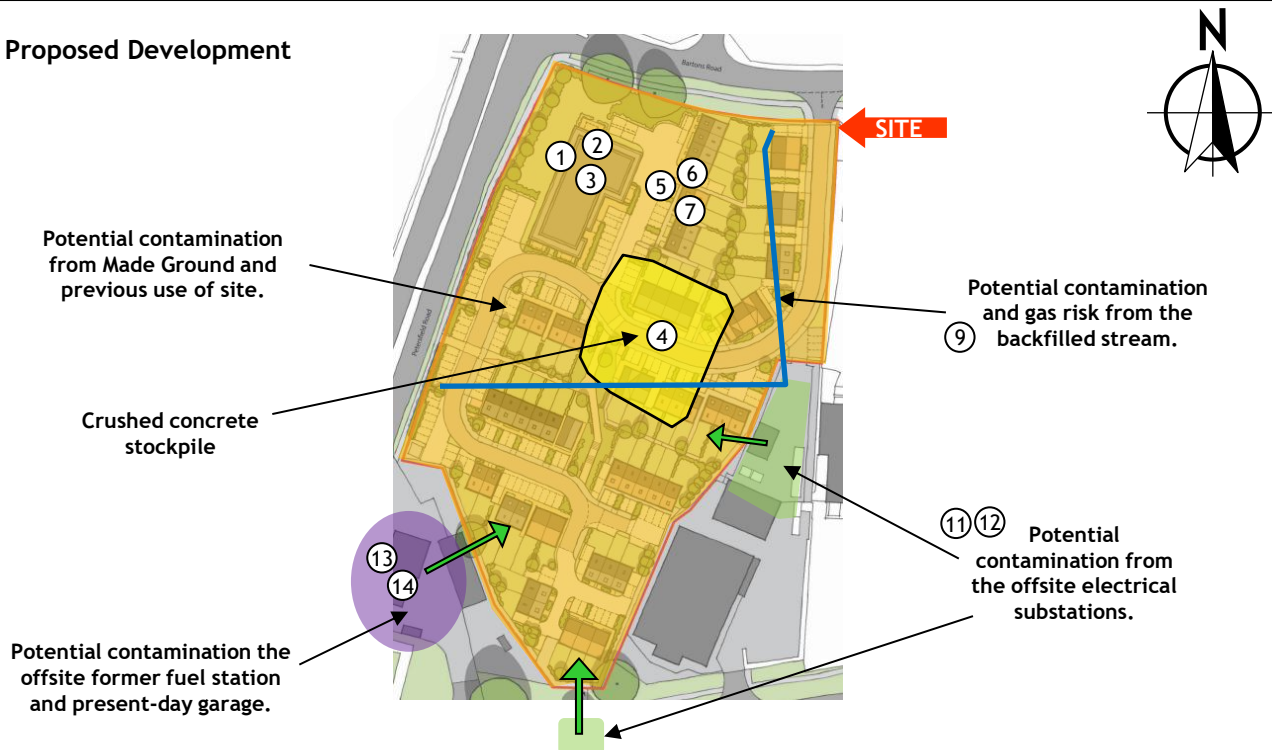
Plate 18: The electrical substation south of site.

Project Title: Bartons Road, Havant
Client: Stonebond
BRD Reference: BRD4469-OP3-A
Date Issued: July 2024

Initial Conceptual Model



Proposed Development

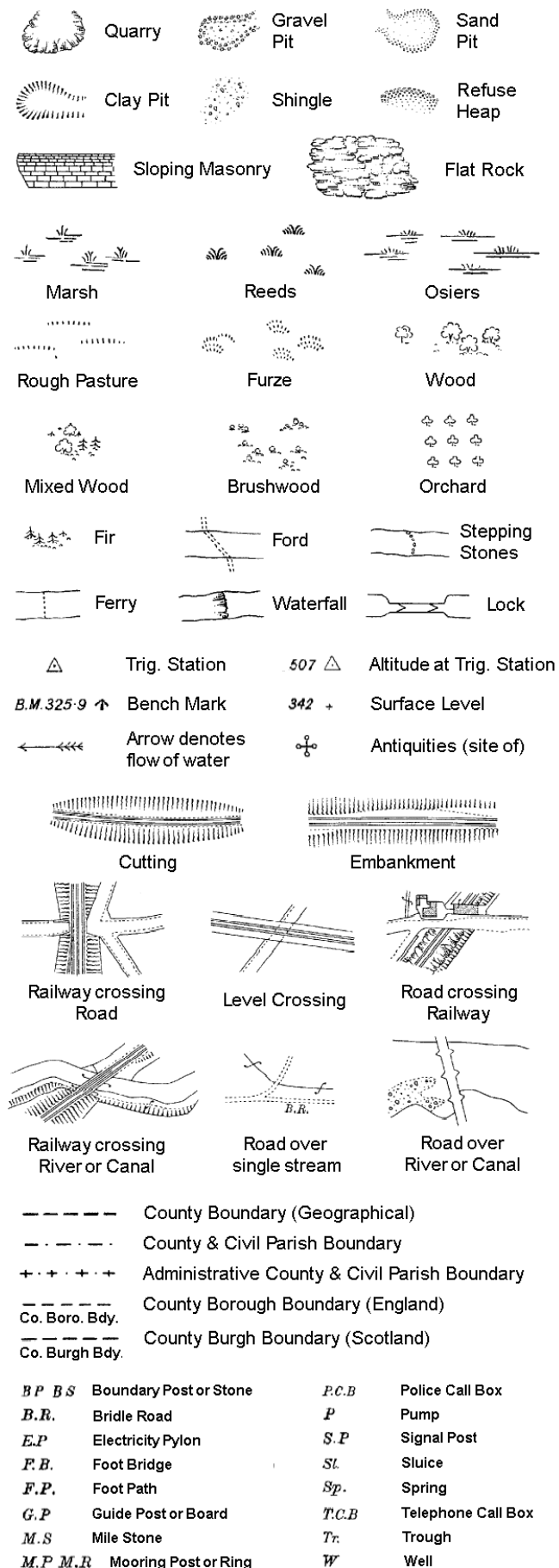


Project Title: Bartons Road, Havant
 Client: Stonebond
 BRD Reference: BRD4469-OP4-B
 Date Issued: July 2025

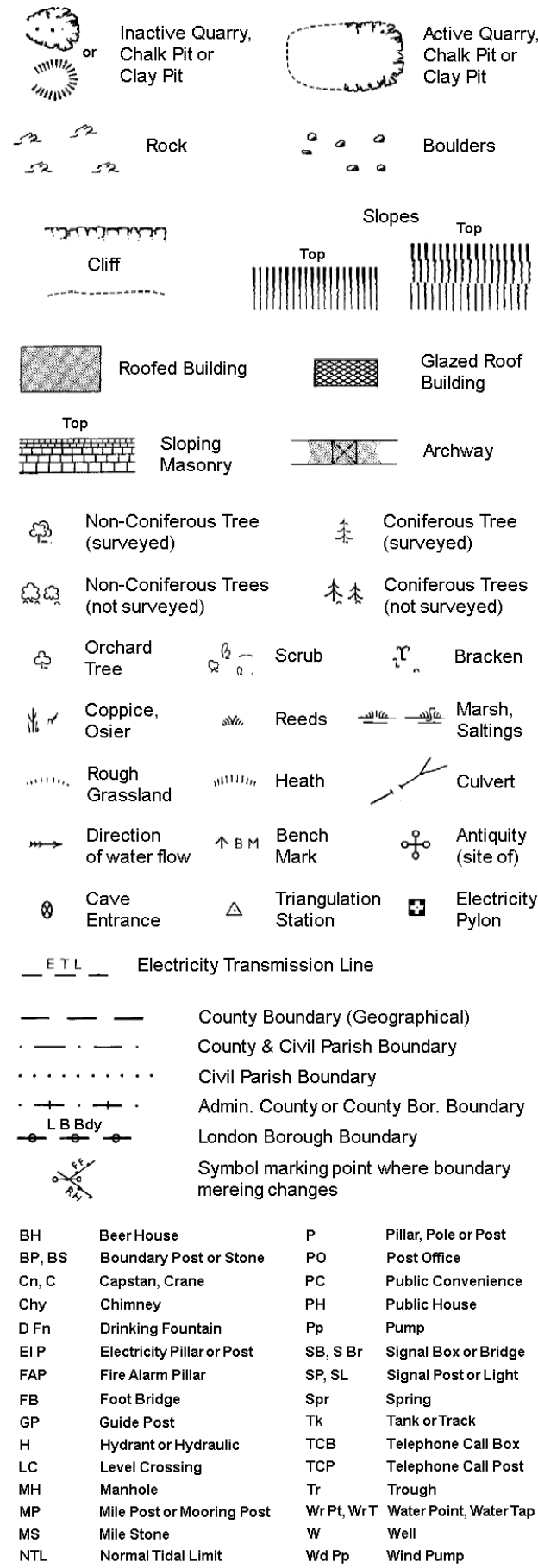
APPENDIX 2

Historical Mapping Legends

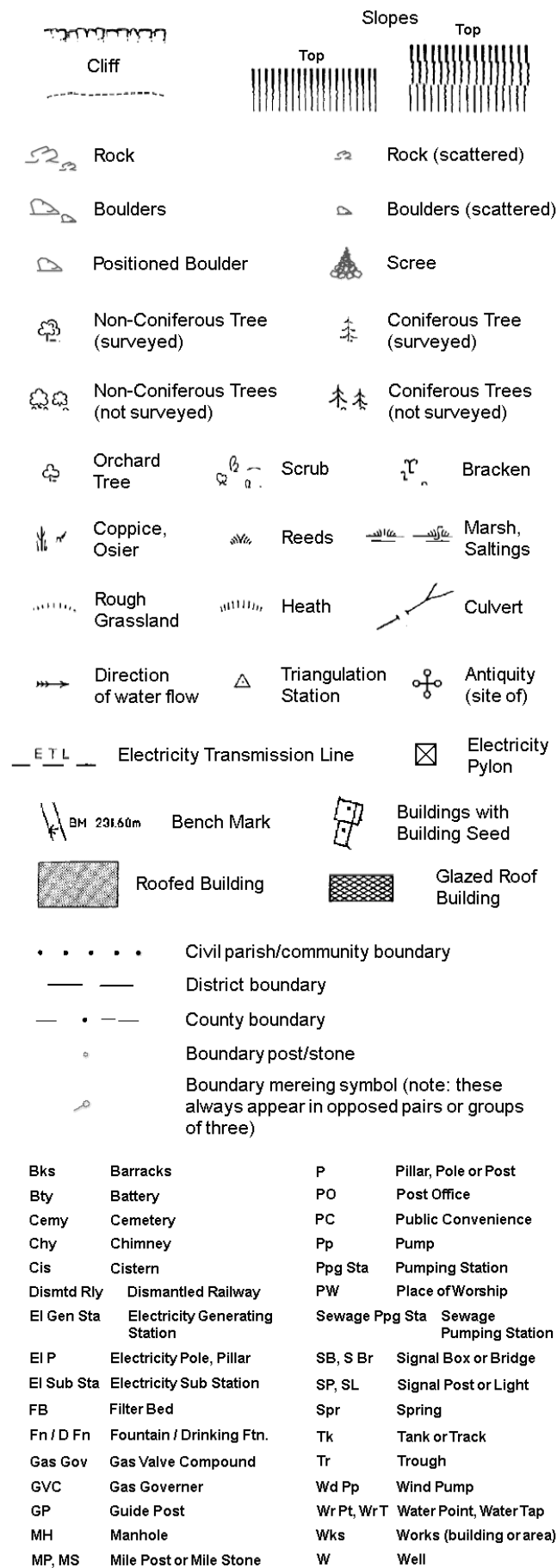
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



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



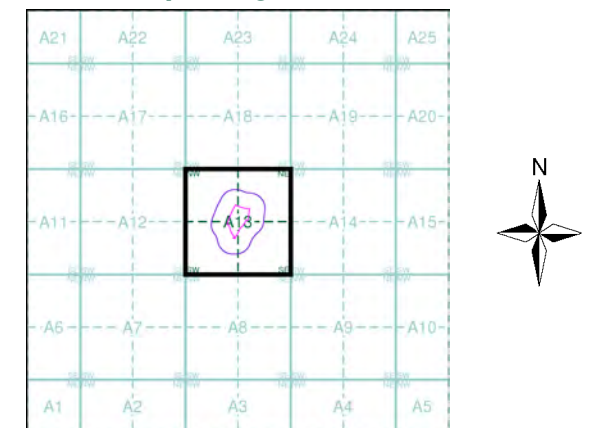
Large-Scale National Grid Data 1:2,500 and 1:1,250



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Hampshire & Isle Of Wight	1:2,500	1866	2
Hampshire & Isle Of Wight	1:2,500	1867 - 1878	3
Hampshire & Isle Of Wight	1:2,500	1868	4
Hampshire & Isle Of Wight	1:2,500	1897	5
Hampshire & Isle Of Wight	1:2,500	1909	6
Hampshire & Isle Of Wight	1:2,500	1932	7
Ordnance Survey Plan	1:2,500	1952 - 1970	8
Ordnance Survey Plan	1:1,250	1956 - 1967	9
Ordnance Survey Plan	1:2,500	1956 - 1972	10
Ordnance Survey Plan	1:2,500	1964 - 1971	11
Ordnance Survey Plan	1:1,250	1970 - 1974	12
Supply of Unpublished Survey Information	1:1,250	1973	13
Additional SIMs	1:1,250	1979 - 1991	14
Large-Scale National Grid Data	1:1,250	1993	15
Large-Scale National Grid Data	1:1,250	1995	16
Large-Scale National Grid Data	1:1,250	1996	17
Historical Aerial Photography	1:2,500	1999	18

Historical Map - Segment A13



Order Details

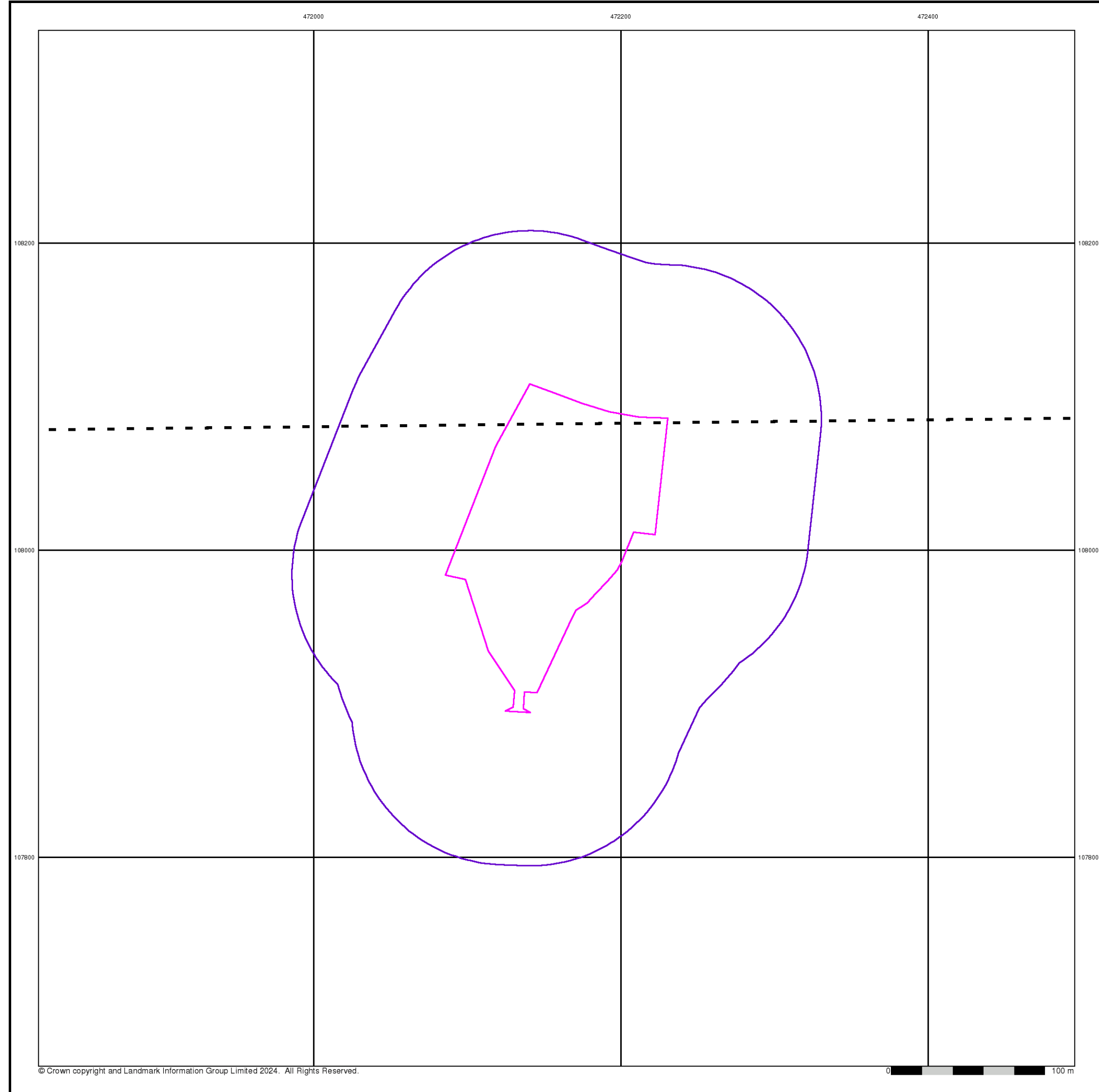
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

Site Details

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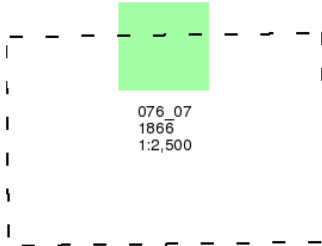
Hampshire & Isle Of Wight

Published 1866

Source map scale - 1:2,500

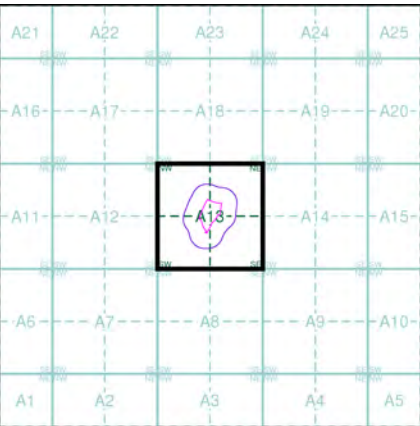
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. 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)



076 07
1866
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	353460273_1_1
Customer Ref:	BRD4469
National Grid Reference:	472160, 108010
Slice:	A
Site Area (Ha):	1.68
Search Buffer (m):	100

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Hampshire & Isle Of Wight

Published 1867 - 1878

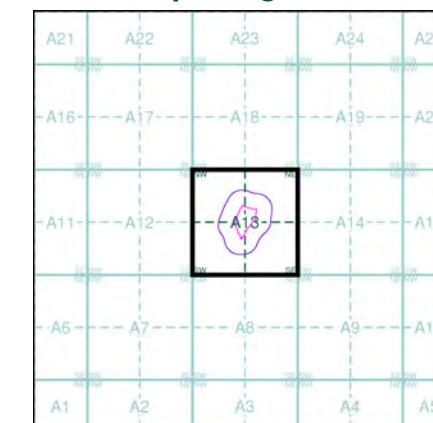
Source map scale - 1:2,500

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)

076_03
1878
1:2,500
076_07
1867
1:2,500

Historical Map - Segment A13



Order Details

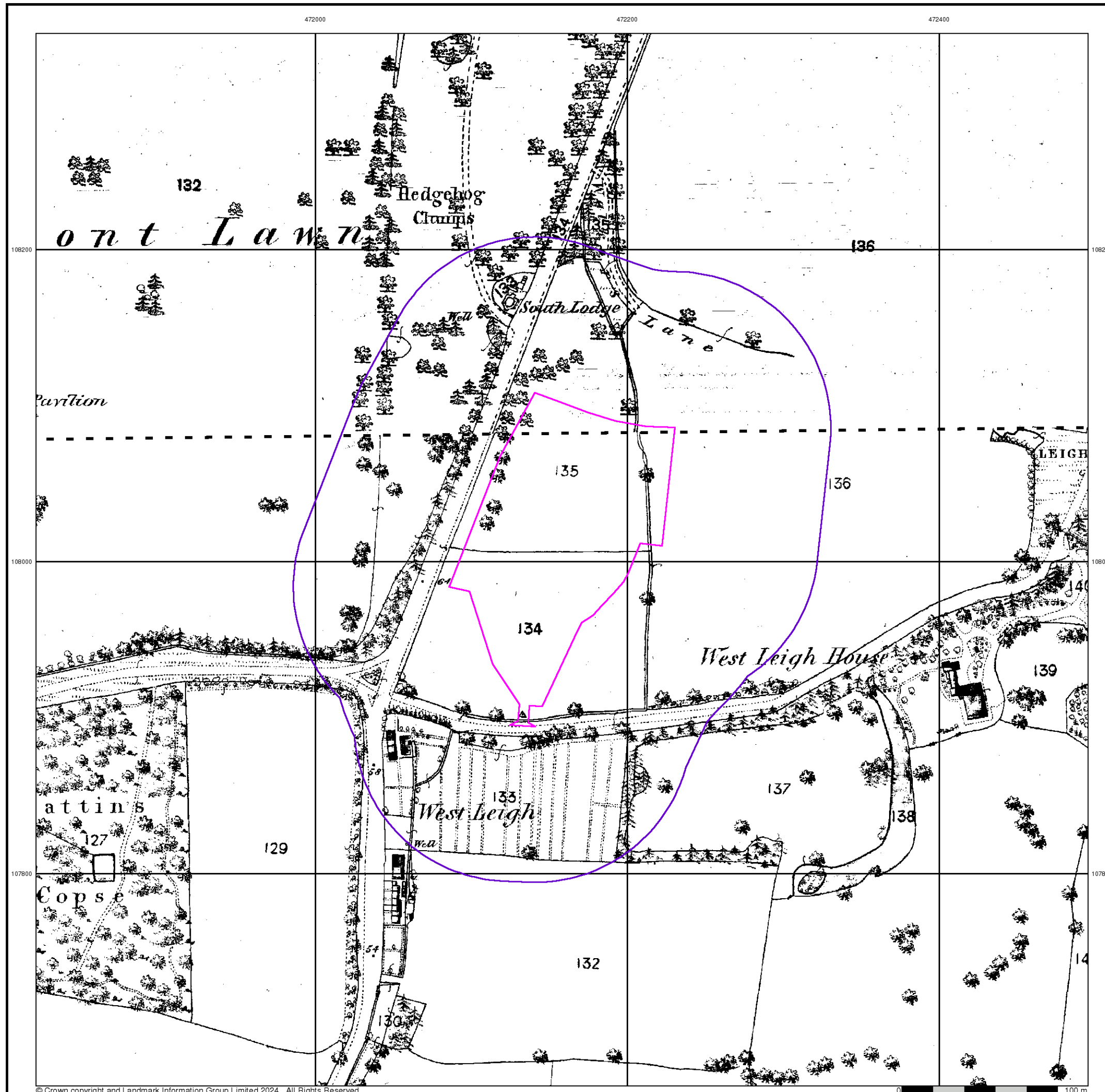
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

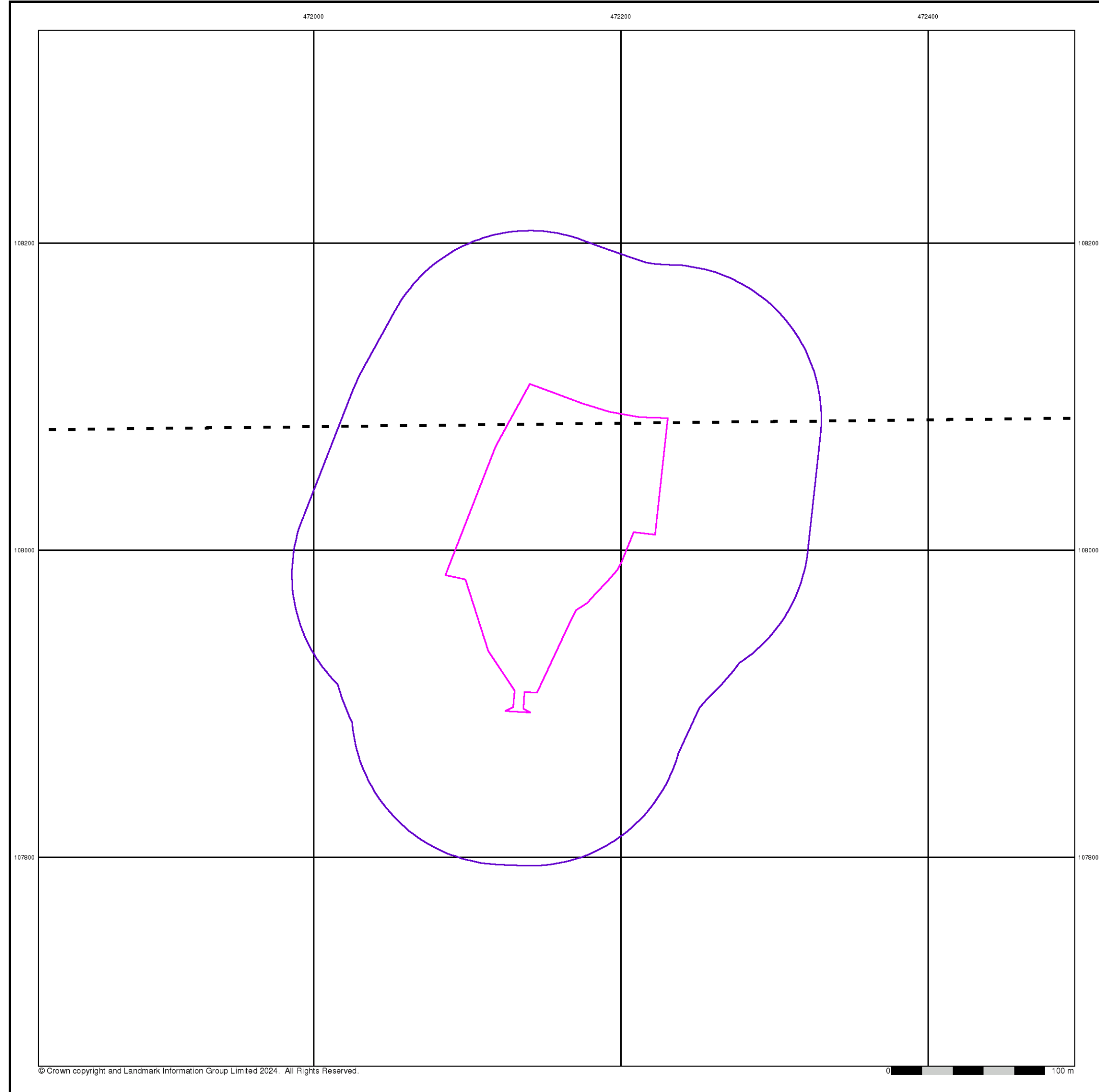
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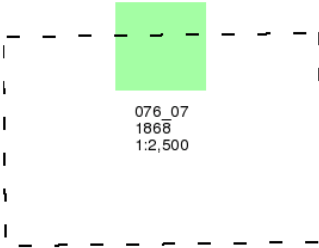
Hampshire & Isle Of Wight

Published 1868

Source map scale - 1:2,500

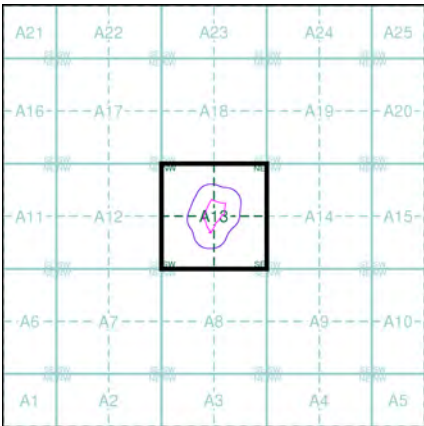
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. 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)



076_07
1868
1:2,500

Historical Map - Segment A13



Order Details

Order Number:	353460273_1_1
Customer Ref:	BRD4469
National Grid Reference:	472160, 108010
Slice:	A
Site Area (Ha):	1.68
Search Buffer (m):	100

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Hampshire & Isle Of Wight

Published 1897

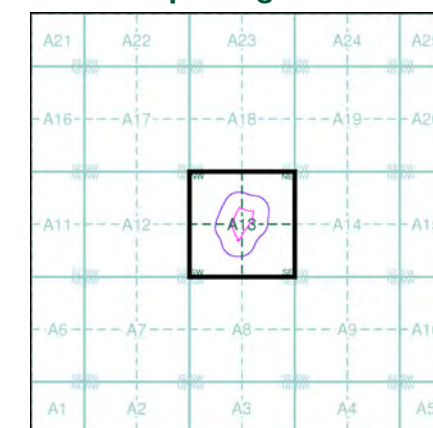
Source map scale - 1:2,500

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)

076_03
1897
1:2,500
076_07
1897
1:2,500

Historical Map - Segment A13



Order Details

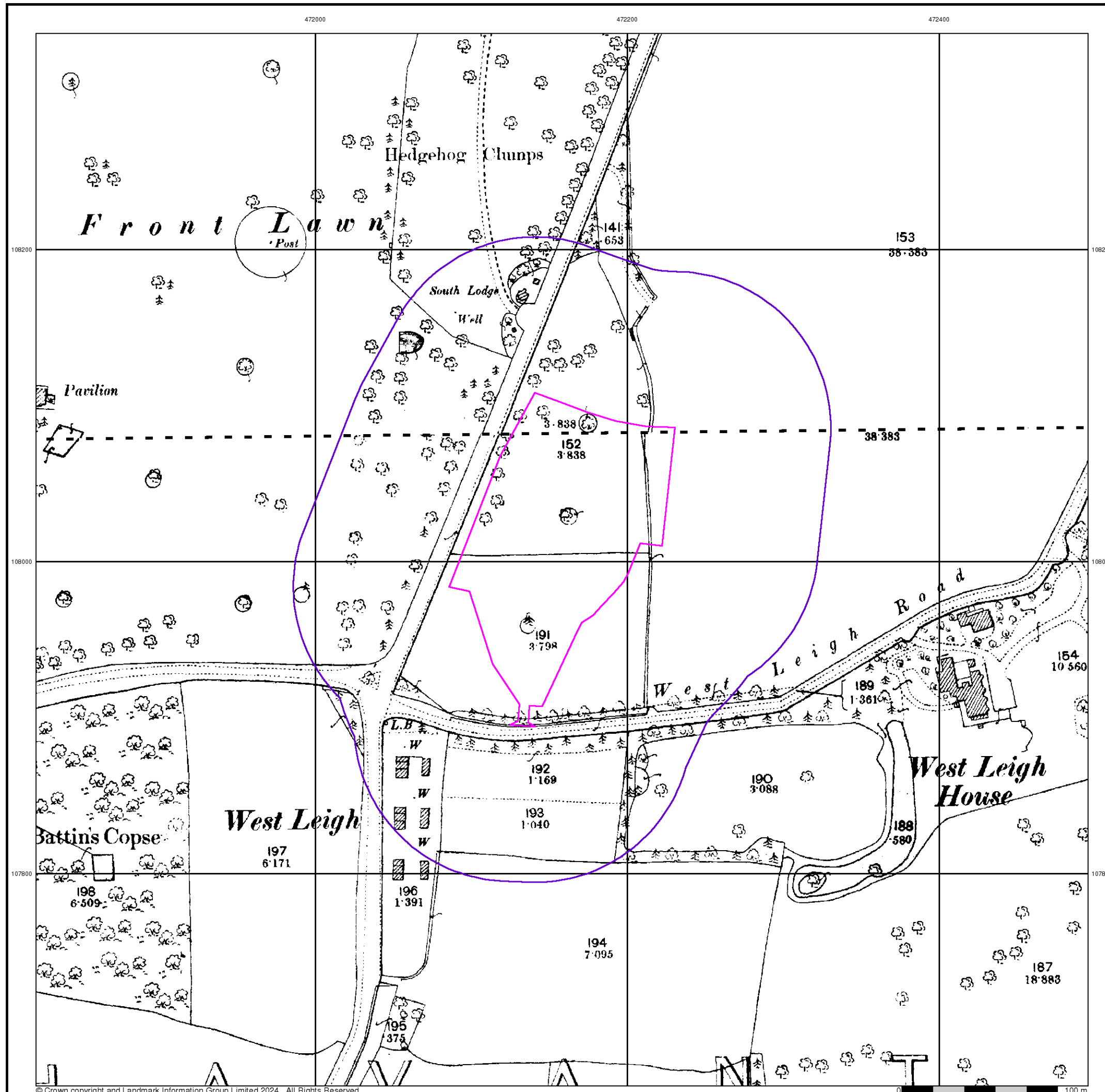
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

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Hampshire & Isle Of Wight

Published 1909

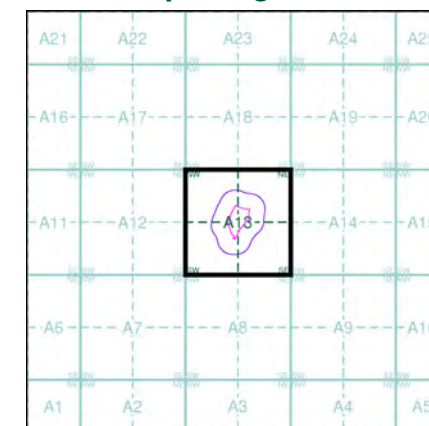
Source map scale - 1:2,500

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)

076_03
1909
1:2,500
076_07
1909
1:2,500

Historical Map - Segment A13



Order Details

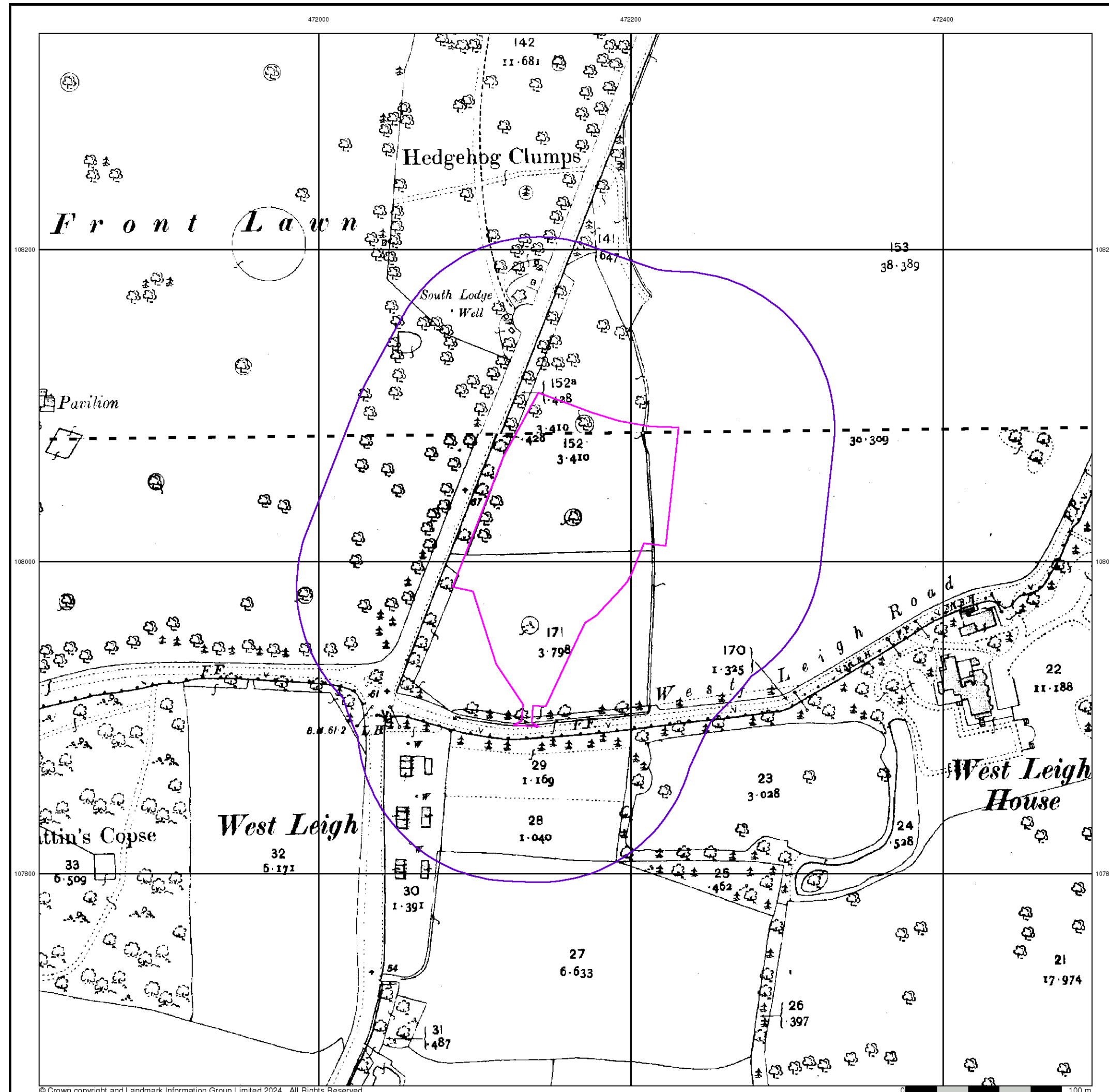
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

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Hampshire & Isle Of Wight

Published 1932

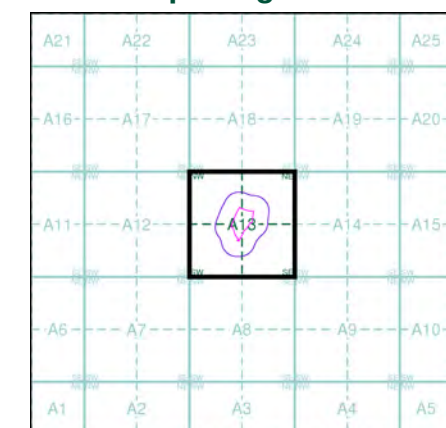
Source map scale - 1:2,500

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)

076-03
1932
1:2,500
076-07
1932
1:2,500

Historical Map - Segment A13



Order Details

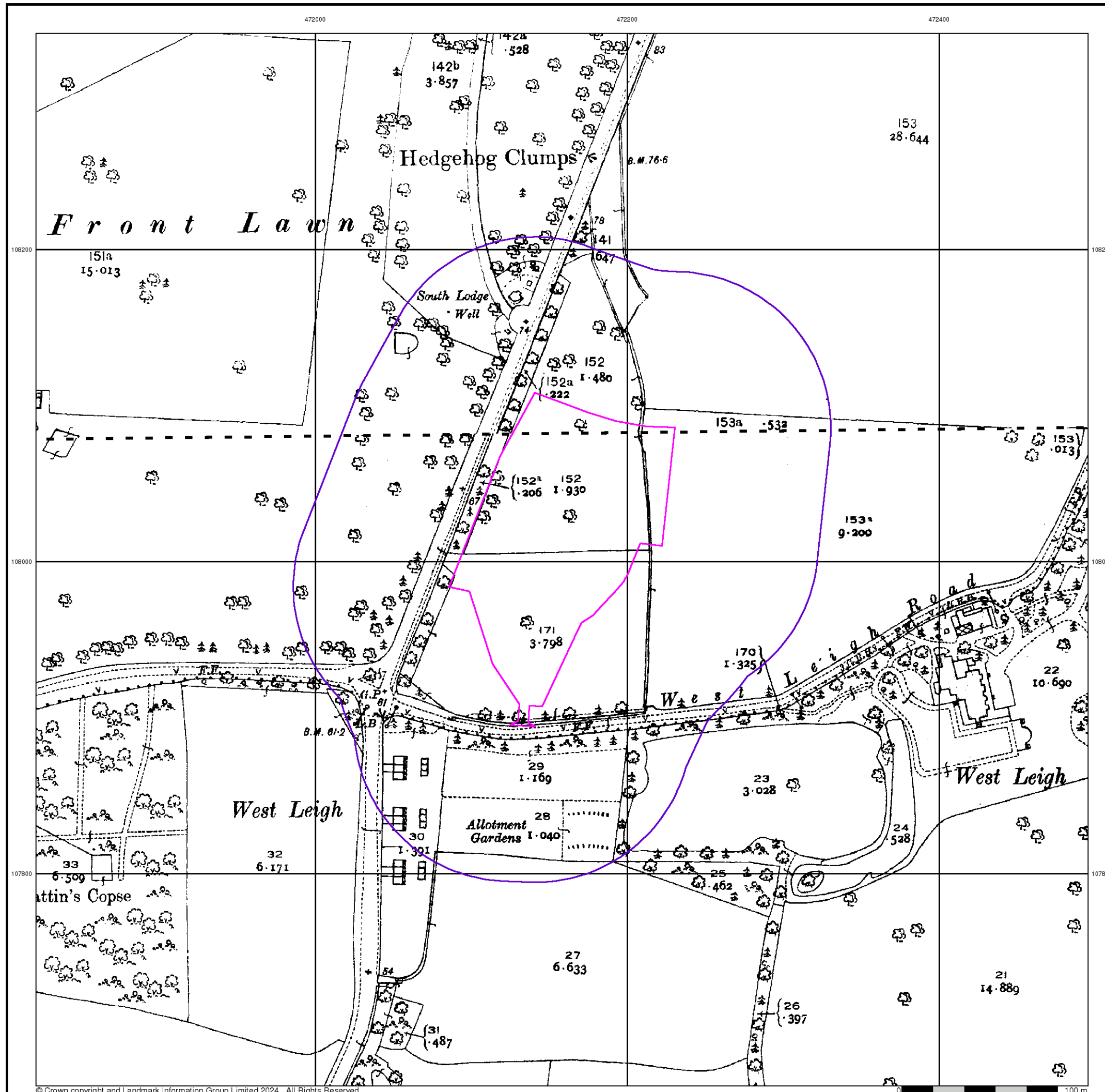
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

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Ordnance Survey Plan

Published 1952 - 1970

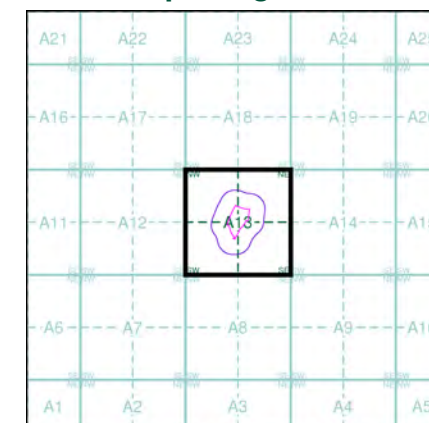
Source map scale - 1:2,500

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)

SU7108 1953 12,500	SU7208 1970 12,500
SU7107 1952 12,500	SU7207 1953 12,500

Historical Map - Segment A13



Order Details

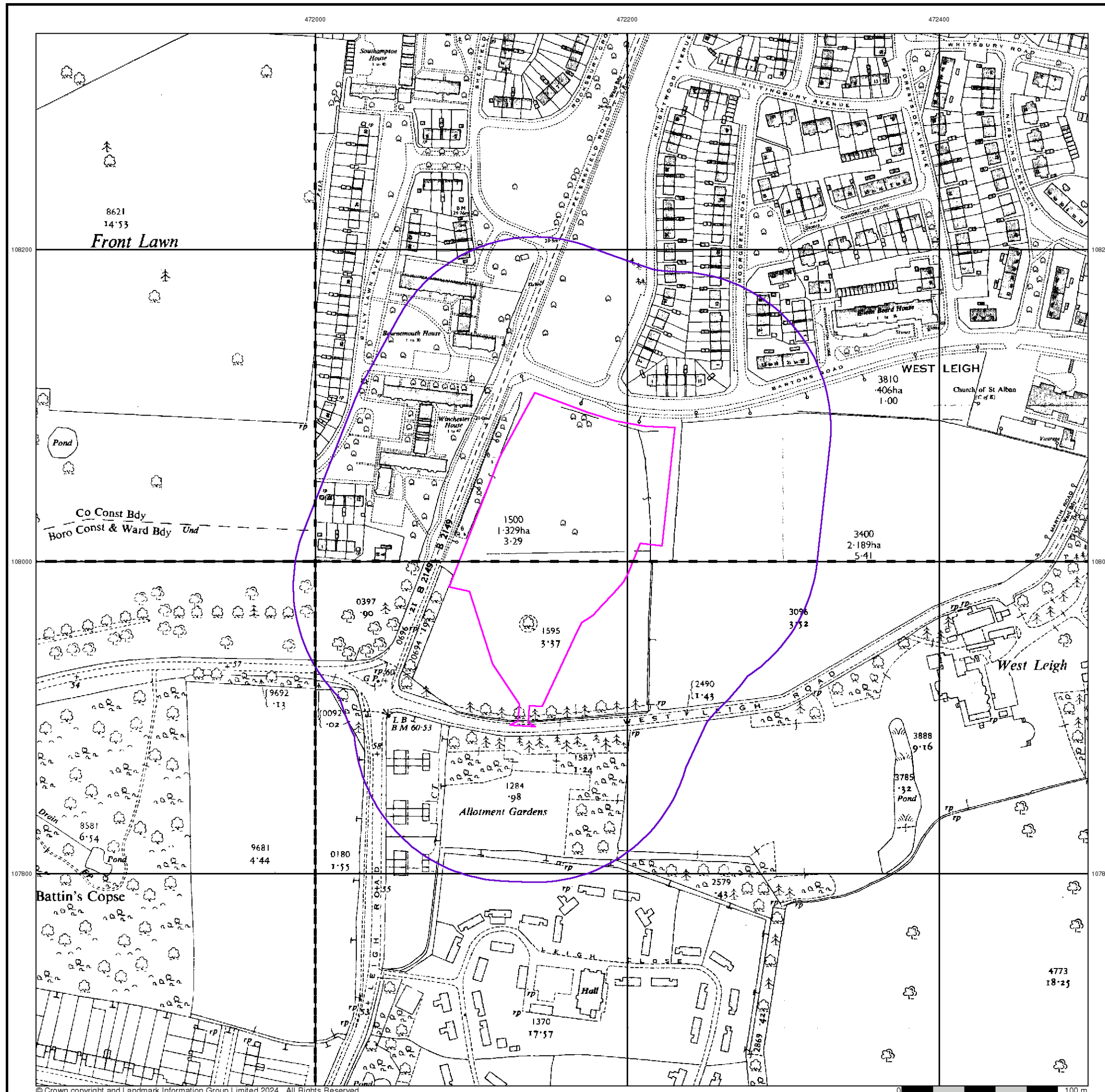
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

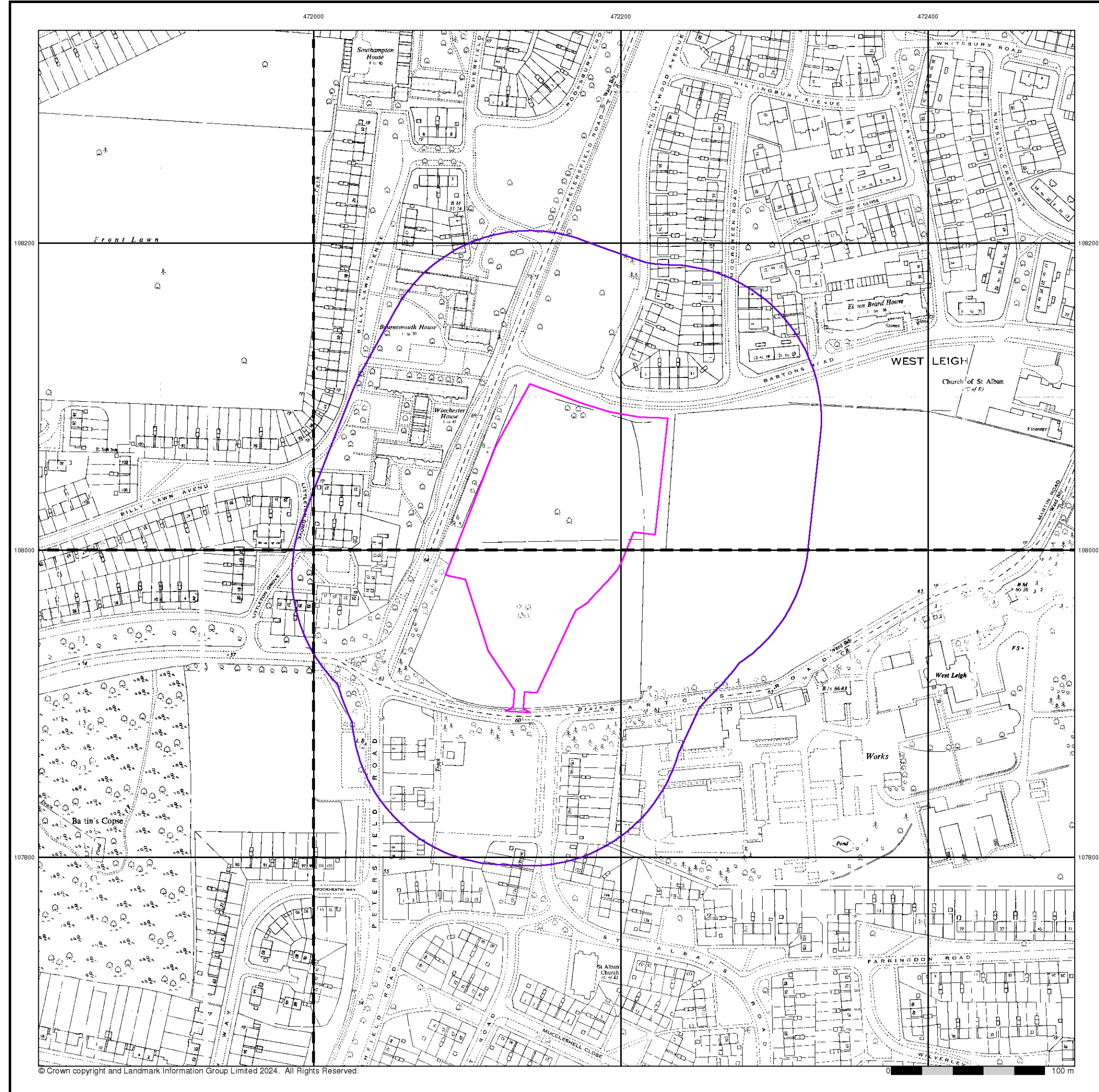
Site Details

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Ordnance Survey Plan

Published 1956 - 1967

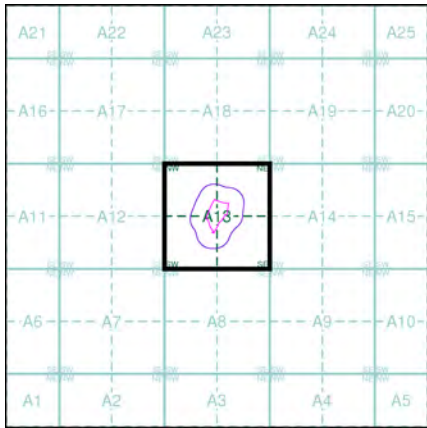
Source map scale - 1:1,250

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)

SU7108SE 1957 1:1,250	SU7208SW 1967 1:1,250
SU7107NE 1956 1:1,250	SU7207NW 1960 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

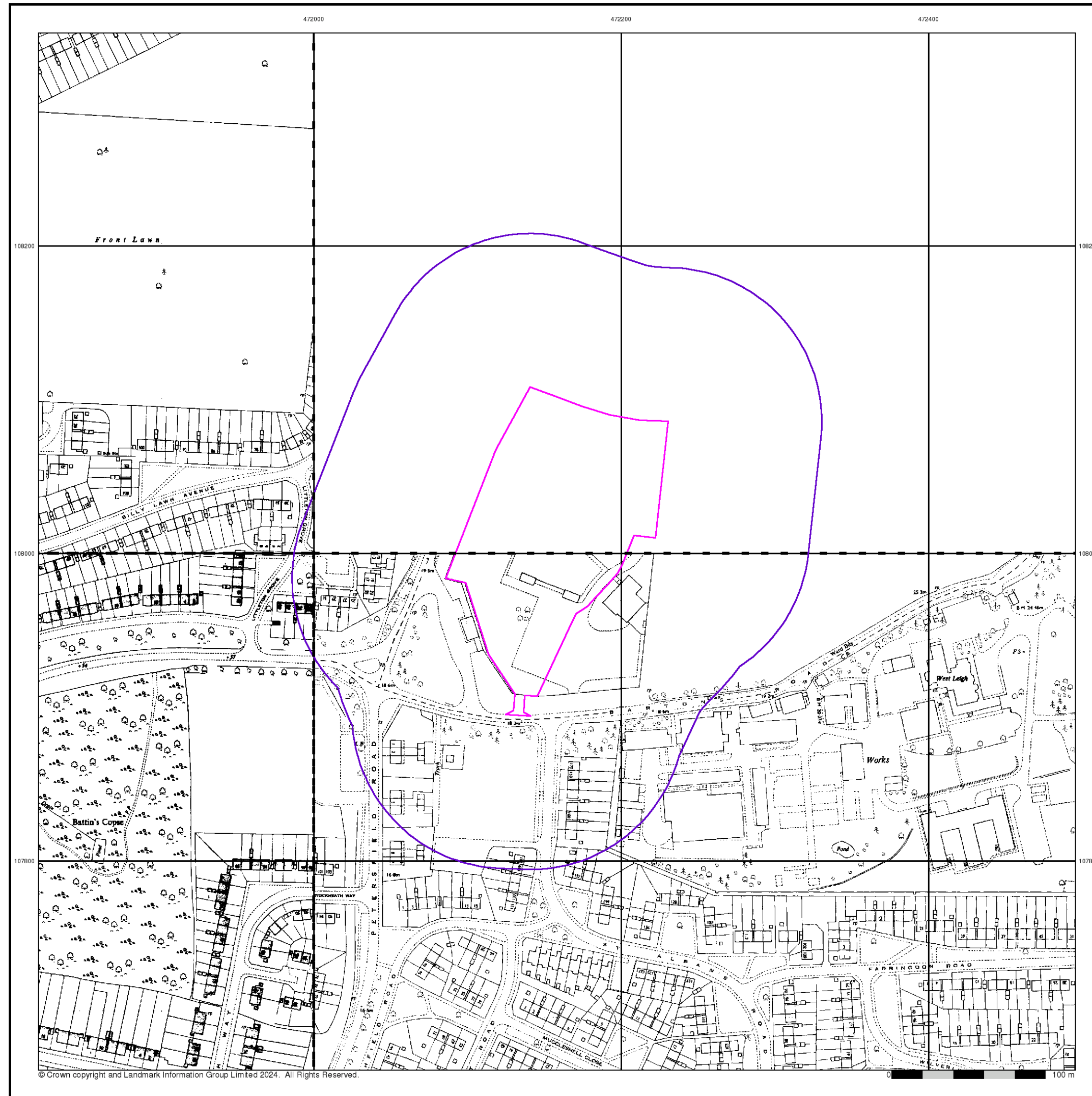
Site Details

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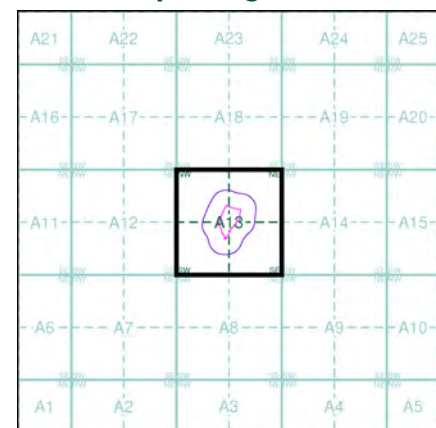
Ordnance Survey Plan
Published 1956 - 1972
Source map scale - 1:2,500

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)

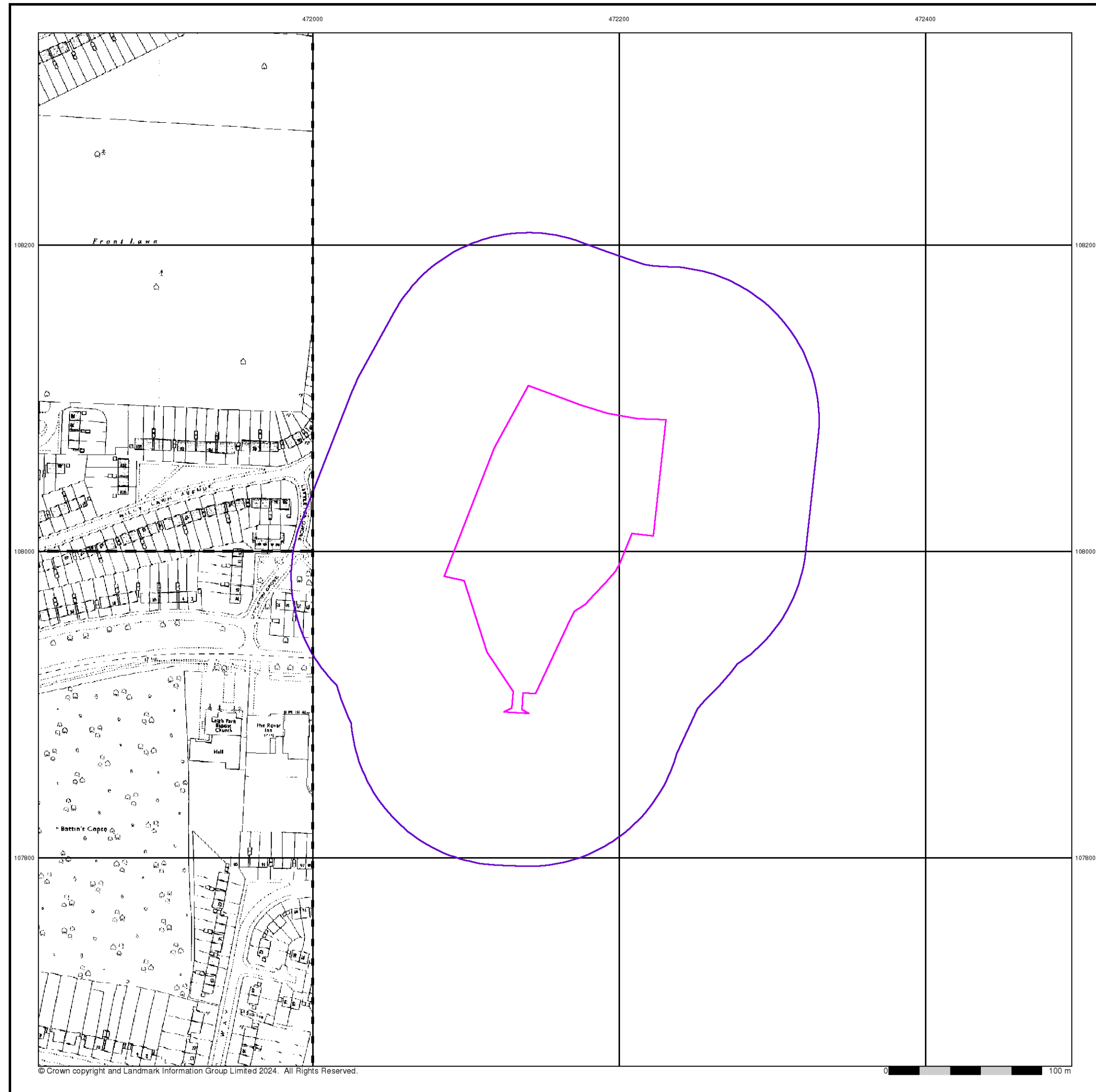
SU7108		
1958		
12,500		
SU7107	SU7207	
1956	1972	
12,500	12,500	

Historical Map - Segment A13



Order Details
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

Site Details
Former SSE Offices, Bartons Road, HAVANT, PO9 5TH





Ordnance Survey Plan

Published 1964 - 1971

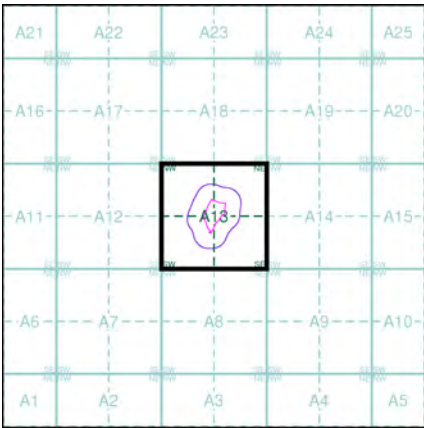
Source map scale - 1:2,500

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)

SU7108	1964	1:2,500
SU7107	1971	1:2,500

Historical Map - Segment A13



Order Details

Order Number:	353460273_1_1
Customer Ref:	BRD4469
National Grid Reference:	472160, 108010
Slice:	A
Site Area (Ha):	1.68
Search Buffer (m):	100

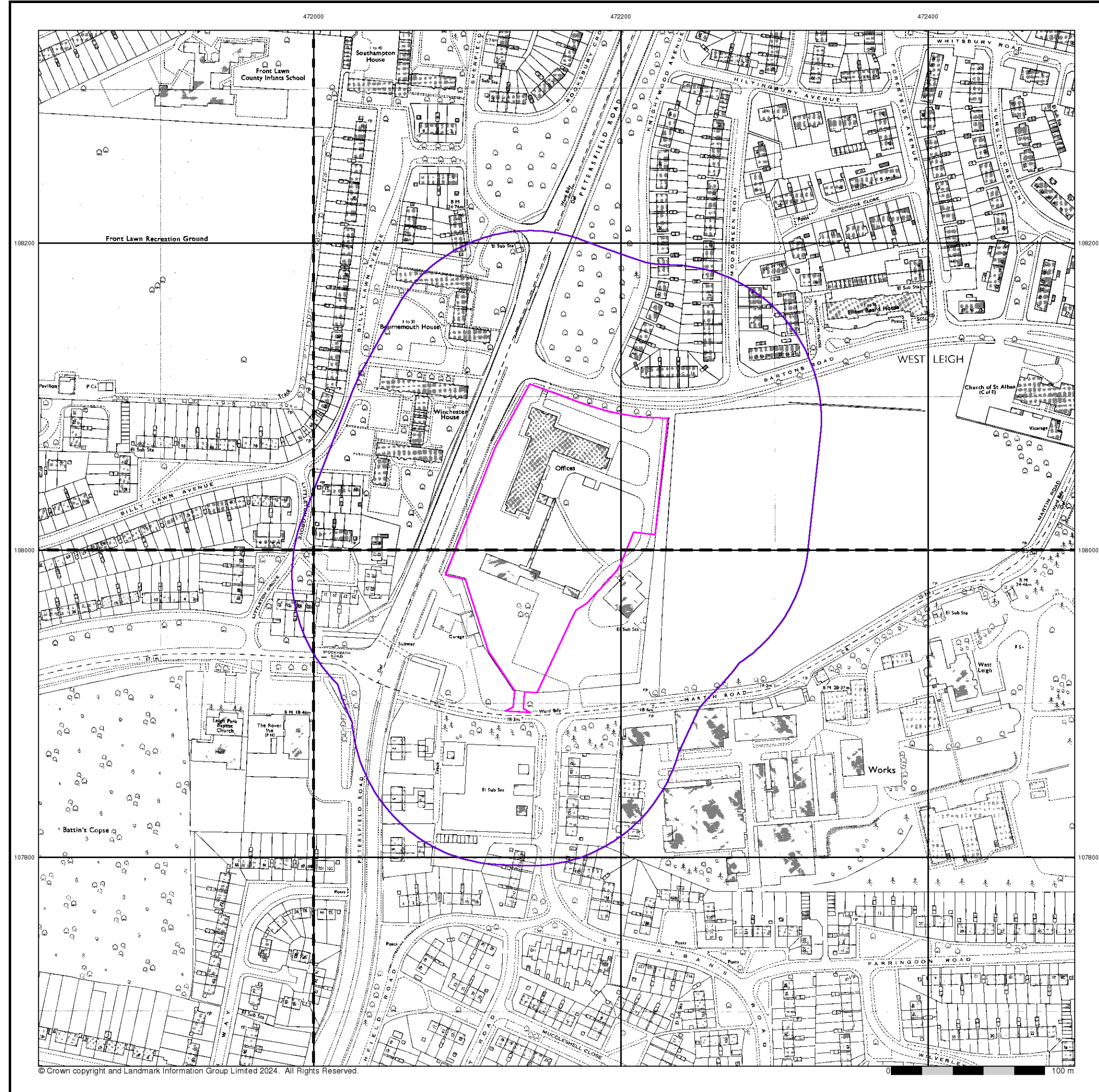
Site Details

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Ordnance Survey Plan

Published 1970 - 1974

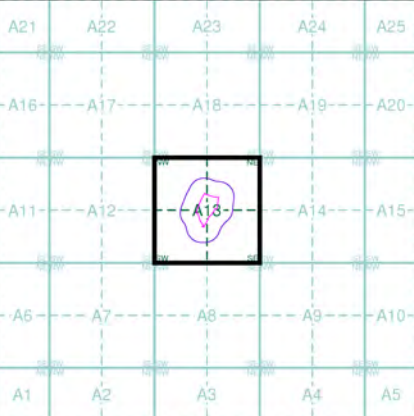
Source map scale - 1:1,250

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)

SU7108SE 1971 1:1,250	SU7208SW 1974 1:1,250
SU7107NE 1970 1:1,250	SU7207NW 1973 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

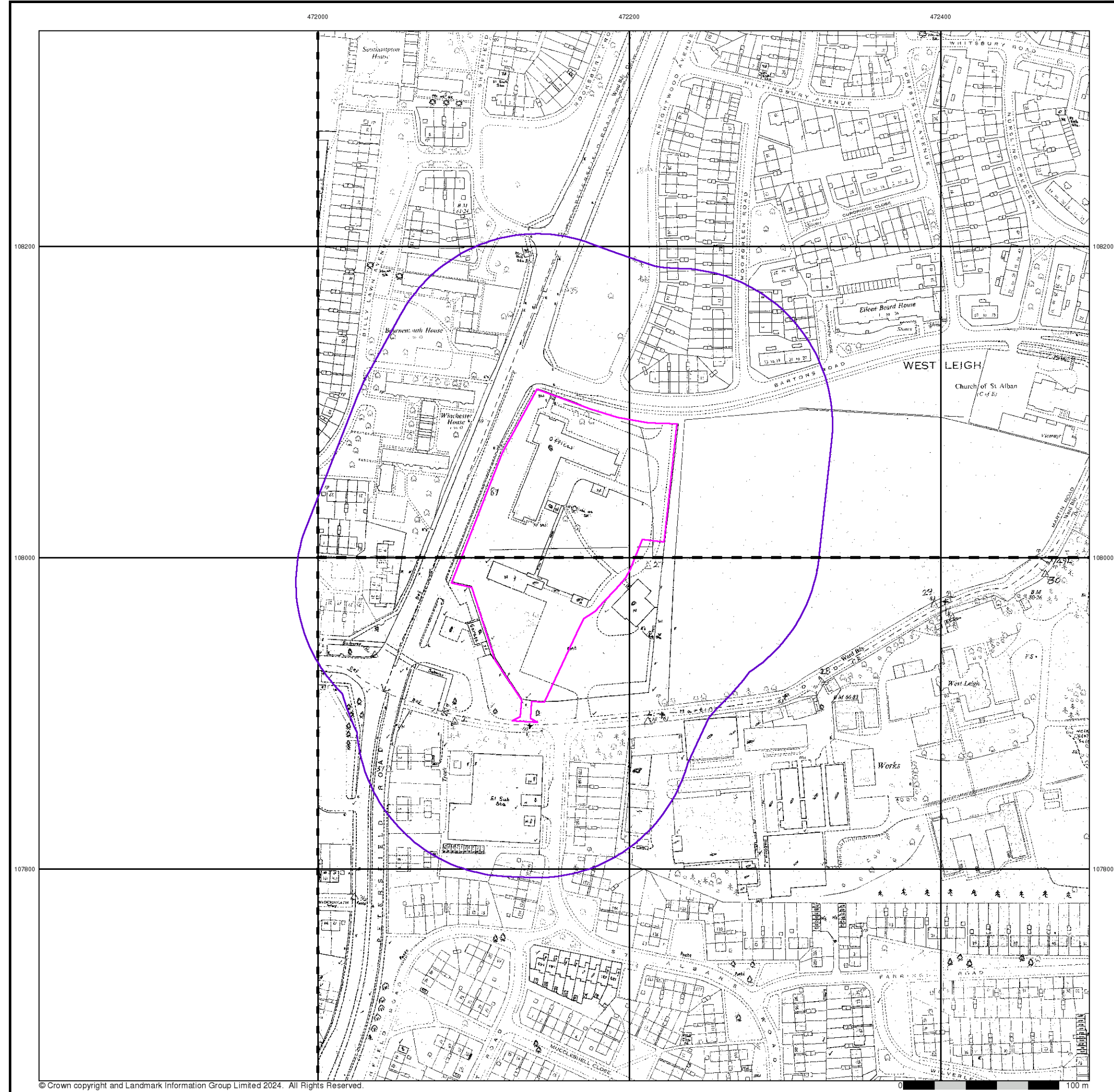
Site Details

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Supply of Unpublished Survey Information

Published 1973

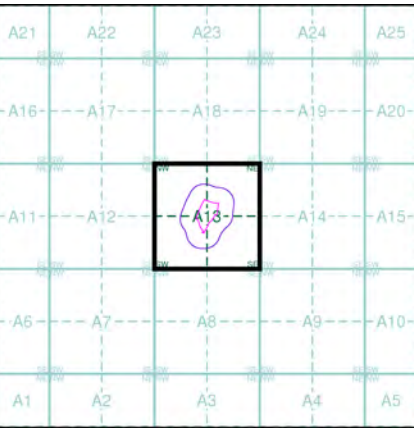
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a 'work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SU7208SW
1973
1:1,250
SU7207NW
1973
1:1,250

Historical Map - Segment A13



Order Details

Order Number:	353460273_1_1
Customer Ref:	BRD4469
National Grid Reference:	472160, 108010
Slice:	A
Site Area (Ha):	1.68
Search Buffer (m):	100

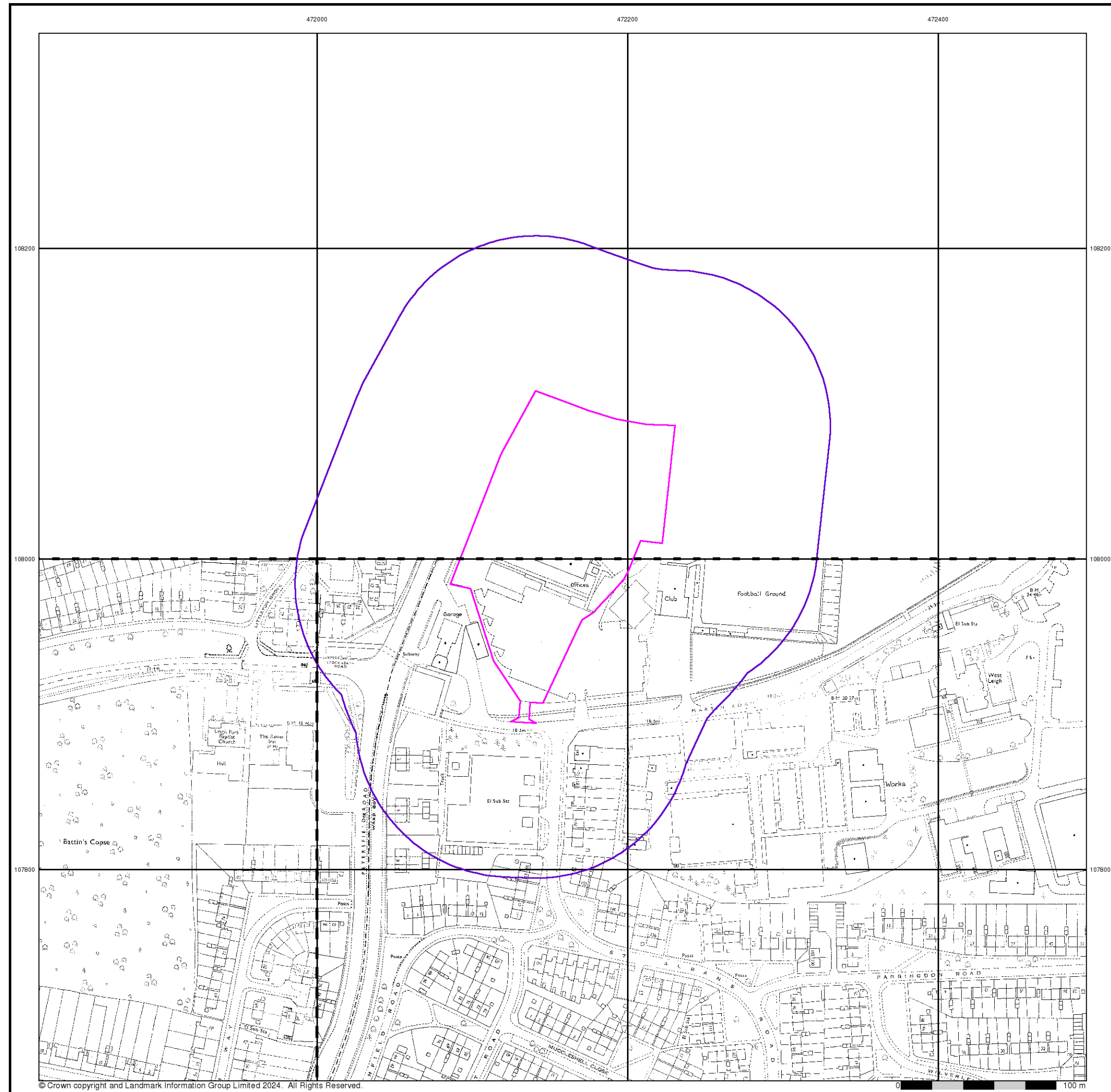
Site Details

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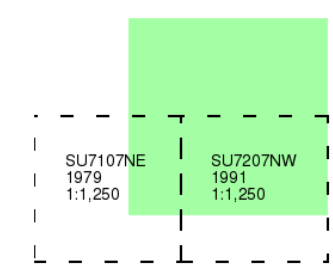
Additional SIMs

Published 1979 - 1991

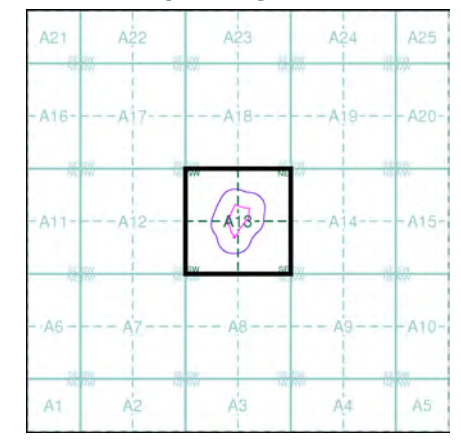
Source map scale - 1:1,250

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

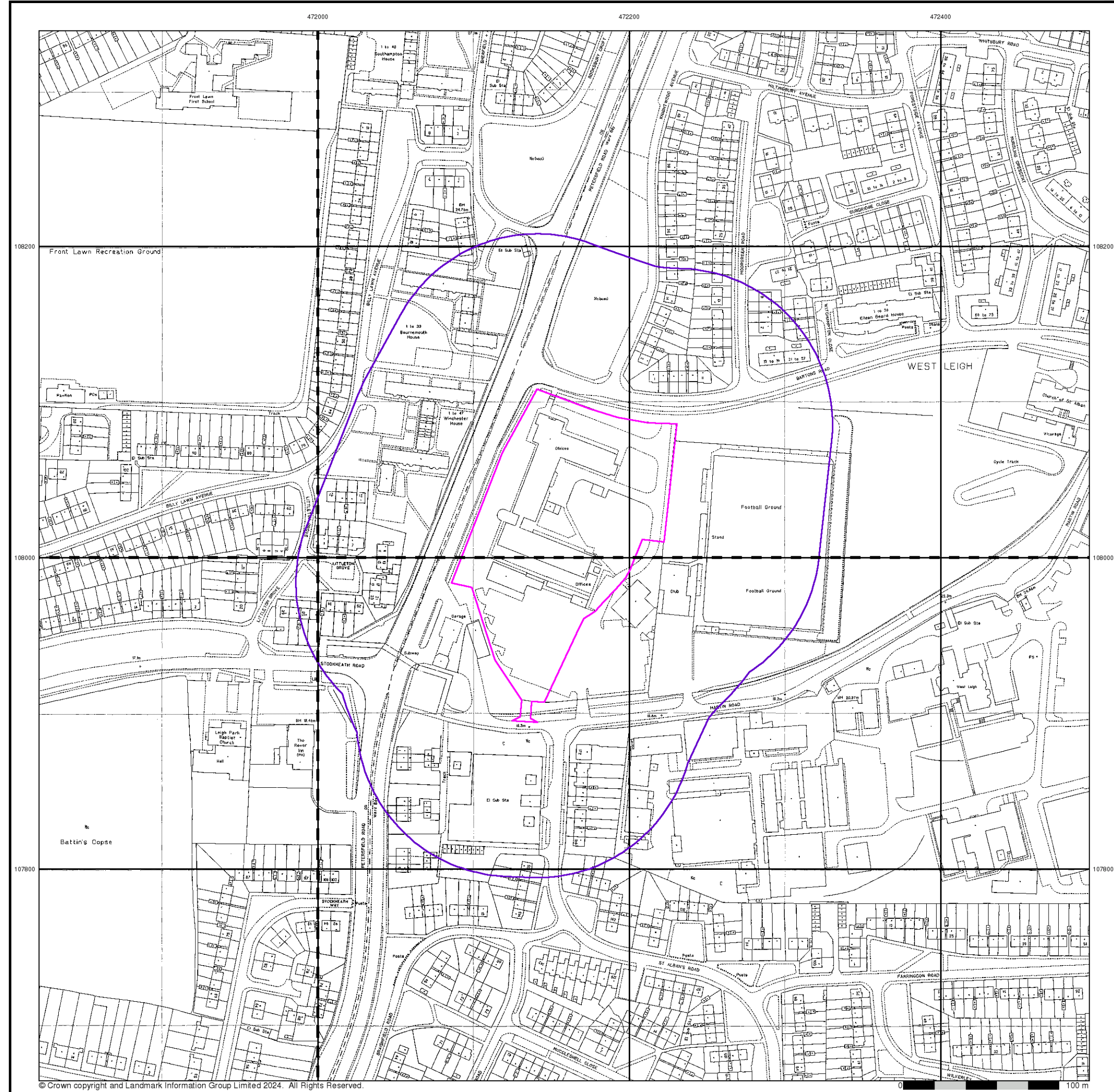
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Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 100

Site Details

Former SSE Offices, Bartons Road, HAVANT, PO9 5TH



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Large-Scale National Grid Data

Published 1993

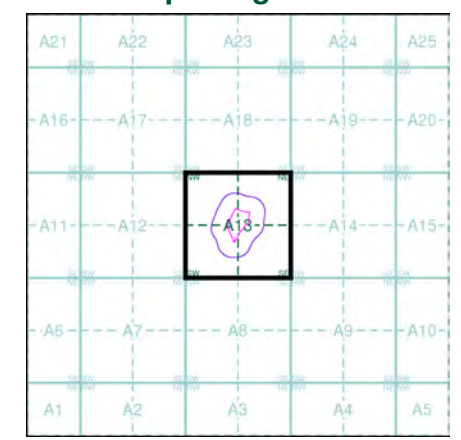
Source map scale - 1:1,250

'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)

SU7108SE 1993 1:1,250	SU7208SW 1993 1:1,250
SU7107NE 1993 1:1,250	SU7207NW 1993 1:1,250

Historical Map - Segment A13



Order Details

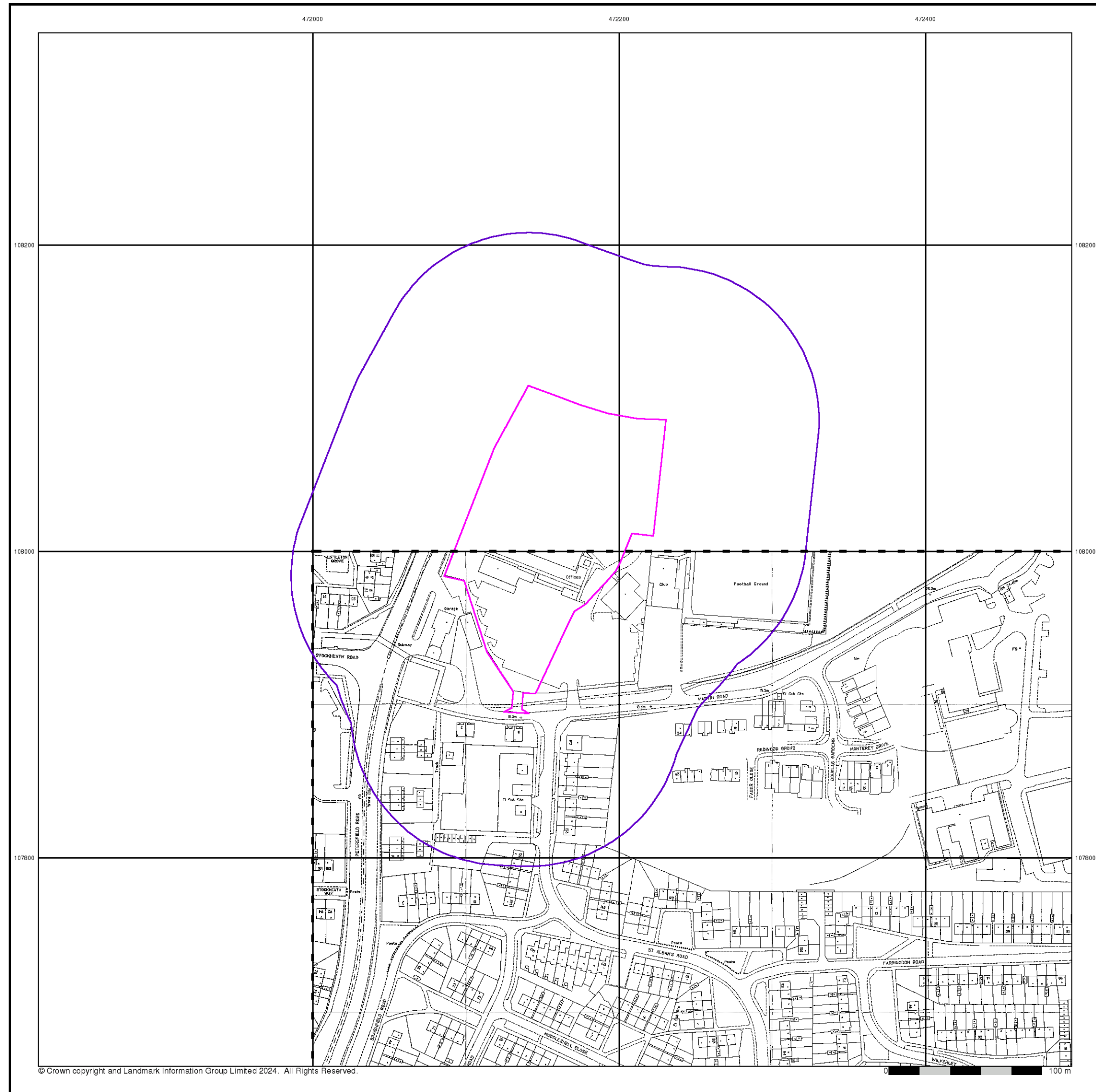
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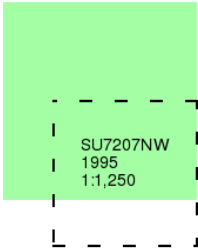
Large-Scale National Grid Data

Published 1995

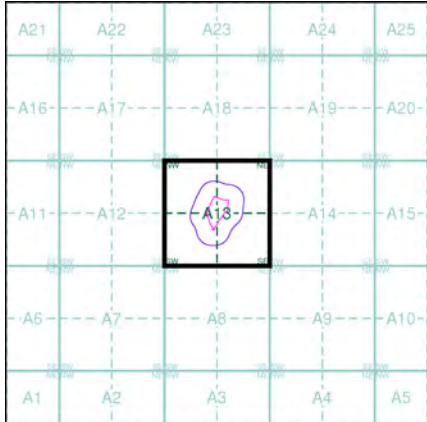
Source map scale - 1:1,250

'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

Order Number:	353460273_1_1
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A Landmark Information Group Service v50.0 22-Jul-2024 Page 16 of 18



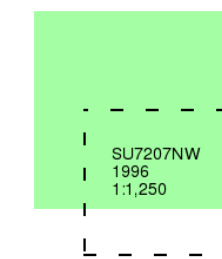
Large-Scale National Grid Data

Published 1996

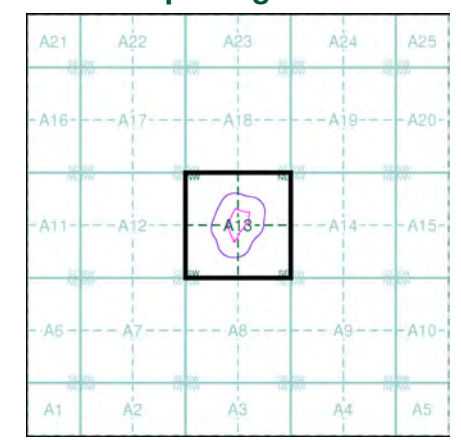
Source map scale - 1:1,250

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Map Name(s) and Date(s)



Historical Map - Segment A13



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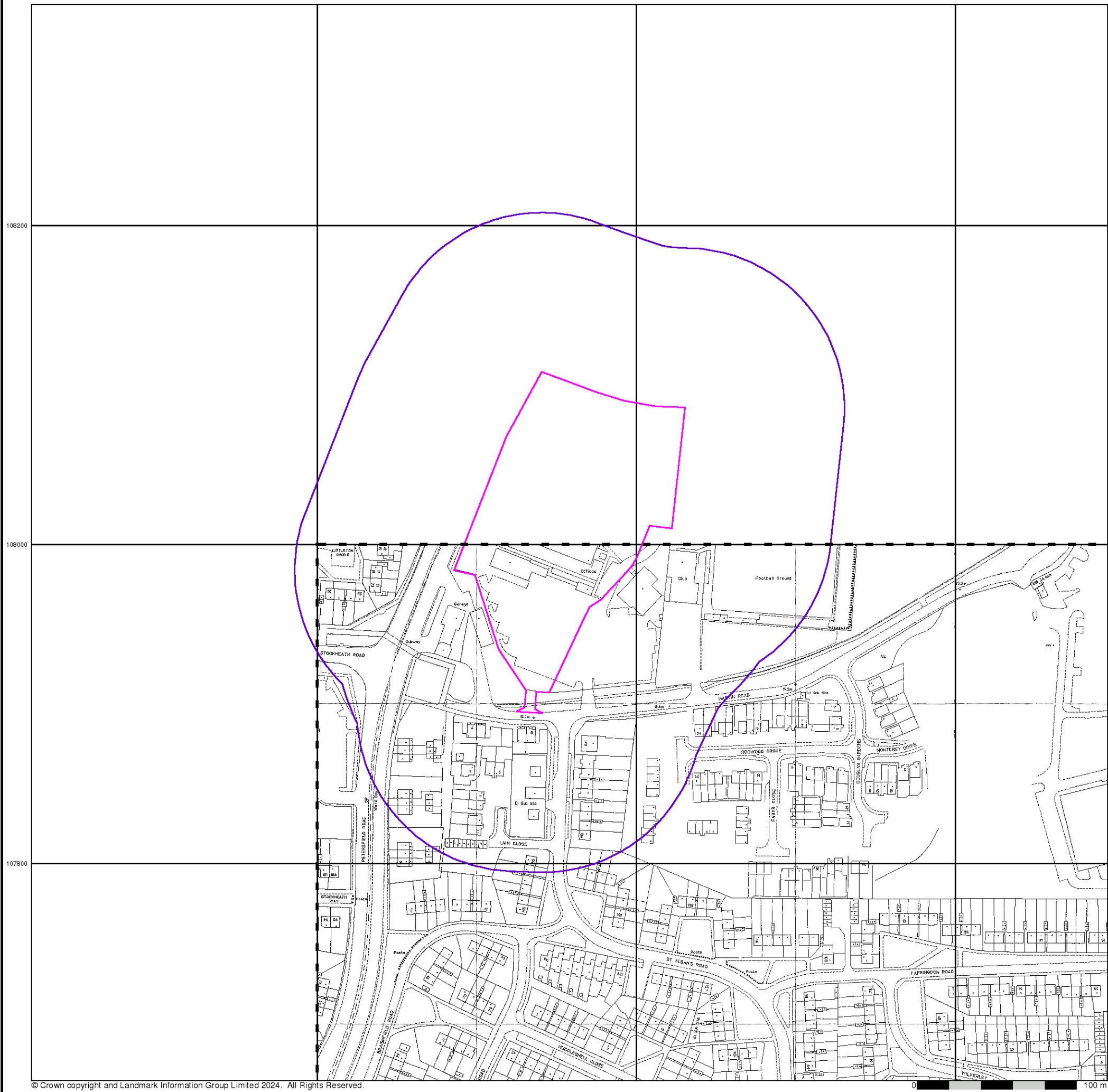
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Customer Ref: BRD4469
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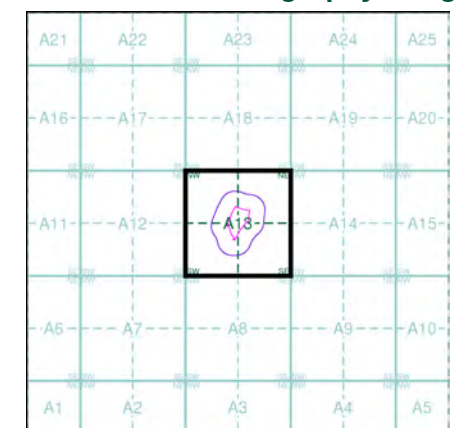


Historical Aerial Photography

Published 1999

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

Historical Aerial Photography - Segment A13



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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	•285 Surface Level				
	Sketched Contour		Instrumental Contour		
	Main Roads		Minor Roads		
	Sunken Road		Raised Road		
	Road over Railway		Railway over River		
	Railway over Road		Level Crossing		
	Road over River or Canal		Road over Stream		
	Road over Stream				
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	Rural District Boundary				
	Civil Parish Boundary				

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Coppice		
	Bracken		Heath
	Rough Grassland		
	Marsh		Reeds
	Saltings		
	Building		Glasshouse
	Sloping Masonry		
	Pylon		Electricity Transmission Line
	Pole		
	Cutting		Embankment
	Standard Gauge Multiple Track		
	Standard Gauge Single Track		
	Siding, Tramway or Mineral Line		
	Narrow Gauge		
	Geographical County		
	Administrative County, County Borough or County of City		
	Municipal Borough, Urban or Rural District, Burgh or District Council		
	Borough, Burgh or County Constituency Shown only when not coincident with other boundaries		
	Civil Parish Shown alternately when coincidence of boundaries occurs		
	BP, BS Boundary Post or Stone		Pol Sta Police Station
	Ch Church		PO Post Office
	CH Club House		PC Public Convenience
	F E Sta Fire Engine Station		PH Public House
	FB Foot Bridge		SB Signal Box
	Fn Fountain		Spr Spring
	GP Guide Post		TCB Telephone Call Box
	MP Mile Post		TCP Telephone Call Post
	MS Mile Stone		W Well

1:10,000 Raster Mapping

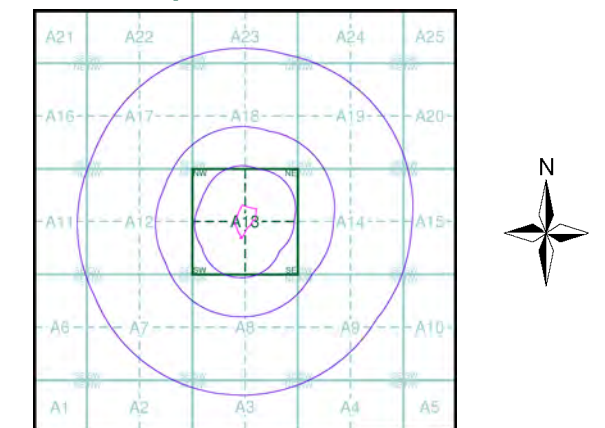
	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, parish or community boundary
	District, Unitary, Metropolitan, London Borough boundary		Constituency boundary
	Area of wooded vegetation		Non-coniferous trees
	Non-coniferous trees (scattered)		Coniferous trees
	Coniferous trees (scattered)		Positioned tree
	Orchard		Coppice or Osiers
	Rough Grassland		Heath
	Scrub		Marsh, Salt Marsh or Reeds
	Water feature		Flow arrows
	MHW(S) Mean high water (springs)		MLW(S) Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	Bench mark (where shown)		Triangulation station
	Point feature (e.g. Guide Post or Mile Stone)		Pylon, flare stack or lighting tower
	Site of (antiquity)		Glasshouse
	General Building		Important Building



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Hampshire & Isle Of Wight	1:10,560	1870	3
Sussex	1:10,560	1879 - 1880	4
Hampshire & Isle Of Wight	1:10,560	1898	5
Sussex	1:10,560	1899	6
Hampshire & Isle Of Wight	1:10,560	1909 - 1910	7
Sussex	1:10,560	1914	8
Sussex	1:10,560	1914	9
Sussex	1:10,560	1914	10
Sussex	1:10,560	1932	11
Sussex	1:10,560	1932	12
Sussex	1:10,560	1932	13
Hampshire & Isle Of Wight	1:10,560	1933	14
Hampshire & Isle Of Wight	1:10,560	1933	15
Hampshire & Isle Of Wight	1:10,560	1938	16
Ordnance Survey Plan	1:10,000	1963	17
Ordnance Survey Plan	1:10,000	1966	18
Ordnance Survey Plan	1:10,000	1975	19
Havant	1:25,000	1983	20
Portsmouth	1:10,000	1988	21
Ordnance Survey Plan	1:10,000	1992	22
10K Raster Mapping	1:10,000	2000	23
10K Raster Mapping	1:10,000	2006	24
VectorMap Local	1:10,000	2024	25

Historical Map - Slice A



Order Details

Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
Search Buffer (m): 1000

Site Details

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Russian Military Mapping Legends

1:5,000 and 1:10,000 mapping

a. Not drawn to scale b. Drawn to scale

Government and Administrative Buildings

Military and Industrial Buildings

Military and Communication Areas

Subway Entrance

Fireproof Building

Prominent Fireproof Building

Non-fireproof Building

Non-fireproof Building (non-dwelling)

Factory, mill, and flour mill, with chimneys

Factory, mill, and flour mill, without chimneys

Power Station, drawn to scale

Hydroelectric Power Station

Radio Station, drawn to scale

Telephone Station, drawn to scale

Abandoned Open-pit Mine or Quarry

Open-pit Salt Mine

Pit

Oil Deposit or Well

Oil Seepage

Tailings Pile

Fuel Storage Tanks

Natural Gas Tank

Bench Mark

Drill Hole

Burial Mound

Triangulation Point on Burial Mound

Single-track Railroad

Double-track Railroad and Station Building

Coniferous Forest

Deciduous Forest

Mixed Forest

Lawns

Citrus Orchard

Wet Ground

Scattered Vegetation

243.8 Values for prominent elevations
186.0 Numbers for spot elevations, depth soundings, contour lines, etc.
0.2 Velocity of the current, width of river bed, depth of river
180/12 Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

Russian Alphabet (For reference and phonetic interpretation of map text)

А а (A)	З з (Z)	П п (P)	Ч ч (CH)
Б б (B)	И и (I)	Р р (R)	Ш ш (SH)
В в (V)	Й й (Y)	С с (S)	Щ щ (SHCH)
Г г (G)	К к (K)	Т т (T)	Ъ (-)
Д д (D)	Л л (L)	У у (U)	Ы (Y)
Е е (E)	М м (M)	Ф ф (F)	Ь (')
Ё ё (YO)	Н н (N)	Х х (KH)	Э э (E)
Ж ж (ZH)	О о (O)	Ц ц (TS)	Ю ю (YU or IU)
			Я я (YA or IA)

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

Government and Administrative Buildings

Military and Industrial Buildings

Military and Communication Areas

Subway Entrance

Partly Demolished Buildings

Demolished Buildings

Built-Up Area with Fireproof Buildings Predominant

Built-Up Area with Non-Fireproof Buildings Predominant

Individual Fireproof Building

Prominent Industrial Building

Individual Dwelling, Fireproof

Ruins of an Individual Dwelling

Factory or Mill Chimney

Factory or Mill with Chimney

Factory or Mill without Chimney

Mine or Open Pit Mine

Operating Shaft or Mine

Non-Operating Shaft or Mine

Salt Mine

Tailings Pile

Pit

Stone Quarry

Gas Pump or Service Station

Fuel Storage or Natural Gas Tank

Oil or Natural Gas Derrick

Small Hydroelectric Power Station

Power Station

Transformer Station

Cemetery

Burial Mound (height in metres)

Triangulation Point on Burial Mound

Triangulation Point

Bench Mark

Bench Mark (monumented)

Telegraph Office

Telephone Station

Radio Station

Radio Tower

Airfield or Seaplane Base

Landing Strip

Telegraph/Telephone Lines

Main Highway

Highway under Construction

Improved Dirt Road (former truck road)

Double-track Railroad with First Class Station

Railroad Under Construction

Shore Embankment

River or Ditch with Embankment

Water Gauge

Water Level Mark

Well

Water Reservoir or Rain Water Pit

Spring

Isobath with value

Heavy (Index) Contour Line

Contour Line and Value

Half Contour Line

Spot Elevation Value

Coniferous

Deciduous

Mixed

Scrub

Key to Numbers on Mapping

SU70_Havant

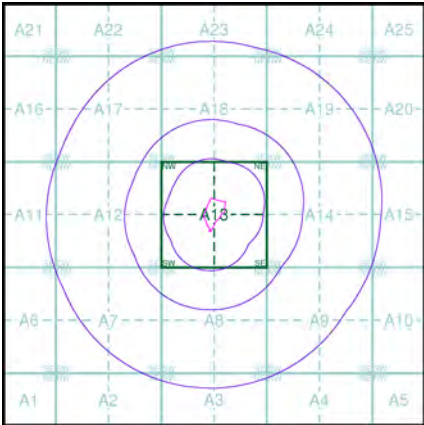
No.	Description
3	Factories (Radio Electronics, Metal Works, Electrical Appliances, Chemicals And Machinery)



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Hampshire & Isle Of Wight	1:10,560	1870	3
Sussex	1:10,560	1879 - 1880	4
Hampshire & Isle Of Wight	1:10,560	1898	5
Sussex	1:10,560	1899	6
Hampshire & Isle Of Wight	1:10,560	1909 - 1910	7
Sussex	1:10,560	1914	8
Sussex	1:10,560	1914	9
Sussex	1:10,560	1914	10
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Sussex	1:10,560	1932	12
Sussex	1:10,560	1932	13
Hampshire & Isle Of Wight	1:10,560	1933	14
Hampshire & Isle Of Wight	1:10,560	1933	15
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10K Raster Mapping	1:10,000	2006	24
VectorMap Local	1:10,000	2024	25

Russian Map - Slice A



Order Details

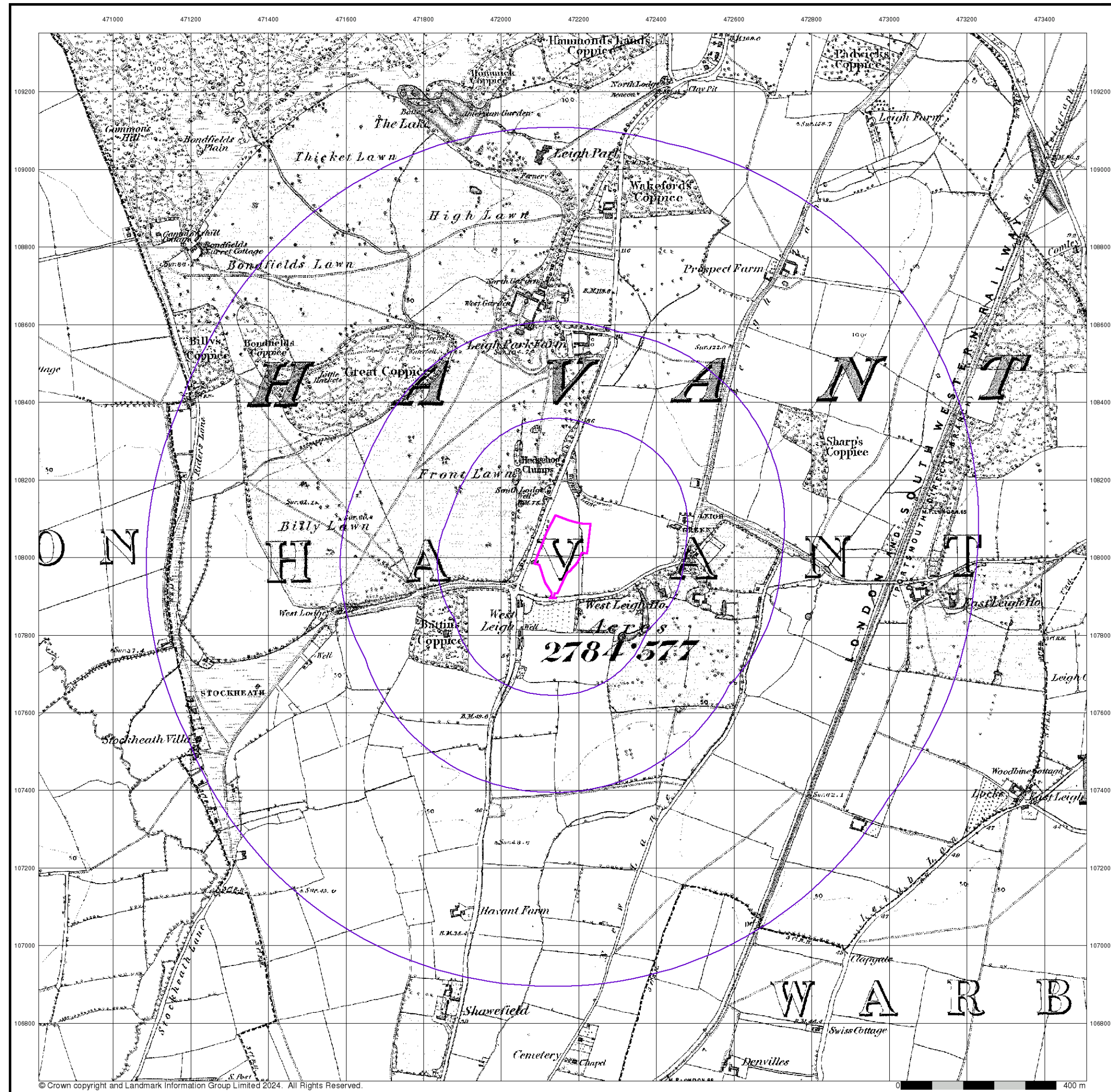
Order Number: 353460273_1_1
Customer Ref: BRD4469
National Grid Reference: 472160, 108010
Slice: A
Site Area (Ha): 1.68
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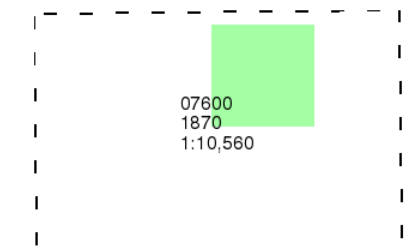
Hampshire & Isle Of Wight

Published 1870

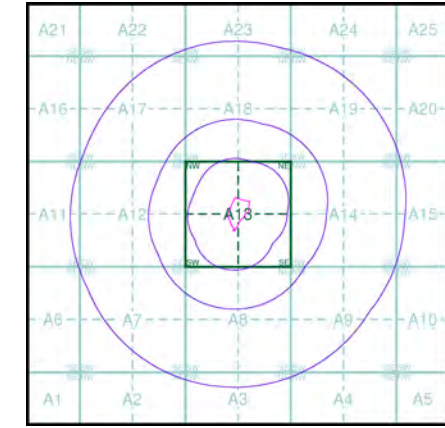
Source map scale - 1:10,560

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)



Historical Map - Slice A



Order Details

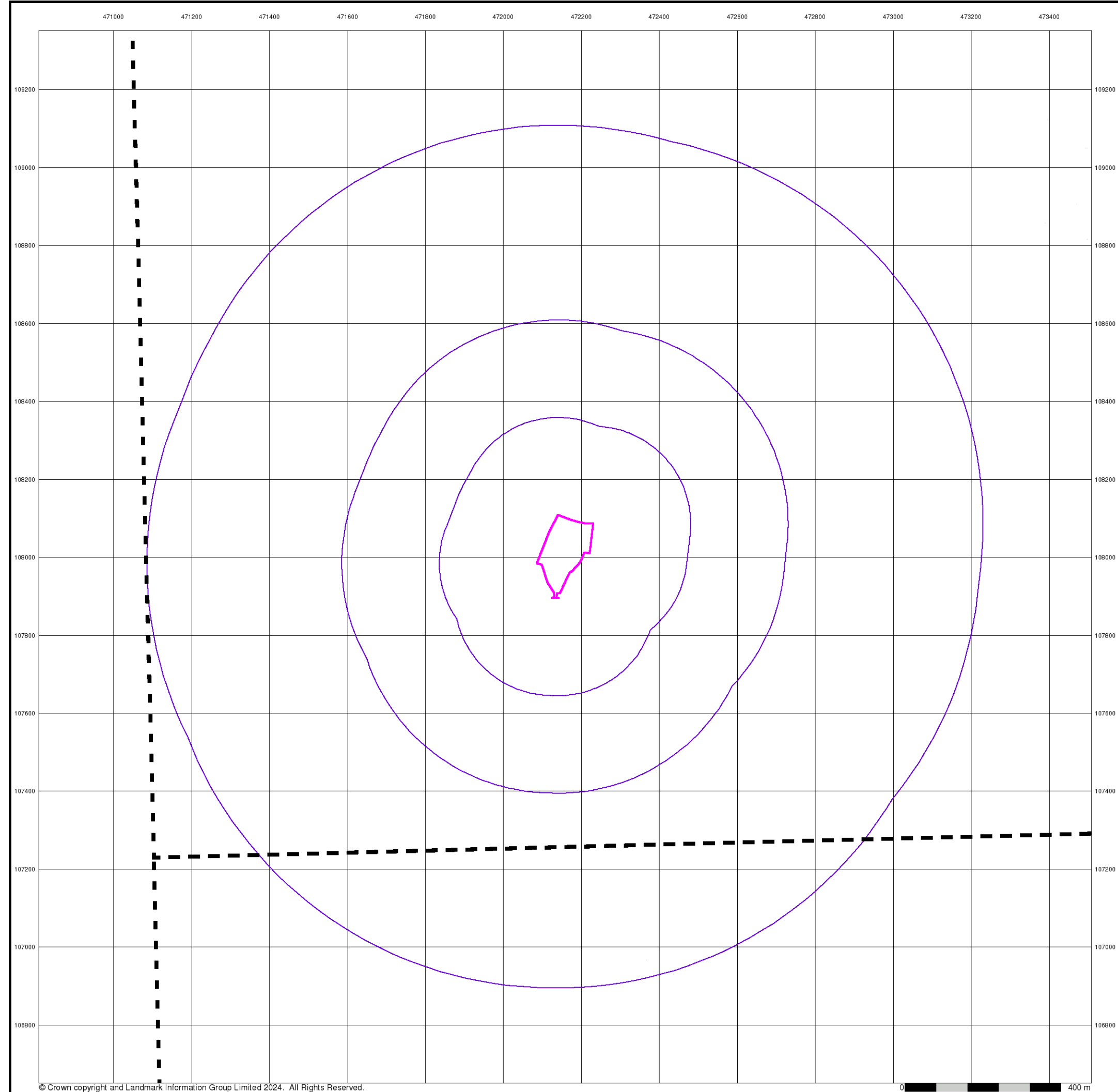
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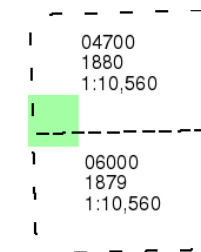
Sussex

Published 1879 - 1880

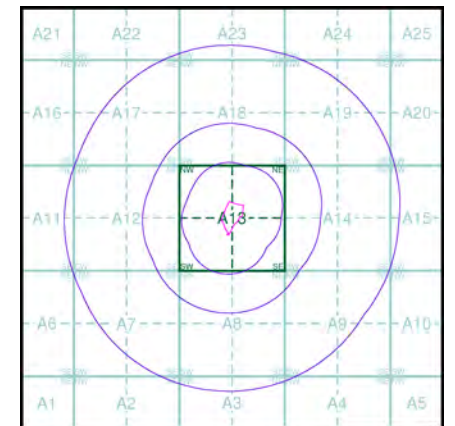
Source map scale - 1:10,560

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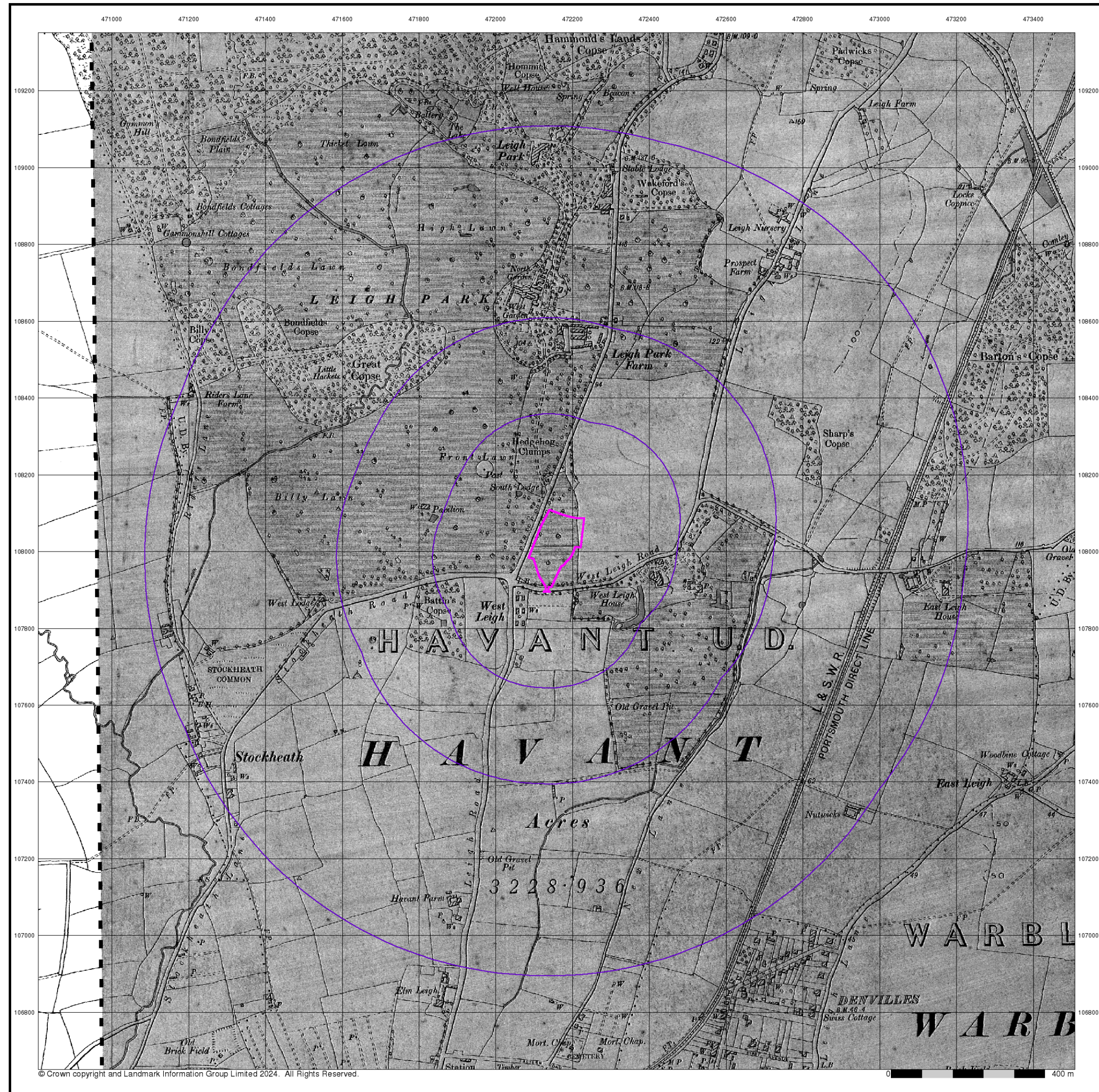
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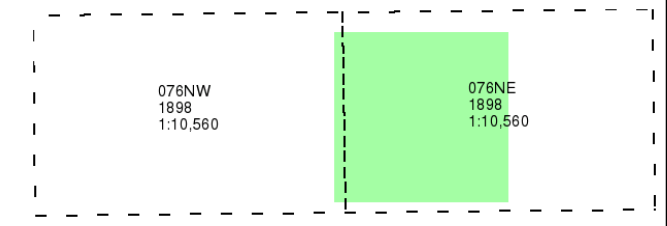
Hampshire & Isle Of Wight

Published 1898

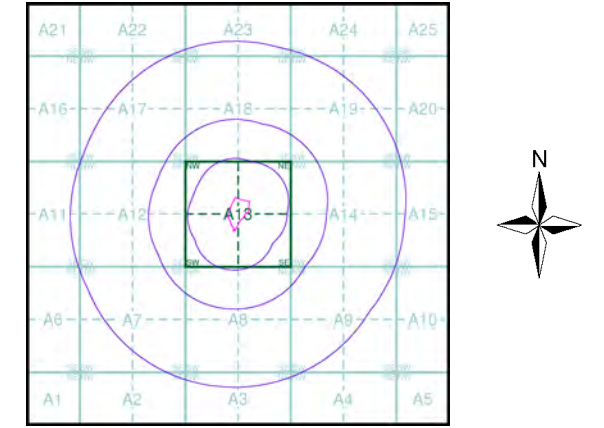
Source map scale - 1:10,560

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