



HA Strategic Land

Land West of Tye Lane, Walberton, Arundel

Preliminary Risk Assessment

29696-R01

FEBRUARY 2018





RSK GENERAL NOTES

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Title: Preliminary Risk Assessment: Lane West of Tye Lane, Walberton, Arundel

Client: HA Strategic Land, Rowans House, Baffins Lane, Chichester, West Sussex
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Date: 9th February 2018

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This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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1 INTRODUCTION

RSK Environment Limited (RSK) was commissioned by HA Strategic Land to carry out a Preliminary Risk Assessment of the land west of Tye Lane, Walberton, Arundel. It is understood the site is being considered for redevelopment as a new build residential led scheme together with associated infrastructure.

At the time of writing, detailed development proposals are yet to be formulated.

This report is subject to the RSK service constraints given in **Appendix A**.

1.1 Objective

The objective of the work is to support a planning application for the proposed redevelopment through obtaining and collating information of the environmental characteristics and to assess the potential hazardous substances or conditions on, or near the site via the development of a preliminary conceptual site model (CSM).

1.2 Scope

The scope of the investigation and layout of this report has been designed with consideration of CLR11 (Environment Agency, 2014) and BS 10175: 2013 (BSI, 2013) and guidance on land contamination reports issued by the Environment Agency (EA) (2010a).

The project was carried out to an agreed brief as set out in RSK's proposal (ref. 29696-01AK, dated 18 December 2018). The scope of works for the assessment included:

- The history of development and industry on the site, including a study of archival Ordnance Survey mapping and other sources of historical information as appropriate e.g. local archives, trade directories and planning records;
- A study of local geology, hydrogeology and surface water setting;
- The identification of potential geological hazards, including radon;
- A review of relevant environmental data held by appropriate statutory authorities e.g. the local Environmental Health Department and the Environment Agency, obtained in the form of an environmental database report (Envirocheck or Groundsure Report) and where appropriate through direct contact;
- Liaison where possible with current/previous owners/occupiers of the site;
- A preliminary conceptual model of contamination on the site identifying possible pollutant linkages;
- An assessment of the environmental risks and liabilities associated with site ownership; and
- Recommendations for further investigations, if required.

1.3 Limitations

The study aims principally to identify and assess the potential risks and liabilities associated with contamination of the ground, on and in the vicinity of the site. While this includes consideration of the current operations and activities on the site, the report does not constitute a comprehensive environmental audit, as covered under ISO 14001.

The study was designed generally to meet the objectives of a preliminary (Phase 1) investigation, as defined by BS 10175:2011+A1:2013 "Code of Practice for the Investigation of Potentially Contaminated Sites".

This report should be considered in light of any changes in legislation, statutory requirement or industry practices that have occurred subsequent to the date of issue.

The "vicinity" of the site for the purposes of this report is defined as locations situated within an approximate 250 m radius of the site, although certain sources and/or sensitive targets further than 250 m may also have been considered.

The opinions expressed in this report, and the comments and recommendations given, are based on the information obtained from the desk assessment and the site reconnaissance survey. No intrusive investigations have been undertaken to confirm the actual ground conditions and hence the environmental status of the site.

2 THE SITE

2.1 Site location and description

The site is located to the west of Tye Lane, Walberton at National Grid reference 496840 106315, as shown on **Figure 1**.

The site covers an approximate area of approximately 8.0 hectares at an elevation ranging between 13.0m and 22.0m above Ordnance Datum (AOD), with ground levels dropping towards the south.

The site comprises a number of fields, with the largest used for agricultural purposes. There is a collection of small buildings in the southeast of the site, which appear to be stables. A number of mature trees and hedgerows are present throughout the site and along the boundaries.

The area around the site is both agricultural and residential as detailed in **Table 1**.

Table 1: Site setting

To the north:	A small track road bounds the majority of the site in the north, leading to Hooe Farm Industrial Estate. Agricultural fields are present beyond this.
To the east:	Tye Lane borders to the east, with a golf course, agricultural field and Primary School present beyond.
To the south:	Residential properties occupy the land directly to the south of the site. Further to the south is The Street followed by associated residential properties.
To the west:	Residential properties border to the west with a large number of mature trees present in the north west.

2.2 Proposed development

The site in question is being considered for redevelopment as a new build residential-led scheme with associated infrastructure.

At the time of writing, detailed development proposals are yet to be formulated.

3 PRELIMINARY RISK ASSESSMENT (PRA)

3.1 Ground conditions

3.1.1 Geology

Published geological records (British Geological Survey, 1996) for the area indicated the geology of the site to be characterised by the succession recorded in **Table 2**.

Table 2: Geology at the site

Geological unit	Description	Estimated thickness (m)
River Terrace Deposits	Sand and gravel, locally with lenses of silt, clay or peat.	Approximately 3.0m
Head Deposits	Yellowish dark brown, silty slightly mottled clay mottled sub-rounded to angular white flint pebbles and chalk.	Approximately 5.0m
Raised Beach Deposits	Shingle, sand, silt and clay; may be bedded or chaotic; beach deposits may be in the form of dunes, sheets or banks.	Approximately 3.0m
London Clay Formation	Blue to grey mottled firm to stiff silty sandy clay with occasional claystone.	<20.0m
Lambeth Group	Vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate	Approximately 20.0m
Source: British Geological Survey (1996) Sheet Number 317 Chichester Solid & Drift, 1:50000		

Publically available borehole records from the British Geological Survey website provide further information regarding ground conditions in the vicinity of the site. These indicate that topsoil overlies silty gravelly clay containing gravel of flint and chalk to a depth of around 3.0m. Head deposits of clayey gravel containing chalk and flint are then present to a depth of around 8.0m.

Raised beach deposits of very clayey sand with some shell fragments and flint underlie these strata extending to a depth in the region of 11.0m, whereupon the London Clay Formation is encountered.

The boundary with the underlying Lambeth Group is expected to outcrop approximately 100m to the north of the site.

3.1.2 Radon

The environmental database report (Envirocheck report dated January 2018 as contained **Appendix C**) indicates that the site is in a low-intermediate probability radon area where between 1% and 3% of homes are estimated to be at or above the Action Level as defined by the Documents of the National Radiological Protection Board (Radon Atlas of England and Wales, NRPB-W26-2002). This would indicate that radon protective measures are not required within new dwellings at the site.

3.1.3 Mining, quarrying landfilling and land reclamation

Evidence has been sought evidence of mining, quarrying, landfilling or land reclamation works that have taken place on or in the vicinity of the site. The sources of information referenced in this element of the desk study include:

- An environmental database report;
- Records held by the Local Authority/Environment Agency;
- Old Ordnance Survey maps and plans; and
- Geological map records.

With reference to the above data, there are no recorded mines or quarries within a 500 m radius of the site.

There are no records of landfill sites (former or current) within 250 m of the site (i.e. within the planning consultation zone). The nearest record is for an historic landfill is located approximately 273 m to the north. This was in operation from December 1955 to December 1960 and accepted inert, commercial and household wastes. Given the distance of the landfill from the site and the intervening geology, this landfill is not considered as representing a significant potential risk to the site from the generation and migration beneath the site of landfill gases and/or leachate.

3.2 Hydrogeology

3.2.1 Aquifer characteristics

Based on the published geological map referred to above, the hydrogeology of the site is likely to be characterised by the presence of a shallow unconfined aquifer comprising the River Terrace Deposits, Head Deposits and underlying Raised Beach Deposits, overlying an unproductive aquifer comprising the London Clay Formation (an aquiclude).

Confined by the London Clay Formation is a deep aquifer, comprising a sequence of deposits consisting of the lower part of the Lambeth Group and Thanet Sands (Basal Sands) and the White Chalk. These units are expected to be in hydraulic continuity.

Based upon nearby historical BGS records, the anticipated depth to the groundwater table is between 2.0m and 7.0m below ground level, i.e. within the granular soils of the Head Deposits. Shallow groundwater in the site area is anticipated to flow in a southerly direction, i.e. towards the coastline and in the direction of flow of the River Arun.

The presence of low permeability superficial clay deposits at relatively shallow depths beneath the site, while restricting downwards migration, may increase the potential for

lateral migration of shallow groundwater (and therefore mobile contamination, if present).

3.2.2 Vulnerability of groundwater resources

The site has been classified by the EA website to overlie the following:

- Secondary A aquifer (River Terrace Deposits, Head Deposits and underlying Raised Beach Deposits): 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
- ‘Unproductive’ strata (London Clay Formation): Low permeability with negligible significance for water supply or river base flow.

The soils beneath the site are classified as having both HIGH (H) and INTERMEDIATE (I) leaching potential.

H – soils of high leaching potential are those with little ability to attenuate diffuse source pollutants and where non-adsorbed diffuse source pollutants and liquid discharges can move rapidly to underlying strata or shallow groundwater.

I – soils that have a moderate ability to attenuate diffuse source pollutants or where some non-adsorbed diffuse source pollutants and liquid discharges could penetrate the soil layer.

3.2.3 Licensed groundwater abstraction

The environmental database report indicates that there is one current licensed groundwater abstraction within a 1 km radius of the site as detailed in **Table 3**.

Table 3: Groundwater abstractions

Reference	Distance and orientation from site	Comment
10/41/542212	746 m North	Operator: W P Wyatt & Son Location: Woodlands Farm, Slindon Use: General Agriculture – Spray Irrigation

Information available on the EA website indicates that the site does not lie within a currently designated groundwater Source Protection Zone.

3.3 Hydrology

3.3.1 Surface watercourses

There is a small pond located in the northeast of site, as well as a series of ponds in the golf course to the east, approximately 50.0m from the site boundary.

The nearest watercourse, which appears to be a drainage channel, is located approximately 200m to the southwest of the site.

Six active discharge consents are located within 500m of the site, with the nearest situated 287m to the northwest. This is operated by My William Hislop for sewage discharges.

There are six recorded pollution incidents to controlled waters within a 1km radius of the site. The nearest occurred 26m to the southwest in November 1992 relating to the release of oils and was classified as a Category 3 – Minor Incident. The remaining incidents all occurred beyond 500m from the site and were also classed as Category 3.

3.3.2 Surface water abstractions

No surface water abstractions were identified within a 1.5km radius of the site.

3.3.3 Site drainage

Given that the site comprises arable fields, the site drainage is assumed to comprise natural infiltration into the ground.

3.3.4 Preliminary flood risk assessment

The site lies within Flood Zone 1, which indicates there is low probability of flooding from rivers or the sea.

This report is not intended to replace a full hydrological study and it is recommended that additional specialist studies be conducted to confirm flood risks at the site.

3.4 History of site and surrounding area

The history of the land-use and development of the site and surrounding area has been assessed based on the following sources:

- Historical maps within the environmental database from 1878 to 2017;
- Town plans;
- Information from the Local Planning Authority; and
- Aerial photography

Copies of OS and County Series maps are included in the environmental database report in **Appendix C**.

Reference to historical maps provides invaluable information regarding the land use history of the site, but historical evidence may be incomplete for the period pre-dating the first edition and between successive maps.

There are no planning records held by Arun District Council directly pertaining to the site. The earliest historical map edition of 1875 shows the site to be open fields with mature trees present. A pond appears in the northeast corner of the site in 1897. Drains are noted on the site from the 1970s. A small collection of buildings appear in the southeast in the late 1990s, most likely the riding stables which are currently present on site. No significant changes appear thereafter.

The development history of the surrounding area from the above sources is detailed in **Table 4**.

Table 4: Summary of historical development of surrounding area

Date	Land use/features in vicinity of site (of relevance to the assessment)
1875 – 1930	Open fields are present to the north, east and west. An unspecified tank is present in the field to the east, believed to be a water tank. A road runs down the eastern boundary and Walberton village is present in the south with residential housing, a post office and a school. A flour windmill is noted close to the southwest boundary. A brick field and additional flour windmill are present 800m to the north. A gravel pit is noted 500 m to the northwest and old clay and gravel pits are noted 1 km to the north, northwest and northeast. 'Stone Cistern', later noted as Roman Cremation, is present 700 m to the northeast.
1950 - 1990	Hooe Farm has been constructed to the north of the site. A residential property appears adjacent to the northeast boundary. Residential properties have been constructed in the west with the gardens directly against the western boundary and farm buildings are present to the north (c. 100 m). Additional residential development has occurred in Walberton village in the south (c. 100 m). A timber yard is present 550 m northeast.
1999 - Present	Hooe Farm to the north now noted as Hooe Farm Industrial Estate. Golf course present to the northeast.

3.5 Sensitive land uses

No national or internationally designated sensitive land uses such as Sites of Special Scientific Interest (SSSI) were identified in the vicinity of the site. The closest sensitive land uses were identified to be Ancient Woodland, present 142 m northwest, 260 m northeast and 299 m northwest. The South Downs National Park is also present 412 m north and the site itself falls within a Nitrate Vulnerable Zone.

A comprehensive evaluation of ecological receptors is outside the scope of this report.

3.6 Local Authority Environmental Health Department Information

The Environmental Health Department (EHD) of Arun District Council has been contacted regarding contamination records in connection with the site. At the time of writing a response has not been received.

3.7 Initial conceptual model

The information presented in **Sections 2 and 3.1 to 3.6**, has been used to compile an initial conceptual model. The identified potential sources of contamination, associated contaminants and receptors have been considered with plausible pathways that may link them. The resulting potential pollutant linkages are considered in **Section 3.7.4**. The risk classification has been estimated in accordance with information in **Appendix D**.

3.7.1 Summary of potential contaminant sources

Potential sources and contaminants of concern are summarised in **Table 5**.

Table 5: Potential sources and types of contamination

Potential sources	Contaminants of concern
On-site	
Agricultural fields	Herbicides, pesticides and fungicides.
Buildings in southeast of the site.	Potential asbestos containing materials (ACMs) present.
Off-site	
Industrial activities at Hooe Farm to the north including; Garage services Joinery manufactures Electrical engineers	Fuel oils, lubricating oils, heavy metals, polychlorinated biphenyls (PCBs), PAHs, solvents and other common industrial contaminants

3.7.2 Sensitive receptors

Sensitive receptors at this site include:

- Human health (future site occupants and adjacent site users who may have acute exposure to sources of contamination on a regular and predictable basis);
- Vegetation (uptake of contamination by plant and vegetable growth);
- Buildings/services (buried concrete and potable water supply pipes within the ground); and
- Controlled waters (groundwater beneath the site and in wider aquifer body as well as surface waters).

Please note that construction workers have not been identified in the conceptual model as receptors because risks are considered to be managed through health and safety procedures including CDM regulations.

3.7.3 Summary of plausible pathways

The plausible pathways are summarised below:

- Direct contact (soil, dust and vegetable ingestion, dermal contact, dust and fibre inhalation);
- Ground gas and soil gas inhalation;
- Vertical and lateral migration including leaching;
- Root uptake; and
- Chemical attack of infrastructure (including water supply pipes) and buildings.

3.7.4 Potentially complete pollutant linkages

The outline conceptual model and an estimate of risk associated with each linkage is summarised in **Table 6** on the following page. The risk classification has been

undertaken in accordance with CIRIA C552 (Rudland et al., 2001), a summary of which is included in **Appendix D**.

The potential pollutant linkages identified with a risk of moderate or above that may drive site investigation works are considered to comprise:

- Inhalation of potential asbestos containing materials associated with the buildings on site by future site users; and.
- Leaching of industrial contaminants from Hooe Farm Industrial Estate into the underlying groundwater table and migrating beneath the site.

Table 6: Risk estimation for potentially complete pollutant linkages

Potential Contaminant	Potential receptor	Possible pathway	Likelihood	Severity	Risk and justification
Herbicides, pesticides and fungicides (On site)	Human Health	Direct via ingestion and dermal contact	Low likelihood	Mild	Low If present, contaminants could affect future residents in areas of soft landscaping, however, it is mainly historic agricultural pesticides which are of most concern and these are considered unlikely to be present in significant quantities.
	Vegetation	Root uptake	Low likelihood	Mild	Low If present, contaminants could affect vegetation in areas of soft landscaping, however, it is mainly historic agricultural pesticides which are of most concern and these are considered unlikely to be present in significant quantities
	Buildings/services	Direct contact	Unlikely	Mild	Low If present, contaminants are unlikely to affect plastic utilities via direct contact pathways.
	Controlled waters	Vertical/lateral migration	Low likelihood	Mild	Low If present, contaminants may leach into underlying aquifer.
Asbestos (On site)	Human health	Direct via inhalation	Low likelihood	Medium	Moderate/Low As the buildings were constructed pre 2000 there is a likelihood that asbestos may be present within the structures.

Potential Contaminant	Potential receptor	Possible pathway	Likelihood	Severity	Risk and justification
Industrial contaminants (Off site)	Human Health	Direct via ingestion and dermal contact	Unlikely	Medium	Low Potential for mobilisation and migration of wind blown dust onto site are considered very low
	Vegetation	Root uptake	Unlikely	Mild	Very Low Potential for mobilisation and migration of wind blown dust onto site are considered very low
	Controlled waters	Vertical/lateral migration	Low likelihood	Medium	Moderate/Low Given the anticipated ground conditions and groundwater flow direction beneath the industrial site to the north, the potential exists for contamination to leach into underlying groundwater table and migrate beneath the site

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Whilst no direct evidence of significant ground contamination has been identified, the study has recorded the potential for asbestos to be present onsite as well as the potential for industrial contaminants to migrate onto/beneath the site from Hooe Farm Industrial Estate to the north.

The overall environmental liability associated with the site is considered low to **moderate**.

4.2 Recommendations

Prior to development, it is considered essential that an intrusive investigation be carried out to clarify the geological/hydrogeological constraints on contamination migration in order to give a more detailed assessment of the potential environmental risks and liabilities. In addition, it is recommended that an asbestos survey of the buildings be carried out by a suitably qualified asbestos surveyor, with any resulting recommendations implemented onsite, prior to demolition.

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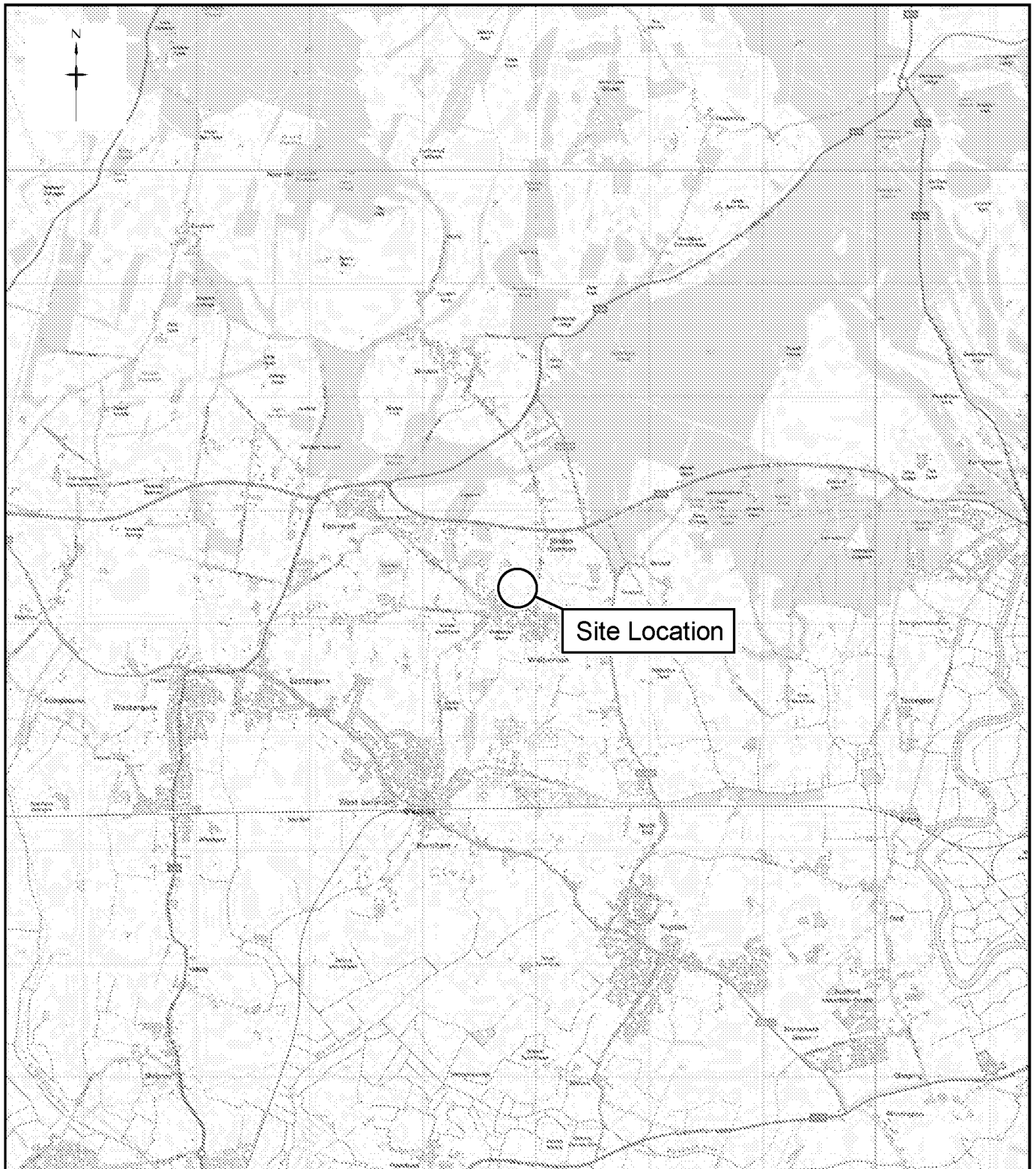
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FIGURES



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Project Title

LAND WEST OF TYE LANE,
ARUNDEL

Drawing Title

SITE LOCATION PLAN

Rev	Drawn	Date	Checked	Date	Approved	Date
01	ASC	16.01.18	HB	16.01.18	HB	16.01.18
Dimensions		Scale		Original Size		
m		1:50,000		A4		

Project Number

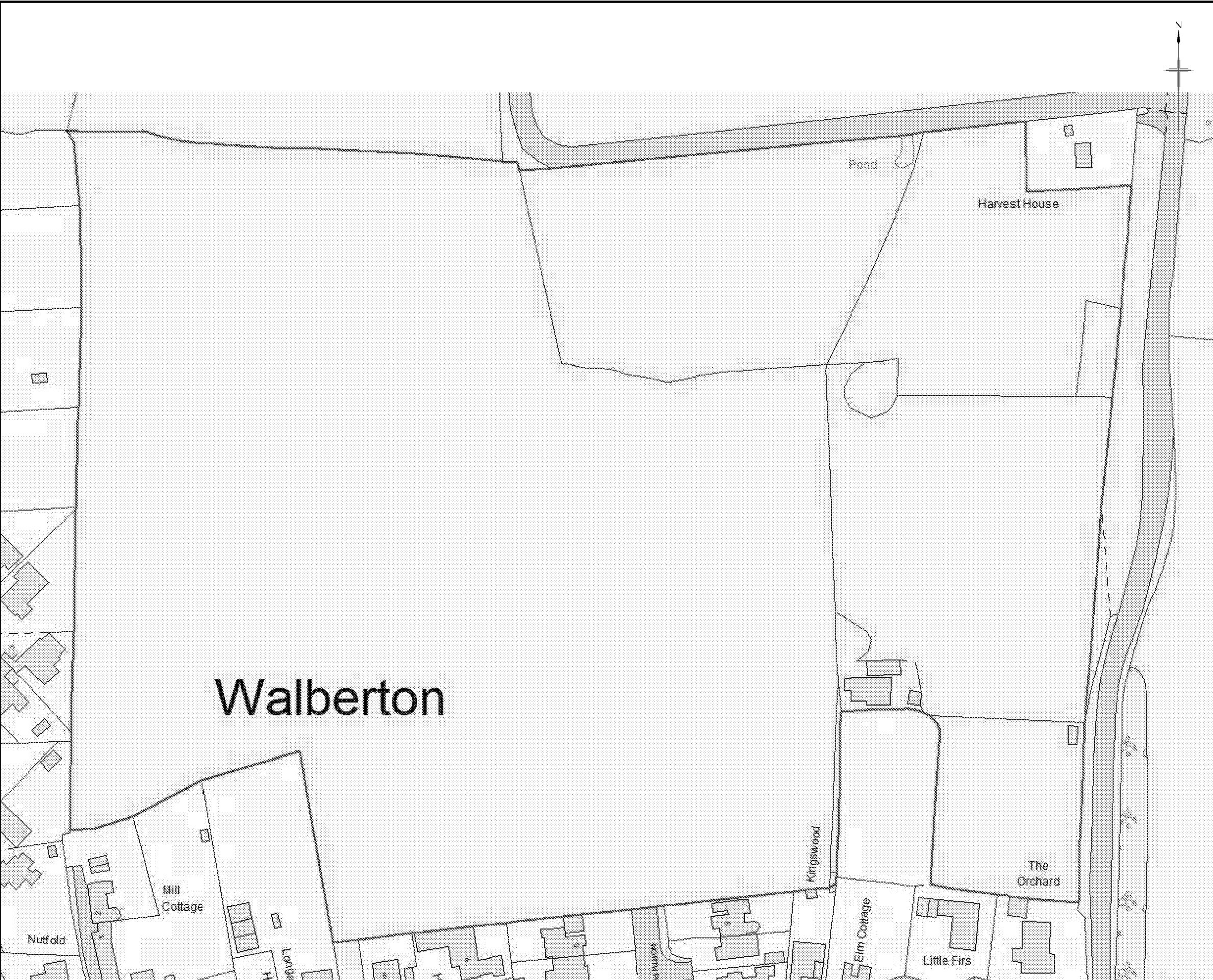
29696 - R01 (00)

Drawing File

29696 - SLP.dwg

Drawing Number

FIGURE 1



LEGEND

Site Boundary

Rev.	Date	Amendment	Drawn	Chkd.	Appd.

RSK

18 Frogmore Road
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Project Title

LAND WEST OF TYE LANE,
ARUNDEL

Drawing Title

SITE
LAYOUT
PLAN

Drawn	Date	Checked	Date	Approved	Date
ASC	16.01.18	HB	16.01.18	HB	16.01.18

Scale	Orig Size	Dimensions
1:1250	A3	m

Project No.	Drawing File
29696 - R01 (00)	29696 (R01-00) Fig 2.dwg

Drawing No.	Rev.
FIGURE 2	P1

Scale 1 : 1,250

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10

20

30

40

50m

ARUN DISTRICT COUNCIL WN/127/21/OUT

APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for HA Strategic Land (the "client") in accordance with the terms of a contract between RSK and the "client", dated 18 December 2017. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.
8. The intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B

SUMMARY OF LEGISLATION AND POLICY RELATING TO CONTAMINATED LAND

Part IIA of the Environmental Protection Act 1990 (EPA) and its associated Contaminated Land Regulations 2000 (SI 2000/227), which came into force in England on 1 April 2000, formed the basis for the current regulatory framework and the statutory regime for the identification and remediation of contaminated land. Part IIA of the EPA 1990 defines contaminated land as 'any land which appears to the Local Authority in whose area it is situated to be in such a condition by reason of substances in, on or under the land, that significant harm is being caused, or that there is significant possibility of significant harm being caused, or that pollution of controlled waters is being or is likely to be caused'. Controlled waters are considered to include all groundwater, inland waters and estuaries.

In August 2006, the Contaminated Land (England) Regulations 2006 (SI 2006/1380) were implemented, which extended the statutory regime to include Part IIA of the EPA as originally introduced on 1 April 2000, together with changes intended chiefly to address land that is contaminated by virtue of radioactivity. These have been replaced subsequently by the Contaminated Land (England) (Amendment) Regulations 2012, which now exclude land that is contaminated by virtue of radioactivity.

The intention of Part IIA of the EPA is to deal with contaminated land issues that are considered to cause significant harm on land that is not undergoing development (see Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, April 2012). This document replaces Annex III of Defra Circular 01/2006, published in September 2006 (the remainder of this document is now obsolete).

Water Framework Directive (WFD)

The Water Framework Directive 2000/60/EC is designed to:

- enhance the status and prevent further deterioration of aquatic ecosystems and associated wetlands that depend on the aquatic ecosystems
- promote the sustainable use of water
- reduce pollution of water, especially by 'priority' and 'priority hazardous' substances
- ensure progressive reduction of groundwater pollution.

The WFD requires a management plan for each river basin be developed every six years.

Groundwater Directive (GWD)

The 1980 Groundwater Directive 80/68/EEC and the 2006 Groundwater Daughter Directive 2006/118/EC of the WFD are the main European legislation in place to protect groundwater. The 1980 Directive is due to be repealed in December 2013. The European legislation has been transposed into national legislation by regulations and directions to the Environment Agency.

Environmental Permitting Regulations (EPR)

The Environmental Permitting (England and Wales) Regulations 2010 provide a single regulatory framework that streamlines and integrates waste management licensing, pollution prevention and control, water discharge consenting, groundwater authorisations, and radioactive substances regulation. Schedule 22, paragraph 6 of EPR 2010 states: 'the regulator must, in exercising its relevant functions, take all necessary measures - (a) to prevent the input of any hazardous substance to groundwater; and (b) to limit the input of non-hazardous pollutants to groundwater so as to ensure that such inputs do not cause pollution of groundwater.'

Water Resources Act (WRA)

The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 updated the Water Resources Act 1991, which introduced the offence of causing or knowingly permitting pollution of controlled waters. The Act provides the Environment Agency with powers to implement remediation necessary to protect controlled waters and recover all reasonable costs of doing so.

Priority Substances Directive (PSD)

The Priority Substances Directive 2008/105/EC is a 'Daughter' Directive of the WFD, which sets out a priority list of substances posing a threat to or via the aquatic environment. The PSD establishes environmental quality standards for priority substances, which have been set at concentrations that are safe for the aquatic environment and for human health. In addition, there is a further aim of reducing (or eliminating) pollution of surface water (rivers, lakes, estuaries and coastal waters) by pollutants on the list. The WFD requires that countries establish a list of dangerous substances that are being discharged and EQS for them. In England and Wales, this list is provided in the River Basin Districts Typology, Standards and Groundwater threshold values (Water Framework Directive) (England and Wales) Directions 2010. In order to achieve the objectives of the WFD, classification schemes are used to describe where the water environment is of good quality and where it may require improvement.

Planning Policy

Contaminated land is often dealt with through planning because of land redevelopment. This approach was documented in Planning Policy Statement: Planning and Pollution Control PPS23, which states that it remains the responsibility of the landowner and developer to identify land affected by contamination and carry out sufficient remediation to render the land suitable for use. PPS23 was withdrawn early in 2012 and has been replaced by much reduced guidance within the National Planning Policy Framework (NPPF).

The new framework has only limited guidance on contaminated land, as follows:

- *"planning policies and decisions should also ensure that:*
 - *the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*



- *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*
- *adequate site investigation information, prepared by a competent person, is presented”.*

APPENDIX C

ENVIRONMENTAL DATABASE REPORT

Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WGR	Worked Ground (Undivided)	Void	Holocene - Holocene
	SLIP	Landslide Deposit	Sandstone and Mudstone	Quaternary - Quaternary

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Flandrian - Flandrian
	HEAD	Head	Gravel, Sand, Silt and Clay	Quaternary - Quaternary
	RBD1	Raised Beach Deposits, 1	Sand and Gravel	Quaternary - Quaternary
	RTDU	River Terrace Deposits (Undifferentiated)	Sand, Silt and Clay	Quaternary - Quaternary
	RBD2	Raised Beach Deposits, 2	Sand and Gravel	Quaternary - Quaternary
	HEAD	Head	Clay, Silt, Sand and Gravel	Quaternary - Quaternary
	RSB2	Raised Storm Beach Deposits, 2	Gravel	Quaternary - Quaternary
	RMD	Raised Marine Deposits	Clay, Silt, Sand and Gravel	Quaternary - Quaternary
	RSB1	Raised Storm Beach Deposits, 1	Sand and Gravel	Quaternary - Quaternary
	CWF	Clay-with-flints Formation	Clay, Silt, Sand and Gravel	Quaternary - Pliocene

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LC	London Clay Formation	Clay, Silt and Sand	Eocene - Eocene
	LMBE	Lambeth Group	Clay, Silt and Sand	Paleocene - Paleocene
	TACH	Tarrant Chalk Member	Chalk	Campanian - Campanian
	SPCH	Spetsbury Chalk Member	Chalk	Campanian - Campanian
	NCK	Newhaven Chalk Formation	Chalk	Campanian - Santonian
	LPCK	Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven	Chalk	Campanian - Turonian

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
		Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation (Undifferentiated)		
		Faults		



Geology 1:50,000 Maps

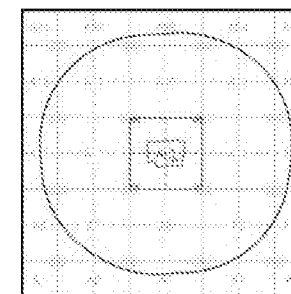
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.

The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID: 1
 Map Sheet No: 317
 Map Name: Chichester and I
 Map Date: 1996
 Bedrock Geology: Available
 Superficial Geology: Available
 Artificial Geology: Available
 Faults: Not Supplied
 Landslip: Available
 Rock Segments: Not Supplied

Geology 1:50,000 Maps - Slice A

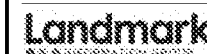


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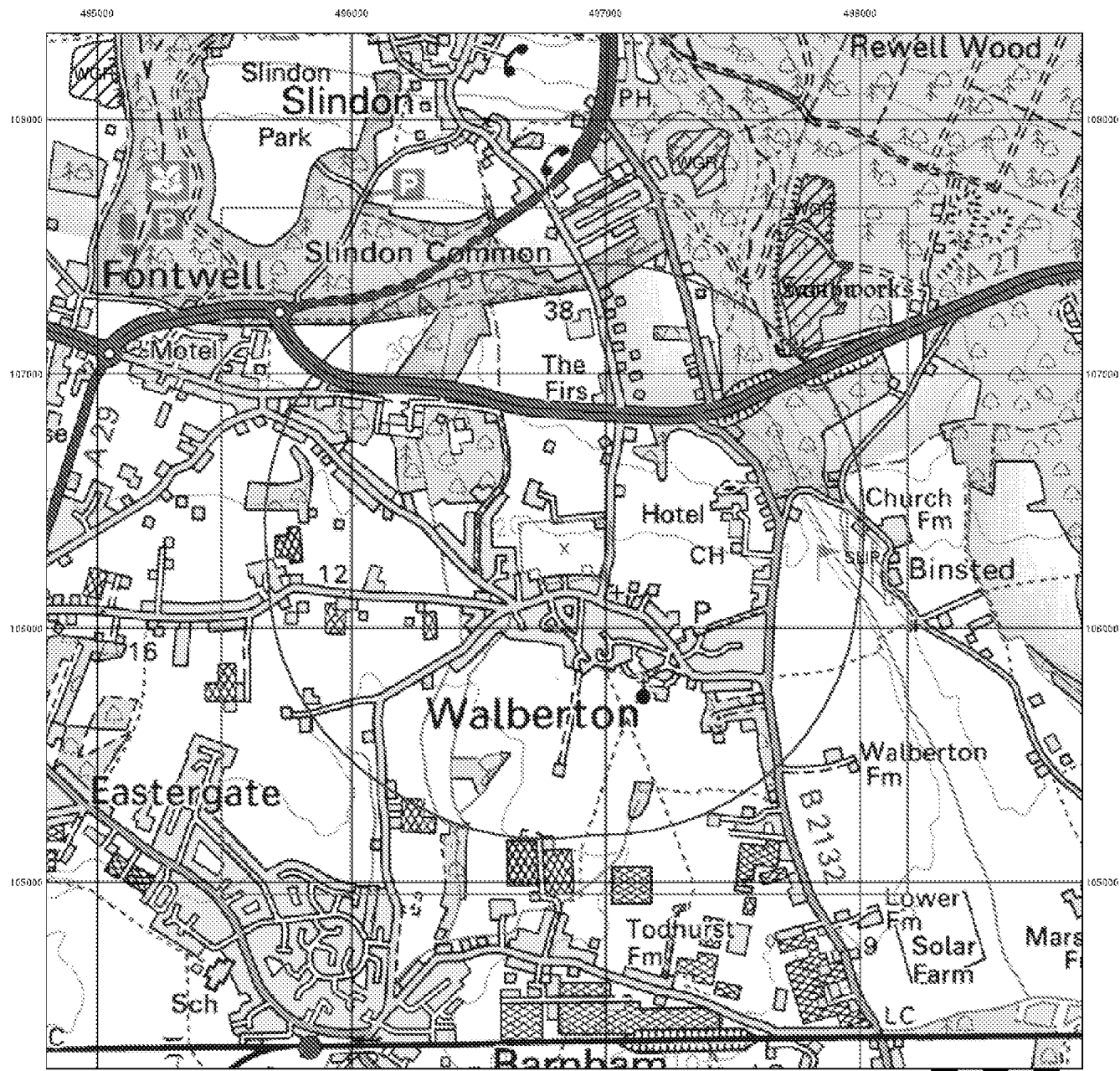
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 National Grid Reference: 496840, 106310
 Slice: A
 Site Area (Ha): 7.55
 Search Buffer (m): 1000

Site Details:

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Artificial Ground and Landslip

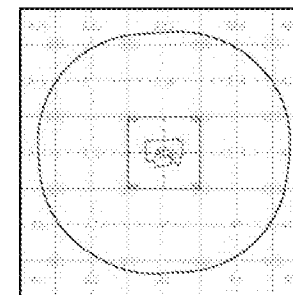
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A

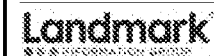


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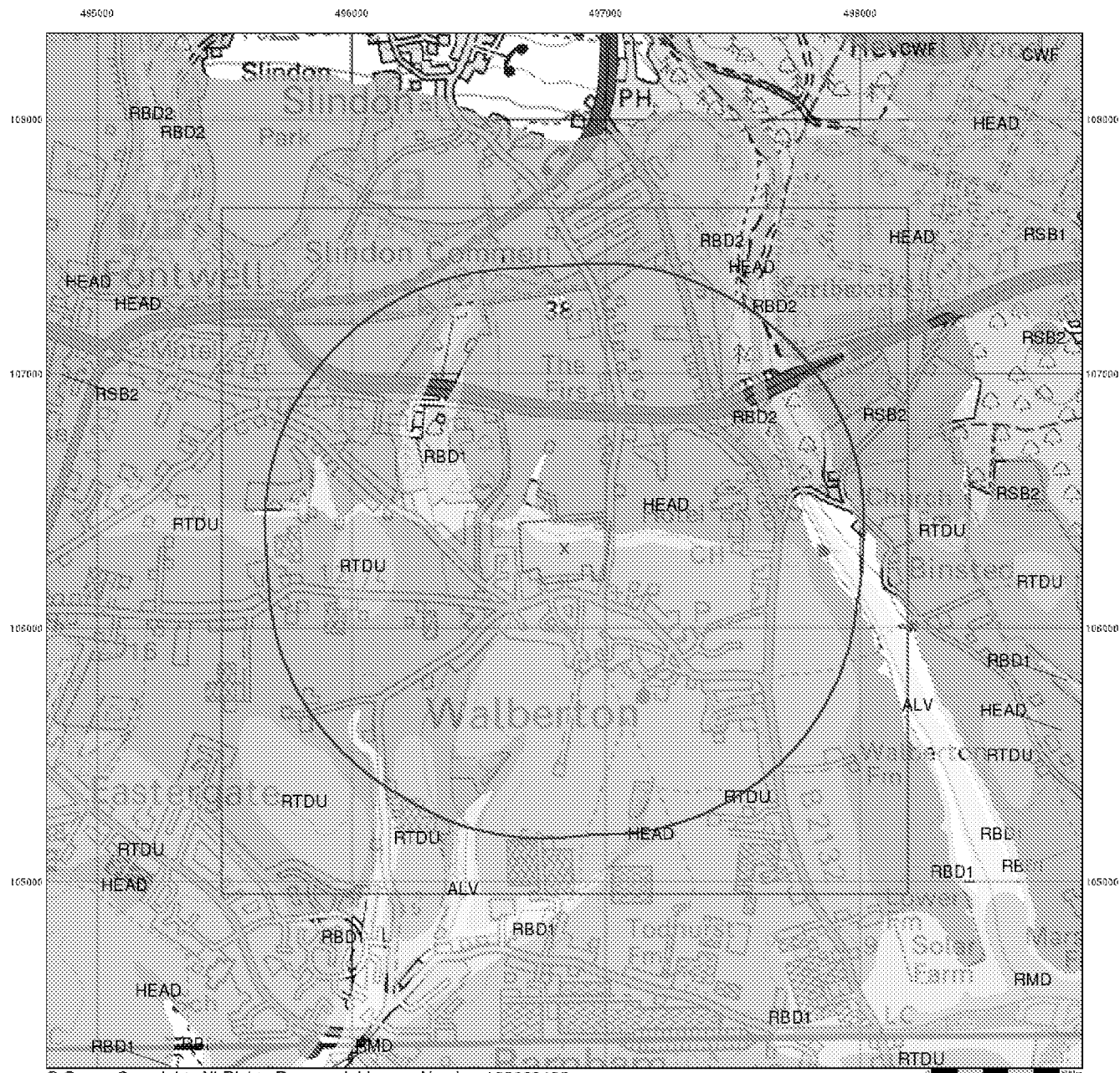
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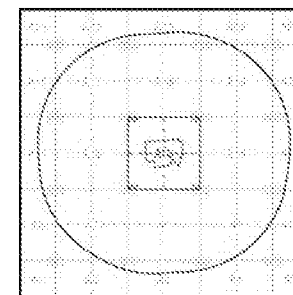
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A

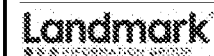


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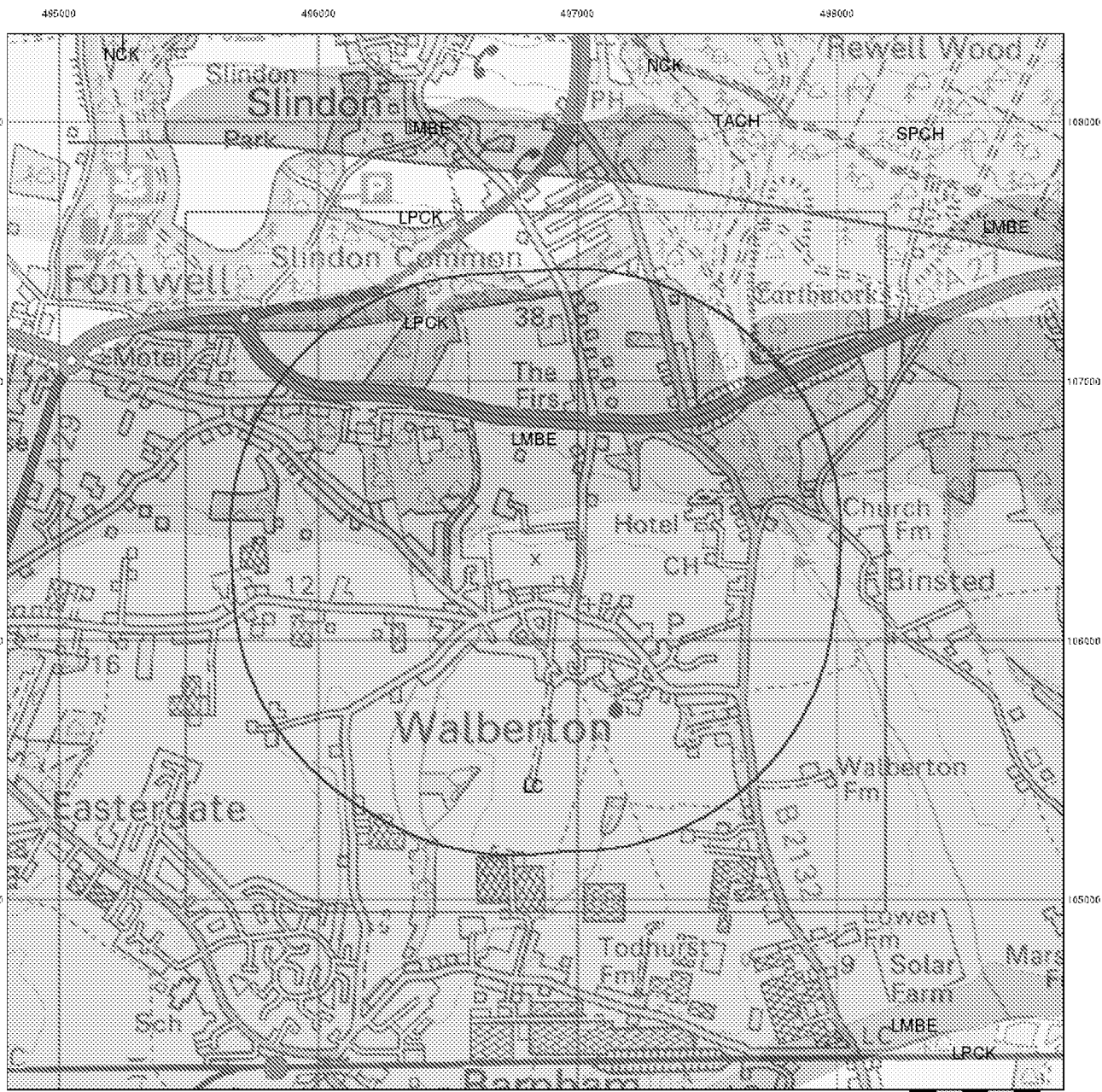
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Bedrock and Faults

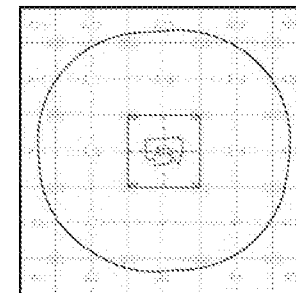
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A

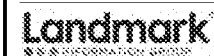


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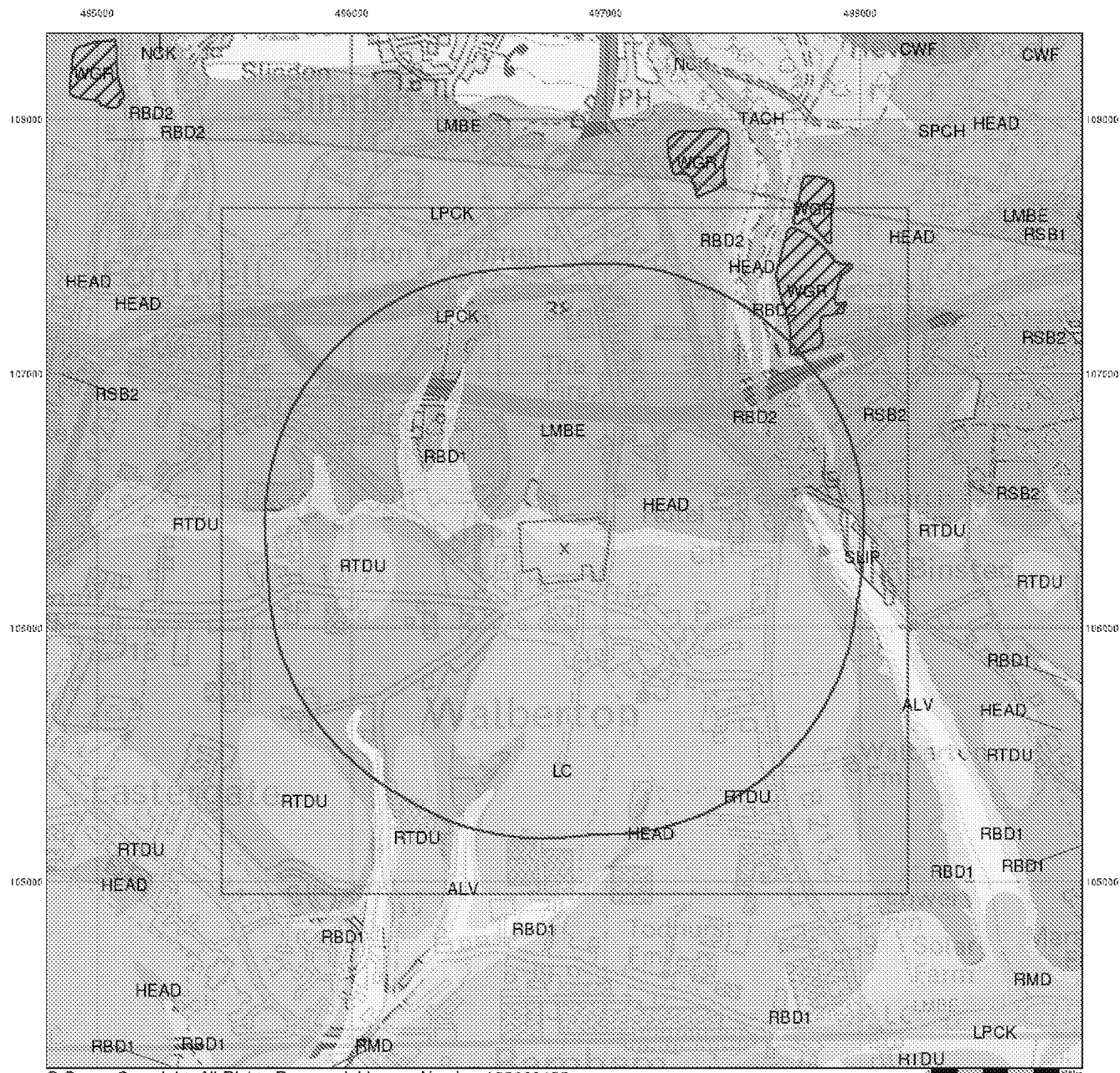
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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

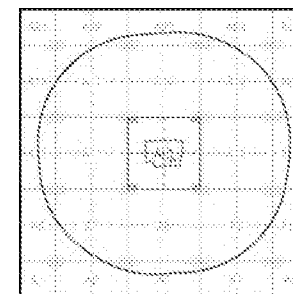
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

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Kingsley Dunham Centre
Keyworth
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NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A

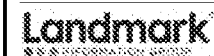


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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

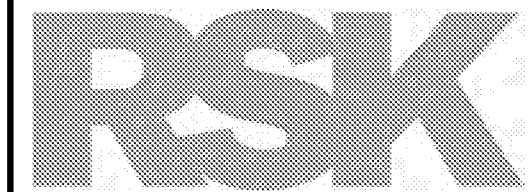
	Gravel Pit		Sand Pit		Other Pits
	Quarry		Shingle		Orchard
	Osiers		Reeds		Marsh
	Mixed Wood		Deciduous		Brushwood
	Fir		Furze		Rough Pasture
	Arrow denotes flow of water		Trigonometrical Station		
	Site of Antiquities		Bench Mark		
	Pump, Guide Post, Signal Post		Well, Spring, Boundary Post		
	285		Surface Level		
	Sketched Contour		Instrumental Contour		
	Main Roads		Fenced Un-Fenced		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		
	County Boundary (Geographical)				
	County & Civil Parish Boundary				
	Administrative County & Civil Parish Boundary				
	County Borough Boundary (England)				
	County Borough 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
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	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

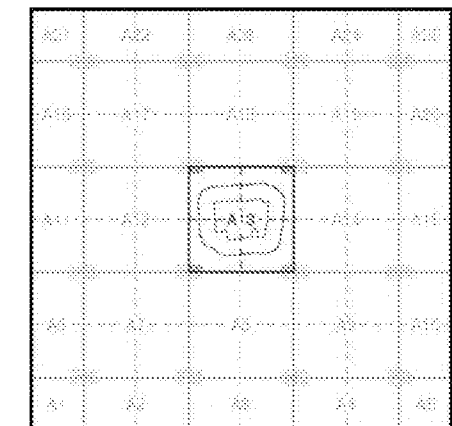
	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil, 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
	Mean high water (springs)		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
Sussex	1:10,560	1880	2
Sussex	1:10,560	1899	3
Sussex	1:10,560	1914	4
Sussex	1:10,560	1914	5
Sussex	1:10,560	1914	6
Sussex	1:10,560	1914	7
Historical Aerial Photography	1:10,560	1947	8
Sussex	1:10,560	1951	9
Ordnance Survey Plan	1:10,000	1961 - 1962	10
Ordnance Survey Plan	1:10,000	1967	11
Ordnance Survey Plan	1:10,000	1979	12
Ordnance Survey Plan	1:10,000	1980	13
Ordnance Survey Plan	1:10,000	1992	14
10K Raster Mapping	1:10,000	2000	15
10K Raster Mapping	1:10,000	2006	16
VectorMap Local	1:10,000	2017	17

Historical Map - Slice A



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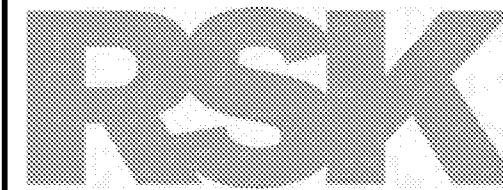
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Site Details

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Landmark
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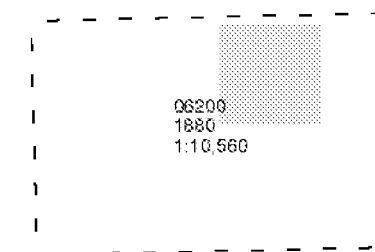
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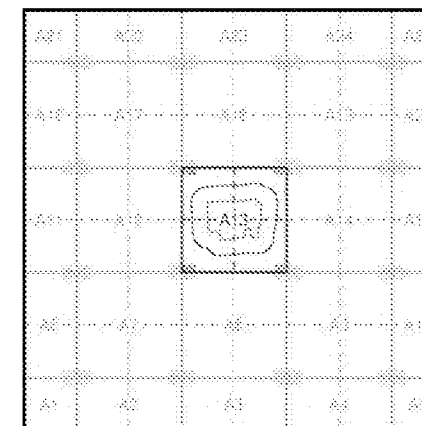
Source map scale - 1:10,560

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

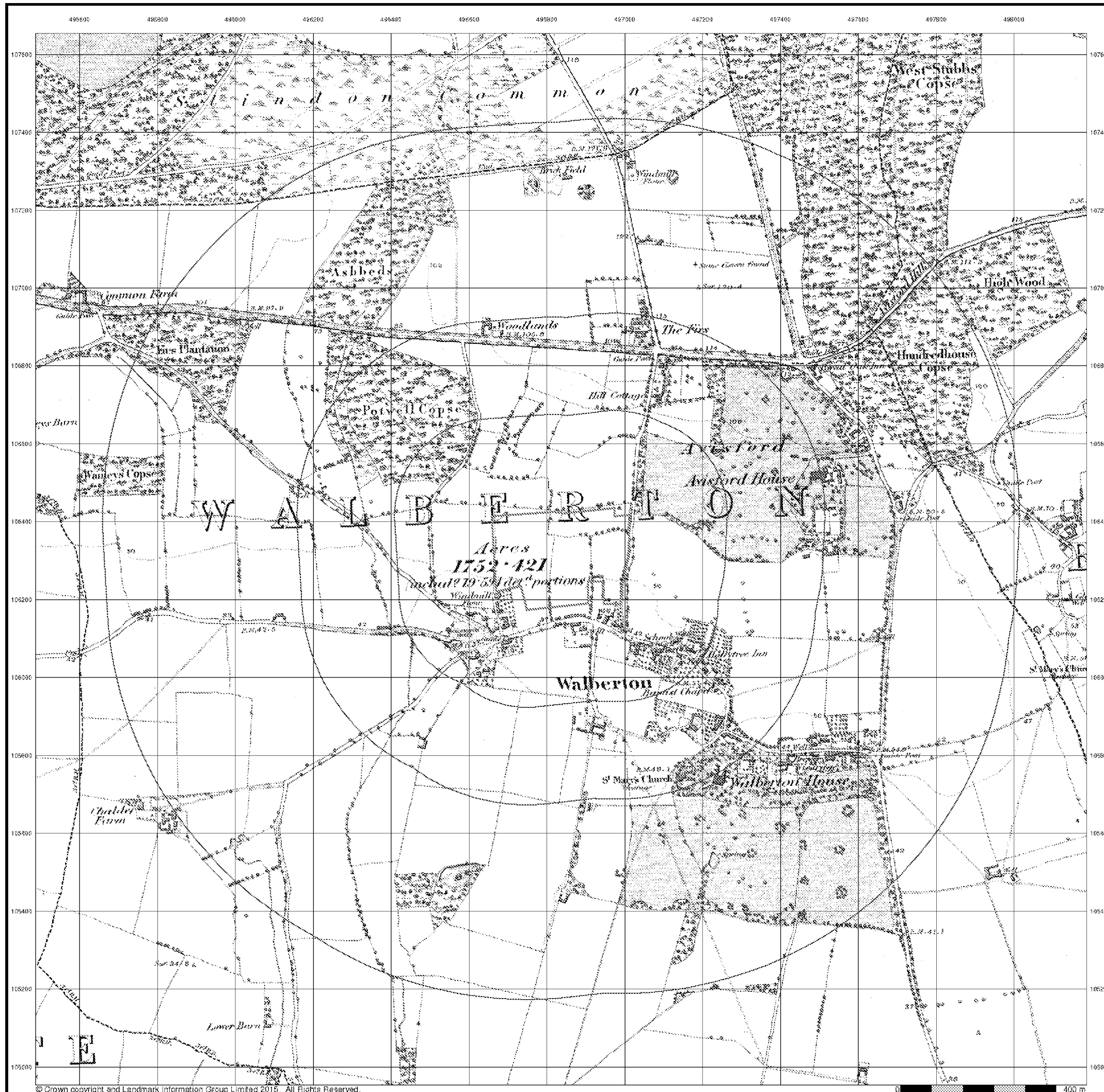
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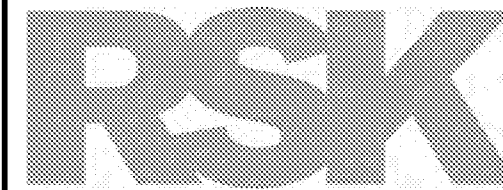
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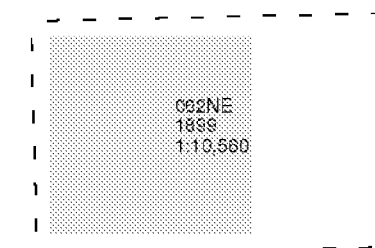
Sussex

Published 1899

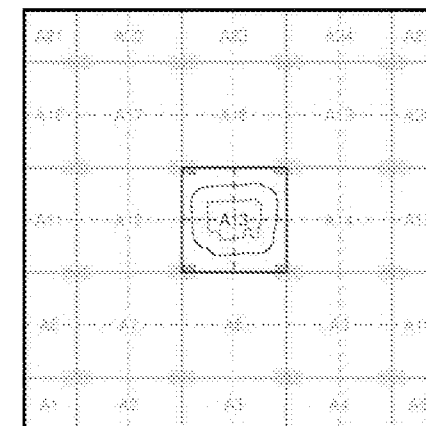
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps.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

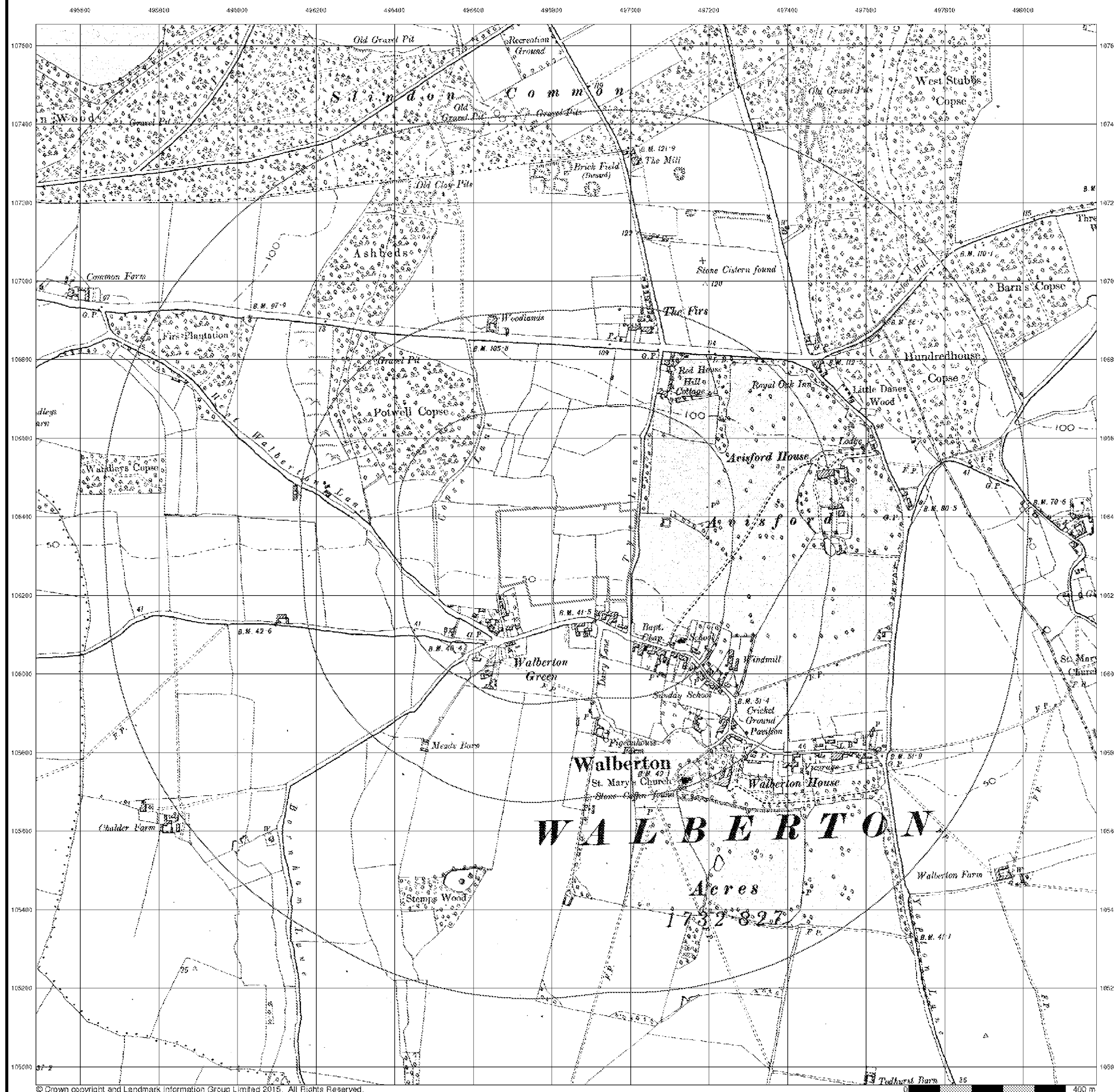
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Customer Ref: 29696
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Slice: A
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Search Buffer (m): 1000

Site Details

Land West of Tye Lane, Walberton, ARUNDEL, BN18 0LU

Landmark
INFORMATION GROUP

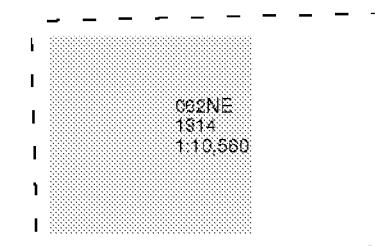
Tel: 0844 844 9852
Fax: 0844 844 9851
Web: www.cnvmapcheck.co.uk



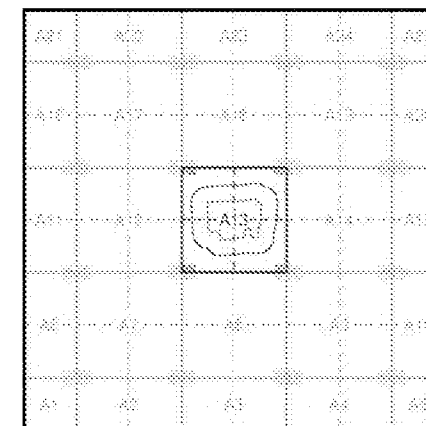


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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

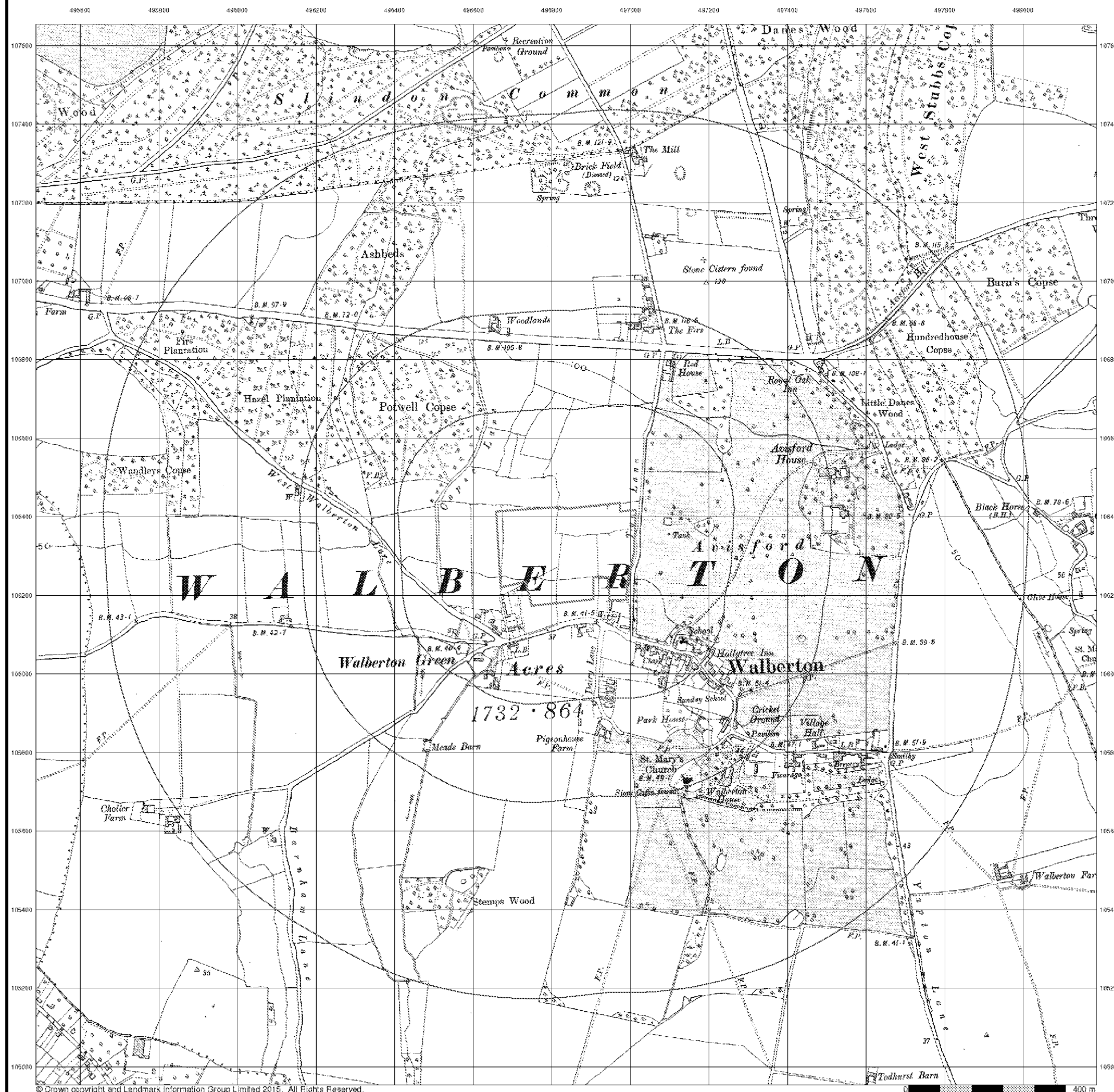
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Landmark
INFORMATION GROUP

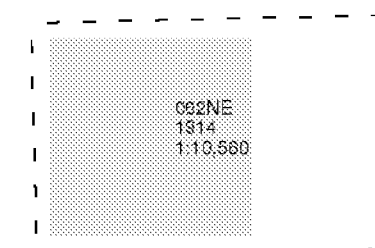
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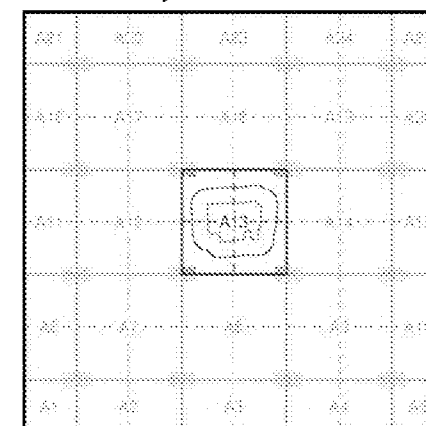


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Landmark
INFORMATION GROUP

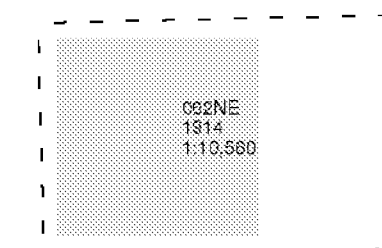
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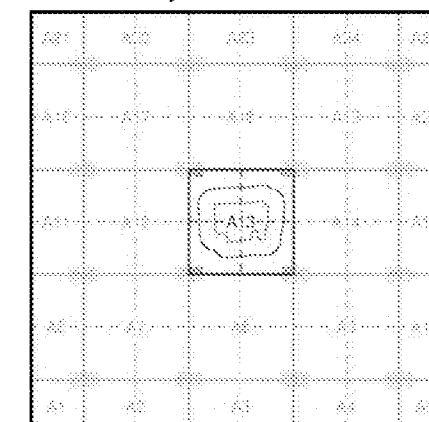


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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

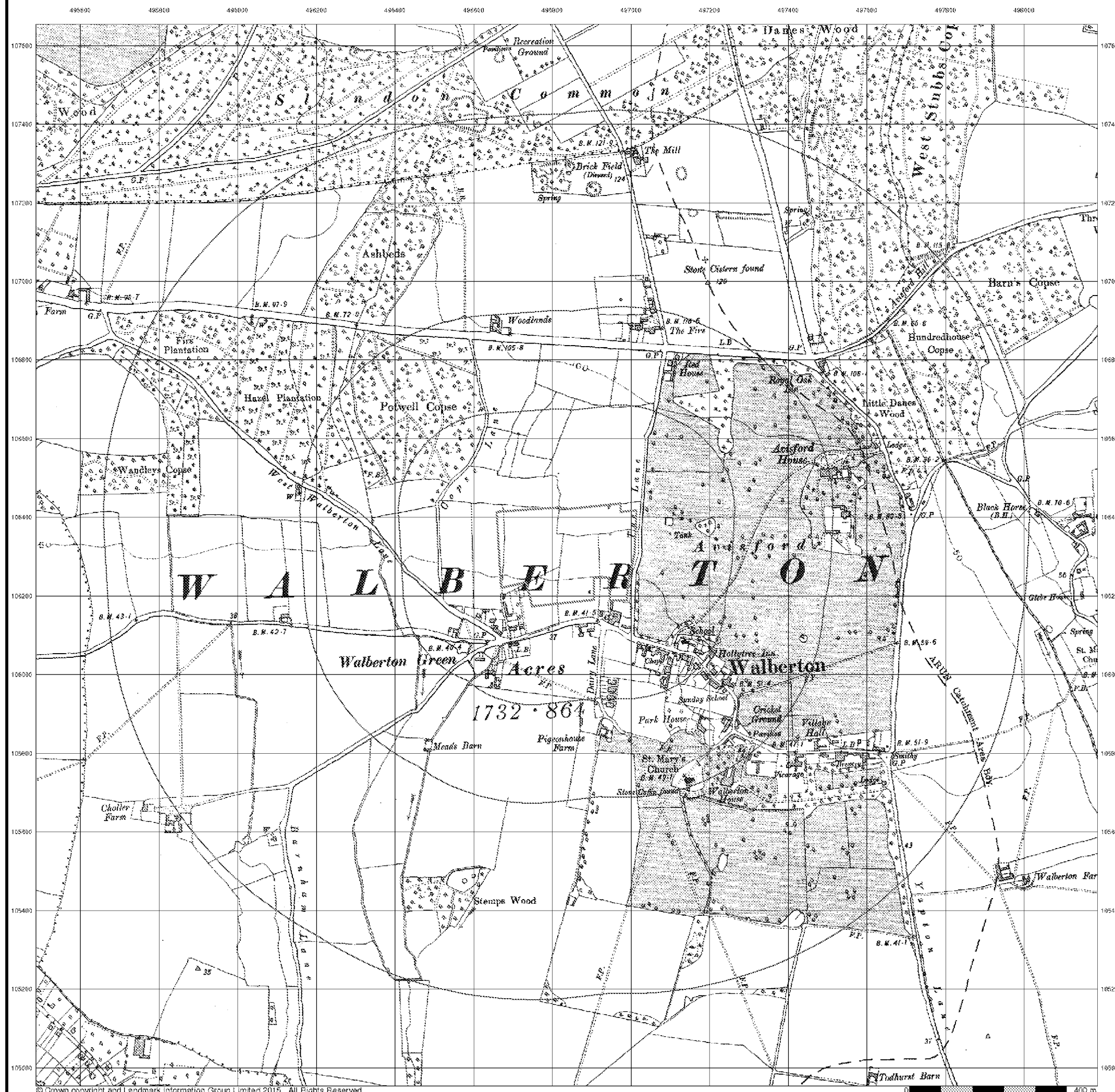
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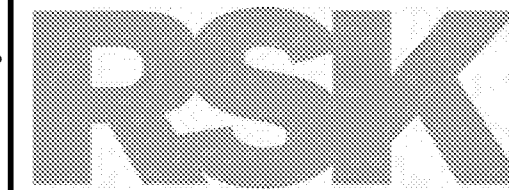
Site Details

Land West of Tye Lane, Walberton, ARUNDEL, BN18 0LU

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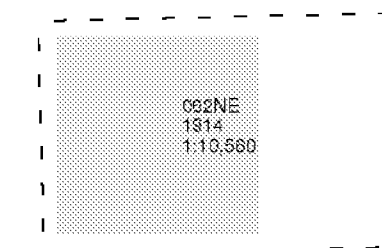
Sussex

Published 1914

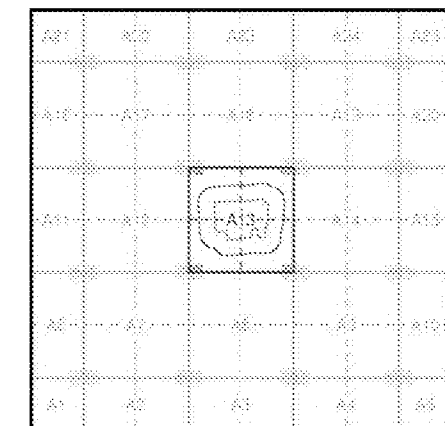
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps.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

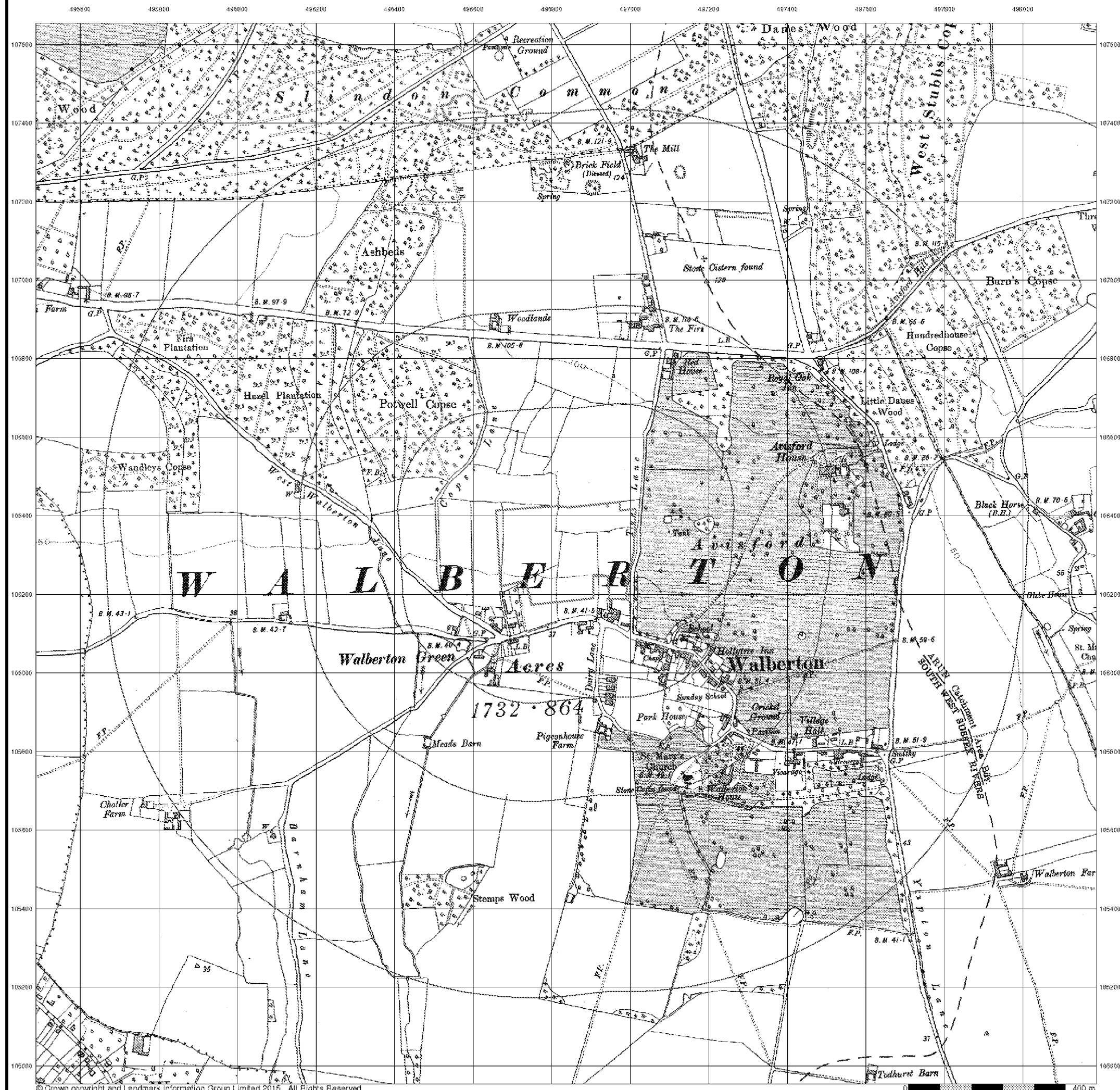
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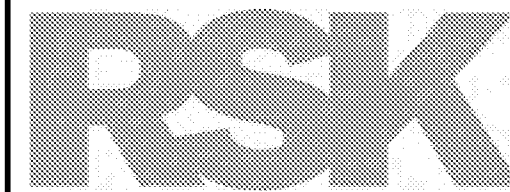
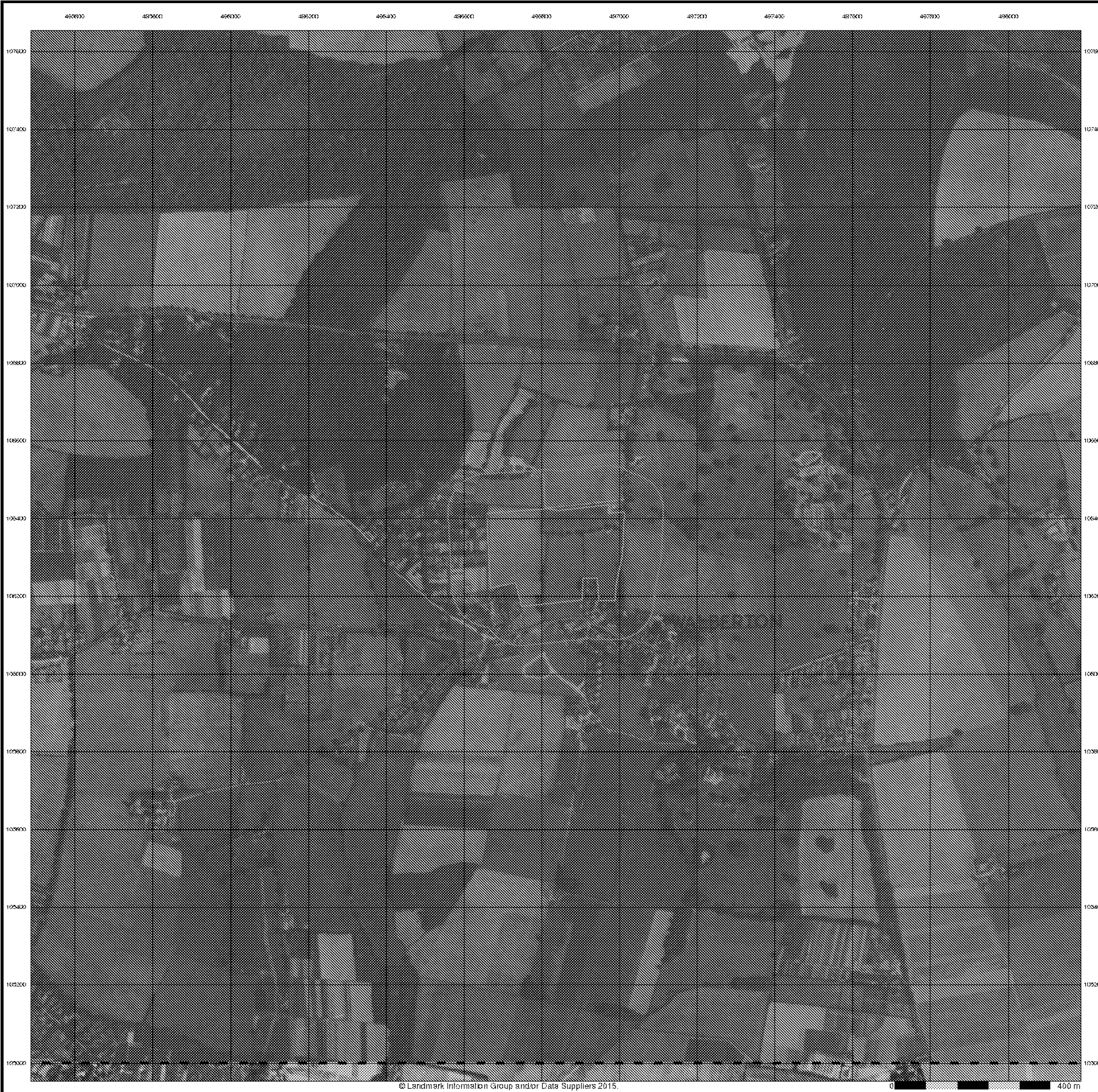
Site Details

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Historical Aerial Photography

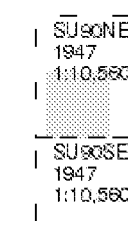
Published 1947

Source map scale - 1:10,560

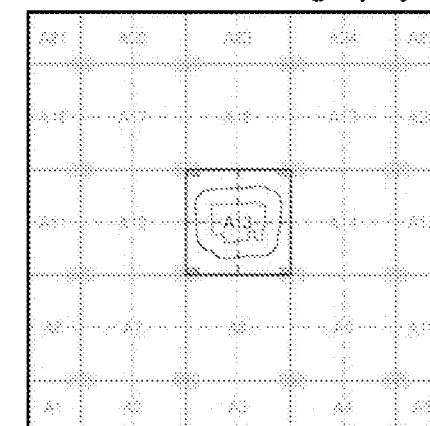
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the 1950's meant that every photograph was re-checked for potentially unsafe information with security sites replaced by fake fields or clouds. The original editions were withdrawn and only later made available after a period of fifty years although due to the accuracy of the editing, without viewing both revisions it is not easy to spot the edits. Where available Landmark have included both revisions.

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Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



Order Details

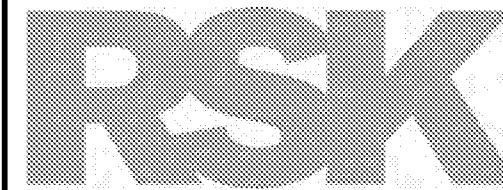
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Site Details

Land West of Tye Lane, Walberton, ARUNDEL, BN18 0LU



Tel: 0844 844 9852
Fax: 0844 844 9851
Web: www.envisprocheck.co.uk



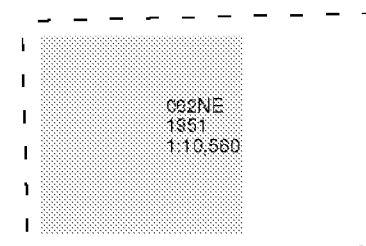
Sussex

Published 1951

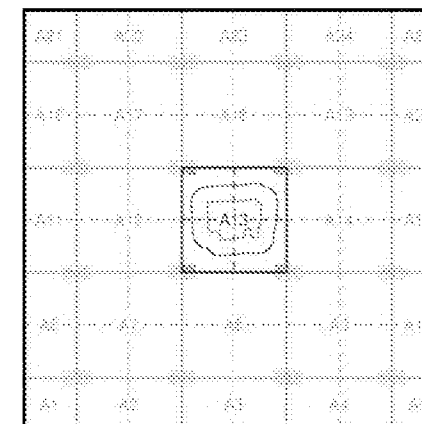
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps.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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 152649938_1_1
Customer Ref: 29696
National Grid Reference: 496840, 106310
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Site Area (Ha): 7.55
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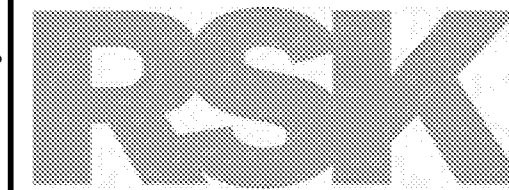
Site Details

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Ordnance Survey Plan

Published 1961 - 1962

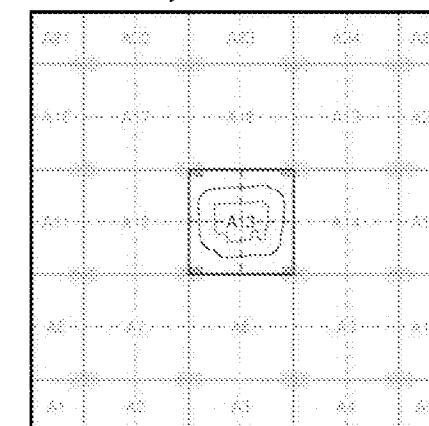
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Map Name(s) and Date(s)

SUBONE	1961
1:10,560	
SUBOSE	1962
1:10,560	

Historical Map - Slice A



Order Details

Order Number: 152649938_1_1
Customer Ref: 29696
National Grid Reference: 496840, 106310
Slice: A
Site Area (Ha): 7.55
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Site Details

Land West of Tye Lane, Walberton, ARUNDEL, BN18 0LU

Landmark
INFORMATION GROUP

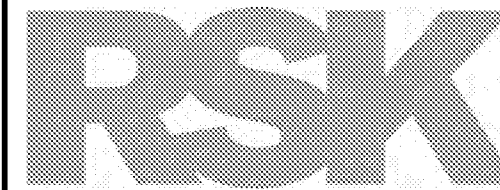
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0 400 m

ARUN DISTRICT COUNCIL WN/1272/OUT



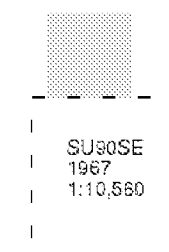
Ordinance Survey Plan

Published 1967

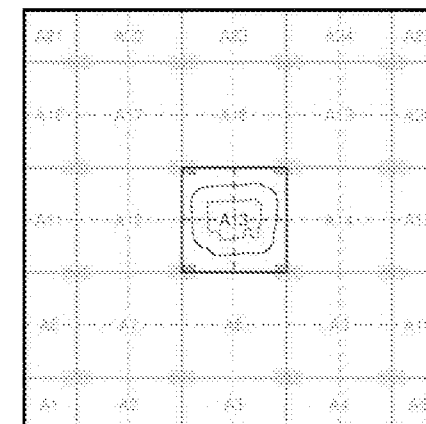
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Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

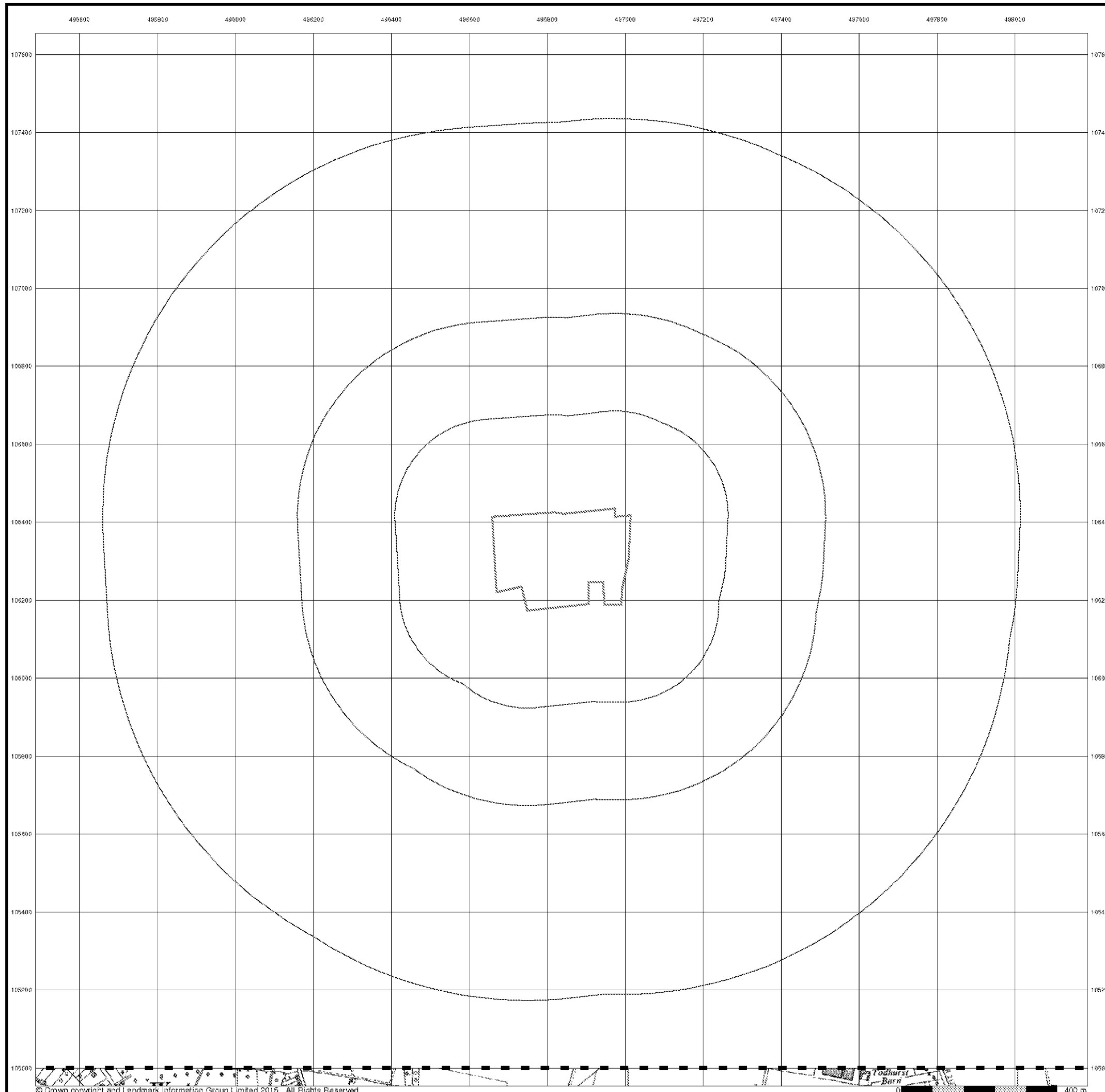
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Site Details

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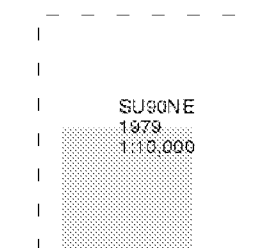
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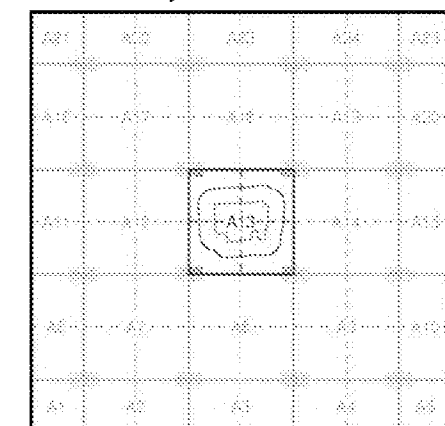


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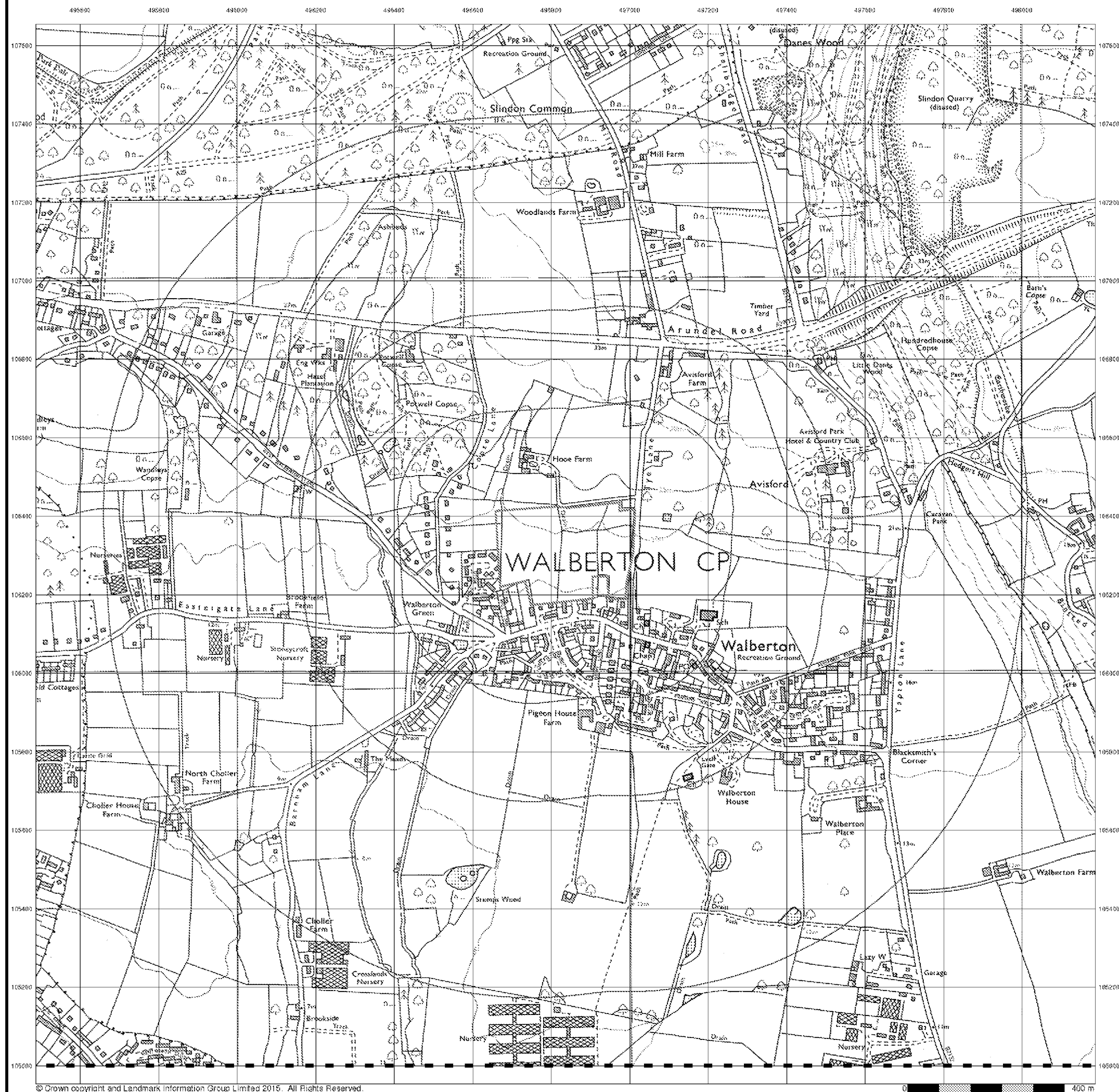
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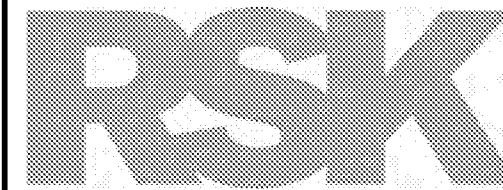
Site Details

Land West of Tye Lane, Walberton, ARUNDEL, BN18 0LU

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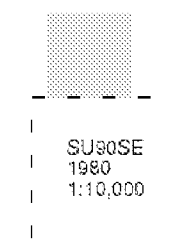
Ordinance Survey Plan

Published 1980

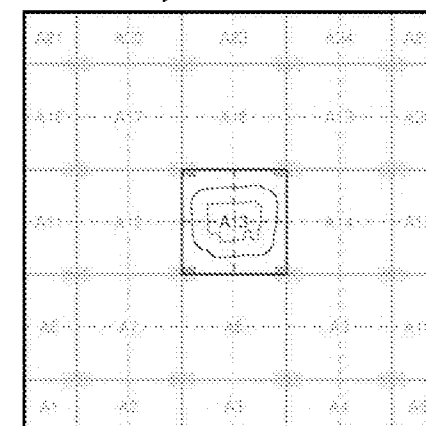
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