



GEOENVIRONMENTAL DESK STUDY REPORT

Westfield Energy Conservation Park Hertfordshire

Reference

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CONTENTS

Confidentiality Statement

Document History

Executive Summary

1.0	Introduction	1
1.1	Instruction	1
1.2	Objectives	1
1.3	Scope of Works	1
1.4	Location	2
1.5	Site Description and Topography	2
1.6	Development Proposals	3
1.7	Limitations	3
2.0	Site History	4
2.1	Ordnance Survey Mapping	4
2.2	Potentially Contaminative Historical Features Off-Site	5
3.0	Site Setting	6
3.1	Geology	6
3.2	Historical Boreholes	7
3.3	Coal Mining	7
3.4	Quarrying/Mineral Extraction	8
3.5	Natural Ground Subsidence	8
3.6	Hydrogeology	8
3.7	Hydrology	9
3.8	Pollution Incidents	9
3.9	Environmental Permits and Registers	9
3.10	Landfills and Waste	10
3.11	Industrial Land Use	10
3.12	Radon Risks	10
3.13	Unexploded Ordnance (UXO)	10
3.14	Previous Reports	11
3.15	Planning Review/Regulatory Enquires	11
3.16	Environmental Designations	11
4.0	Environmental Risk Assessment	12
4.1	Introduction	12
4.2	Potential Sources	13
4.3	Potential Pathways	14
4.4	Potential Receptors	14
4.5	Pollutant Linkage Assessment	15
4.6	Conceptual Site Model & Risk Rating	16
4.7	Risk Classification	16
5.0	Land Contamination Risks and Liabilities	17
5.1	Soils	17
5.2	Groundwater	17
5.3	Hazardous Ground Gas	17
5.4	Materials Management	17
5.5	Potential Contaminated Land Development Risks	17



6.0	Geotechnical Considerations	18
6.1	Uncertainty & Data Gaps	18
6.2	Preliminary Ground Model	18
6.3	Foundations & Floor Slabs	18
6.4	Earthworks	18
6.5	Roads, Pavements and Hardstanding Surfaces	19
6.6	Chemical Attack on Buried Ground	19
7.0	Recommendations & Development Constraints	20

APPENDICES

Appendix A Drawings

JPG. Site Location Plan. Proposed Solar & BESS, Westfield, Hertfordshire. Drawing No. 6437-JPG-ZZ-ZZ-DR-C-1000 S2 P01, dated 19 February 2025.

JPG. Geoenvironmental Constraints Plan. Proposed Solar & BESS, Westfield, Hertfordshire. Drawing No. 6437-JPG-ZZ-ZZ-DR-C-1100 S2 P02, dated 04.07.2025.

Lanpro. Environmental Masterplan. Westfield Energy Conservation Park. Drawing No. 5686-LAN-XX-XX-DR-L-1003-P06, dated 03.07.2025.

Appendix B Site Photographs

Appendix C Historical Maps

Appendix D BGS Borehole Records

Appendix E Notes on Limitations



CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

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This report has been prepared for the sole use and reliance of the above-named party. This report shall not be relied upon or transferred to any other parties without the express written authorisation of JPG (Leeds) Limited. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party.

DOCUMENT HISTORY

Revision	Date	Revision Details	Status	Author(s)	Approved
P01	26.02.2025	First Issue	Final	JBW	AJS
P02	04.07.2025	Planning Issue	Final	JBW	JBW



1.0 INTRODUCTION

1.1 Instruction

JPG (Leeds) Limited (JPG) has been instructed by Lanpro Services Limited (Lanpro) to provide a Geoenvironmental Desk Study Report for Westfield Energy Conservation Park which incorporates a Battery Energy Storage System (BESS), co-located ground mounted solar farm, associated infrastructure, access, biodiversity enhancements and landscaping (the 'Proposed Development') on land south of A507 at Westfield Common, Hertfordshire ('the Site').

1.2 Objectives

The main objective of the geoenvironmental desk study is to identify potential geotechnical and environmental issues that may represent constraints to the proposed development of the Site.

This purpose of this report is to support the submission of a planning application for the Proposed Development.

1.3 Scope of Works

The scope of works for the desk study includes the following:

- Site inspection and description.
- Review of contemporary and historical Ordnance Survey publications and available aerial photographs.
- Obtain a Mining Remediation Authority (MRA) coal mining report if located within a coal mining reporting area.
- Consultations with regulatory authorities, where appropriate.
- Review of geological publications (including hydrology, hydrogeology and soil survey publications, where appropriate).
- Review of any previous geoenvironmental reports, if available.
- Review of the radon status of the site.
- An environmental database search.
- Outline environmental risk assessment.
- Recommendations for further work, where appropriate; and
- Presentation of the findings in a tabular non-technical summary.

The report has been prepared in accordance with BS1075:2011+A2:2017 *Investigation of potentially contaminated sites* and the Environment Agency's manual *Land Contamination: Risk Management* (LCRM), published in October 2020 and last updated on 20 July 2023.



1.4 Location

The Site is located to the south of the A507 between Clothall and Cumberlow, Hertfordshire. The approximate centre of the Site is located at NGR 529060, 230372.

A site location plan is presented as Figure 1 in Appendix A.

1.5 Site Description and Topography

The Site is irregular in shape with an overall area of approximately 187.3 hectares. The Site currently comprises agricultural fields separated by hedgerows, land drains and trees with isolated areas of woodland.

For ease of reference, the Site has been separated into a series of field references as shown on the site layout plan referenced below and presented in Appendix A of this report.

- Lanpro. Environmental Masterplan. Westfield Energy Conservation Park. Drawing No. 5686-LAN-XX-XX-DR-L-1003-P06, dated 03.07.2025.

Field 5, located to the north of the A507, and Field 8, located to the east of the B1037, lie within the land ownership boundary but are located outside the red line boundary. Therefore, no development is to take place on these fields.

A site walkover of readily accessible areas was carried out by a JPG engineer on 10 February 2025. Pertinent information is described below and indicated on the geoenvironmental constraints plan referenced below and included in Appendix A.

- JPG. Geoenvironmental Constraints Plan. Proposed Solar & BESS, Westfield, Hertfordshire. Drawing No. 6437-JPG-ZZ-ZZ-DR-C-1100 S2 P02, dated 4 July 2025.

Two areas of named woodland, Coldash Wood and Rydale Wood, are located in the west of the Site, adjacent to Field 16 and Field 11 respectively, but are not within the red line development boundary. A further copse is located between Fields 4 and 10, again this copse is excluded from the Site boundary.

A public right of way (PROW), trending north to south, bisects the Site. An unnamed watercourse is present adjacent to PROW HD|CLOTHALL|019. A further PROW (HD|CLOTHALL|020) is located between Fields 6 and 7. This PROW extends northeasterly to Cumberlow Green.

An agricultural building (Munches Farm) is located to the north of Field 14a, this is excluded from the Site boundary. A fuelling facility comprising an above-ground fuel storage tank (AST) on a concrete base is located to the immediate southeast of this building. A pond is located to the north of the farm building, beyond a chalk-surfaced track. All of these features are located outside the Site boundary.



Agricultural machinery was parked up in the west of Field 12 adjacent to small stockpiles of soil arisings (made ground) at the time of the Site walkover. A further agricultural building (barn) is located in the southwest of Field 12, adjacent to the Site's southern boundary and outside the area proposed for development.

Evidence of small-scale quarrying/pitting of chalk was observed in the southeast of Field 14 during the Site walkover. It is understood that the landowner has reinstated and landscaped over this area at the time of the planning submission.

An existing pylon is located on Field 9 with 400kV overhead electricity lines (OHELs) aligned roughly east to west.

Ground levels generally fall to the PROW HD|CLOTHALL|019 and adjacent watercourse at a ground level of approximately 108m AOD with the highest ground present in the west (Field 15) with ground levels at approximately 138m AOD. A series of hillsides and valleys are present in the eastern half with the topography rising and falling steadily.

Site boundaries are generally formed by hedgelines, trees and/or adjacent agricultural land.

The Site is located in a rural setting with areas of woodland (Toggs Spring, Baskets Wood and Munches Wood) present beyond the A509 Clothall Road to the north and a farm (Cumberlow Green) located on the eastern side of the adjacent highway to the northeast of the Site. Residential properties are also present adjacent to the northwest (Field 1), although this field will not contain any infrastructure and will be used for biodiversity enhancement only.

The River Beane is located approximately 670m to the northeast and approximately 200m to the south of the Site at its closest point.

A selection of photographs is provided in Appendix B.

1.6 Development Proposals

It is proposed to develop the Site as a Battery Energy Storage System (BESS), co-located ground mounted solar farm, associated infrastructure, access, biodiversity enhancements and landscaping. Indicative areas for the solar and BESS development are shown on the Site layout plan in Appendix A.

No development is to take place in Fields 1, 2, 11, 16 or the northern part of Field 7. The Site layout plan indicates a proposed substation and BESS in Field 9 located in the east. The remaining fields will be installed with solar panels and their associated infrastructure.

1.7 Limitations

The general limitations to the nature of the investigation are outlined in Appendix E.



2.0 SITE HISTORY

2.1 Ordnance Survey Mapping

Historical maps for the Site were obtained from Groundsure. These have been reviewed to establish the previous uses of the Site and identify any potentially contaminative historical uses or potential geotechnical constraints to the Proposed Development. In addition, a review was carried out of historical aerial photographs contained in the Groundsure report as well as on Google Earth Pro.

A summary of the relevant map information is provided in Table 2.1 and copies of the Ordnance Survey (OS) maps (Scale 1:10,560 and 1:10,000 only) are provided in Appendix C.

Table 2.1 – Summary of Relevant Historical Map Information

Field Reference	Summary of Pertinent Information
1	The earliest mapping (1878) indicates that the field comprised agricultural land with a drainage channel on the southern boundary. The field is later annotated as Westfield Common. Based on mapping, there has been no significant development.
2	The earliest mapping (1878) indicates that the field comprised agricultural land with a drainage channel on the southern boundary. The field is later annotated as Westfield Common. A footpath is located on the south-eastern boundary. Based on mapping, there has been no significant development.
3	The earliest mapping (1878) indicates that the field comprised agricultural land with a footpath located on the western boundary. An old chalk pit was located immediately to the south; this area is now a wooded feature. Based on mapping, there has been no significant development.
4	The earliest mapping (1878) indicates that the field comprised agricultural land. An old gravel pit is indicated adjacent to the northern boundary. The pit is no longer shown on later mapping, and it is assumed that it was backfilled and the location restored to agricultural use. A drainage channel is later indicated on the eastern boundary. Based on mapping, there has been no significant development.
6	The earliest mapping (1878) indicates that the field comprised agricultural land divided by field boundaries with footpaths extending alongside some of the field boundaries. Based on mapping, there has been no significant development.
7	The earliest mapping (1878) indicates that the field comprised agricultural land with a footpath extending along the north-western boundary. Ponds are later indicated immediately to the north where at present there is a copse. A chalk pit is shown to the east (within Field 8), this is not shown on later maps and is assumed to have been infilled. Based on mapping, there has been no significant development.
9	The earliest mapping (1878) indicates that the field comprised agricultural land with a footpath extending along the western boundary. A pylon and OHEL is shown from 1978. Based on mapping, there has been no significant development.
10	The earliest mapping (1878) indicates that the field comprised agricultural land with a footpath and trees on the south-western boundary. A track is shown to cross the southern part of the Site in the 1990s. Based on mapping, there has been no significant development.
11	The earliest mapping (1878) indicates that the field comprised agricultural land with a footpath crossing the northern part. A drainage channel forms the north-eastern boundary. Based on mapping, there has been no significant development.
12	The earliest mapping (1878) indicates that the field comprised agricultural land divided by field boundaries with footpaths extending alongside some of the field boundaries. An agricultural building is located in the southeast from the 1970s. Based on mapping, there has been no significant development.
13	The earliest mapping (1878) indicates that the field comprised agricultural land with tree-lined field boundaries. Based on mapping, there has been no significant development.
14a, 14b	The earliest mapping (1878) indicates that the field comprised agricultural land divided by field boundaries with footpaths extending alongside some of the field boundaries. A small pit indicated in the south from 1922 corresponds to a present-day copse. A track on the north-western boundary separating Field 14 from Field 15 is shown from 1981. The agricultural building located to the north of Field 14 is shown on maps by 2010. Based on mapping, there has been no significant development.
15	The earliest mapping (1878) indicates that the field comprised agricultural land. Based on mapping, there has been no significant development.



16

The earliest mapping (1878) indicates that the field comprised agricultural land with a drainage channel on the northern boundary and a footpath on the south-western boundary. The field is later annotated as Westfield Common. Based on mapping, there has been no significant development.

2.2 Potentially Contaminative Historical Features Off-Site

The surrounding land use has remained agricultural with no significant potential sources of contamination identified within 250m of the overall Site boundary.



3.0 SITE SETTING

3.1 Geology

The Groundsure Insight report and the following geological publications have been consulted:

- British Geological Survey (BGS), Sheet 221, Hitchin, 1:50,000 Scale, Solid and Drift Edition, dated 1995.
- BGS Onshore GeoIndex (<http://mapapps2.bgs.ac.uk/geoindex/home.html>).
- BGS, Lexicon of Named Rock Units.

Based on the Groundsure Insight report and BGS maps, there are five records of artificial or made ground deposits shown onsite. These are summarised in Table 3.1.1 below.

Table 3.1.1 Summary of Artificial or Made Ground On-site

Description	Location	Comment
Worked ground (void).	North of Field 10/South of Field 3.	Former chalk pit (now copse).
Infilled ground (artificial deposit).	Adjacent to northern boundary of Field 4.	Infilled gravel pit (now restored to agricultural use).
Worked ground (void).	In South of Field 14.	Small pit (now copse).
Made ground (artificial deposit).	Northern boundary of Field 1.	Not within development area.
Made ground (artificial deposit).	East of Field 6.	Based on the GS report, this is 'worked ground' and has now been restored to agricultural use.

The Site is shown to be locally underlain by superficial deposits, the distribution of which is outlined in Table 3.1.2 below.

Table 3.1.2 – Summary of Superficial Deposits

Field Reference	Summary of Pertinent Information
1	Typically glacial till of the Lowestoft Formation with head (clay, silt, sand and gravel) on southern boundary. No superficial deposits locally in south.
2	Typically glacial till of the Lowestoft Formation with head (clay, silt, sand and gravel) on southern boundary. Glaciofluvial deposits (sand and gravel) in northeast.
3	Typically glacial till of the Lowestoft Formation. Glaciofluvial deposits (sand and gravel) in northeast. Clay-With-Flints Formation encroaches onto southeast. Locally absent adjacent to southern boundary.
4	Glacial till along the eastern and western flanks (sides of valley). Clay-With-Flints Formation encroaches onto southwest. Head (clay, silt, sand and gravel) at the lower valley level.
6	Glacial till in the north. Clay-With-Flints Formation present in the centre. Head (clay, silt, sand and gravel) at the lower valley level. Head (clay, silt, sand and gravel) encroaches onto the south. No superficial deposits on remainder.
7	Glacial till on the eastern third. No superficial deposits on remainder.
9	No superficial deposits.
10	Clay-With-Flints Formation is present in the north. Head (clay, silt, sand and gravel) on western boundary extending northeast along valley base. No superficial deposits on remainder.
11	Glacial till with head on eastern and northern boundaries.
12	Generally glacial till with head on eastern and northern boundaries. Superficial deposits are absent locally in south.
13	Glacial till with Clay-With-Flints Formation encroaching onto northwest.
14a, 14b	Glaciofluvial deposits (sand and gravel) in centre and west. Glacial till in northeast and south.



	Clay-With-Flints Formation in centre east.
15	Glaciofluvial deposits (sand and gravel) with glacial till in east.
16	Glacial till with head (clay, silt, sand and gravel) in north and northwest.

The bedrock geology is shown to generally comprise chalk of the Lewes Nodular Chalk Formation and Seaford Chalk Formation with a central swathe comprising the Chalk Rock Member and the Holywell Nodular Chalk Formation and New Pit Chalk Formation.

There are no recorded faults below the Site or within 500m of the Site.

3.2 Historical Boreholes

Historical borehole records have been obtained from the BGS Onshore GeolIndex. There are five BGS borehole records located on and within 250m of the Site, two of which are well records without any strata descriptions. The three borehole records containing strata descriptions are summarised in Tables 3.2.1 to 3.2.3 and copies are contained in Appendix D.

Table 3.2.1 BGS Borehole Record Summary – A P S West Field, Baldock
Ref. TL23SE84 (On-Site – Field 15)

Strata Description (Driller's)	Depth to Base (m bgl)	Comment
Brown clay and stones chalk and flint	7.00	
Chalk and flint	19.50	
Melbourne Rock	21.70	BGS describes as: 'Hard to very hard off-white, blocky fractured chalk'.
Chalk and flint	30.20	
Melbourne Rock	33.50	
Chalk	>70.00	

Table 3.2.2 BGS Borehole Record Summary – Kingswoodbury, Clothall
Ref. TL23SE9 (47m to the northwest)

Strata Description (Driller's)	Depth to Base (m bgl)	Comment
Drift	4.27	Superficial deposits.
Chalk	>60.96	

Table 3.2.3 BGS Borehole Record Summary – Toggs, Clothall
Ref. TL23SE1 (101m to the northwest)

Strata Description	Depth to Base (m bgl)	Comment
Topsoil	0.91	
Chalk	>67.06	

3.3 Coal Mining

The Site does not lie within a Mining Remediation Authority (MRA) Coal Mining Reporting Area. Therefore, an MRA CON29 Mining Report and a Coal Mining Risk Assessment (CMRA) are not required under the planning regime.



3.4 Quarrying/Mineral Extraction

There are nine records of BGS-recorded mineral sites within 500m, two of which are onsite. These are summarised in Table 3.4 below.

Table 3.4 – BGS Recorded Mineral Sites

Location	Commodity	Status	Details
On-site (northern boundary)	Sand and Gravel	Ceased	Munches Wood Gravel Pit
On-site (centre-north)	Chalk	Ceased	Baskets Wood Chalk Pit

3.5 Natural Ground Subsidence

The potential hazard for ground dissolution of soluble rocks is rated moderate in areas in the northeast and southwest.

The Groundsure report indicates a localised area of moderate hazard rating due to potential compressible deposits on the northeastern boundary. The location corresponds to a historical gravel pit.

There is one recorded sinkhole located on the southern boundary. At this location the superficial deposits comprise glacial till and morainic drift and the bedrock comprises chalk.

There are no records of recent sinkhole events.

The recorded sinkhole and areas rated moderate risk of ground dissolution are indicated on the Geoenvironmental Constraints Plan included in Appendix C.

3.6 Hydrogeology

The glacial till and head of the underlying superficial deposits are classified as a Secondary Undifferentiated Aquifer. This classification is *'assigned when it is not possible to attribute either category A or B to a soil or rock type.'* The glaciofluvial deposits in the west and north are classified as a Secondary A Aquifer, defined as *'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.'* The Clay-With-Flints Formation in the west, centre and northeast is classified as Unproduction.

The underlying chalk bedrock is classified as a Principal Aquifer. This classification is designated by the EA as *'strategically important rock units that have high permeability and water storage capacity.'*

Groundwater vulnerability of the bedrock ranges from low to high.

The Groundsure Insight report indicates that the risk of groundwater flooding ranges from negligible to moderate. The moderate risk corresponds to areas where glaciofluvial deposits are present.



The Site lies within the Total Catchment (Zone 3) of an Environment Agency (EA) Groundwater Source Protection Zone (SPZ).

There is one historical groundwater abstraction license located approximately 200m to the east of the Site. The abstraction was from a point source (Cumberlow Green Well). The water was used for general farming and domestic purposes. There are no active groundwater abstractions within 1km of the Site. There are no potable abstractions within 2km.

There are no licensed discharges to controlled waters within 500m.

3.7 Hydrology

The nearest surface watercourse is an inland river/drainage channel that extends through the Site from the northwest and north and flowing to the south through the centre of the Site.

The River Beane is recorded to be located approximately 179m to the southeast at its closest point to the Site. Another named watercourse, the Western Tributary, is recorded between 237m and 246m to the south.

There are 12 surface water features recorded within 250m. These include the ponds in the south of Rydale Wood to the north of Field 14.

There are no records of any active surface water abstraction licenses within 2km.

There are no recorded active discharge consents to controlled waters within 500m of the Site.

Information on the gov.uk website and provided in the Groundsure Insight report indicates that the Site does not lie within a Zone 2 or Zone 3 floodplain except for land immediately adjacent to the unnamed watercourse that runs through the Site, which is classified as Zone 2.

The majority of the Site is shown not to be at risk of surface water flooding except for the land immediately adjacent to the on-site watercourse.

3.8 Pollution Incidents

There are no records of pollution incidents within 500m of the Site.

3.9 Environmental Permits and Registers

There are 10 records of Part A(1) installations regulated under Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment. All records relate to Cumberlow Green Farm, located 159m to the east of the Site, and the process of 'recovery or a mix of recovery and disposal of >75 t/d non-hazardous waste (>100 t/d if only ad) involving biological treatment'.



There is one record of a pollution inventory waste transfer associated with Cumberlow Green Farm relating to biowaste treatment as described above.

There are no recorded active Control of Major Accidents Hazard (COMAH) sites within 1km of the Site.

There are no records of sites determined as Contaminated Land under Part 2A of the Environmental Protection Act (EPA) 1990 within 500m of the Site.

3.10 Landfills and Waste

The Groundsure Insight report includes information on active and former landfill sites supplied by the EA, Local Authority and the BGS.

There are no recorded active or historical landfill sites located within 500m of the Site.

There are five records of Licensed Waste Management Facilities located within 500m of the Site, all of which relate to the production of compost at Cumberlow Green Farm.

There are 12 records of waste exceptions within 500m of the Site, nine of which relate to processes carried out at Cumberlow Green Farm. The other three records relate to storage of sludge on a farm approximately 455m to the southwest.

3.11 Industrial Land Use

Potentially contaminative industrial sites include the recycling, reclamation and disposal activities at Cumberlow Green Farm.

Electric features within 250m of the Site include three pylons, one of which is located in Field 9.

There are no current or recent petrol stations.

3.12 Radon Risks

The majority of the Site is in a lower probability radon area as defined by Public Health England with (less than 1% of homes are estimated to be at or above the Action Level). There are two areas in the north and an area adjacent to the south-western boundary where between 1% and 3% are estimated to be affected.

In accordance with the Building Research Establishment (BRE) publication BR211, no radon protective measures are required for new properties constructed on the Site.

3.13 Unexploded Ordnance (UXO)

The Site is indicated as a low UXO risk on online mapping¹.

¹ <https://zeticauxo.com/guidance/risk-maps/>



3.14 Previous Reports

No previous geoenvironmental reports have been made available for review.

3.15 Planning Review/Regulatory Enquires

An enquiry was made to North Herts Council Environmental Protection. The response stated that they held no information relating to the Site additional to that acquired through Groundsure by JPG.

A review of planning applications on the North Herts Council Environmental Protection Planning Portal on 19 February 2025 indicated that there were no planning applications relating to the Site. There was a planning application for the installation and operation of a solar farm (reference 24/02923/ADJ) on land to the east of the Site.

No additional potentially contaminative activities or other information pertinent to this assessment was identified from historical planning records.

3.16 Environmental Designations

There are two areas of Designated Ancient Woodland, Coldash Wood and Rydale Wood, located in the west, both are excluded from the Site boundary. The west of the Site is designated Green Belt land.



4.0 ENVIRONMENTAL RISK ASSESSMENT

4.1 Introduction

The statutory definition of contaminated land is given in the Environmental Protection Act, Part 2A, Section 78, 1990, which was introduced by the Environment Act, Section 57, Department of Environment, 1995 and is defined as:

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 there is a significant possibility of such harm being caused (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and/or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused (by the land).

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. The potential for harm to occur requires three conditions to be satisfied:

- **Sources** – The presence of substances (potential contaminants/pollutants), in or under the ground, that may cause harm or pollution.
- **Receptors** - The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna and flora; and
- **Pathway** - The existence of a linkage between the Source and the Receptor.

In summary, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and an unacceptable risk of harm to available receptors.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the sensitivity of the intended end use of the Site and the Site's characteristics and environmental setting.

Legislation and guidance on the assessment of contaminated sites acknowledges the need for a tiered risk-based approach. This is set out in the Environment Agency's manual *Land Contamination: Risk Management (LCRM)*, published in October 2020 and last updated on 20 July 2023.



The LCRM outlines the following stages of risk assessment:

Tier 1: Preliminary risk assessment (PRA)	As part of this assessment, the overall site objectives are defined. Current and historical information about the Site and the potential contaminants expected to be present are assessed and an outline conceptual model (CM) is developed. The risks are assessed qualitatively, and the findings reported in the PRA (or desk study). The report recommends what further works would be required in order to assess whether the Site is suitable for its proposed use.
Tier 2: Generic quantitative risk assessment (GQRA)	The GQRA uses Generic Assessment Criteria, and a standard set of generic assumptions based on specific end uses in order to assess the risks to receptors. It includes the collection of more detailed information including laboratory analysis of soil and water samples in order to inform and assess the risks.
Tier 3: Detailed quantitative risk assessment (DQRA)	If pollutant linkages are confirmed as part of the GQRA, these are known as relevant pollutant linkages (RPLs) and further detailed assessment is required. At this tier, detailed site-specific information is collected to estimate the risk or to develop site-specific assessment criteria (SSAC). This may include collecting information about the receptor.

This desk study report represents a Tier 1 Preliminary Risk Assessment.

4.2 Potential Sources

The following potentially contaminative sources may be present on or adjacent to the Site:

- Made ground associated with former land use, i.e. agricultural use.
- Made ground associated with infilled pits/quarries.
- Potential leaks and/or spills from farm vehicles/plant associated with former onsite uses and adjacent land uses.
- Made ground associated with off-site sources, e.g. adjacent agricultural land.

Potential contaminants which could be present on the Site are listed below:

- Metals, metalloids and their compounds.
- Inorganic compounds, e.g. arsenic.
- Asbestos fibres/asbestos containing materials.
- Organic compounds including polycyclic aromatic hydrocarbons (PAH) and petroleum hydrocarbons (TPH).
- Pesticides and herbicides; and
- Hazardous ground gases/soil vapours.



4.3 Potential Pathways

Based on the available information and the proposed development of the Site for a solar farm and BESS end use, the following potential exposure pathways will require consideration, both during the development works and on completion of construction:

- Ingestion, inhalation and/or dermal contact with contaminated soil and/or groundwater.
- Inhalation of hazardous ground gases/soil vapours/asbestos fibres.
- Leaching/migration of potential contaminants from soil into groundwater and surface water via surface infiltration, drainage and/or groundwater flow.
- Permeation of water supply pipes and other services by organic and aggressive contaminants; and
- Uptake of contaminants by planting in landscape areas.

4.4 Potential Receptors

The potential receptors considered are:

- Development workers and future maintenance workers involved in excavations, e.g. foundations or where services are being installed or repaired following development.
- Future end users of the Site, i.e. maintenance workers.
- Controlled waters, i.e. unnamed drainage channel, on-site ponds, off-site ponds, Secondary Undifferentiated, Secondary A, Secondary B Aquifers (superficial deposits) and Principal Aquifer (bedrock).
- Buildings and infrastructure; and
- Planting in landscaped areas.



4.5 Pollutant Linkage Assessment

A potential pollutant linkage assessment has been completed and is summarised in the Conceptual Site Model (CSM), which is provided in Section 4.6. This is based on the proposed development of the Site for a proposed solar farm/BESS development (industrial).

Based on the proposed solar farm/BESS end use and history of the Site, the following potential pollutant linkages may be present:

- Development and maintenance workers and future site end users could come into contact with soils and groundwater containing elevated concentrations of potential contaminants and hazardous ground gases/soil vapours.
- Controlled waters could become contaminated due to leaching and migration of potential contaminants from the made ground.
- Buildings and services could be affected by potential contaminants in any made ground; and
- Plants in landscaped areas could be affected by phytotoxic elements in any made ground.

These are based on current site conditions and do not consider exposure pathways following any remediation of the Site.



4.6 Conceptual Site Model & Risk Rating

The conceptual model is summarised in Table 4.6 below.

Table 4.6 Preliminary Conceptual Model

Source	Pathway	Receptor	Risk Rating	Comments
On-site Sources Made ground associated with former and current land uses. Potential leaks and/or spills from farm vehicles/plant associated with former onsite uses and adjacent land uses. Off-site Sources Made ground associated with off-site sources.	Inhalation. Ingestion. Dermal contact.	Future Site Users Development Workers	Very Low	Based on proposed development, no action required.
	Leaching of mobilised contaminants. Migration via surface water and groundwater flow.	Controlled Waters Surface Water • Unnamed drainage channel, on-site ponds, off-site ponds. Groundwater Undifferentiated Aquifers (superficial deposits) and Principal Aquifer (bedrock).	Very Low	Controlled Waters There are no recorded active discharge consents to controlled waters within 500m of the Site. Surface Water There are no records of any surface water abstraction licenses within 500m. Groundwater The Site lies within the Total Catchment (Zone 3) of an Environment Agency (EA) Groundwater Source Protection Zone (SPZ). There are no active groundwater abstraction licenses within 500m of the Site. Based on proposed development, no action required.
Hazardous Ground Gases/Soil Vapours	Inhalation.	Future End Users Development Workers	Very Low	Based on proposed development, no action required. Appropriate health and safety procedures to be in place during the construction phase of the development.
Areas of Phytotoxic Contamination	Root uptake.	Vegetation Landscaping.	Low	No action required.
Aggressive Contaminants in Soil/Water	Direct contact.	Construction Materials Concrete and Services.	Low	Targeted samples of any made and natural ground should be obtained and submitted to the laboratory for testing in order to assess the sulphate content and acidity where concrete and/or services are to penetrate the ground.

4.7 Risk Classification

Based on the conceptual site model, the Site is considered to be a **very low to low risk** with respect to contamination in soils and hazardous ground gases. This designation will be largely dependent on the nature of any made ground and hazardous ground gases present on or adjacent to the Site.



5.0 LAND CONTAMINATION RISKS AND LIABILITIES

5.1 Soils

Given the very low sensitivity end use comprising a solar farm and BESS, the risk to future site users is considered very low and no further assessment is required.

5.2 Groundwater

No significant potential sources have been identified and there are no licensed groundwater abstraction records for potable water within 500m of the Site. On this basis, the risk to controlled waters is considered very low.

5.3 Hazardous Ground Gas

Limited sources of ground gas associated with potentially infilled pits/quarries have been identified locally on and adjacent to the Site.

Given the very low sensitivity end use comprising a solar farm with limited infrastructure comprising BESS and substations, the potential for hazardous ground gas to accumulate is considered very low. Should buildings be proposed over any infilled area, a targeted investigation should be undertaken to assess the potential for hazardous ground gas generation and requirement for any ground gas protection measures.

5.4 Materials Management

It is not anticipated that significant groundworks will be undertaken as part of the majority of the Proposed Development. Locally groundworks will be required as part of the construction of the BESS and Substation.

Any earthworks carried out will need to be undertaken under a Materials Management Plan (MMP) in accordance with the CL:AIRE Code of Practice to facilitate the reuse of these materials. The Contractor shall be responsible for the preparation of an MMP and obtaining appropriate sign off from a Qualified Person prior to the commencement of earthworks.

5.5 Potential Contaminated Land Development Risks

Widespread contamination is considered unlikely, and the preliminary risk assessment has identified a very low to low risk of soil/groundwater contamination and hazardous ground gas at the Site.



6.0 GEOTECHNICAL CONSIDERATIONS

6.1 Uncertainty & Data Gaps

This assessment is based on desk study information only. No site-specific ground investigation data has been made available for review.

6.2 Preliminary Ground Model

Based on the available information, it is anticipated that the Site will be underlain by topsoil overlying superficial deposits comprising either glacial till, head, glaciofluvial deposits or clay with flints in the north, northeast and west. The superficial deposits are shown to be absent locally in the northwest (part of Field 1) and the eastern half of the Site (parts of Fields 3, 4, 6, 7, 9 and 10) and in these locations it is anticipated that the topsoil will be underlain directly by weathered chalk strata.

Infilled ground is anticipated locally, including in the northeast of Field 4 and the centre-east of Field 6. It is recommended that solar panels or any other structures are not installed over infilled ground which may be soft and/or highly variable in terms of soil properties without targeted ground investigation. Areas of potentially infilled ground are indicated on the geoenvironmental constraints plan presented in Appendix A.

Bedrock below the entire Site comprises chalk, generally of the Lewes Nodular Chalk Formation and Seaford Chalk Formation.

Shallow groundwater is not expected.

6.3 Foundations & Floor Slabs

The Proposed Development will include a substation, access roads and parking.

The selection of foundation type will be governed by the nature of the Proposed Development and the thickness, strength and settlement characteristics of the underlying natural strata.

Foundation design will be confirmed through information obtained during targeted ground investigation of future load-bearing areas.

The suitability of the Site for the use of ground bearing floor slabs should be assessed as part of any ground investigation. The requirements of any ground gas protection measures will also need to be taken into consideration in relation to ground floor design and construction of any buildings.

6.4 Earthworks

Any earthworks specification should be in general accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks.



6.5 Roads, Pavements and Hardstanding Surfaces

For any new access roads and/or parking, it is recommended that a conservative bearing value for the subgrade is assumed until the nature of the subgrade can be physically assessed.

Any earthworks should be designed to achieve a suitable CBR value for the Proposed Development.

6.6 Chemical Attack on Buried Ground

Aggressive ground chemistry may attack buried concrete and therefore there may be a requirement for protection measures to be put in place where foundations are to be installed.

Samples of made and natural ground should be obtained and submitted to the laboratory for testing in order to assess the sulphate content and acidity and hence the concrete class required for buried concrete to the latest standard.



7.0 Recommendations & Development Constraints

The following recommendations and development abnormalities are considered appropriate.

- Targeted geotechnical ground investigation to assess in-situ geotechnical soil strength testing/laboratory testing and CBRs, in order to inform proposed foundation/pavement design where any buildings, substation and/or access roads are to be constructed.
- Targeted ground investigation of areas of infilled ground should any development including solar/BESS be proposed in such areas.
- A hotspot protocol should be put in place for any groundworks to act upon should potential contamination be identified; and
- A Materials Management Plan (MMP) may be required in accordance with regulatory protocols during the construction of the Proposed Development.



Appendix A Drawings



SITE LOCATION PLAN
SCALE 1:5000

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SITE INFORMATION

SITE ADDRESS
ADDRESS - HERTFORDSHIRE, CUMBERLOW
GREEN, BUNTINGFORD, SG7 6RN
OS CO-ORDINATES - E529060, N230372

LEGEND

RED LINE BOUNDARY

0m 125m 250m
SCALE 1:5000

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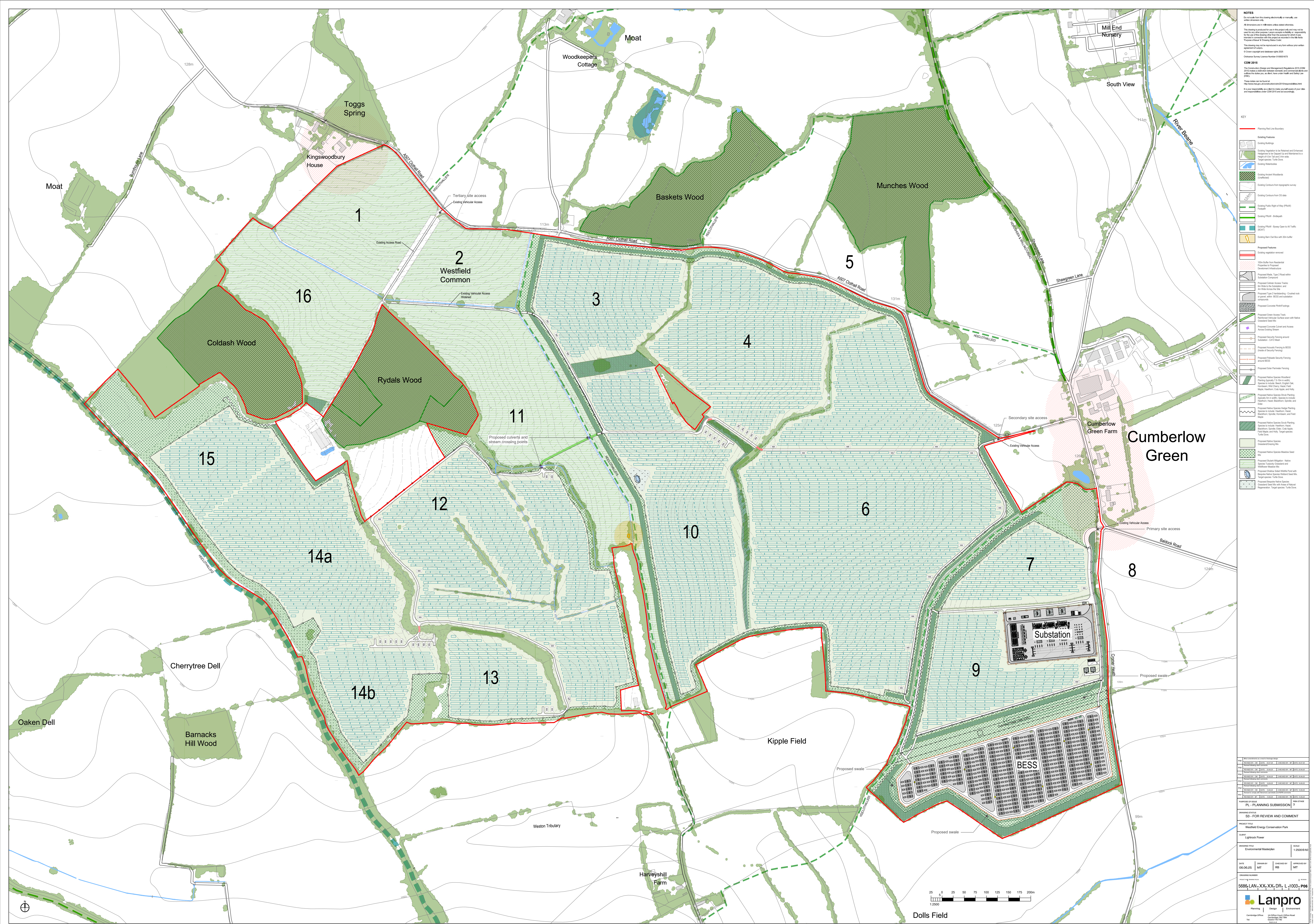
Project - 6437
PROPOSED SOLAR & BESS,
WESTFIELD,
HERTFORDSHIRE

Drawing Title
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Appendix B Site Photographs



Photograph 1: Track leading to Munches Farm with Field 1 on the Right and Field 2 on the Left.



Photograph 2: View looking East across Field 2, with Fields 3 and 11 in Background.



Photograph 3: View Looking West Across Field 16.



Photograph 4: Munches Farm.



Photograph 5: Fuelling Facility at Munches Farm.



Photograph 6: Pond at Munches Farm.



Photograph 7: View Looking South across Field 15.



Photograph 8: View Looking South across Field 14.



Photograph 9: View Looking East across Field 12.



Photograph 10: Farm Equipment in West of Field 12.



**Photograph 11: Farm Equipment in West of Field 12
with Small Stockpiles of Soil Arisings.**



Photograph 12: Looking East Across South of Field 12 Towards Farm Building.



Photograph 13: Looking East Across Watercourse Towards Field 10.



Photograph 14: Looking East Across Watercourse Towards Field 4.



Photograph 15: Looking West Towards Field 7.



Appendix C Historical Maps

Site Details:

Clothall, Hertfordshire - Solar
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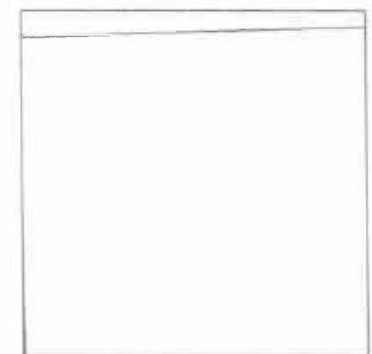
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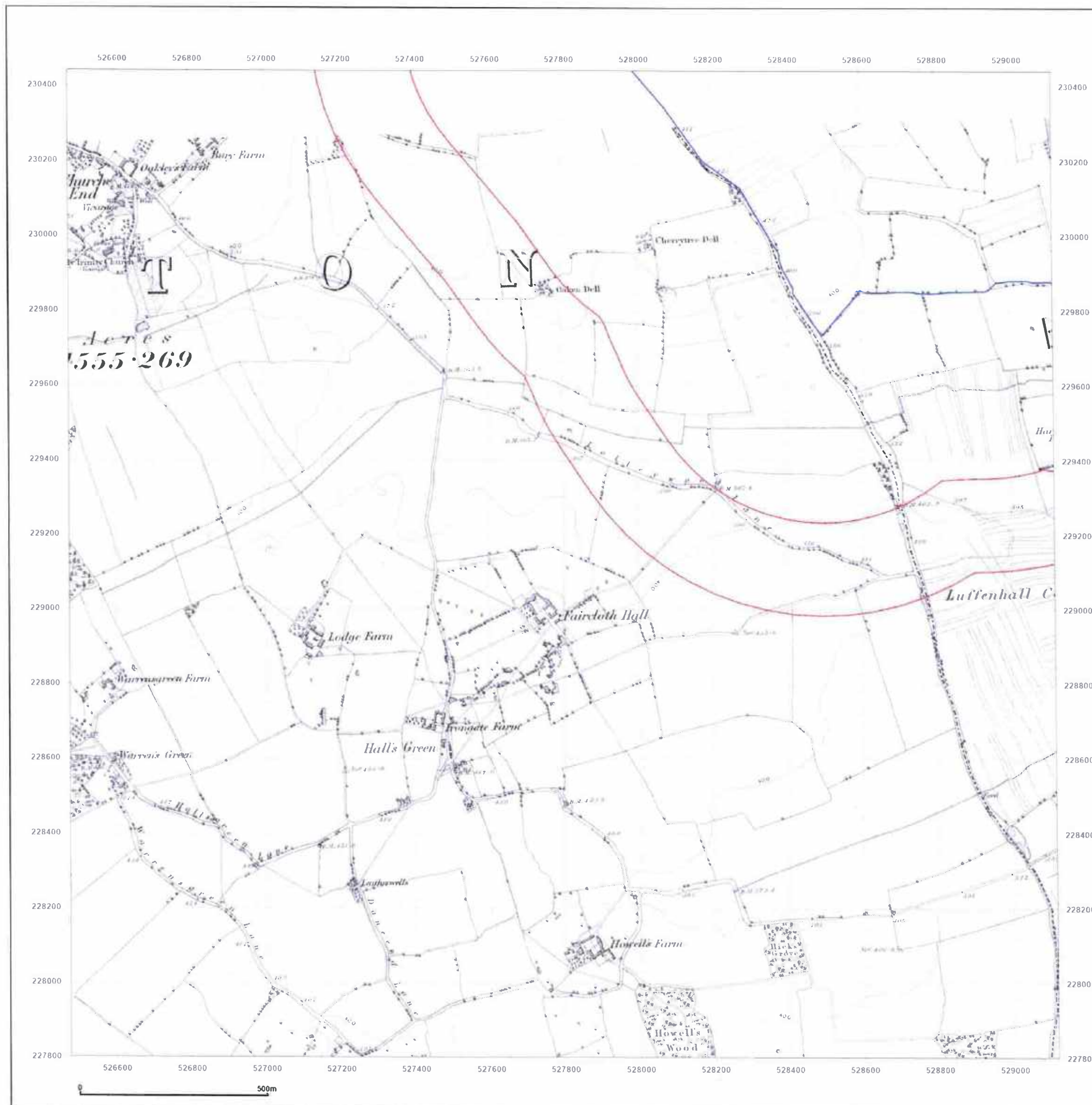


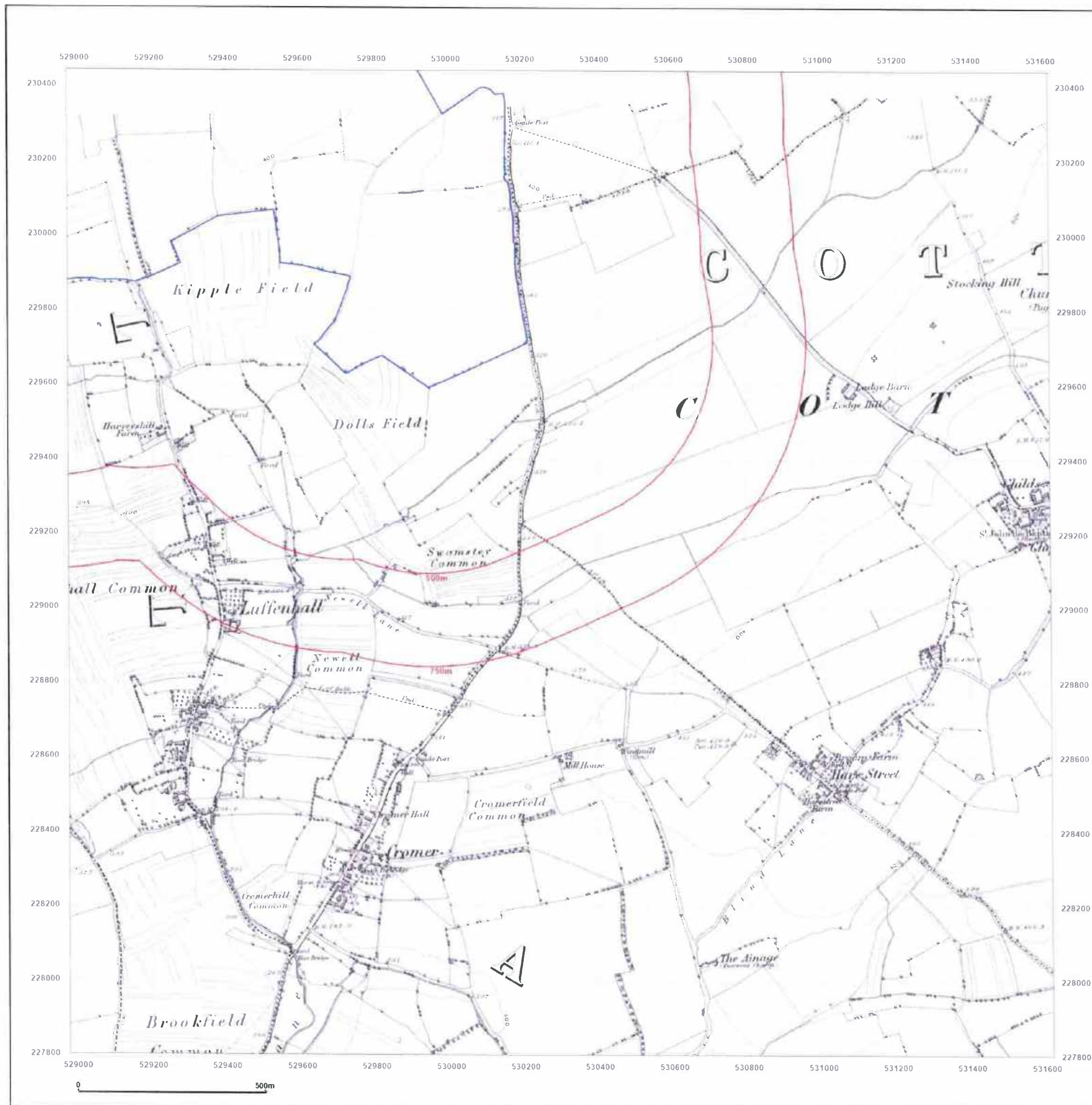
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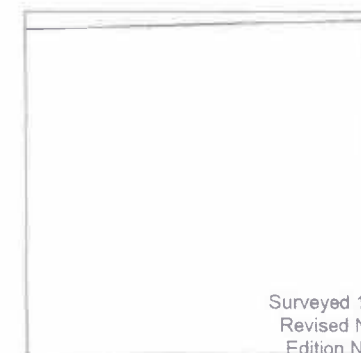
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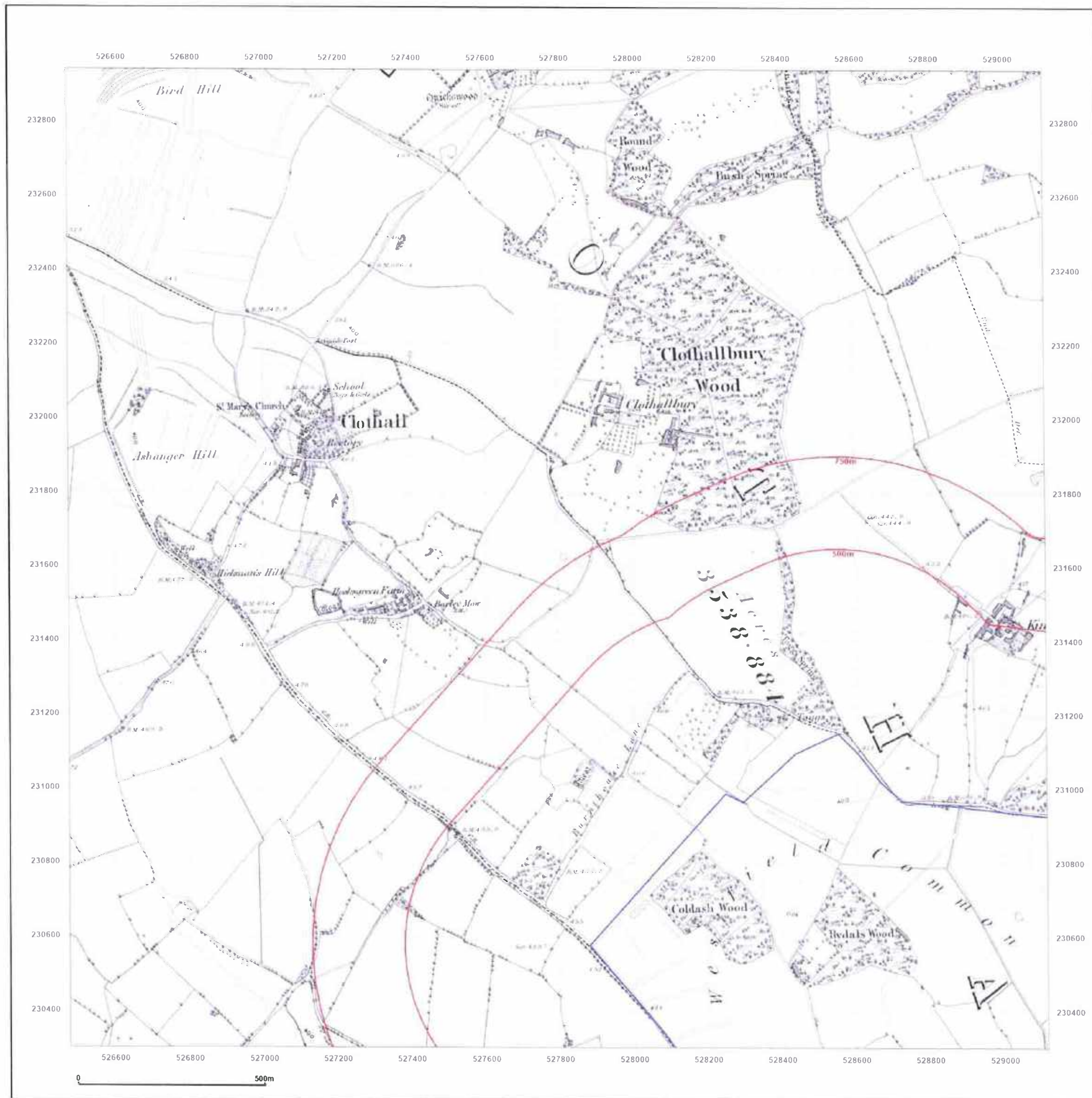


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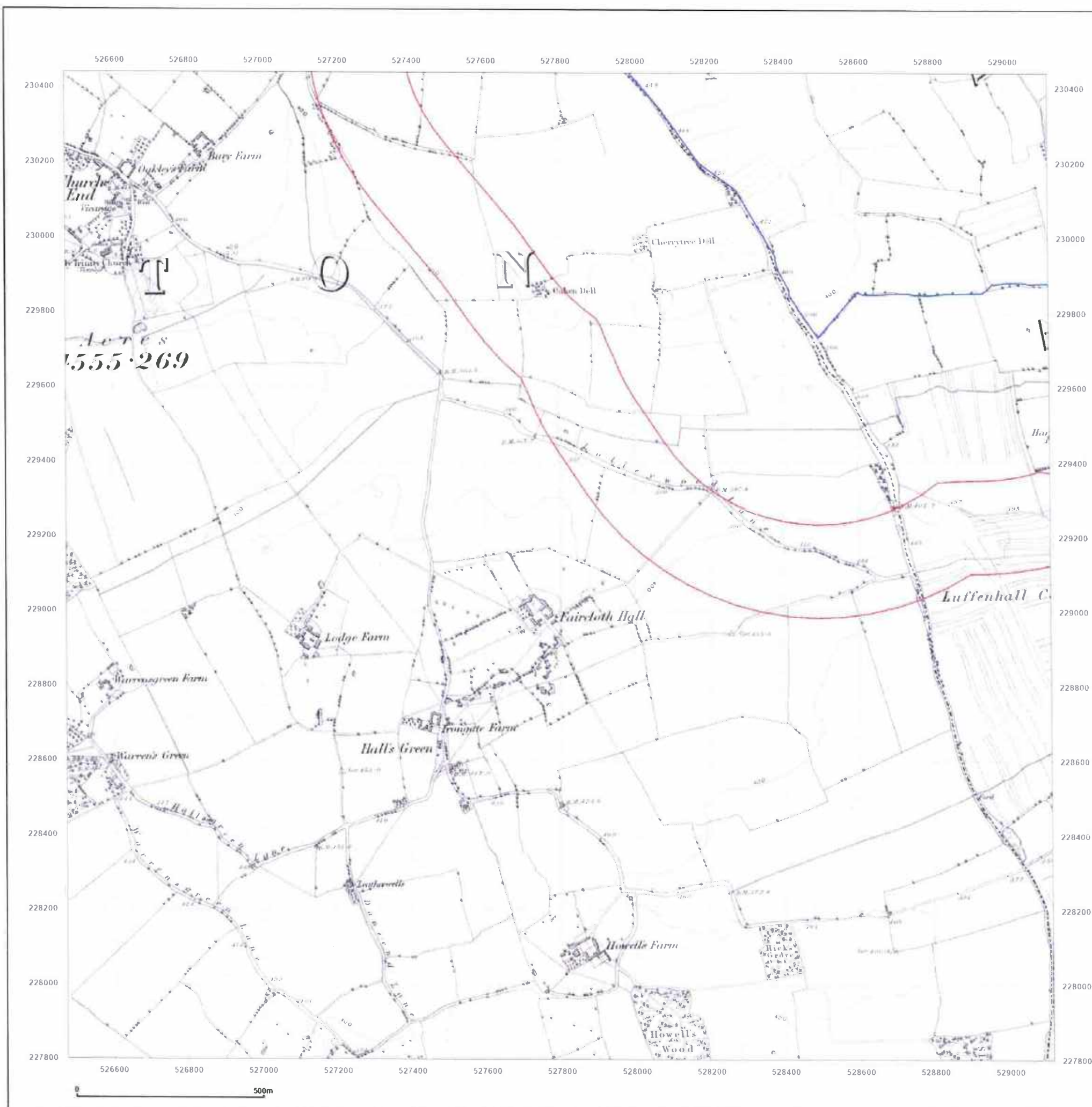


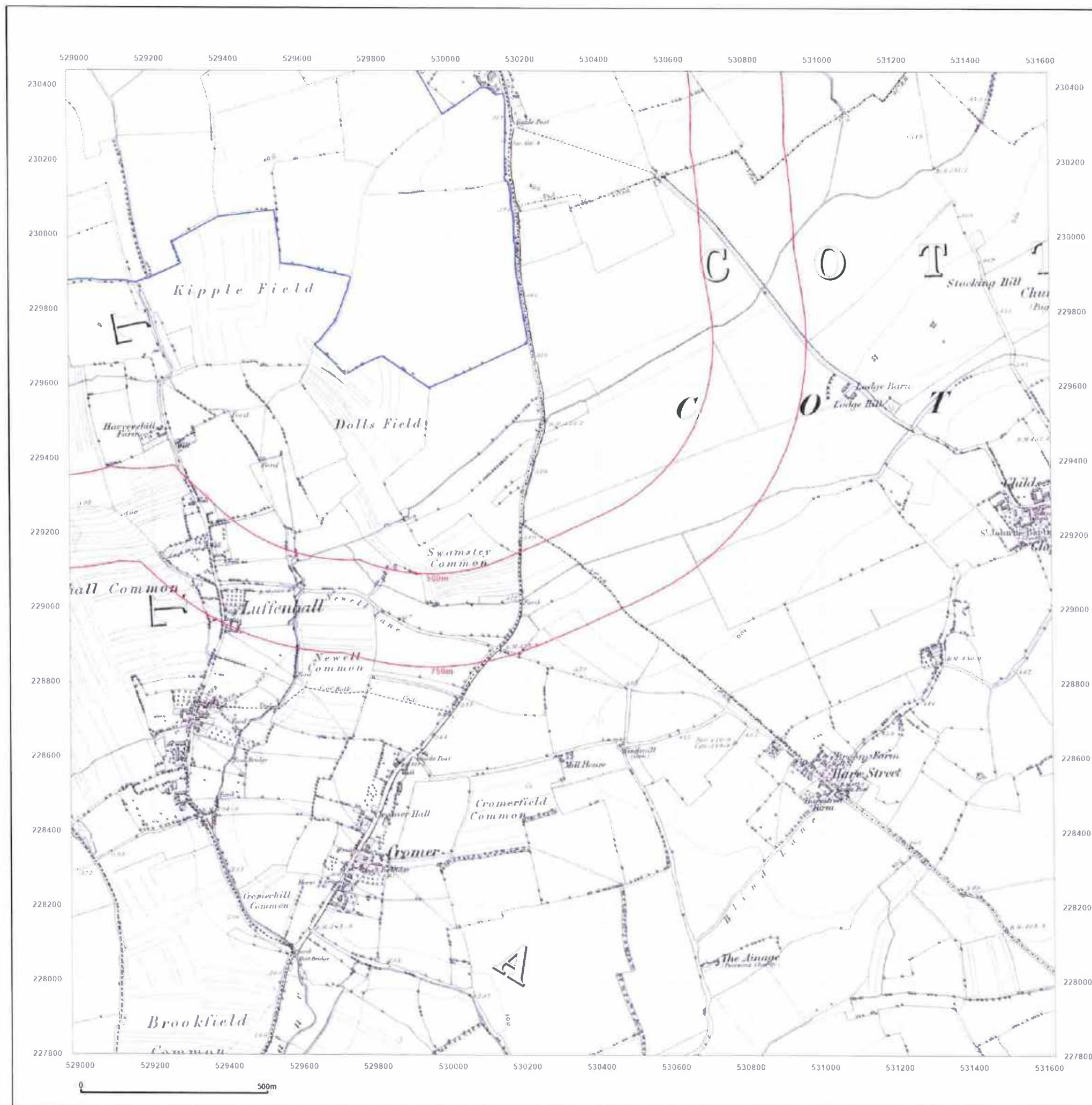
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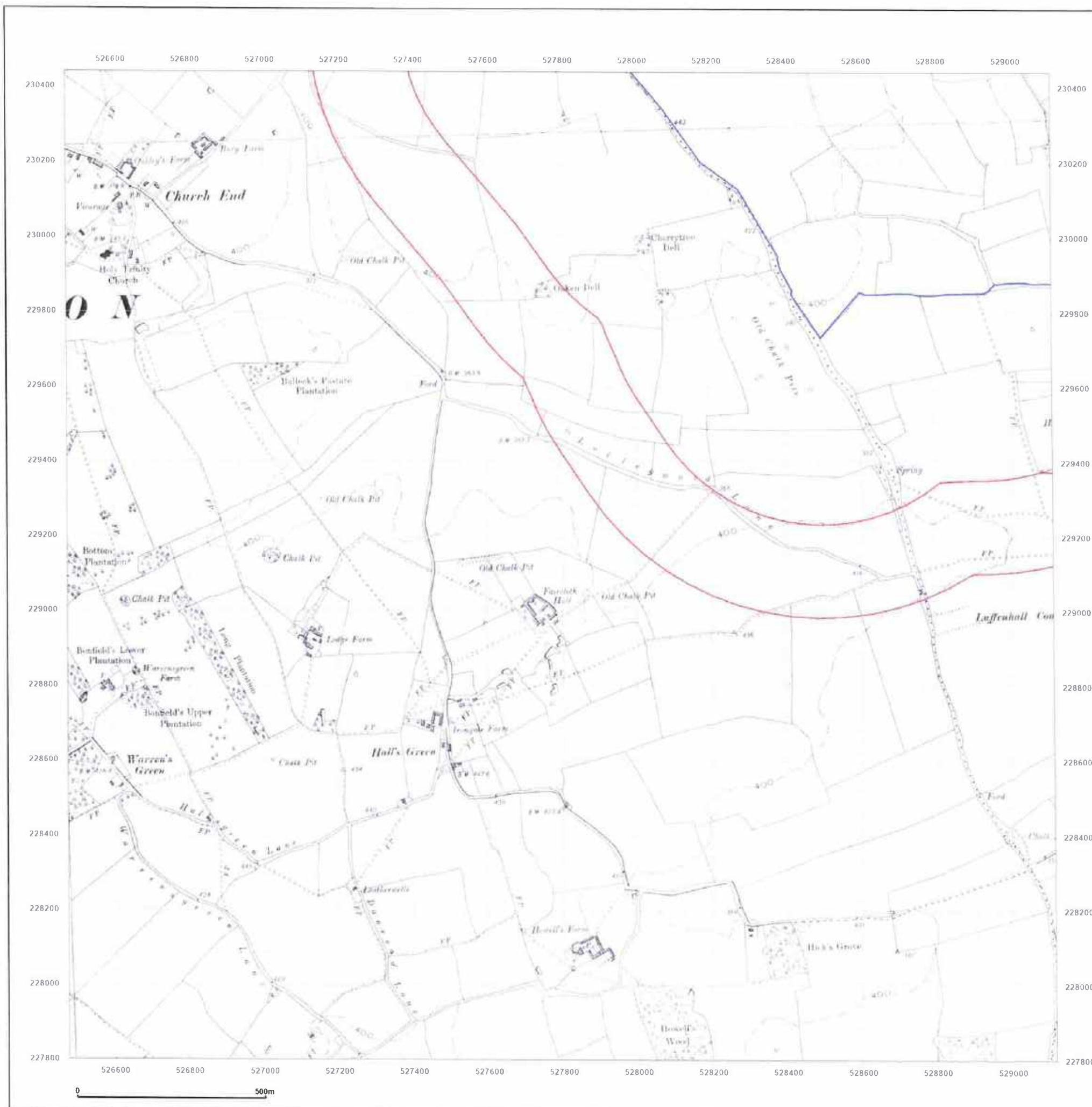


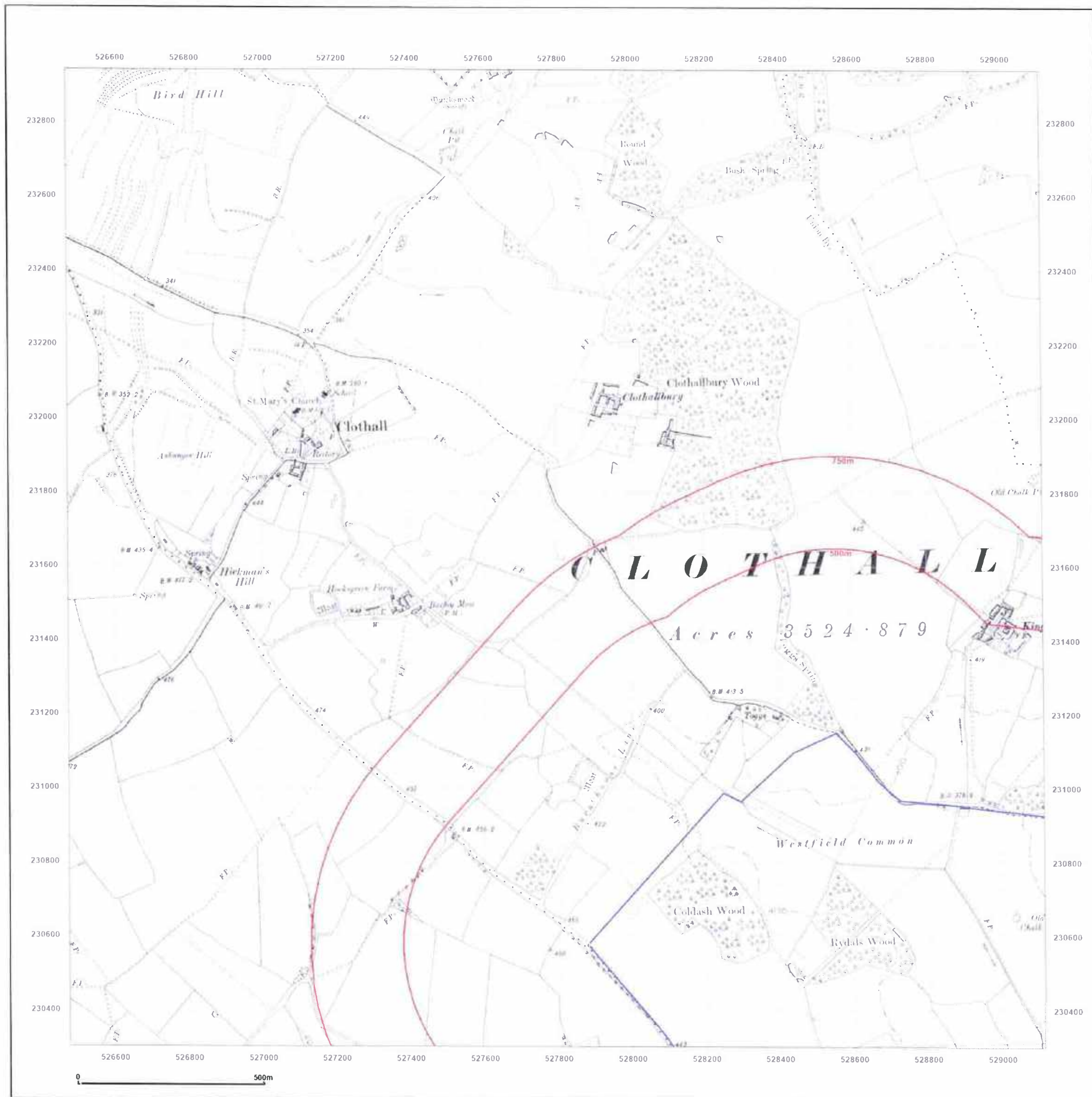
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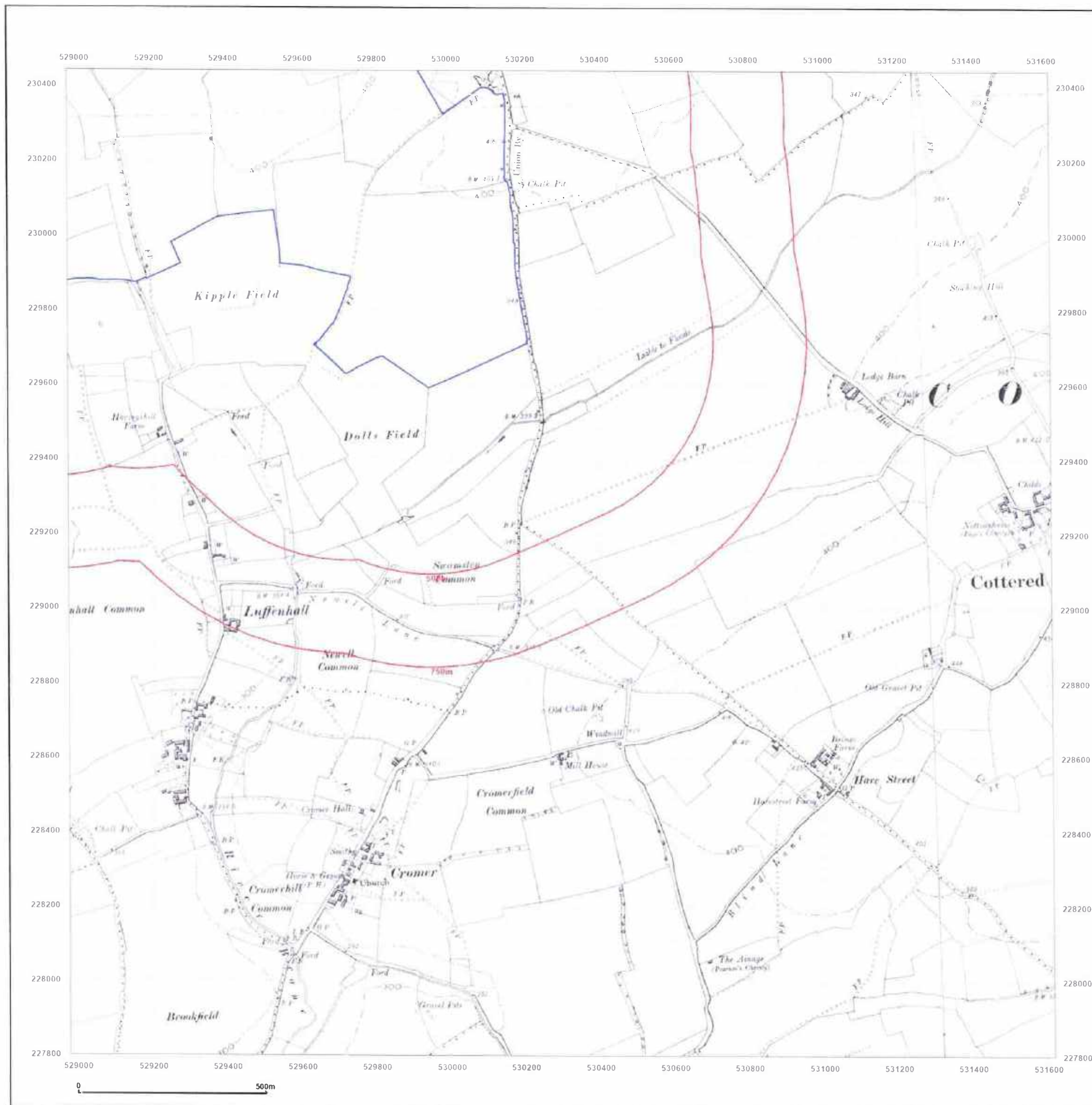


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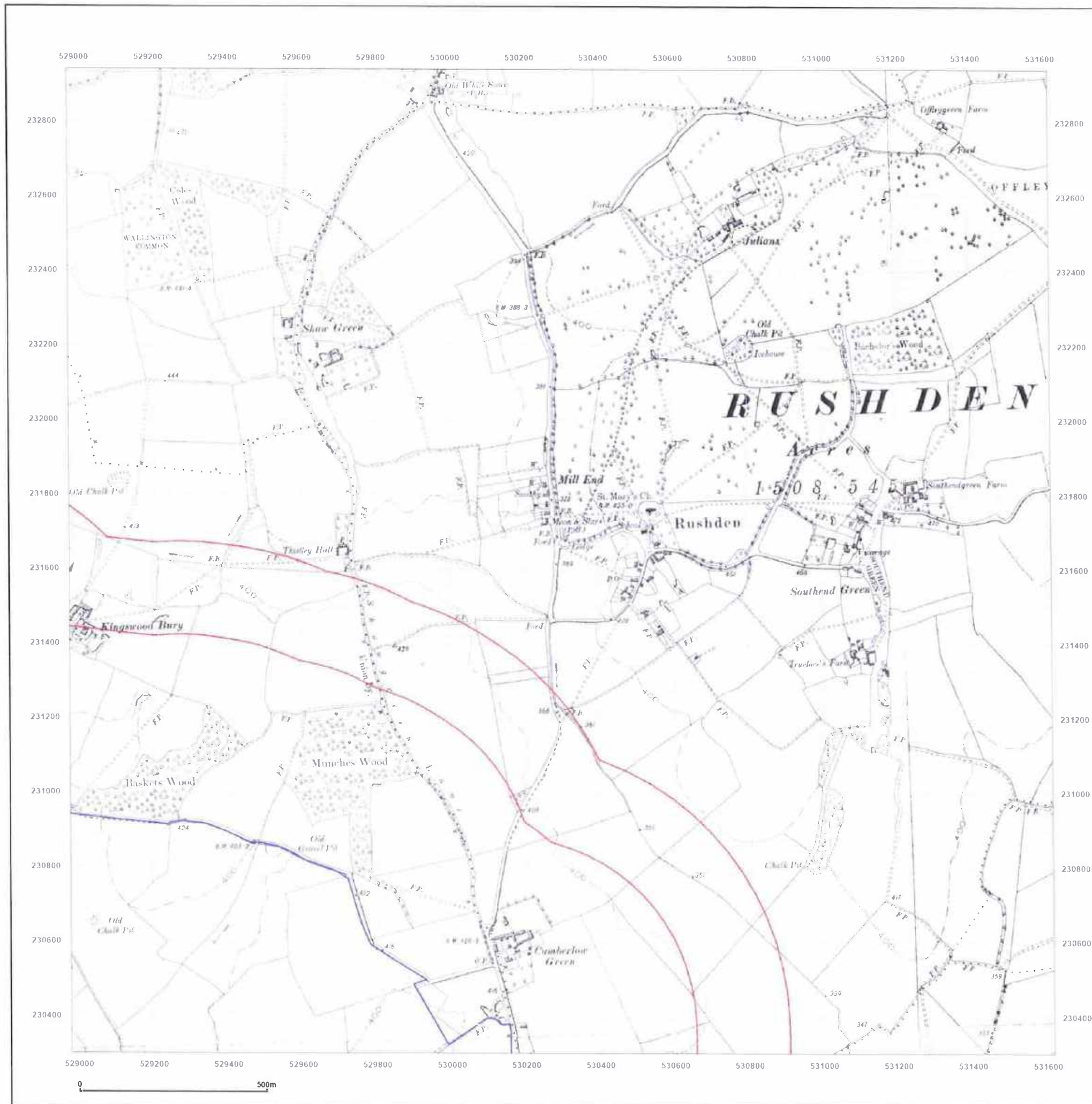


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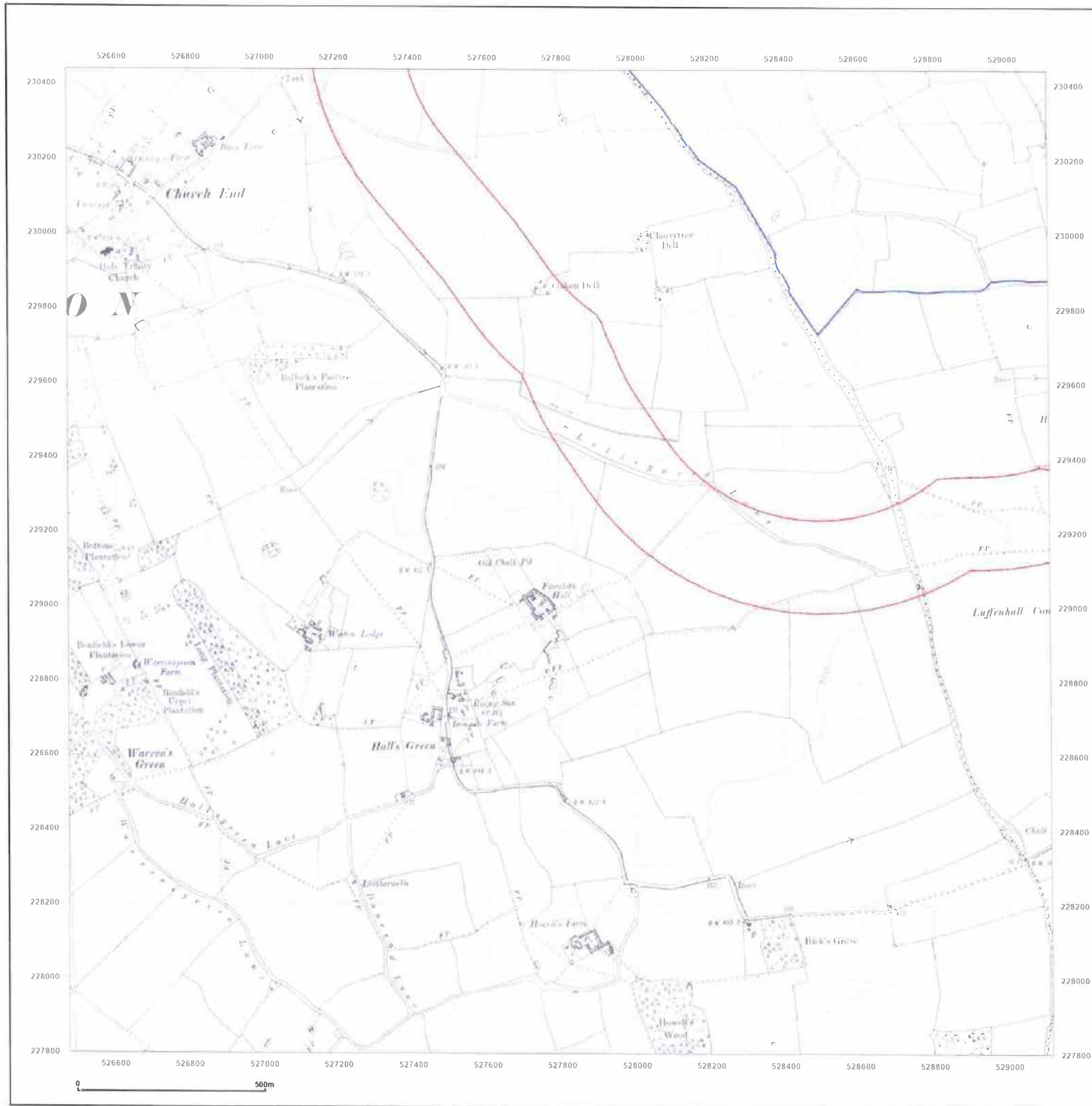


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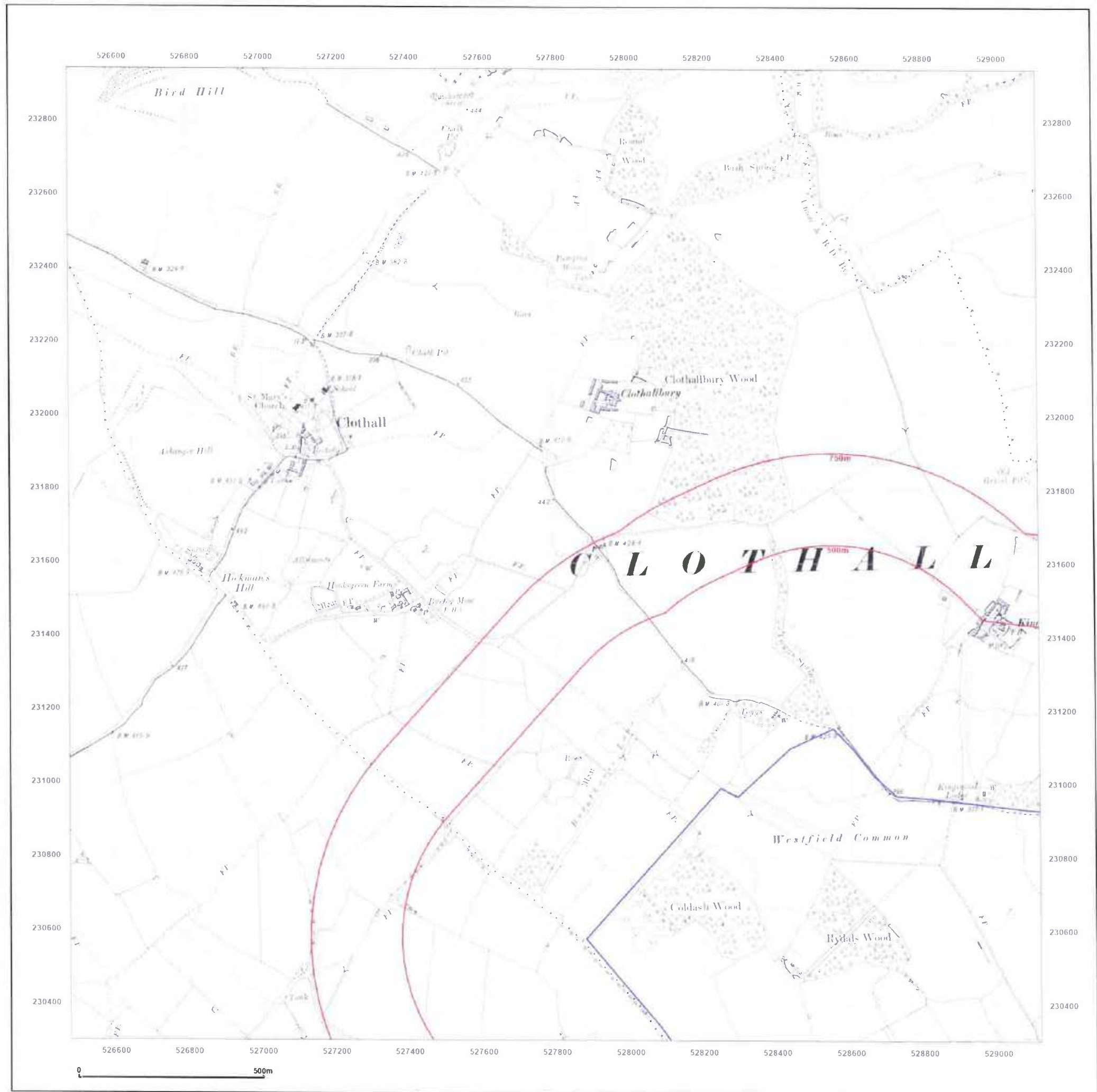


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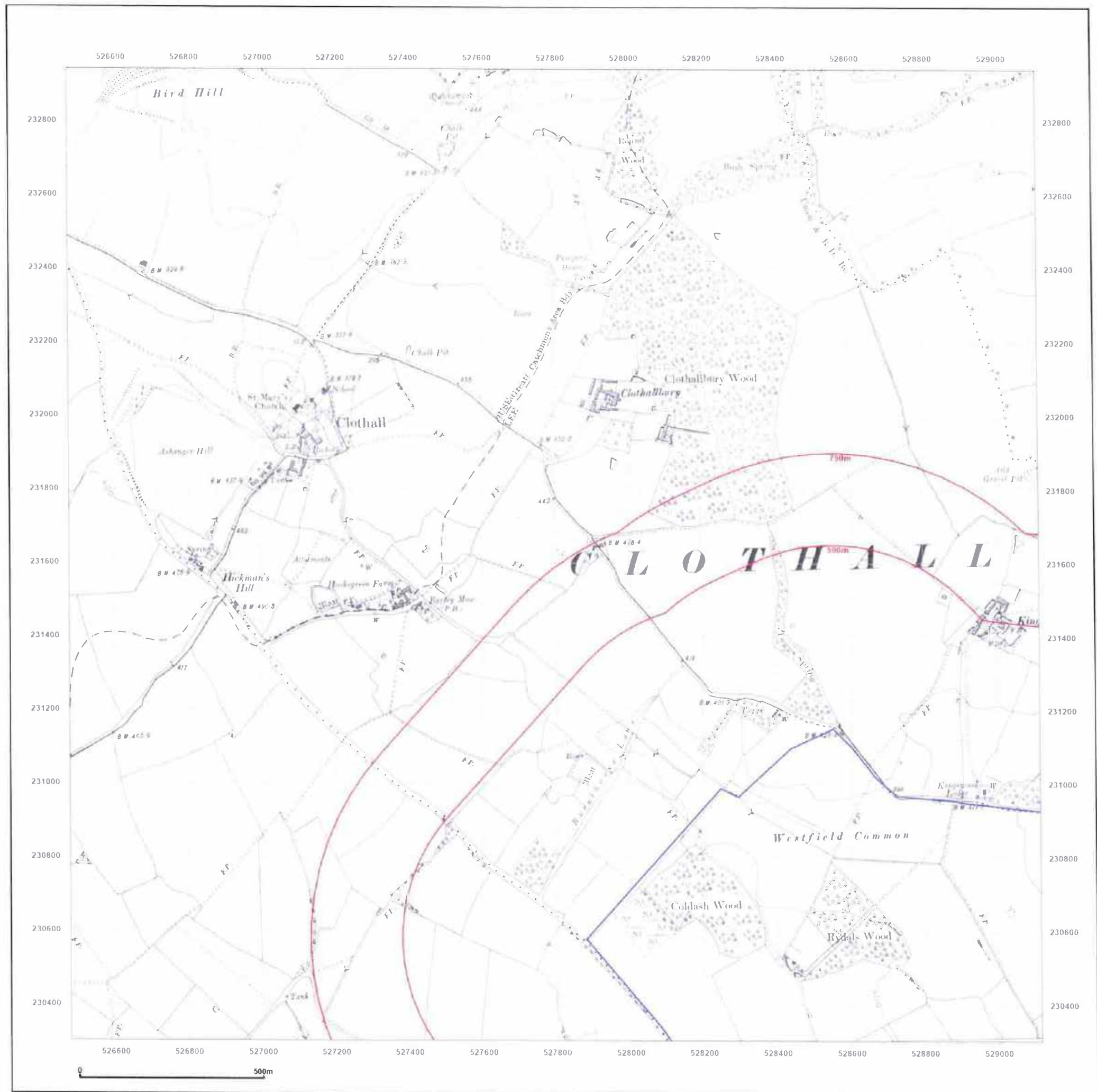


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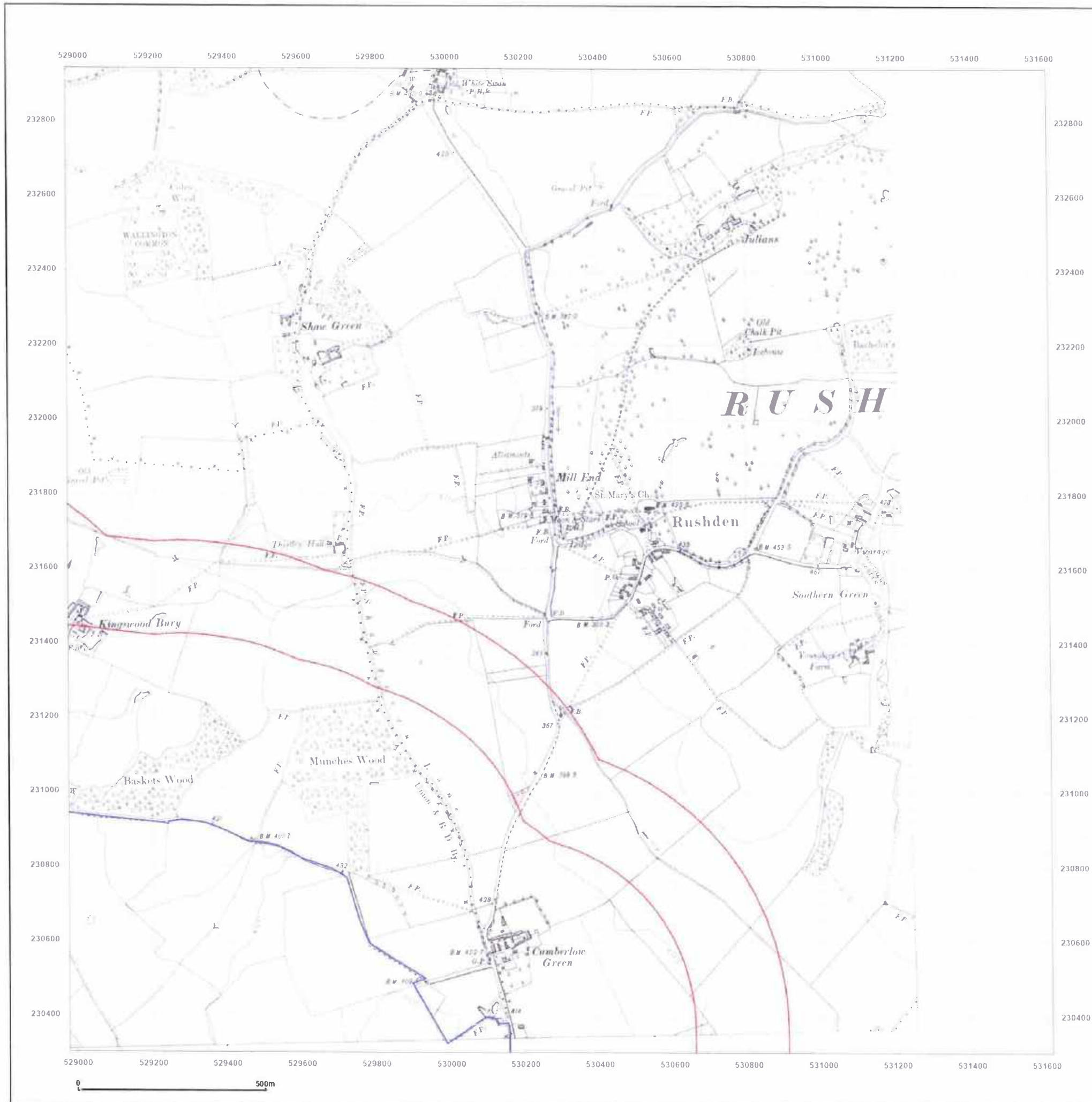


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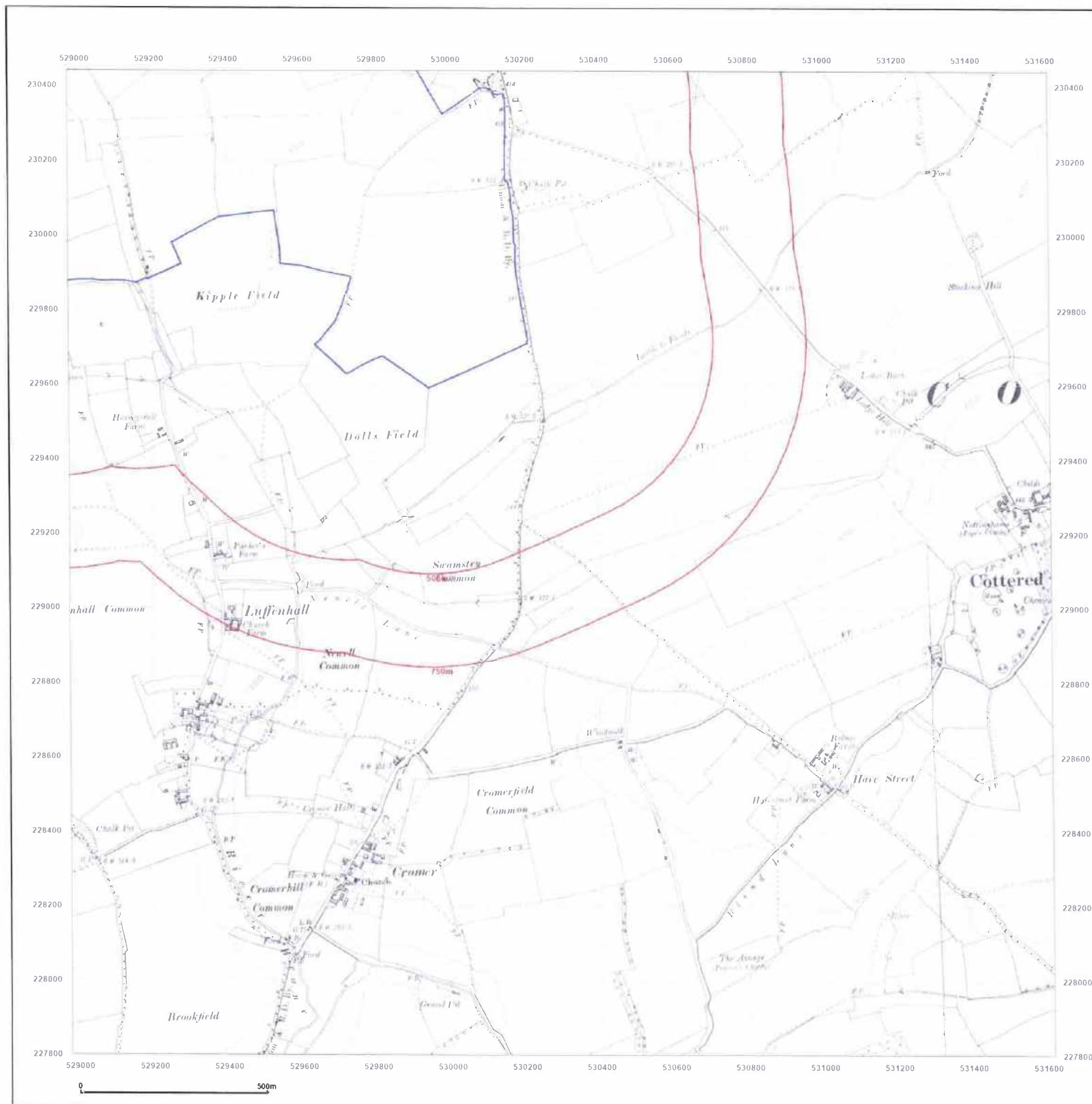


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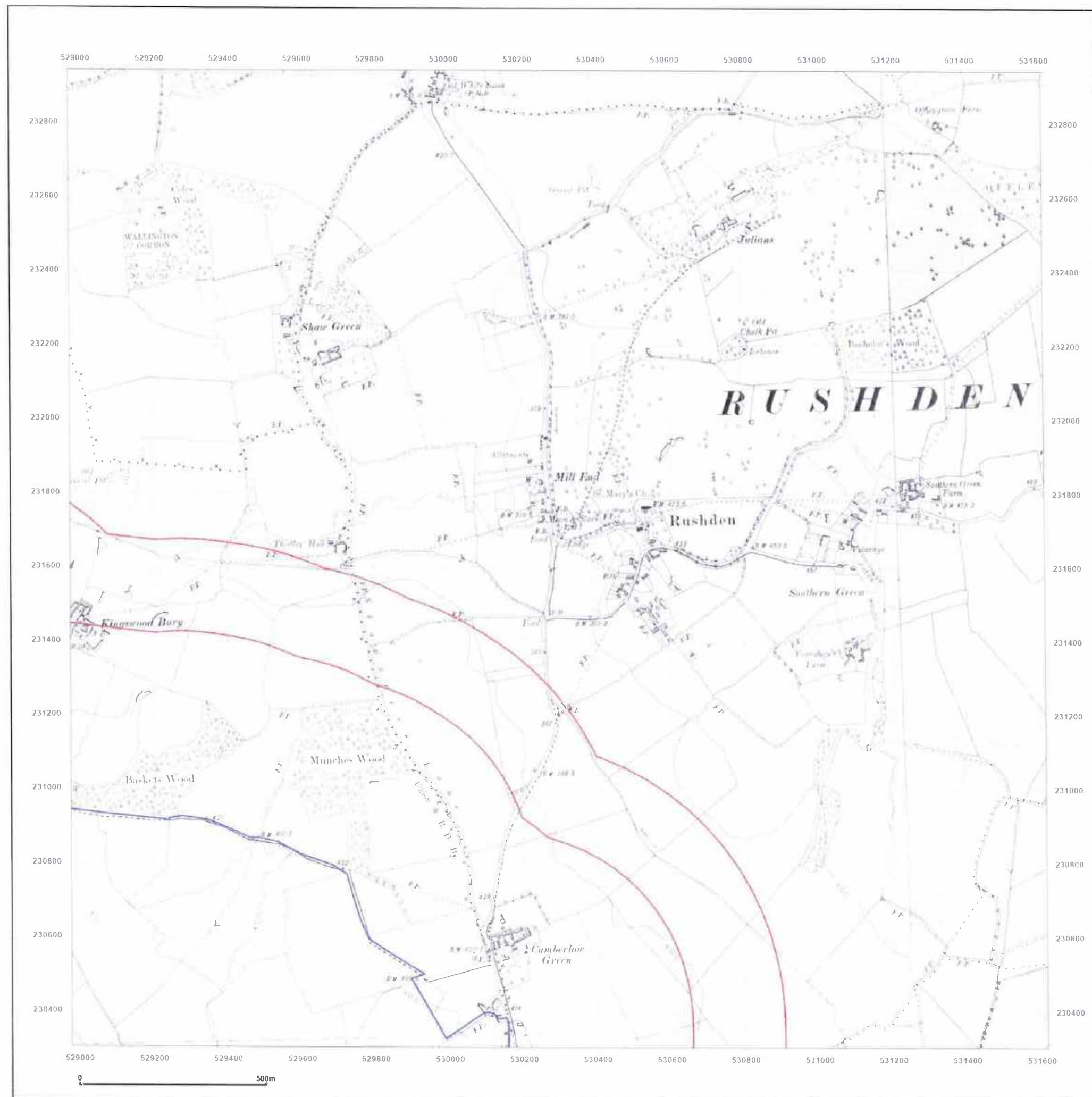


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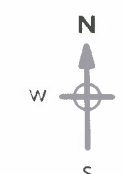
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Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1922
Edition N/A
Copyright N/A
Levelled N/A

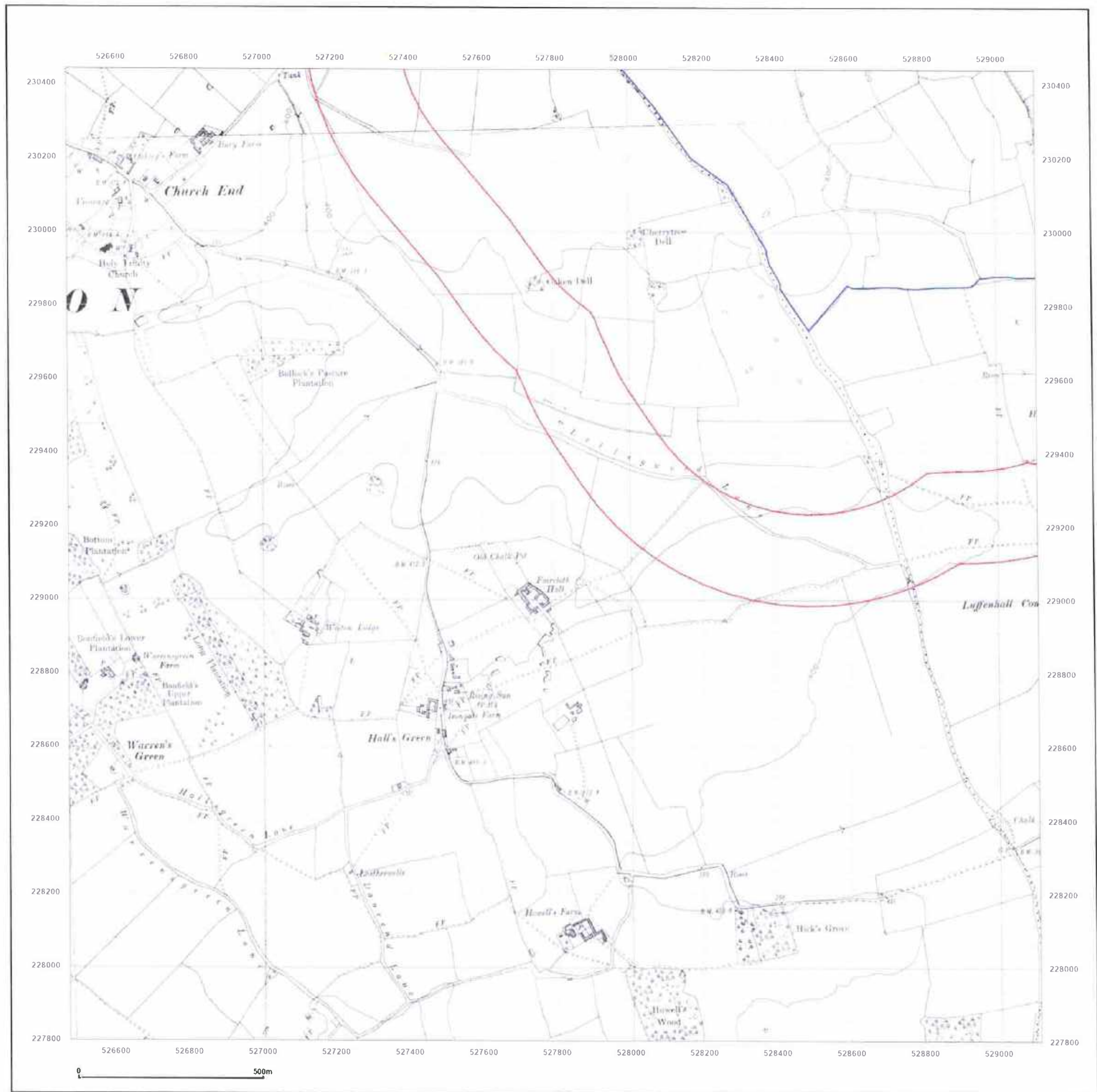


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Site Details:
Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: County Series
Map date: 1946-1947
Scale: 1:10,560
Printed at: 1:10,560



Surveyed 1877
Revised 1947
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1879
Revised 1946
Edition N/A
Copyright N/A
Levelled N/A

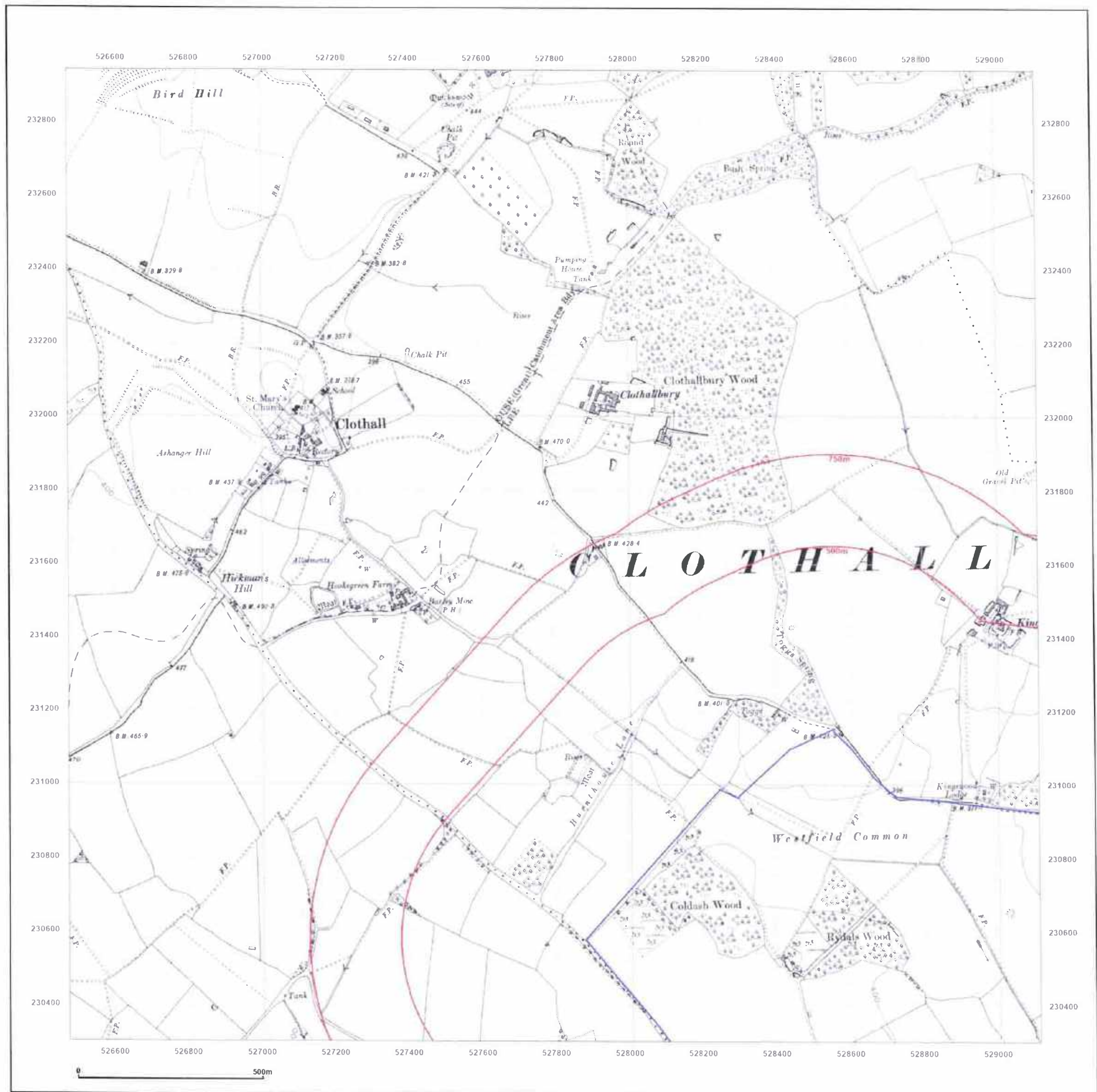


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Site Details:

Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_2
Grid Ref: 527795, 231620

Map Name: County Series

Map date: 1947

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1877
Revised 1947
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1879
Revised 1947
Edition 1947
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Site Details:

Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: County Series

Map date: 1947

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1879
 Revised 1947
 Edition 1947
 Copyright N/A
 Levelled N/A

Surveyed 1877
 Revised 1947
 Edition N/A
 Copyright N/A
 Levelled 1921

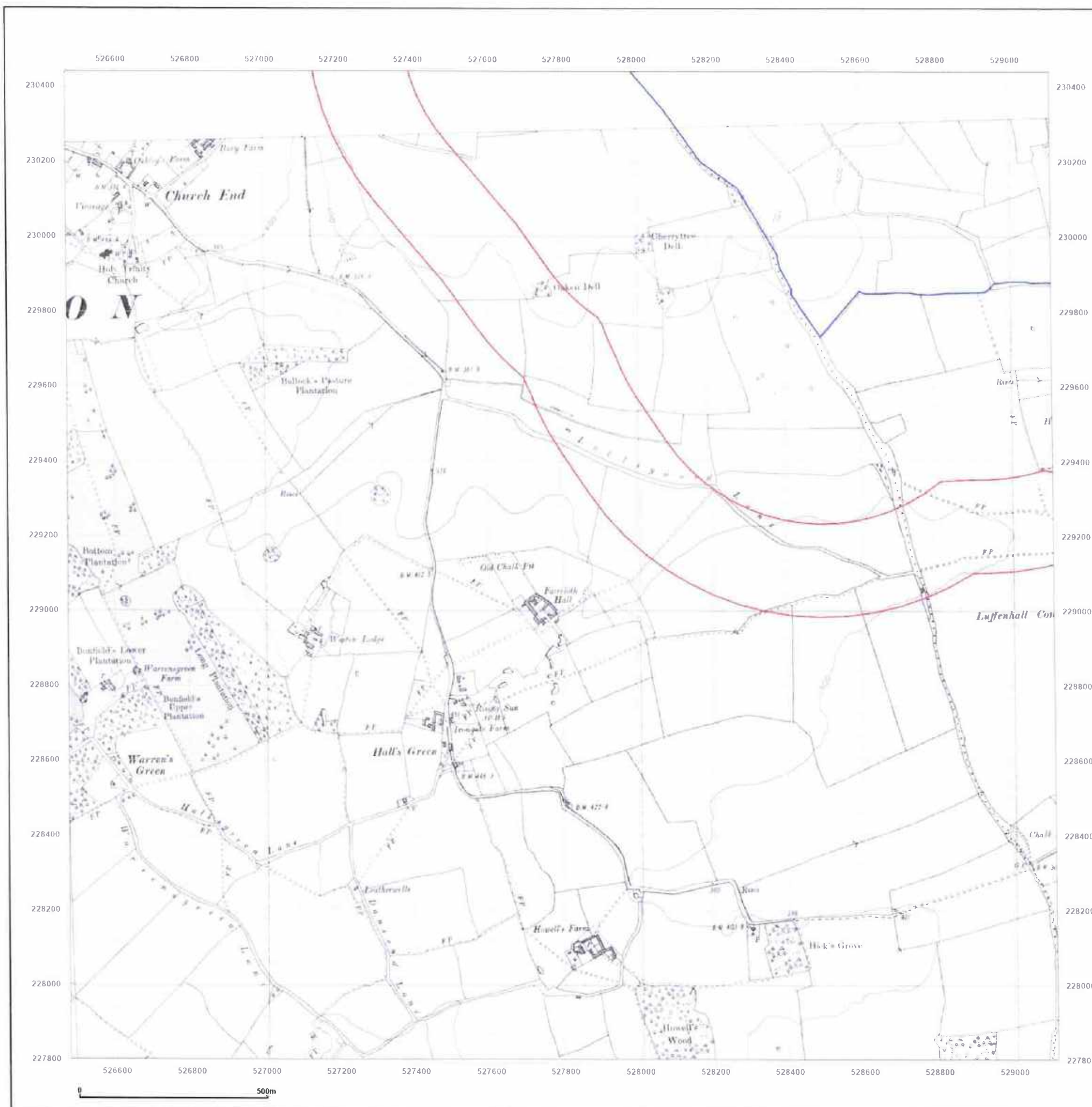


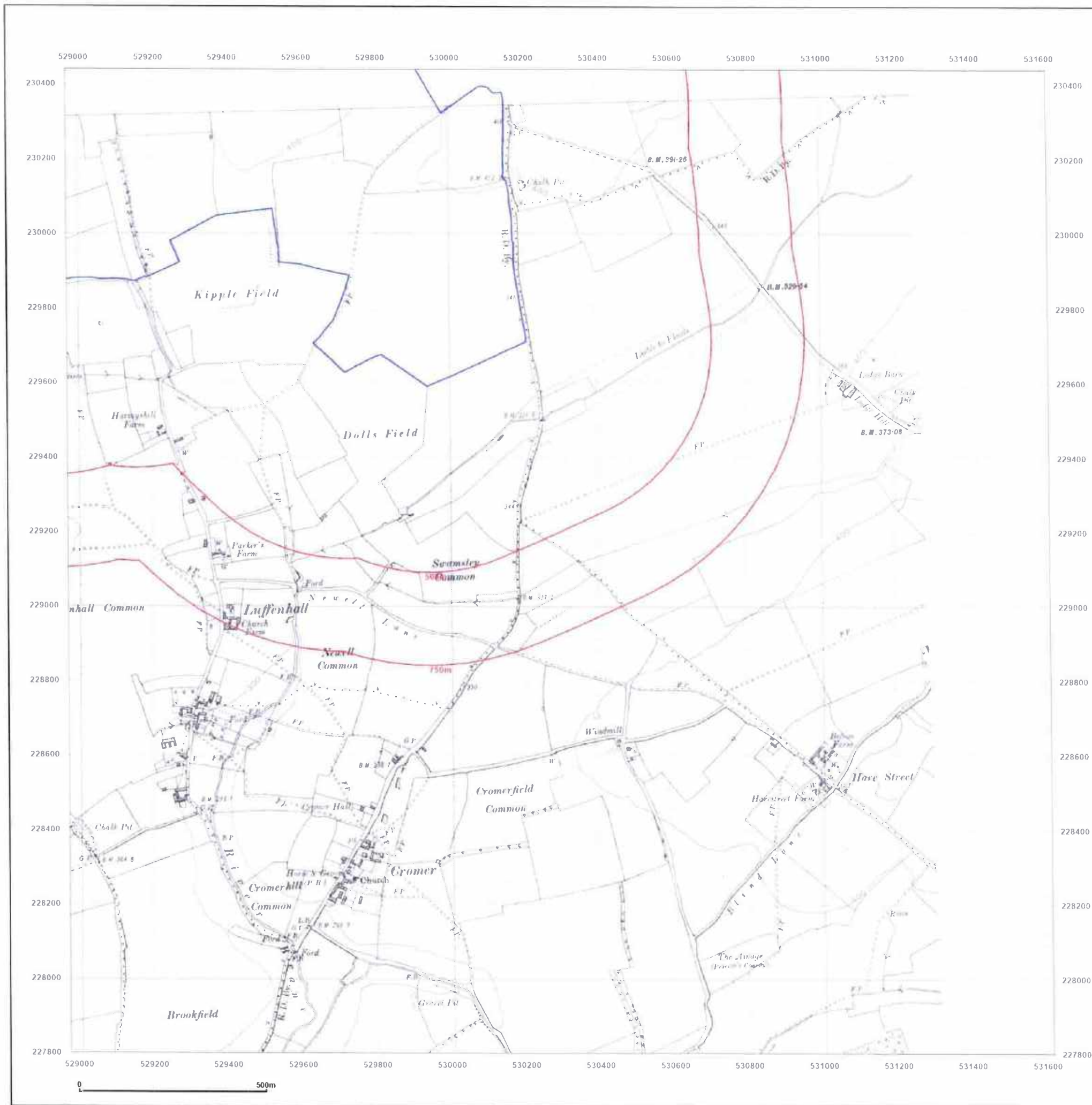
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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: County Series

Map date: 1947

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1877
Revised 1947
Edition N/A
Copyright N/A
Levelled 1921

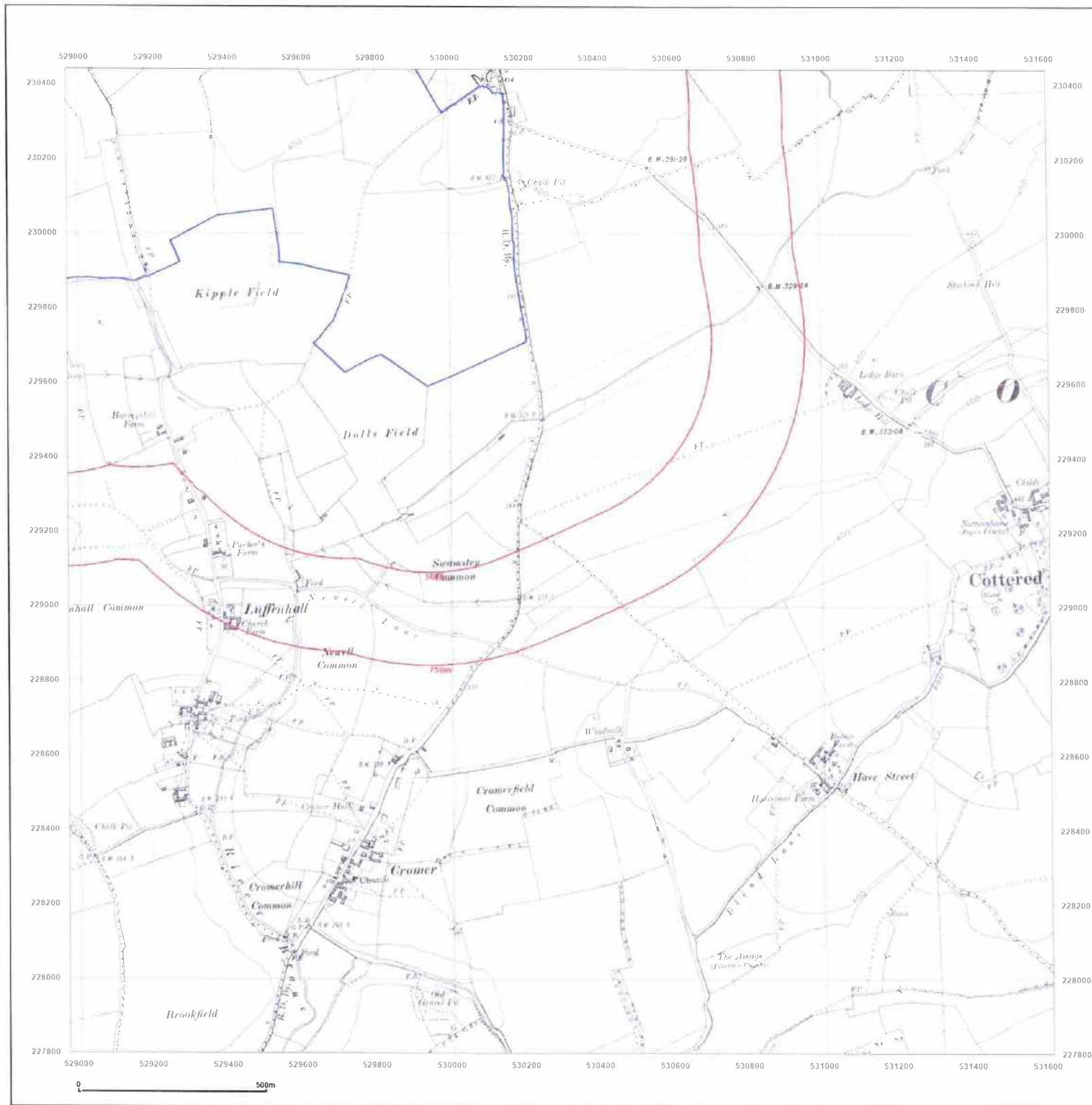


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Site Details:

Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: County Series

Map date: 1947-1950

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1877
Revised 1947
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1876
Revised 1949
Edition 1950
Copyright N/A
Levelled 1922

Surveyed 1879
Revised 1947
Edition 1947
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1948
Edition N/A
Copyright N/A
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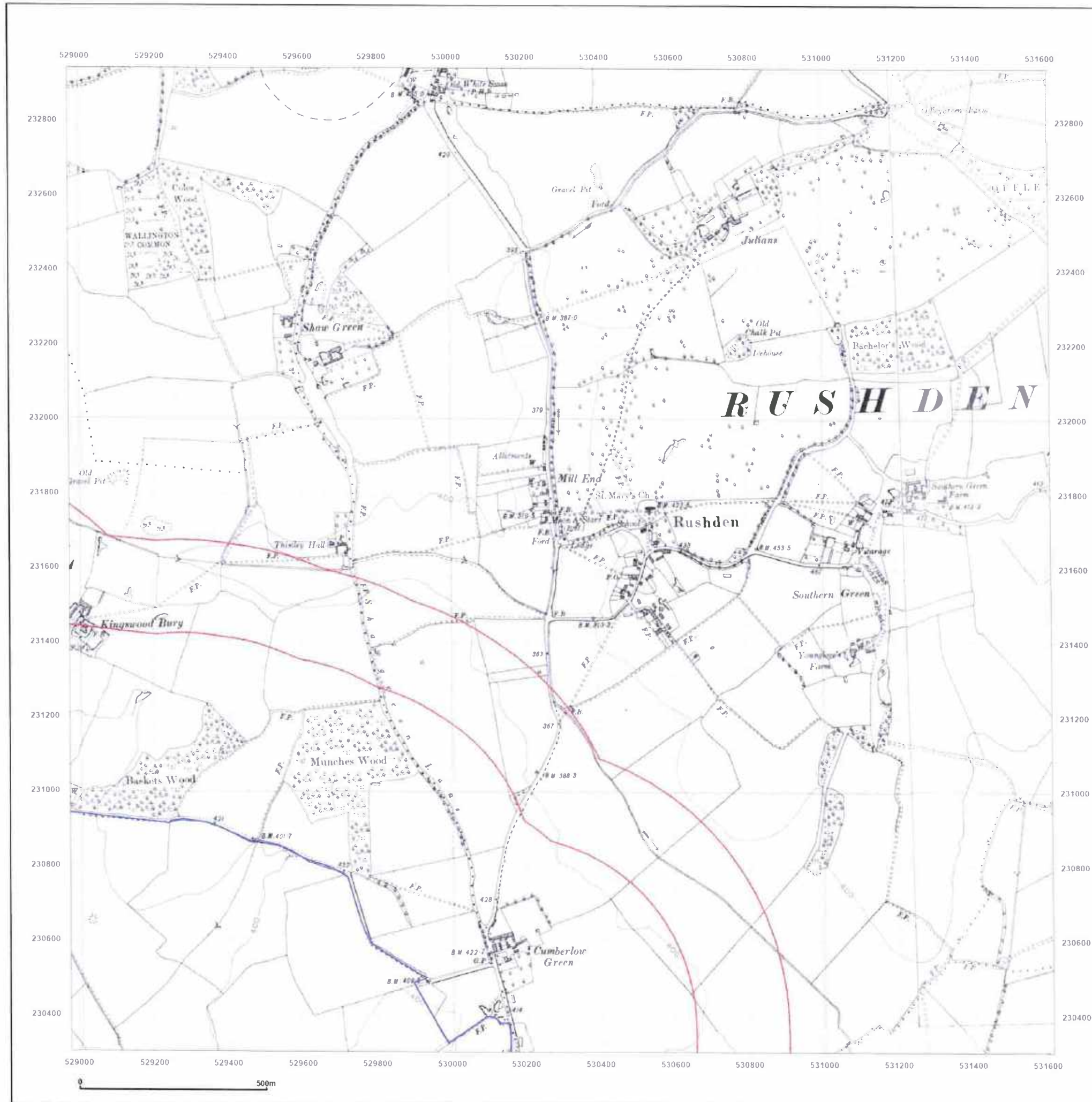


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_2
Grid Ref: 530295, 231620

Map Name: County Series

Map date: 1947-1950

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1877
Revised 1947
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1876
Revised 1949
Edition 1950
Copyright N/A
Levelled 1922

Surveyed 1879
Revised 1947
Edition 1947
Copyright N/A
Levelled N/A

Surveyed 1877
Revised 1948
Edition N/A
Copyright N/A
Levelled N/A

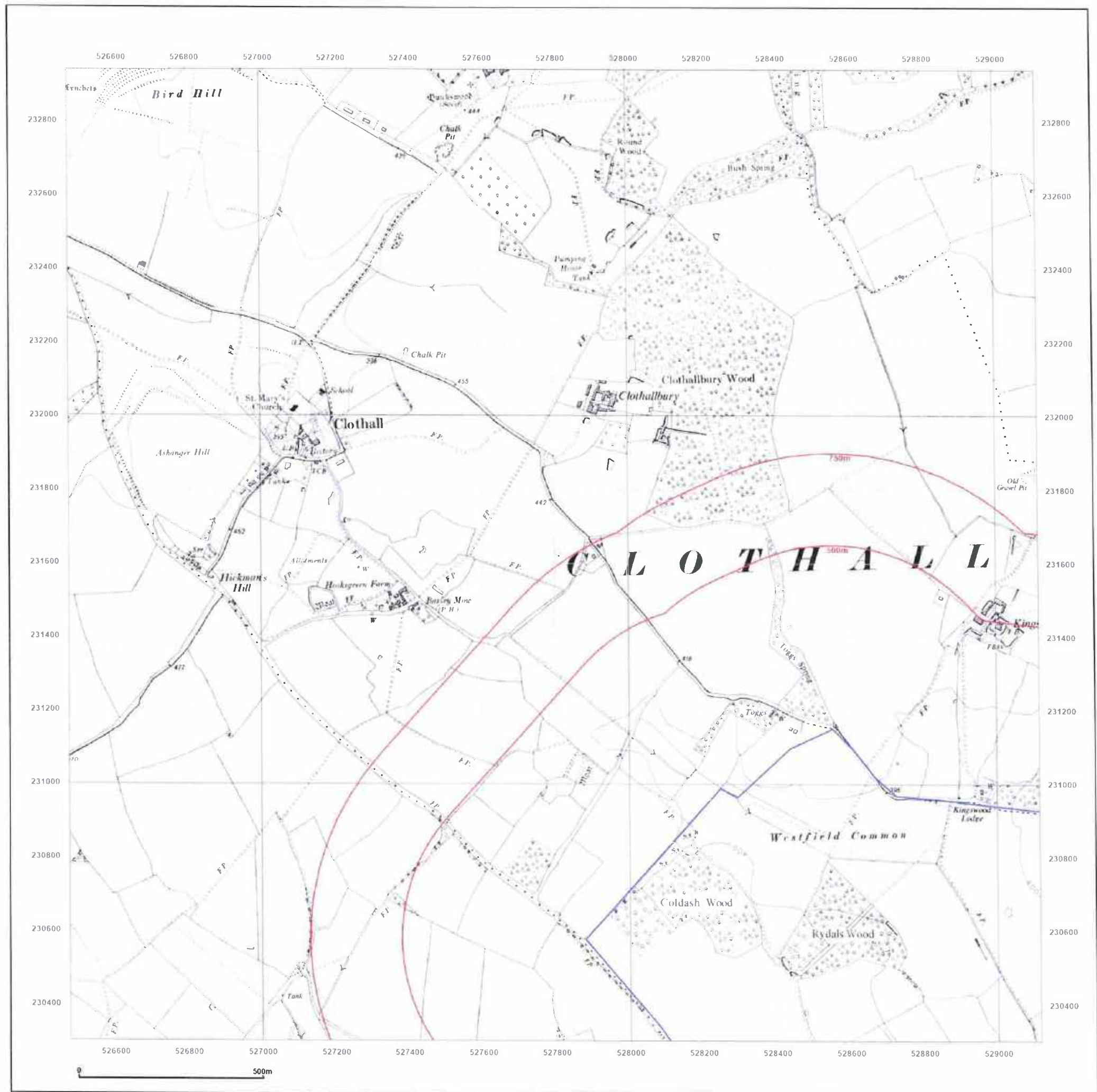


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Site Details:

Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_2
Grid Ref: 527795, 231620

Map Name: Provisional

Map date: 1951

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
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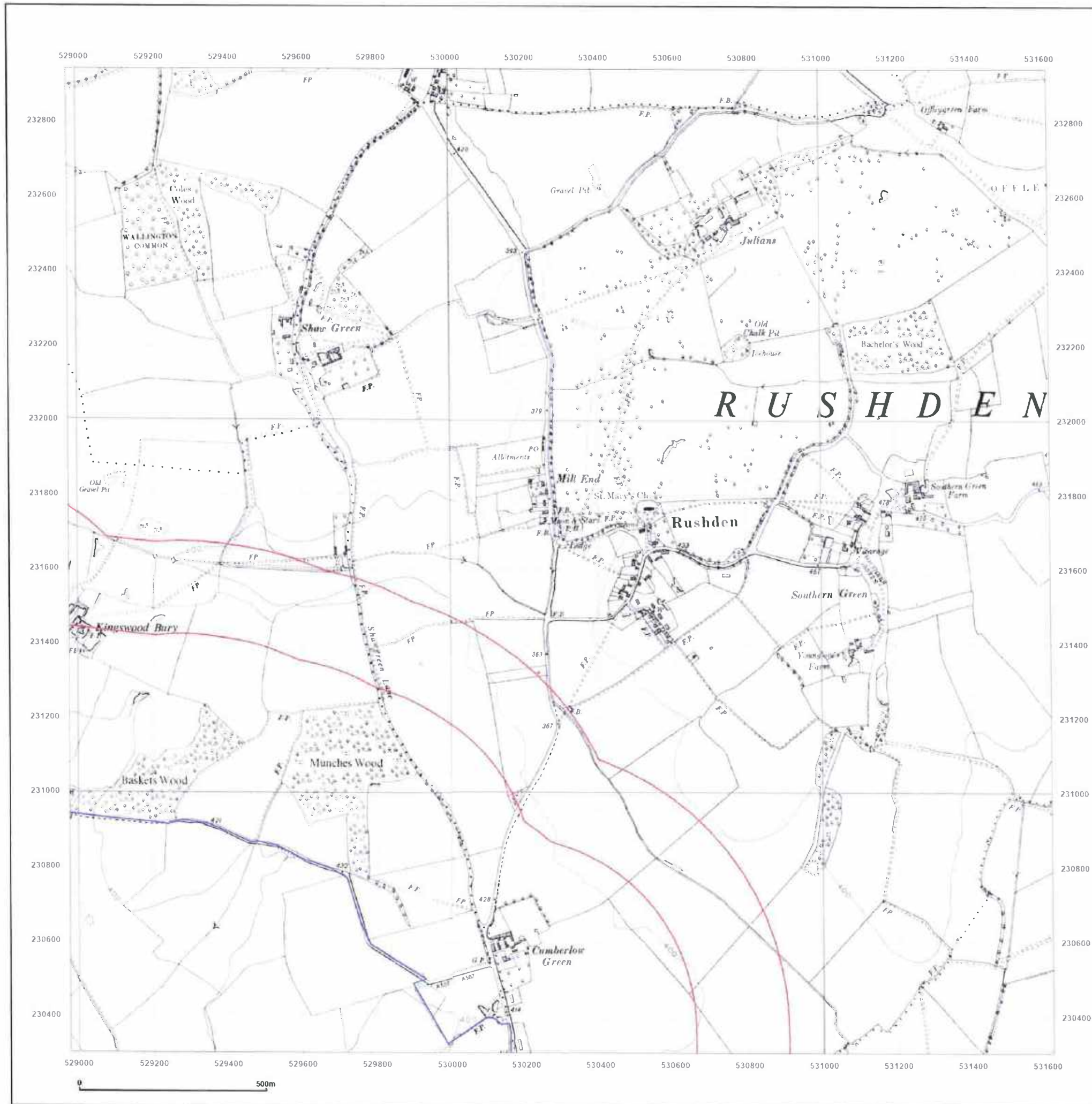


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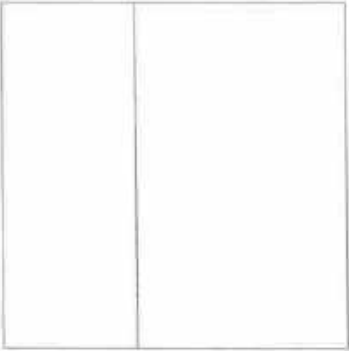
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Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_2
Grid Ref: 530295, 231620

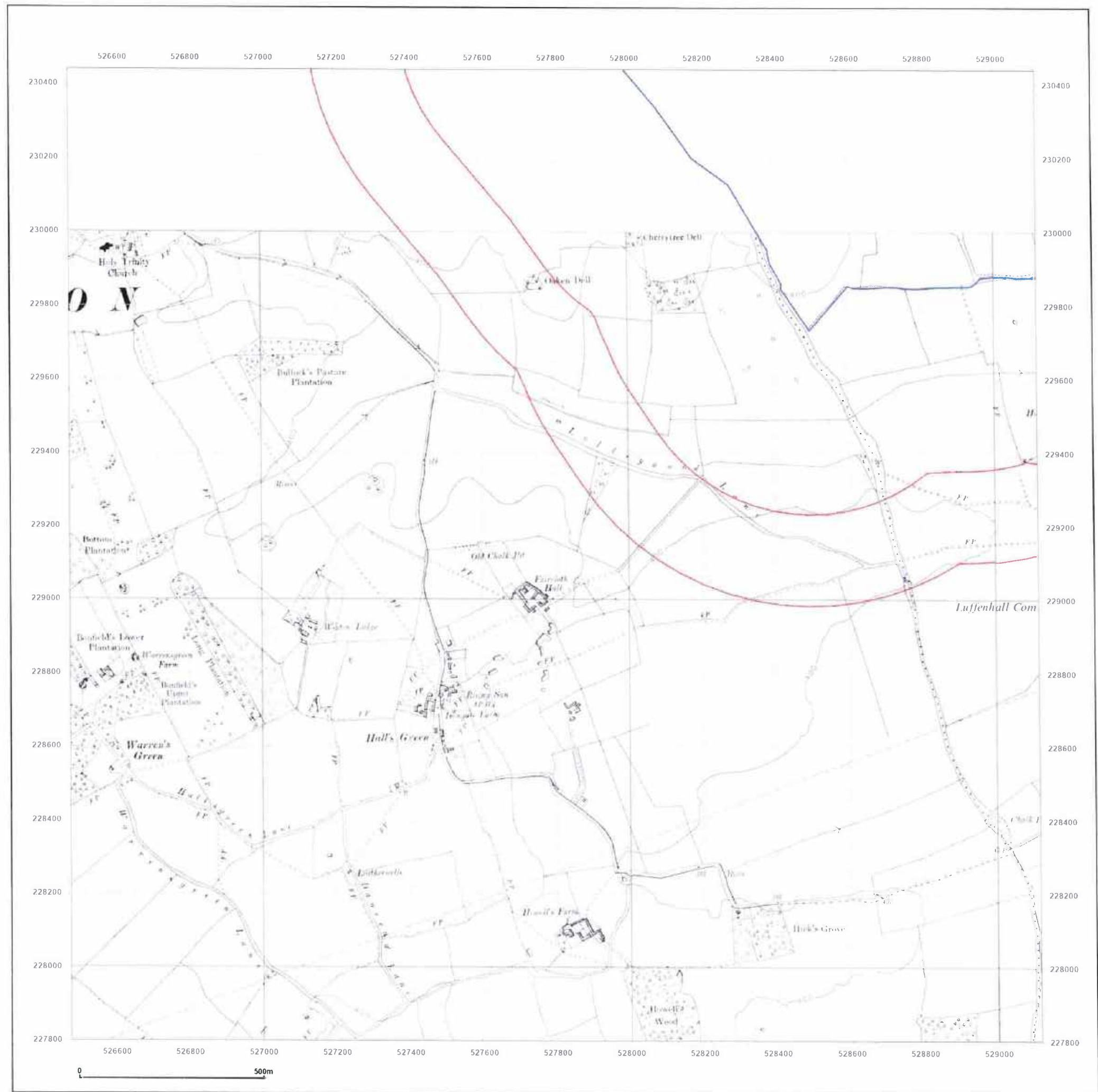
Map Name: Provisional
Map date: 1951
Scale: 1:10,560
Printed at: 1:10,560

Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1951
Revised 1951
Edition N/A
Copyright N/A
Levelled N/A





Site Details:

Clothall, Hertfordshire - Solar
and BESS

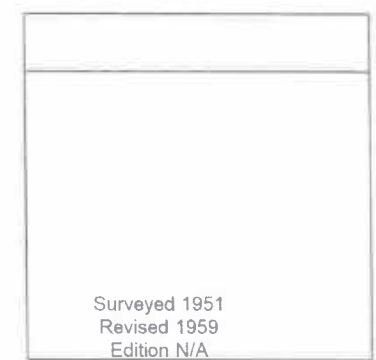
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Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: Provisional

Map date: 1959

Scale: 1:10,560

Printed at: 1:10,560

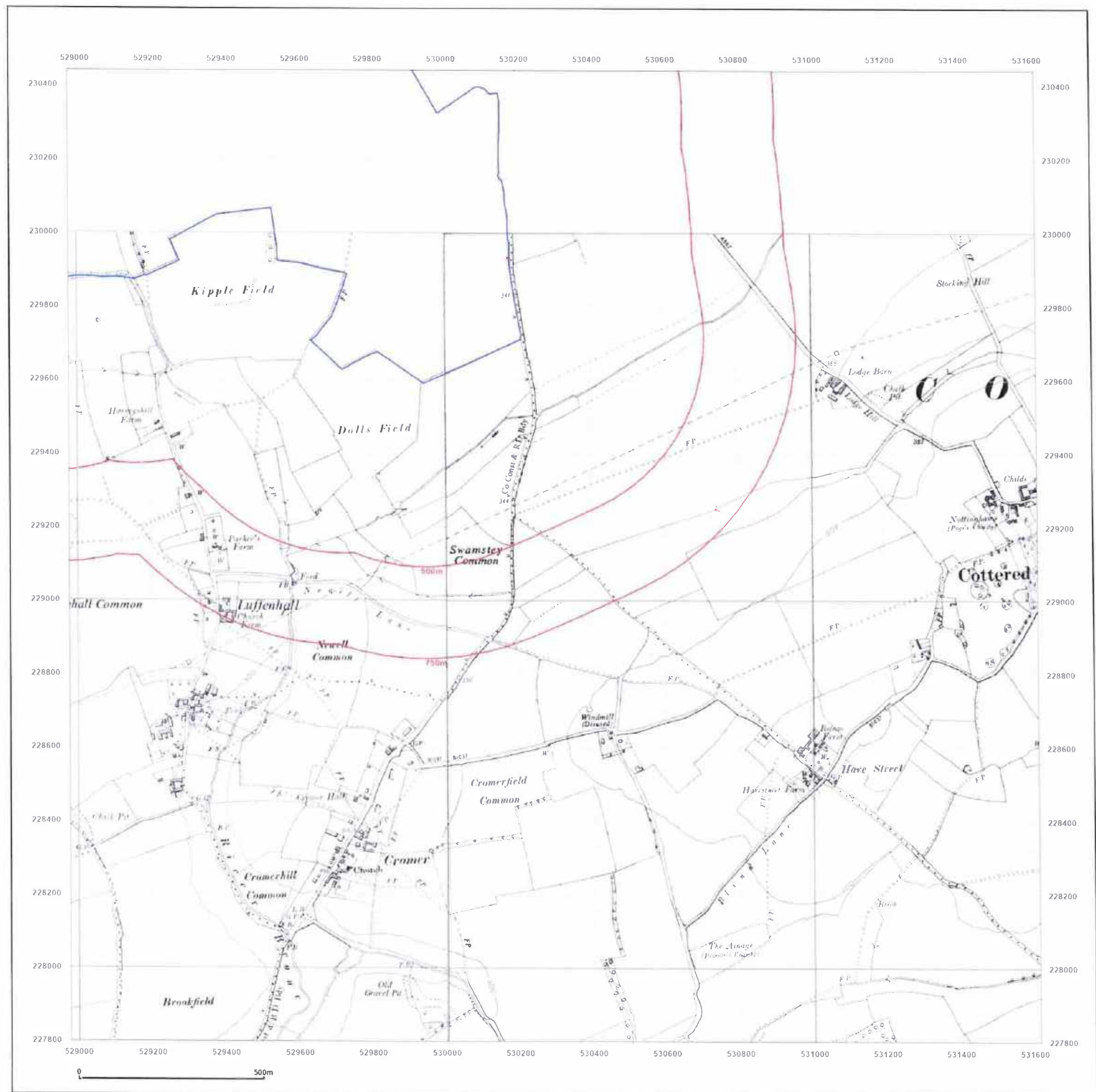


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Site Details:

Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: Provisional
Map date: 1959-1960
Scale: 1:10,560
Printed at: 1:10,560

Map Legend:

Symbol	Description
[Red line]	Boundary
[Blue line]	Water
[Black line]	Other

Map Legend:

Symbol	Description
[Red line]	Boundary
[Blue line]	Water
[Black line]	Other

Surveyed 1951
Revised 1959
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised 1959
Edition N/A
Copyright 1960
Levelled N/A

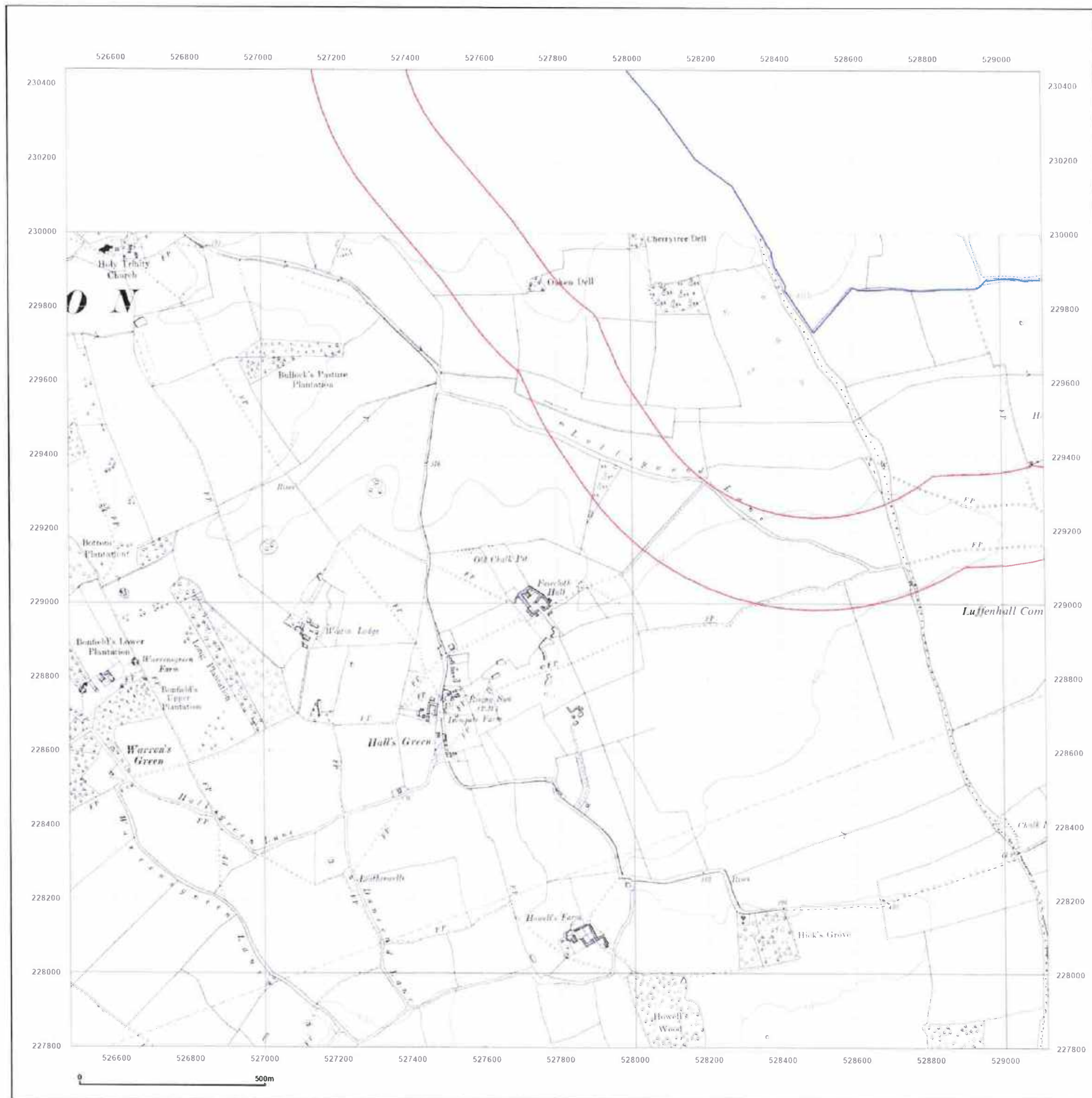
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Site Details:

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and BESS

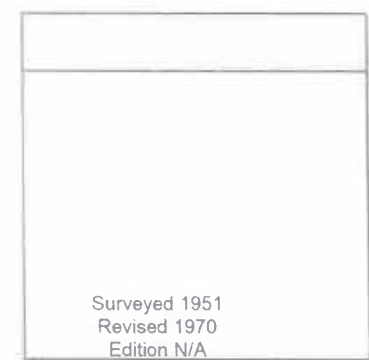
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Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: Provisional

Map date: 1970

Scale: 1:10,560

Printed at: 1:10,560

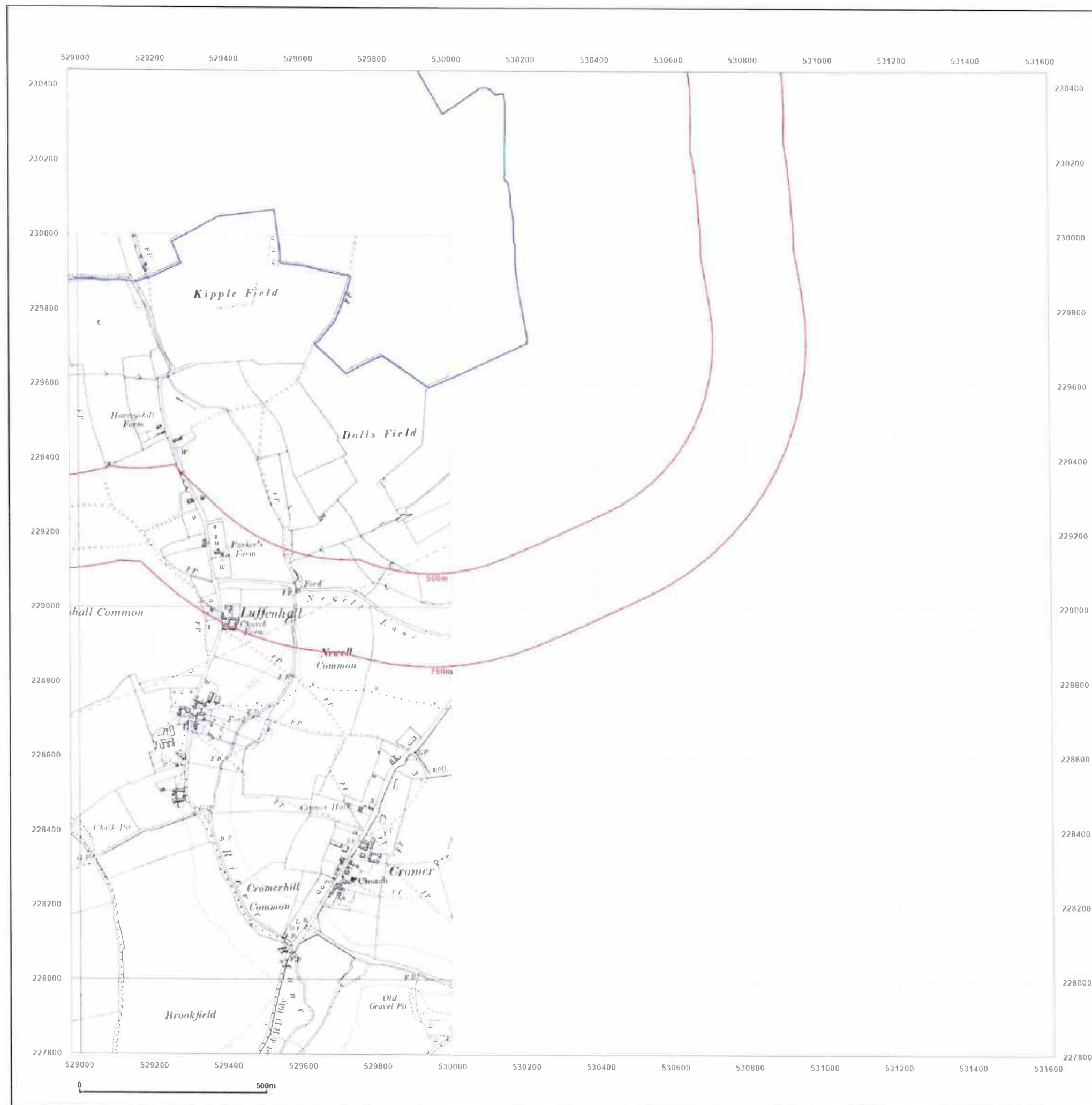


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and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: Provisional

Map date: 1970

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1951
Revised 1970
Edition N/A
Copyright N/A
Levelled N/A

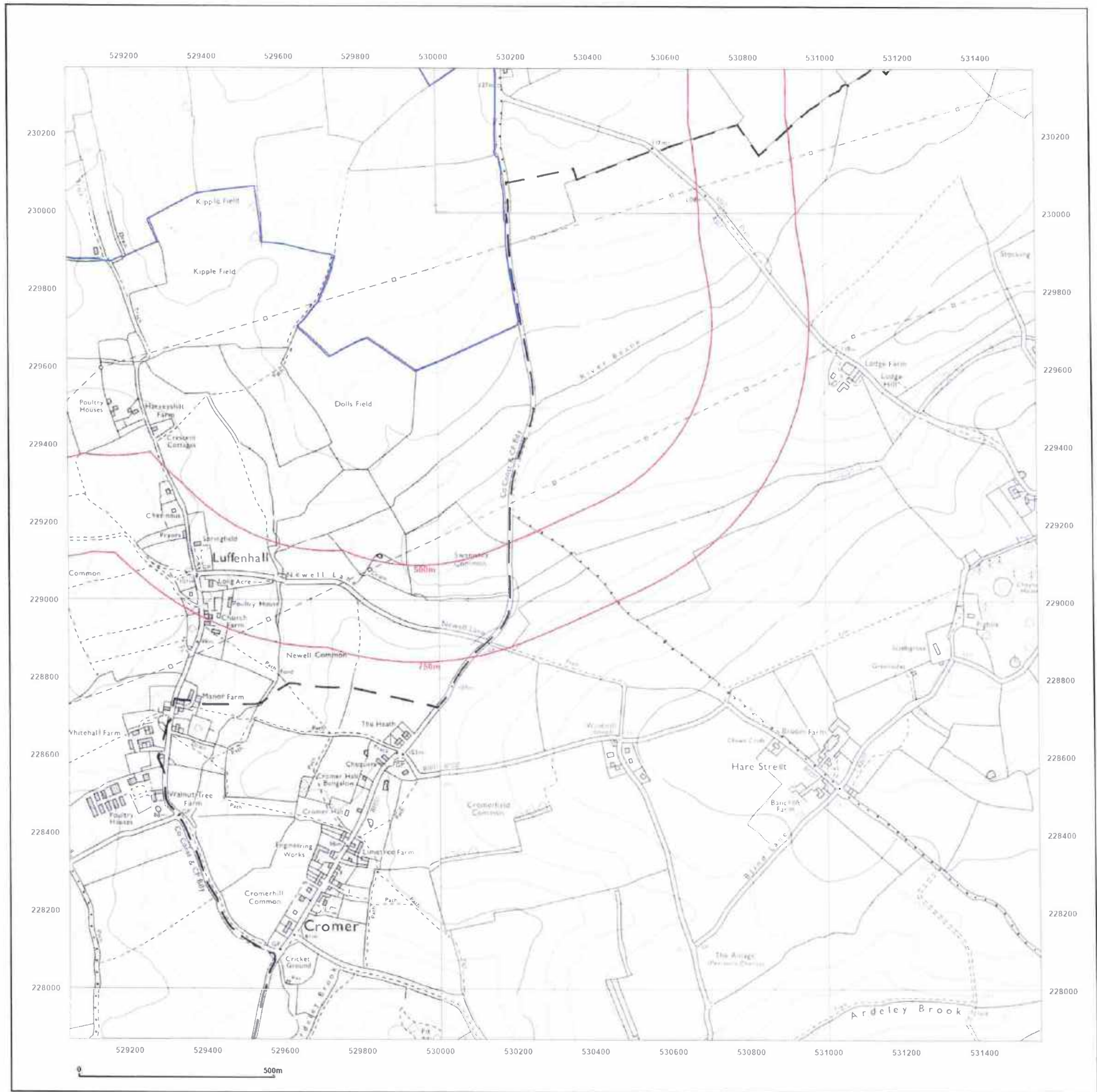


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Site Details:

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and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: National Grid

Map date: 1978-1981

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1975
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1974
Revised 1978
Edition N/A
Copyright 1979
Levelled 1973

Surveyed 1973
Revised 1977
Edition N/A
Copyright 1978
Levelled 1975

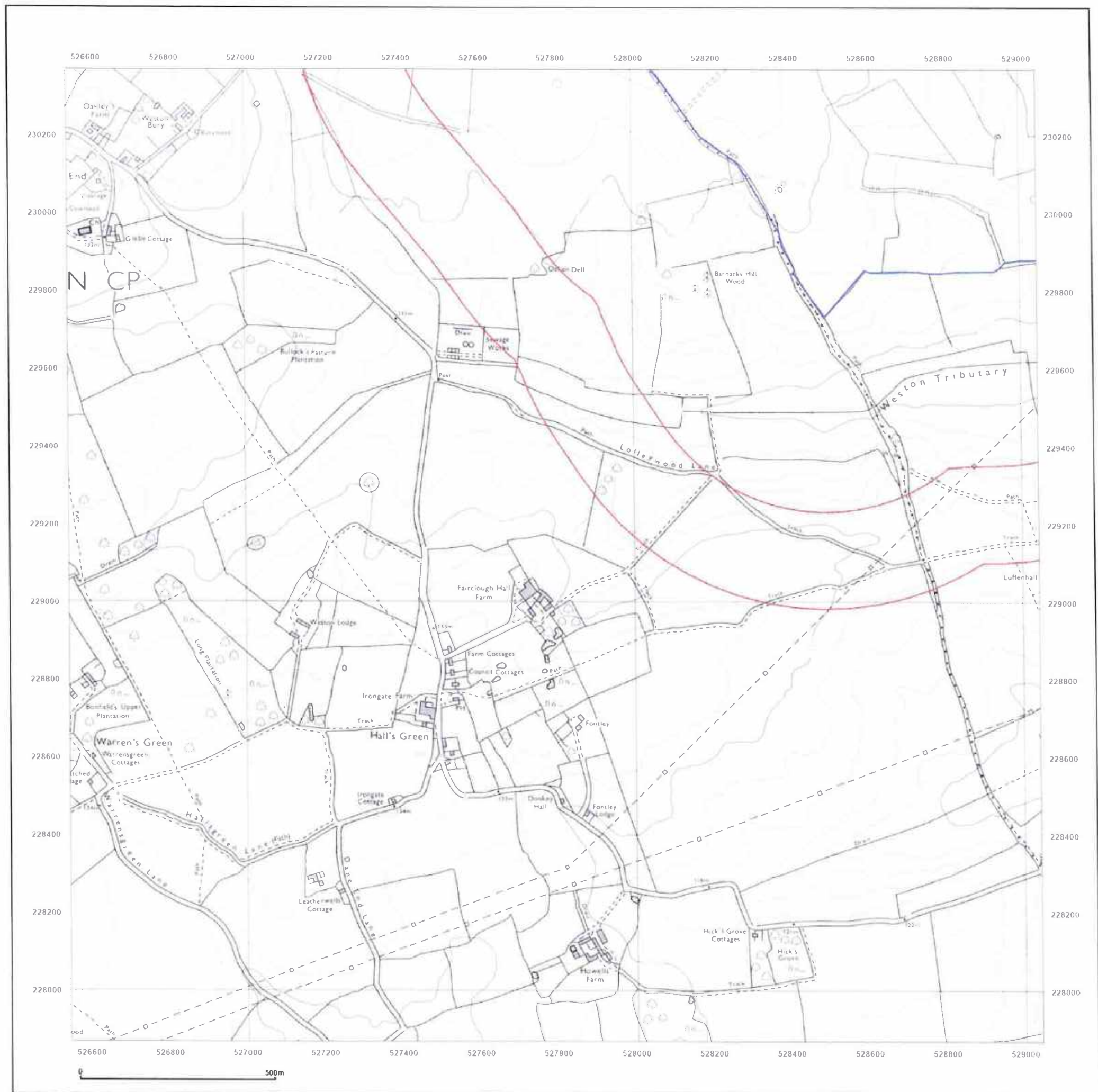


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: National Grid

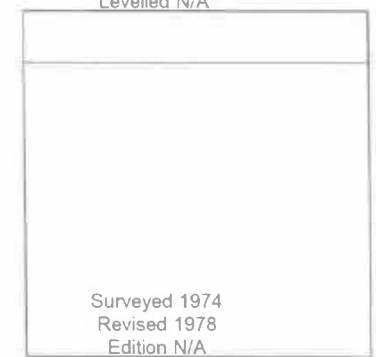
Map date: 1979-1981

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1974
Revised 1978
Edition N/A
Copyright 1979
Levelled 1973

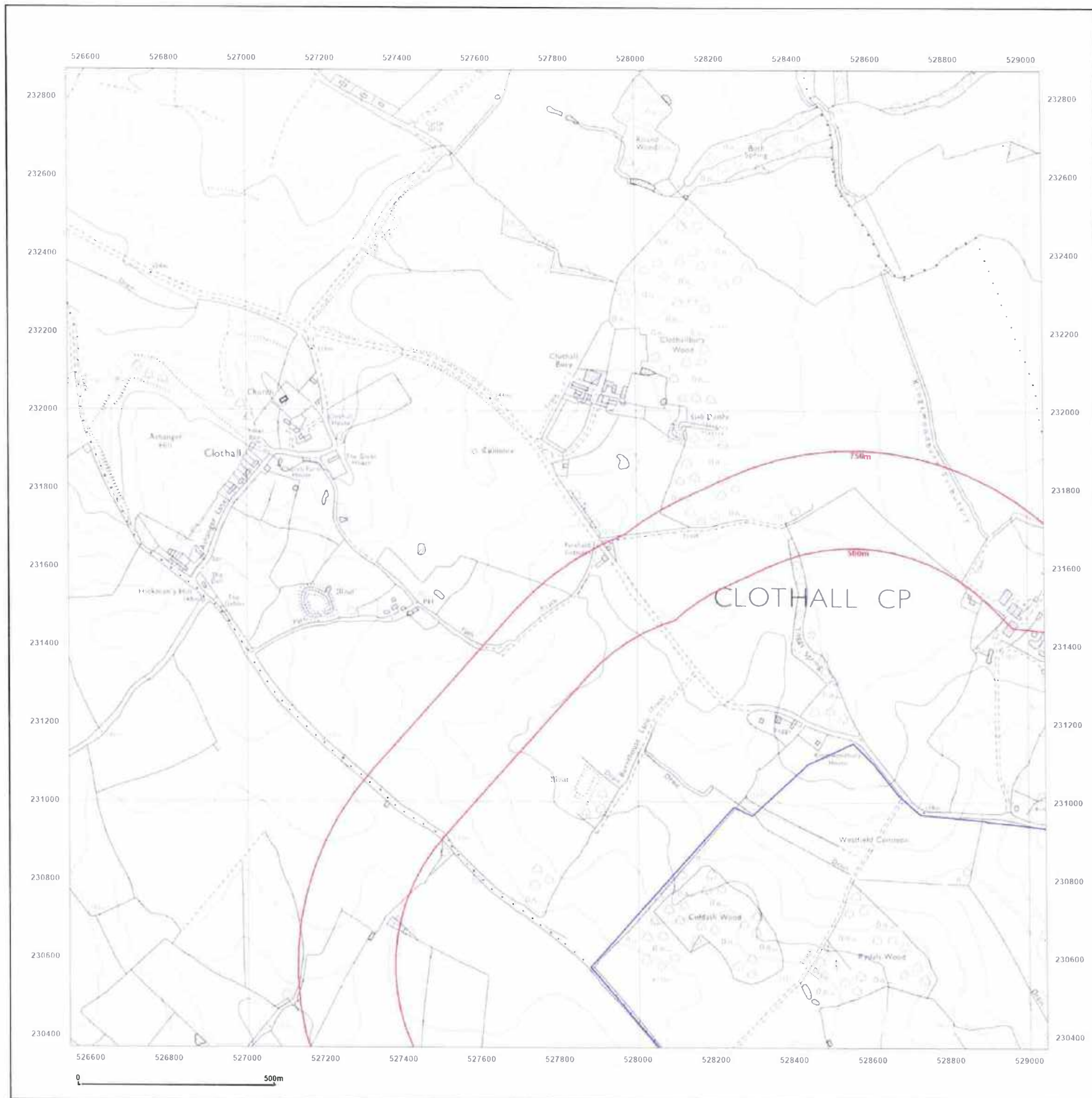


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Site Details:

Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_2
Grid Ref: 527795, 231620

Map Name: National Grid

Map date: 1981

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

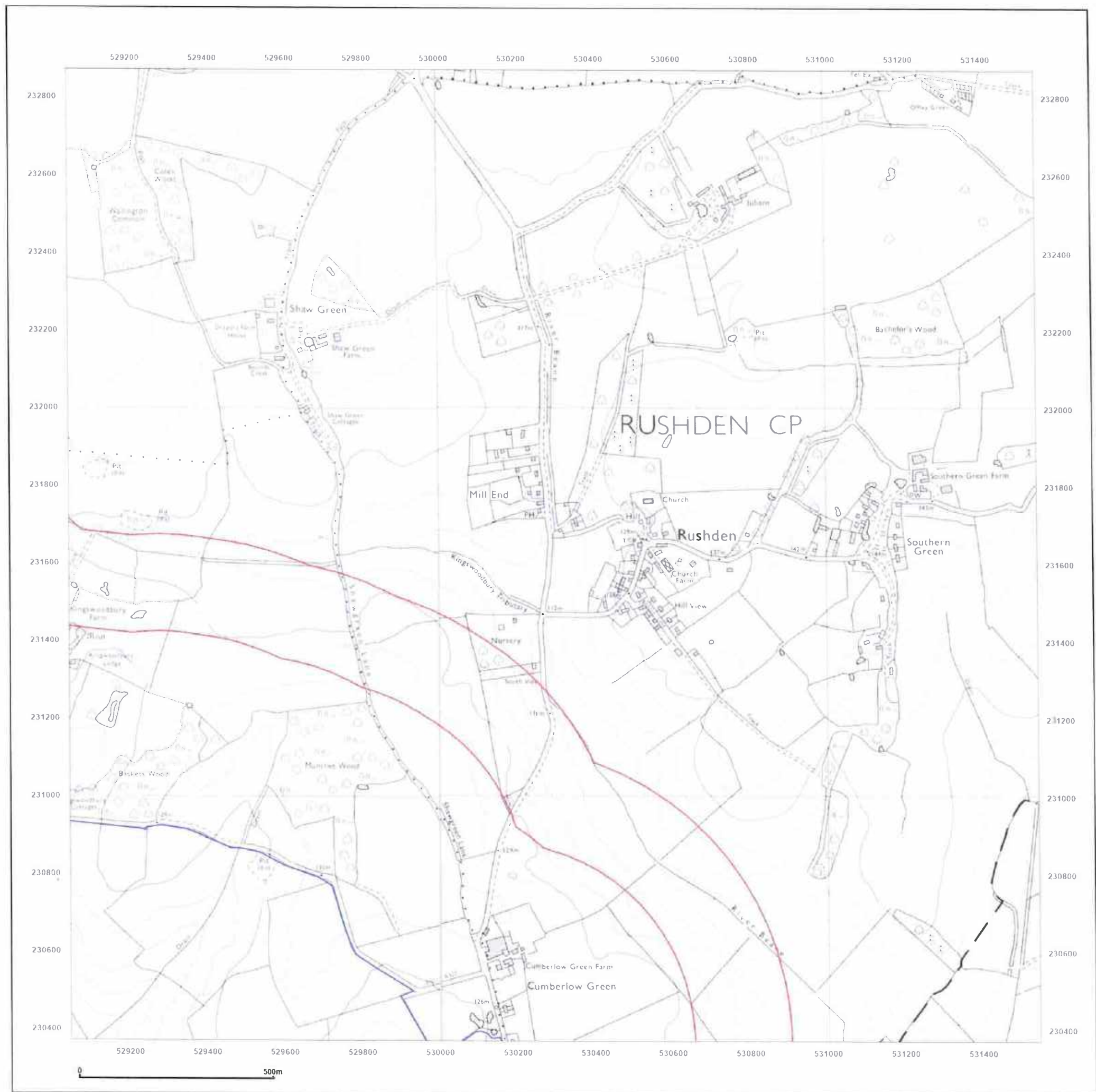


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Site Details:

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and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_2
Grid Ref: 530295, 231620

Map Name: National Grid

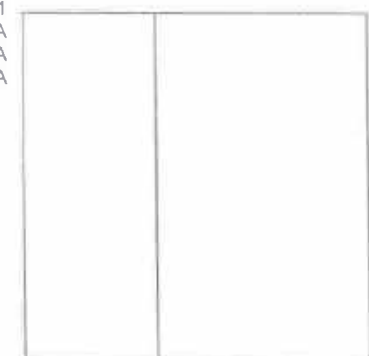
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Printed at: 1:10,000



Surveyed 1974
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1975
Revised 1981
Edition N/A
Copyright N/A
Levelled N/A

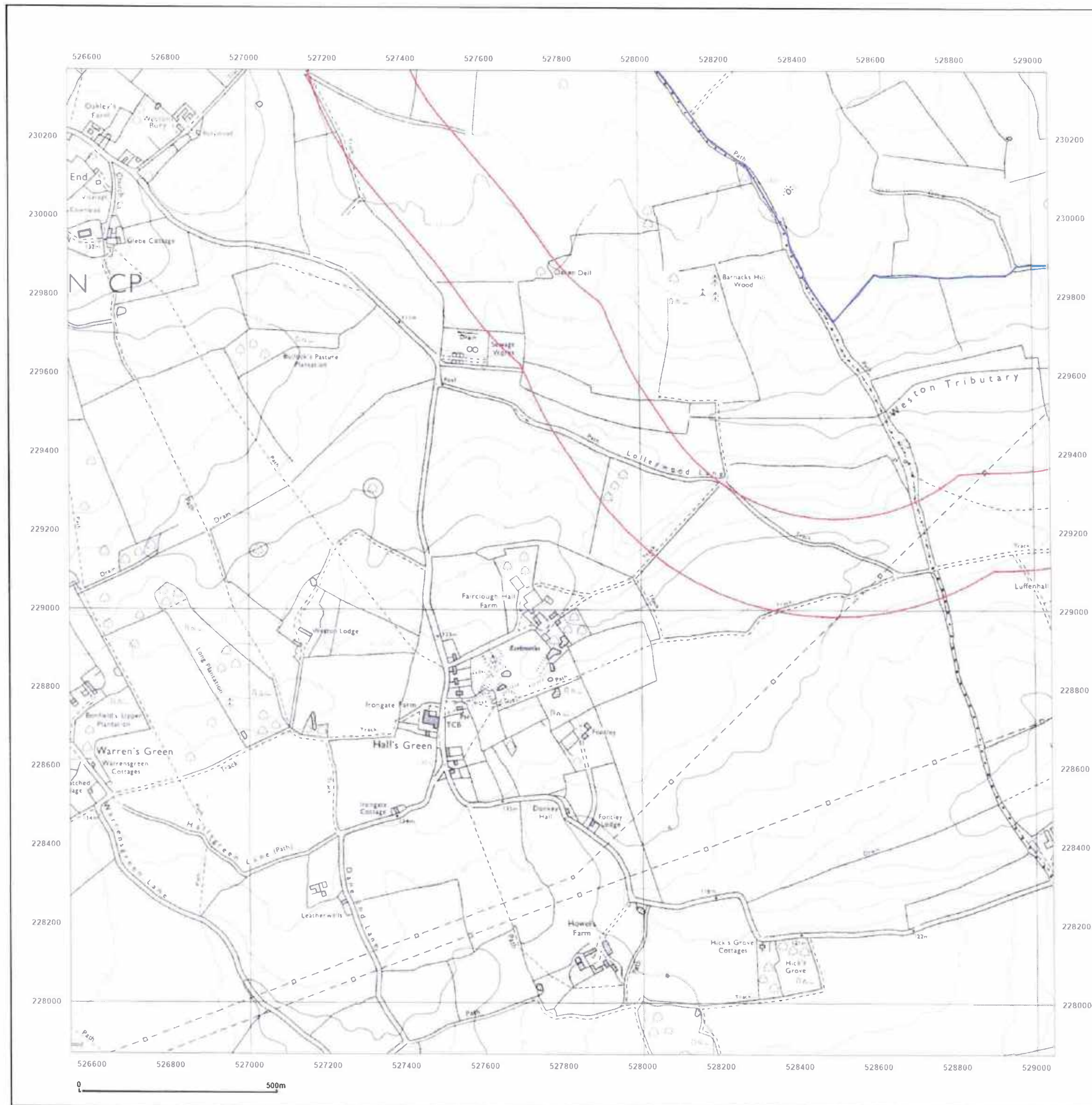


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: National Grid

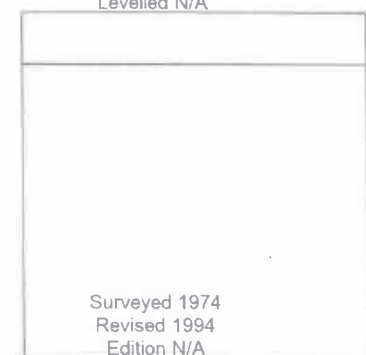
Map date: 1994

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1974
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A

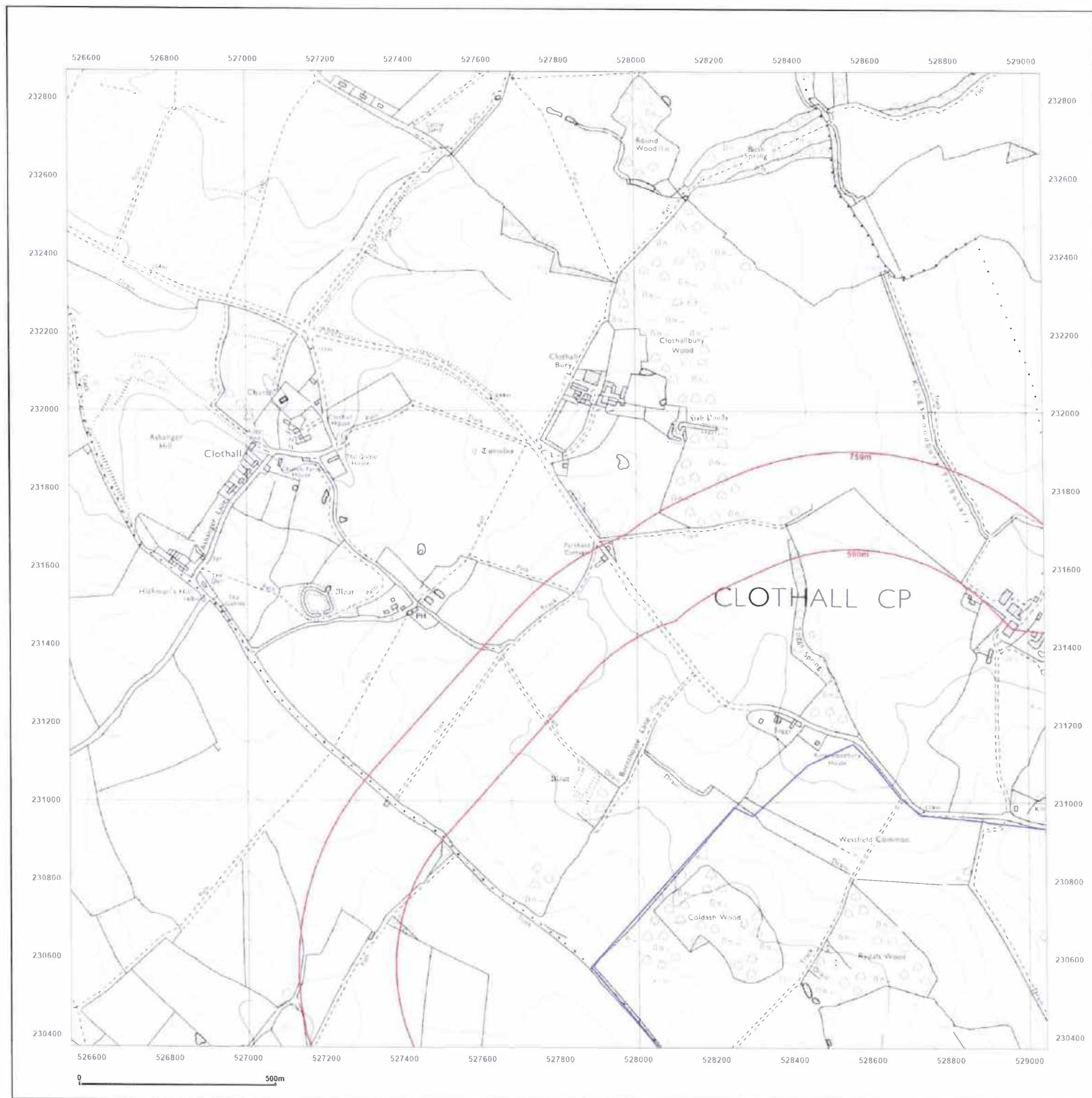


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Site Details:

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and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_2
Grid Ref: 527795, 231620

Map Name: National Grid

Map date: 1994

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A

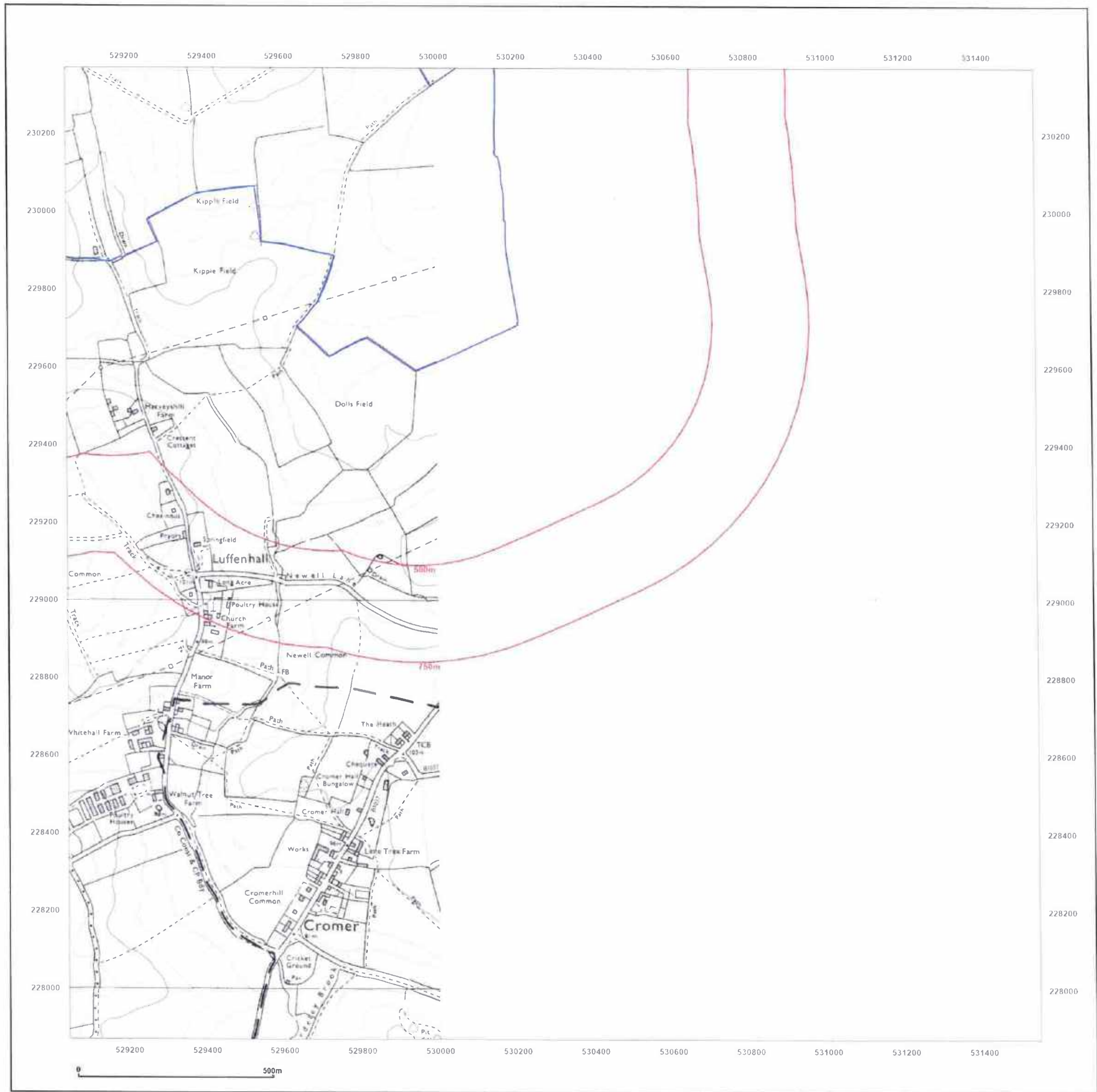


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: National Grid

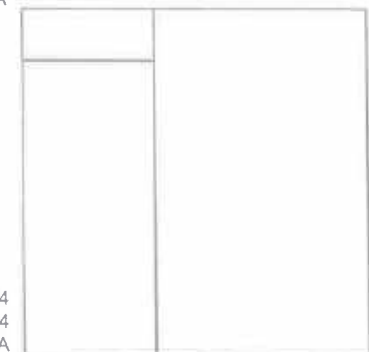
Map date: 1994

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1974
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1974
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A

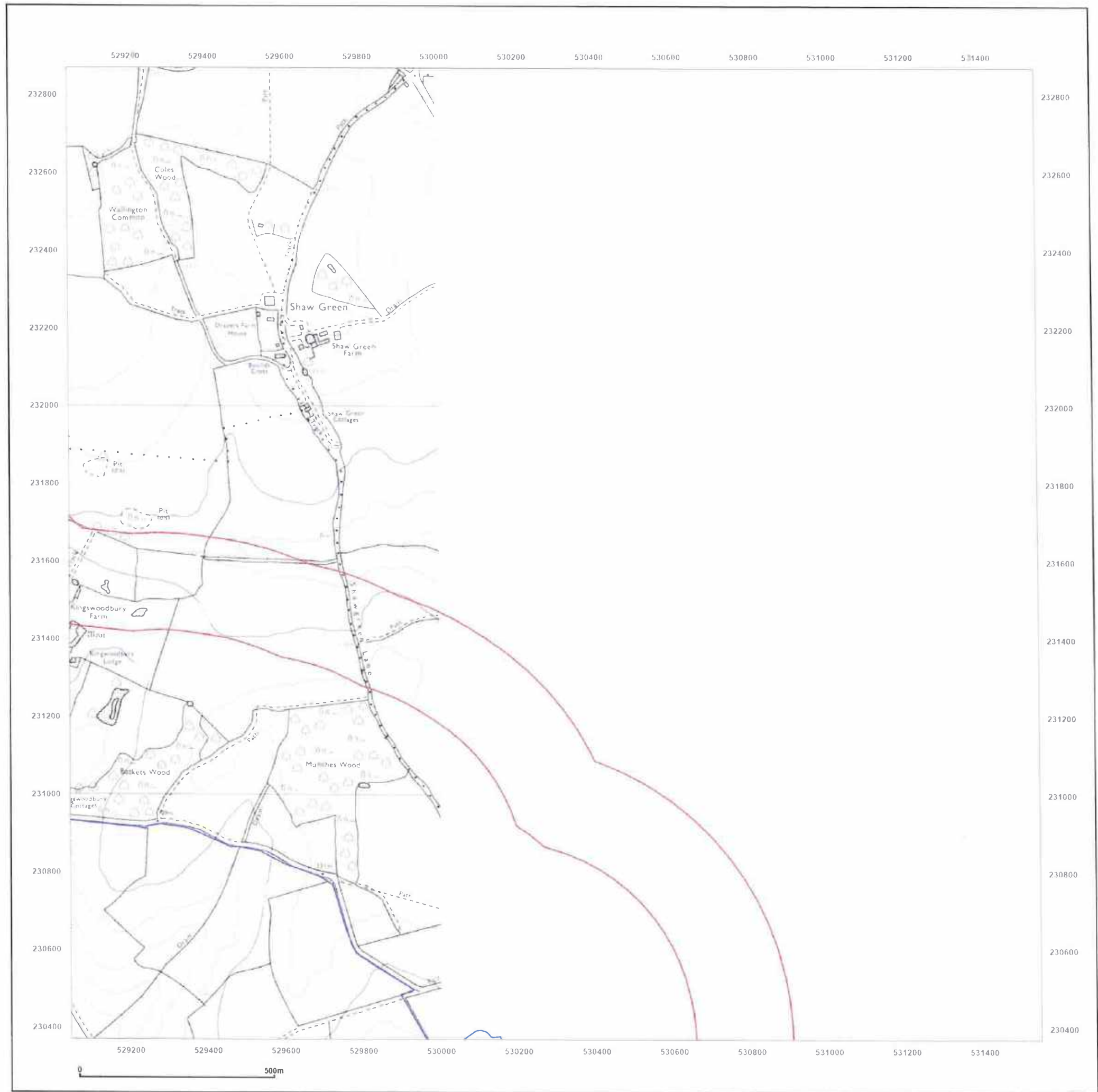


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_2
Grid Ref: 530295, 231620

Map Name: National Grid

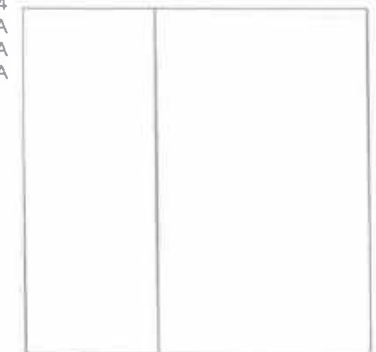
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Surveyed 1974
Revised 1994
Edition N/A
Copyright N/A
Levelled N/A

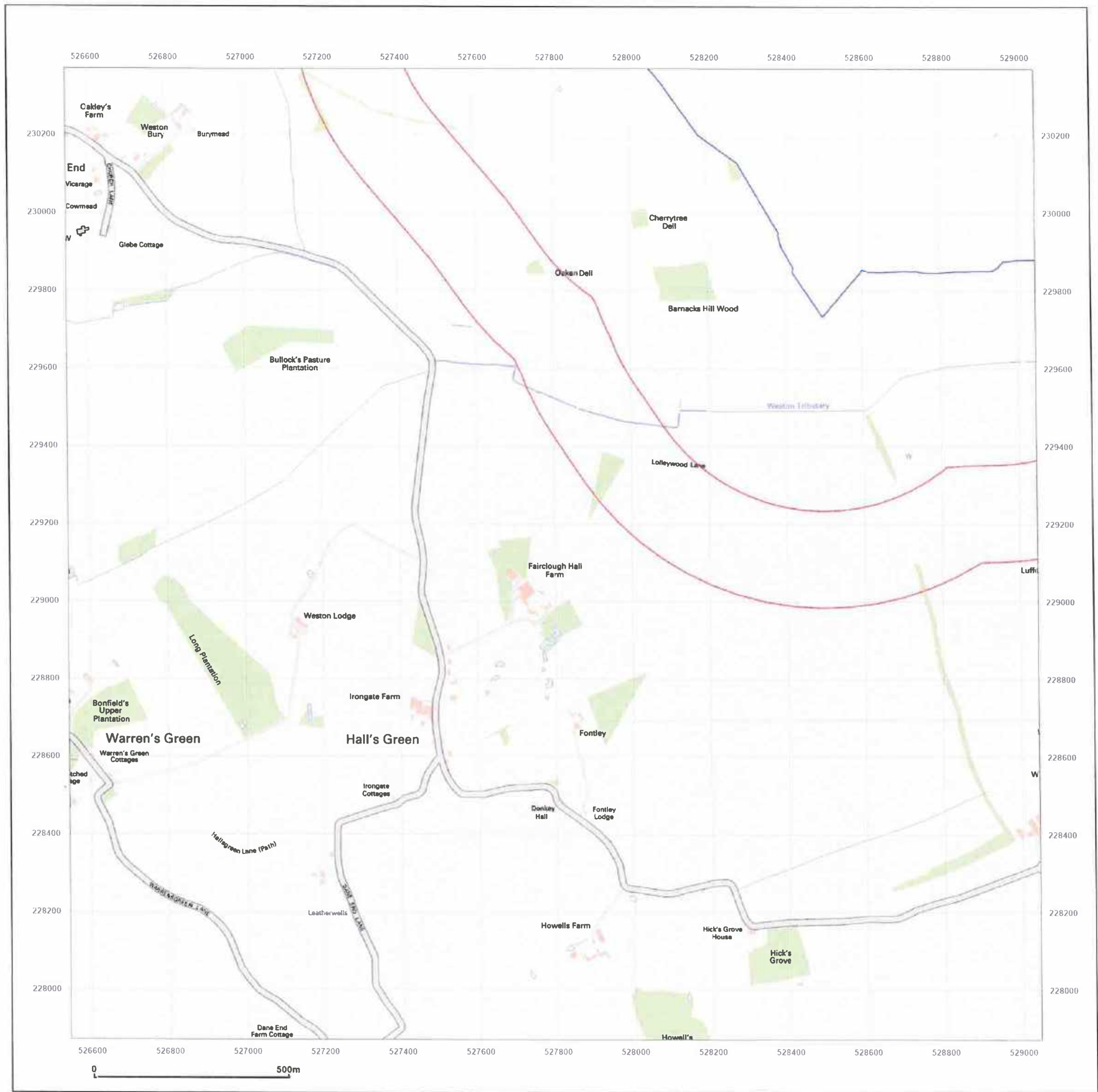


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000

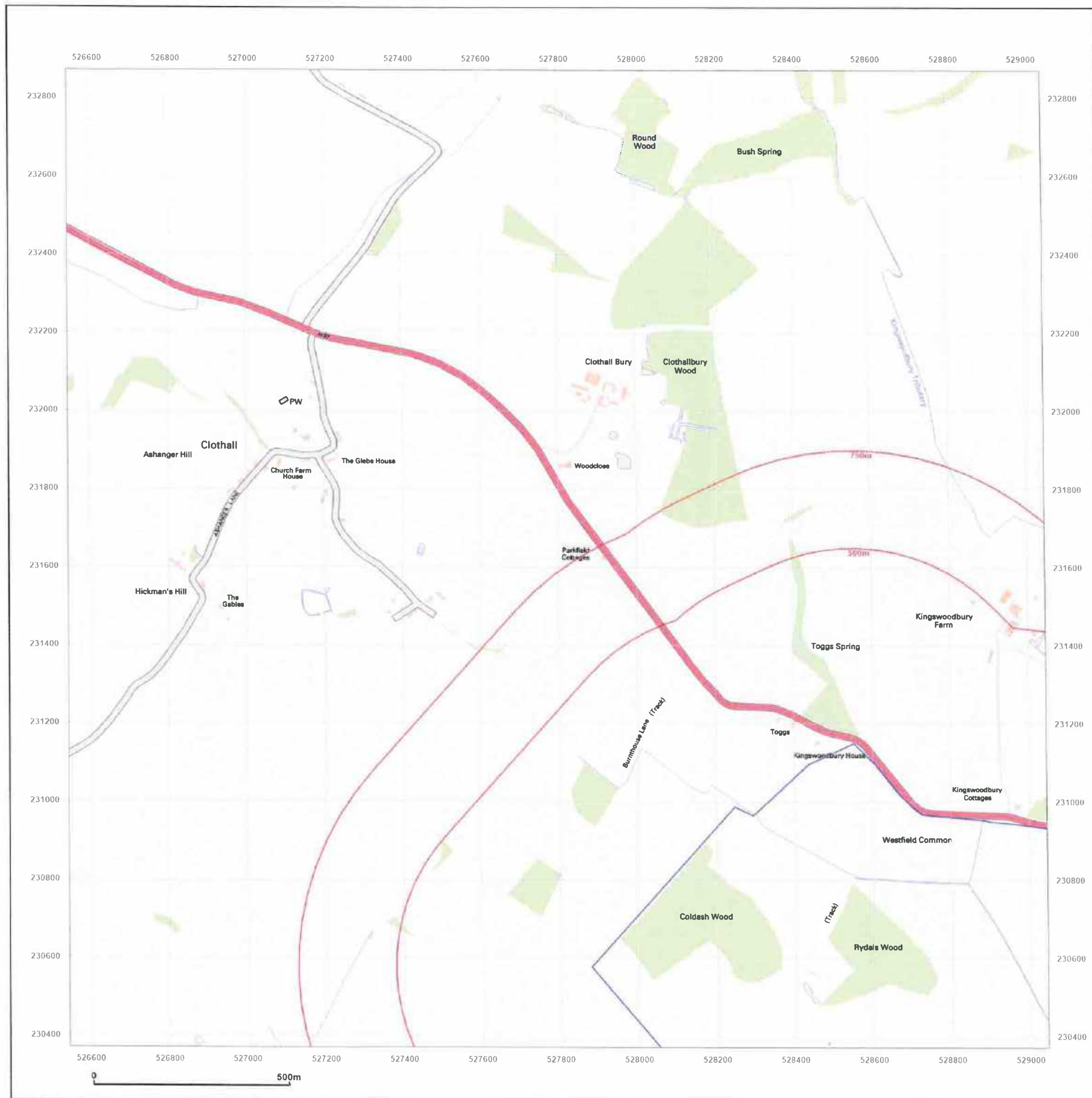


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

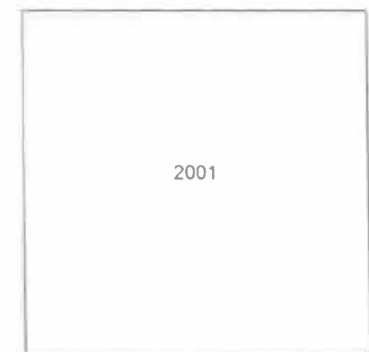
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Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_2
Grid Ref: 527795, 231620

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000

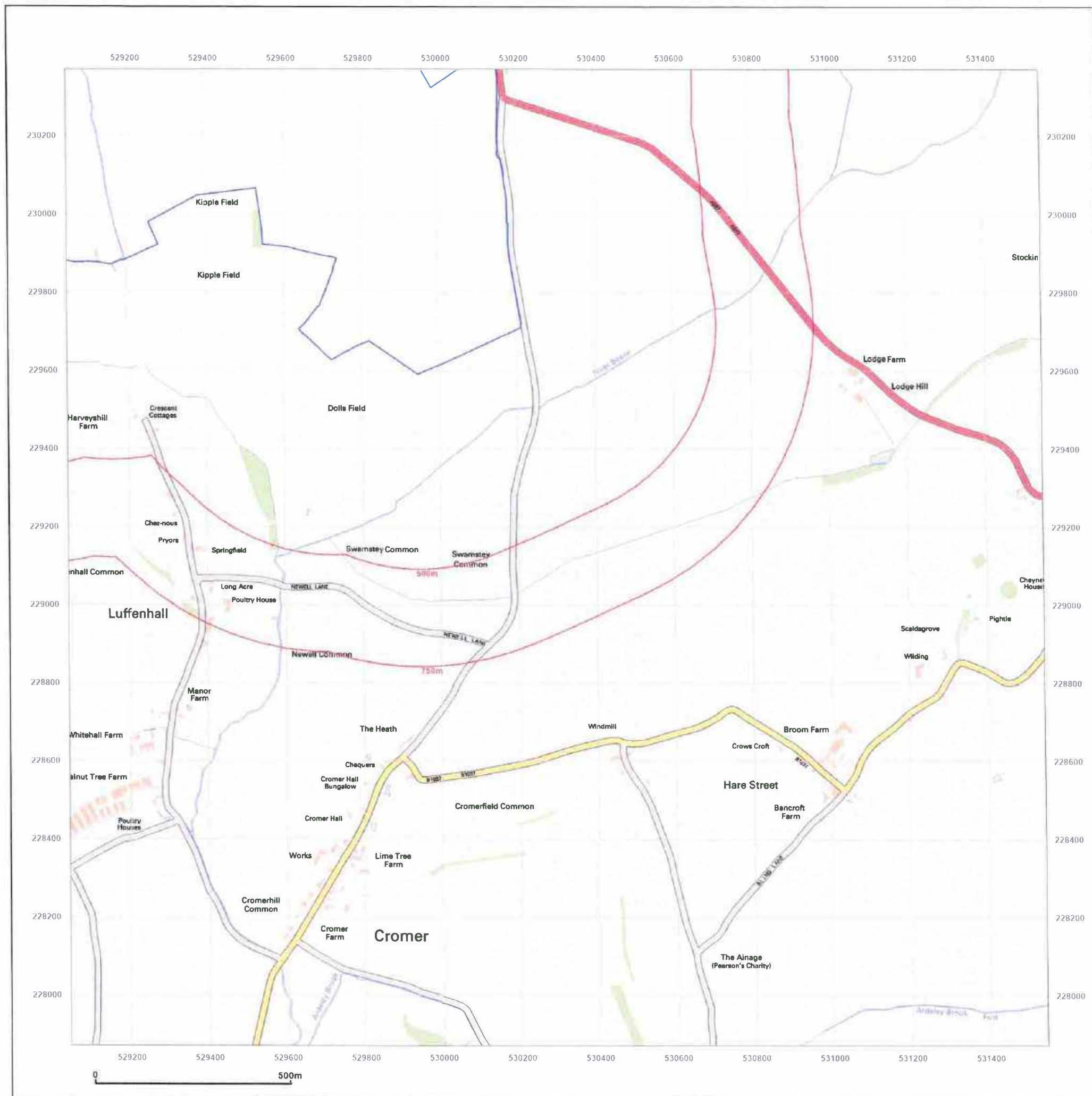


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Site Details:

Clothall, Hertfordshire - Solar
and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000

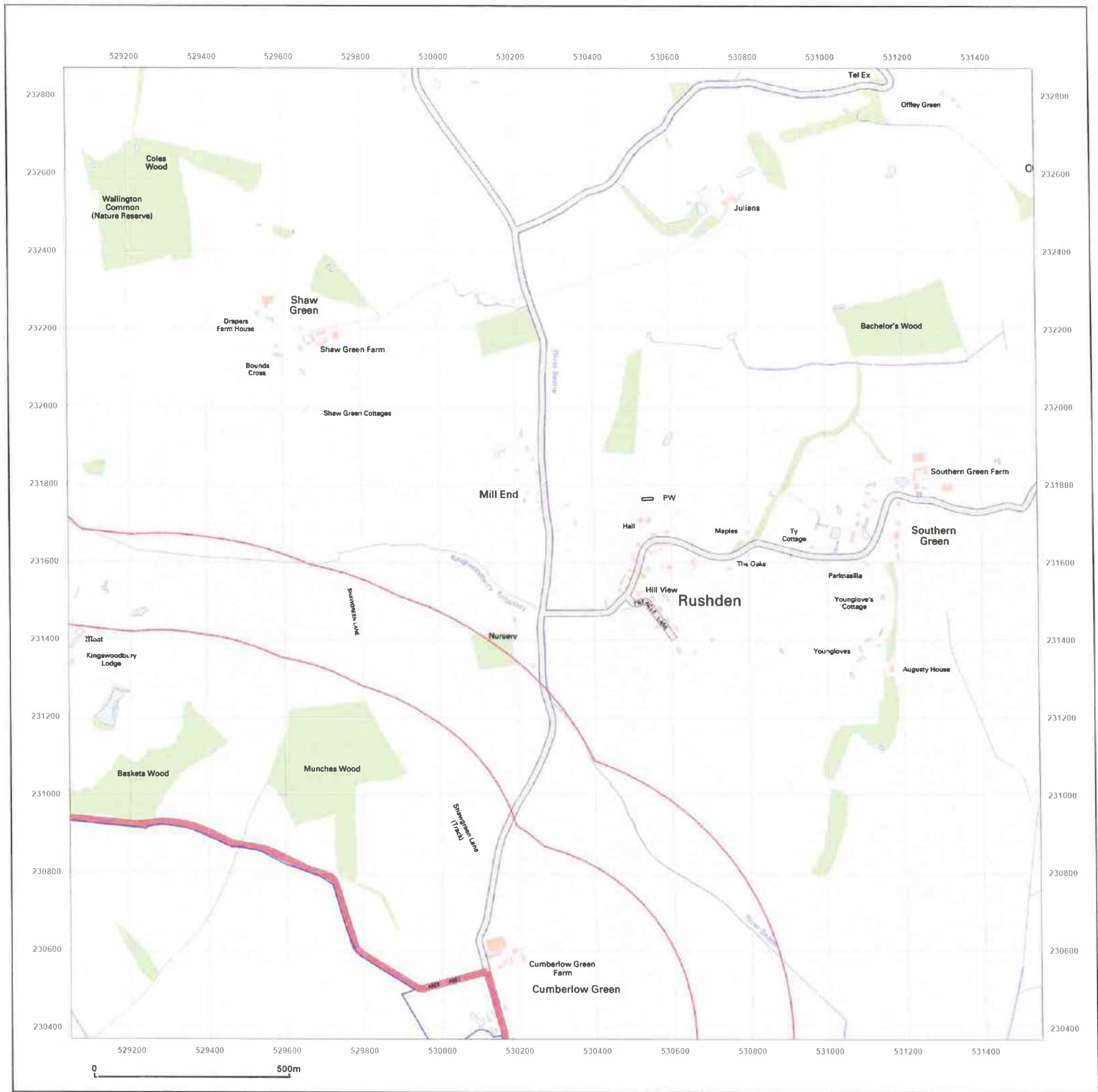


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Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_2
Grid Ref: 530295, 231620

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000

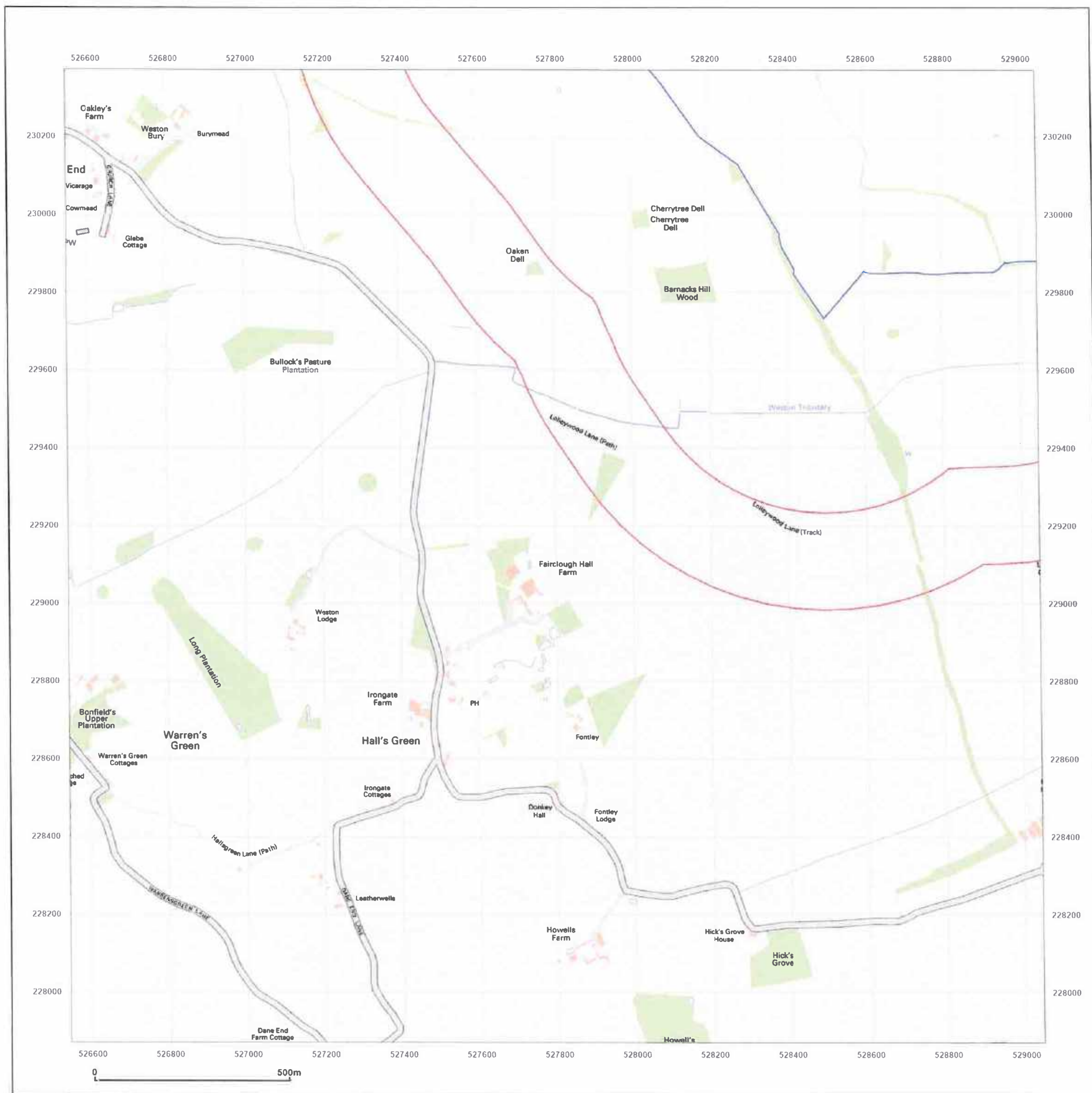


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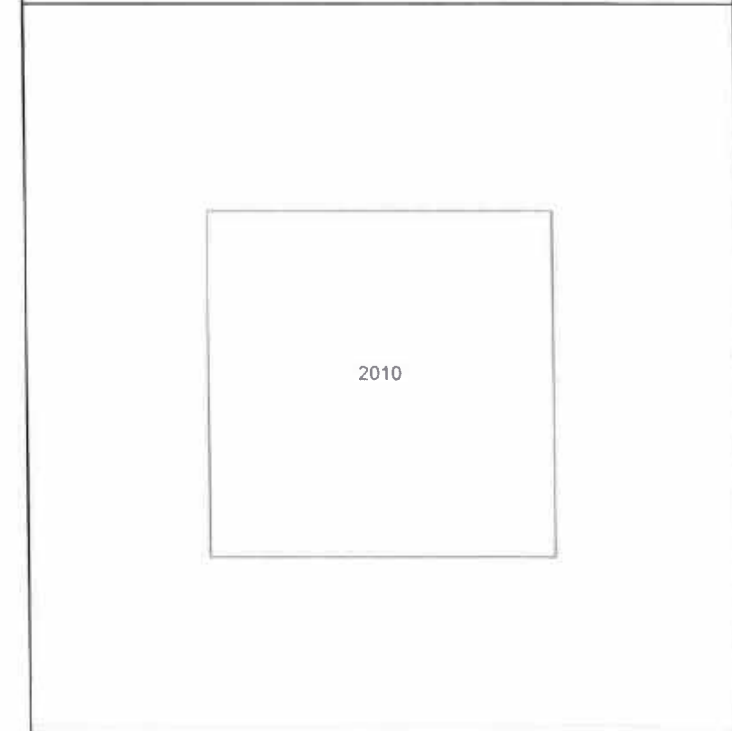
Site Details:

Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_1
Grid Ref: 527795, 229120

Map Name: National Grid
Map date: 2010
Scale: 1:10,000
Printed at: 1:10,000



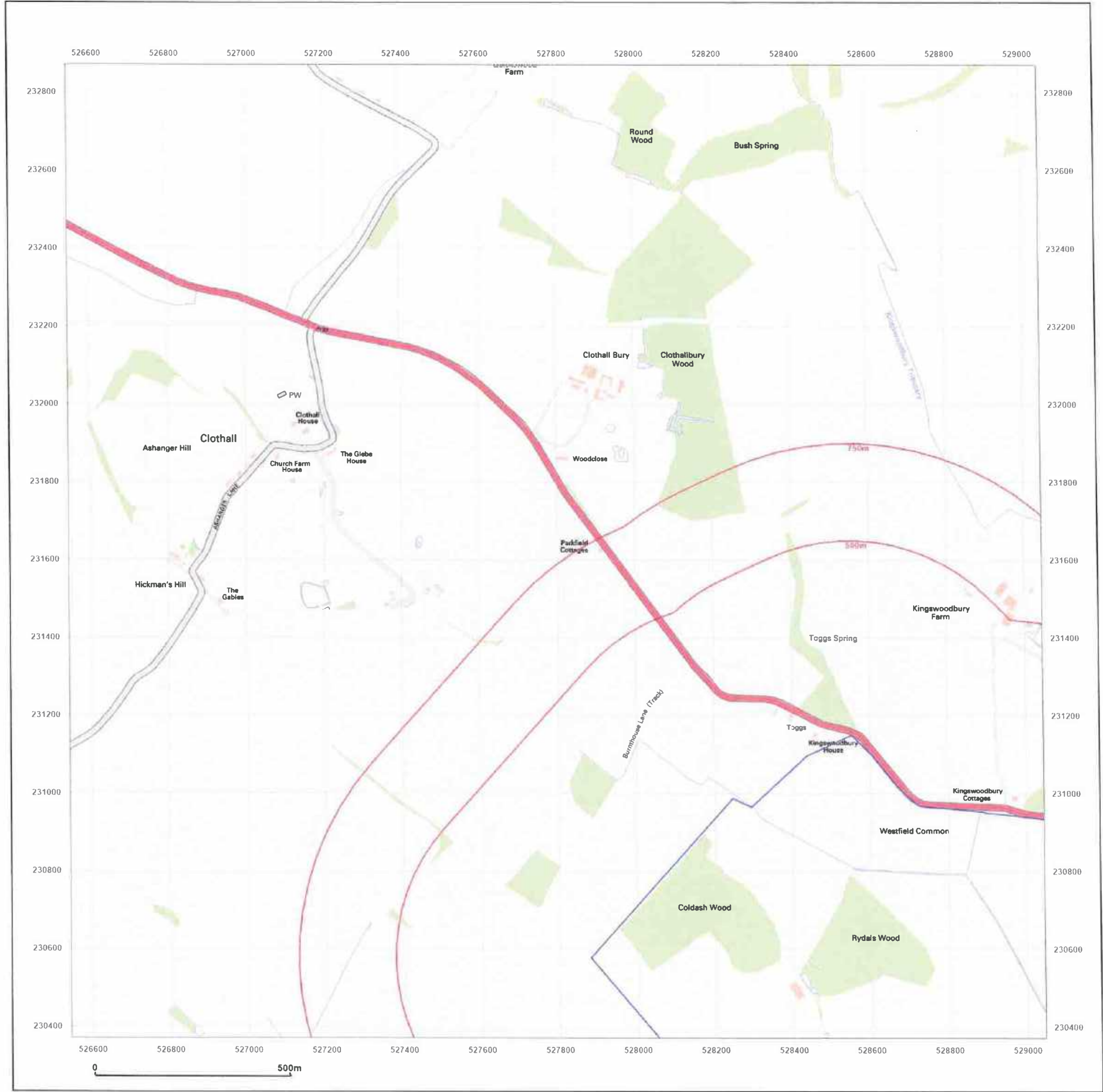


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Site Details:

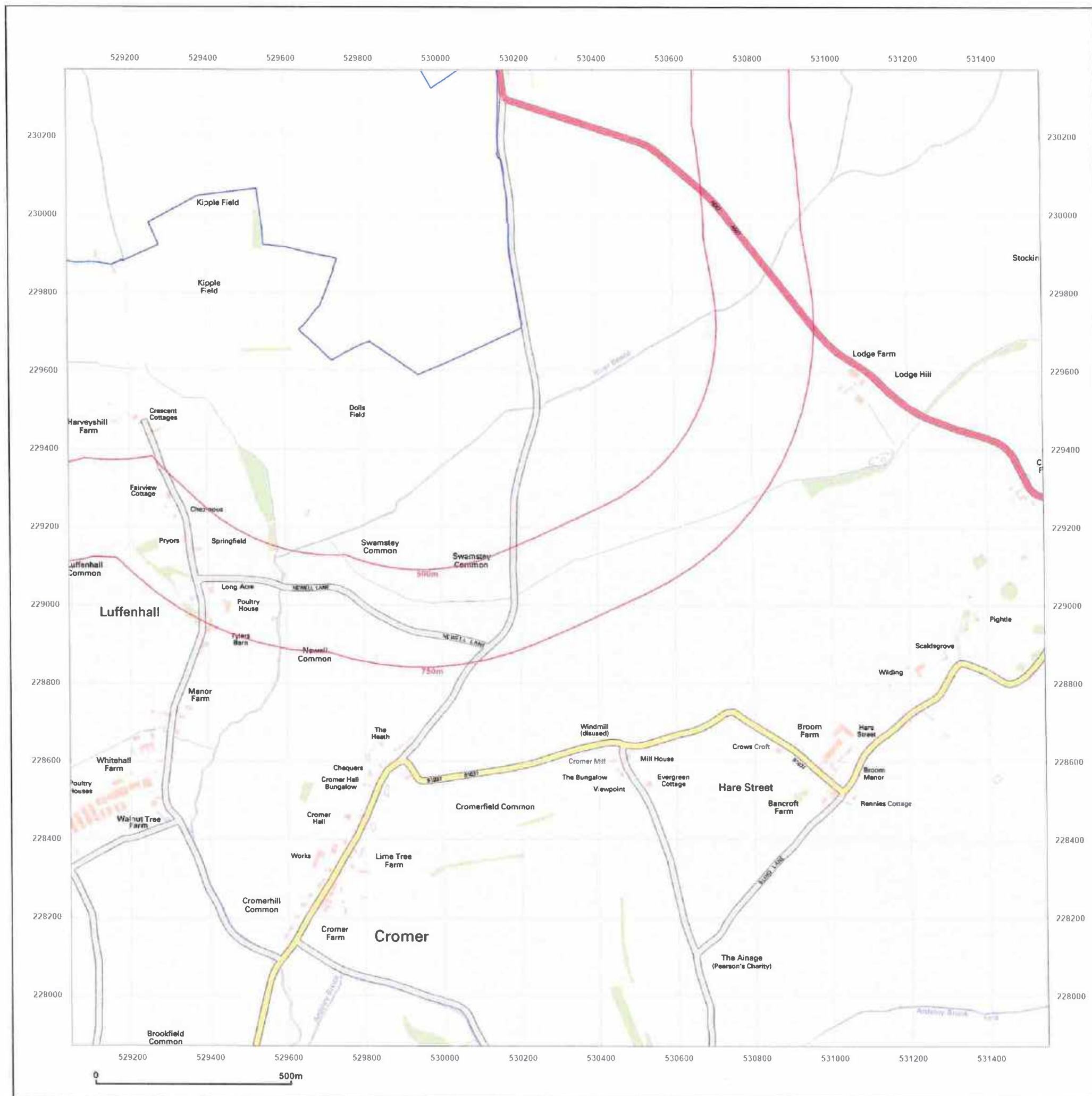
Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_1_2
Grid Ref: 527795, 231620

Map Name: National Grid
Map date: 2010
Scale: 1:10,000
Printed at: 1:10,000



2010

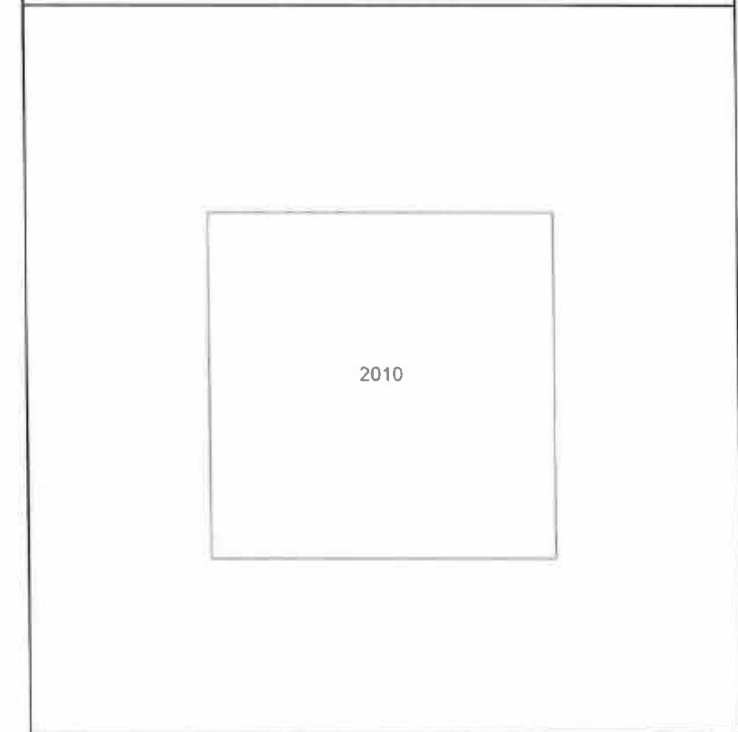


Site Details:
Clothall, Hertfordshire - Solar and BESS

Client Ref: Clothall, Hertfordshire - Solar and BESS
Report Ref: GS-XRM-V5Q-QSC-1LI_SS_2_1
Grid Ref: 530295, 229120

Map Name: National Grid
Map date: 2010
Scale: 1:10,000
Printed at: 1:10,000



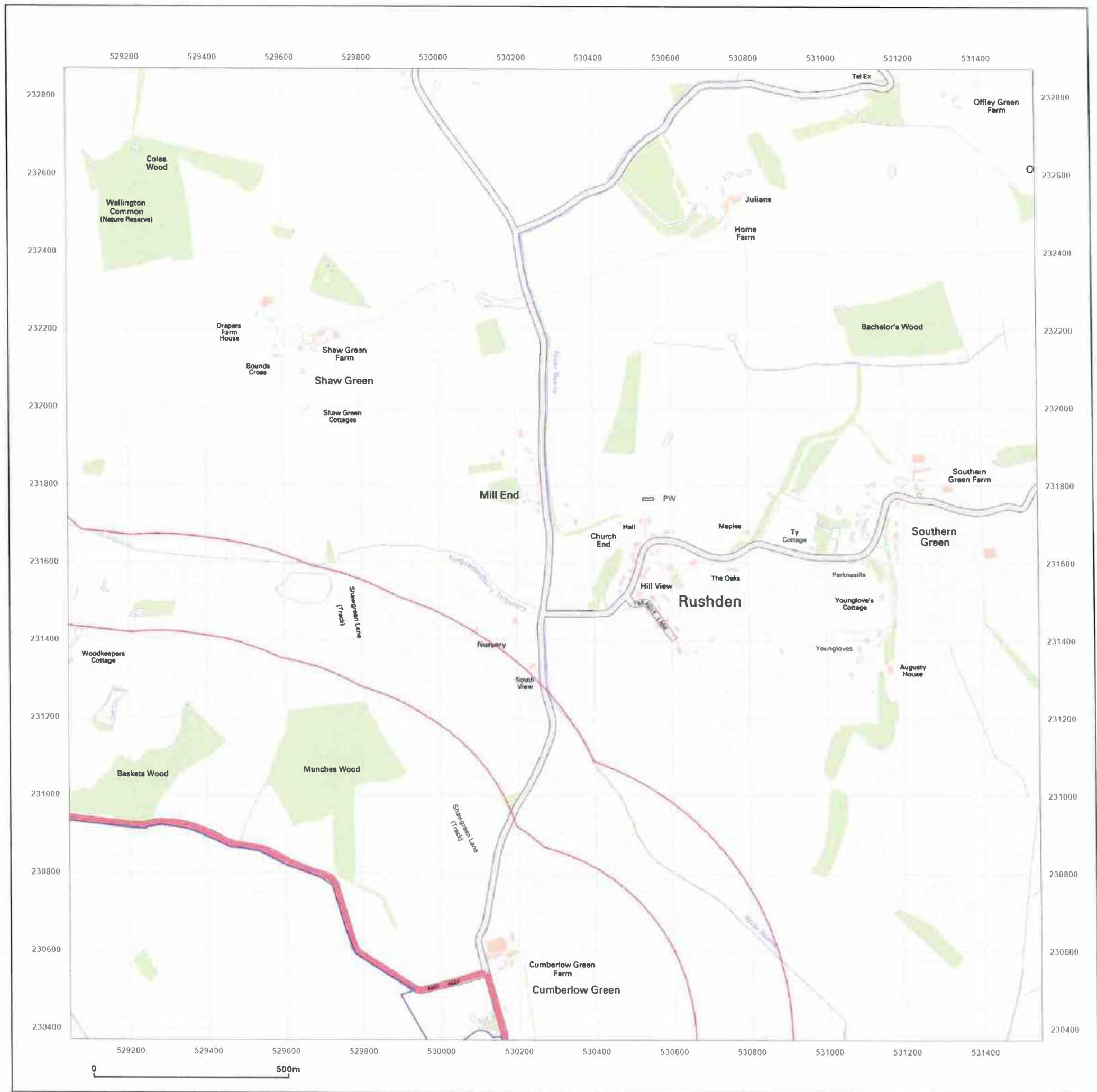


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Grid Ref: 530295, 231620

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000

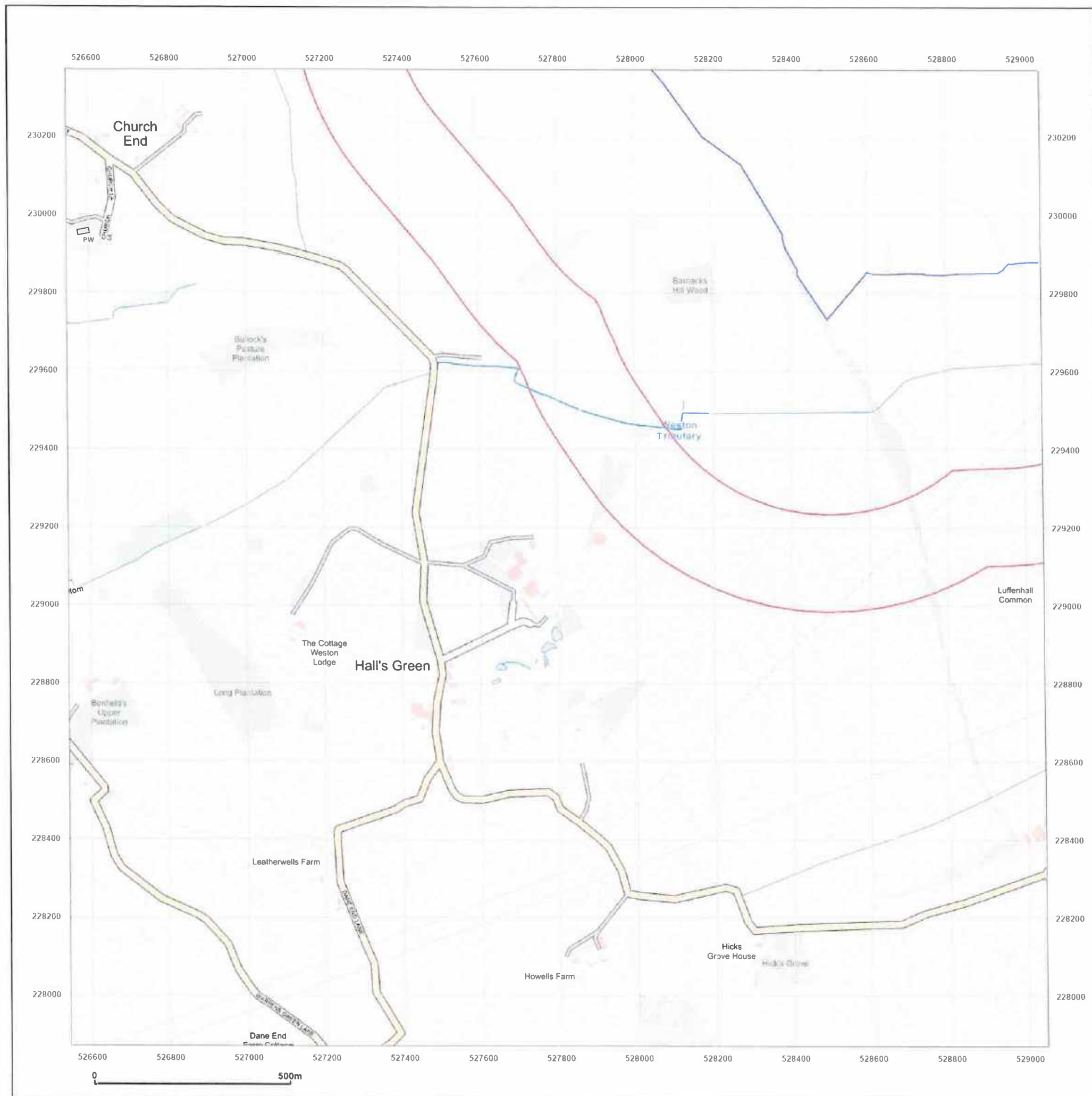


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Scale: 1:10,000

Printed at: 1:10,000

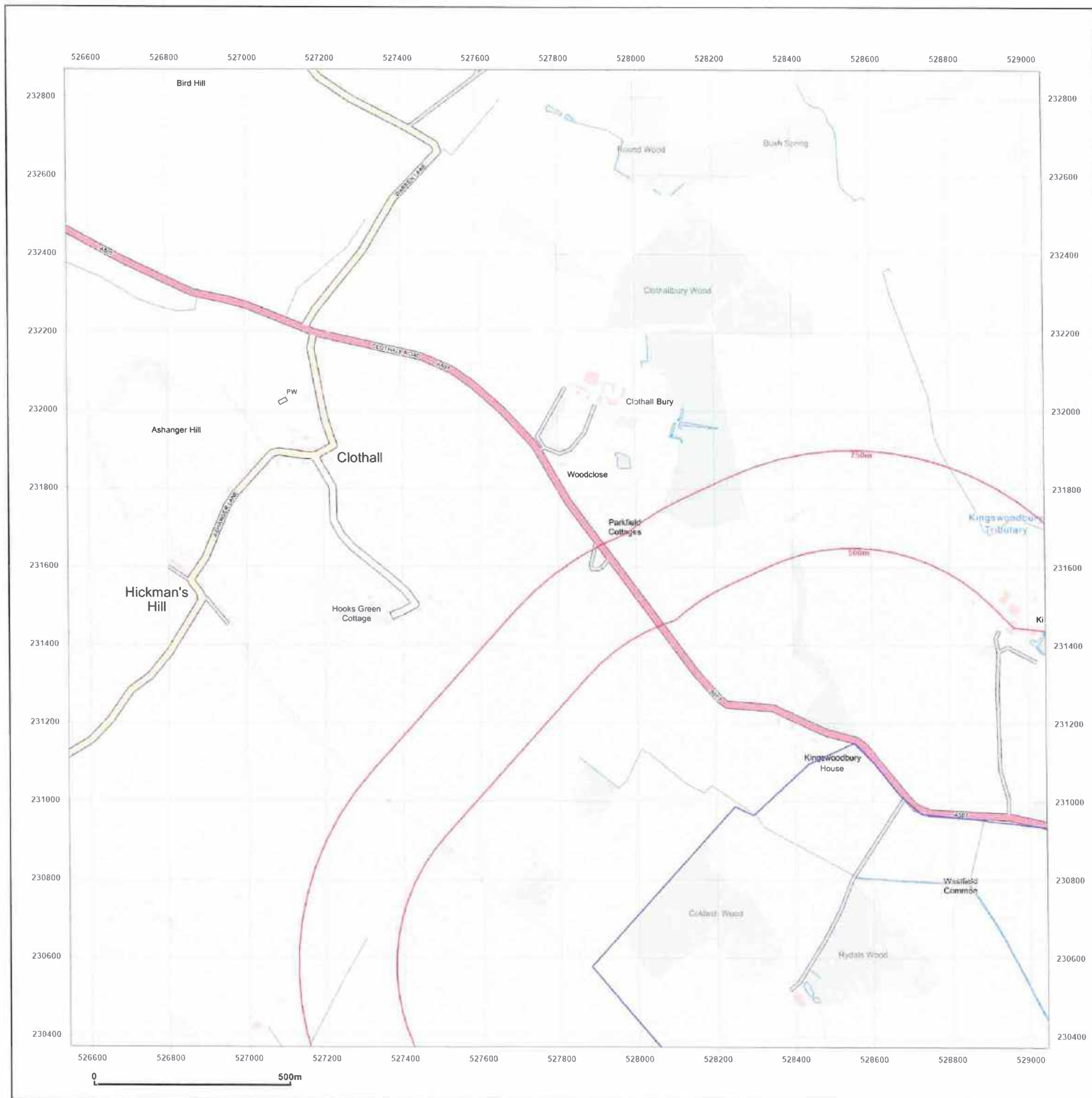


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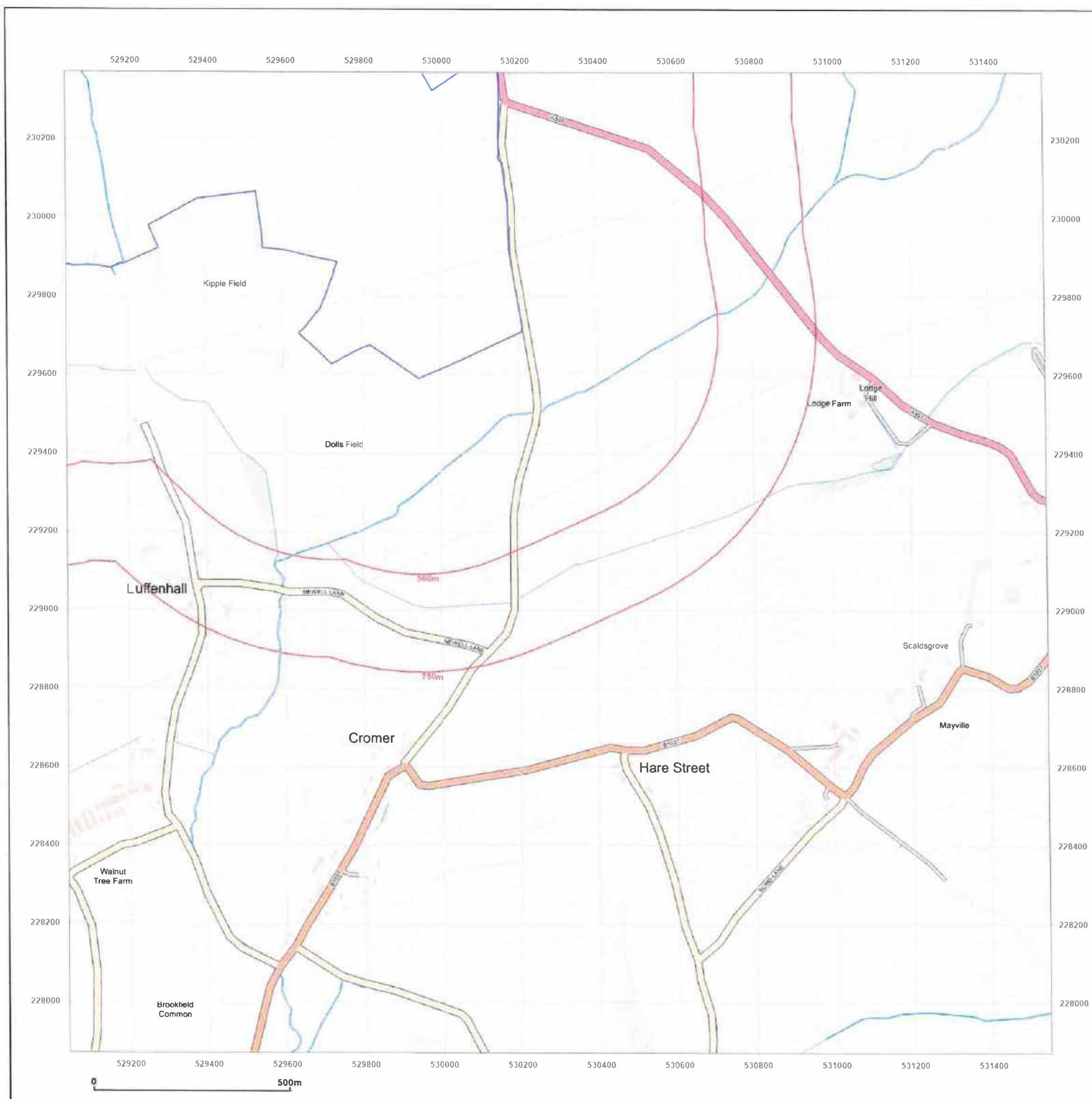


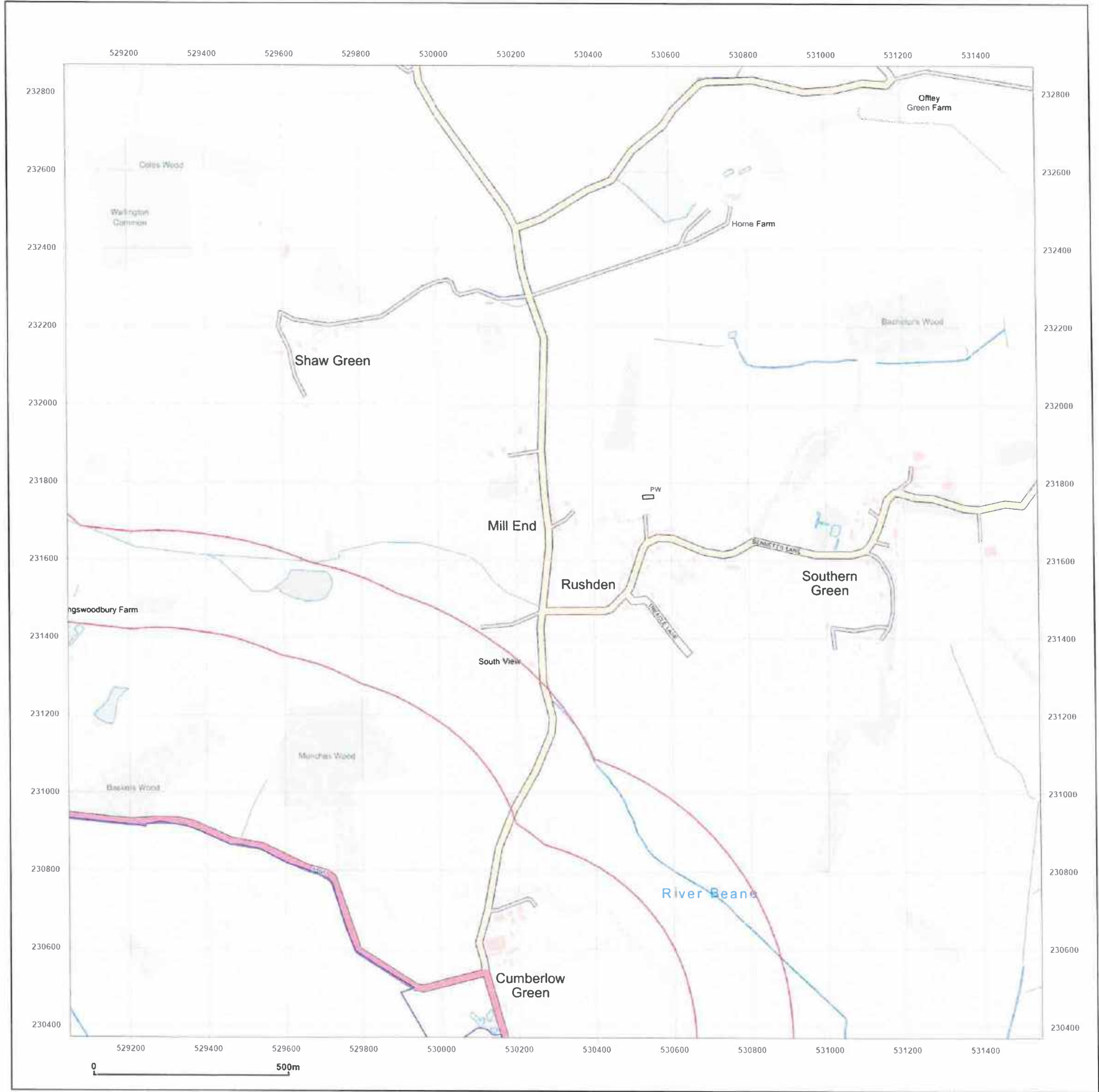
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Appendix D BGS Borehole Records



TL 2838 3118
RECORD of WELL or BORING

at (house or farm) Toggs, CLOTHALL 221 TL23/21
 Survey No. 221
 1° N.S. 221
 1° O.S. 221

Town, Village, &c. Between Baldock & Clothall, Herts. Six-inch map ---
 Exact site (unless a tracing from a map is supplied, give distance and direction from parish church, cross-roads, or other object shown on maps) Tracing herewith. Popular Edition Sheet 9b
120 yds. S.E. of St. Mary's Ch. of 34 one-inch map. Square 01

Surface level of ground 410 ft. above Ordnance Datum. Well or Bore commenced at --- ft. below surface level of ground.
 Sunk --- ft., diameter --- ft. Bored 220 ft.; diameter of boring: at top 5 in., at bottom 5 in.
 Details of lining tubes (internal diameters preferred) 17ft.6" of 5" I/D steel tube in top of bore.

Water struck at depths of (feet) ---
 Rest-level of water below top of well or bore 130 ft. Pumping level --- ft. Time of recovery --- hours.
 Suction at 189 ft. depth. Yield: (i) on test 360 galls. per hr., (ii) normal --- galls. per ---
 Quality (attach copy of analysis if available) ---

Made by Chas. J. Ell & Sons for Mr. Dr. Suckling Date of boring Oct. 1940
 Information from Chas. J. Ell & Sons, Victoria Well Works, LUTON, Beds.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	THICKNESS.		DEPTH.	
		Feet.	Inches.	Feet.	Inches.
<u>Made 3</u> <u>unluck.</u>	<u>Top soil</u>	<u>3</u>	<u>-</u>		
<u>17 ft. 6 in.</u>	<u>Chalk</u>	<u>217</u>	<u>-</u>	<u>220</u>	<u>-</u>

17 ft. 6 in.
17 ft. 6 in.

HERTS SHEET 8 N 1/4
6" - 1 mile.

5" Bore

Yield 240 g. p.d. - not used to capacity.
Ref. bottles with water having an analysis from
LA. HENRISS, Esq., in letter dated 1 June 1943
Analysed 9/11/43

"Toggs". In use. Automatic electric
submersible pump. R.W.L. 133' 11 1/2" L.S.
OD + 2.416. Visited. MCD. 10-11-64

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,

For Survey use only.

Date received	G.S.M.	M. of H. received	Site marked on 1" map
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441/54 Togg's, Clothall

TL23/21

Surface +416. Lining tubes: $17\frac{1}{2} \times 5$ in from surface. R.W.L. +286. Suction +227. Yield 360 g.p.h. (test). Ell. Oct. 1940.

Hardness: P. 80, T. 260. Anal. June 1941. Yield 240 g.p.d. 1943. R.W.L. +282. Electric pump. Nov. 1964.

Made	...	...	3	3
Uck)				
Mck)	...	...	217	220

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS ft.	DEPTH ft.
Made ground 31	Top soil	3	3
Upper chalk } 217'	Chalk	217	220
Middle chalk			

pp. L.P. Thomas 8/2/68.



"Toggs", Clothall. Kitchen tap.

221 TL23/21

Source: Deep well over 200 ft ^{cistern} into Chalk
after passage through house. Date 20.6.41, 9 a.m.

34

Analysis by Counties Public Health Laboratories.
Parts per 100,000

Appearance - Faintly opalescent - slight deposit of mineral debris.

Colour - Normal

Odour - Nil

Reaction pH - Neutral: 7.0

Free carbonic acid 4.4

Electric conductivity at 20°C. 700

Alkalinity as CaCO₃ 28.0

Hardness: total 34.0; Permanent 8.0, Temporary 26.0.

Nitrogen as Nitrates 0.52

Nitriles - Trace

Free ammonia 0.0000

Ammoniacal Nitrogen -

Albuminoid ammonia 0.0004

Oxygen absorbed in 4 hours at 27°C - 0.010

Metals { Iron Absent
Zinc 0.45

Sy¹ E.V. Suckling



Beale and Suckling,
Ernest V. Suckling, M.B., B.S., M.R.C.S., L.R.C.P., D.M.H.,

THE COUNTIES PUBLIC HEALTH LABORATORIES.

Ref. E.V.S.

2nd July, 1943.

ANALYSIS OF A SAMPLE OF WATER received on:

20th June, 1943.

for A.L. LUCAS, ESQ.

Labelled: Well at "Toggs", Clothall - Kitchen tap (Source: Deep well over 200' boretube into Chalk) after passage through house cistern Date: 20.6.43. 9 a.m.

CHEMICAL RESULTS IN PARTS PER 100,000.

Appearance:	Faintly opalescent - slight deposit of mineral debris		
Colour:	Normal	Odour:	Nil
Reaction pH:	Neutral: 7.0	Free Carbonic Acid	4.4
Electric Conductivity at 20°C:	700	Total Solids, dried at 100°C:	47.0
Chlorine in Chlorides	2.6	Alkalinity as Calcium Carbonate	28.0
Hardness: Total	34.0	Temporary: 26.0 Permanent	8.0
Nitrogen in Nitrates	0.52	Nitrates	Trace
Free Ammonia	0.0000	Ammoniacal Nitrogen	-
Albuminoid Ammonia	0.0004	Albuminoid Nitrogen	-
Oxygen Absorbed in 4 hrs. at 27°C.	0.010		
Metals	Iron: absent Zinc: 0.45		

BACTERIOLOGICAL RESULTS.

Number of "Bacteria" growing on) 1 day at 37°C. 2 days at 37°C. 3 days at 20°C.
Agar per cc. or ml. in) 0 12 -

Presumptive Coliform Reaction * Present in 100 c.c. Absent from: 50 cc.
Bact. coli Present in - Absent from: 100 cc.
Cl. welchii Reaction Present in - Absent from -
* False presumptive reaction

This sample contains an appreciable trace of zinc, the origin of which is the galvanized iron tank with which the water has been in contact, and which causes a faint opalescence and deposit.

The water has a significant content of free carbonic acid which causes the action on galvanized iron.

It is a very hard water although not to such a degree as to be detrimental to health, contains no excess of salinity and is of satisfactory organic and bacterial purity.

These results are consistent with a wholesome water, suitable for drinking and domestic purposes.

The presence of zinc and the hardness of the water are disadvantageous but not injurious in the amounts recorded. Fairly rapid scaling of boilers, hot water pipes, etc. can however be expected since the greater part of the hardness will be deposited from the water on heating.

(Signed)



221/197 Kingswoodbury, Clothall

TL 23 SE 10
2844.3115

Surface +420. Lining tubes: 21 x 5 in from surface; 35 x 4 in. R.W.L. +283. Ell, Nov. 1938.
Electric pump. 1964.

Boulder Clay	...	...	14	14	4.3 m
MCh	...	...	186	200	

Grithated classification

pp. L.P. Thomas March 68

ALB.17.6.40

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CE 125

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File No.

Site marked
on 1" map
(use symbol)

(*11815) W1.20151/0.369 10,000 9/39
A. & E.W. Ltd. Op. 686



221/197 Kingswoodbury, Clothall

TL 2844 3115. TL 23(33)

Surface +420. Lining tubes: 21 x 5 in from surface; 35 x 4 in. R.W.L. +283. Ell, Nov. 1938.
Electric pump, 1964.

Boulder Clay	...	14	14
Mck	...	186	200

Estimated classification

pp. L.P. Thomas March '68.



RECORD OF WELL (SHAFT OR BORE)

At Kingwoodbury Clotfall
Town or Village Kingwoodbury County Wilt SSW-W Six-inch quarter sheet 07
Exact site 1 mi S.E. by E. of King's Ch. (A rough sketch-map or a tracing from a map is very desirable)

Level of ground surface above sea-level (O.D.) c 420 ft. If well starts below ground surface, state how far _____ ft.
Shaft _____ ft., diameter _____ ft. Bore 250 ft. Diameter of bore: at top 5 ins.; at bottom 4 ins.
Details of permanent lining tubes (internal diameters preferred) 21' x 5"; 35' x 4' **TL 23/33**

Water struck at depths of (feet) _____
Rest-level of water ^{below} top of well 137 feet. Suction at _____ feet. Yield on _____ hours' test
_____ gallons per _____ (with pump of capacity _____ g.p.h.); depressing water level to _____ feet
below top. Time of recovery _____ hrs. Amount normally pumped daily _____ g.p.h. for _____ hours.
Quality (attach copy of analysis if available) _____
Sunk by C. J. E. E. Jones for Mr. A. W. White Date of well Nov. 1938
Information from Adm

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA (and any additional remarks).	THICKNESS		DEPTH	
		Feet.	Inches.	Feet.	Inches.
<u>Kingwoodbury</u>	<u>Chalk</u>	<u>14</u>		<u>14</u>	
<u>Chalk</u>		<u>176</u>		<u>200</u>	
<u>Kingwoodbury</u>	<u>In use - supplying one house</u>				
<u>12/4/44</u>	<u>Situated in garage - inaccessible.</u>				
<u>L.P. Main 1/6 8</u>	<u>Access pump.</u>				
	<u>OD + 420. Visited, sited by O.</u>				
	<u>10-11-64.</u>				
	<u>sited @ Mr Fox</u>				
	<u>DATA Bank</u>				

ALB. 17.6.40
GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON, S.W.7.

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Date received	G.S.M. Office File No.	Site marked on 1" map (use symbol)
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(*11815) Wt. 29051/0.369 10,000 9/80
A. & E. W. Ltd. Gp. 486

CE 125



British
Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

INFORMATION MANAGEMENT PROGRAMME

BGS COPY

TL23/67

A SITE DETAILS

Borehole drilled for: A.P.S. - Small Agricultural Use
Location: West Field Baldock
NGR (8 figures): TL 2838 3050
Ground Level (if known): _____ Please attach site plan
Drilling Company: A & Brown Drilling, Haverhill, Suffolk
Date of Drilling: Commenced March 2010 Completed April 2010

B CONSTRUCTION DETAILS

Borehole Datum (if not ground level) _____ above
_____ m below GL
(point from which all measurements of depth are taken e.g. flange, edge of chamber, etc.)
Borehole drilled diameter _____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth
_____ mm from _____ to _____ m/depth
Casing material Steel diameter 6" mm from GL to 12 m/depth
and type (e.g. if plain steel, plastic slotted)
Casing material _____ diameter _____ mm from GL to 70 m/depth
Casing material _____ diameter _____ mm from _____ to _____ m/depth
Casing material _____ diameter _____ mm from _____ to _____ m/depth
Grouting details _____
Water struck at 41.5 m (depth below datum - mbd)
_____ m (depth below datum - mbd)
Rest water level on completion 39.80 mbd

C TEST PUMPING SUMMARY (Please supply full details on Forms WR-39)

Test Pumping Datum _____ m above
(if different from borehole datum) _____ below borehole datum (mbd)
Pump Suction depth _____ mbd
Water Level (Start of Test) _____ mbd
Water Level (End of Test) _____ mbd
Pumping rate _____ m³/d: l/s
for _____ days/hours
Recovery to _____ mbd in _____ mins: hrs: days
(from end of pumping)
Date(s) of measurements _____
Please supply chemical Analysis if available

*To be
carried out
by others*



D STRATA LOG

Geological Classification (BGS only)	Description of strata	Thickness	Depth
		m	m
	Brown clay and stones	7	GL - 7
	Chalk and Flint	12.5	7 - 19.5
	Melbourne Rock	2.2	19.5 - 21.7
	Chalk and Flint	8.5	21.7 - 30.2
	Melbourne Rock.	3.3	30.2 - 33.5
	Chalk.	56.5	33.5 - 90
(continue on separate page if necessary)			
Other comments (e.g. gas encountered, saline water intercepted, etc.)			

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FILE

CONSENT NO

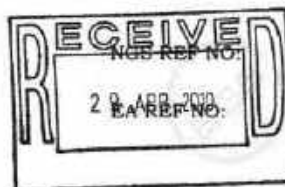
LIC NO:

PURPOSE:

DATE REC:

COPY TO:

ENTERED BY:





Appendix E Notes on Limitations



General

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- a) The consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) This document to any third party with whom an agreement has not been executed.

Phase I Desk Study Reports

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, JPG (Leeds) Ltd reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Geo-Environmental Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics and ground and groundwater conditions to allow a reasonable assessment of the environmental risks together with engineering and development implications.

The objectives of the investigation have been limited to establishing the risks associated with potential human receptors, building materials, the environment (including adjacent land) and controlled waters (surface water and groundwater).

The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance values relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

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