



LAND TO THE EAST OF LONGWATER ROAD, FINCHAMPSTEAD

PHASE I DESK STUDY FOR CATESBY STRATEGIC LAND LTD and STONEBOND PROPERTIES (GUILFORD) LTD

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Prepared for:
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This report has been prepared in accordance with GRM's Accredited Quality Procedures.

If you have any queries regarding this report please contact the project manager in the first instance.

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Issue	Description of Revision		Signature
DS.4	In-line with Client's comments		PW

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1 INTRODUCTION

1.1 PREAMBLE

GRM Development Solutions Limited (GRM) has been appointed by Catesby Strategic Land Ltd and Stonebond Properties Ltd (Client) to produce a revised and updated Phase I Site Appraisal (desk study). The desk study and site inspection form Phase I of the assessment and allow the geotechnical and geo-environmental setting of the site to be determined and the identification of areas of particular concern that require targeted investigation.

This site appraisal is intended to provide information that will assist decision making by identifying potential ground engineering and contamination issues.

GRM Standard Limitations of Reporting are provided in Appendix A of this report.

Development proposals comprise the erection of 40 no. residential dwellings (Class C3) together with associated outdoor space and landscaping, drainage infrastructure, hard and soft landscaping, parking, access and associated works. A proposed development plan is presented in Appendix B.

1.2 OBJECTIVES OF THE SITE APPRAISAL

The principal aims of the Phase I Site Appraisal (desk study) are as follows:

- a) Obtain information, from easily accessible sources, about the soil and groundwater conditions within the area of the site.
- b) Determine the possible ground related geotechnical and contamination hazards within the site boundaries that may affect the proposed development.
- c) Provide preliminary development recommendations.
- d) Provide advice on further works required for the cost-effective reduction of risks to the development and procedures likely to satisfy regulators.

2 PHASE I DESK STUDY AND SITE OBSERVATIONS

2.1 INFORMATION SOURCES

In addition to the general sources of information listed in Appendix A (i) the Client has supplied the location of the site, which has been used in the assessment of the site.

2.2 SITE DESCRIPTION

2.2.1 Geographical Setting

The site is located on the southern outskirts of the village of Finchampstead, which lies approximately 13.5km south east of Reading city centre. The National Grid Reference (NGR) for the approximate centre of the site is SU 796 627. A Site Location and Boundary Plan is presented in Appendix C.

The northern boundary is formed by residential housing, the eastern by pasture land, the western boundary by Longwater Road and the southern boundary by restored former gravel workings.

The topography of the site slopes down very gently to the south, by approximately 4m over 100m (1:25).

2.2.2 Site Inspection Observations

The Site Features Plan/General Site Photographs presented in Appendix D illustrate the salient observations made during a site inspection on 14th of December 2023.

The site is presently used as pasture land for horses and covers an area of 2.29 hectares.

The ground surface comprises grass, which was firm underfoot at the time of the walkover. Trees are present along the southern and western boundaries and included species such as oak, silver birch, pine, cedar and rowan. Additional isolated mature oak trees were observed along the eastern boundary. A drainage ditch was noted along the southern boundary.

Access from the main road is obstructed by overgrown vegetation at the gate.

Significant Features identified during site inspection:
Trees – deepened foundations in association with cohesive strata.
Access constraint – vegetation clearance required to enable ground investigation works.
Drainage ditch to south – potential receptor for site derived contamination (should any be present), receptor for siltation, potential flood risk.

2.3 HISTORICAL DEVELOPMENT OF THE SITE

A review of the available historical Ordnance Survey (OS) maps gives an insight into the development of the site and can highlight potential hazards. Extracts of the maps reviewed are provided in Appendix E.

The site presently comprises pasture land, and has no recorded history of development. Accordingly, as no potential hazards have been identified the risk to the proposed development is considered to be very low.

Off site features:

- 1871 – Present: Longwater River situated 380m to the south and flowing to the west.
- 1871 – 1899: a well is recorded 10m to the north east.
- 1973 – Present: housing development recorded along the northern boundary. A drain is recorded on the southern boundary and trending south.
- 1973 – c.1978: sewage treatment works situated 120m to the west.
- 1975 – Present: field drains noted along southern boundary and lower part of eastern boundary.
- 1975 – c.2001: sewage treatment works located 325m to the south.

Aerial imagery (2008 - 2017) records flooded gravel workings 50m from the southern boundary. These workings are present along the entire southern boundary and extend beyond to the east and west. By 2018 the water levels within the workings are recorded to reduce and by 2021 the workings are dry. The workings do not appear to have been backfilled.

The summary below identifies the significant features identified on the historical mapping data considered likely to have the potential to affect the site.

Significant Features identified on OS Maps:
Nearby well – indicator of potential shallow groundwater. Field drains – potential receptors for site derived contamination (should any be present), receptors for siltation, potential flood risk. Water filled gravel pits to the south – indicators of potential shallow groundwater, and indicators of potential viable mineral reserves. Former sewage treatment facilities – potential sources of contamination (negligible risk given distance and anticipated groundwater flow direction).

2.4 ANTICIPATED GEOLOGY

The BGS Geological Sheet for this area shows the site to be underlain by:

- Alluvium (clay, silt and sand) is recorded in the extreme south eastern corner.
- River Terrace Deposits (sand and gravel) are recorded across the southern half of the site. River Terrace Deposits are anticipated beneath the locally occurring Alluvium. No superficial deposits are recorded across the northern half of the site.
- Solid geology of Bagshot Formation (sand locally clayey) is anticipated beneath the topsoil in the north and concealed beneath the River Terrace Deposits, and locally occurring Alluvium, in the south.

The nearest BGS borehole in the same geology is located 610m to the east. The BGS borehole records topsoil to 0.2m below ground level (bgl), underlain by dark grey, silty clay (Alluvium) to 1.0m bgl. Underlying the Alluvium is gravel (River Terrace Deposits) to 5.4m bgl with clayey sand (Bagshot Formation) to the base of the borehole at 9m bgl (full extent not proven). A copy of the BGS borehole is presented in Appendix F.

A limited ground investigation was conducted between 20th and 21st June 2017 consisting of four soakaway pits (SA01 – SA04 inclusive). These pits were progressed to depths of between 1.7m bgl and 2.0m bgl. The encountered ground conditions comprised:

- Topsoil: light brown, gravelly sand with gravel of chert and quartzite to 0.40m bgl.
- River Terrace Deposits: clayey gravelly sand or sandy, gravelly clay to depths of between 0.3m and 1.9m bgl.
- Bagshot Formation: clayey sand and locally sandy clay encountered up to 2.0m bgl (full depth not proven).

At all locations an infiltration to 75% was unachievable and an accurate infiltration rate could not be established an alternative to soakaway drainage was recommended. A copy of the Soakaway Letter Report (ref. GRM/P7995 SA.1) is presented in Appendix G.

Based on the available data made ground materials are not anticipated to be present.

Significant Features identified from geological data:
Localised Alluvium – potential soft or loose ground, potential shallow groundwater.
Variable soils – potential requirement for reinforcement.
Cohesive soils – deepened foundations in association with trees.

2.5 HYDROGEOLOGICAL INFORMATION

The BGS borehole to the east records a water strike at approximately 1.0m bgl at the boundary of the Alluvium and underlying River Terrace deposits. The borehole was drilled in June 2017 and the groundwater level is likely to be subject to seasonal variations. The presence of flooded workings to the south suggests a shallow groundwater table.

Given the anticipated predominantly granular geology hydraulic continuity is anticipated between the site surface and the underlying groundwater.

Groundwater flow is anticipated to be to the south west following the direction of the local surface water courses.

The Environment Agency has classified the underlying Alluvium, River Terrace and Bagshot Formation as Secondary A aquifers.

The nearest recorded groundwater abstraction is situated 484m to the north east for the purposes of spray irrigation. Given the distance and sensitivity of the abstraction it is considered not to be at risk from any site derived contamination (should any be present).

The site is not recorded to be within a Groundwater Source Protection Zone.

Significant Features identified from hydrogeological data:
Secondary A aquifers – potential receptors for site derived contamination (should any be present).
Shallow groundwater – reduced bearing capacity in granular soils, requirement for upgraded groundwater control measures.

2.6 HYDROLOGICAL INFORMATION

Local surface water features include:

- Longwater River approximately 380m to the south and flowing to the west. Given the distance and likely dilution factors the river is not considered a viable receptor.
- Un-named secondary rivers (drains) on eastern and southern boundaries.

There are no surface water abstraction licenses recorded within 250m.

There is a discharge consent recorded on the western boundary associated with drainage of the gravel extraction to the south. As the discharge medium was groundwater there is considered to be no risk to the site.

Significant Features identified from hydrological data:
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Drains to east and south – potential flood risk, potential receptor for site derived contamination (should any be present), potential receptors for siltation.

2.7 FLOOD RISK

The site is situated wholly within Environment Agency Flood Zone 1. The site is within 250m of an indicative fluvial floodplain related to Longwater River. There is considered to be a risk of flooding from rivers (≥ 1 in 30 chance of an annual flood event), relating to the area in immediate proximity to the south east corner.

The southern site boundary is within an area susceptible to surface water flooding (pluvial) with a maximum inundation depth of between 0.3m and 1.0m based on a 1 in 30 year event.

In addition, the site is recorded to be within an area of moderate risk from groundwater flooding (emergence of groundwater at the surface).

Information provided by the landowner confirms that no flooding has occurred within the 12 years since they owned the site.

A Phase II ground investigation would provide information on the local groundwater regime so that the risk can be assessed by the projects infrastructure engineer. Any risk associated with the groundwater regime should be catered for within the development infrastructure design.

Based on the above and as the site is >1ha in size a Flood Risk Assessment (FRA) is required.

Significant Flood Risk Features identified:
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High risk of flooding from rivers, groundwater and surface water – FRA required.

On-site historical flood events – FRA required.
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Site in excess of 1ha – FRA required.
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2.8 MINING

2.8.1 Coal

The site is not within an area recorded to require a Coal Authority mining report, and no coal bearing strata is recorded beneath the site. Therefore, the risk from coal mining is considered to be negligible.

2.8.2 Brine

The site is not within the area defined by the Brine Compensation Board and no readily soluble strata are recorded beneath the site. Therefore, the risk from dissolution is considered to be negligible.

2.8.3 Ironstone

The strata beneath the site are not suitable for ironstone extraction; therefore the risk is assessed as negligible.

2.8.4 Gypsum

The strata beneath the site are not suitable for gypsum extraction; therefore the risk is assessed as negligible.

2.8.5 Oil And Gas.

GRM have conducted an on-line search, which has shown that the Oil and Gas Authority does not record the site to be within an on-shore licence area or is recorded to be within either an On-shore Hydrocarbon Field or a Shale Prospecting area. Therefore, the risk from oil and gas exploration is assessed as negligible.

Significant Mining Risks:
None identified.

2.9 QUARRYING

There are a series of recorded sand and gravel extractions beyond the southern site boundary at Manor Farm Quarry. The pits recorded within c.98m have ceased extraction; however, active gravel extraction is recorded 312m to the south west.

Although gravel extraction has (and is) occurring in proximity to the site, and within a similar geology, the site itself has no recorded history of mineral extraction.

Significant Quarrying Risks:
None identified.

2.10 MINERAL RESOURCE PROTECTION

Whilst GRM can comment on the geological considerations regarding Mineral Resources, a legal expert should be commissioned concerning Mineral and Manorial Rights.

There are areas of the country where large reserves of aggregates and other minerals exist, which are actively being, or could potentially be, exploited as a valuable resource. A Mineral Risk Assessment is typically required when developments, particularly those that are large in size, is proposed in areas where large reserves do, or may, exist, to determine whether the mineral resource will be sterilised.

The BGS Aggregate Safeguarding Map/Plan for the county of Berkshire has been used to provide an initial assessment of the known reserves of aggregates in the area of the site.

The site is underlain by River Terrace Deposits and within an area where such materials have historically, and currently, been exploited for aggregate purposes. The Berkshire County Council's Minerals Plan records the sand and gravel deposits as a protected resource.

It is recommended that a separate Mineral Risk Assessment (MRA) is produced to further considered the likely impact of the potential mineral resources effect on the proposed development.

Mineral Risk Assessment:
Further assessment required – MRA required.

2.11 ENVIRONMENTAL INFORMATION

An Environmental Report has been acquired for the site. The full report is presented in Appendix H. No significant environmental hazards, that are considered likely to pose a potential risk to the site, have been identified from the available information.

Significant Environmental Risks:
None identified.

2.12 ARCHAEOLOGY

GRM have been informed that an archaeological and heritage assessment has been produced by The Environmental Design Partnership Ltd as part of the application process

Archaeological Hazards:
Additional assessment undertaken.

2.13 INVASIVE PLANT SPECIES/ECOLOGY

GRM is not a specialist in this topic and has not conducted such a survey; however, we will endeavour to report easily recognisable issues such as Japanese Knotweed,

Giant Hogweed, badger sets etc, when seen on site. No such issues were observed during the walkover.

GRM have been informed that an ecological baseline report has been produced by The Environmental Design Partnership Ltd as part of the application process.

Invasive Plant Species/Ecological Hazards:
None observed.
Additional assessment undertaken.

2.14 RADON ASSESSMENT

The site has been assessed following the guidelines in 'Radon: guidance on protective measures for new dwellings (including supplementary advice for extensions, conversions and refurbishment projects)' (BR211 2023). The site is not within an area recorded to require radon protection measures.

Radon Hazard:
None.

2.15 SUMMARY OF POTENTIAL GEOTECHNICAL/GENERAL HAZARDS

Potential geotechnical/general hazards have been identified in earlier sections and are summarised below.

Potential Hazard	Potential Consequence	Action
Possible localised soft strata (Alluvium)	Poor trafficability	Deepened foundations. Ground investigation constraint.
Variable strata	Deepened foundations	Ground investigation
Shrinkable clay/trees	Deepened foundations	Ground investigation
Access constraints	Delays to development program	Vegetation clearance prior to ground investigation
Drainage ditches	Risk of siltation	Surface water management plan
Potential protected mineral reserves beneath site	Risk to development viability	Mineral Risk Assessment and consultation with Local Authority.
Potential shallow groundwater	Reduced bearing capacity in granular soils. Upgraded groundwater control measures	Ground investigation and monitoring
Flood risk	Danger to structures	FRA required

Potential sources, pathways and receptors are summarised in the Phase I Conceptual Model in Section 3, which is based on current relevant guidance, the principles of which are set out in Appendix A (iii).

Where appropriate potential hazards to the proposed development are shown on the Hazard Plan (Ground Model) presented in Appendix I.

2.16 CONTAMINANTS OF CONCERN

In addition to the general contaminants listed in Appendix A (ii), no site specific contaminants have been identified:

3 PHASE I CONCEPTUAL SITE MODEL

HUMAN HEALTH			
Source	Pathway	Receptor	Level of Risk
No sources of contamination have been identified.	Indoor and outdoor inhalation of soil dust, the ingestion of, and dermal contact with, contaminated soil and soil dust, ingestion of vegetables that have taken up contamination and contaminated soil attached to vegetables.	End users.	Negligible.
		Construction and Maintenance Workers.	
No significant sources of ground gas have been identified.	Inhalation of ground gas.	End users.	Negligible.

CONTROLLED WATERS			
No sources of contamination have been identified.	Leaching of contaminants and vertical migration to the groundwater.	Secondary A aquifers.	Negligible.
No sources of contamination have been identified.	Leaching of contaminants and lateral migration to surface waters.	Nearby drains.	Negligible.

4 CONTAMINATION / REMEDIATION RECOMMENDATIONS

The risk from ground contamination is considered to be negligible.

The risk from ground gas is considered to be negligible.

Prior to development a ground investigation will be required, the scope of which is outlined in Section 6. At this stage, based on the desk study information available, it is considered that allowance be made for the following:

- A soil capping system is not anticipated to be required; however, testing will be required to confirm this.
- Standard PE water supply pipes are anticipated to be suitable.
- It is considered unlikely that gas protection measures will be required; however, gas monitoring will be required to confirm this.

5 PRELIMINARY GEOTECHNICAL ASSESSMENT

It should be noted that the following comments and recommendations are based on the findings of this desk study which may not give a true indication of a soils actual engineering properties (i.e. stability, mass structure etc). Prior to development a ground investigation will be required to confirm the initial recommendations outlined below, the scope of which is outlined in Section 6. However, at this stage based on the desk based information available it is considered:

- The ground conditions are generally anticipated to comprise sand and gravel (River Terrace Deposits in the south over weathered Bagshot Formation and weathered Bagshot Formation from near surface in the north). Alluvium may be present in the extreme south east. The Bagshot Formation has locally been recorded as sandy clay. Rock is not anticipated at shallow depth beneath the site.
- Traditional trench fill foundations founding in the natural granular soils are generally considered to be suitable. The deepening of foundations through any Alluvium should be anticipated due to their inherent variability and poor strength. As the Bagshot Formation has locally been recorded as clay an allowance for some reinforcement is recommended should variable strata be encountered. Given the potential for cohesive strata and trees to be present an allowance for a percentage of plots to require piled foundations would be prudent at this stage.
- Previous trial pits did not encounter instability; however, as shallow groundwater is anticipated to be present, the adoption of a supervised dig and pour philosophy and the use of full trench support is recommended. Upgraded dewatering systems, such as well-pointing, should be allowed for at this stage.
- At this stage allowance should be made for the use of suspended floors. Additionally, allowance for voided suspended floors will be necessary for plots that fall within the heave zone of trees if cohesive soils are present.

- Overly aggressive ground conditions are not expected and standard concrete should be suitable.
- The potential for shallow groundwater is considered likely to limit the feasibility of a soakaway drainage system.
- Given the anticipated natural granular geology CBR values of >5% are generally considered likely. Lower CBR values should be anticipated in the alluvial soils (c.2%) and during periods of inclement weather.

6 FURTHER INVESTIGATION

A Phase II ground investigation is recommended to determine more accurately the effect of the identified hazards on the development. Initially, this should include:

A ground investigation designed to BS10175:2011 and BS5930:2015 and comprising window sampling, trial pitting will be required to confirm ground conditions and collect samples for analysis.

Chemical analysis of soils followed by risk assessment so that the risk to human health and controlled waters can be determined.

Based on the Phase I Conceptual Model (Section 3) the ground gas risk has been assessed as negligible. However, a ground gas investigation designed to current guidance is recommended to determine the ground gas regime beneath the site. At this stage allowance for 6 visits over 3 months should be made to assess potential liabilities.

Geotechnical soils testing of the founding strata to assess its character and suitable grades of buried concrete.

Following your review of this document, a copy of it should be submitted to the Planning Department of the Local Authority for comment and approval prior to any ground investigation works being undertaken, as this is often a condition of planning.

7 CONCLUSIONS

This Phase I Site Appraisal has shown the site is suitable for the proposed development, assuming compliance with all the recommendations contained within this report.



A P P E N D I X A

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GENERAL APPRAISAL COMMENTS

i INFORMATION SOURCES

Where available the following sources have been used for the identification and assessment of potential ground hazards:

- Relevant British Standards
- British Geological Survey (BGS) Geology Map Scale 1:10,000 for local area
- British Geological Survey (BGS) Geology Map Scale 1:50,000/1:63,320
- BGS Memoir
- BGS Borehole Records: <https://mapapps2.bgs.ac.uk/geoindex/home.html>
- BGS online viewer: <https://geologyviewer.bgs.ac.uk>
- Magic Groundwater Vulnerability Maps
- Historical Ordnance Survey (OS) Maps
- Environmental Data Report
- Environment Agency Website: <http://www.environment-agency.gov.uk/>
- Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UKWIR, 2010.
- Coal Authority Records / Coal Mining Report
- DEFRA/Environment Agency Contaminated Land publications and DoE Industry Profiles
- BRE Guide BR211 (2023), 'Radon: Guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects)'
- UK HSA Radon Maps: <https://www.ukradon.org/information/ukmaps>
- CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings'
- BS8485:2015 +A1: 2019, 'Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'
- Other technical references used throughout this document are detailed in the text.

ii CONTAMINANTS OF CONCERN

The DoE Industry Profiles are normally used to assess likely contaminants from past land use and potential nearby industrial sources. For land uses where no profile is available, likely contaminants of concern are selected by GRM based on past experience of similar sites, a general screening suite of contaminants covered by CLEA and common contaminants from the Industry Profiles.

- | | | |
|------------|-------------------|--|
| · Arsenic | · Copper | · Water soluble sulphate |
| · Cadmium | · Nickel | · PAH (polycyclic aromatic hydrocarbons) |
| · Chromium | · Zinc | |
| · Lead | · Phenols | |
| · Mercury | · cyanide (total) | |
| · Selenium | · pH | |

Asbestos and PCBs are listed in the vast majority of profiles. PCBs are listed as the profiles expect electricity substations and switch boxes on all industrial sites. There is the potential for asbestos containing material to be mixed up with made ground, following any demolition works.

iii CONCEPTUAL MODEL METHODOLOGY

The consideration of contamination is based upon the principles of risk assessment, using the 'source-pathway-receptor' model in order to establish the presence, or potential presence, of a pollutant linkage.

To create a risk, contamination must have the potential to cause harm to susceptible targets or receptors such as humans, the water environment or the built environment. The potential for harm to occur requires three conditions to be satisfied to form a pollutant linkage:

- The presence of substances that may cause harm (SOURCE).
- The presence of a target which may be harmed (RECEPTOR).
- The existence of a plausible migration route between the source and the receptor (PATHWAY).

In the absence of a plausible pollutant linkage there is no risk. Where a potential linkage is identified in order for it not to pose a risk to the identified receptor it must be broken.

iv INTRUSIVE INVESTIGATION SAMPLING METHODOLOGY

The ground investigation (including fieldwork, sampling, monitoring and laboratory analyses) has been designed to identify and assess potential ground related problems and to allow cost effective solutions to be advised. It has been planned on the basis of the desk study, site inspection and the proposed development layout (where available). All fieldwork and soil descriptions were carried out in general accordance with relevant British Standards.

The exploratory holes have been positioned and advanced to depths to determine the general ground/groundwater/gas conditions below the site. A general grid pattern has been adopted, where possible, to provide sufficient information based on the current proposed layout scheme. Some holes have been targeted at particular hazards identified in the Phase I assessment. The resultant exploratory hole density is considered to be commensurate with the complexity of the site conditions and detail of information required for this phase of the investigation.

v GROUND GAS RISK ASSESSMENT METHODOLOGY

Gas monitoring programmes undertaken by GRM are designed to broadly comply with the recommendations outlined in CIRIA Report C665 'Assessing risks posed by hazardous ground gas to buildings' (2007) and BS8576 'Guidance on Investigations for ground gas – Permanent gases and Volatile Organic Compounds (VOCs) (2013).

To assess the risks posed by ground gases such as radon, carbon dioxide and methane, the relevant current guidance has been used. For radon the site has been assessed following the guidelines in 'Radon: guidance on protective measures for new dwellings (including supplementary advice for extensions, conversions and refurbishment projects) (BR211: 2023)'. For methane and carbon dioxide the primary guidance document used to determine if protection measures are required is *BS8485:2015 Code of practice for the design of protective measures from methane and carbon dioxide ground gases for new buildings*. This uses hazardous gas flow rates (Q_{hg}), which are gas concentrations multiplied by borehole flow rates, to derive a Gas Flow Rate (GSV) for the site. The gas regime is then determined based on the GSV and other limiting factors such as gas concentrations.

Where flow is not recorded during the monitoring a default flow rate of 0.1l/hr will be used in the assessment to produce a positive result.

vi HUMAN HEALTH RISK ASSESSMENT METHODOLOGY

Guidance contained in the Environment Agency's CLEA Reports has been used to assess the risks posed to human health.

For residential developments that include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land with plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered including the consumption of home-grown vegetables.

For residential developments that do not include domestic gardens the default Tier 1 Assessment Criteria (TAC) for 'residential land without plant uptake' are used, i.e. a female with a start age class of one and an end age class of six. All pathways are considered except the consumption of home-grown vegetables. For commercial/industrial developments the default Tier 1 Assessment Criteria (TAC) for 'commercial/industrial' are used, i.e. a female with a start age class of sixteen and an end age class of eighteen. All pathways are considered except the consumption of home-grown vegetables.

The TAC used by GRM include Category 4 Screening Levels (C4SLs) published by DEFRA, values calculated by GRM using the CLEA v1.071 risk assessment, and values and Suitable for Use Levels (S4UL) developed by LQM/CIEH. The TAC used in the assessment are selected based on the lowest site specific SOM values returned as part of the chemical analysis.

Where soil chemical analysis results are found to exceed the TAC, Site-Specific Risk Assessments may be undertaken using the CLEA v1.071 risk assessment software using the age classes and pathways described above.

vii RISK TO SITE WORKERS – GENERAL COMMENTS

The risks to site workers are similar to those posed to site end users, although likely to be less severe due to the site workers' shorter exposure to the identified contamination. However, site workers (particularly groundworkers) are more likely to come into direct contact with contaminated soils due to the nature of their work. On this basis ground and construction workers should be provided with basic Personal Protective Equipment based on the site's general health and safety risk assessment, but including as a minimum safety footwear, gloves and overalls.

A site specific risk assessment should be carried out for all hazards identified within the ground investigation in accordance with current health and safety legislation. This assessment should identify any measures required to further reduce risks i.e. providing further Personal Protective Equipment, welfare facilities and if necessary preventing access to certain areas.

Demolition and dismantling of existing structures on the site must be carried out to a safe and acceptable standard, in accordance with current UK guidance and best practice. Whilst not ground related, asbestos and hazardous substances surveys should be conducted prior to any demolition.

Any unusual colours, odours and suspicious ground should be reported immediately to site management and then GRM.

Whilst this appraisal has considered the long-term effects of contamination, GRM can also help during the formulation of Health and Safety documentation, if required.

viii CONTROLLED WATERS RISK ASSESSMENT METHODOLOGY

Where the desk study and fieldwork do not reveal a potential source of contamination no leachate or groundwater testing will be performed. Where a potential source is identified the testing will comprise leachate testing on the material considered most likely to pose a risk, groundwater testing will be undertaken if water is present at shallow depth.

The UK Drinking Water Standards (UKDWS) or Environmental Quality Standards (EQS) are usually adopted for comparison with the leachate/groundwater test results. When the most sensitive receptor is considered to be the aquifer (groundwater) UKDWS will be adopted as the Initial Tier 1 screening values.

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Where the most sensitive receptor is a surface water feature the EQS values will be used as Initial Tier I Screening values.

ix CONSTRUCTION MATERIALS RISK ASSESSMENT METHODOLOGY

The 'screening levels' adopted for the assessment of risk to construction materials are taken from the following documents:

- UK Water Industry Research (UKWIR) Contamination thresholds for sub-surface water pipes, for the protection of buried pipes.
- Building Research Establishment (BRE) Special Digest SD1 (2005), 'Concrete in Aggressive Ground', for the protection of buried concrete.

x WASTE DISPOSAL, SITE WASTE MANAGEMENT PLANS AND MATERIAL MANAGEMENT PLANS

Under current Waste Management Regulations, waste soil materials produced from the site will require characterisation to enable it to be disposed of correctly.

The chemical analysis results included in this report should be provided to the relevant landfill operators to establish the characterisation of the waste, confirm its suitability for landfill disposal and provide estimated costings. If material is classified as hazardous, then the site will need to be registered with the Environment Agency prior to the movement of the waste. Depending on the receiving landfill's current permit, further chemical analysis, incorporating Waste Acceptance Criteria (WAC) leachate analysis, may be required.

All materials removed from the site will be classified as 'waste' and therefore must be removed by a suitably licensed carrier of waste. This applies whether or not the waste is contaminated. All waste removed to landfill will attract Landfill Tax.

The developer/builder is likely to be classed as the waste producer and therefore, has a duty of care to ensure that all waste is disposed of appropriately. This includes ensuring the waste carrier is licensed and disposes of the waste to a suitably licensed landfill site. They are also required to keep a paper trail from 'cradle to grave' including copies of the waste disposal tickets.

Efficient materials management on site is recommended as it can lead to significant cost savings when compared to the traditional side casting or single stockpile of arisings. GRM can assist in the production of Material Management Plans under the CL:AIRE Definition of Waste: Code of Practice. The DoWCoP enables:

- The direct transfer and re-use of clean naturally occurring soil materials between sites, and
- The re-use of both contaminated and uncontaminated materials on their site of origin and between sites within defined Cluster projects.

GRM can also undertake the role of Qualified Person and submit the DoW CoP project Declaration.

Likewise making the site as volume neutral as possible will reduce the costs of development. Whilst not a statutory requirement, Site Waste Management Plans allow better waste management practices, help to reduce the amount of waste produced and identify best environmental disposal options. Implementing a Site Waste Management Plan (SWMP) can reduce costs (increasing business profits) and maximise resource efficiency.

xi GEOTECHNICAL ASSESSMENT GENERAL COMMENTS

Where finished floor levels of proposed structures have not been provided by the Client, then for the purposes of initial assessment, GRM will assume that finished levels will not vary appreciably from the existing ground levels. If the depths of any underground engineering works (i.e. sewers, pumping stations etc.) are unknown they will not be taken in to account in the assessment and it will be assumed that any such works will not compromise foundation or ground stability.

Should the development proposals or finished levels be different from these assumptions then the comments/recommendations in the Geotechnical Assessment may require revising.

It should be noted that the results of window sampling and/or cable percussive boreholes may not give a true indication of a soils actual engineering properties (i.e. stability, mass structure etc). GRM consider that that prior to development trial pitting should be undertaken to confirm the recommendations in the Geotechnical Assessment.

xii GEOTECHNICAL ASSESSMENT – ENGINEERING GROUND TREATMENT

Near surface soils have the potential to be disturbed by weathering and site traffic. Precautions should always be taken to avoid this, as excessive disturbance may leads to more onerous floor slab designs, road cap thickness and increased amounts of off-site disposal etc.

Near surface soils may need treatment or reinforcing to allow safe movement of construction plant and labour. An assessment by the contractor should be undertaken once the type of machinery/plant needed to complete the development is known.

xiii GEOTECHNICAL ASSESSMENT – EXCAVATIONS

Excavation instability (over-break) can result in damage to existing services or structures (e.g. foundations, roads or boundary walls/fences) both on and off-site, as well as increased foundation concrete costs. In order to minimise this, all excavations deeper than 1.2m deep (or any excavation within 1.5m of any existing structure or service) should be supported. Full support should be provided to the full depth of all near vertically sided excavations in made ground, soft and very soft clays and granular soils. A reduction to intermediate support should be acceptable within firm and stiffer natural clays.

Wherever possible, man entry into excavations should be prevented; however, where this is not possible, entry to, and time spent in, excavations should be kept to a minimum.

The build program should be tailored to reflect the impact that deep excavations through potentially unstable strata can have on adjacent properties, so that they are not undermined.

All excavations on site should be in accordance with HSE guidelines and stability should be practically maintained at all times. Reference should be made to HSE construction information sheet No. 8 (Revision 1) 'Safety in Excavations'.

Care should be taken to ensure that falls from excavation faces do not adversely affect the integrity of foundation concrete.

If contaminated water enters excavations it should be removed and transported to an appropriate treatment facility by a suitably licensed carrier before construction begins.

xiv GEOTECHNICAL ASSESSMENT – SUBSTRUCTURES

Where practicable, existing buried construction should be fully removed; however, if this is not practicable all new foundations should be carried down to fully penetrate it and it should be broken well away from all new structures.

There may be existing structures and/or infrastructure in close proximity to the proposed development. New build foundations may be constructed next to pavements with existing underground services beneath them, or excavations may be required near existing footings associated with adjacent properties. These potential hazards need to be taken into consideration when designing foundations and the groundworker needs to be made aware of their potential impact during the redevelopment works. Foundations close to existing underground services or buildings may require alternative foundation techniques (such as piling) to protect the integrity of these structures.

The contractor for the works should carry them out in such a fashion so as to not cause excessive overbreak, concrete usage or undermine existing buildings/roads/ services that are to be retained.

xv **GEOTECHNICAL ASSESSMENT – SOAKAWAYS**

Soakaway testing in trial pits by GRM is broadly carried out in accordance with BRE DG 365 (2016). The testing comprises the excavation of a test pit to a suitable depth, and the placement of water into the pit. The level of water present is then monitored over time. For borehole installations, the permeability testing (falling head/rising head) is undertaken in accordance with BS5930.

If it is decided to proceed with the use of soakaway drainage, then the following general points should be noted:

- Soakaways should not be placed so that water can be discharged through potentially contaminated made ground.
- The Environment Agency may require soakaways to be sealed systems such that only roof run off falls to soakaway.
- Interceptors are likely to be required for soakaways for highway drainage. The adopting authority for the highways should be consulted at the earliest opportunity regarding the use of soakaways for highways drainage.
- Consideration of site levels and slopes should be taken into account during the design.
- The construction of all soakaways should be in accordance with the current building regulations.
- Soakaways should not be placed within 5m of a proposed building.
- Placement of soakaways needs to be considered so as to avoid ponding of water down slope.
- The base of a soakaway should not be below the highest recorded water level.
- The Environment Agency prefer 1m of dry soil to be present between the base of a soakaway and the water table to provide attenuation for contamination.

xvi **GEOTECHNICAL ASSESSMENT – FOUNDATIONS**

If soft or hard spots are encountered during foundation excavation then they should be replaced with suitably compacted material or the footings deepened to suitable strata, to avoid differential settlement.

If strata of differing bearing character (e.g. sand and clay) are encountered at foundation levels within the excavations for a single plot then the excavation depths should be altered as appropriate to ensure the foundations rest on a single stratum, or strata that will not induce differential settlement. Where this is impractical then GRM should be contacted to assess a reinforced concrete detail or an alternative foundation solution (e.g. piles or vibro-replacement).

NOTES ON LIMITATIONS

General

GRM Development Solutions Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement had been executed, or with whom an assignment had been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from GRM Development Solutions Limited; a charge may be levied against such approval.

GRM Development Solutions Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
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Phase I Environmental Audits/ Desk Studies

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, GRM Development Solutions Limited reserves the right to review such information and as considered necessary and appropriate to modify the opinions accordingly. It should be noted that any risks identified in a Phase 1 report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Environmental Audits (Contamination Investigations)

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, ground and groundwater conditions to allow a reasonable risk assessment to be made. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, and controlled waters.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as provisional only and must, in any event, be confirmed by a commercial adviser.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. Whilst exploratory testing is intended to gain an accurate representation of the site, the very nature of sampling and testing is such that it cannot ensure that all localised conditions are detected.

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

Phase II Geo-environmental Investigations (Combined Geotechnical and Contamination 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 provide a reasonable assessment of the environment risks together with engineering and development implications. If costs have been included in relation to site development a commercial adviser must confirm these.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site for each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time the site work was conducted. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects. 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.



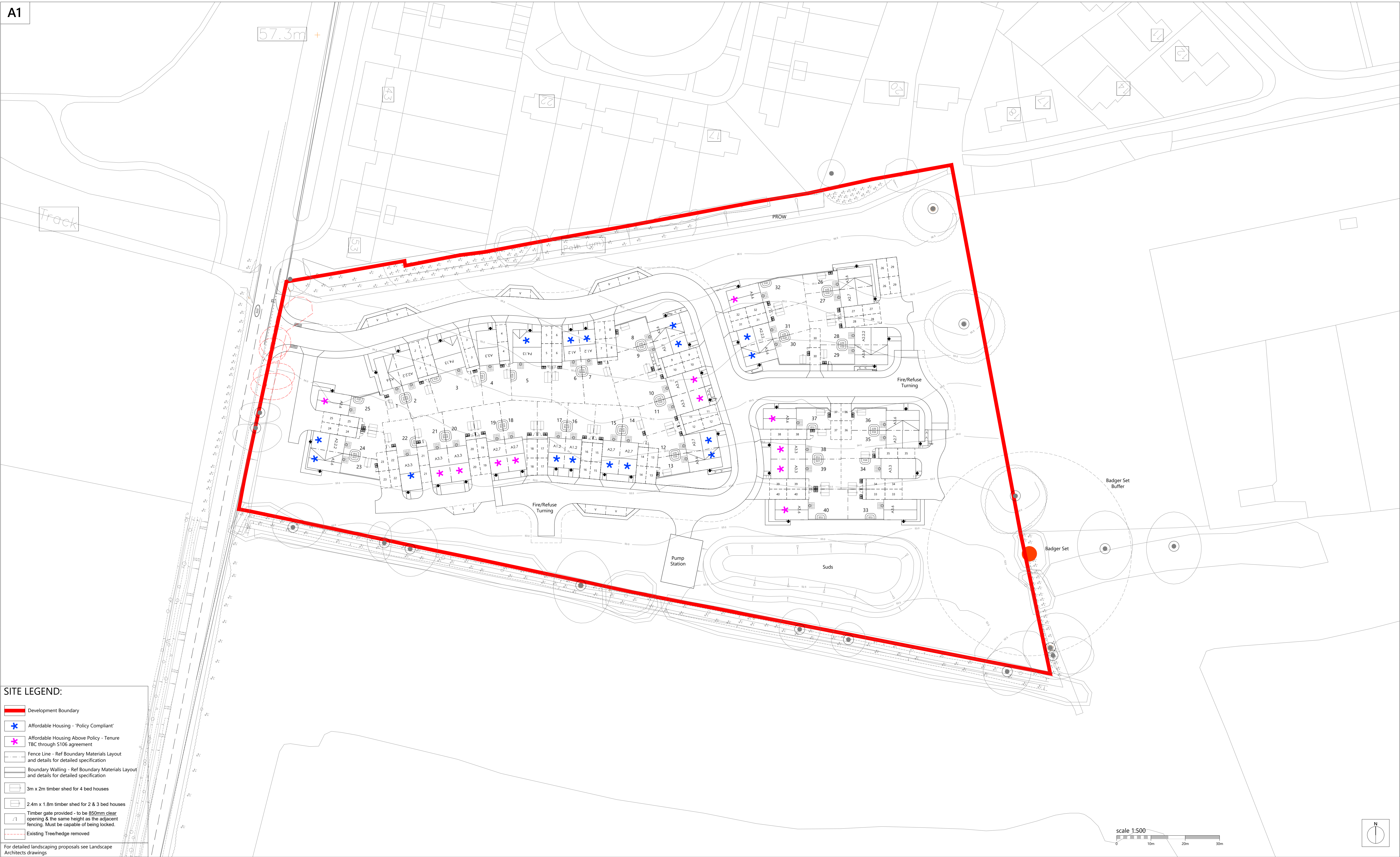
The risk assessment and opinions provided take in to consideration, inter alia, currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.



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www.grm-uk.com | info@grm-uk.com | 01283 551249 Company No. 3099018 (England), VAT Reg. No. 658 1005 48



SITE LEGEND:

- Development Boundary
- Affordable Housing - 'Policy Compliant'
- Affordable Housing Above Policy - Tenure TBC through S106 agreement
- Fence Line - Ref Boundary Materials Layout and details for detailed specification
- Boundary Walling - Ref Boundary Materials Layout and details for detailed specification
- 3m x 2m timber shed for 4 bed houses
- 2.4m x 1.8m timber shed for 2 & 3 bed houses
- Timber gate provided - to be 850mm clear opening & the same height as the adjacent fencing. Must be capable of being locked.
- Existing Tree/hedge removed

For detailed landscaping proposals see Landscape Architects drawings

Romsey T:01794 367703
Portishead T:01275 407000
London T:01794 367703

Rev	Description	Date	Au	Ch
A	Issued for Planning	31.05.24	MK	

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Project	Land at Longwater Road, Finchampstead		
Drawing	Site Layout		
Client	Catesby Estates PLC & Stonebond Properties (Guildford) Limited		
Job no.	CATE230603	Date	26.03.24
Dwg no.	SL01	Rev.	A
Author	MK	Checked	
Status	PLANNING	Scale	1:500 at A1
Client ref.		Office	Romsey

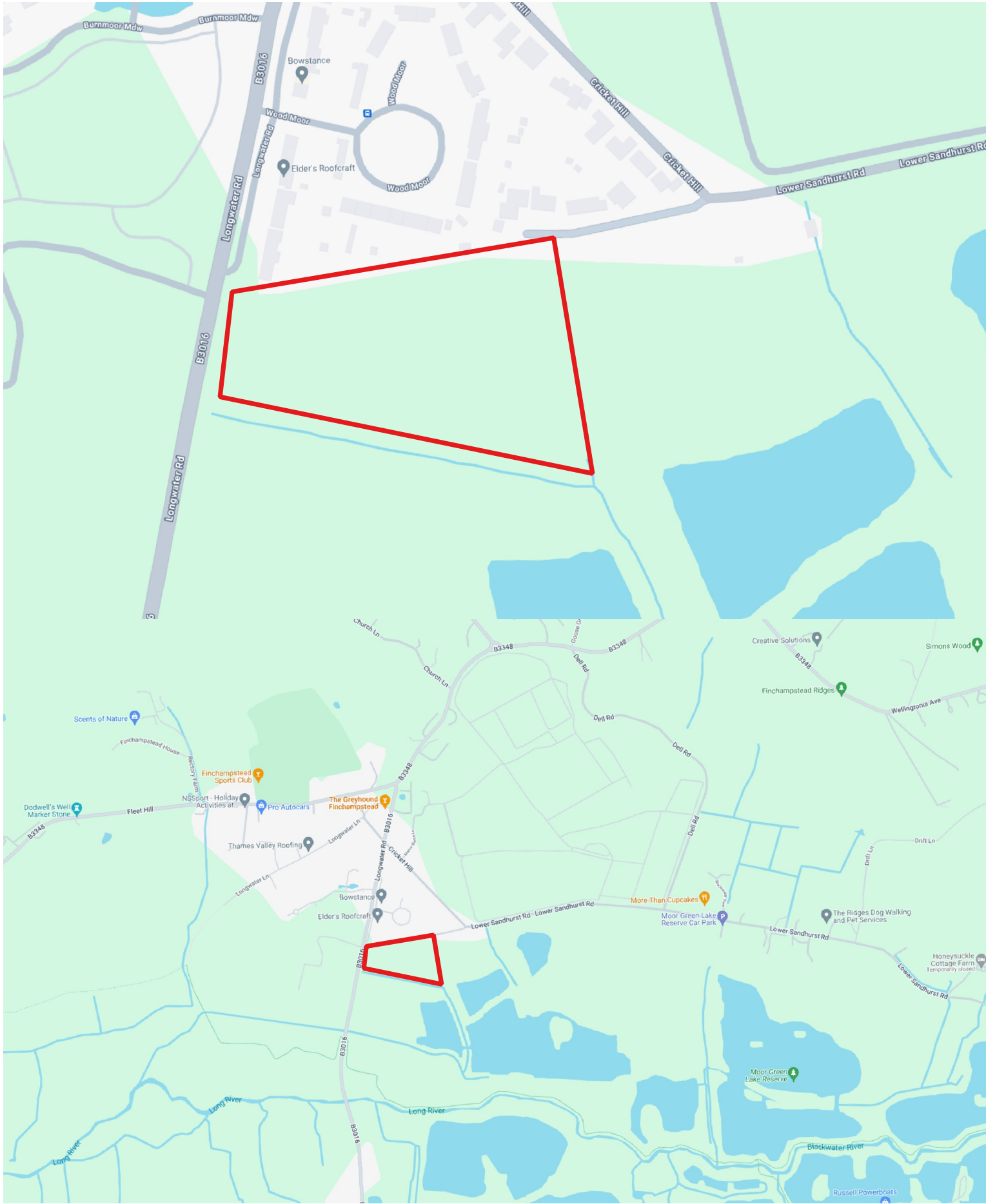




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NOTES:

CLIENT: CATESBY STRATEGIC LAND LTD

PROJECT: LAND TO THE EAST OF LONGWATER ROAD, FINCHAMPSTEAD

TITLE: SITE LOCATION AND BOUNDARY PLAN

PROJECT No: P7995

DATE: DEC 2023

DESIGN/DRAWN: MRL

DRAWING NUMBER: 001

ISSUE: Final

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- Site Boundary
- Access/Hazards
 - Gates (access)
 - Overgrown vegetation
 - Drainage ditch
 - Private land
 - Trees
 - Public Path

Photo location and direction

CLIENT:	CATESBY STRATEGIC LAND LTD	PROJECT No:	P7995	DATE:	DEC 2023	DESIGN/DRAWN:	MRL	 GRM Development Solutions Ltd Tel: 01283 551 249 mail@grm-uk.comwww.grm-uk.com
PROJECT:	LAND TO THE EAST OF LONGWATER ROAD, FINCHAMPSTEAD	DRAWING NUMBER:		002	ISSUE:		DRAFT	
TITLE:	SITE FEATURES AND PHOTOGRAPH PLAN	© GRM Development Solutions Ltd © Crown Copyright. AL 100014100						

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PROJECT:

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FINHAMPSTEAD**

TITLE:

Site Photographs

SCALE@SIZE :

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ISSUE:

FINAL

DESIGN/DRAWN :

MRL

DATE:

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P10433

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PROJECT No:

P10433

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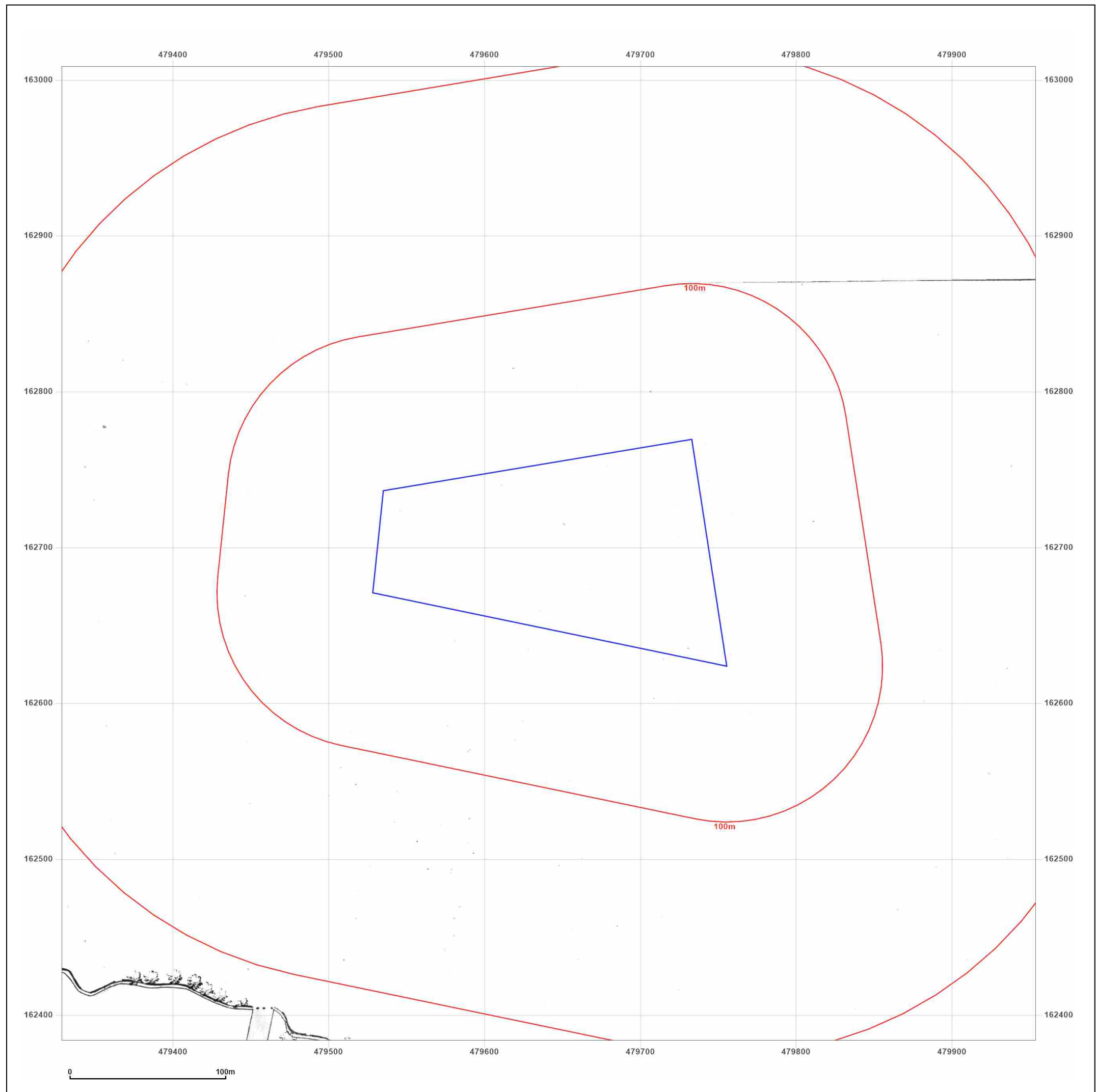
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Site Details:

Land Off Longwater Road,
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Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: County Series

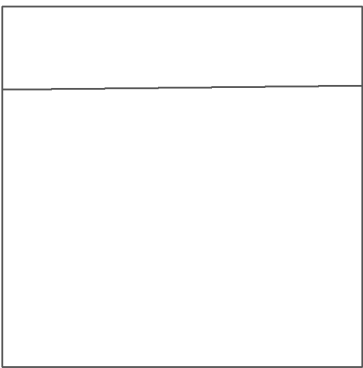
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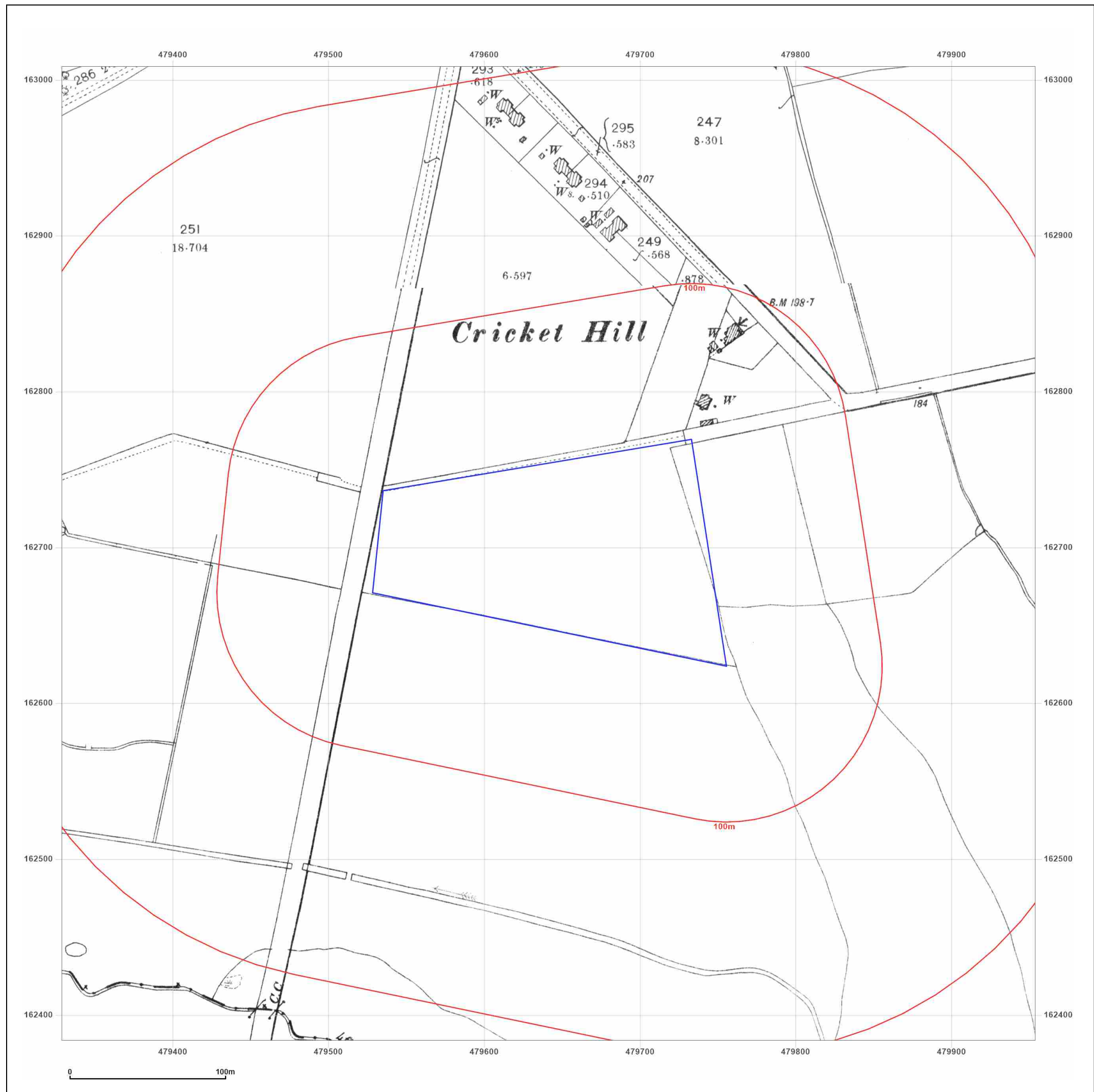


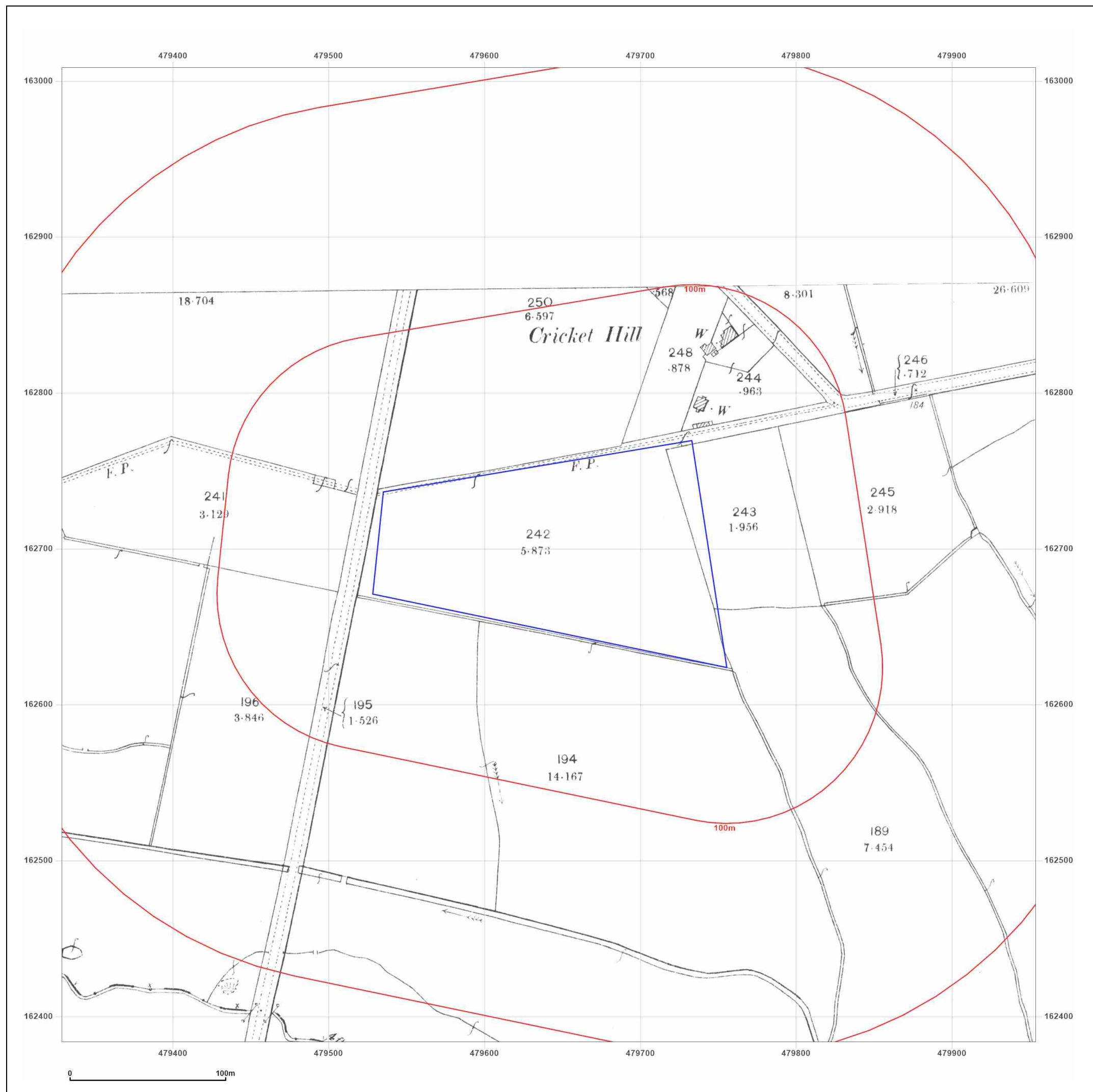
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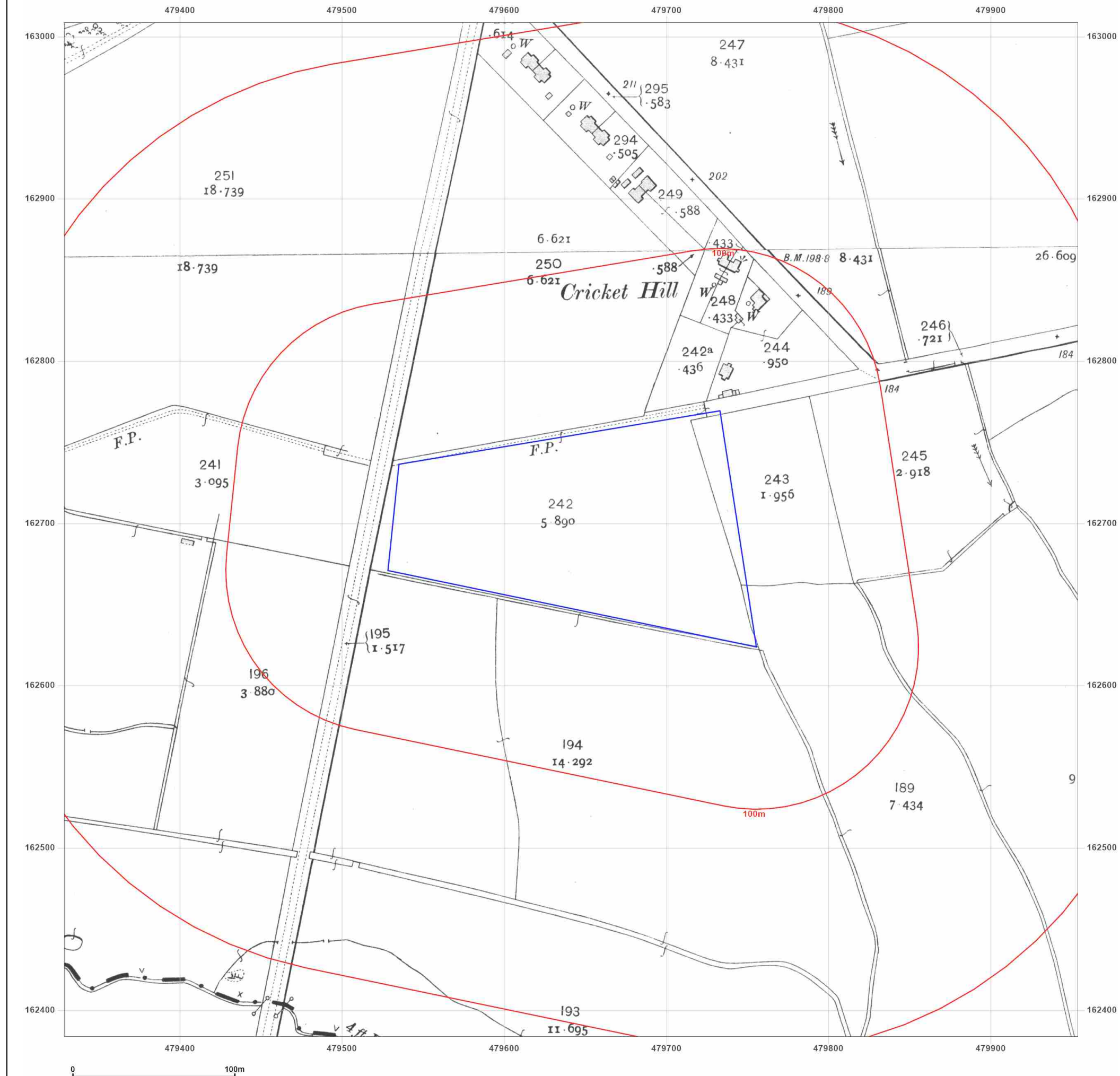


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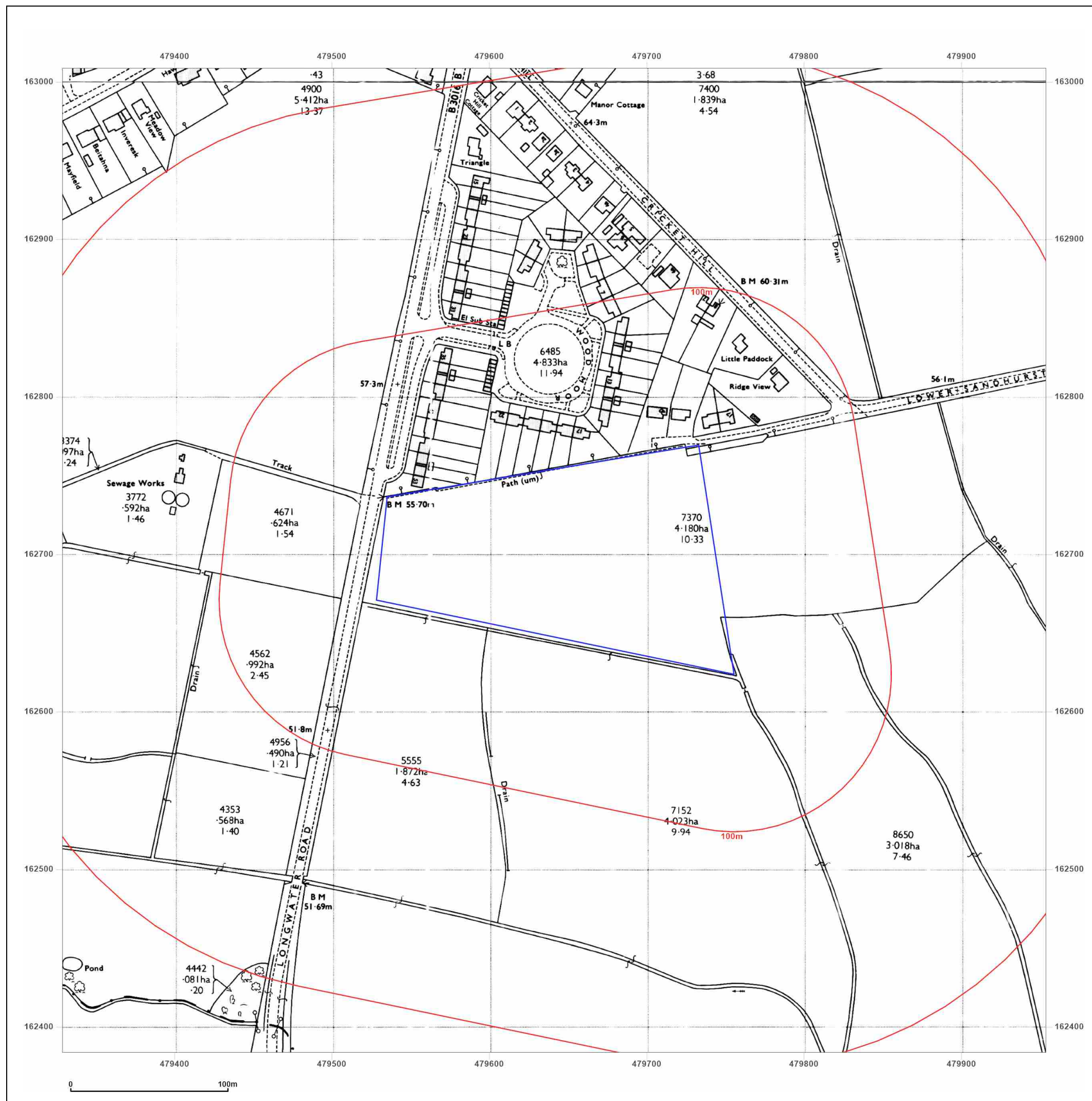


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Map Name: National Grid

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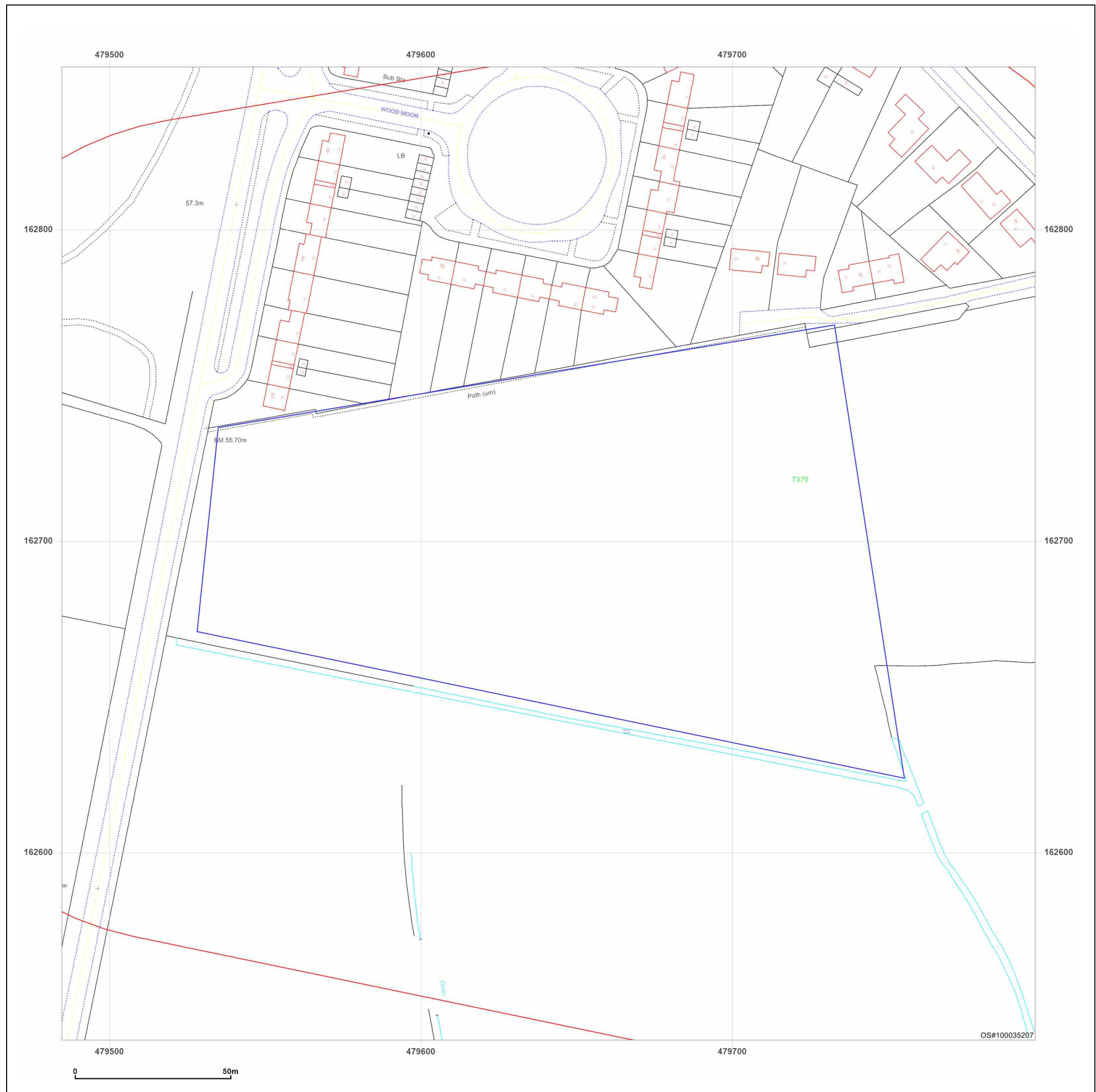


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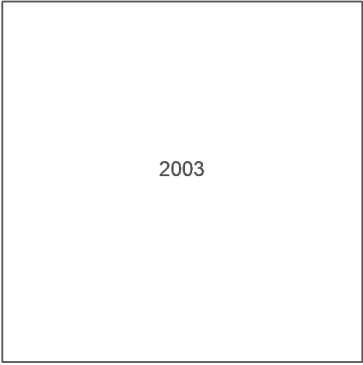
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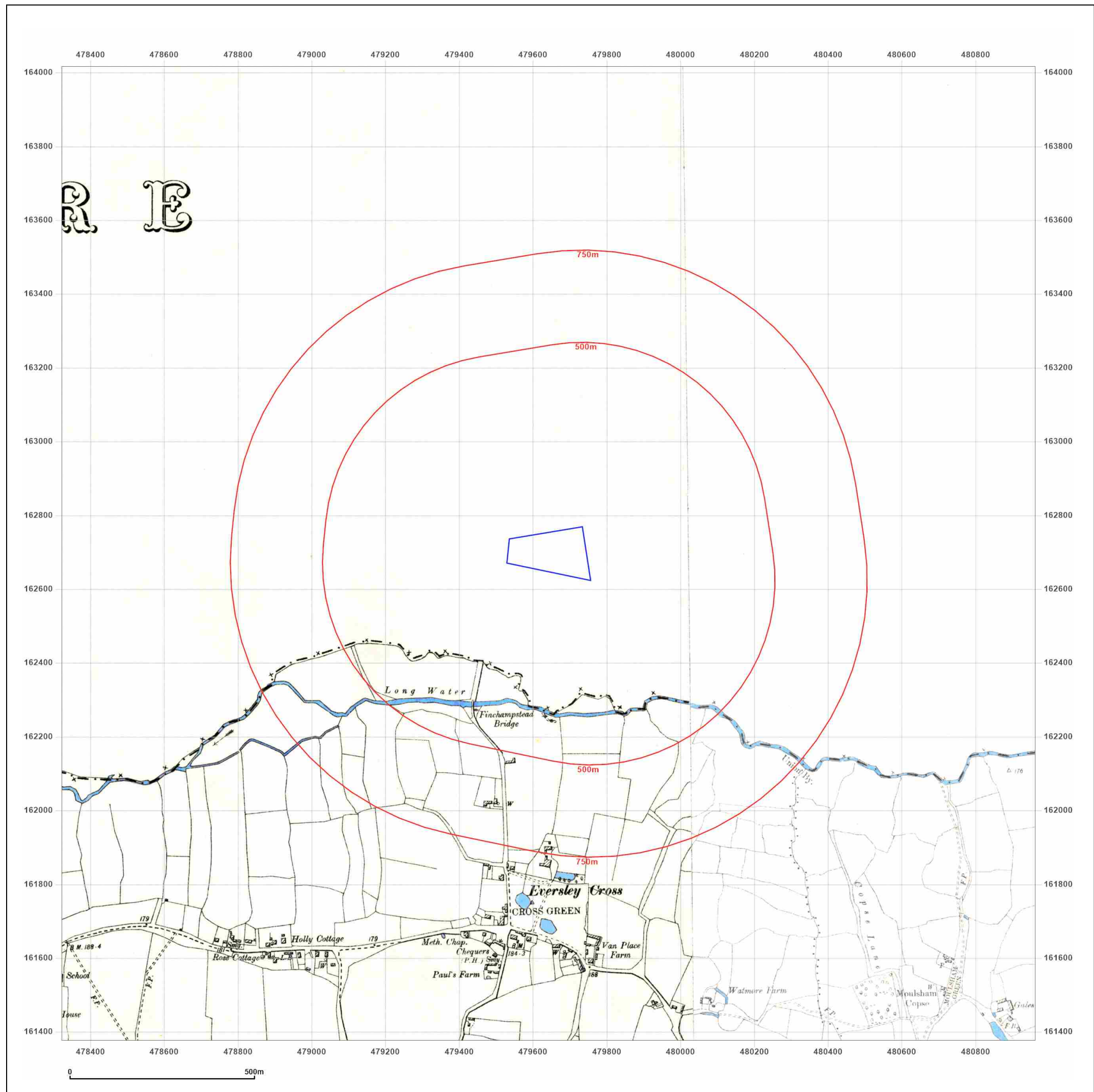


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Map Name: County Series

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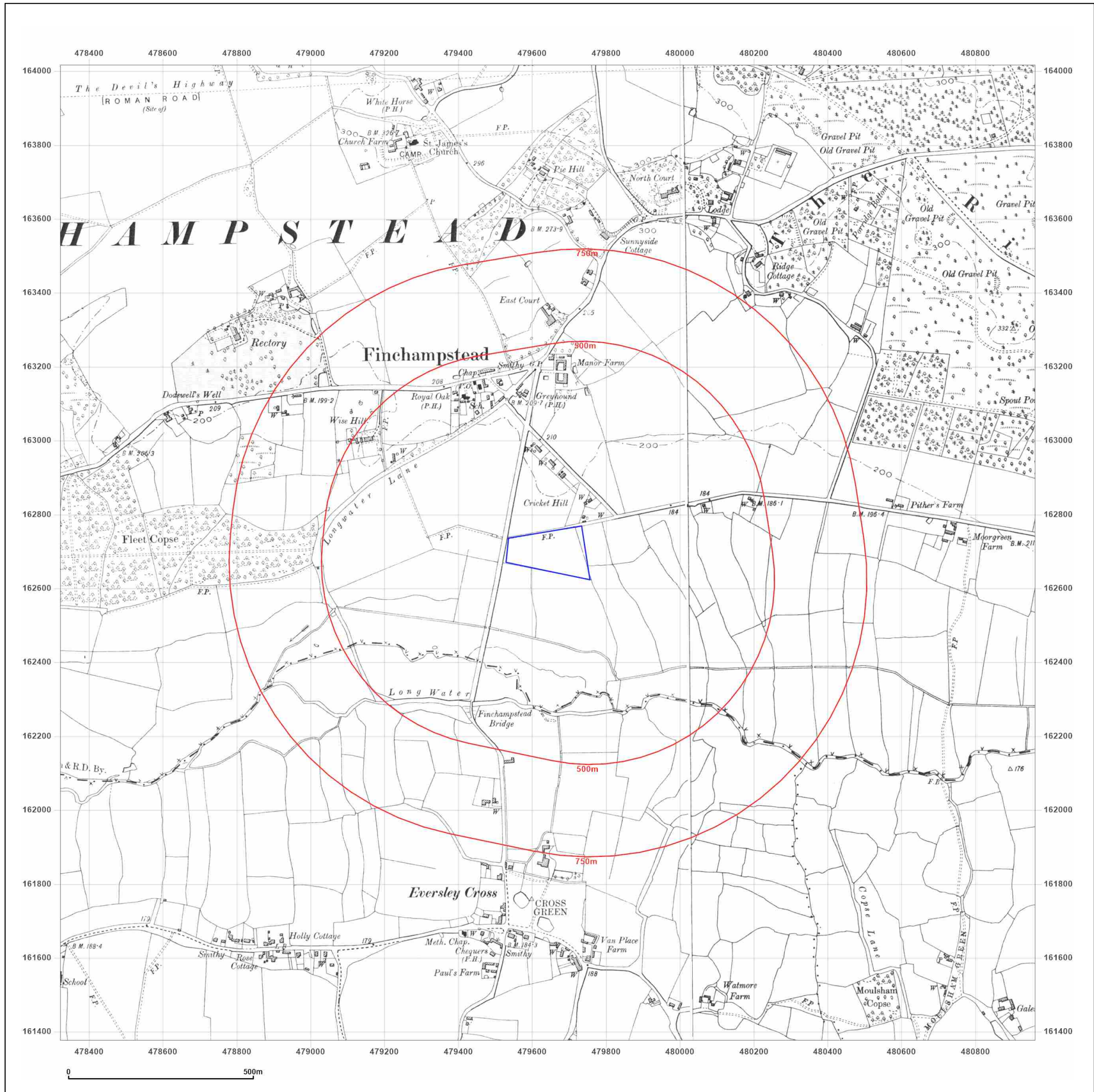


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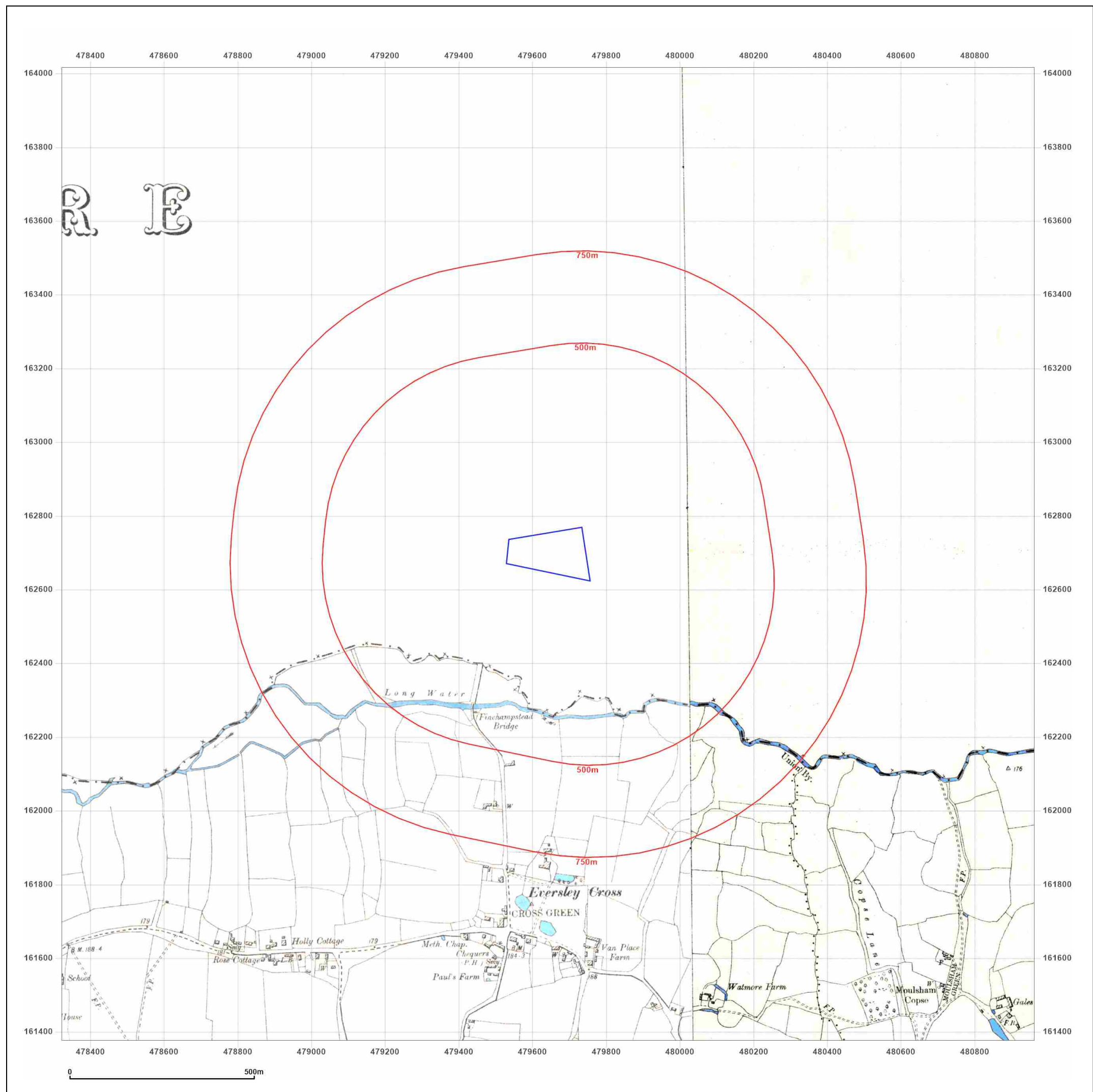


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Grid Ref: 479641, 162696

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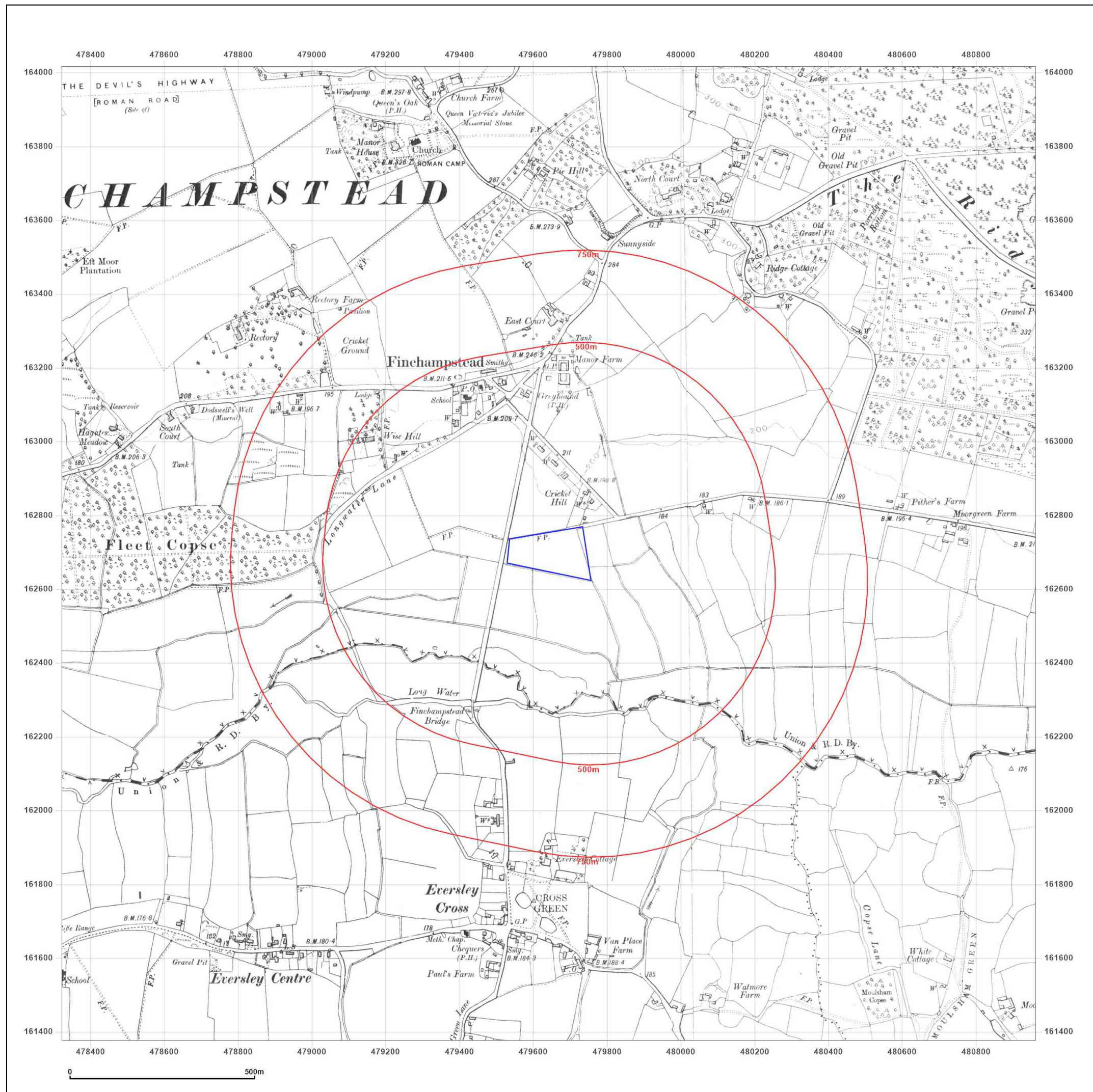


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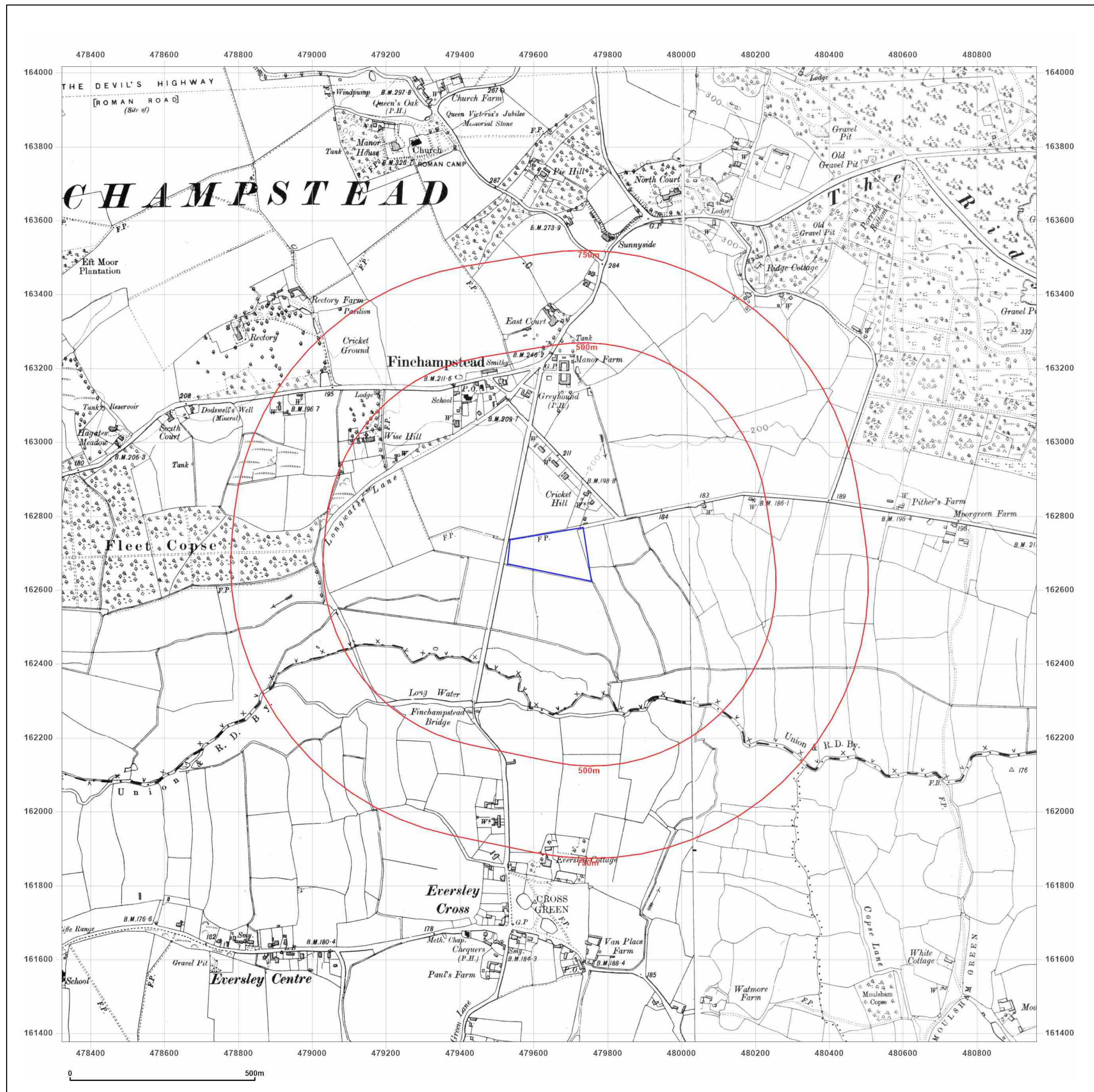


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Land Off Longwater Road,
Finchampstead, RG40 3TT

Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: County Series

Map date: 1913

Scale: 1:10,560

Printed at: 1:10,560



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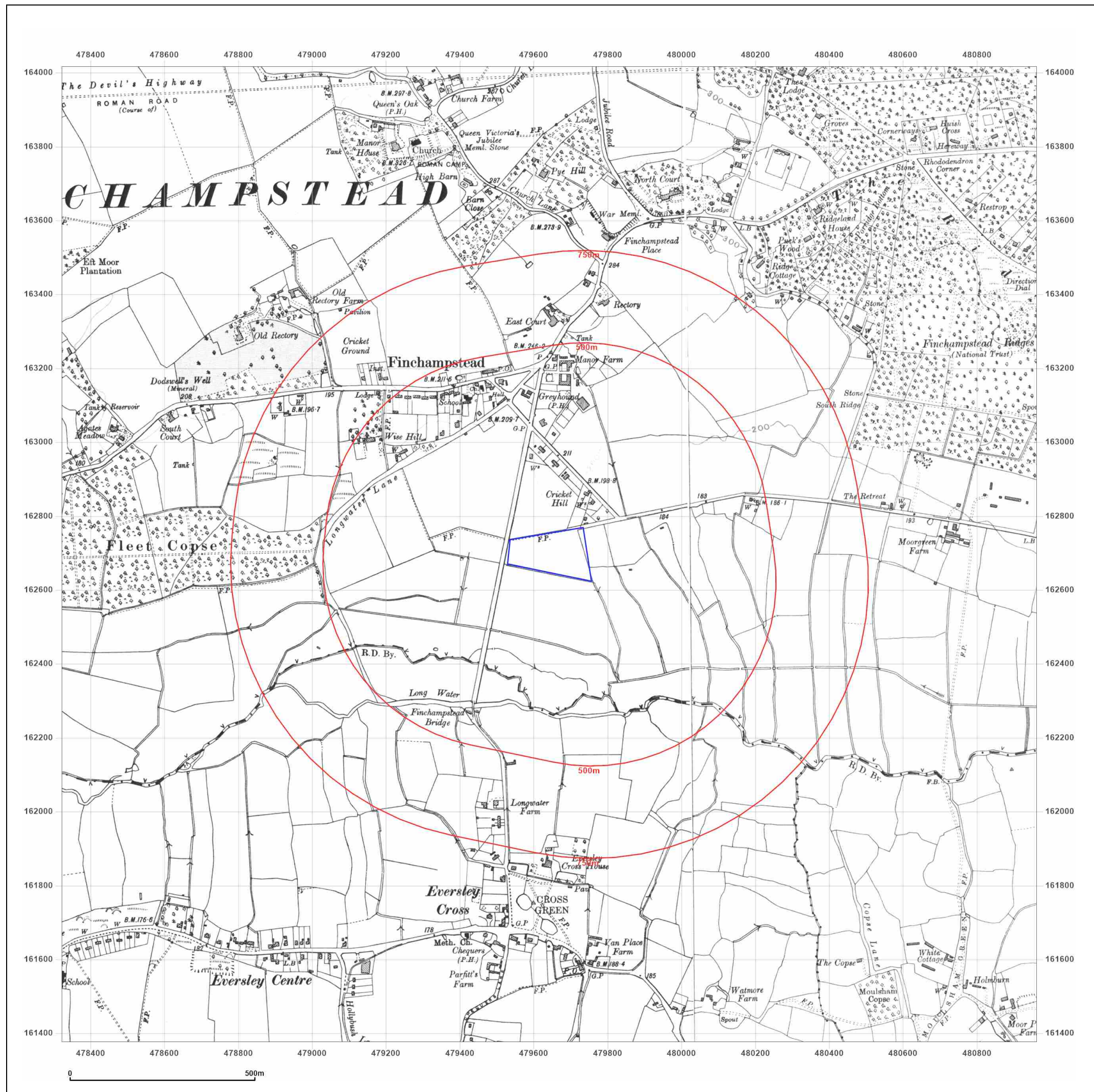


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Site Details:

Land Off Longwater Road,
Finchampstead, RG40 3TT

Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: County Series

Map date: 1930

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1871
Revised 1930
Edition N/A
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Surveyed 1871
Revised 1930
Edition N/A
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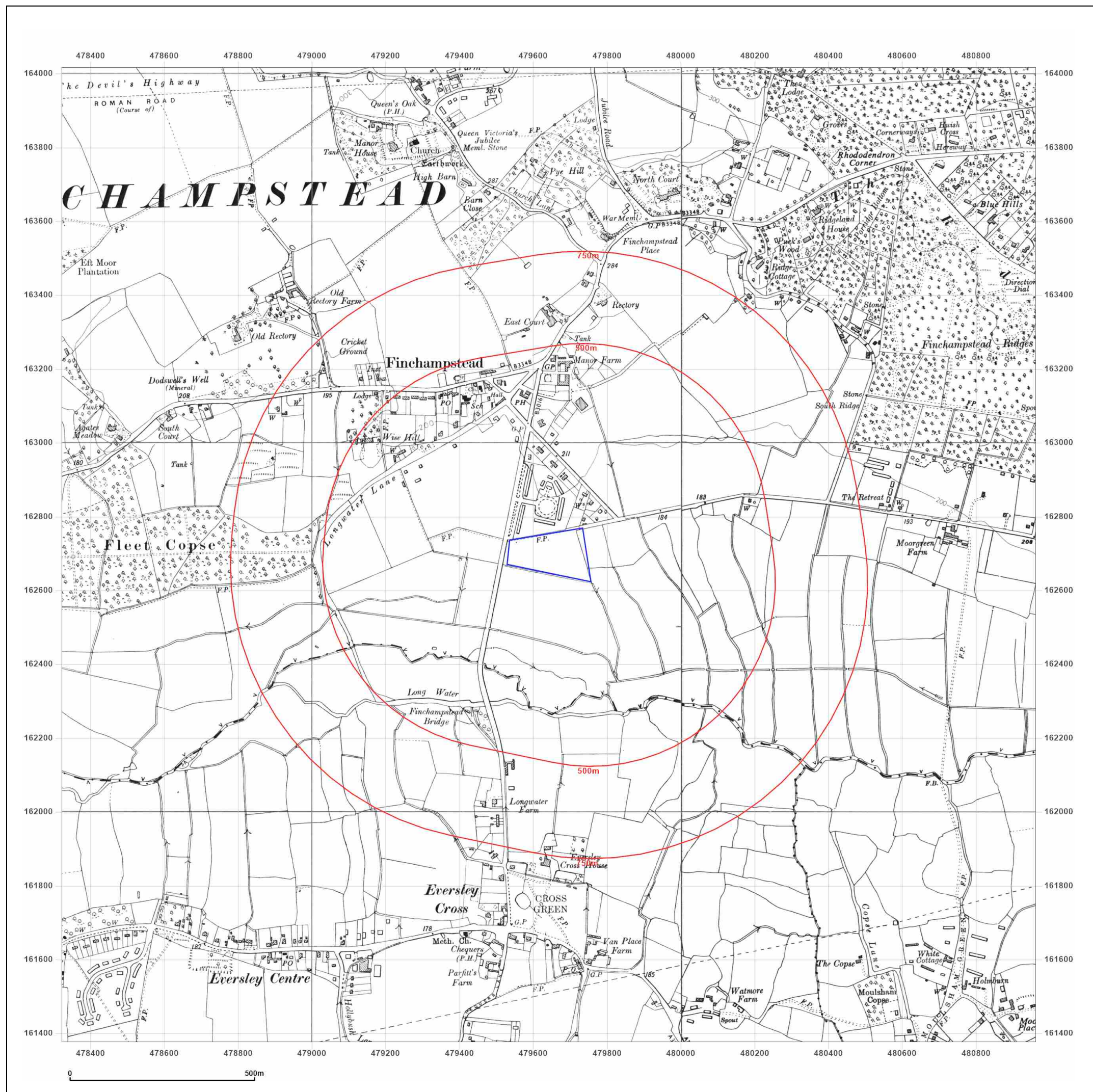


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Site Details:

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Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: Provisional

Map date: 1956-1960

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1956
Revised 1960
Edition N/A
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Surveyed 1956
Revised 1956
Edition N/A
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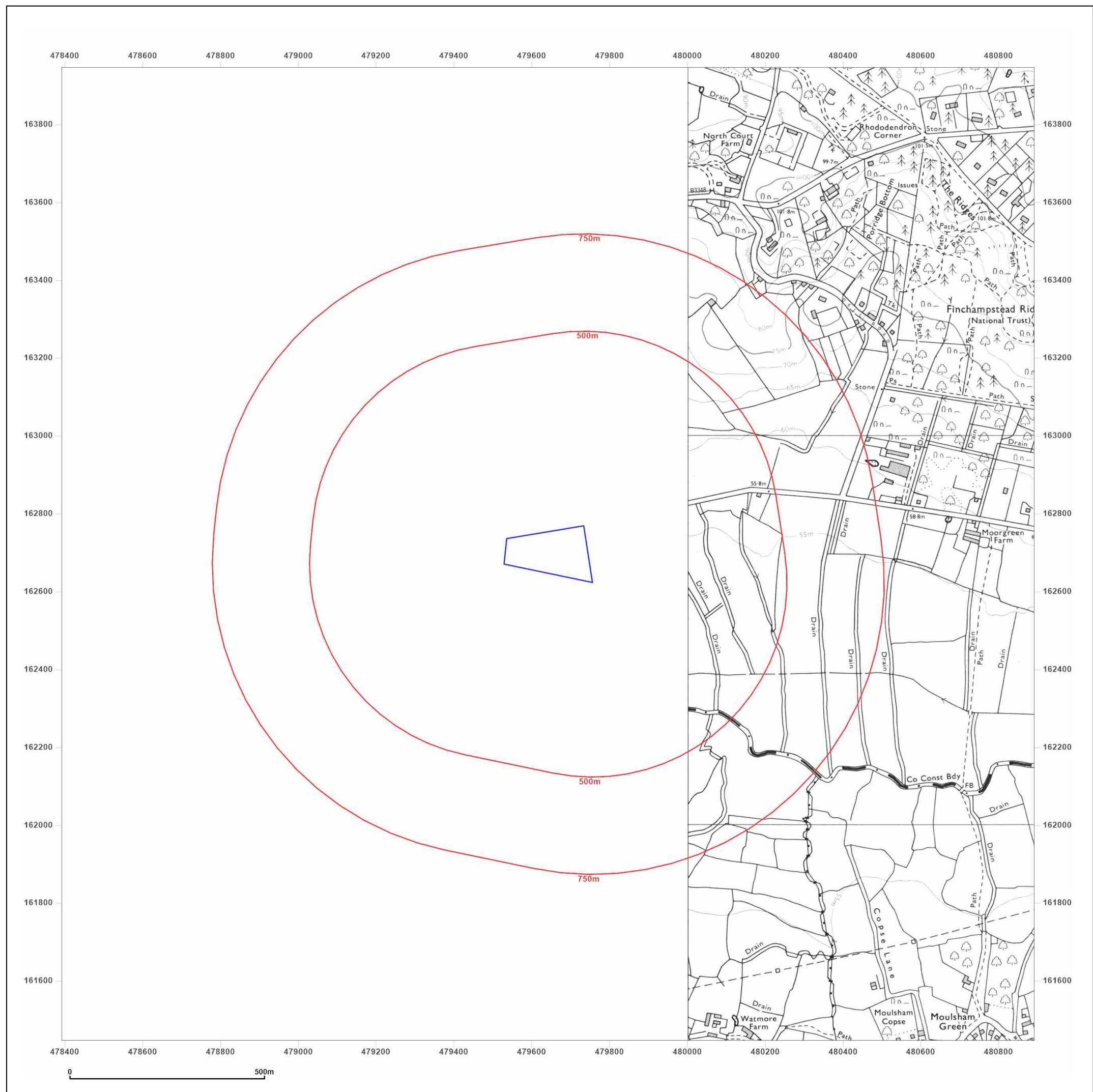


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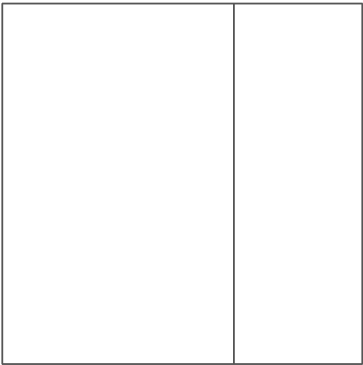
Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 1969

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1969
Revised 1969
Edition N/A
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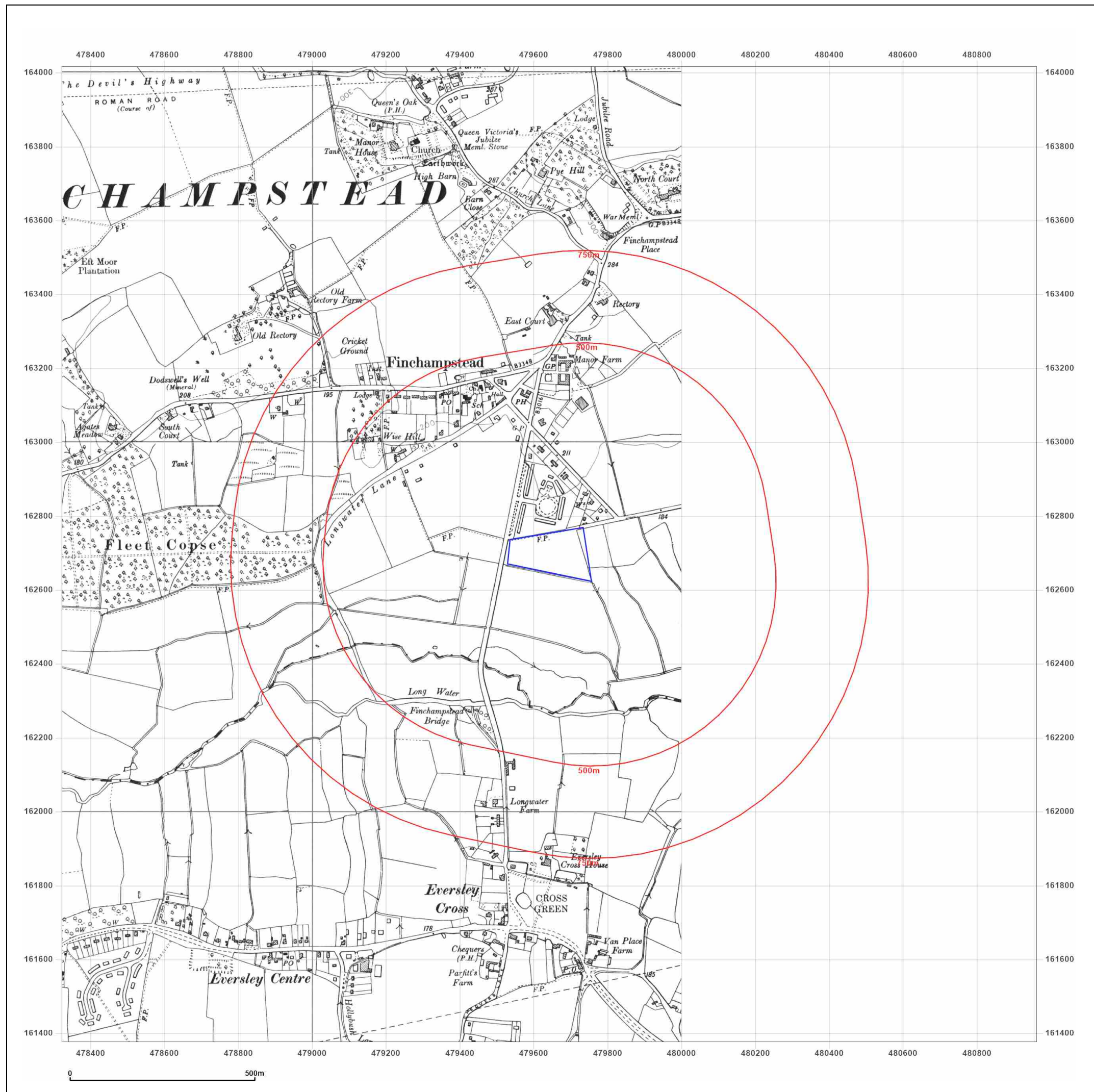


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Site Details:

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Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: Provisional

Map date: 1975

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1956
Revised 1975
Edition N/A
Copyright N/A
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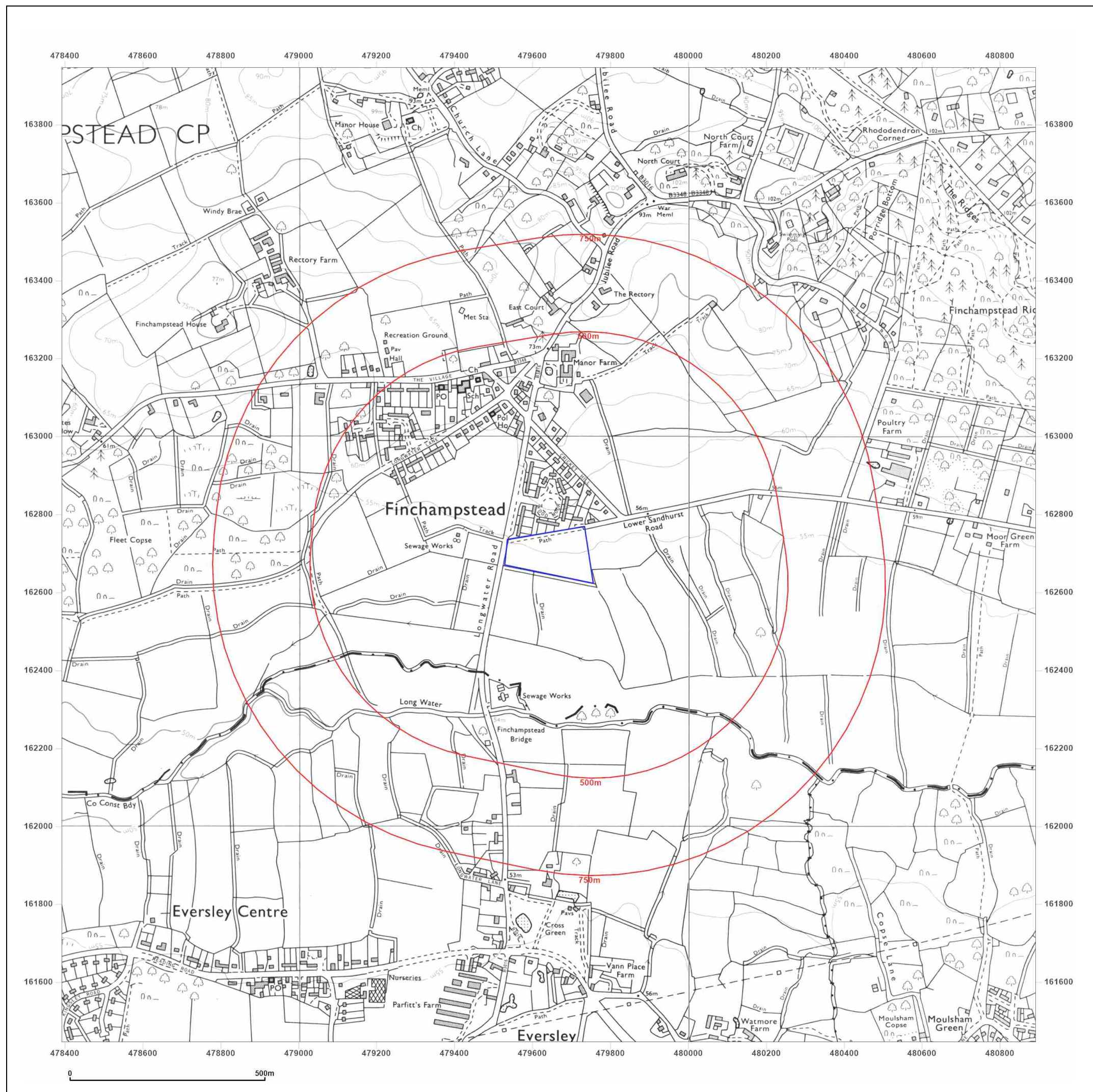


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Site Details:

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Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 1975-1978

Scale: 1:10,000

Printed at: 1:10,000



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Revised 1978
Edition N/A
Copyright 1978
Levelled 1975

Surveyed 1972
Revised 1975
Edition N/A
Copyright 1974
Levelled 1969



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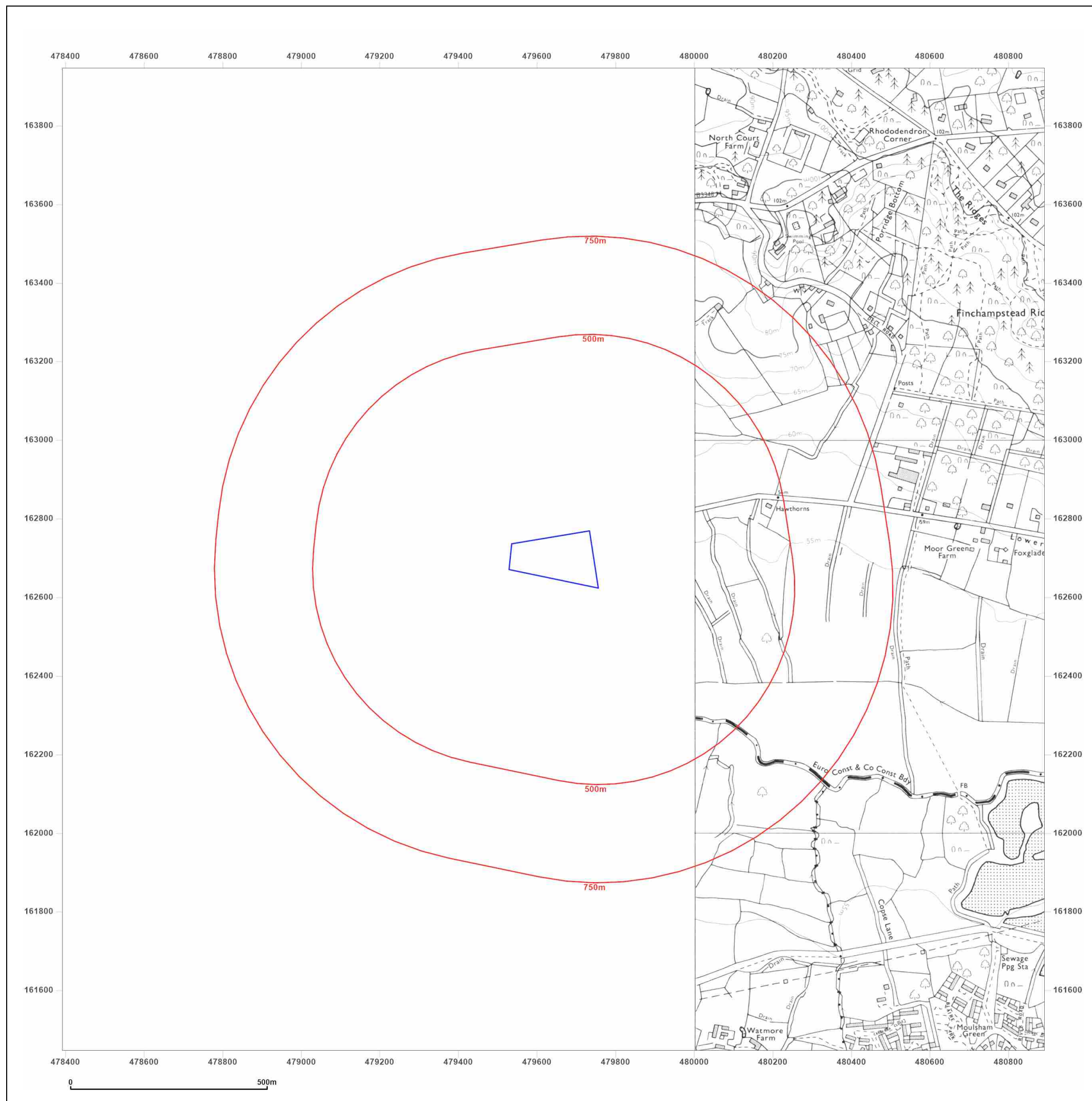


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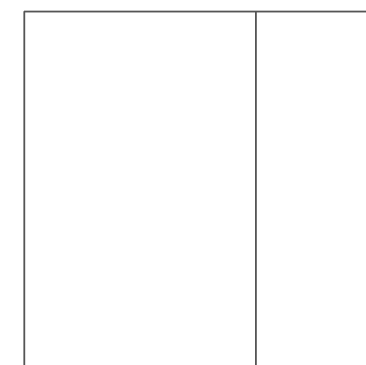
Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 1983

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1982
Revised 1983
Edition N/A
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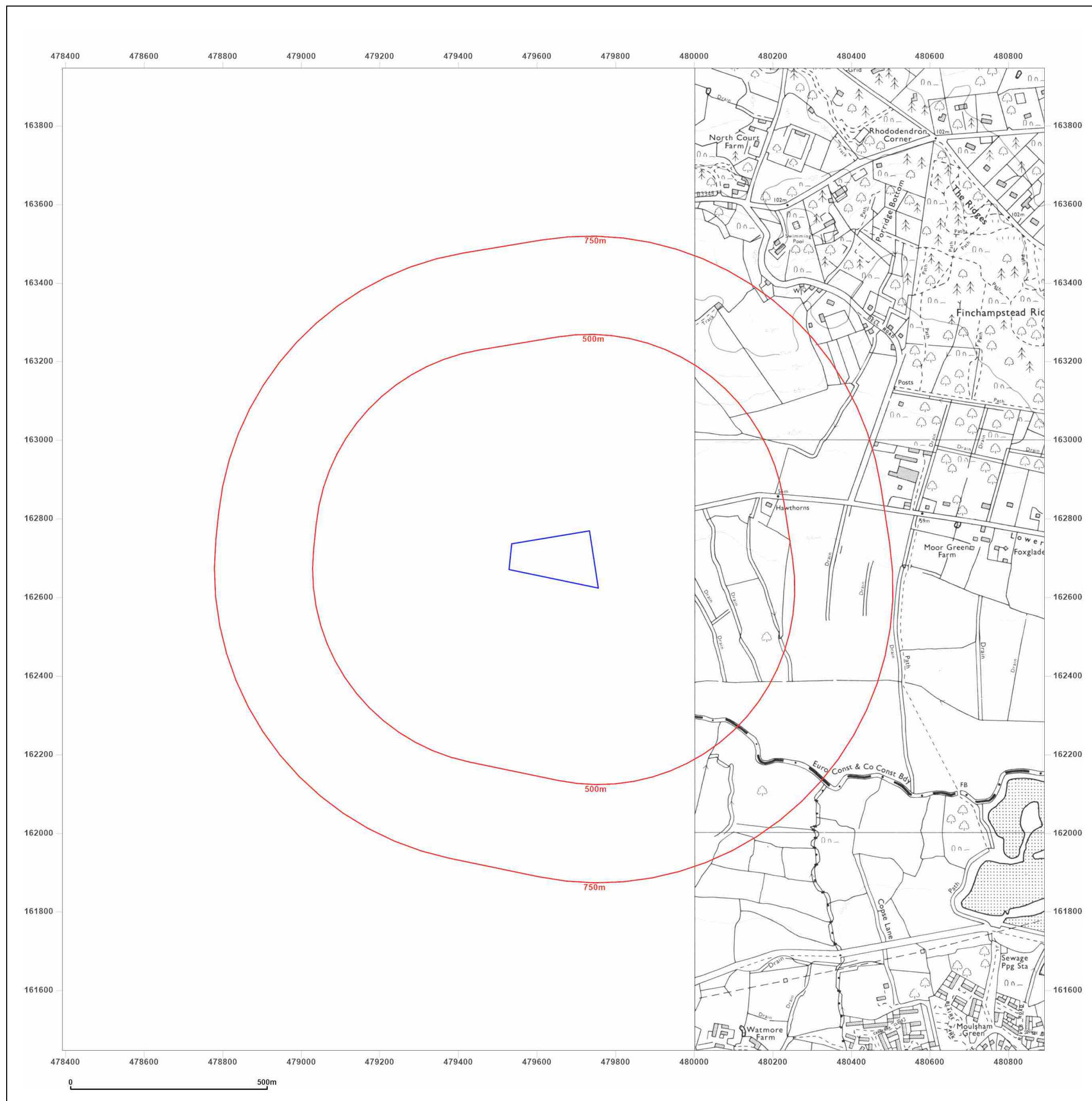


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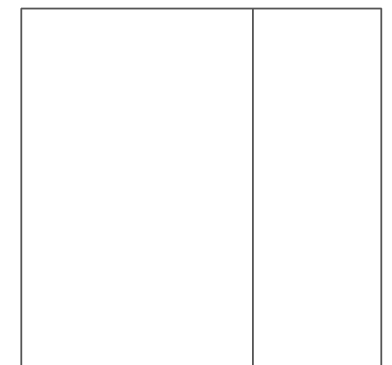
Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 1988

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1982
Revised 1988
Edition N/A
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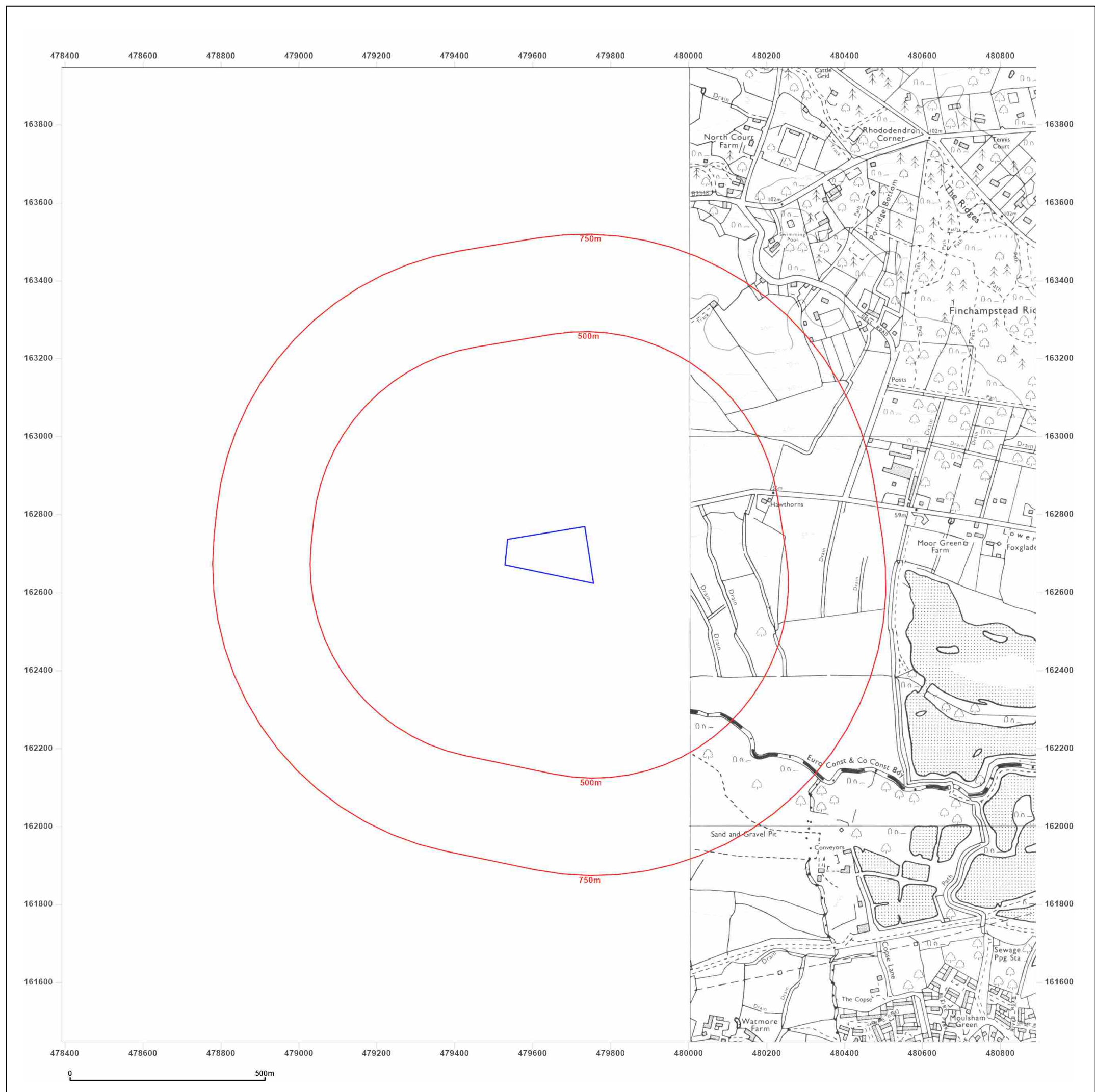


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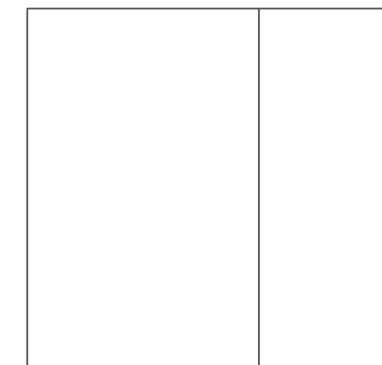
Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 1992

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1990
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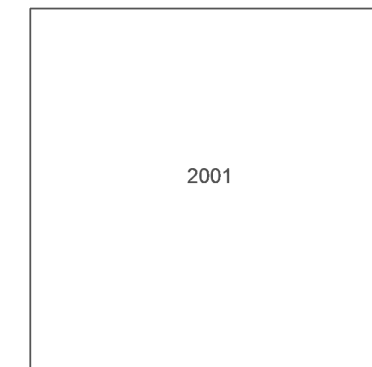
Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 2001

Scale: 1:10,000

Printed at: 1:10,000



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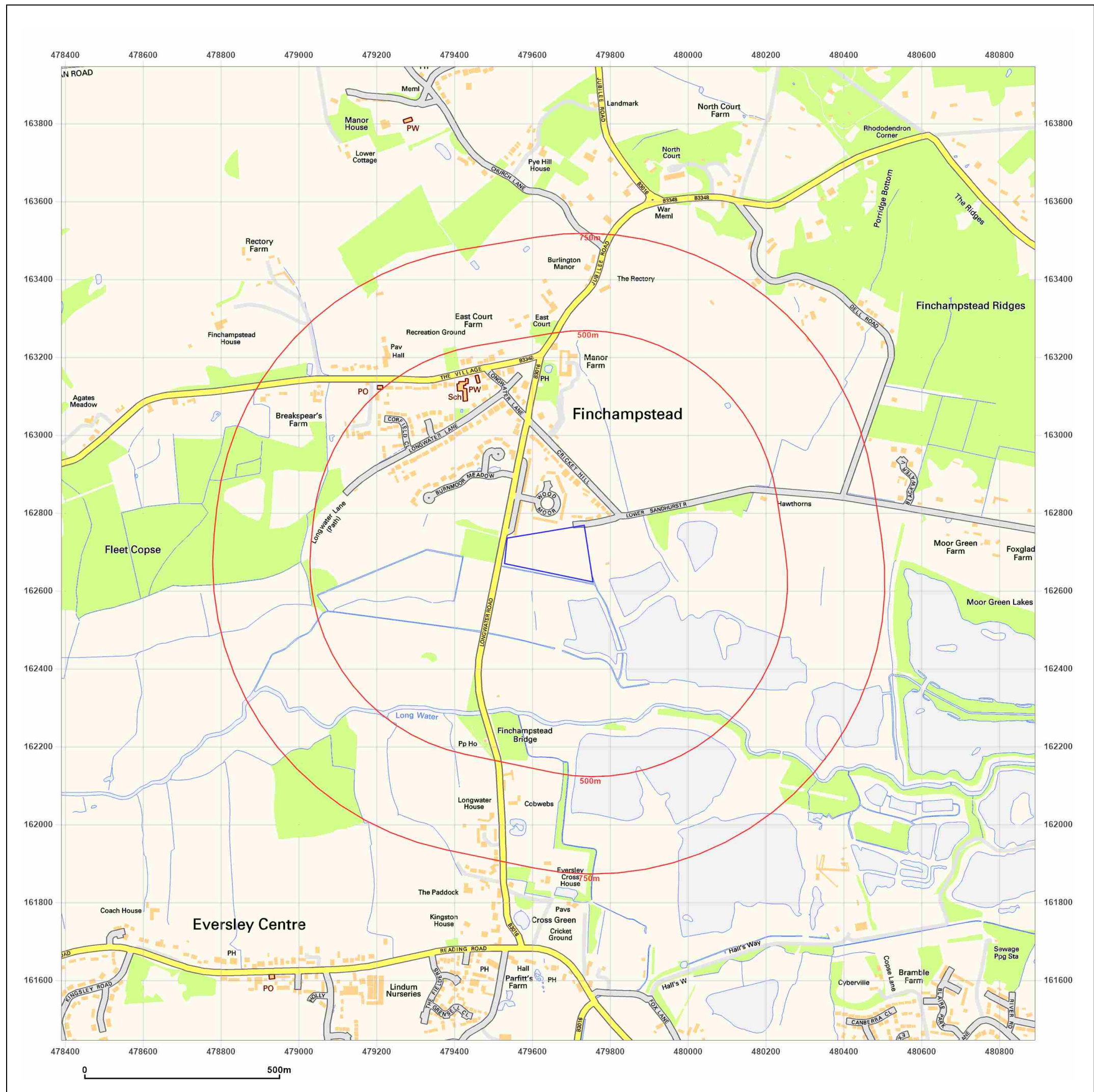


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Site Details:

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Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

Printed at: 1:10,000



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Site Details:

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Client Ref: EMS_912899_1131260
Report Ref: EMS-912899_1164085
Grid Ref: 479641, 162696

Map Name: National Grid

Map date: 2023

Scale: 1:10,000

Printed at: 1:10,000



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