



GEOENVIRONMENTAL DESK STUDY REPORT

The Airfields Deeside

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CONFIDENTIALITY STATEMENT

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

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DOCUMENT HISTORY

VERSION	PURPOSE/DESCRIPTION	DATE
1	Final – For Issue to Client	July 2014



EXECUTIVE SUMMARY

Site Address	The Airfields, Deeside
NGR	Approximate NGR 332476,369703.
Current Site Use & Proposed Development	The site is an irregular shape and occupies a total area of approximately 100ha. It is generally level, with mounded stockpiles from the demolition of previous buildings. For the planned development, the site has been divided into plots for commercial development and pods for residential developments.
Site History	The earliest use of the north of the site was as an airfield in 1916. It is understood that the War Office requisitioned the aerodrome during the First World War, establishing a military camp and quarters. The World War One (WWI) airfield still survives as a large open space within the development. During World War Two, the site was used as a maintenance unit and a single concrete runway was constructed. After WWII Sealand was loaned to the United States Air Force and the hangars were used for storage until 1957. The base passed back to the RAF in 1957 and in 1959 a maintenance unit was reformed at the site. The site continued to function as a minor Royal Air Force air station until its closure in 2006. The south of the site was largely undeveloped until sometime prior to 1948, when a sewage works was noted on the southern site boundary. Records indicate that above ground and below ground storage tanks for fuels were present at the site and included a 95,000 litre capacity fuel tank.
Site Setting	<p>Geology – The site is shown to be underlain by made ground along the western boundary, a small area in the south of the site and along the eastern site boundary. Superficial tidal flat deposits are recorded as present across the whole site. These comprise soft silty clay with layers of sand gravel and peat. Underlying the superficial deposits in the western, central and south eastern parts of the site, bedrock of Lower and Middle Coal Measures strata was recorded. These strata are comprised of a mixed sequence of sandstone, mudstone, siltstone and coal. The north eastern part of the site is shown to be underlain by sandstone strata of the Kinnerton Sandstone Formation. In the south east of the site a small area of the site is indicated to be underlain by solid strata of the Etruria Formation, a mudstone, with lenticular sandstones and conglomerates. The site is indicated to be bisected by an inferred north south orientated fault through the centre of the site which splits in two close to the southern site boundary.</p> <p>Mining – The GroundSure (GS) report indicates that much of the site is underlain by strata of the Pennine Lower Coal Measures. It is noted that the study site is located 236m north of a Coal Mining Reporting Area. The site is assessed to be outside the zone of likely physical influence on the surface from past workings.</p> <p>Hydrogeology – The underlying Coal Measures and Etruria bedrock are classified as a Secondary A Aquifer. In the northeast quadrant of the site the Kinnerton Sandstone Formation is classified as a Principal Aquifer.</p> <p>Hydrology – Surface water features are recorded at the site as an un-named and undefined primary river and several undefined secondary rivers identified as drains. There is one surface water abstraction recorded within 1km of the site.</p> <p>Flooding – Information from the Environment Agency, presented in the GS report, indicates that the site is located on an Environment Agency Zone 2 and a Zone 3 floodplain.</p> <p>Landfill – There are no records of any active or historical landfill sites within 500m of the site. There are three recorded waste treatment, transfer or disposal sites within 500m of the site.</p> <p>Radon Risks – The Building Research Establishment publication BR211 states that the site is in a radon affected area, as between 5 and 10% of the homes are above the action level for radon gas. Basic radon protective measures will be necessary in the construction of new dwellings or extensions.</p>
Environmental Risk Assessment	<p>Based on the above, the following potentially contaminative sources may be present on the site:</p> <ul style="list-style-type: none"> • Made ground associated with the former structures and construction of roads. • Potential localised spillages of hydrocarbons associated with the historic presence of AST's and UST's. • Hazardous gases/soil vapours associated with the made ground. <p>Potential contaminants which could be present on and beneath the site are listed below:</p> <ul style="list-style-type: none"> • Metals, metalloids and their compounds. • Inorganic compounds. • Organic compounds, e.g. hydrocarbons (fuels, oils). • Polycyclic Aromatic Hydrocarbons (PAH). • Hazardous Gases/Soil Vapours. • Asbestos. <p>These linkages are based on current site conditions and do not consider exposure pathways following any remediation of the site. If the site can be shown to pose no "significant harm" or pollution to controlled waters, then the site can be considered to be uncontaminated. In lieu of any chemical testing, ground contamination information, or implementation of mitigation measures, the site should be considered to be a moderate risk with respect to contamination.</p>
Preliminary Engineering Assessment	<p>Foundations – The selection of foundation type will be governed by the thickness and nature of the made ground and the superficial strata, which will need to be confirmed for each development plot/pod. For the commercial units it is anticipated that a deep foundation solution will be required, i.e. piled foundations. As an alternative some form of ground treatment may be suitable. For the smaller structures and residential development areas shallow foundations may be suitable on treated ground.</p> <p>Excavations - Excavations through any made ground or shallow natural ground may be unstable in the short term and temporary side support is likely to be required.</p>



	<p>Groundwater - It is likely that groundwater will be encountered within the made ground and shallow natural strata. The presence of groundwater will need to be assessed as part of any ground investigation.</p> <p>Obstructions - Parts of the development site have been occupied by structures. The presence of obstructions in the made ground should be anticipated. These may influence the implementation of any foundation solution and may have to be broken out and removed prior to the commencement of construction.</p> <p>Roads, Pavements and Hardstanding Surfaces - It is recommended that at this stage, a conservative bearing value for the sub-grade is used, until the nature of the sub-grade can be physically assessed.</p> <p>Chemical Attack on Buried Concrete - 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 and hence the concrete class required for buried concrete.</p>
<p>Further Work Required</p>	<p>It is recommended that a ground investigation is carried out in order to further assess the potential environmental and geotechnical constraints to development and should comprise the following:</p> <ul style="list-style-type: none"> • Trial pitting to provide geotechnical information in order to assess the nature of the sub-surface and confirm the depth and distribution of any made ground. • Cable percussive drilling and window sampling boreholes with insitu tests to provide geotechnical information in order to assess the nature of the sub-surface and confirm the depth and distribution of any made ground. • These boreholes will also facilitate the installation of gas and groundwater monitoring wells. • Chemical analysis of soil and water samples in order to determine the concentrations of potential contamination on the site. • Geotechnical testing to classify materials and inform foundation design and chemical testing to assess the nature and extent of any contamination on the site and determine the Aggressive Chemical Environment for Concrete classification. • Monitoring of gas and groundwater wells for hazardous gases, methane, carbon dioxide, and oxygen and flow rate to the requirements of the Local Authority.
<p>This sheet is intended as a summary only of the assessment of the site in relation to ground condition. It does not provide a definitive engineering analysis.</p>	



1.0 INTRODUCTION

1.1 Instruction

JPG (Leeds) Limited (JPG) has been instructed by Praxis Real Estate Management Limited to carry out a Geoenvironmental Desk Study for a proposed phased mixed use development on land situated adjacent to Welsh Road, Deeside, Clwyd, CH5 2LS.

1.2 Objectives

The main objective of the geoenvironmental desk study was to identify potential geotechnical and environmental issues that may represent constraints to the proposed redevelopment of the site.

1.3 Scope of Works

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

- Site inspection and description.
- Review of any previous reports provided.
- Review of contemporary and historical Ordnance Survey publications.
- Consultations with regulatory authorities where appropriate.
- Review of geological publications (including hydrology, hydrogeology and soil survey publications where appropriate).
- Review of the radon status of the site.
- An environmental database search.
- Outline environmental risk assessment.
- Preliminary recommendations with respect to foundations, ground floor and pavement design.
- Recommendations for further work where appropriate; and
- Presentation of the findings in a tabular non technical summary.

1.4 Location

The site is located approximately 6 km north west of Chester; the approximate centre of the site is located at NGR 332476,369703. A site location plan is given Figure 1 in Appendix A.



1.5 Site Description and Topography

A site inspection was carried out by JPG during March 2014.

The site is an irregular shape and occupies a total area of approximately 100ha. It is generally level, with some mounded stockpiles from the demolition of previous buildings.

The northern boundary of the site follows a dismantled railway line which is now a cycle track. The Deeside Industrial Estate is present further north.

The western boundary of the site follows an un-named drainage ditch with agricultural land beyond.

The southern boundary of the site has an irregular form which follows field boundaries and the residential development at Garden City.

The eastern boundary of the site is formed by the Welsh Road and residential developments at Garden City.

The site is accessed from Welsh Road in the north east part of the site. Here the ground is covered with concrete hard standing and tarmacked roadways.

The north eastern area of the site and the eastern margin and the south east corner, contained the buildings associated with the Airfields site. Many of the buildings in the north east corner are still present. Demolition has recently been carried out of buildings along the eastern margin and in the south east corner. The building floor slabs remain for the demolished structures. Some World War II (WWII) pillboxes are also present over the site.

An aerial photograph of the site is presented as Figure 2 and selected photographs of the site are presented in Appendix B.

1.6 Development Proposals

For the planned phased development, the site has been divided into commercial plots and residential pods. Plots A to F in the north and west of the site are proposed for commercial development. The central and south eastern part of the site are identified for residential development and divided into nine pods as shown in the development plan. The development scheme drawings available at this time are referenced below:

- Fletcher Rae. September 2013. The Airfields, Deeside. Plot Masterplan Composite. Drawing 13001_SK39.
- JPG. January 2014. The Airfields. Overall Masterplan. Drawing 4671-SK1 rev B.



Six separate development phases are identified and these are summarised in Table 1.6.1 below:

Table 1.6.1 – Planned Development Phases

Phase	Development Areas
1	Pods 1, 2, 3 and planned pump station.
2	Plot C
3	Plot A & B Pods 4, 5, 6 & 7
4	Plot D
5	Pods 8 & 9
6	Plot E & F

1.7 Previous Reports

There are some previous reports which have been made available for review. These are referenced as follows:

- Gibb Environmental, 1996. Land Quality Assessment, Phase 1 Desk Study.
- Entec, 2006. RAF Sealand Land Quality Assessment, Phase 2 Intrusive Investigation. Defence Estates ref: DE11/4471.
- Halcrow Group Ltd, 2012. Geoenvironmental/Geotechnical Assessment of The Airfields.
- Ian Farmer Associates, 2012. The Airfields, Deeside, CH5 2RQ. Factual Report on Ground Investigation. IFA Ref: 20864.
- Capita Symonds 2013. The Airfields, Deeside, Phase 1 Geoenvironmental Appraisal. Capita Symonds Ref: SS/018782.

Reference should be made to the above reports as appropriate.

The reports taken together highlight the main issues for consideration at the site.

The 1996 Gibb Environmental report and 2006 Entec report includes interviews with personnel with knowledge of the site and the site Property Manager. The Entec investigation identified a number of areas of localised contamination based upon their understanding of the operational use of the site. The later Halcrow report builds upon this information and the Capita Symonds report supersedes this and makes reference to the 2012 Ian Farmers Associates factual report. It provides an overview of development constraints and outlines the scope for further intrusive investigation. This report provides an update of the available published geoenvironmental data.

1.8 Limitations

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



2.0 SITE HISTORY

Historical plans for the site were obtained from GroundSure (GS). These have been reviewed in order to establish any former uses of the site and identify any potentially contaminative historical uses, or potential geotechnical constraints to the proposed redevelopment.

A summary of the relevant map information is presented in Table 2 and copies of relevant plans are presented in Appendix C.

Table 2 – Summary of Relevant Historical Map Information

Date(s) & Scale	Feature.
1869 1:10,560 1870 1:2,500	Most of the site is shown to be agricultural land with several features assumed to be drainage ditches. A well is marked near the eastern boundary of the site. The surrounding area is shown to be largely agricultural land with several farms marked to the south of the site. A 'Rifle Range' is noted to the north of the site.
1890 1:10,560	No significant changes are shown on the site. The Central Railway Line is marked along the northern boundary of the site and a track curves south to the west of the site. Two stone cottages are marked in the east of the site. No other significant changes are shown beyond the site.
1898 1:10,560 1897-1898 1:10,560 1899 1:2,500	No significant changes are shown on or beyond the site
1911 1:2,500 1909-1913 1:10,560 1913-1914 1:10,560	No significant changes are shown on the site The Hawarden Bridge Steel Works is marked approximately 250m to the west of the site adjacent to the railway.
1938 1:2,500, 1:10,560 1938 1:10,560	No significant changes are shown on the site. Residential development is noted at the southern boundary of the site. No other significant changes are shown beyond the site.
1948 1:10,560	A sewage works is marked at the site. No significant changes are shown on surrounding land.
1960-1963 1:10,560 1963 1:2,500	Several large buildings and numerous small buildings are marked in the eastern half of the site. An airfield (shown as disused) is marked to the north of the site and several buildings marked immediately to the north east of the site. Further residential development is noted to the south and east of the site.
1976 – 1981 1:10,000 1979 1:2,500	No significant changes are shown on or beyond the site.
1986 -1992 1:10,000	No significant changes are shown on the site. Commercial and industrial type developments are noted to the north of the site along with several balancing ponds.
1988 – 1992 1:10,000 1992 1:1,250 1993 1:1,250	No significant changes are shown on or beyond the site.
1990 – 1993 1:1,250, 1993 1:1,250 & 1993 – 1994 1:2,500 1995 1:2,500	No significant changes are shown on or beyond the site.
2002 1:10,000	No significant changes are shown on or beyond the site.
2012 1:10,000, 1:2,500	Several buildings previously marked at the site are no longer identified. No significant changes are shown on surrounding land.



2.1 Archaeological Survey

An archaeological survey was undertaken for the site by Oxford Archaeology North (OA North). They note that the earliest use of the site as an airfield was as a flying school in 1916. The War Office requisitioned the aerodrome during the First World War, establishing a military camp and quarters. The WWI airfield still survives as a large open space within the development.

During WWII, the site was used as a Maintenance Unit and a single concrete runway was constructed. After WWII, Sealand was loaned to the United States Air Force and the hangars were used for storage until 1957. The base passed back to the RAF in 1957, and in 1959 a maintenance unit was reformed at the site. The site continued to function as a minor Royal Air Force air station until its closure in 2006.

Surviving military features identified in the study area comprise five pillboxes/observation posts, a large observation post/command unit and a series of slit trenches.



3.0 SITE SETTING

3.1 Geology

The GS report and the following geological publications have been consulted:

- Geological Survey of Great Britain. Sheet 108, Flint, 1:50,000 Scale, Solid & Drift.

The site is shown to be underlain by made ground along the western boundary, a small area in the south of the site and along the eastern site boundary. The areas identified as made ground can be seen to relate to features noted from historic map records.

Superficial tidal flat deposits are recorded as present across the whole site. The tidal flat deposits comprise soft silty clay with layers of sand gravel and peat.

Underlying the superficial deposits in the western, central and south eastern parts of the site bedrock of Lower and Middle Coal Measures strata was recorded. These strata are comprised of a mixed sequence of sandstone, mudstone, siltstone and coal.

The north eastern part of the site is shown to be underlain by a sandstone strata of the Kinnerton Sandstone Formation. In the south east of the site a small area of the site is indicated to be underlain by solid strata of the Etruria Formation. The BGS Lexicon of Named Rock Units records the lithology as a red, purple, brown, ochreous, green, grey and commonly mottled mudstone, with lenticular sandstones and conglomerates referred to as 'espleys'.

The site is indicated to be bisected by an inferred north south orientated fault through the centre of the site, which splits in two close to the southern site boundary.

A number of historical borehole records were inspected from the previous investigations and broadly confirm the published records. The Ian Farmers Associates 2012 factual site investigation report comprised, trial pits, window sampling boreholes and cable percussive boreholes. The general ground conditions encountered are summarised in table 3.1.1 below:

Table 3.1.1 – Summary Ground Conditions

Strata	Encountered Thickness
Topsoil	0.1-0.3m thick
Made Ground	0.25 to 2.80m thick
Tidal Flat Deposits	At least 15.25m thick

Groundwater was recorded during the formation of the boreholes at depths of between 1.10m and 2.70m below ground level.



3.2 Mining

The GS report indicates that much of the site is underlain by strata of the Pennine Lower Coal Measures. It is noted that the study site is located 236m north of a Coal Mining Reporting Area.

The substantial thickness of drift deposits assumed to cover the site would suggest that risks of ground movements relating to coal extraction are unlikely to impact the planned development. Ground movements associated with brine extraction are also considered to be unlikely.

The GS report also records non-coal mining activities within 1km of the site. These records, based upon BGS data, record iron ore (bedded) and vein mineral potential at the site; their presence is assessed as highly unlikely or rare. Other records were greater than 250m from the site were for vein mineral and were assessed to be rare or highly unlikely.

3.3 Hydrogeology

The underlying superficial deposits are classified as a Secondary A Aquifer. These are described as "permeable layers capable of supporting water supplies at a local rather than a strategic scale and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as Minor Aquifers."

The underlying bedrock in the south and west, comprising the Pennine Middle and Lower Coal Measures and the Etruria Formation are also classified as Secondary A Aquifers. In the north east quadrant of the site the Kinnerton Sandstone Formation is classified as a Principal Aquifer. These are described as having a geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously Major Aquifers.

There is one recorded groundwater abstraction within 1km of the site. This is located 526m to the south west of the site and is a borehole for general farming and domestic water supply.

There is one surface water abstraction license within 1km of the site. This is located 369m south east of the site and was used for spray irrigation, assumed to be for agricultural use.

There are no potable water abstraction licences within 2km of the site.

There are no Source Protection Zones within 500m of the site.



There are ten recorded licensed discharge consent within 500m of the site. The details of the consents is summarised in table 3.3.1 below:

Table 3.3.1 – Licensed Discharge Consents

Distance & Direction	Address	Effluent Type	Operator	Receiving Water	Permit Number & Dates
On site	Sealand Ps,	Sewage Discharges - Pumping	Water Company	Garden City Drain	No: CM0118001 Status: New Consent, By Application (wra 91, Section 88) Effective: 08/02/167
On site	General Office Stw Shotton Works, General Office Stw, Shotton Works, Deeside, CH5 2NH	Sewage Discharges - Final/treated Effluent - Not Water Company	Not Water Company	Shotwick Brook	Permit Number: CM0015801 Consent Expired - Time Limit Effective: 22/5/1970
On site	Deeside Garden City	Unspecified	Unspecified	Garden City Drain	Permit Number: CM0096201 Status: Consent Expired - Time Limit Revocation Date: 5/4/1995
25m north	Address: Unit 53 Deeside Ind Estate,	Unspecified	Unspecified	Land	Permit Number: CM0188901 Status: Consent Expired - Time Limit Revocation Date: 6/1/1993
33m south east	Garden City British Legion - Sso,	Sewage Discharges - Sewer Storm Overflow	Water Company	Manor Drain	Permit Number: CM0166001 Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Effective Date: 14/9/2006
33m south east	Garden City British Legion - Sso, Garden City British Legion - Sso	Sewage Discharges - Sewer Storm Overflow	Water Company	Manor Drain	Permit Number: CM0166001 Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Revocation Date: 13/9/2006
157m south	Garden City British Legion	Sewage Discharges - Sewer Storm Overflow	Water Company	Manor Drain	Permit Number: CM0166001 Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Revocation Date: 9/3/2007
157m south	Garden City British Legion - Sso,	Sewage Discharges - Sewer Storm Overflow	Water Company	Manor Drain	Permit Number: CM0166001 Status: New Consent, By Application (wra 91, Section 88) Issue date: -Effective Date: - Revocation Date: 30/3/2007
158m south east	Address: Queensferry Drome Service Station, :	Unspecified	Unspecified	Manor Drain	Permit Number: CM0026201 Status: Consent Expired - Time Limit Revocation Date: 30/1/1996
335m north	Deeside Ind Park Chester Cheshire,	Sewage Discharges Final/treated Effluent	Not Water Company	Trib. Of Shotwick Brook	Permit Number: CM0084601 Status: Consent Expired - Time Limit Effective Date: 8/1/1979

The site does not lie within an Environment Agency Groundwater Source Protection Zone.



3.4 Hydrology

Surface water features are recorded at the site as an un-named and undefined primary river and several undefined secondary rivers, identified as drains.

There is one surface water abstraction recorded within 1km of the site. This was located 369m to the south east for spray irrigation.

Information on the EA website and presented in the GS report indicate that the site is located on an Environment Agency Zone 2 and a Zone 3 floodplain.

The BGS have indicated that the site is located in an area with a potential, at surface, of flooding due to potential fluctuations in the groundwater table. This classification is based on the limited geological information available to the BGS for the site at the present time. The susceptibility and the risk of groundwater flooding occurring at the site should be re-assessed based on site specific information.

A flood risk assessment may be required as part of any planning application for the site.

3.5 Pollution Incidents

There are no List 1 Environment Agency recorded pollution incidents within 500m of the site.

There are no List 2 Environment Agency recorded pollution incidents within 500m of the site.

3.6 Landfills and Waste

The GS report includes information on active and former landfill sites supplied by the Environment Agency, Landmark, Local Authority and the BGS.

There are no records of any active or historical landfill sites within 500m of the site.



There are three recorded waste treatment, transfer or disposal sites within 500m of the site, these are summarised in table 3.6.1 below.

Table 3.6.1 – Waste Treatment Sites

Distance & Direction	Address	Waste Type	Details
60m north	Storage Yard, Welsh Road, DEESIDE, Clwyd, CH5 2JX	Waste Transfer Station	Change of use to a waste transfer and recycling centre with an office of 18 sqm.
130m north	CT Skip Hire, Land at Drome Road, Deeside Industrial Estate, DEESIDE, Clwyd, CH5	Waste Transfer Station	Scheme comprises change of use to allow development of small scale waste transfer operation in connection with skip hire business including the construction of a building for storage of recyclates and mixed waste and provision of open air storage for skips and inert material. Construction -block, metal cladding, steel cladding walls; metal cladding roof; black top surfacing, drain covers, fencing site works.
143m north	T. J's Skip Hire Limited, 26, Welsh Road, Deeside Industrial Estate, DEESIDE, Clwyd, CH5 2LR	Waste Transfer Station	Scheme comprises change of use for use of building as waste transfer station involving alteration to current access door to the hangar.

3.7 Environmental Permits, Incidents and Registers

There are no records of any historic Integrated Pollution Control (IPC) authorisations within 500m of the site.

There are no active Part A(1) or Integrated Pollution Prevention Control (IPPC) authorised activities within 500m of the site.

There are no recorded Part A(2) permitted activities within 500m of the site.



There is one active Part B permitted activity recorded at the site and six within 500m of the site. These records are summarised in table 3.7.1 below.

Table 3.7.1 – Part B Activities

Distance & Direction	Address	Process	Details
On Site	Tata Steel, Shotton Works, Weighbridge Road, Deeside Industrial Park, Deeside, CH5 2HN	Di Isocyanate	Status: Current Permit
199m north	Excelsior, Parkway, Deeside Industrial Park, Deeside, Flintshire, CH5 2NS Process:	Solvent coating	Status: Current Permit
211m north	Ball Packaging, Sixth Avenue, Deeside Industrial Park, Deeside, CH5 2LB	Coating Of Metal Packaging	Status: Historical Permit
242m north	Graphoprint (clwyd) Ltd, Parkway, Deeside Industrial Park, Deeside, Flintshire, CH5 2NS	Printers/publishers	Status: Historical Permit
268m north	Rainbow International, Evans Business Centre, Welsh Road, Deeside Industrial Park, Flintshire, Queensferry, Deeside, Clwyd CH5 2JZ	Dry Cleaning	Status: Historical Permit
330m north	Rexam Plastic Packaging Ltd, 48 First Avenue, Deeside Industrial Estate, Deeside, Flintshire, CH5 2NU	Printing Of Flexible Packaging	Status: Historical Permit
483m north	The Real Pet Food Co Ltd, 25 Drome Road, Deeside Industrial Park, Deeside, CH5 2NY	Pet Food Manufacture	Status: Current Permit

There are no records of Water Industry Referrals (potentially harmful discharges to the public sewer) or Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the site.

There are no records of List 1 Dangerous Substances Inventory Sites within 500m of the site.

There no recorded active List 2 Dangerous Substances Inventory Site within 500m of the site.

There are four records of Category 3 or 4 Radioactive Substances authorisations within 500m of the site. Three of these are located 25m north of the site and are operated by the Royal Air Force and the Ministry of Defence. The licenses were for the disposal of radioactive waste and their status was revoked/cancelled. The fourth record was located 436m north of the site and was operated by Convatec Ltd and the license was for the disposal of radioactive waste; the status was recorded as revoked/cancelled.



There are no recorded Control of Major Accidents Hazard (COMAH) or Notification of Installation Handling Hazardous Substances (NIHHS) sites within 500m of the site.

There are four recorded pollution incidents by the environment agency within 500m of the site. One was recorded at the site and related to spillages of oils and fuels and was recorded as minor or no impact to water, land or air. The other incidents were all located 200m or further from the site and relate to spillages of oils and fuels and tyre waste. All were recorded as minor or no impact to water, land or air.

There are no sites determined as contaminated Land under Part IIA EPA 1990 within 500m of the site.

3.8 Radon Risks

The Building Research Establishment publication BR211 states that the site is in a radon affected area, as between 5% and 10% of the homes are above the action level for radon gas. Basic radon protective measures will be necessary in the construction of new dwellings or extensions.

Based on recent research into the health effects of radon gas, the Health Protection Agency have made recommendations to the Government that consideration should be given to the installation of radon protective measures in all new buildings.

They have recommended that UK Building Regulations and Standards should be changed to ensure that all new property incorporates the basic materials and measures necessary to reduce indoor radon concentrations. This would also apply to new extensions and to any other changes to property where the Building Regulations and Standards apply. It should be noted that changes to the Building Regulations relating to this matter have not yet been made. It is recommended that the advice of Building Control should be obtained during the design process.

3.9 Other Information

There are no records of any petrol or fuel sites within 250m of the site.

Evidence from the site walkover indicated the presence of an above ground fuel storage tank. The facility is located at building unit 166 as shown on the Sealand South Site Building Access plan, a copy of which is contained in Appendix A. Photographs are also included in Appendix A.



A large concrete foundation was identified at the position of building unit 296, of which photographs are included in Appendix A. A search of documents retained on site was carried out and this was identified to be the location of the T93 Radome. This was a radar facility used by the airfield. The surface mechanical and electrical equipment has been removed, leaving the concrete foundations in place. The design drawings indicate that the thickness of the concrete foundation was typically 250mm. For further details of the T93 Radome, reference should be made to the design and installation documents which are held on site. An electronic copy of relevant documents has been created for the project archive.

Copies of relevant plans from the on site archive are contained in Appendix A.

4.0 ENVIRONMENTAL RISK ASSESSMENT

4.1 Introduction

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. Within the context of current UK Legislation i.e. Part 2A of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995, the interpretation of a "significant risk" is termed to be one where:

- 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
- Pollution of controlled waters is being caused.

The potential for harm to occur requires three conditions to be satisfied:

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

In order to assess the contamination risk at the site, the above rationale has been applied and is discussed in the context of Contamination Sources and Potential Pollutant Linkages.



4.2 Potential Sources

The map records show a small area of the site was occupied by a sewage treatment works and the northeast of the site was occupied as part of RAF Sealand.

The 2002 Gibb Environmental Report identifies a number of medium sized above ground storage tanks (AST's) and underground storage tanks. The above ground tanks were located at several locations around the site and were recorded to have between 1,000 and 7,500 litre capacity. Oils fuels and lubricants were recorded in small quantities in a number of buildings at the site. At 'Building 195' a 95,000 litre fallback diesel UST was noted to be present in a restricted area (in 2002), the operator stated that the tank was integrity tested and that no leaks had been detected.

Based on the above, the following potentially contaminative sources may be present on the site:

- Made ground associated with the former structures and construction of roads.
- Potential localised spillages of hydrocarbons associated with the historic presence of AST's and UST's.
- Hazardous gases/soil vapours associated with the made ground.

Potential contaminants which could be present on and beneath the site are listed below:

- Metals, metalloids and their compounds.
- Inorganic compounds.
- Organic compounds, e.g. hydrocarbons (fuels, oils).
- Polycyclic Aromatic Hydrocarbons (PAH).
- Hazardous Gases/Soil Vapours.
- Asbestos.

4.3 Potential Pathways

Based on the available information and the proposed redevelopment for an office building, the following potential exposure pathways will require consideration, both during the redevelopment works and on completion of the construction:

- Ingestion and dermal contact with contaminated soil and groundwater.
- Inhalation of hazardous gases/soil vapours.
- Leaching/migration of contaminants into groundwater via surface and groundwater flow.



- Permeation of water supply pipes and other services by organic and aggressive contaminants; and
- Uptake of contaminants by crops within residential gardens and 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, e.g. residents, employees, maintenance workers.
- The underlying groundwater.
- Buildings and services; and
- Residential gardens and plants in landscape areas.

4.5 Pollutant Linkage Assessment

A potential pollutant linkage assessment has been completed and is summarised in the Conceptual Site Model which is presented as Figure 3 in Appendix A. This is based on the proposed redevelopment of the site for a commercial end use.

On the basis of the proposed end use and known history of the site, the following potential pollutant linkages may be present:

- Site end users – future residents and visitors (public open space and private gardens).
- Development and maintenance workers and site end users, e.g. employees, could come into contact with soils containing elevated concentrations of contaminants and hazardous gases/soil vapours.
- Any underlying groundwater could become contaminated due to the leaching and migration of mobile contaminants from within the made ground.
- Buildings and services could be affected by potential contaminants in the made ground; and
- Crops in residential gardens and plants in landscape areas could be affected by phytotoxic elements within the made ground.

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

If the site can be shown to pose no “significant harm” or pollution to controlled waters, then the site can be considered to be uncontaminated.



4.6 Risk Classification

Based on the potential pollutant linkages present on the site, the site should be considered to be a **moderate risk with respect to contamination**. This designation will be largely dependent on the nature of any made ground present on, or adjacent to the site.

In order to fully assess and classify the risks to human health, any underlying perched groundwater, surface water and buildings/services, a Phase 2 intrusive investigation, including chemical testing of soils and groundwater and gas monitoring will be required.



5.0 PRELIMINARY ENGINEERING ASSESSMENT

5.1 Development Proposals

For the planned phased development the site has been divided into plots for commercial development and pods for residential developments. Plots A to F in the north and west of the site are proposed for commercial development. The central and south eastern part of the site are identified for residential development and divided into nine pods as shown in the development scheme drawings listed in section 1.6.

As noted by others, the site topography is broadly level and low lying and, in order to mitigate flood risks for both new infrastructure and redevelopment areas a development platform is likely to be constructed. When forming the development platform, the criteria to be satisfied are as follows:

- Ground level to facilitate foundation construction, avoid water logged gardens/paths, and enable satisfactory falls to drains.
- Ground level to be above any Environment Agency specified flood levels.
- Ground level raising subject to Planning Authority permission.
- The installation of gas control means for houses and statutory undertaker's trenches.
- To enable road construction suitable for Section 38 adoption by the local Highway Authority.

5.2 Foundations

The selection of foundation type will be governed by the thickness and nature of the made ground and the superficial strata which will need to be confirmed for each development plot/pod.

For the commercial units it is anticipated that a deep foundation solution will be required, i.e. piled foundations. As an alternative some form of ground treatment may be suitable.

For the smaller structures and residential development areas shallow foundations may be suitable on appropriately engineered /treated ground.

5.3 Excavations

Excavations through any made ground or shallow natural ground may be unstable in the short term and temporary side support is likely to be required.



5.4 Groundwater

It is likely that groundwater will be encountered within the made ground and shallow natural strata. The presence of groundwater will need to be assessed as part of any ground investigation.

5.5 Obstructions

Parts of the development site have been occupied by structures. The presence of obstructions in the made ground should be anticipated. These may influence the implementation of any foundation solution and may have to be broken out and removed prior to the commencement of construction.

5.6 Roads, Pavements and Hardstanding Surfaces

It is recommended that at this stage, a conservative bearing value for the sub-grade is used, until the nature of the sub-grade can be physically assessed.

5.7 Chemical Attack on Buried Concrete

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 and hence the concrete class required for buried concrete.



6.0 FURTHER INVESTIGATIONS

It is recommended that a ground investigation is carried out in order to further assess the potential environmental and geotechnical constraints to development and should comprise the following:

- Trial pitting to provide geotechnical information in order to assess the nature of the sub-surface and confirm the depth and distribution of any made ground.
- Cable percussive drilling and window sampling boreholes with in situ tests to provide geotechnical information in order to assess the nature of the sub-surface and confirm the depth and distribution of any made ground.
- These boreholes will also facilitate the installation of gas and groundwater monitoring wells.
- Chemical analysis of soil and water samples in order to determine the concentrations of potential contamination on the site.
- Geotechnical testing to classify materials and inform foundation design and chemical testing to assess the nature and extent of any contamination on the site and determine the Aggressive Chemical Environment for Concrete classification.
- Monitoring of gas and groundwater wells for hazardous gases, methane, carbon dioxide, and oxygen and flow rate to the requirements of the Local Authority.

M Townend
BSc MSc FGS CGeol
For and on behalf of JPG (Leeds) Limited

July 2014



Appendix A Figures/Drawings

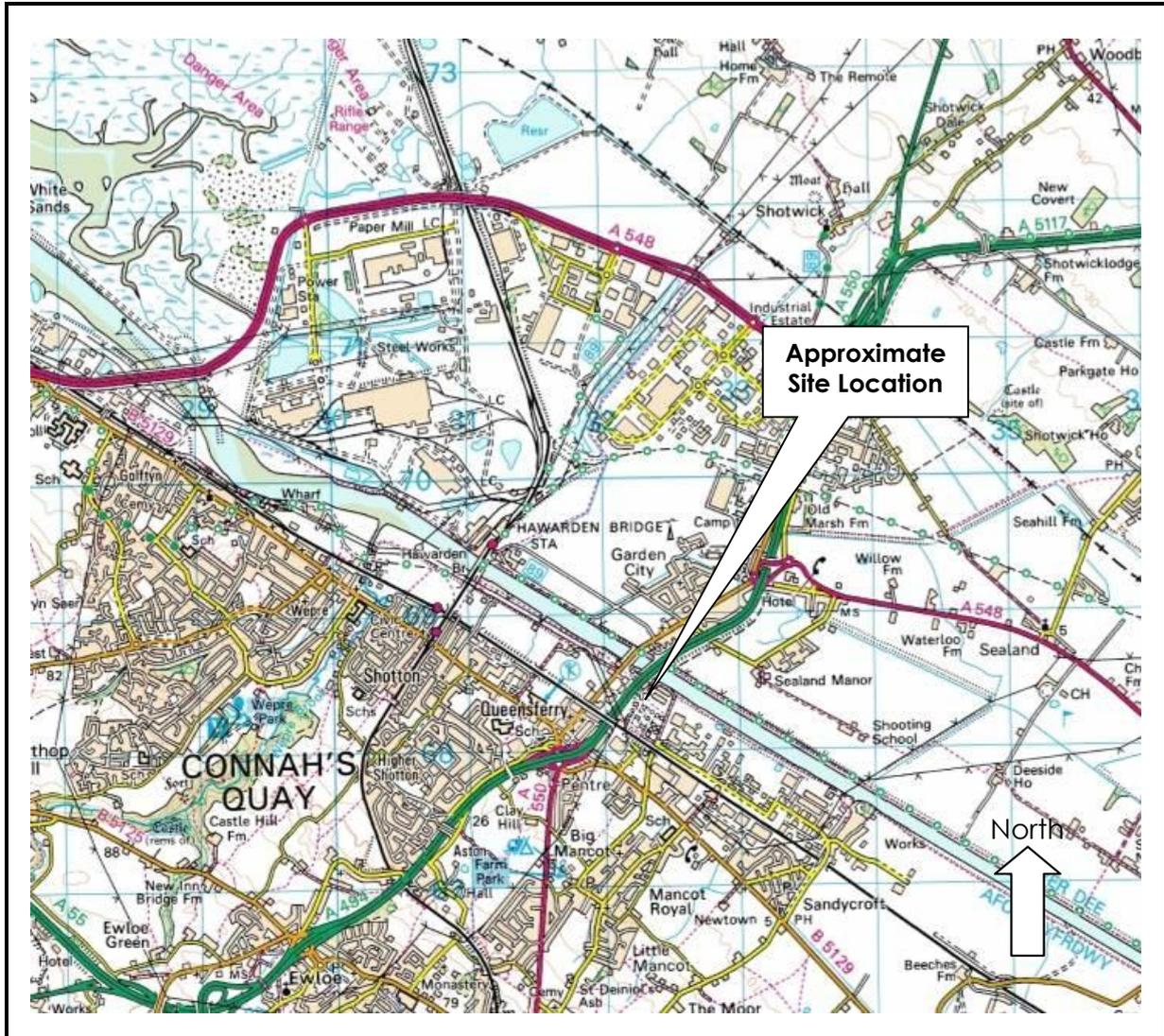


Figure 1 – Site Location Plan

Site	The Airfields, Deeside
Client	Praxis Real Estate Management Ltd
Job Number	4671
Scale	NTS



Figure 2 – Aerial Photograph	
Site	The Airfields, Deeside
Client	Praxis Real Estate Management Ltd
Job Number	4671
Scale	NTS

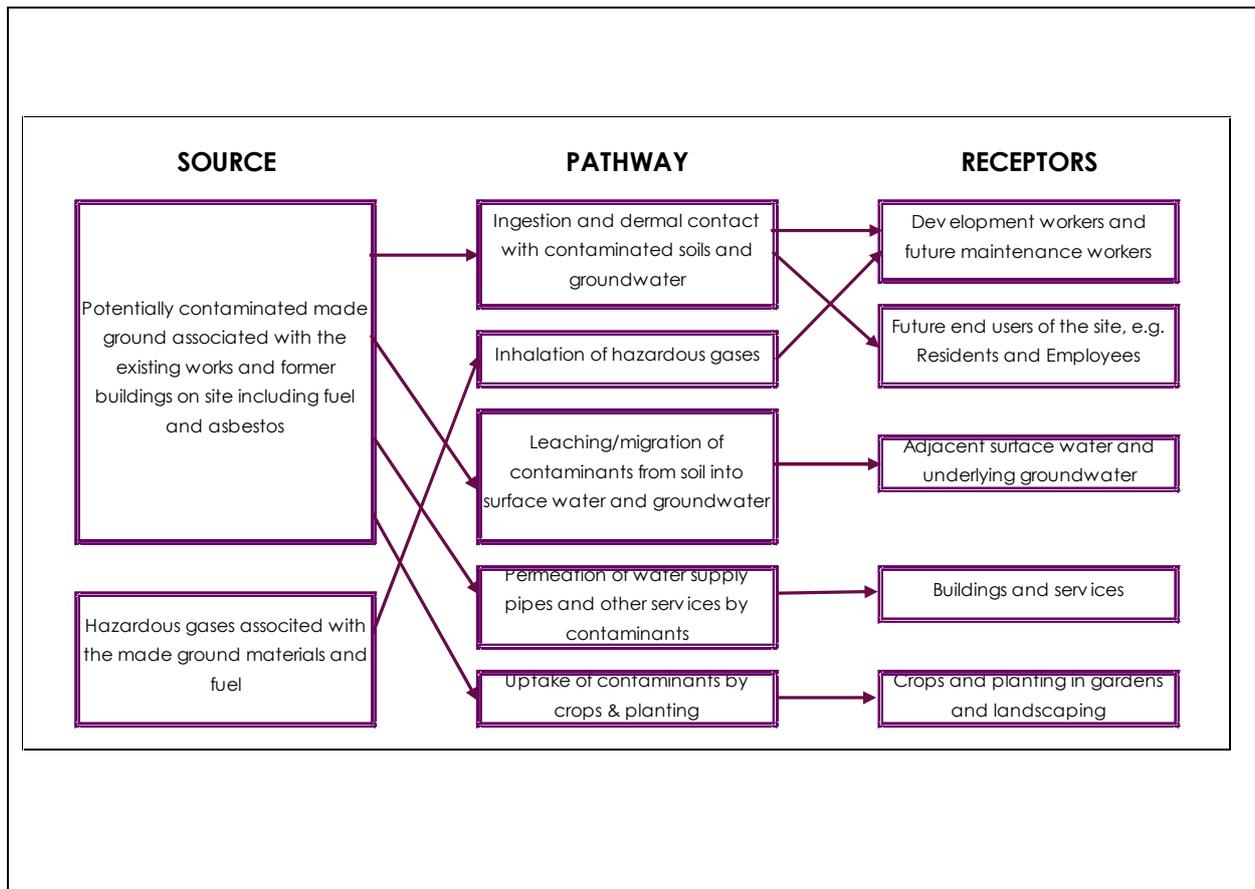


Figure 3 – Conceptual Site Model

Site	The Airfields, Deeside
Client	Praxis Real Estate Management Ltd
Job Number	4671
Scale	NTS

ASBESTOS REGISTER

SEALAND SOUTH SITE

ESTABLISHMENT NAME				
Bldg No.	Building Name	Asbestos Present	Asbestos Type	Location
60	Redundant Fire Booster Pump house	Y	Chrysotile	For location of Asbestos within each building see Type 2 Asbestos Surveys by Tersus dated Dec 2005 & BES Consulting dated July 2008
61	EWS Tank	N	none known	
63	Electrical Distribution House	Y	Chrysotile	
64	Contractors Workshop	Y	Chrysotile	
65	Contractors Storage Facility	Y	Chrysotile, amosite	
66	Contractors Storage Facility	Y	Chrysotile, amosite	
70	Garages	Y	Chrysotile	
73	Contractors Office Accomodation	Y	Crocidolite, Chrysotile, Amosite	
74	Contractors Mess Facilities	Y	Chrysotile	
75	Contractors Workshop	Y	Chrysotile	
77	Cinema	Y	Crocidolite, Chrysotile, Amosite	
78	Offices	Y	Chrysotile	
80	Officers Mess Facility	Y	Crocidolite, Chrysotile, Amosite	
81a	Mess & Office Accommodation	Y	Crocidolite, Chrysotile, Amosite	
81c	Single Officers Accommodation	Y	Crocidolite, Chrysotile, Amosite	
81h	MCS Office Accommodation	Y	Chrysotile	
83	Compressor House	N	none known	
86	Old Gatehouse	Y	Chrysotile	
91	Officers Mess Garage Facility	N	none known	
156	Civilain Canteen	Y	Chrysotile	
157	Contractors Offices/Workshop	Y	Crocidolite, Chrysotile, Amosite	
159	Model Railway Club	Y	Chrysotile	
160	Storage Facility	Y	Chrysotile	
161	Blacksmiths Workshop	Y	Chrysotile	
162	Police Dog Compound	Y	Chrysotile	
163	Vehicle Wash	Y	Chrysotile	
165	MT Office Accommodationm	N	none known	
166	Underground Fuel Tank	N	none known	
167	MT Garage Facility	Y	Chrysotile	
168	Hangar	Y	Chrysotile	
168a	Hangar Plant room	Y	Chrysotile	
169	Vehicle Workshop (former Hangar)	Y	Chrysotile	
170	Battery Changing Room	Y	Chrysotile	
171	Storage Facility	Y	Chrysotile	
172	Workshop	Y	Amosite, Chrysotile	
173	Plant room	Y	Chrysotile	
174	Storage Facility	Y	Chrysotile	
175	Classrooms (Portable units)	N	none known	
176	Gatehouse	N	none known	
177	Classrooms	Y	Amosite, Chrysotile	
178	Storage Facility	N	none known	
181	Contractors Storage Facility	Y	Amosite, Chrysotile	
183	Lamella Hangar	Y	Chrysotile	
184	Lamella Hangar	N	none known	
186	POL Storage Facility	N	none known	
200	Woodwork/Kart Club	Y	No sample but presumed at high level	
209	Sports Pavilian	N	none known	
221	Contractors Storage Facility	Y	Chrysotile	
237	EWS Tank	N	none known	
238	EWS Tank	N	none known	
271	EWS Tank	N	none known	
278	Office Facility	N	none known	
280	Storage/Office Facility	N	none known	
280a	Ablutions	N	none known	
281	Compressor House	Y	Amosite, Chrysotile	
282	Ablutions	N	none known	
292	Fire Booster Pump House	Y	Chrysotile	
298	Offices/Classroom/Toilets	N	none known	



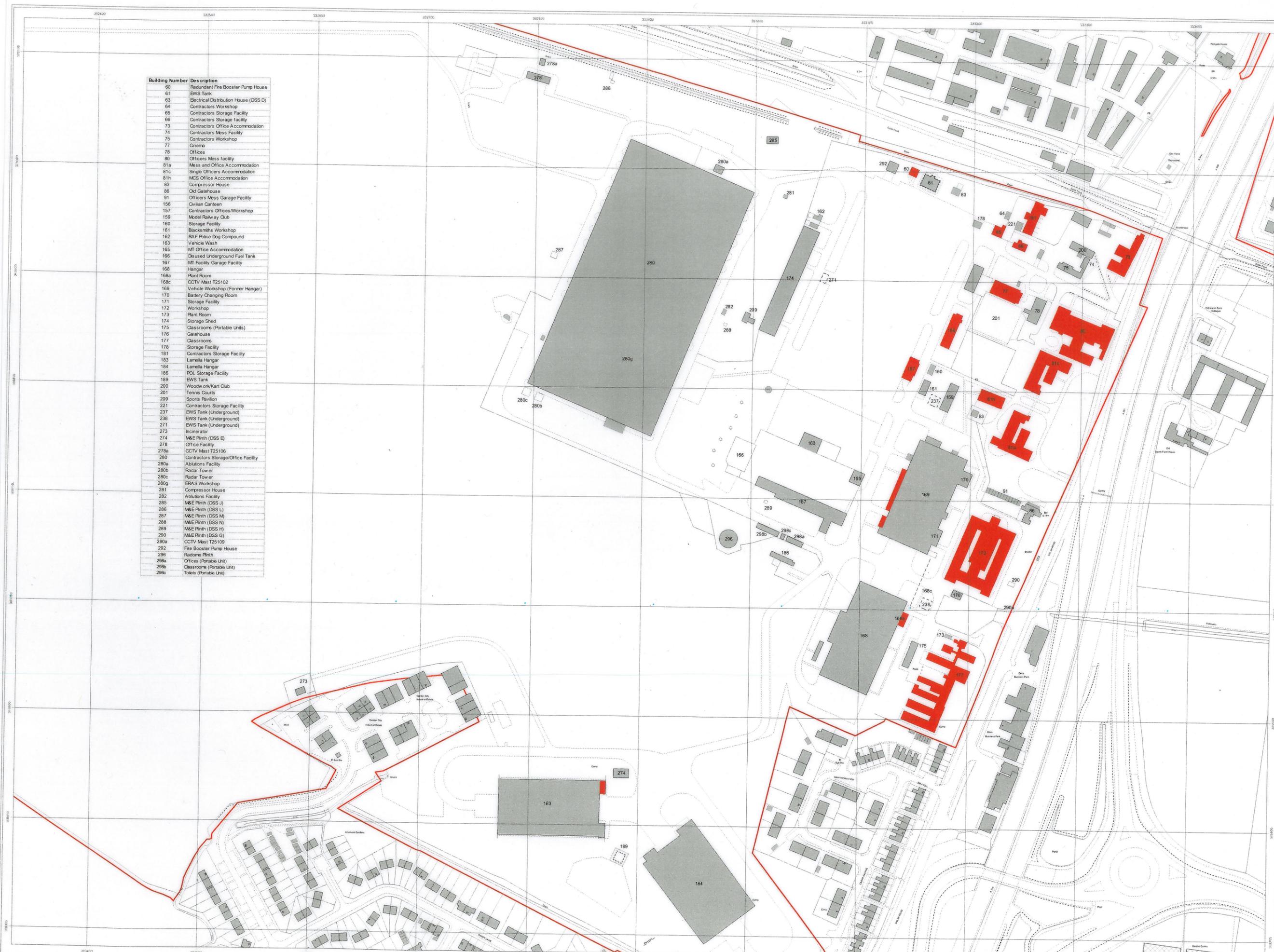
MINISTRY OF DEFENCE
SEALAND SOUTH
FLINTSHIRE

Sealand South Site -
Building Access

USER NOTE
No Access to any Buildings
Unless Authorized

KEY
Buildings Status as Internal Records

Building Number	Description
60	Redundant Fire Booster Pump House
61	EWS Tank
63	Electrical Distribution House (DSS D)
64	Contractors Workshop
65	Contractors Storage Facility
66	Contractors Storage Facility
73	Contractors Office Accommodation
74	Contractors Mess Facility
75	Contractors Workshop
77	Cinema
78	Offices
80	Officers Mess facility
81a	Mess and Office Accommodation
81c	Single Officers Accommodation
81h	MCS Office Accommodation
83	Compressor House
86	Old Gatehouse
91	Officers Mess Garage Facility
156	Officer's Canteen
157	Contractors Offices/Workshop
159	Model Railway Club
160	Storage Facility
161	Blacksmiths Workshop
162	RAF Police Dog Compound
163	Vehicle Wash
165	MT Office Accommodation
166	Disused Underground Fuel Tank
167	MT Facility Garage Facility
168	Hangar
168a	Plant Room
168c	CCTV Mast T25102
169	Vehicle Workshop (Former Hangar)
170	Battery Changing Room
171	Storage Facility
172	Workshop
173	Plant Room
174	Storage Shed
175	Classrooms (Portable Units)
176	Gatehouse
177	Classrooms
178	Storage Facility
181	Contractors Storage Facility
183	Lamella Hangar
184	Lamella Hangar
186	POL Storage Facility
189	EWS Tank
200	Woodwork/Kart Club
201	Tennis Courts
209	Sports Pavilion
221	Contractors Storage Facility
237	EWS Tank (Underground)
238	EWS Tank (Underground)
271	EWS Tank (Underground)
273	Incinerator
274	M&E Plinth (DSS E)
278	Office Facility
278a	CCTV Mast T25105
280	Contractors Storage/Office Facility
280a	Abulions Facility
280b	Radar Tower
280c	Radar Tower
280g	ERAS Workshop
281	Compressor House
282	Abulions Facility
285	M&E Plinth (DSS J)
286	M&E Plinth (DSS L)
287	M&E Plinth (DSS M)
288	M&E Plinth (DSS N)
289	M&E Plinth (DSS H)
290	M&E Plinth (DSS G)
290a	CCTV Mast T25109
292	Fire Booster Pump House
296	Radome Plinth
298a	Offices (Portable Unit)
299b	Classrooms (Portable Unit)
299c	Toilets (Portable Unit)

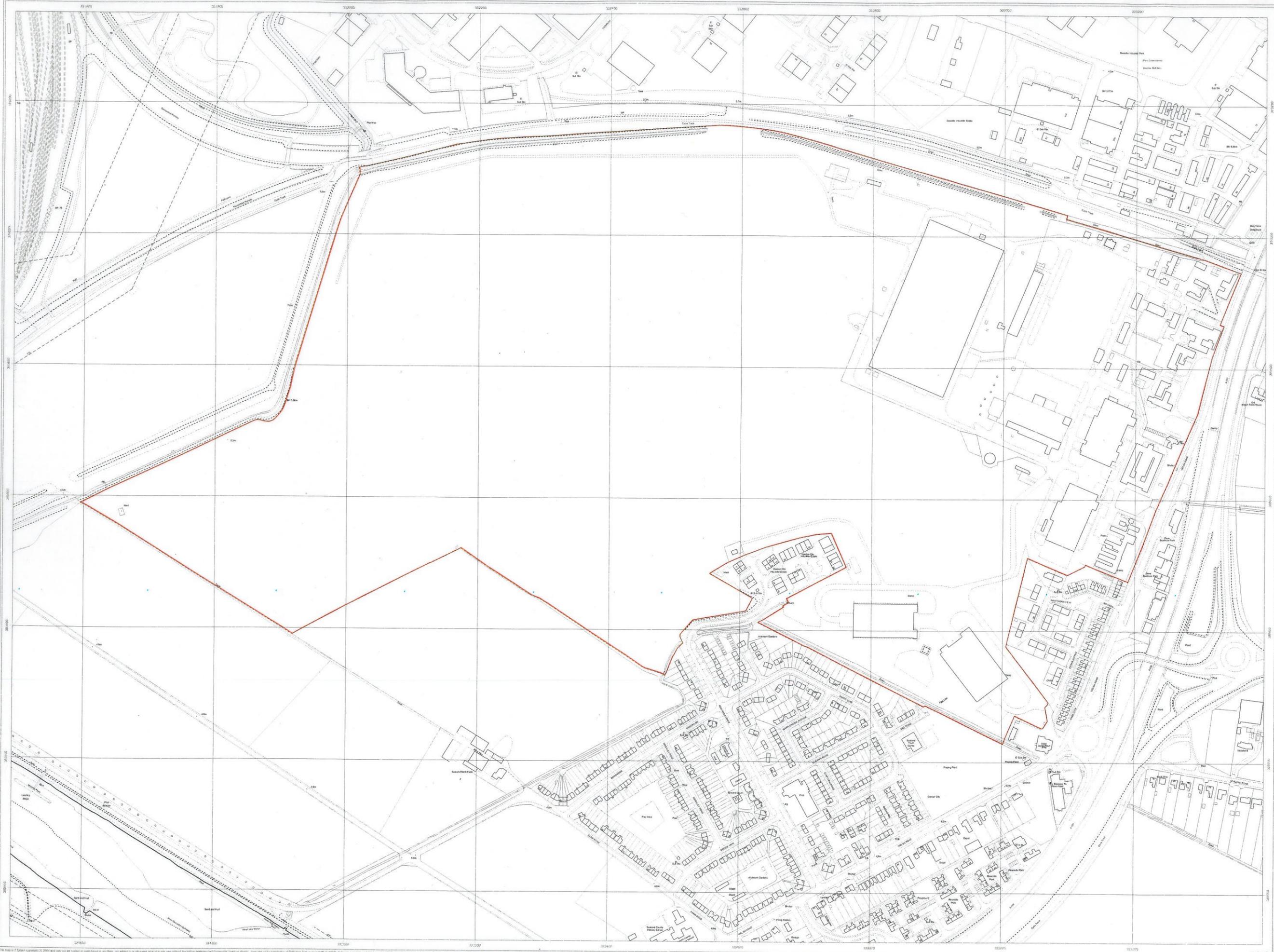


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RAF SEALAND
 CHESHIRE

**SEALAND SOUTH SITE
 DISPOSAL PLAN**

KEY
 MOD Freehold Boundary

Scale 1:2,500

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MINISTRY OF DEFENCE

RAF SEALAND
FLINTSHIRE

SEALAND SOUTH SITE FIRE SAFETY PLAN

KEY

- MOD Boundary
- Security Fence
- Fire Assembly Point

Hydrants

- 100mm Potable Main Fire Hydrants. Unmarked
- 200mm and 150mm Main Fire Hydrants. All Marker Posted

Emergency Water Supply Tanks

- 100,000 Litres Full
- 20,000L Capacity (Underground)
-Auto Fill Not Operational
-Manual Re-Filling Required

Scale 1:4,000

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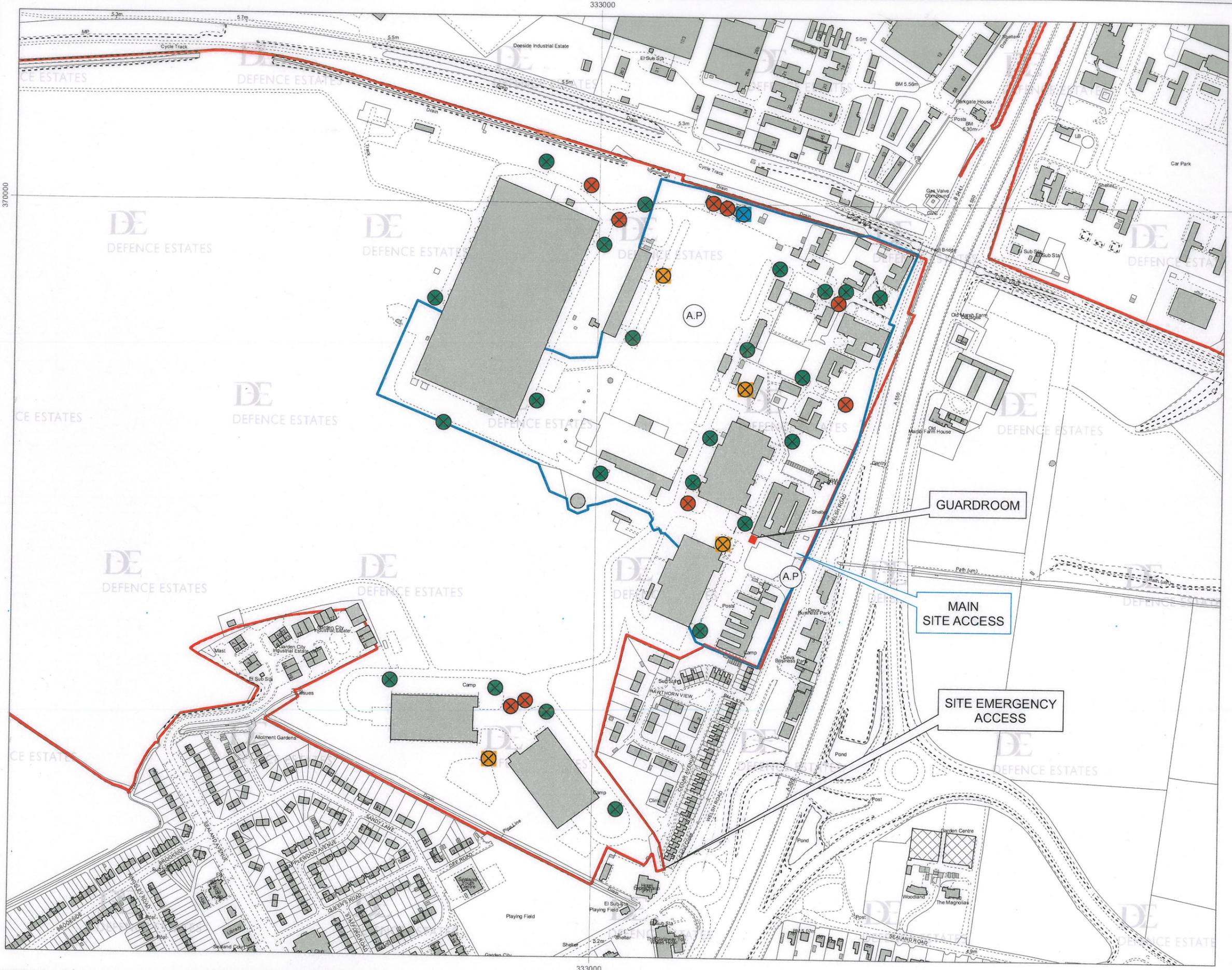
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Appendix B Site Photographs



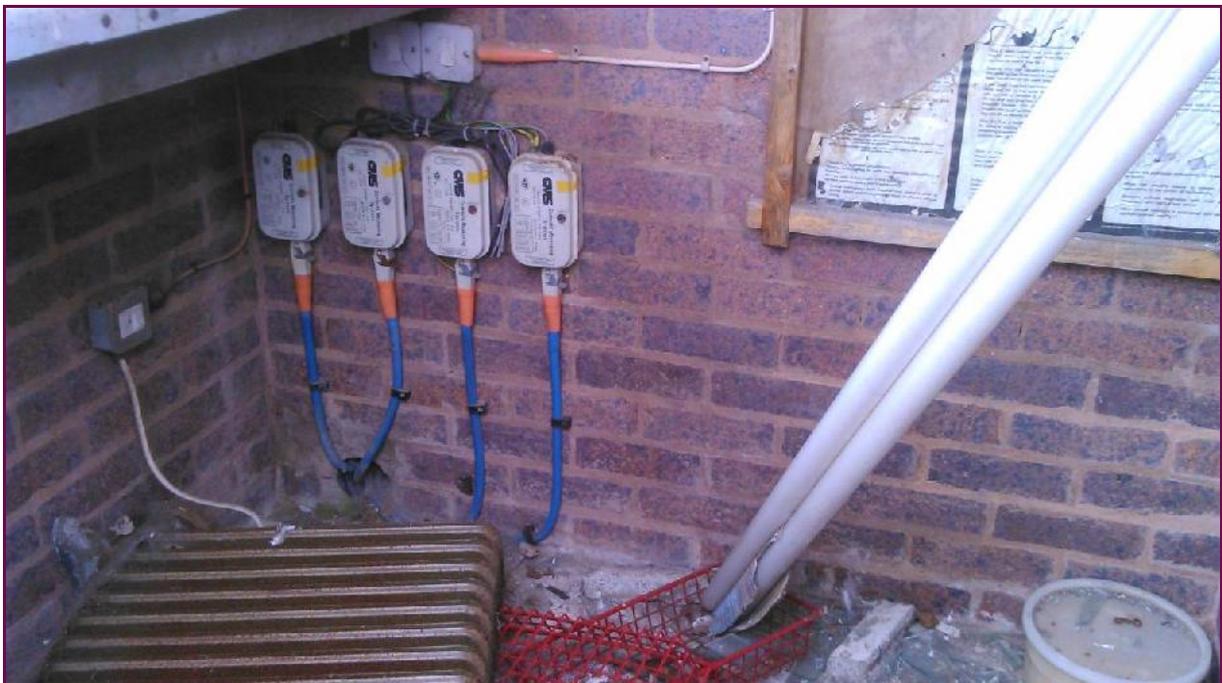
Photograph 1: View looking towards underground storage tank.



Photograph 2: View of underground storage tank.



Photograph 3: View of electrical units adjacent to fuel tank.



Photograph 4: View of control units adjacent to fuel tank.



Photograph 5: View north towards fuel tank area.



Photograph 6: View north towards fuel tank area.



Photograph 7: View north across Radome foundation.



Photograph 8: View east across Radome foundation.



Photograph 9: View west across Radome foundation.



Photograph 10: View north from site security compound.



Photograph 11 View north from central cross roads.



Photograph 12 View north towards building 167.



Photograph 13 View west from cross roads.



Appendix C Historical Plan

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Map Name: County Series

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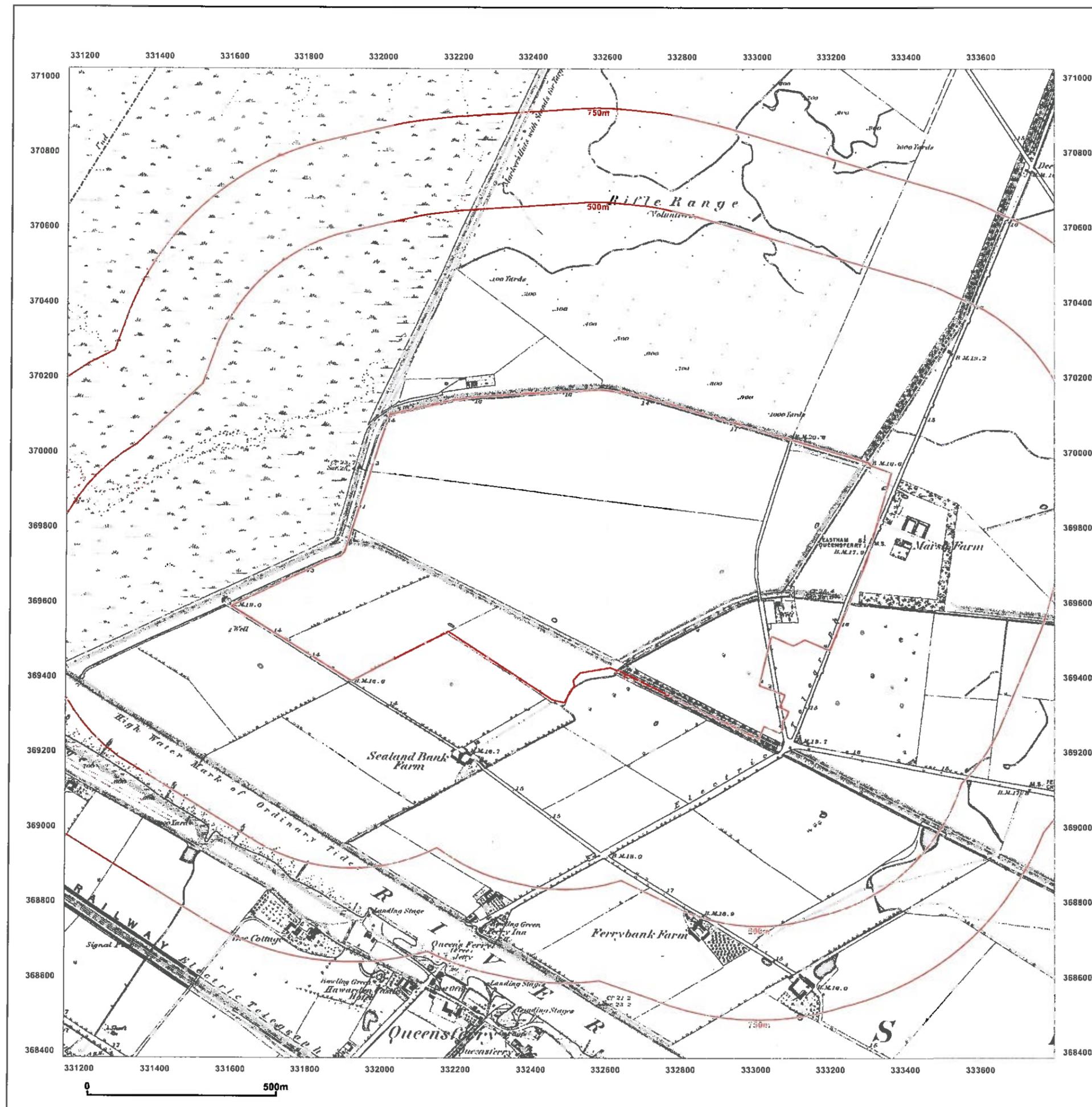


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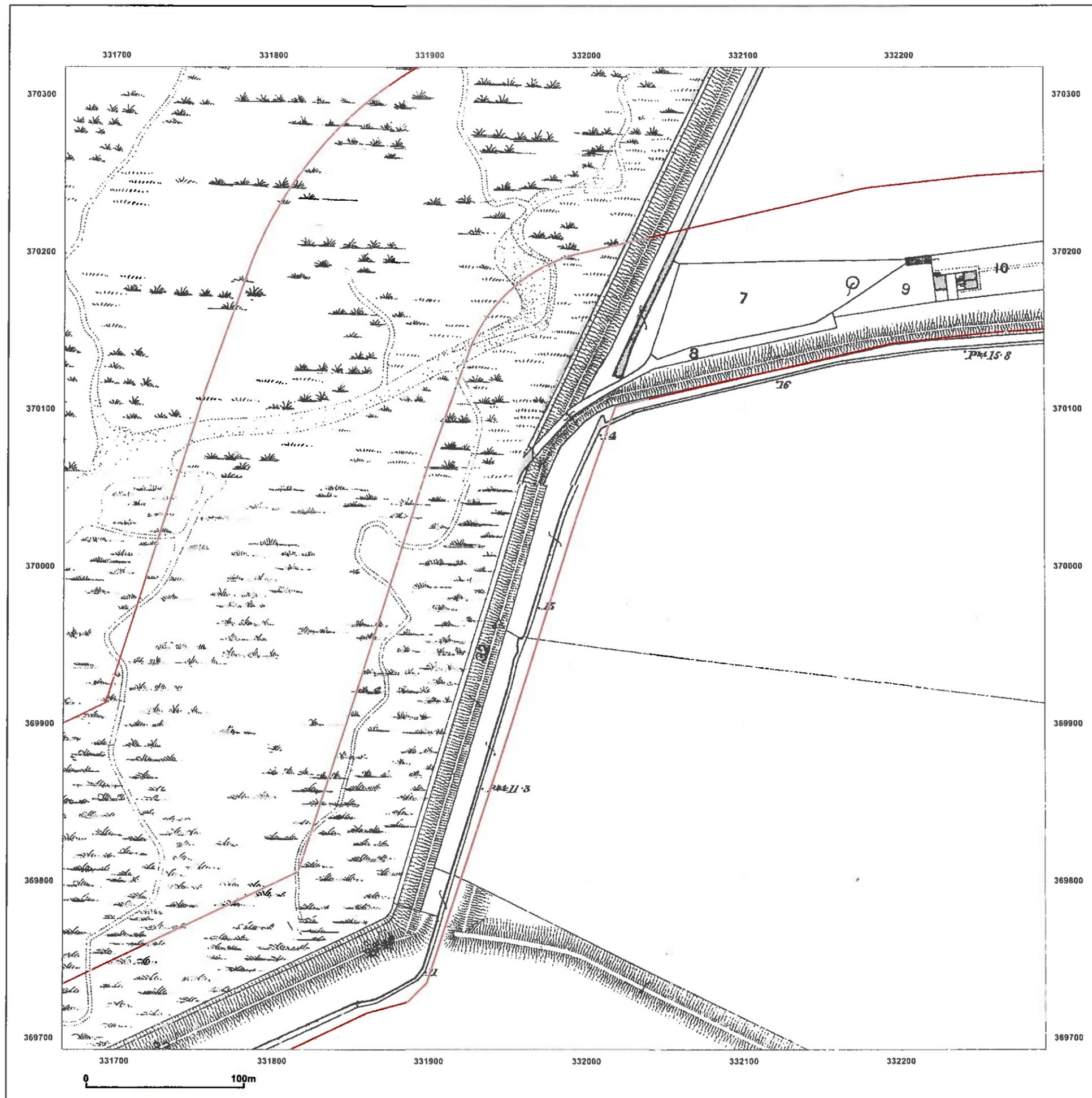


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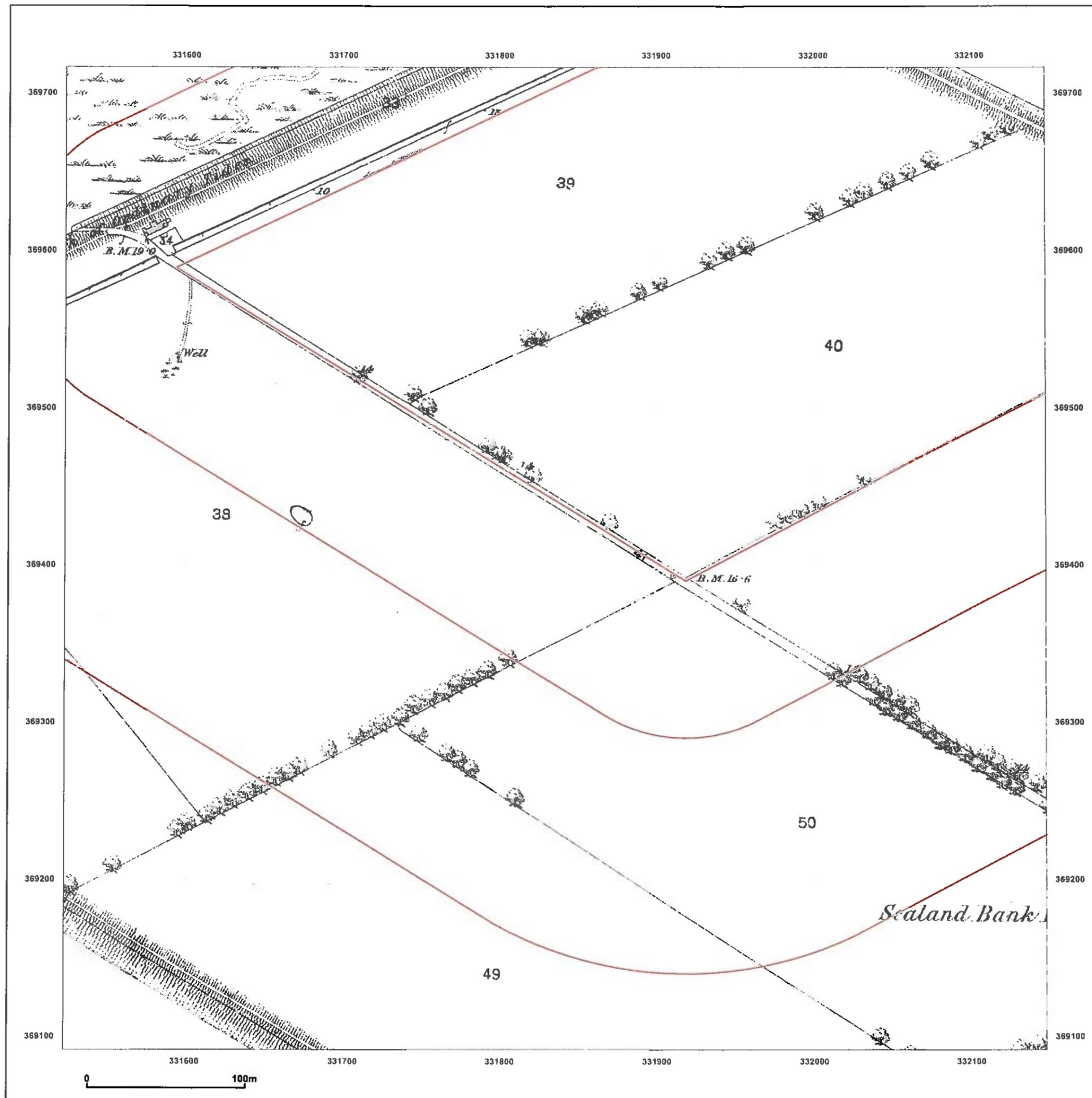


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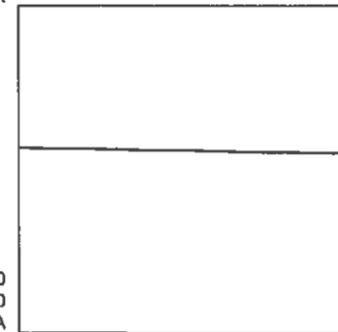
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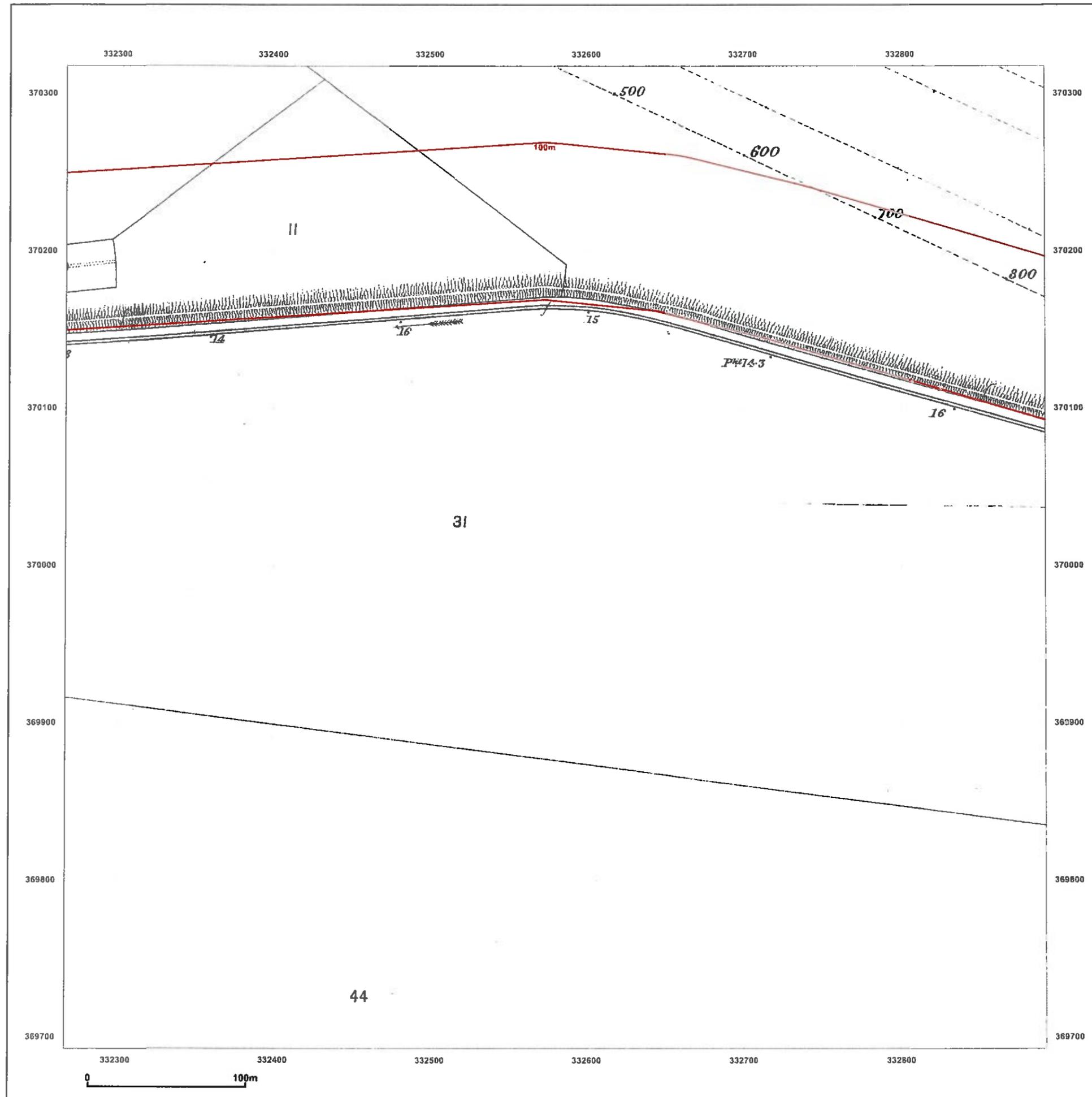


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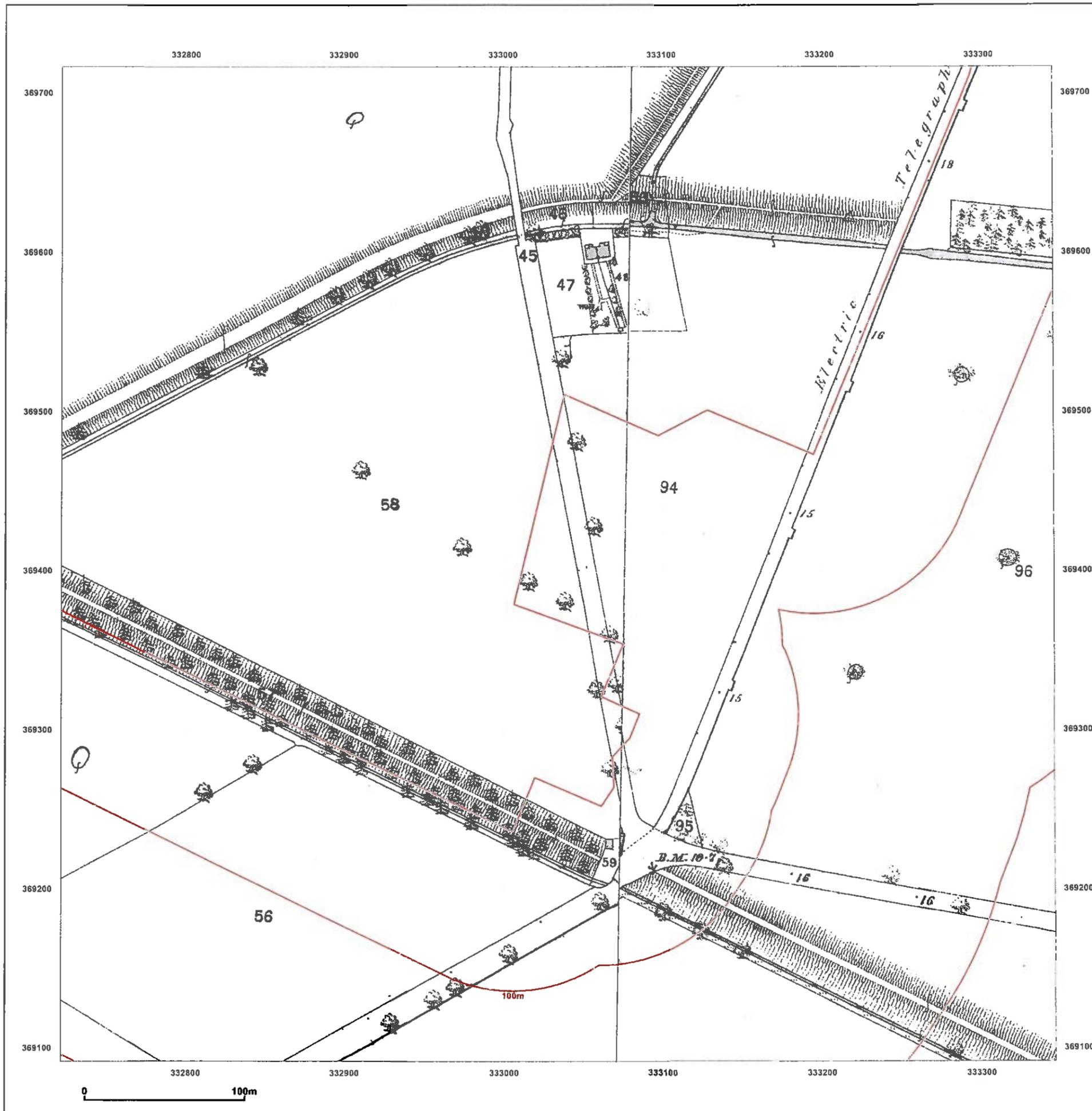


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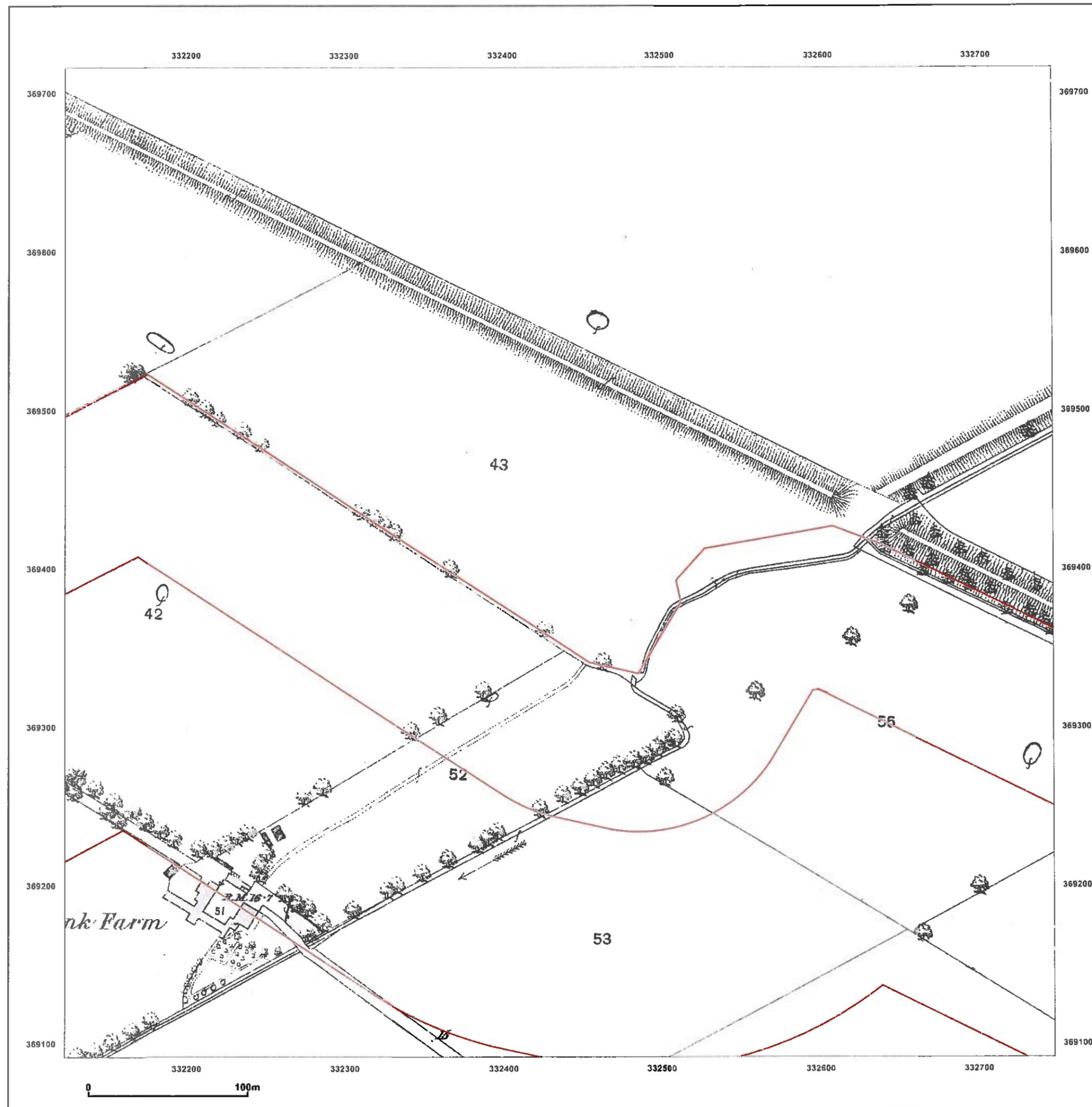


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Map Name: County Series

Map date: 1897-1898

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1872
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1869
Revised 1898
Edition N/A
Copyright N/A
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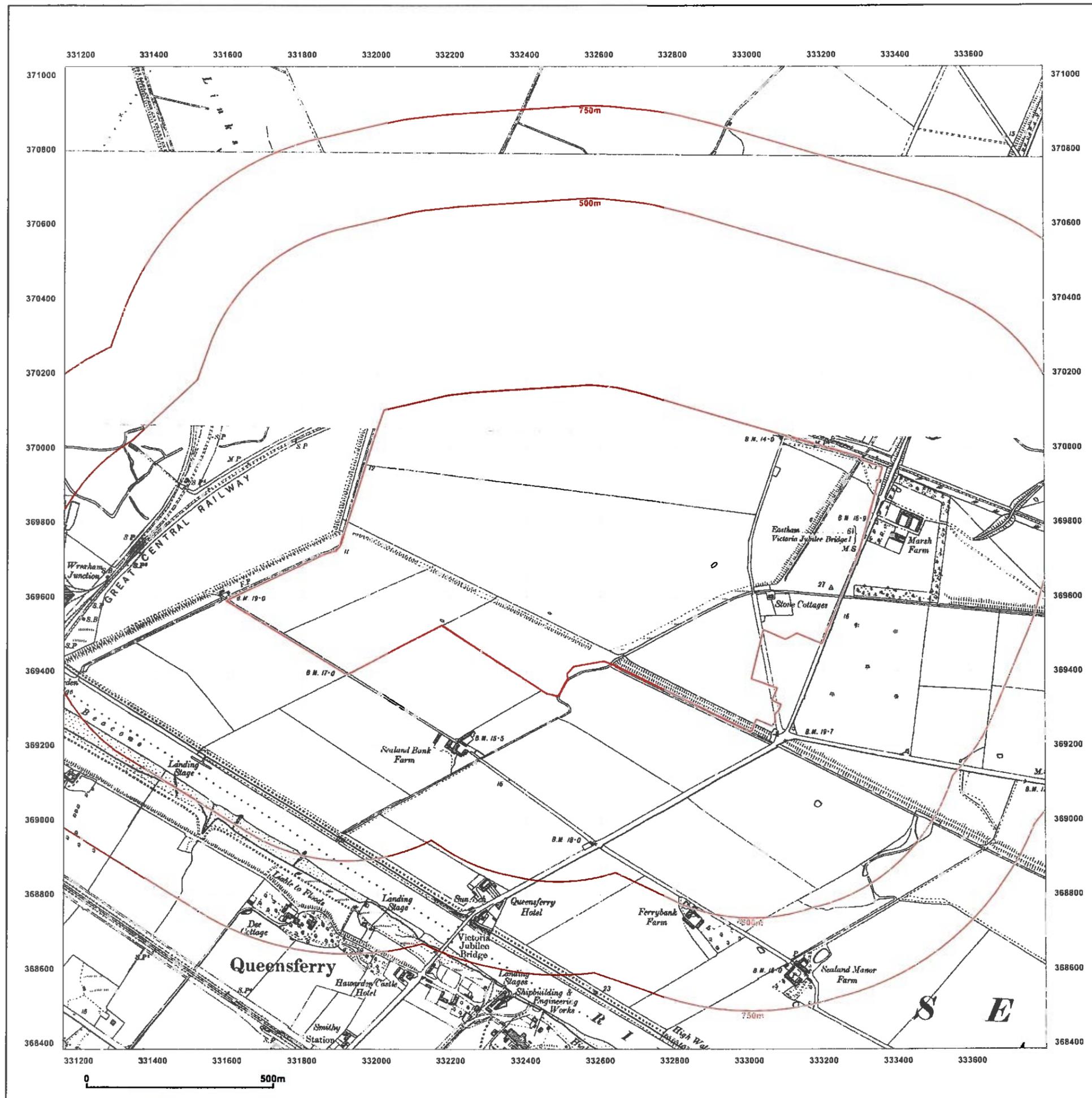


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Site Details:

Deeside, CH5 2RD

Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: County Series

Map date: 1898

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1872
Revised 1898
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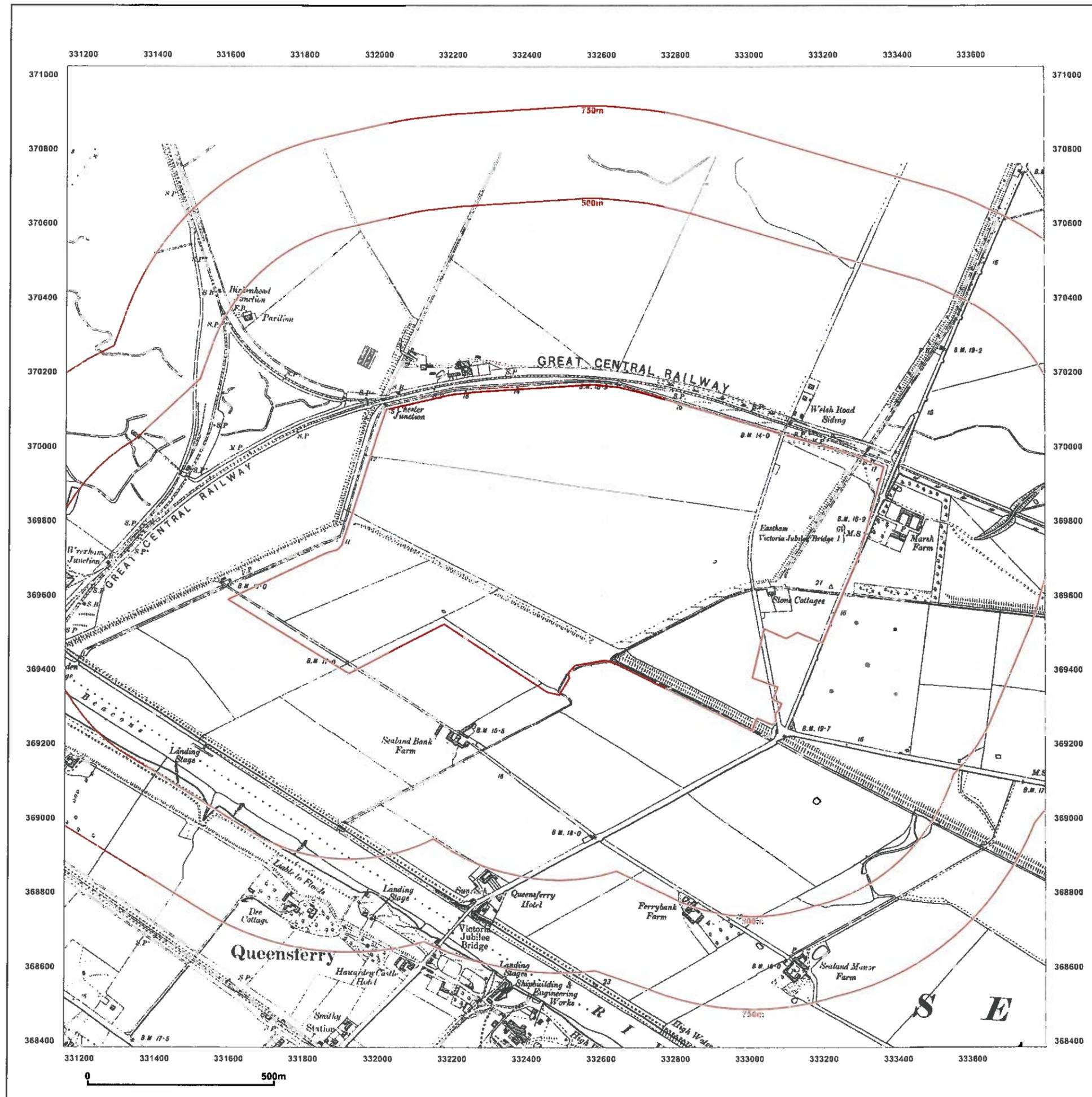


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Deeside, CH5 2RD

Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: County Series

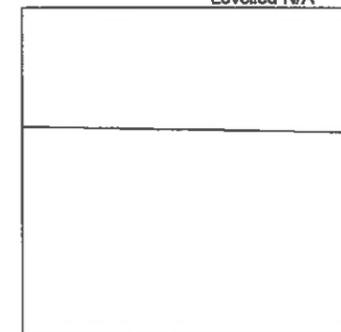
Map date: 1898

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1869
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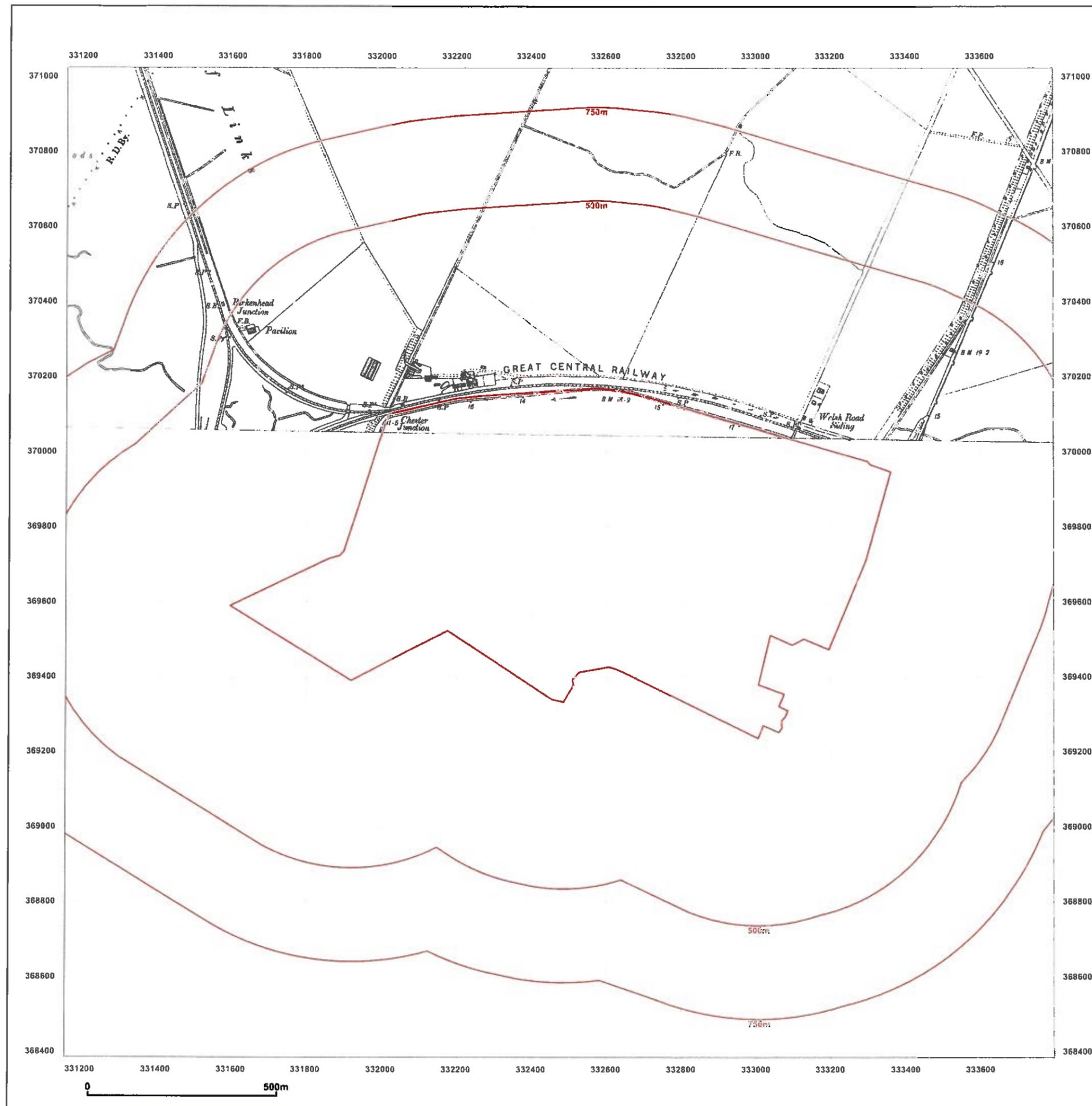


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: County Series

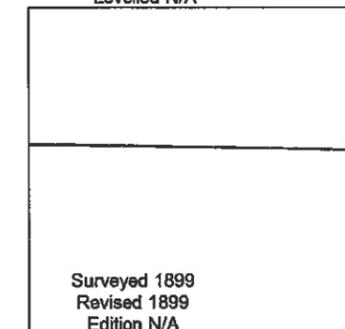
Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



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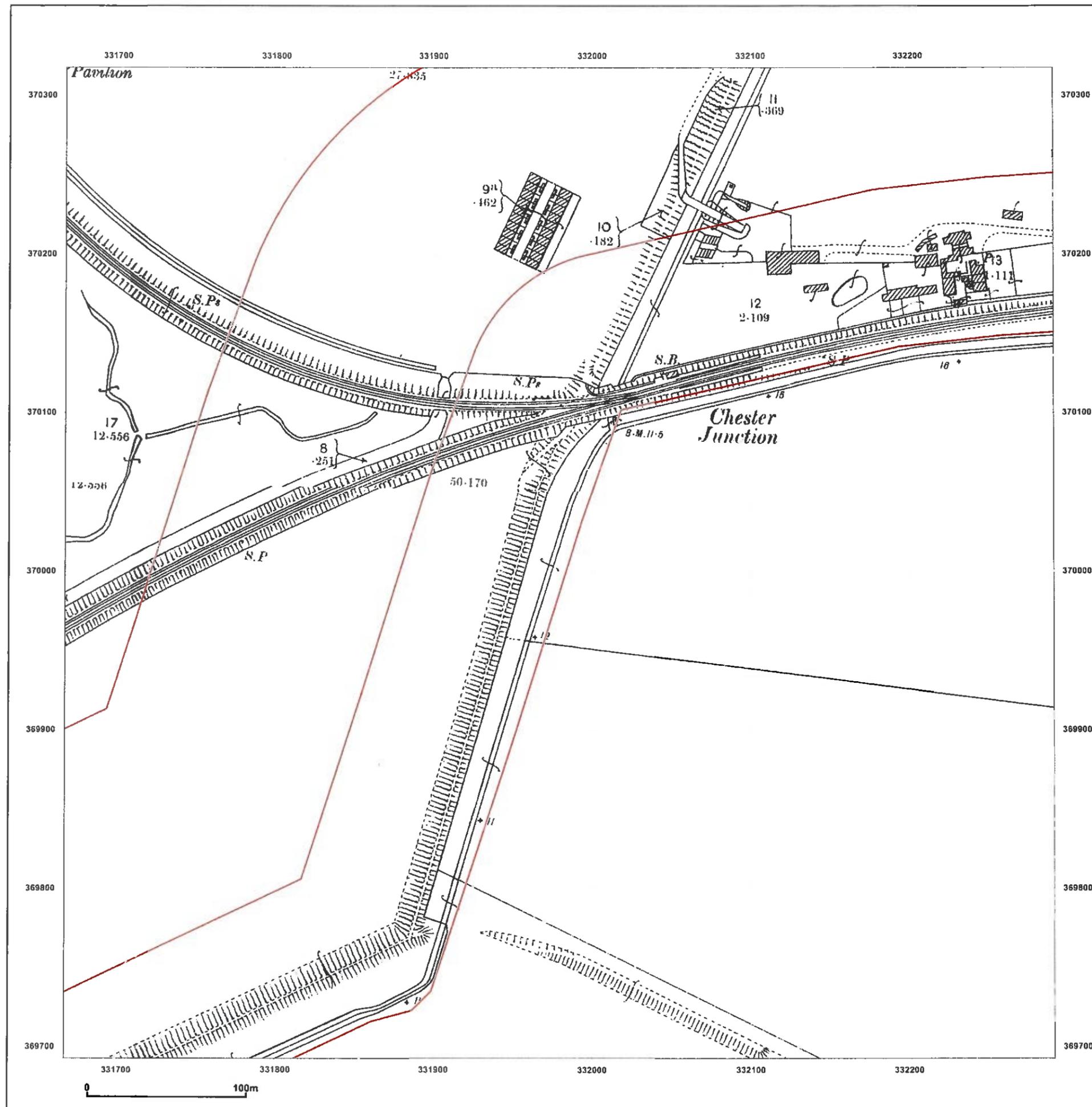


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A2
Grid Ref: 331835, 369404

Map Name: County Series

Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



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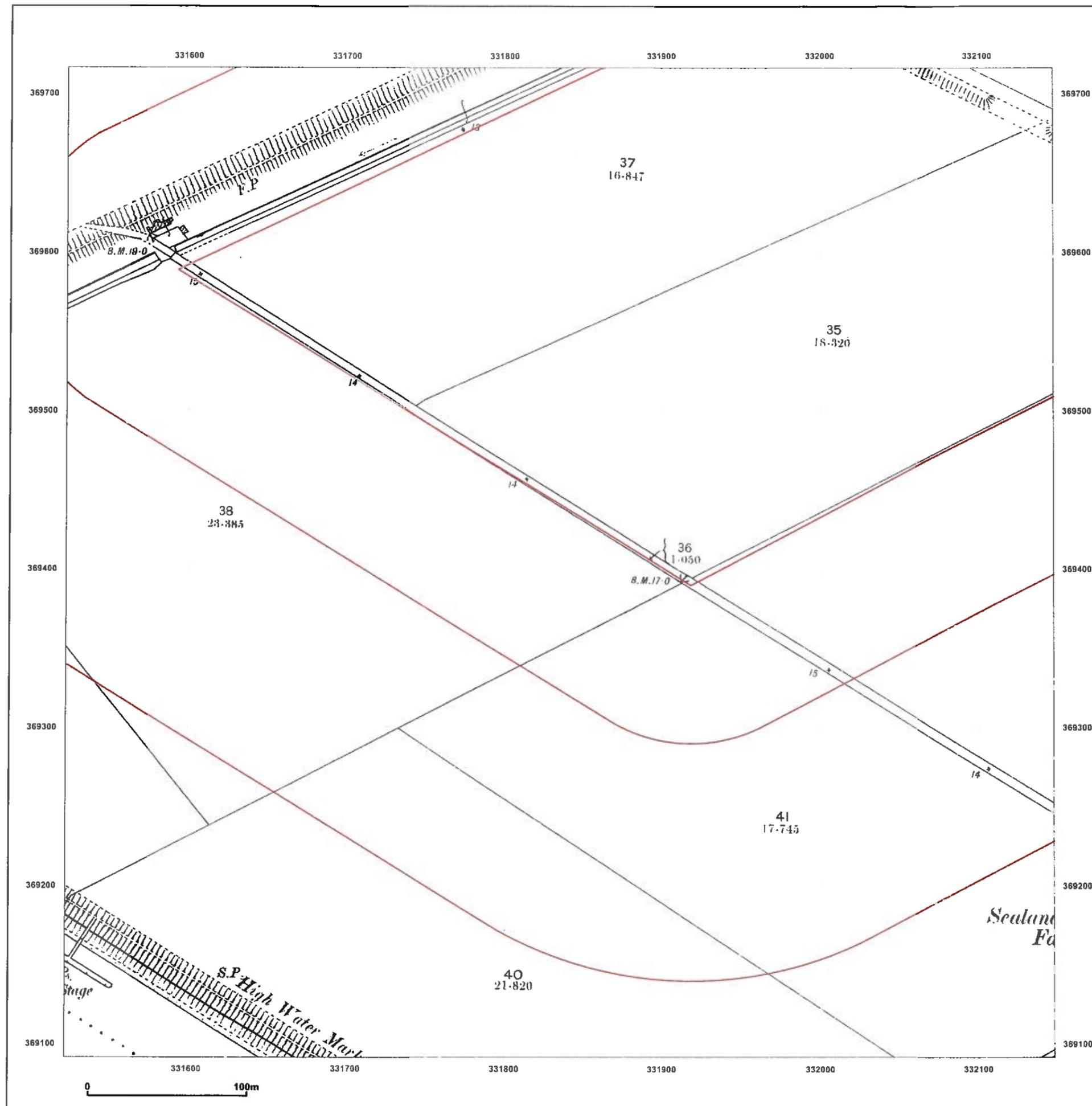


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: County Series

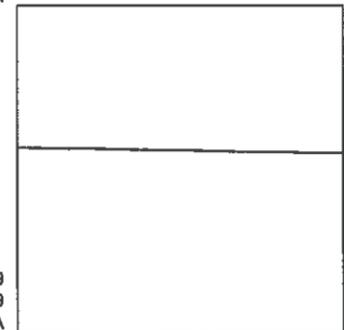
Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



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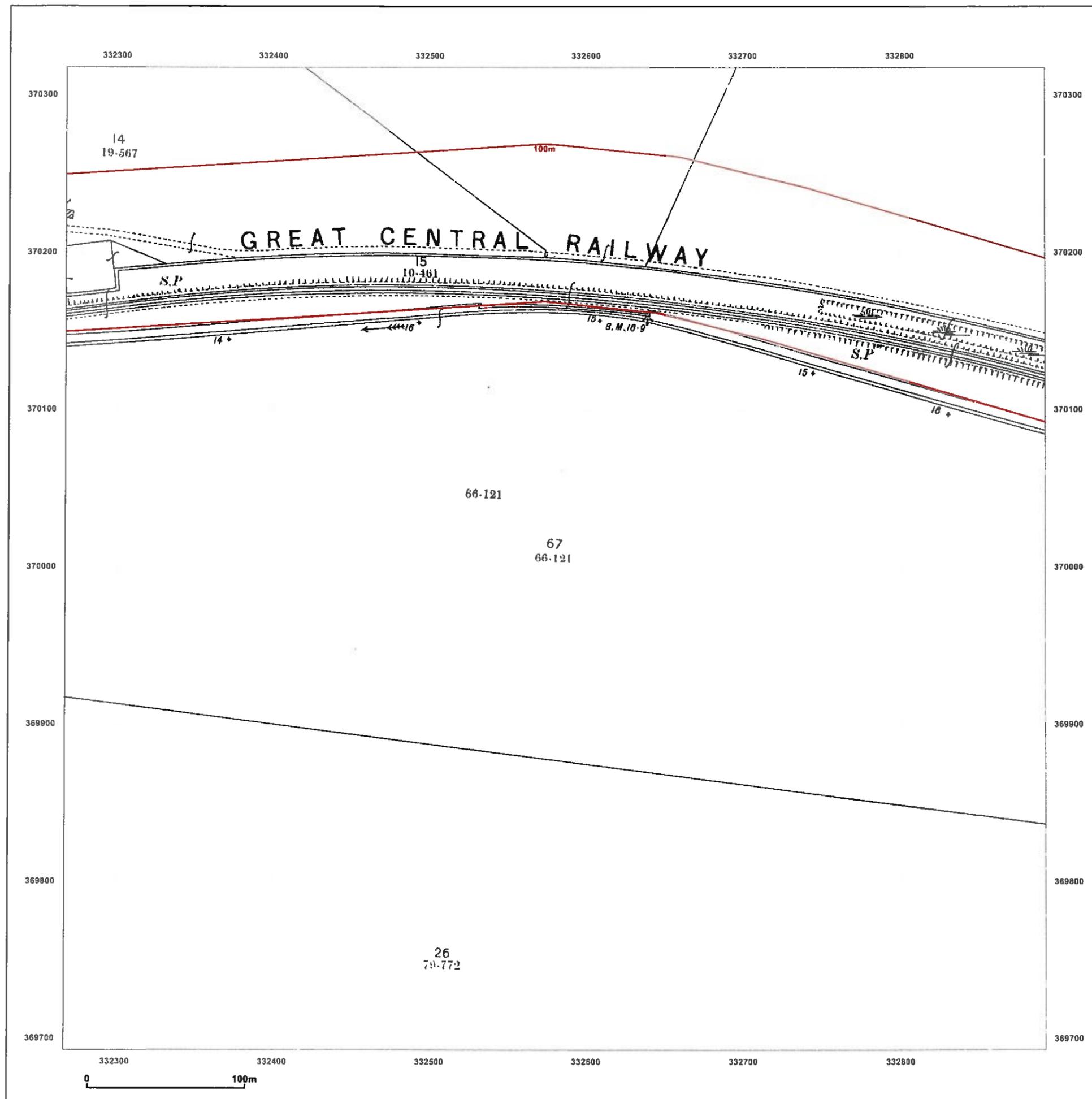


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B2
Grid Ref: 332435, 369404

Map Name: County Series

Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



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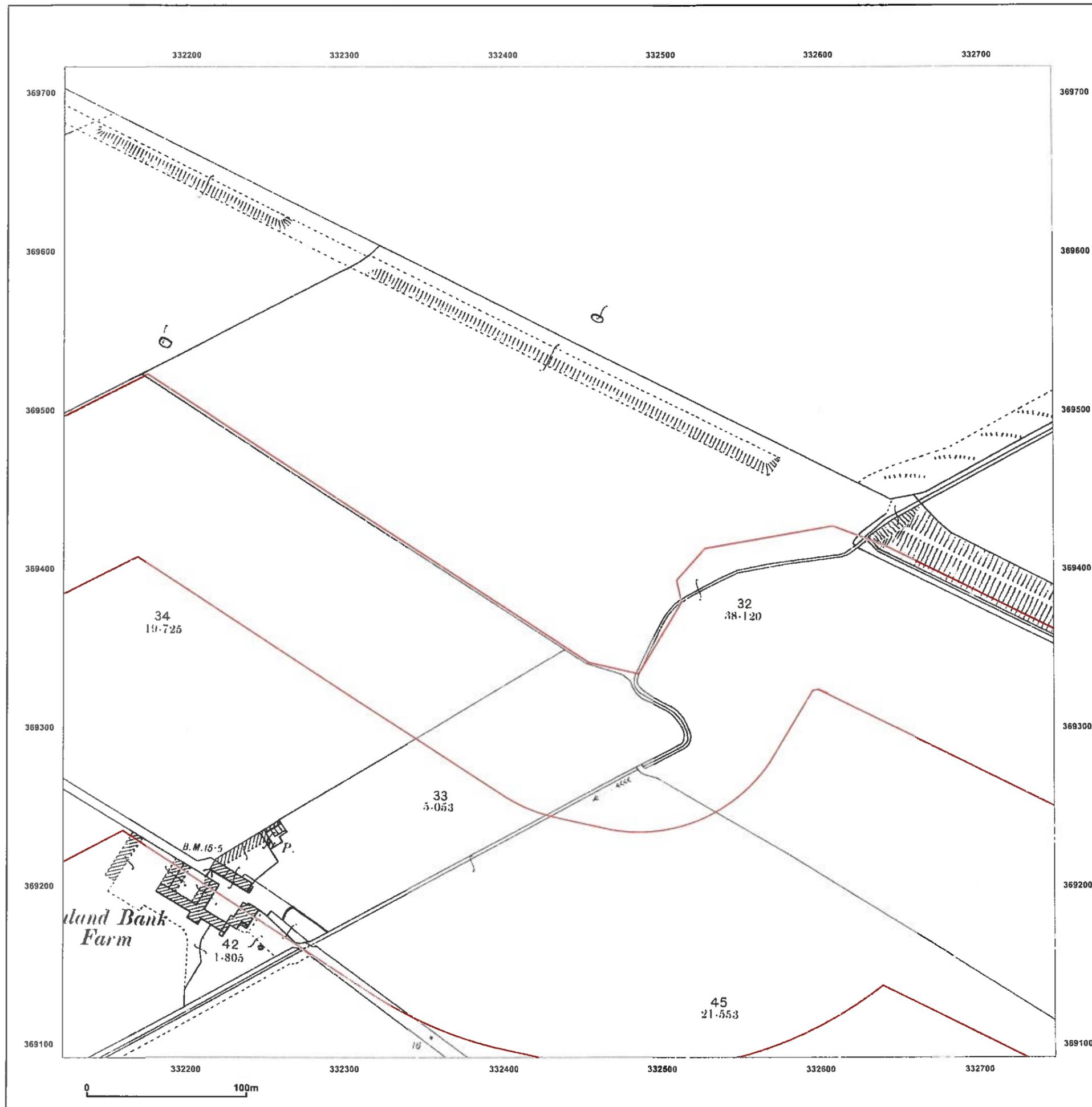


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_C2
Grid Ref: 333034, 369404

Map Name: County Series

Map date: 1899

Scale: 1:2,500

Printed at: 1:2,500



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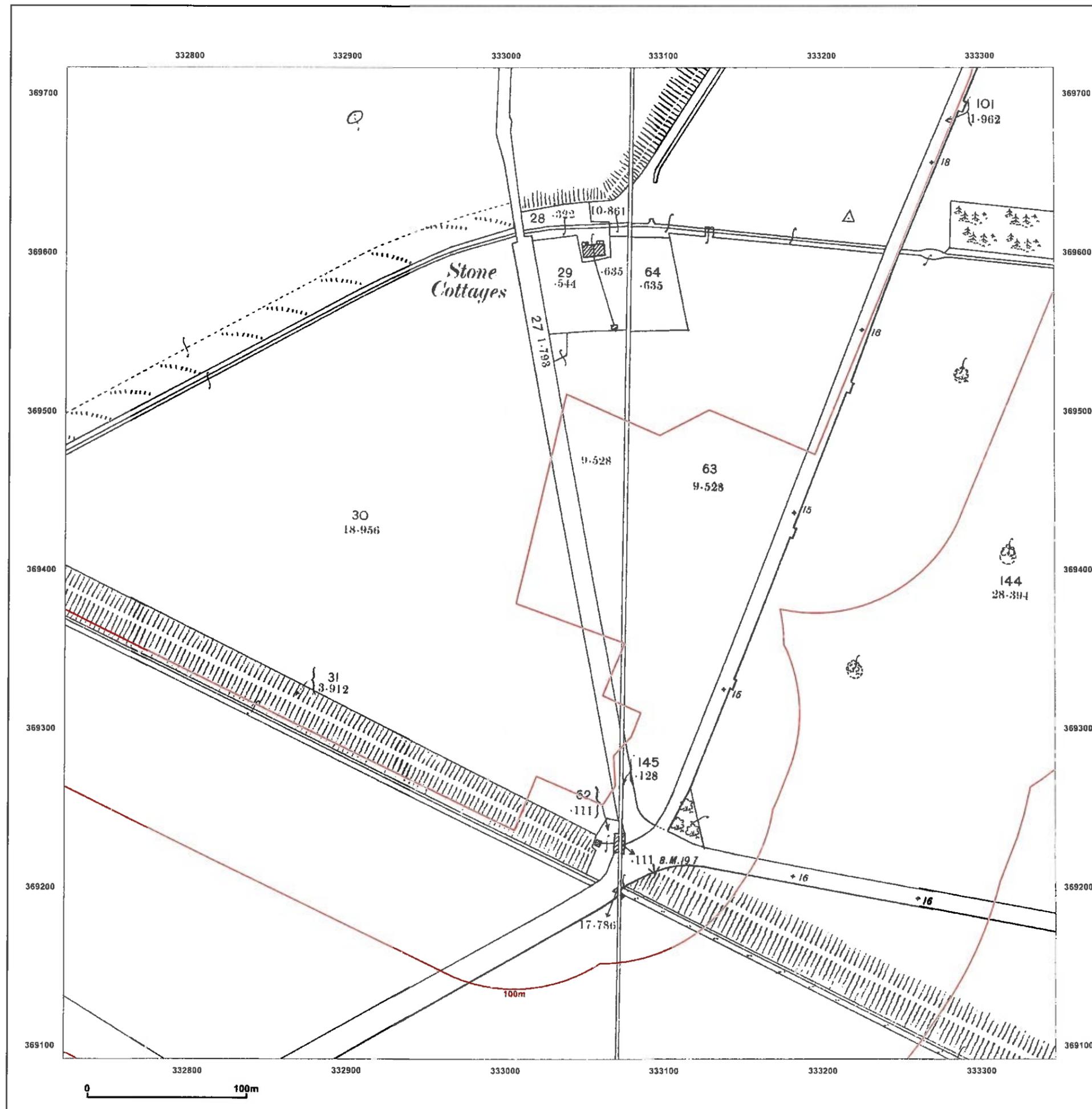


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: County Series

Map date: 1909-1913

Scale: 1:10,560

Printed at: 1:10,560



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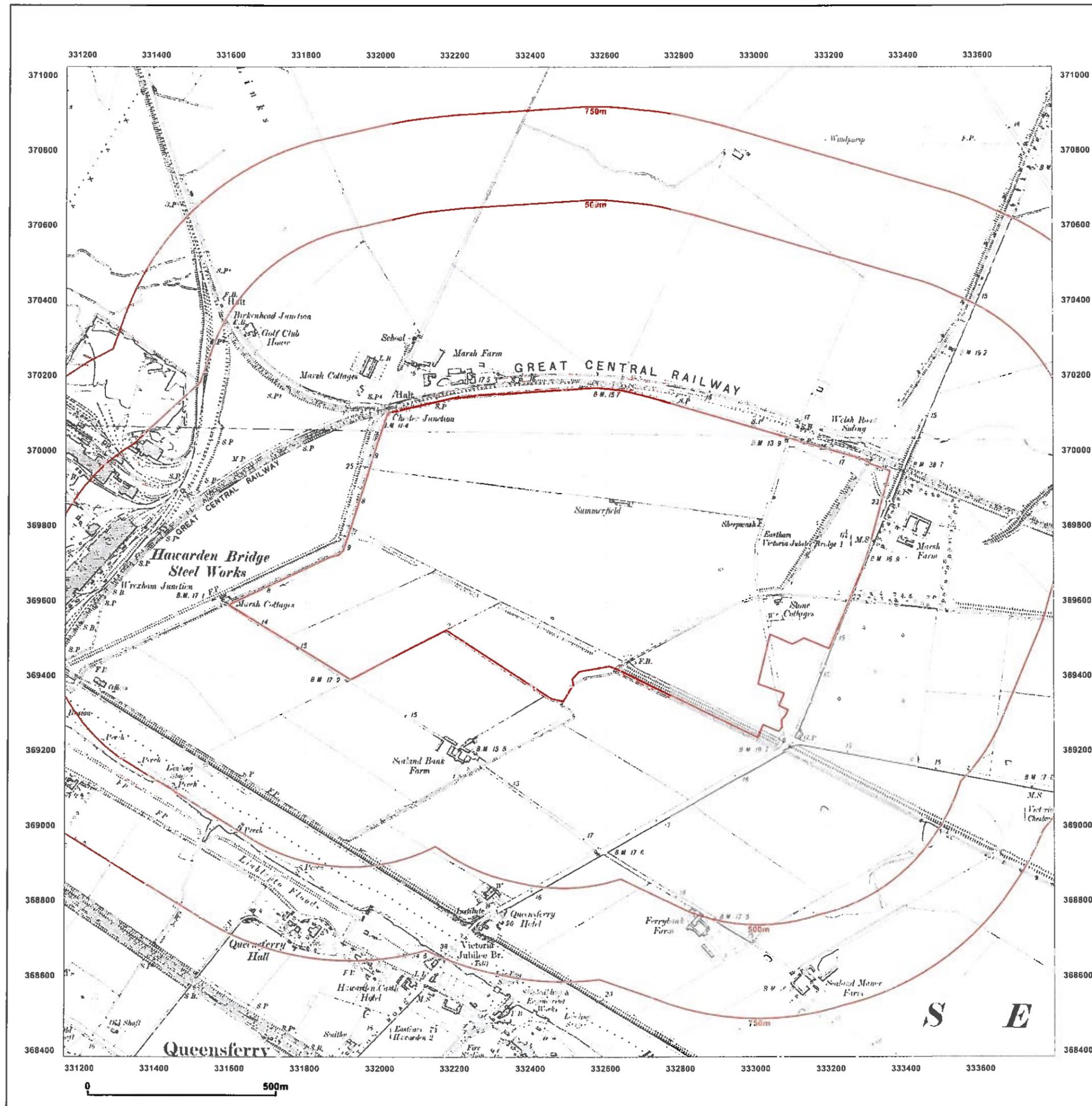


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: County Series

Map date: 1911

Scale: 1:2,500

Printed at: 1:2,500



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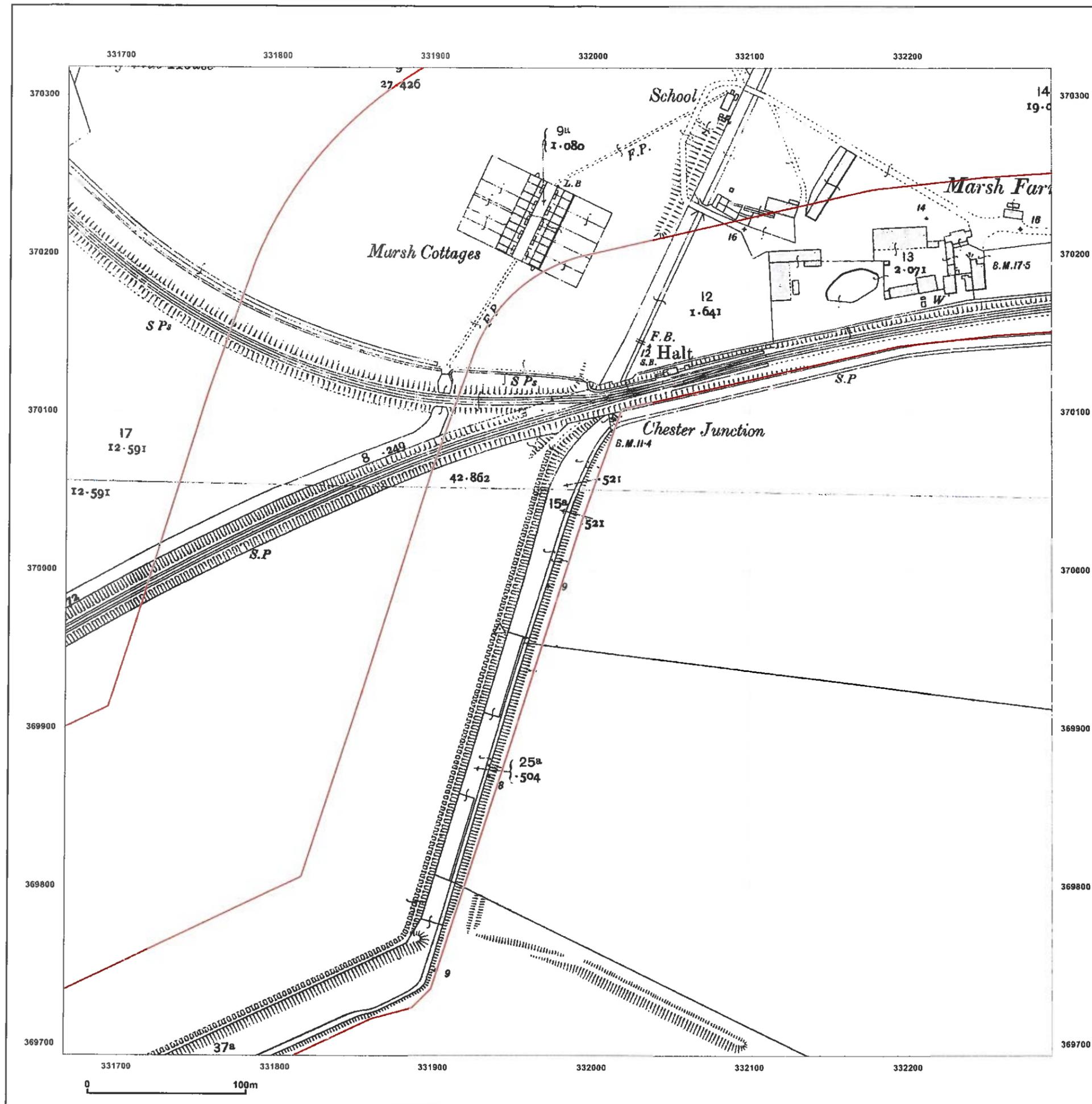


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A2
Grid Ref: 331835, 369404

Map Name: County Series

Map date: 1911

Scale: 1:2,500

Printed at: 1:2,500



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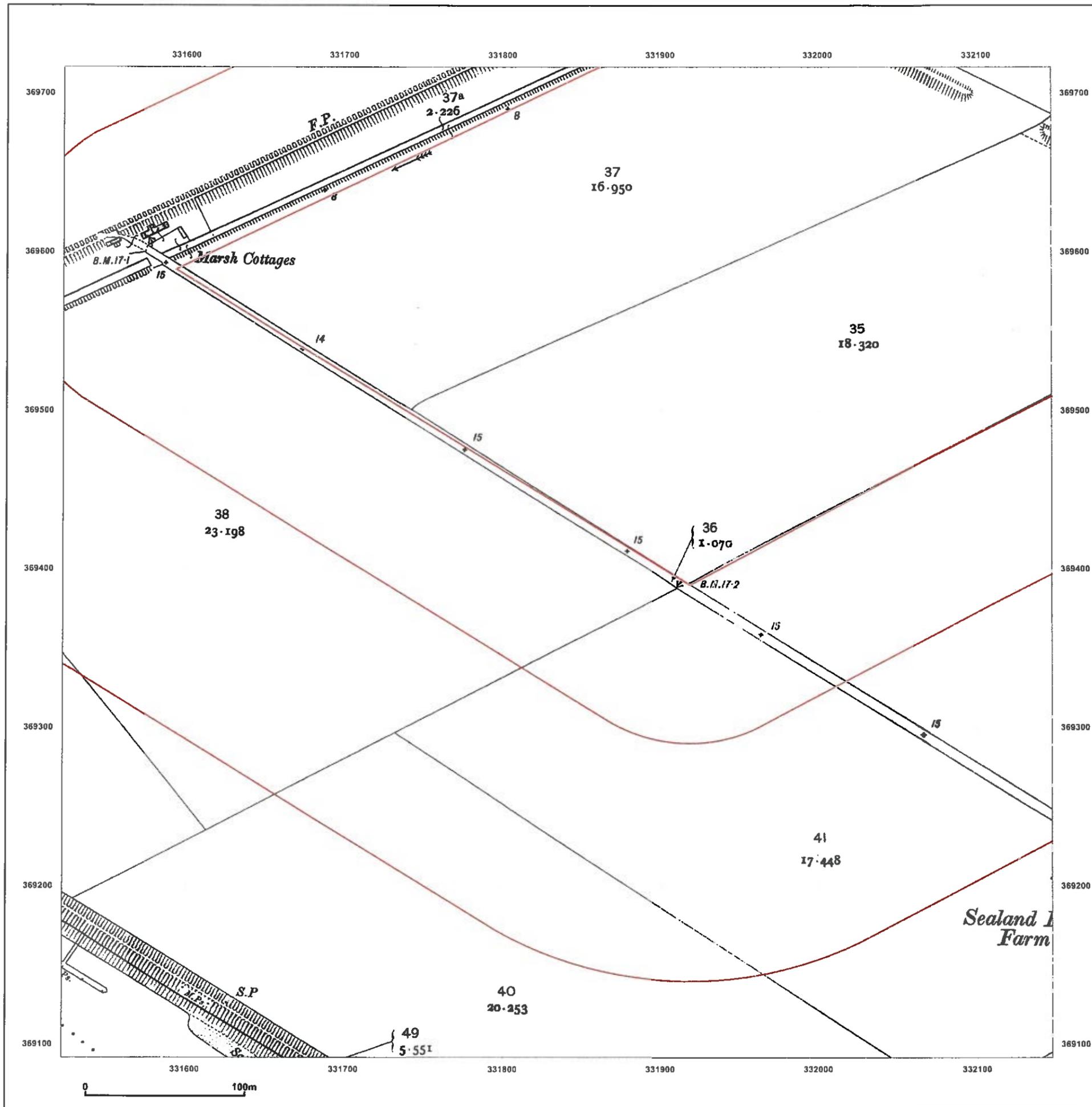


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: County Series

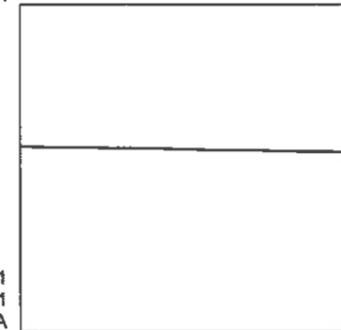
Map date: 1911

Scale: 1:2,500

Printed at: 1:2,500



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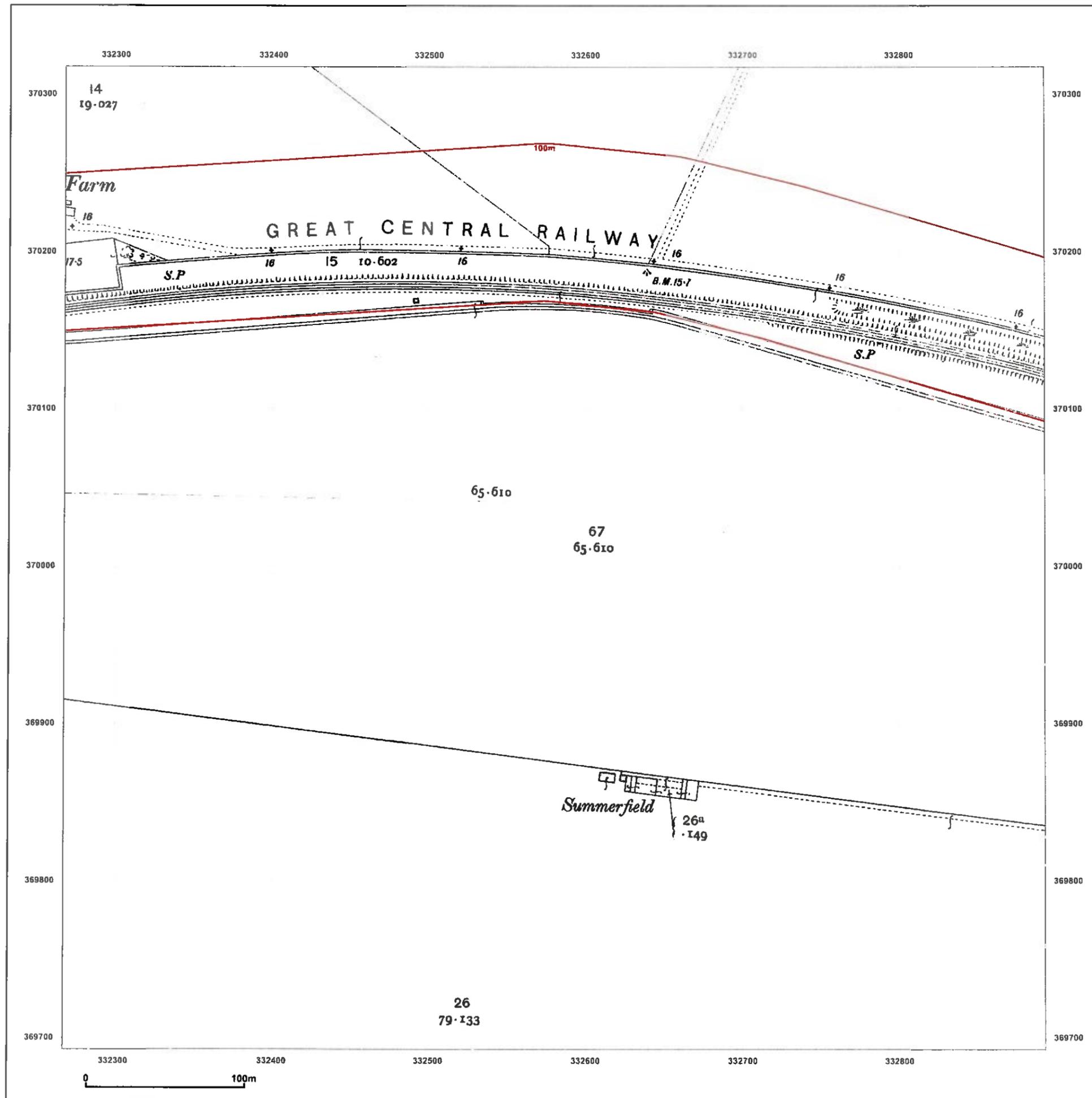


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B2
Grid Ref: 332435, 369404

Map Name: County Series

Map date: 1911

Scale: 1:2,500

Printed at: 1:2,500



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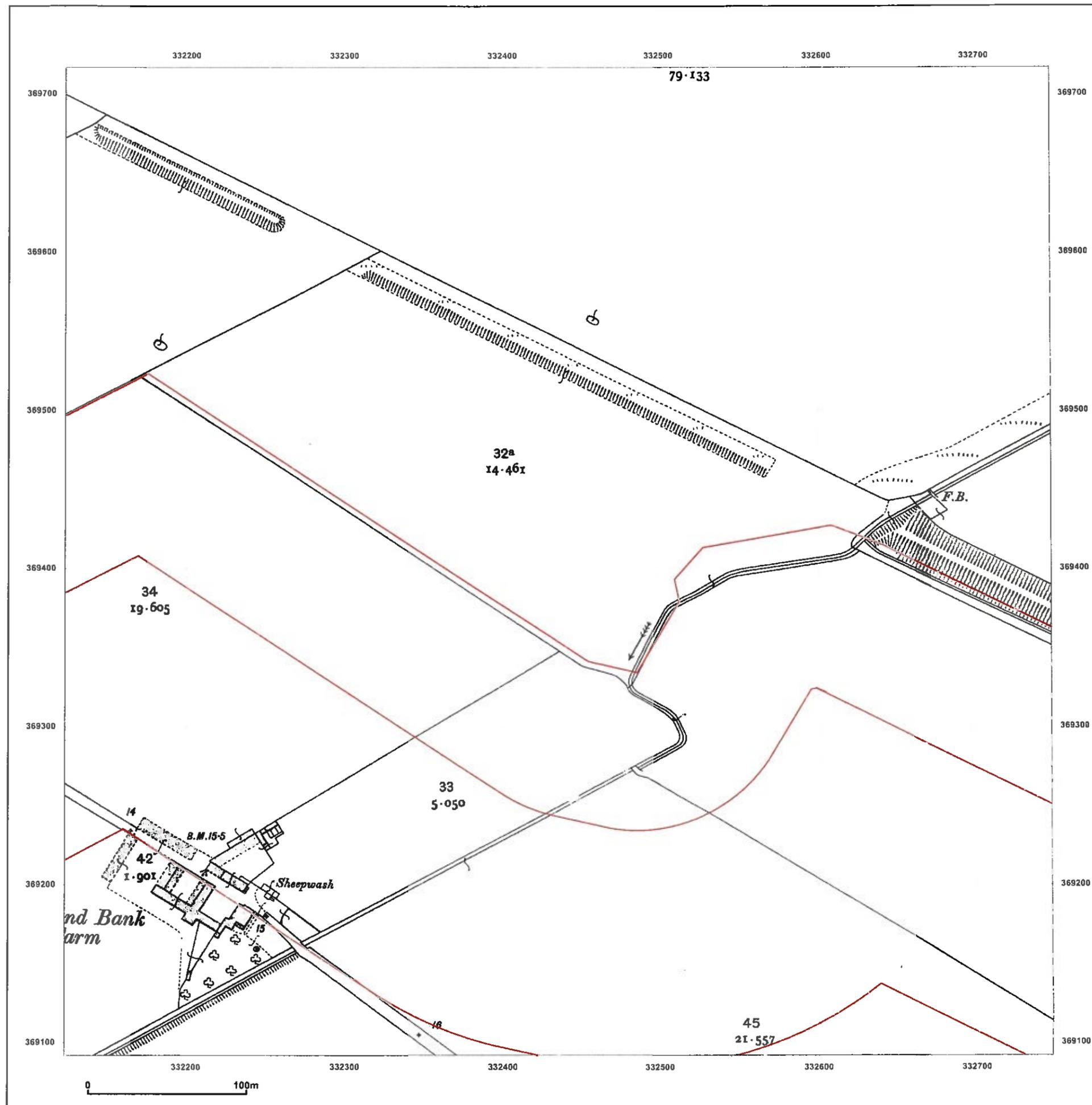


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Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_C2
Grid Ref: 333034, 369404

Map Name: County Series

Map date: 1911

Scale: 1:2,500

Printed at: 1:2,500



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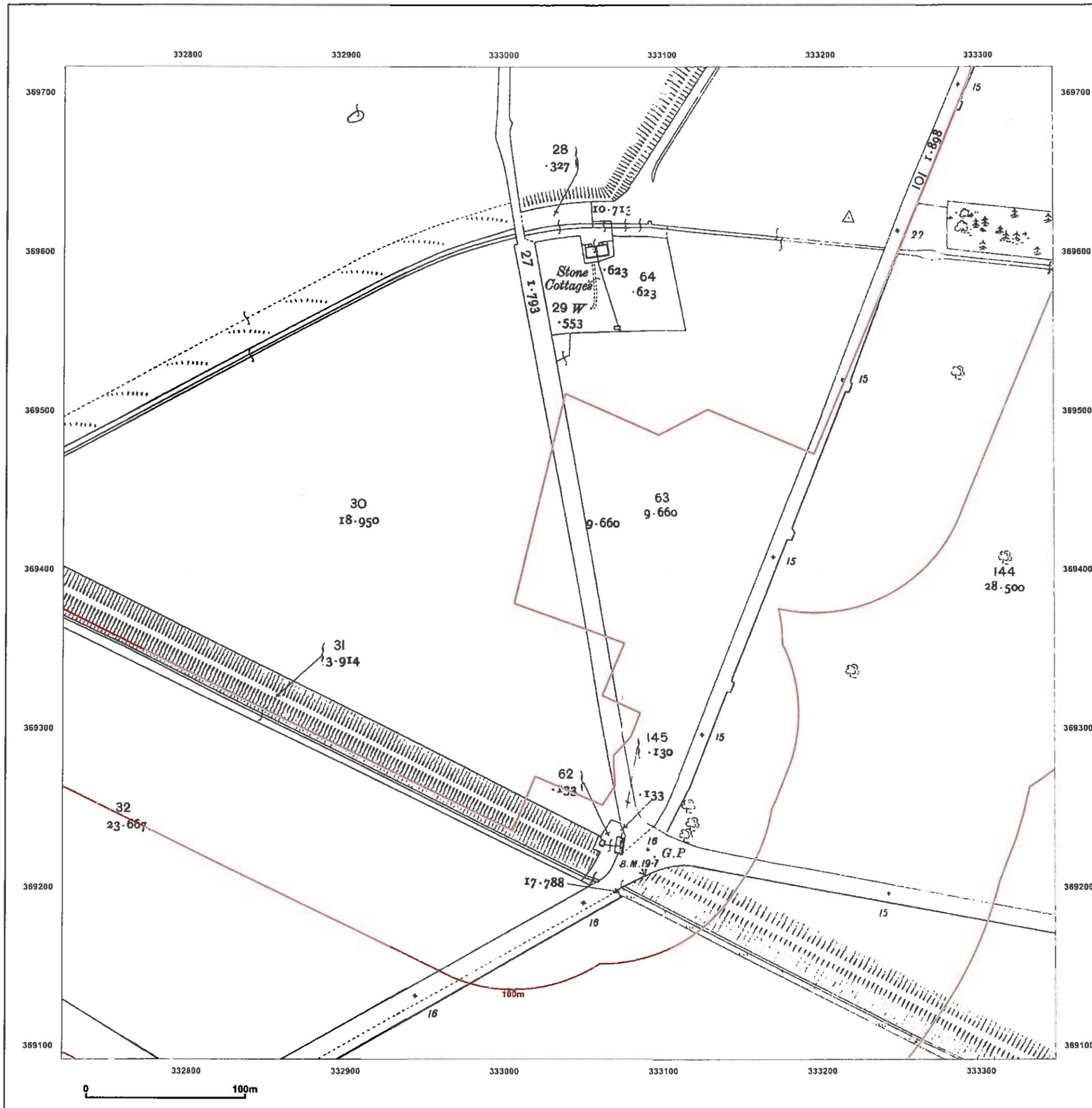


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Deeside, CH5 2RD

Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: County Series

Map date: 1913-1914

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1872
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Surveyed 1872
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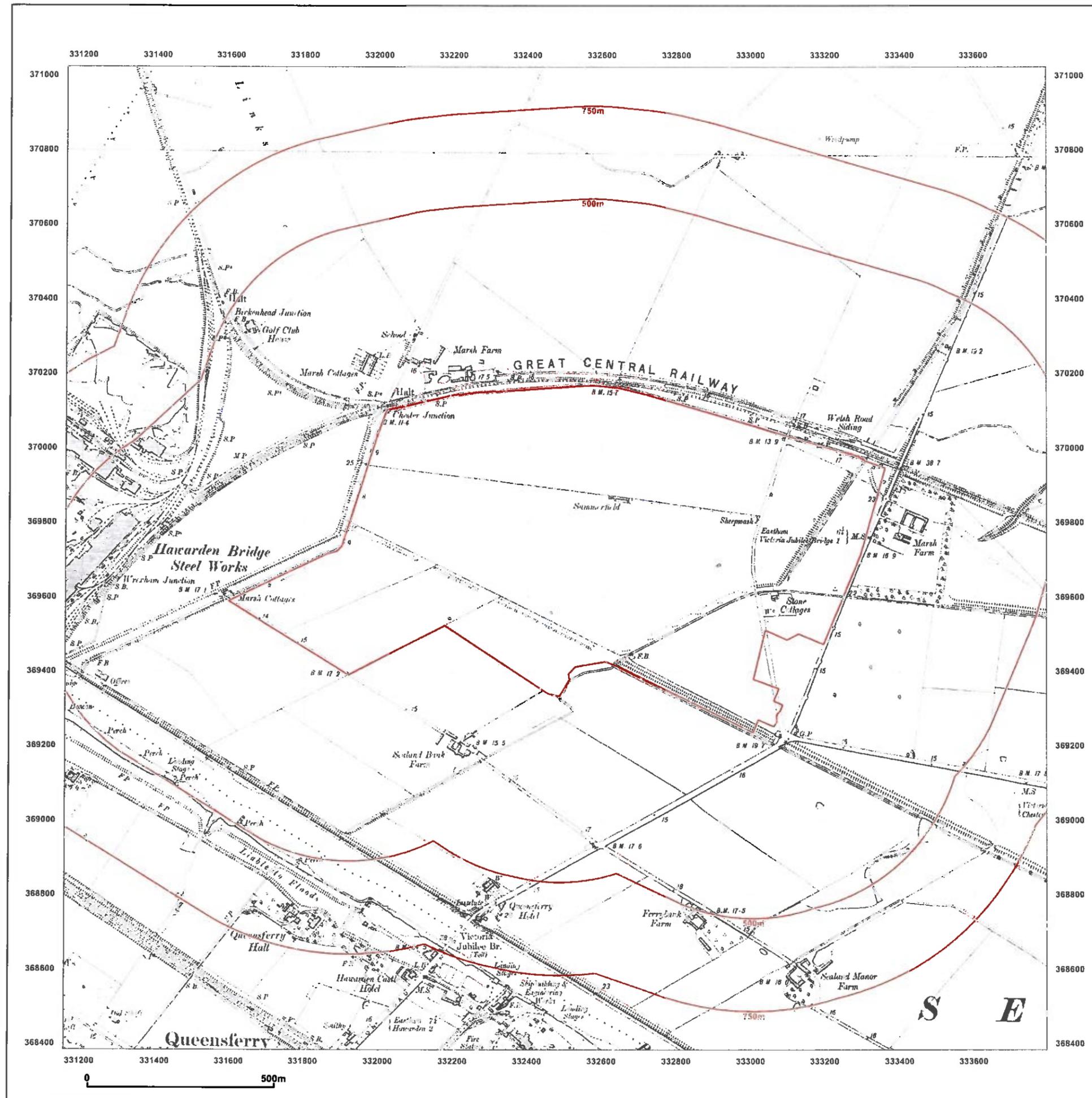


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



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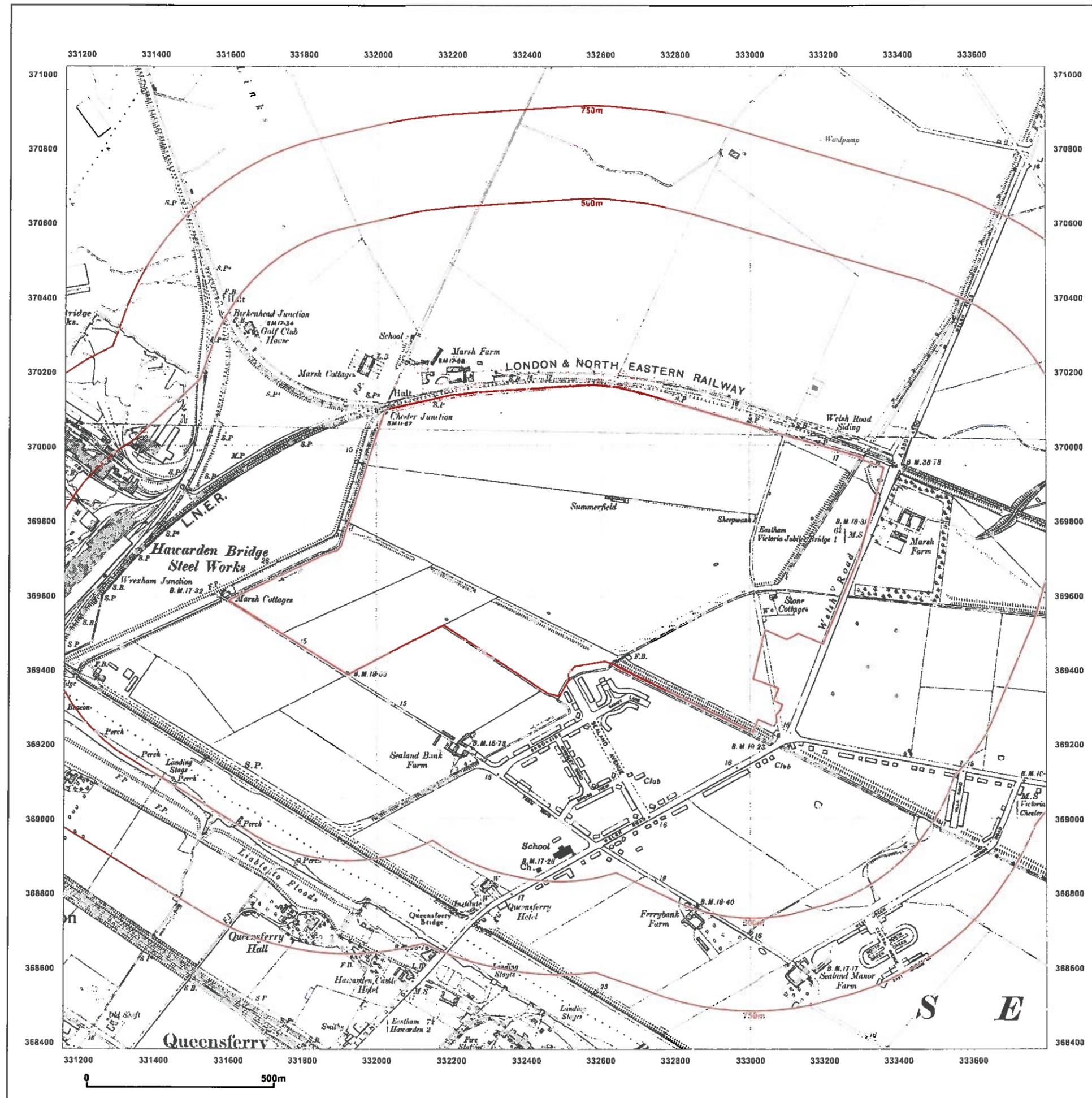


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: Provisional

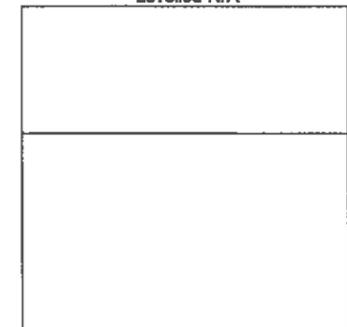
Map date: 1948

Scale: 1:10,560

Printed at: 1:10,560



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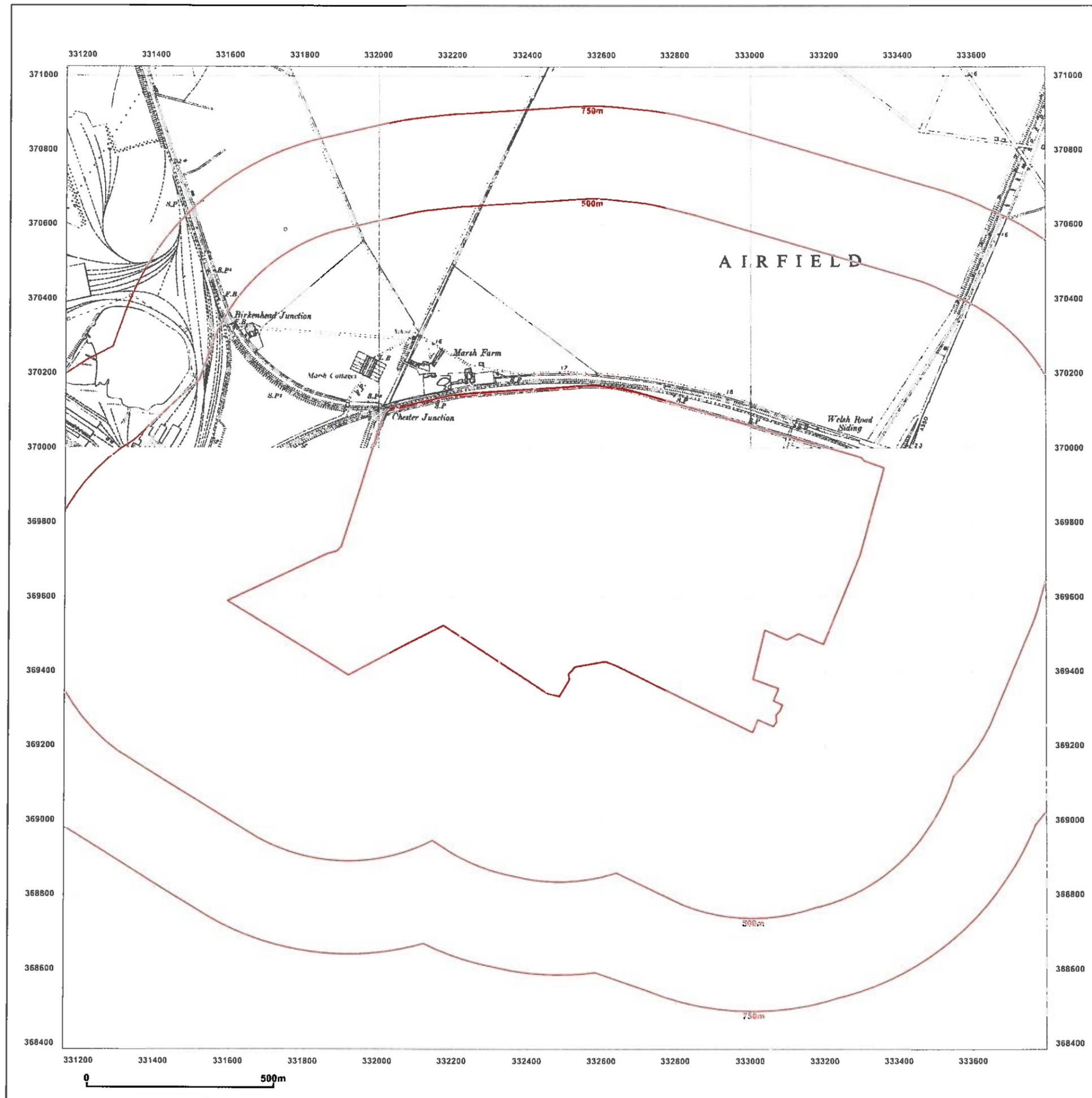


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Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: County Series

Map date: 1948

Scale: 1:10,560

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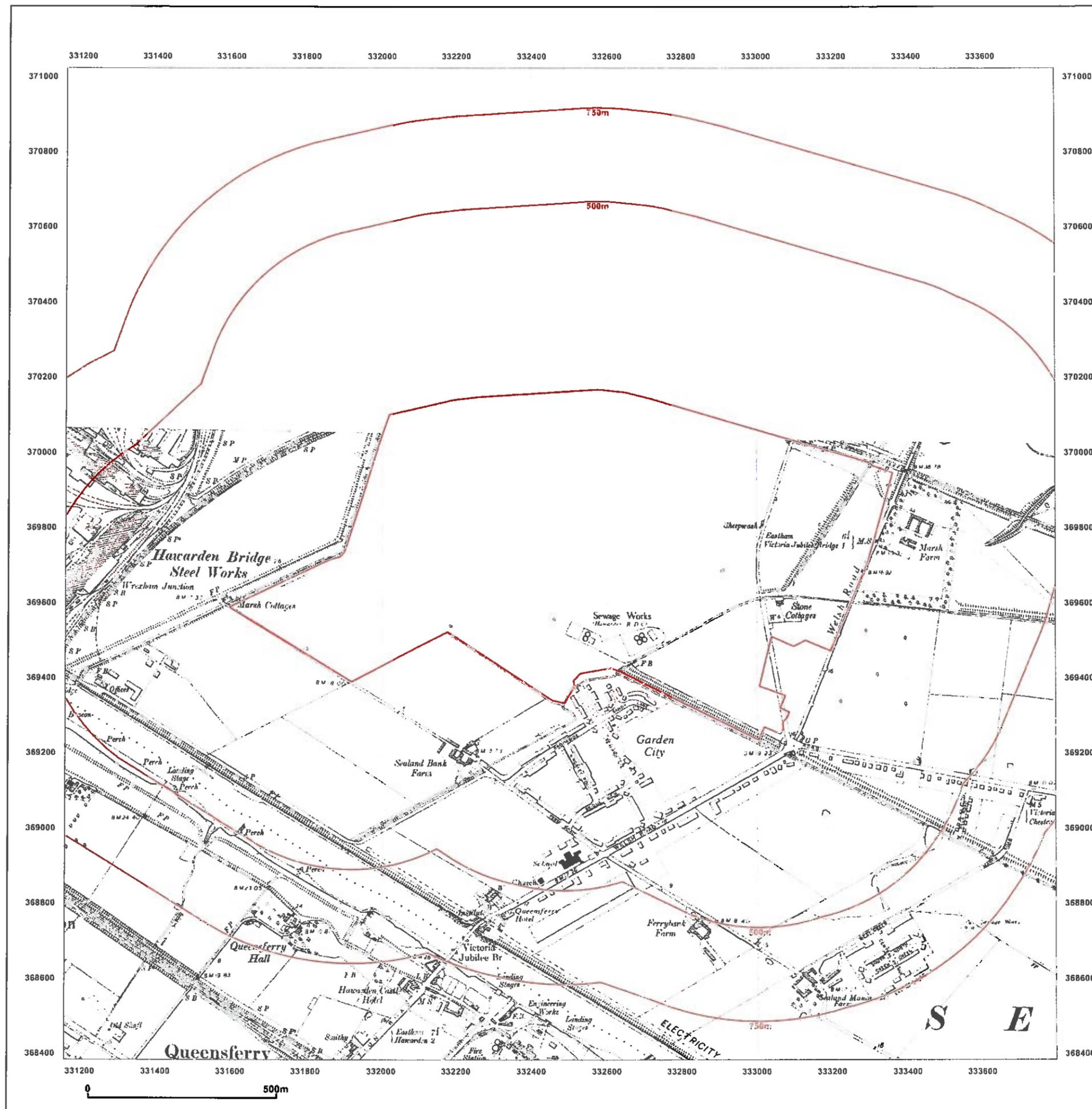


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: Provisional

Map date: 1960-1963

Scale: 1:10,560

Printed at: 1:10,560



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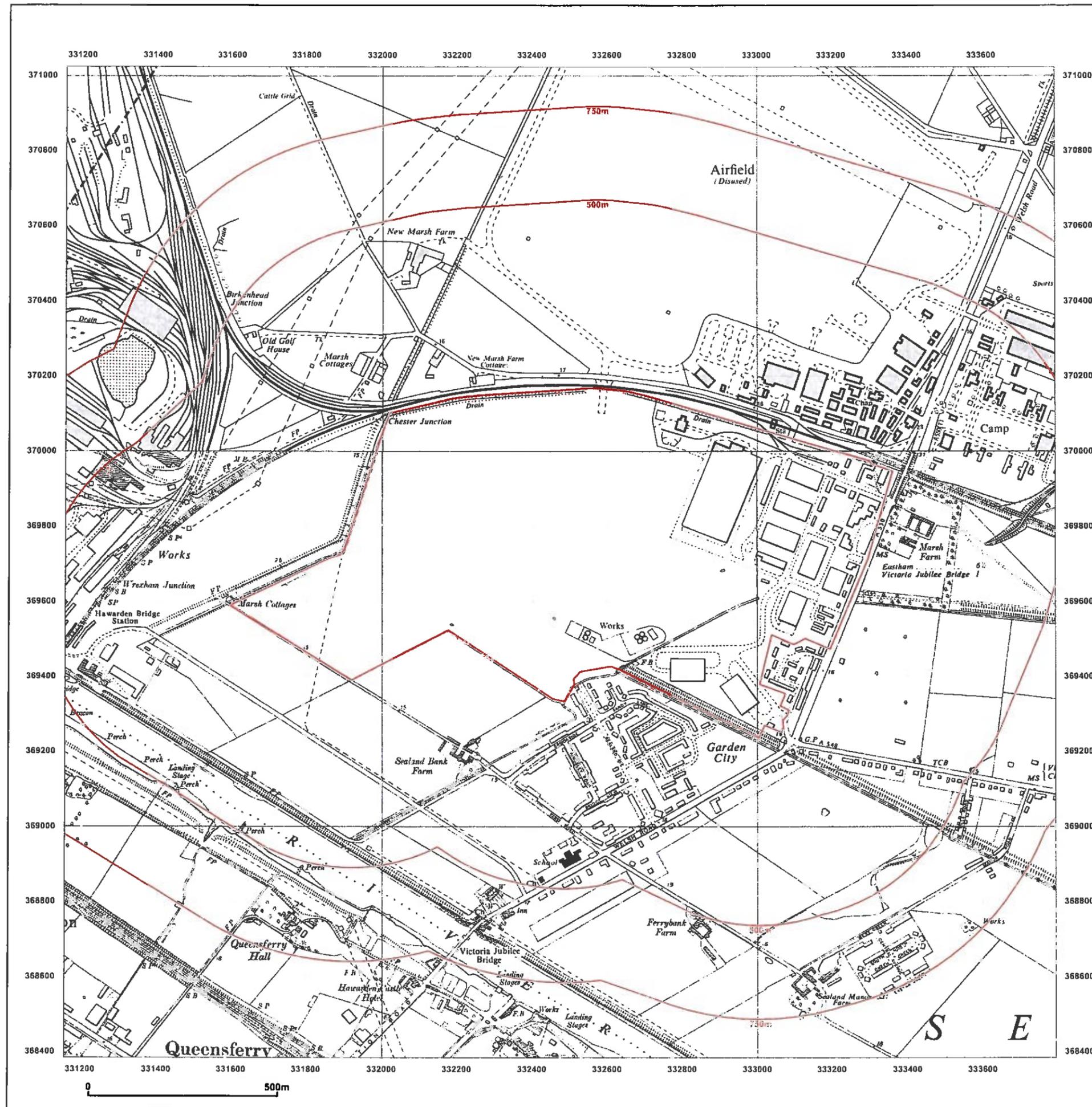


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: National Grid

Map date: 1962-1963

Scale: 1:2,500

Printed at: 1:2,500



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Surveyed 1962
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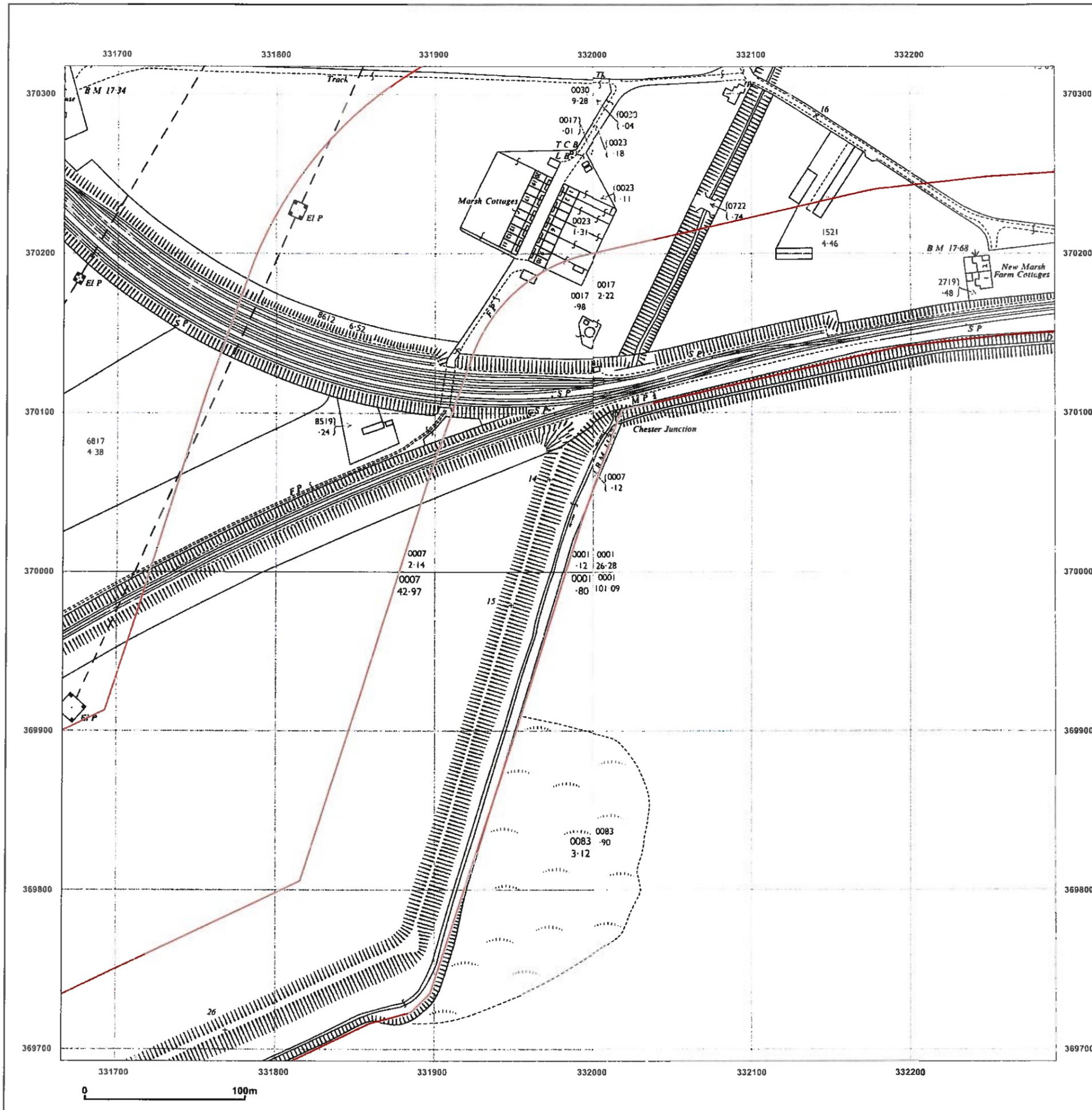


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Site Details:

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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A2
Grid Ref: 331835, 369404

Map Name: National Grid

Map date: 1962-1963

Scale: 1:2,500

Printed at: 1:2,500



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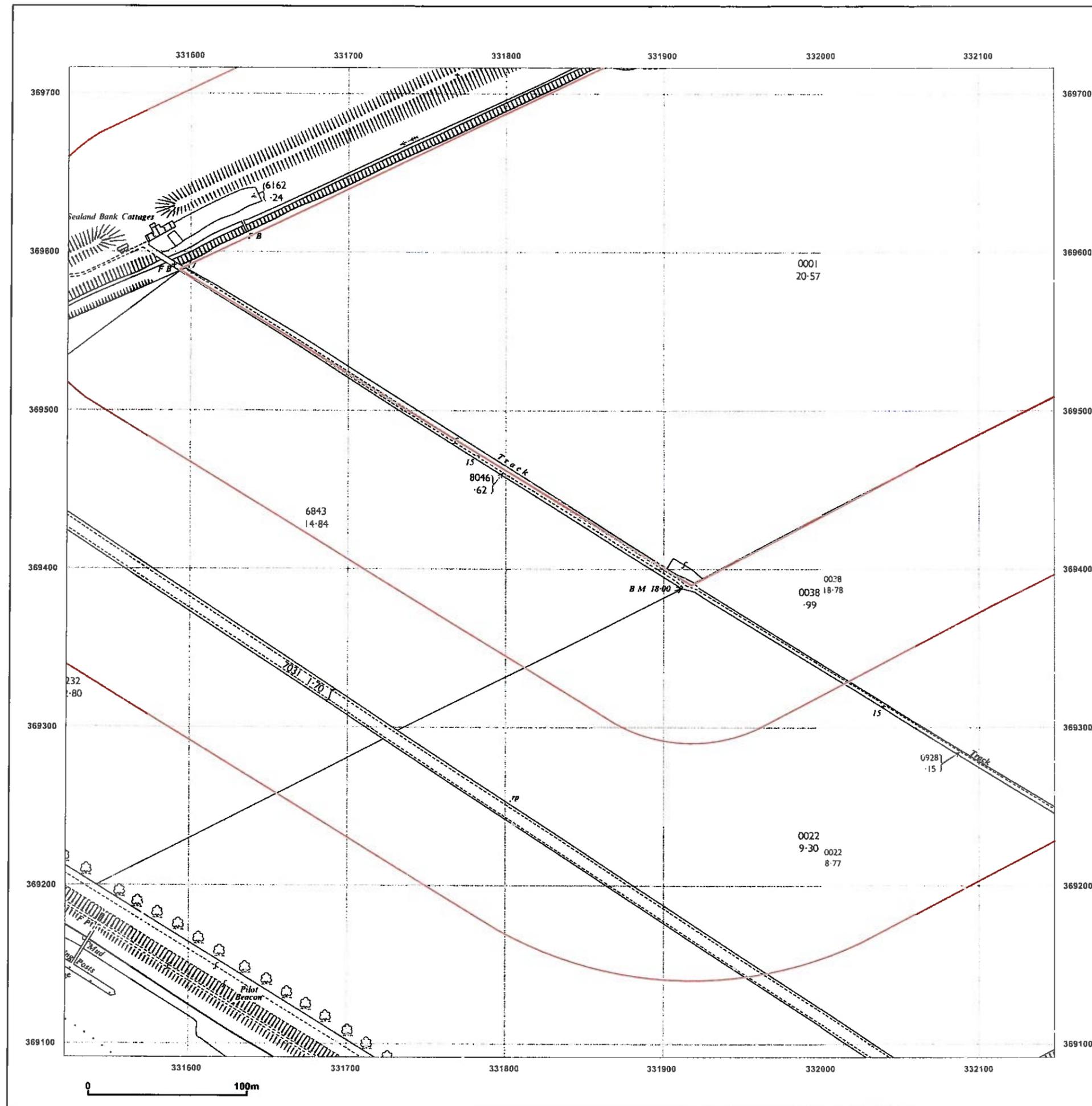


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Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: National Grid

Map date: 1962-1963

Scale: 1:2,500

Printed at: 1:2,500



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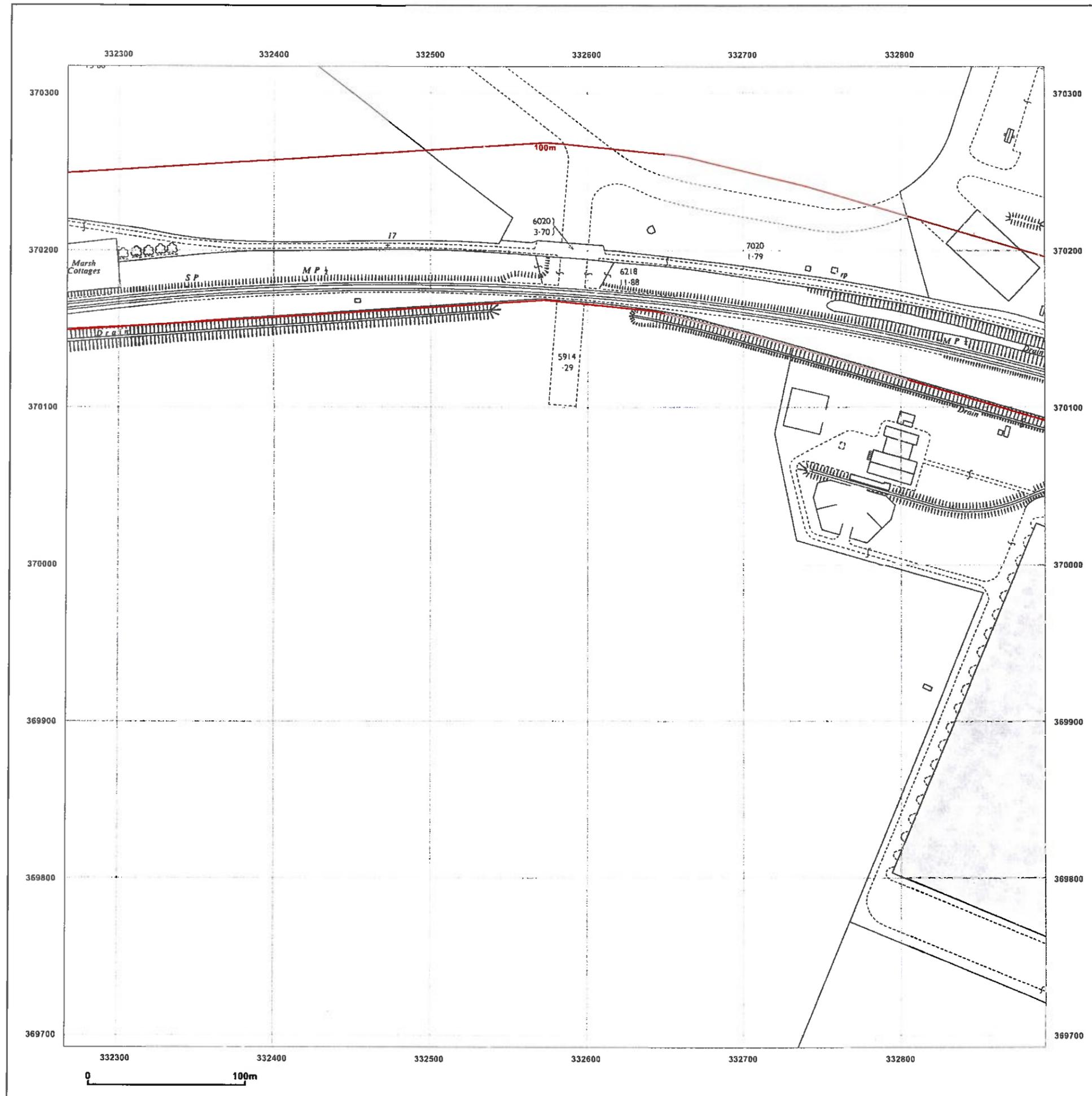


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Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B2
Grid Ref: 332435, 369404

Map Name: National Grid

Map date: 1963

Scale: 1:2,500

Printed at: 1:2,500



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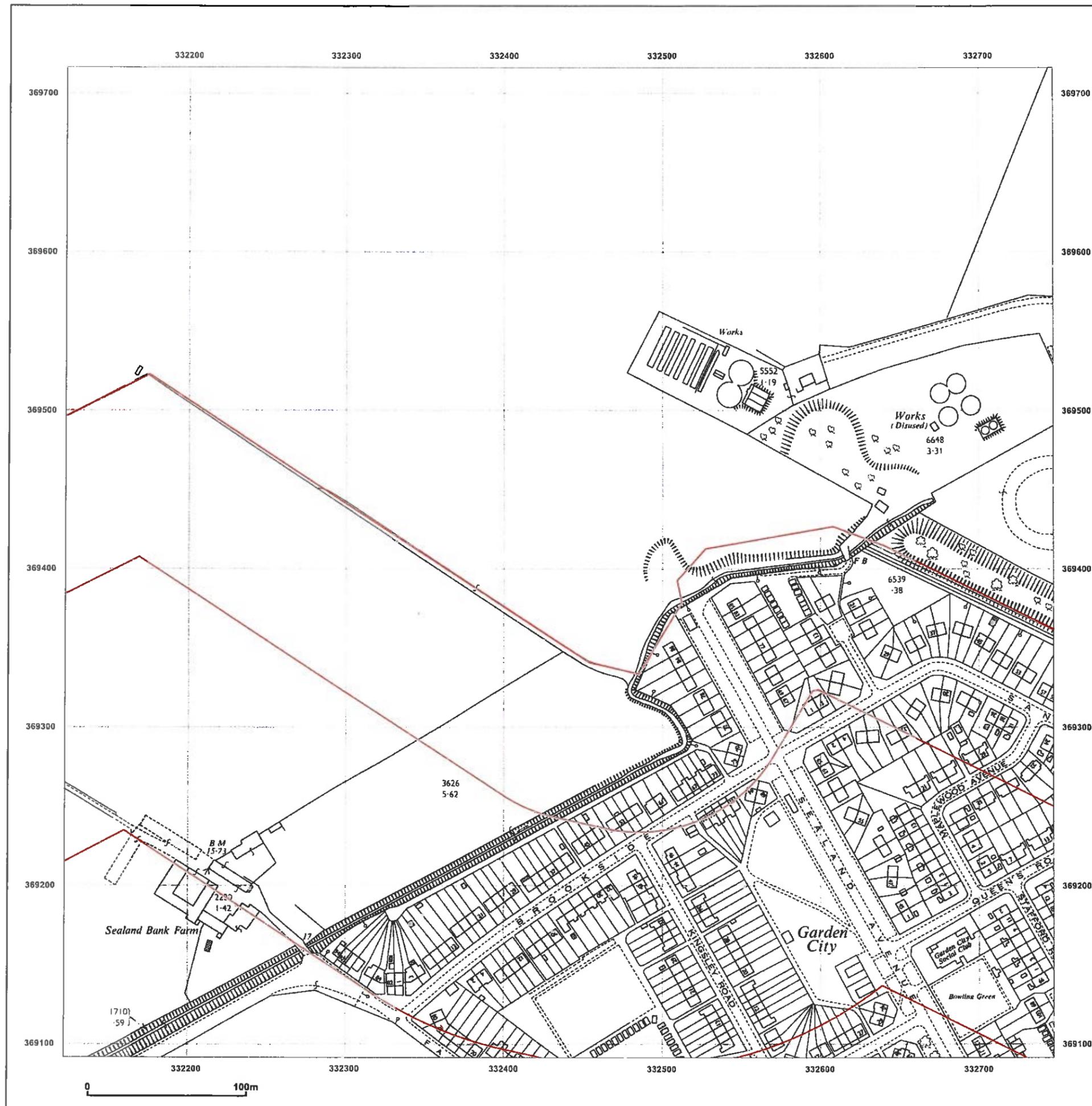


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Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_C2
Grid Ref: 333034, 369404

Map Name: National Grid

Map date: 1963

Scale: 1:2,500

Printed at: 1:2,500



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Deeside, CH5 2RD

Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: National Grid

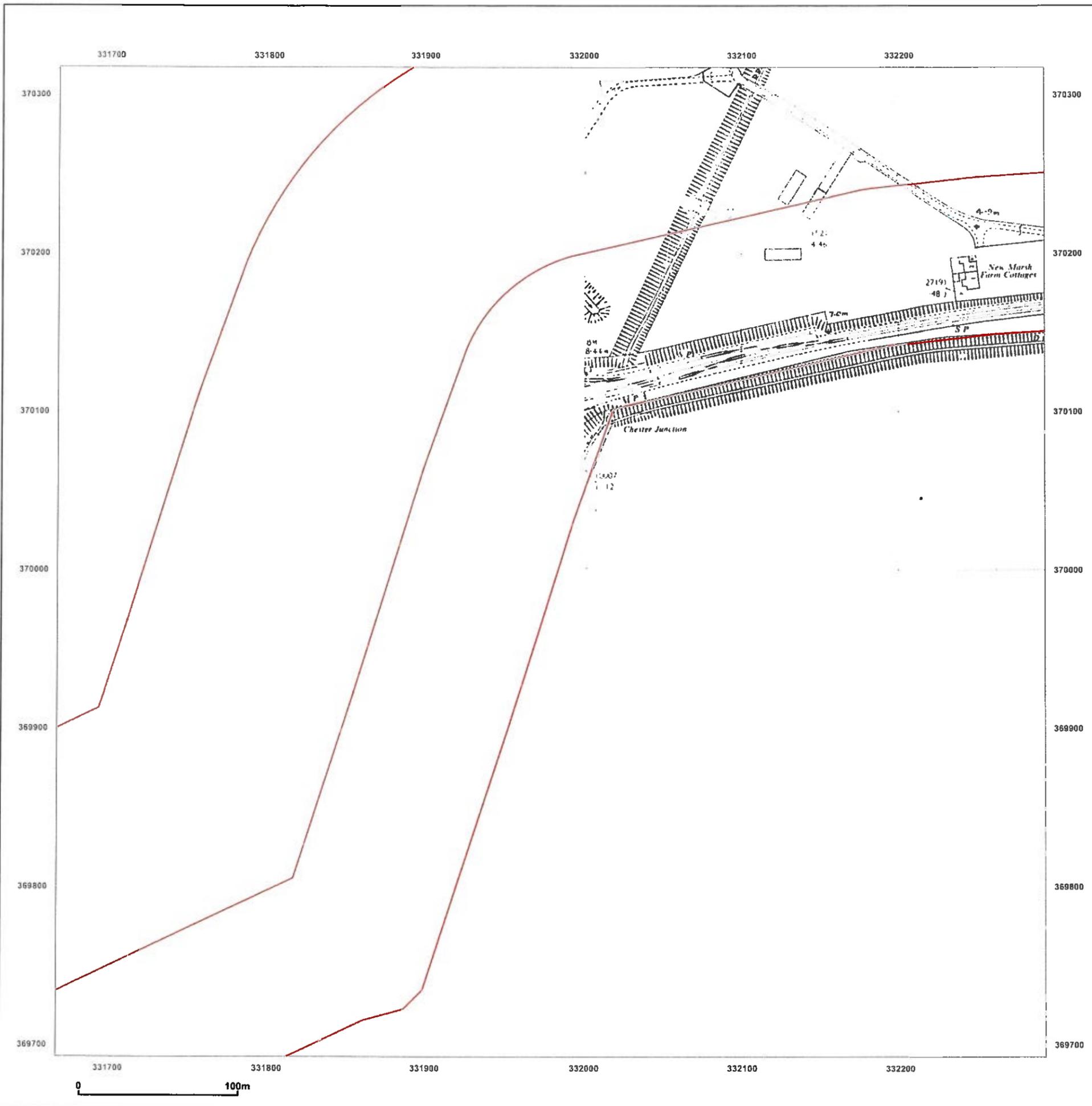
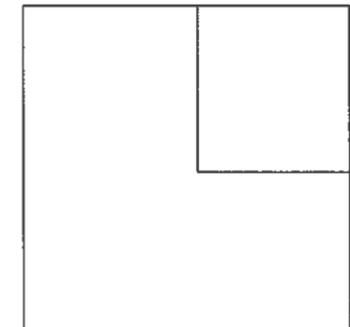
Map date: 1965

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
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Site Details:

Deeside, CH5 2RD

Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: National Grid

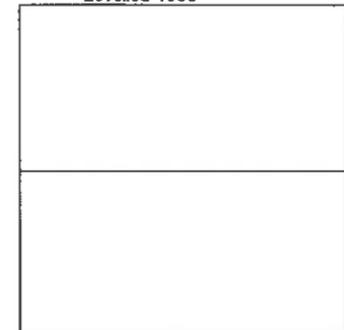
Map date: 1965

Scale: 1:2,500

Printed at: 1:2,500



Surveyed N/A
Revised N/A
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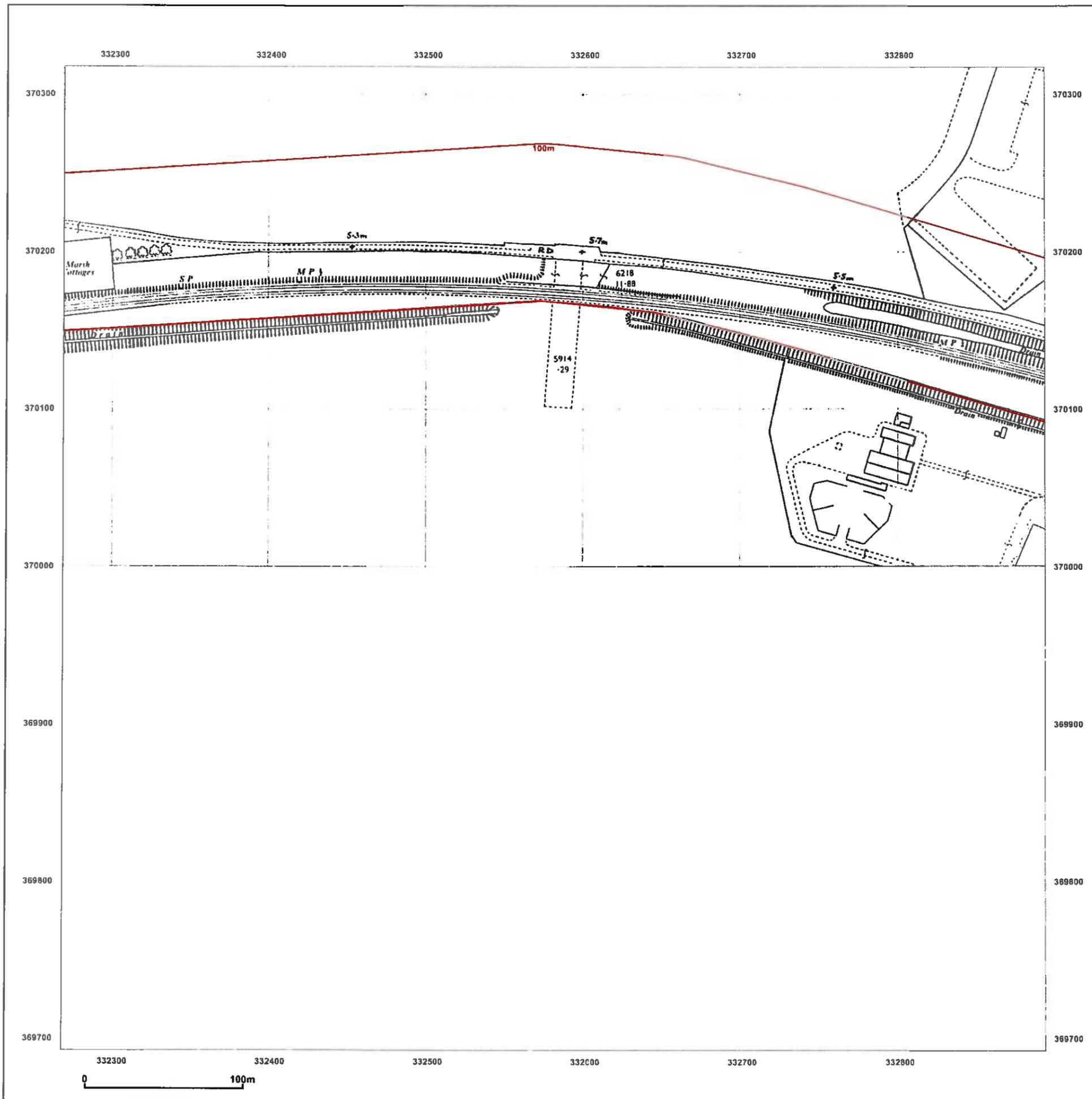


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Site Details:

Deeside, CH5 2RD

Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: Provisional

Map date: 1967-1969

Scale: 1:10,560

Printed at: 1:10,560



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Surveyed 1980
Revised 1967
Edition N/A
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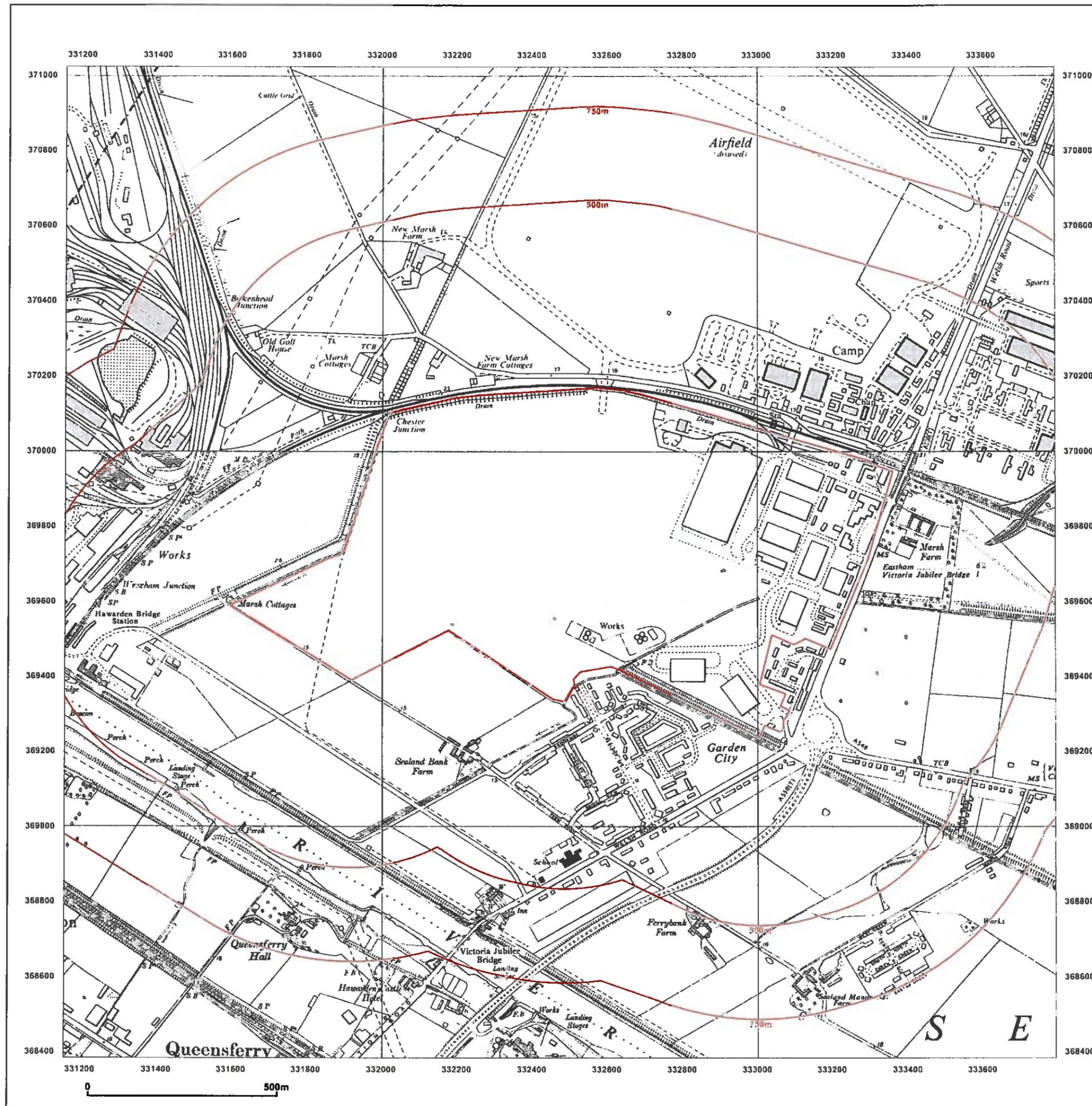


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Site Details:

Deeside, CH5 2RD

Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS
Grid Ref: 332476, 369703

Map Name: National Grid

Map date: 1976-1981

Scale: 1:10,000

Printed at: 1:10,000



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Surveyed 1989
Revised 1976
Edition N/A
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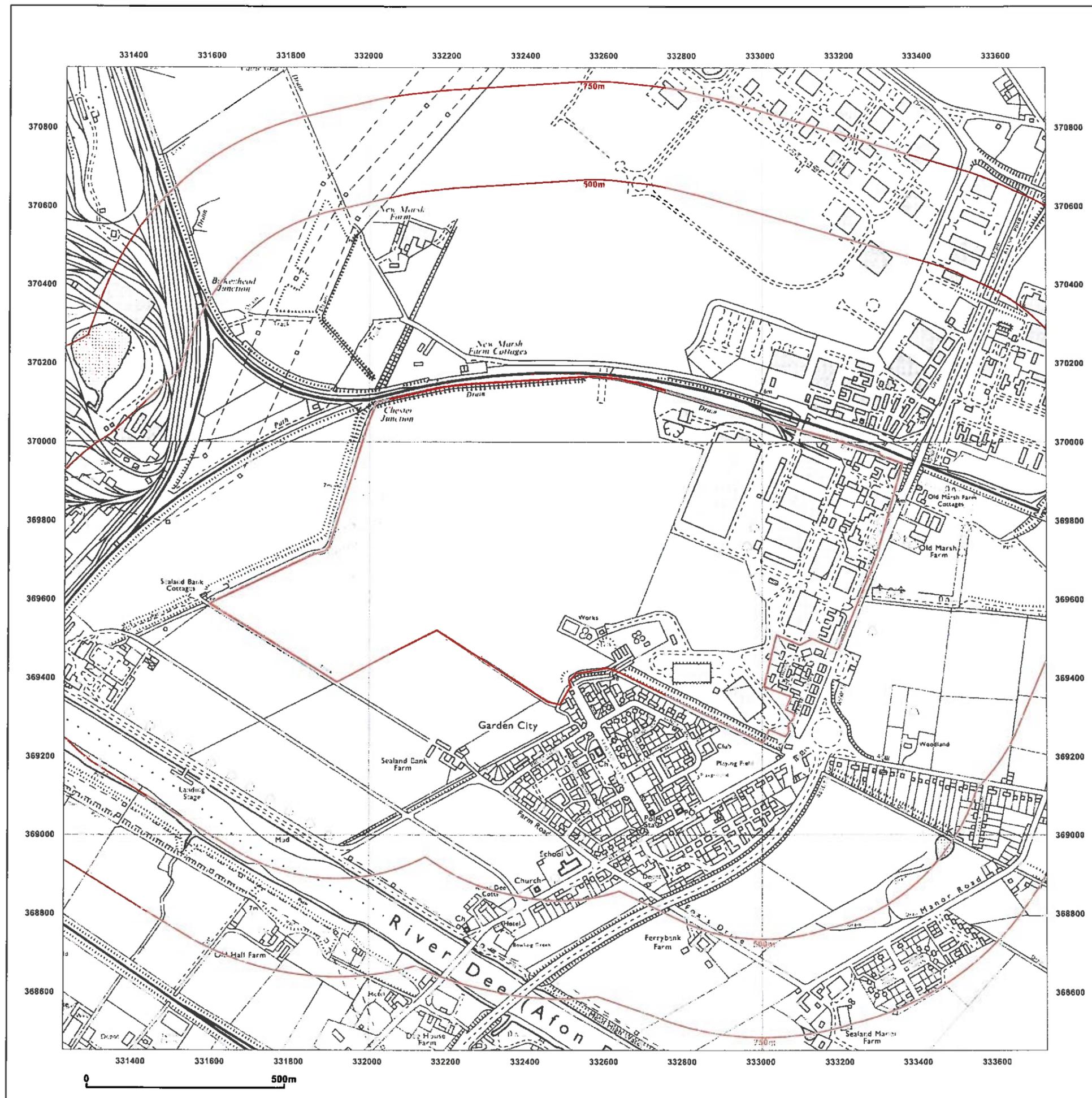


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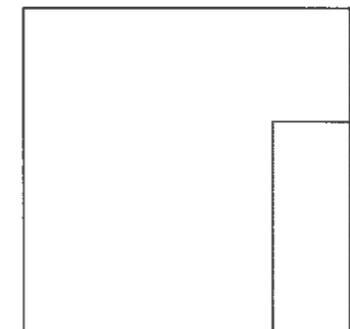
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Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A2
Grid Ref: 331835, 369404

Map Name: National Grid

Map date: 1979

Scale: 1:1,250

Printed at: 1:2,500



Surveyed 1978
Revised 1978
Edition N/A
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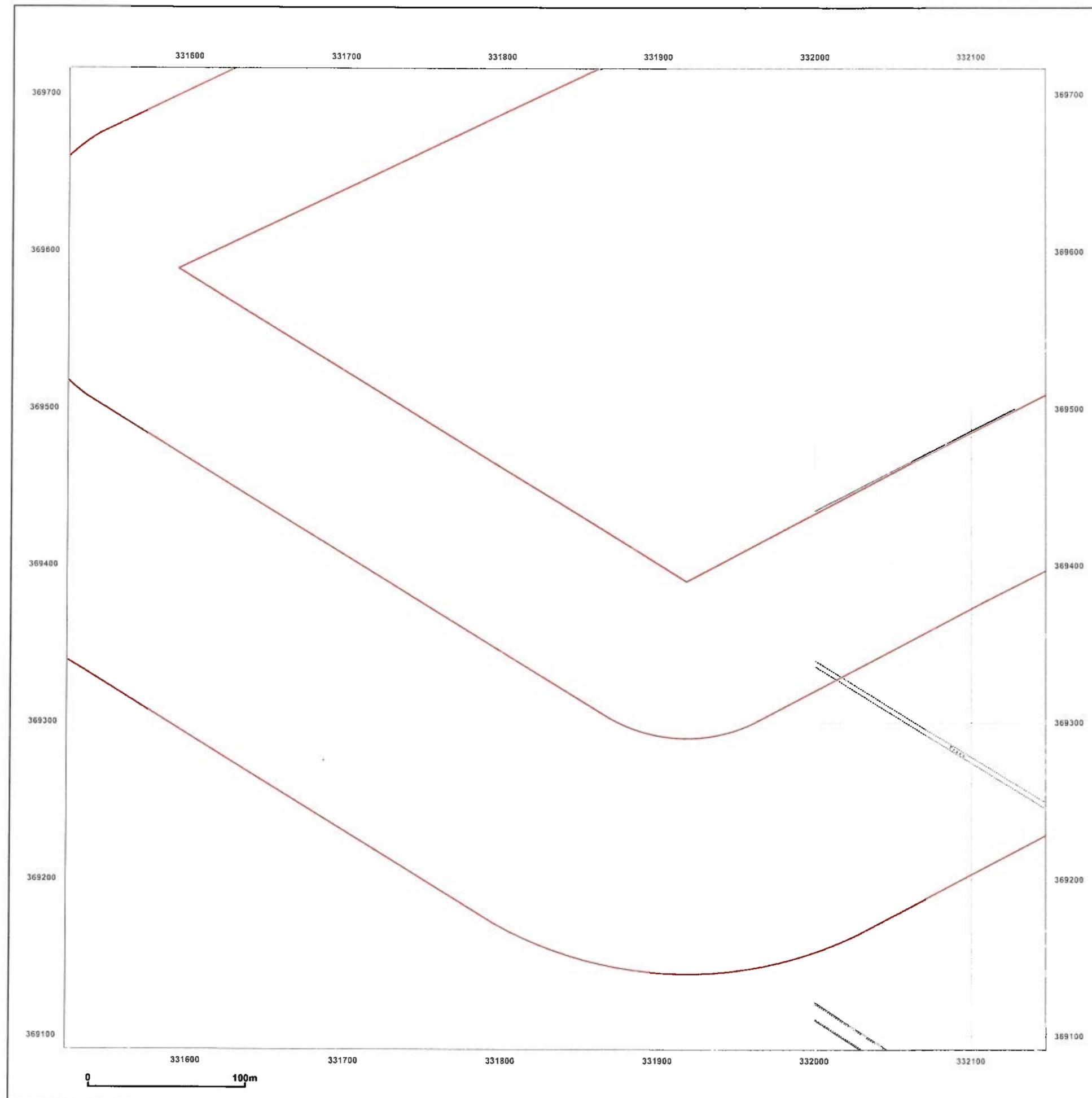


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Site Details:

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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B2
Grid Ref: 332435, 369404

Map Name: National Grid

Map date: 1979

Scale: 1:1,250

Printed at: 1:2,500



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Site Details:

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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_C2
Grid Ref: 333034, 369404

Map Name: National Grid

Map date: 1979

Scale: 1:1,250

Printed at: 1:2,500



Surveyed 1976 Revised 1976 Edition N/A Copyright 1979 Levelled 1985	Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A
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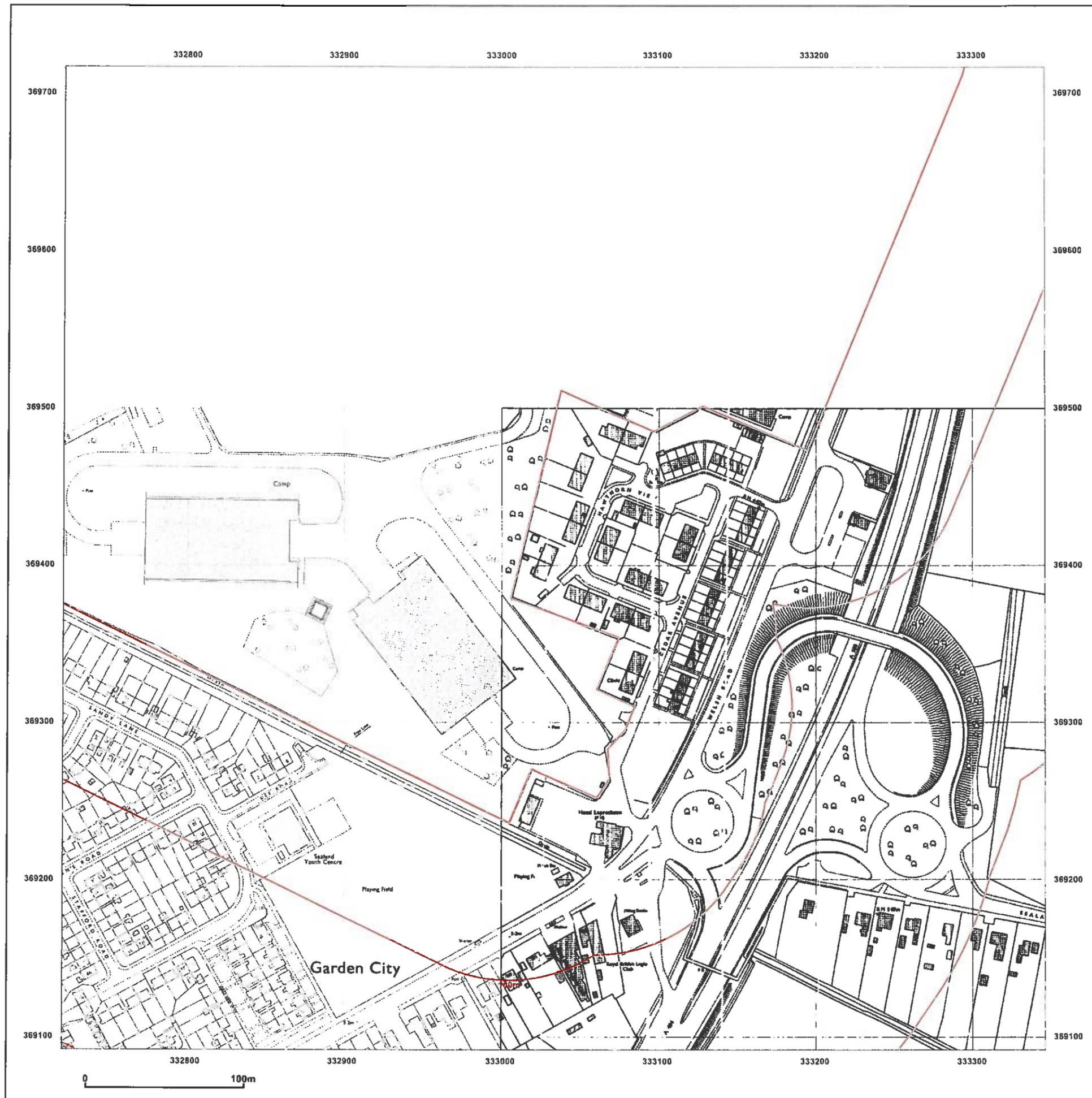


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Site Details:

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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: National Grid

Map date: 1984-1986

Scale: 1:2,500

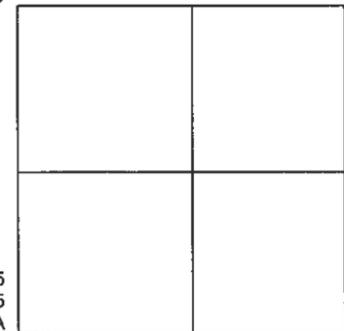
Printed at: 1:2,500



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Revised 1986
Edition N/A
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Revised 1984
Edition N/A
Copyright 1986
Levelled 1965

Surveyed 1965
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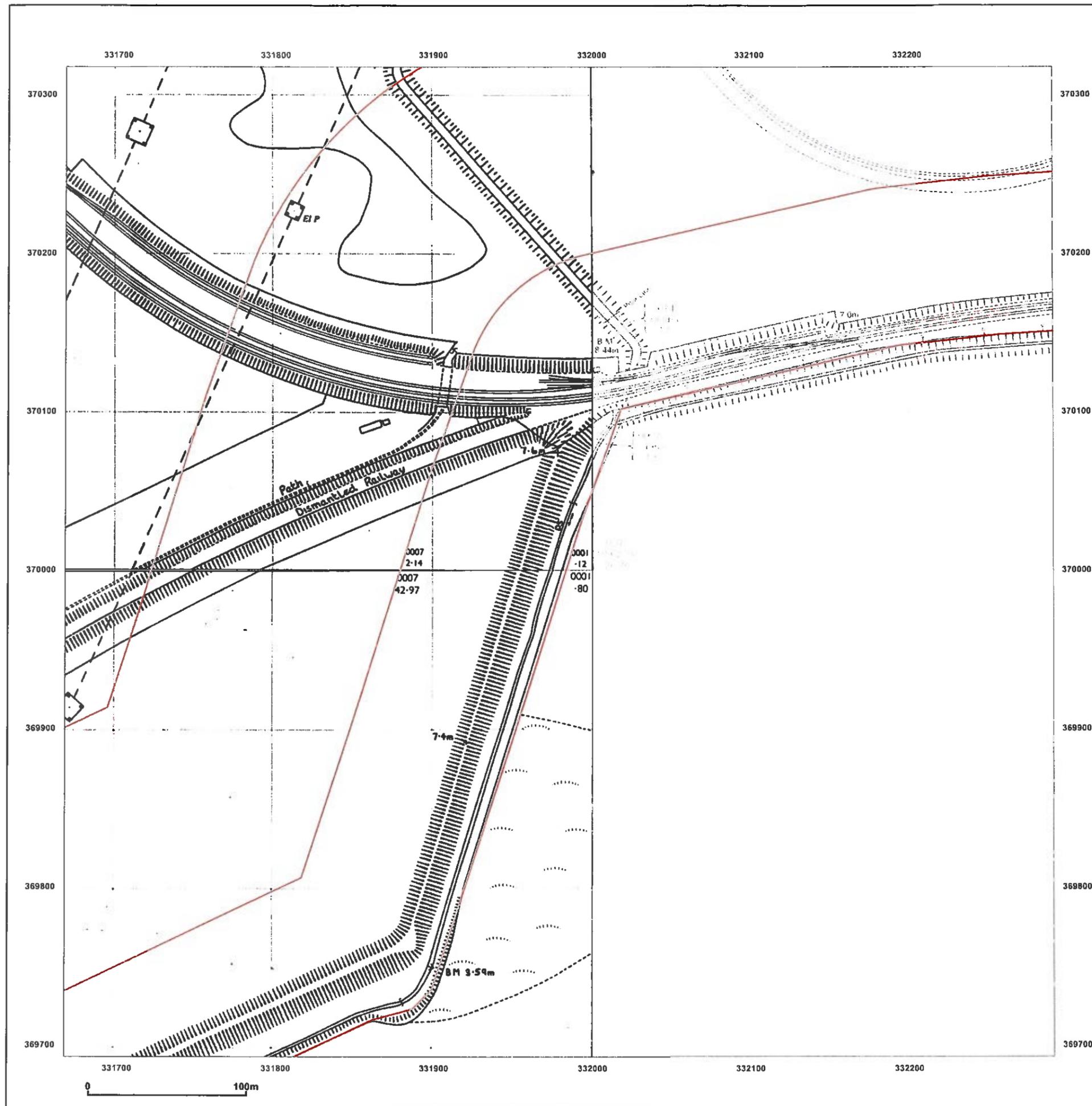


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A2
Grid Ref: 331835, 369404

Map Name: National Grid

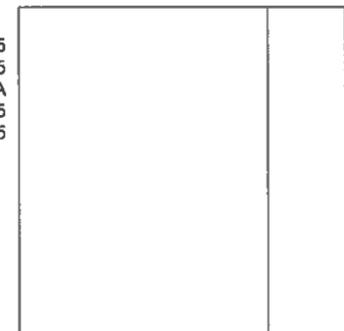
Map date: 1985

Scale: 1:2,500

Printed at: 1:2,500



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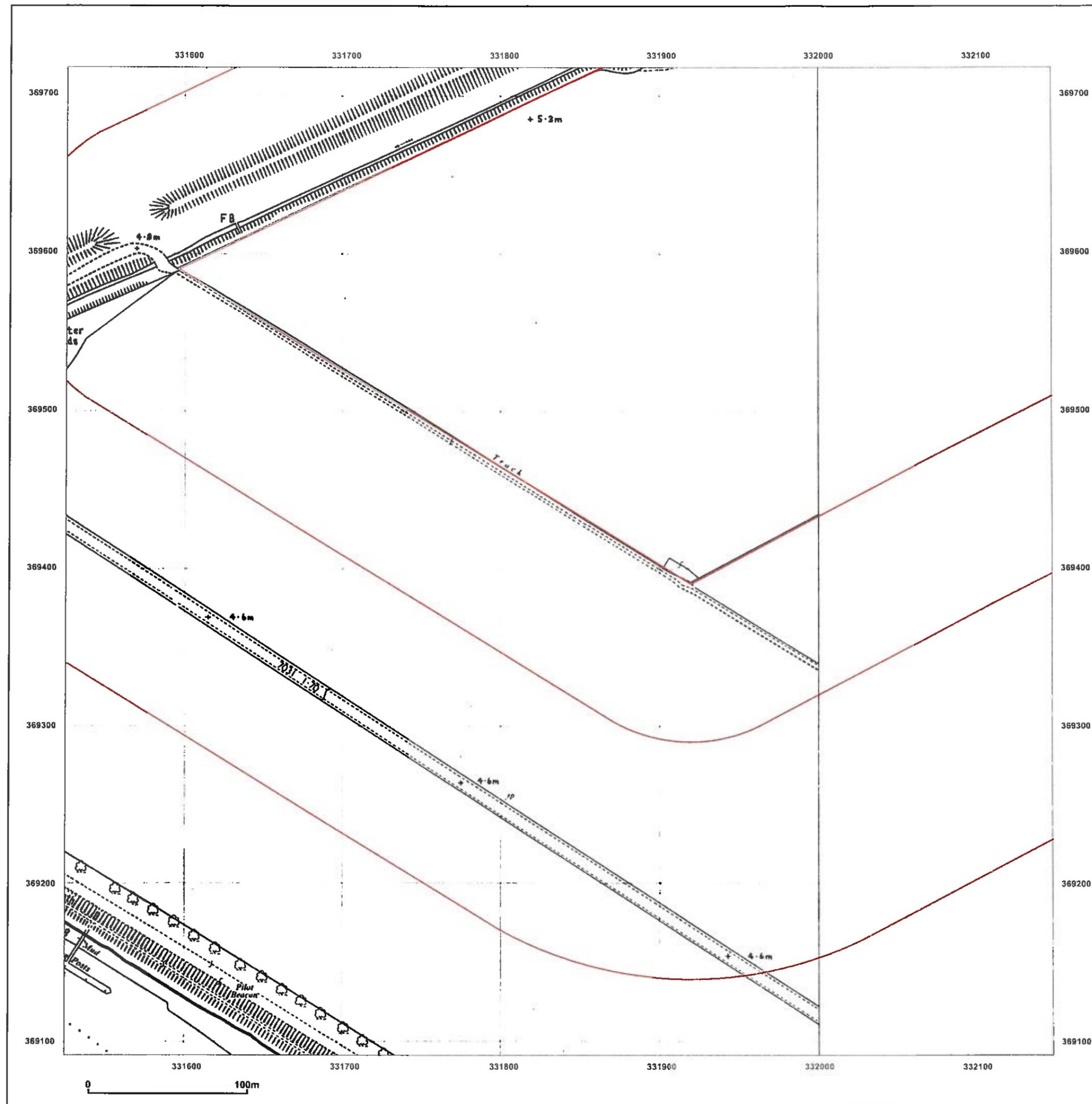


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: National Grid

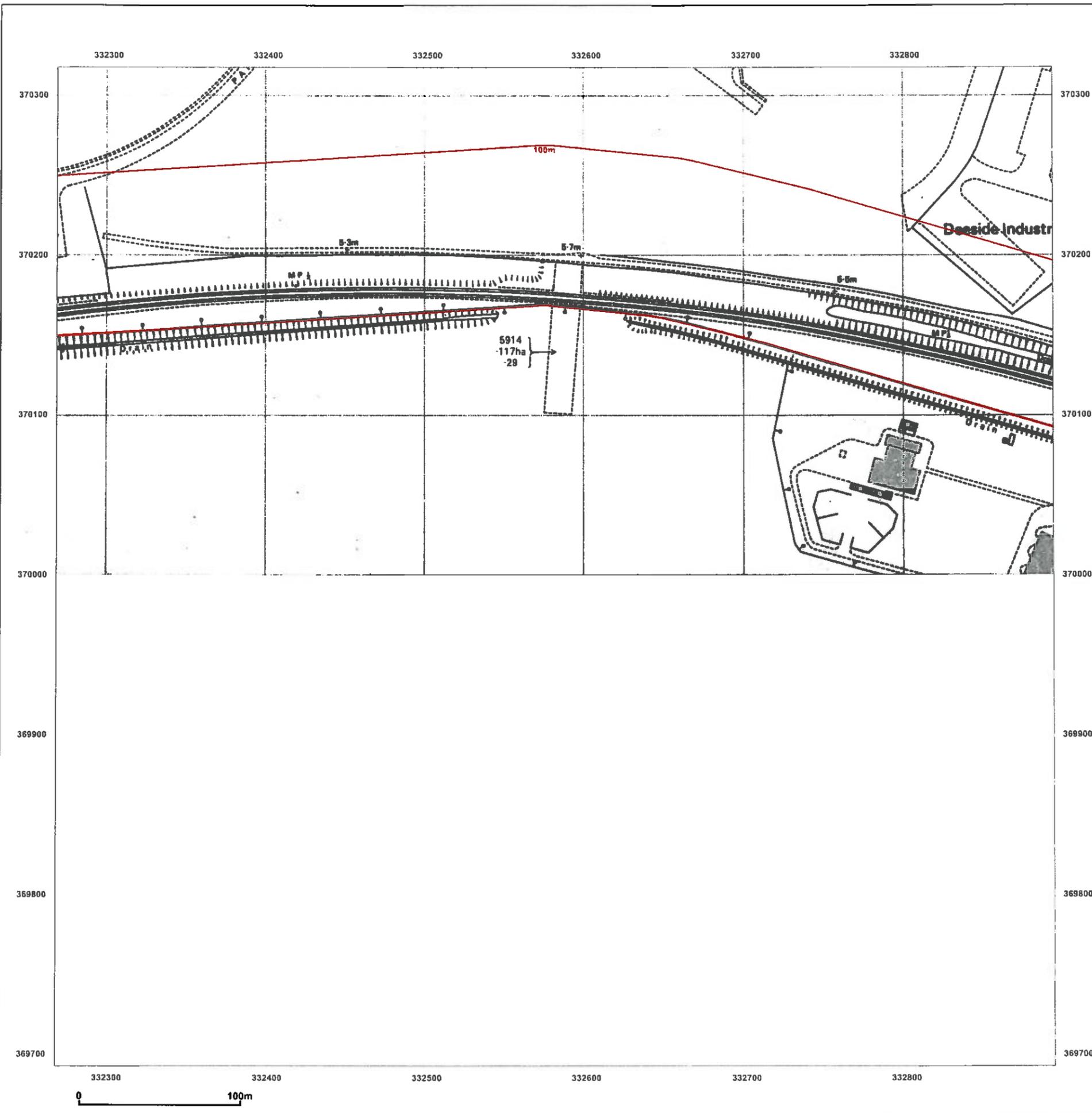
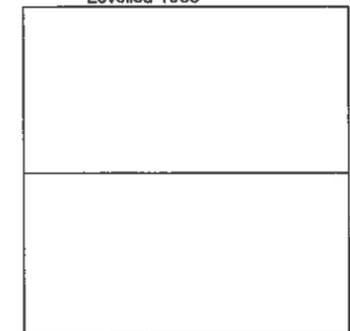
Map date: 1986

Scale: 1:2,500

Printed at: 1:2,500



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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: National Grid

Map date: 1986-1988

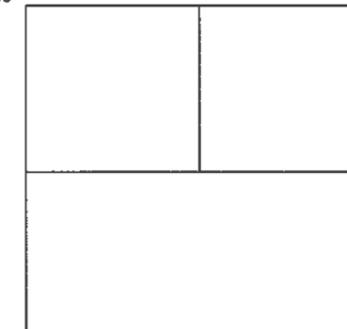
Scale: 1:2,500

Printed at: 1:2,500



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Surveyed 1965
Revised 1984
Edition N/A
Copyright 1986
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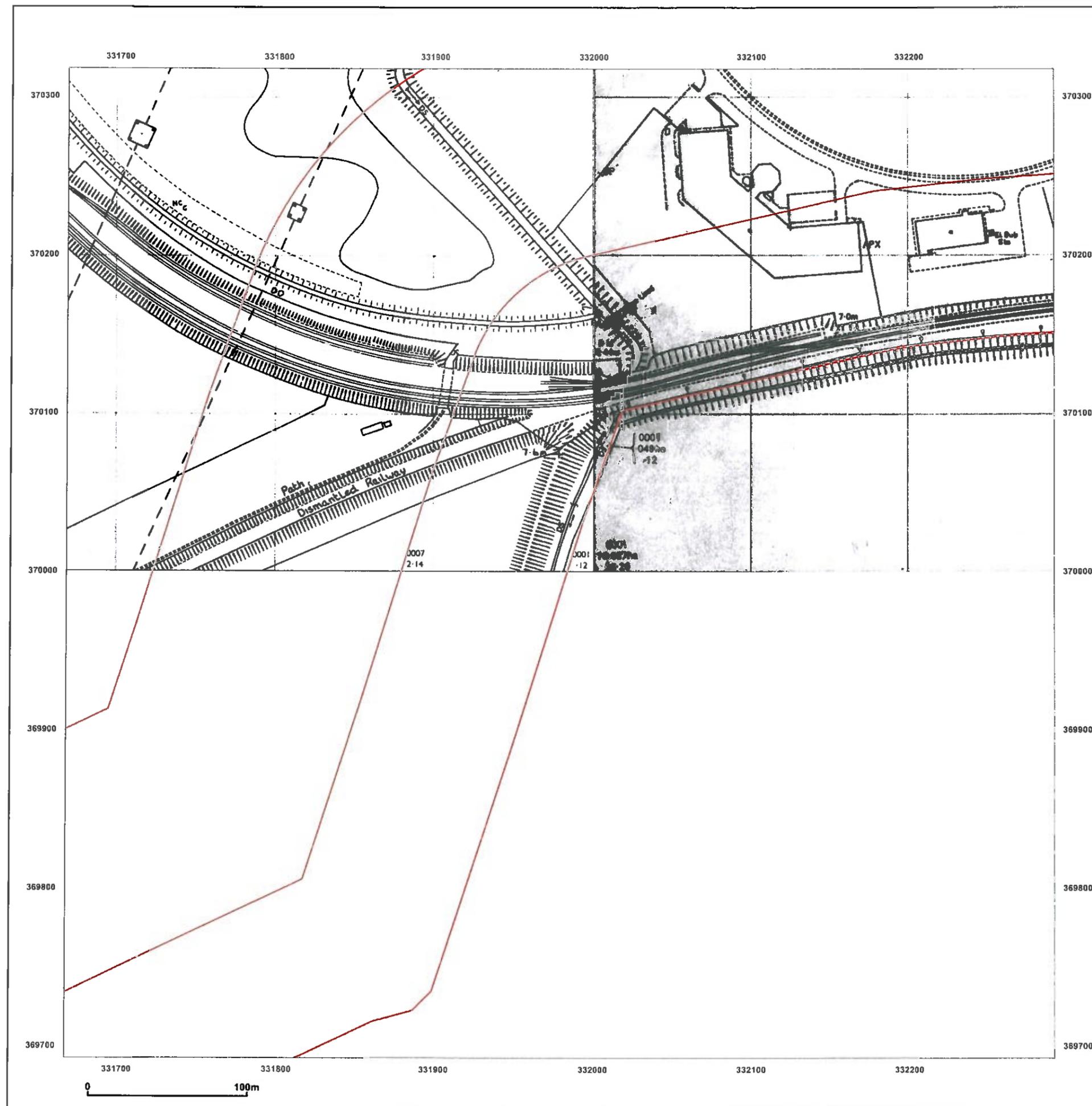


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: National Grid

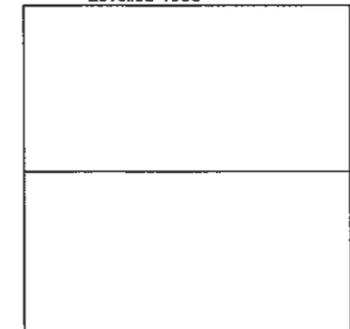
Map date: 1988

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1965
Revised 1988
Edition N/A
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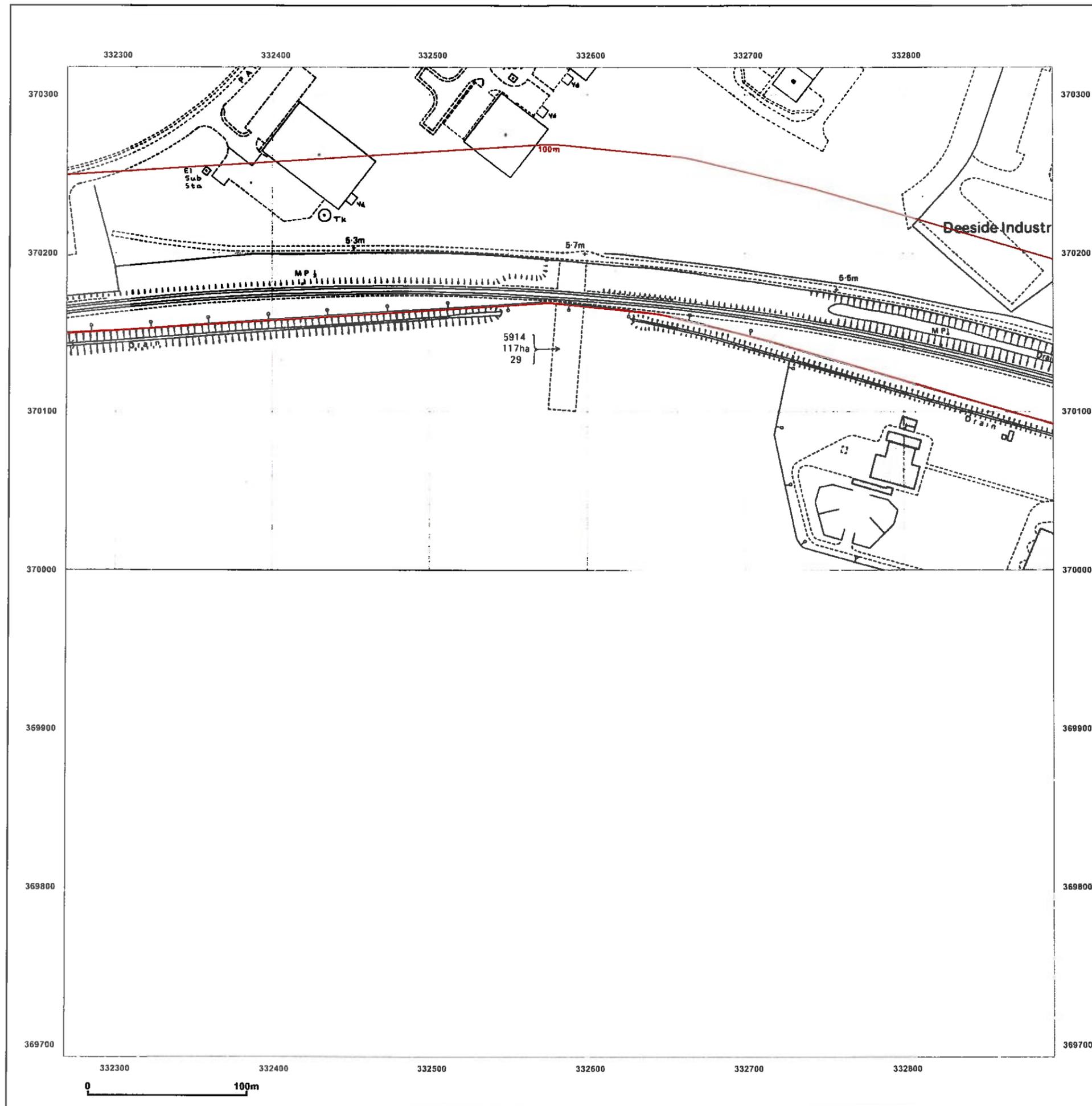


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: National Grid

Map date: 1988-1992

Scale: 1:2,500

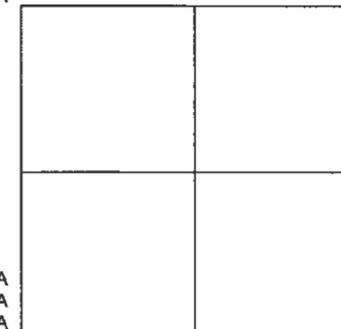
Printed at: 1:2,500



Surveyed 1989
Revised 1989
Edition N/A
Copyright 1991
Levelled N/A

Surveyed 1965
Revised 1968
Edition N/A
Copyright 1988
Levelled 1965

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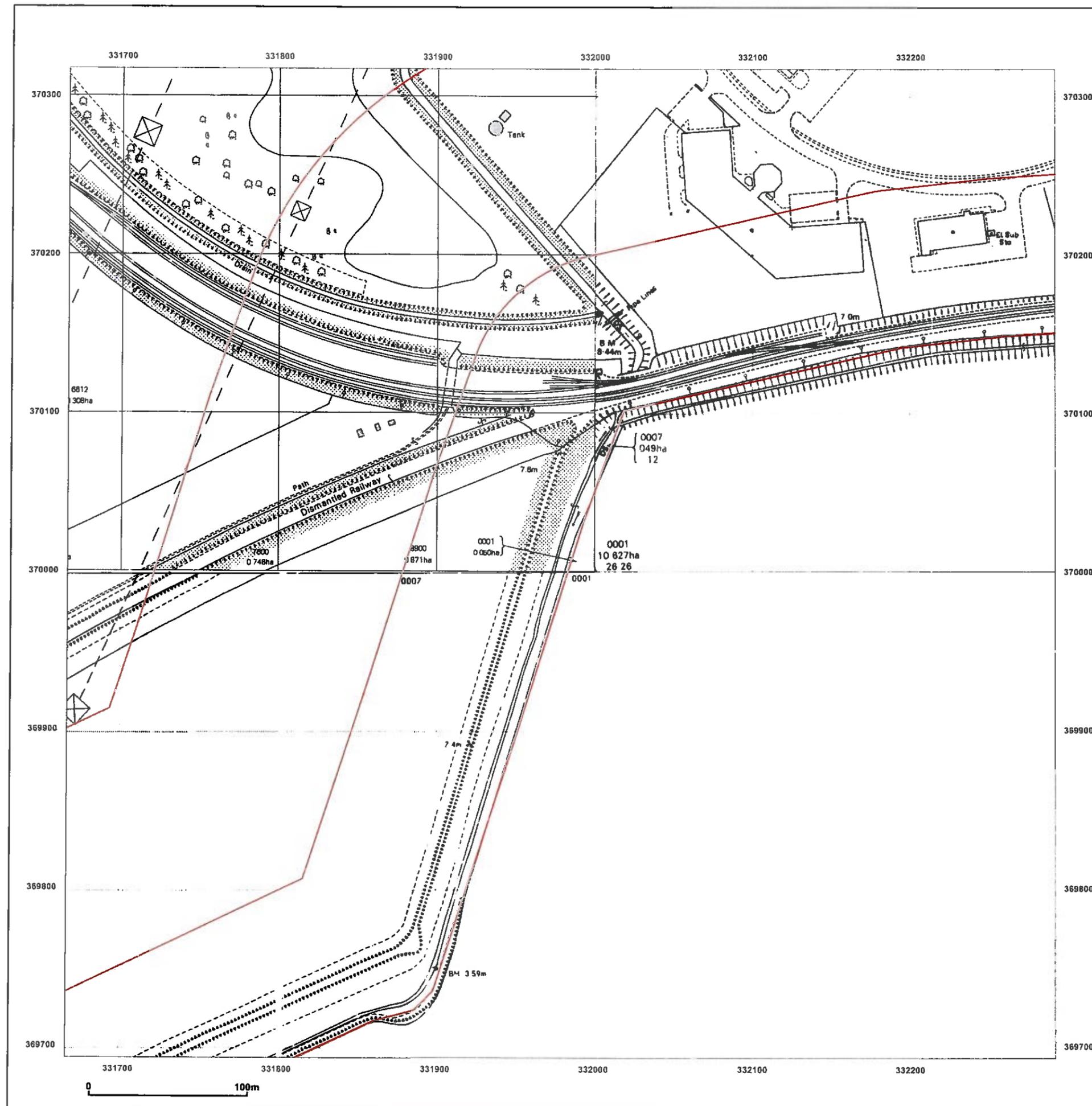


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: National Grid

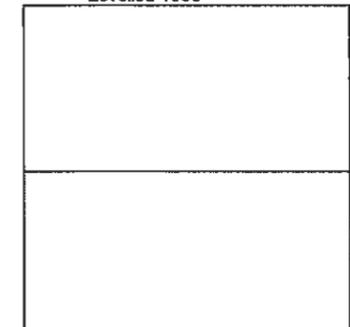
Map date: 1991

Scale: 1:2,500

Printed at: 1:2,500



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Revised 1991
Edition N/A
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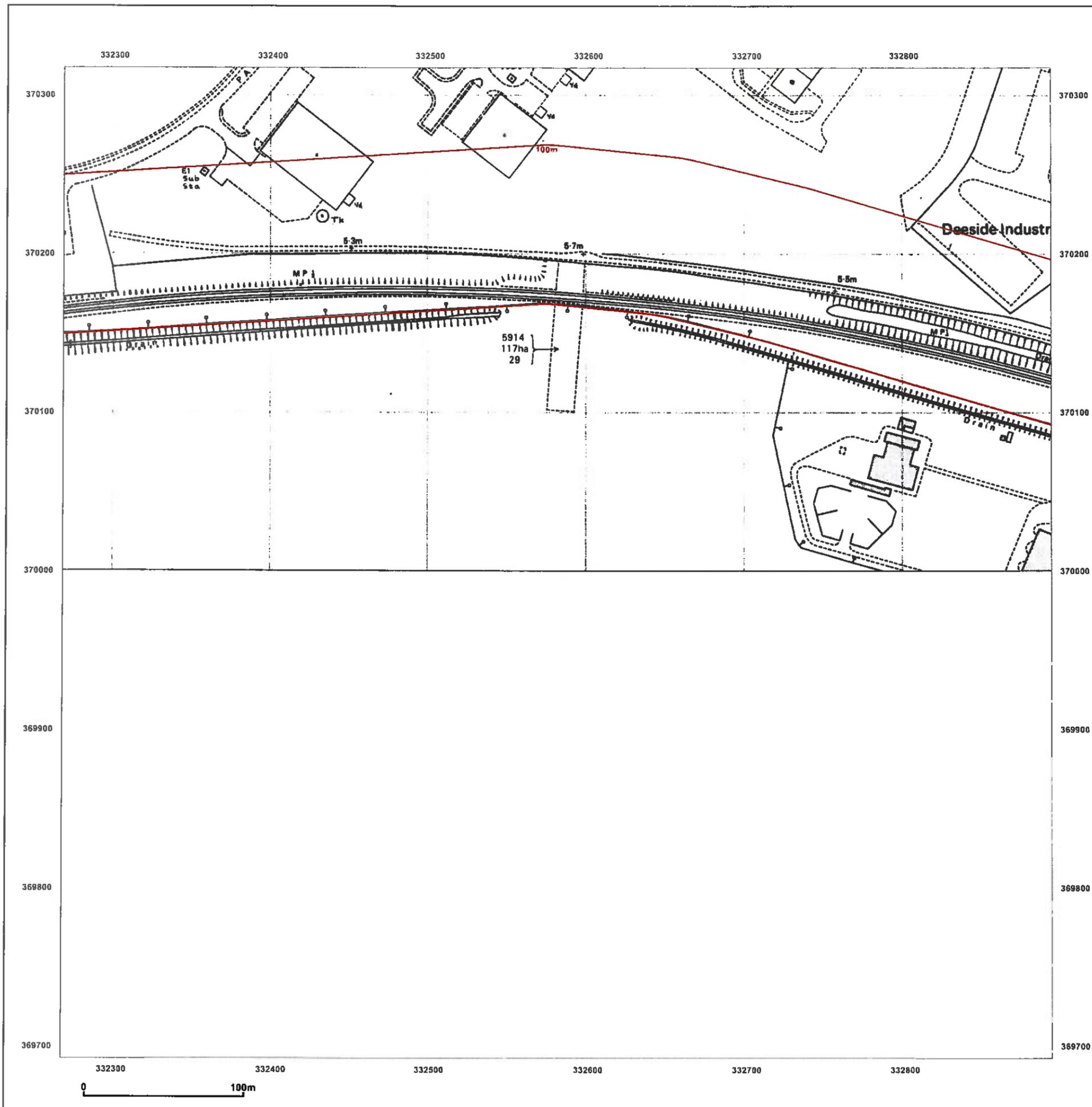


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: National Grid

Map date: 1991-1993

Scale: 1:2,500

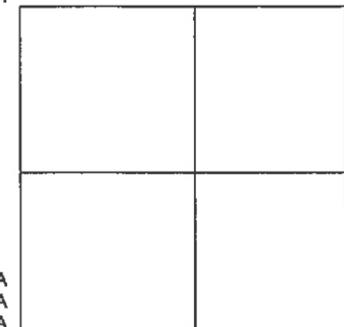
Printed at: 1:2,500



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

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Revised 1991
Edition N/A
Copyright 1991
Levelled 1965

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Edition N/A
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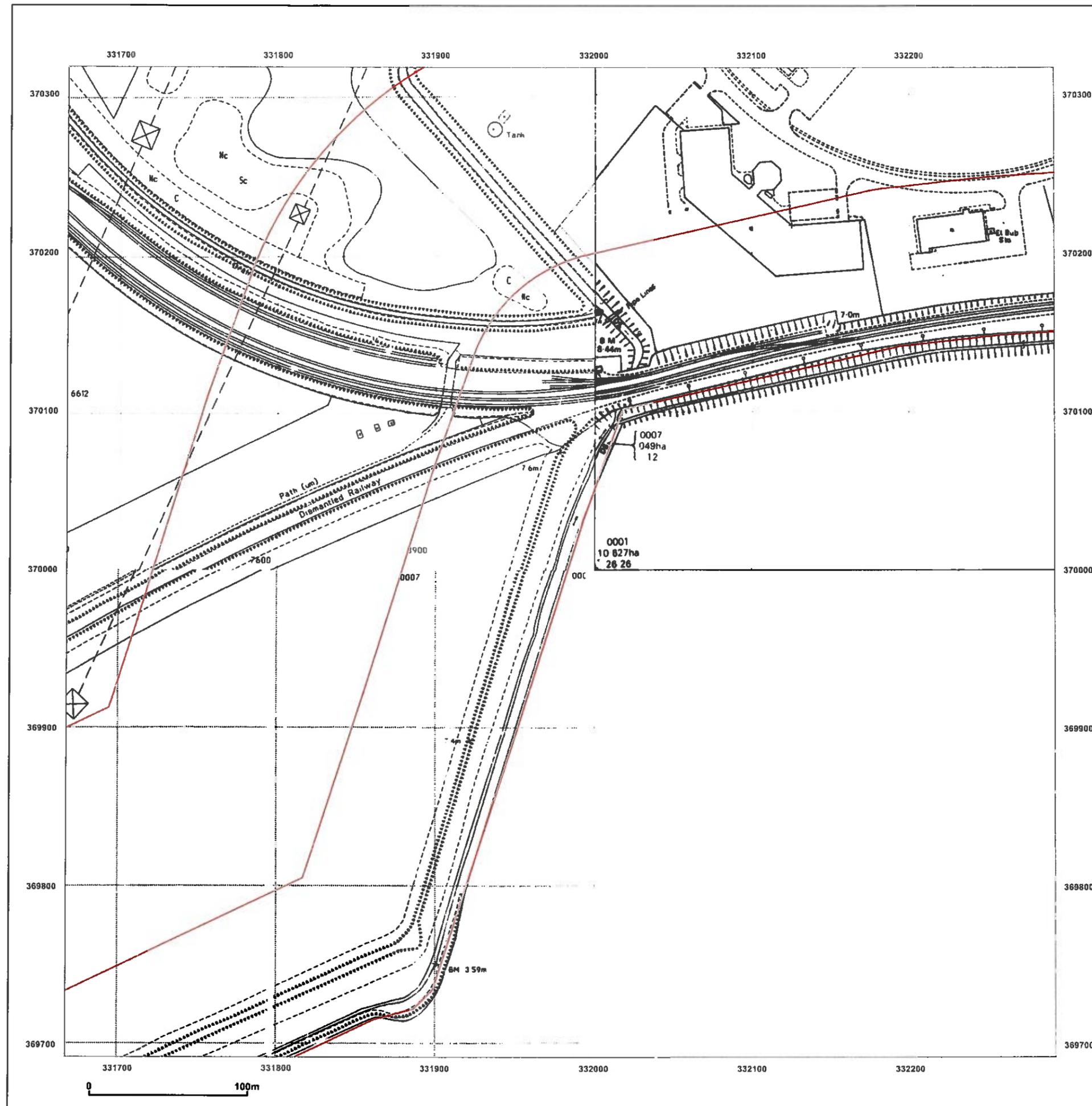


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A1
Grid Ref: 331979, 370005

Map Name: National Grid

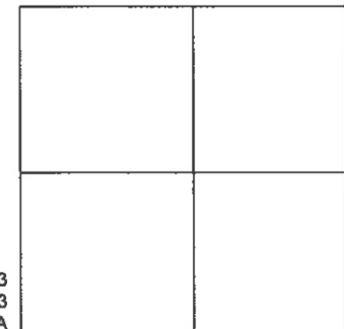
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Scale: 1:2,500

Printed at: 1:2,500



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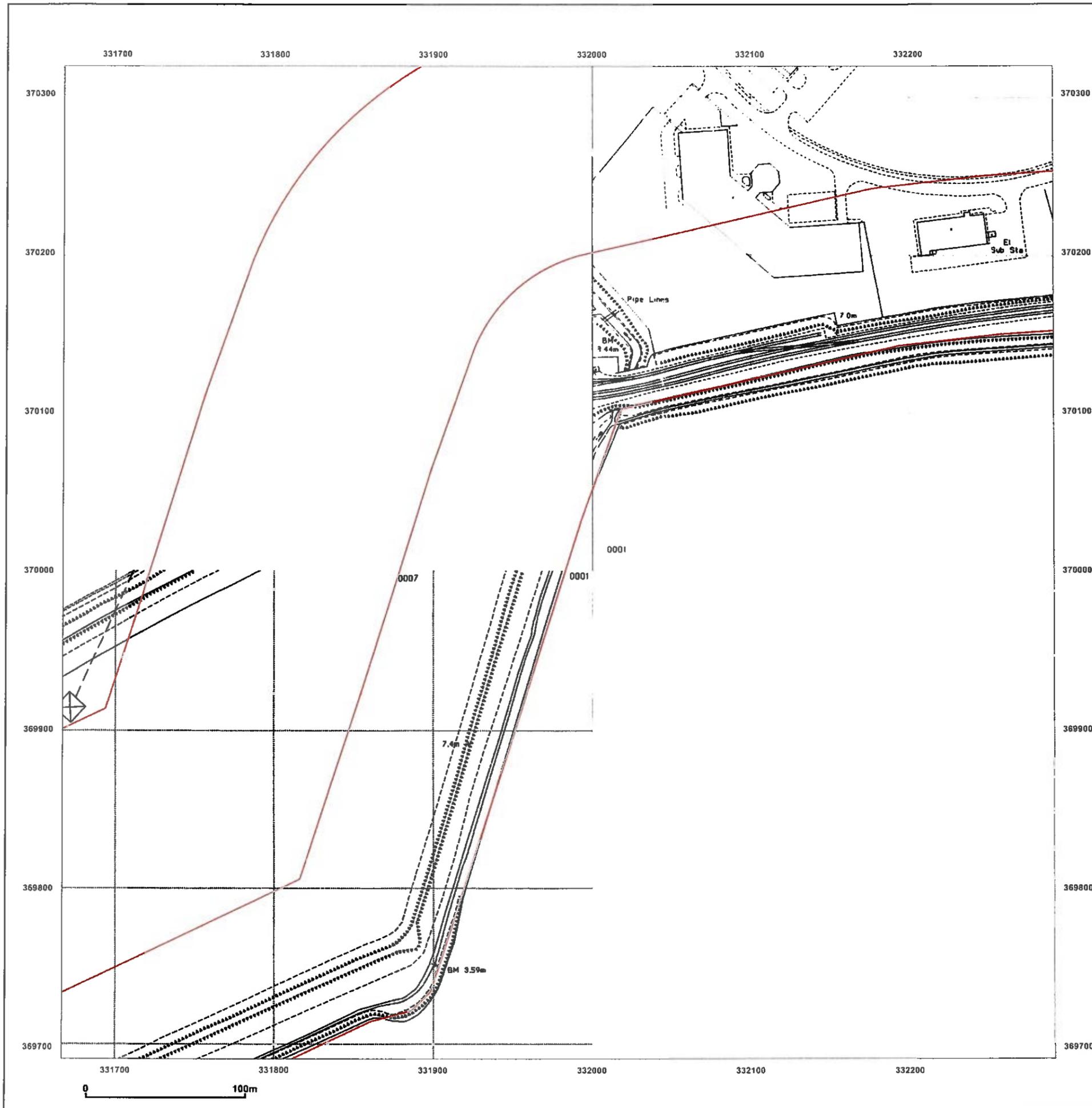


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Site Details:

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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A2
Grid Ref: 331835, 369404

Map Name: National Grid

Map date: 1992

Scale: 1:1,250

Printed at: 1:2,500



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Edition NA
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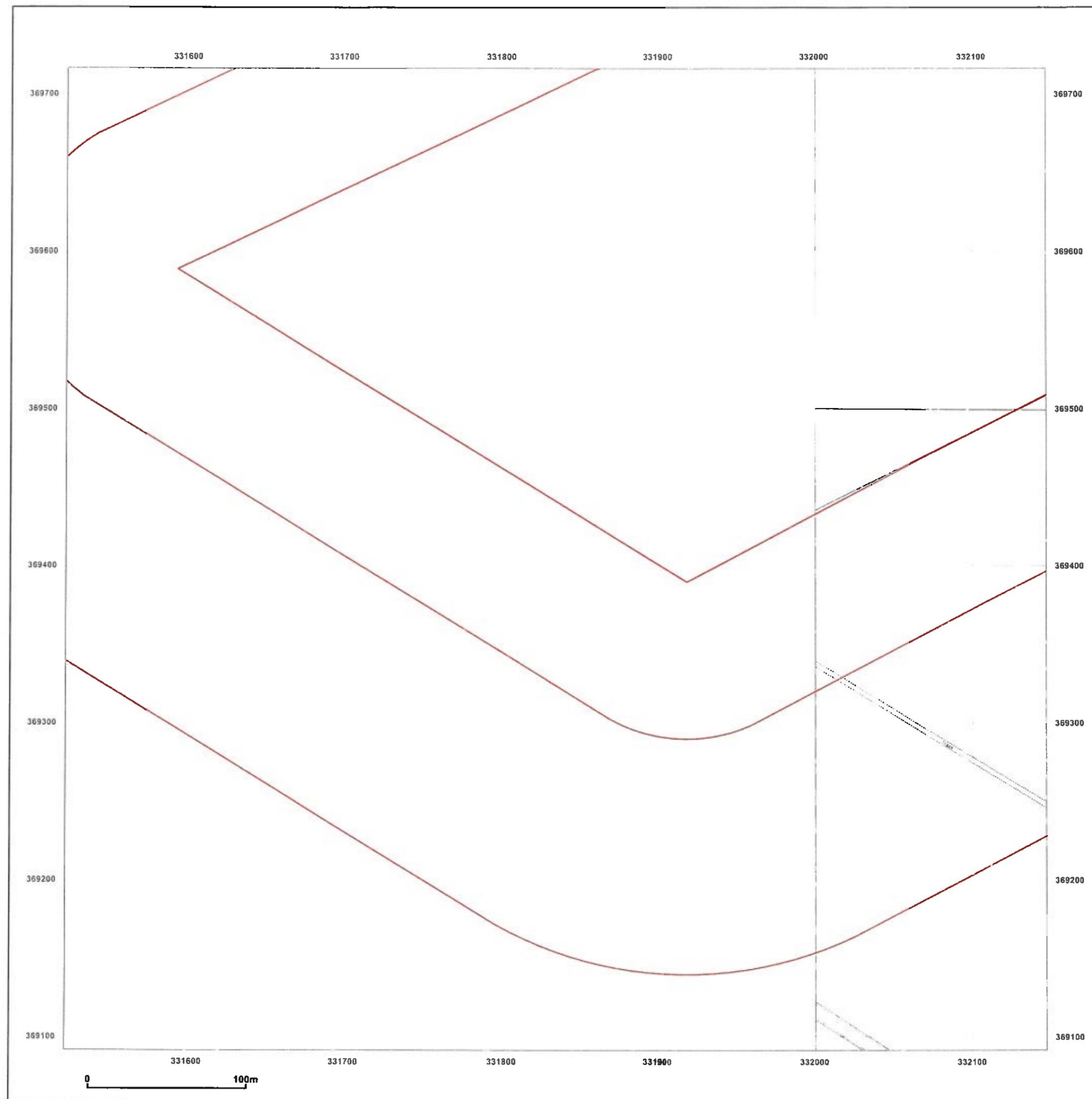


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_A2
Grid Ref: 331835, 369404

Map Name: National Grid

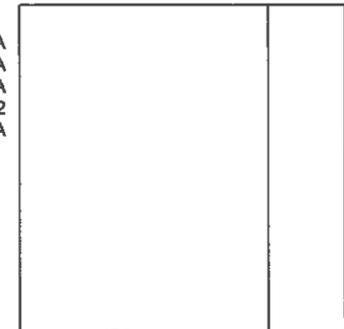
Map date: 1992

Scale: 1:2,500

Printed at: 1:2,500



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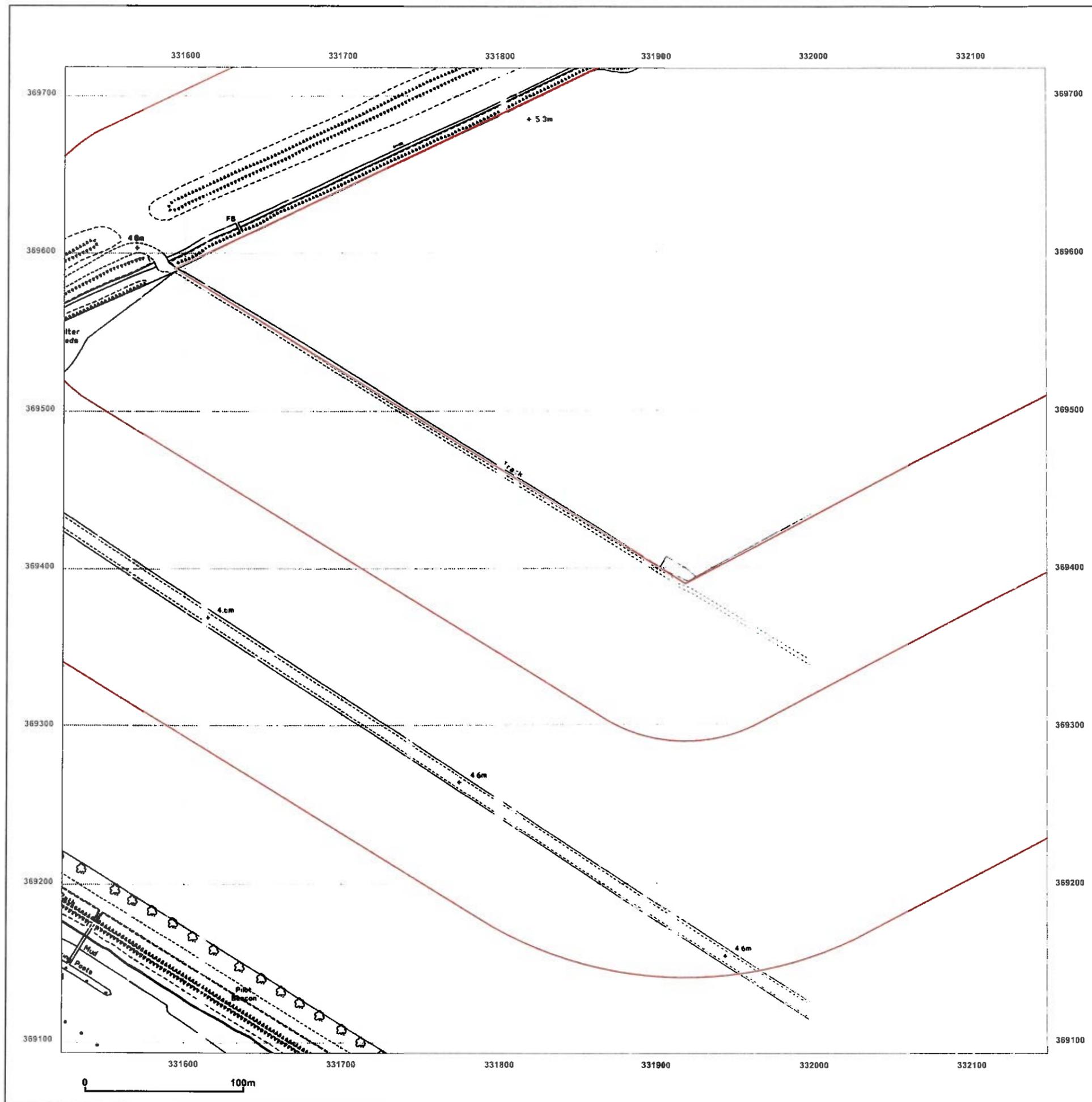


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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B1
Grid Ref: 332580, 370005

Map Name: National Grid

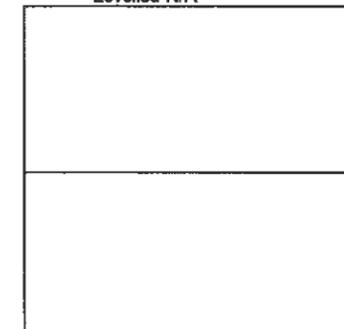
Map date: 1992

Scale: 1:2,500

Printed at: 1:2,500



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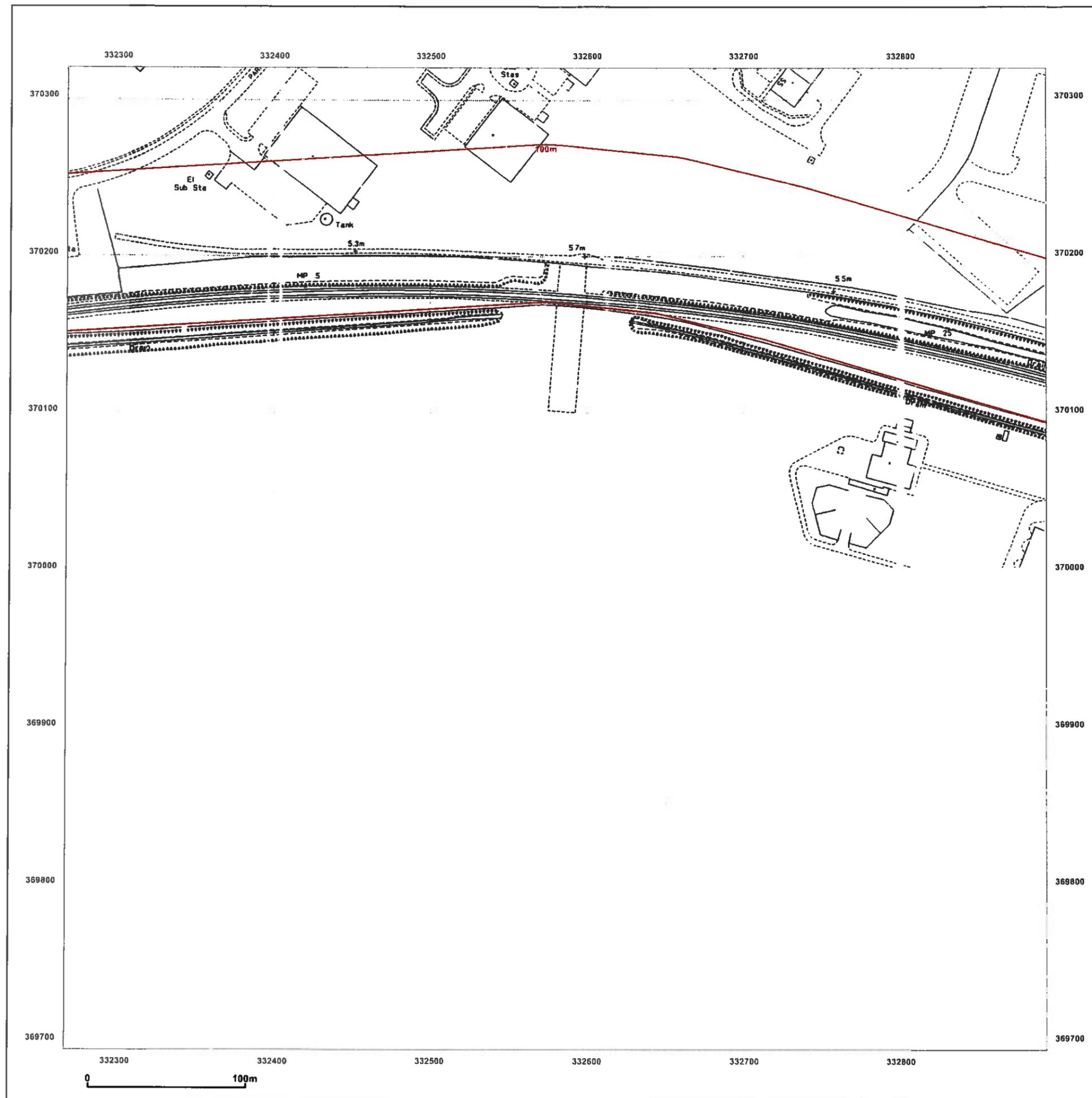


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Site Details:

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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_B2
Grid Ref: 332435, 369404

Map Name: National Grid

Map date: 1992

Scale: 1:1,250

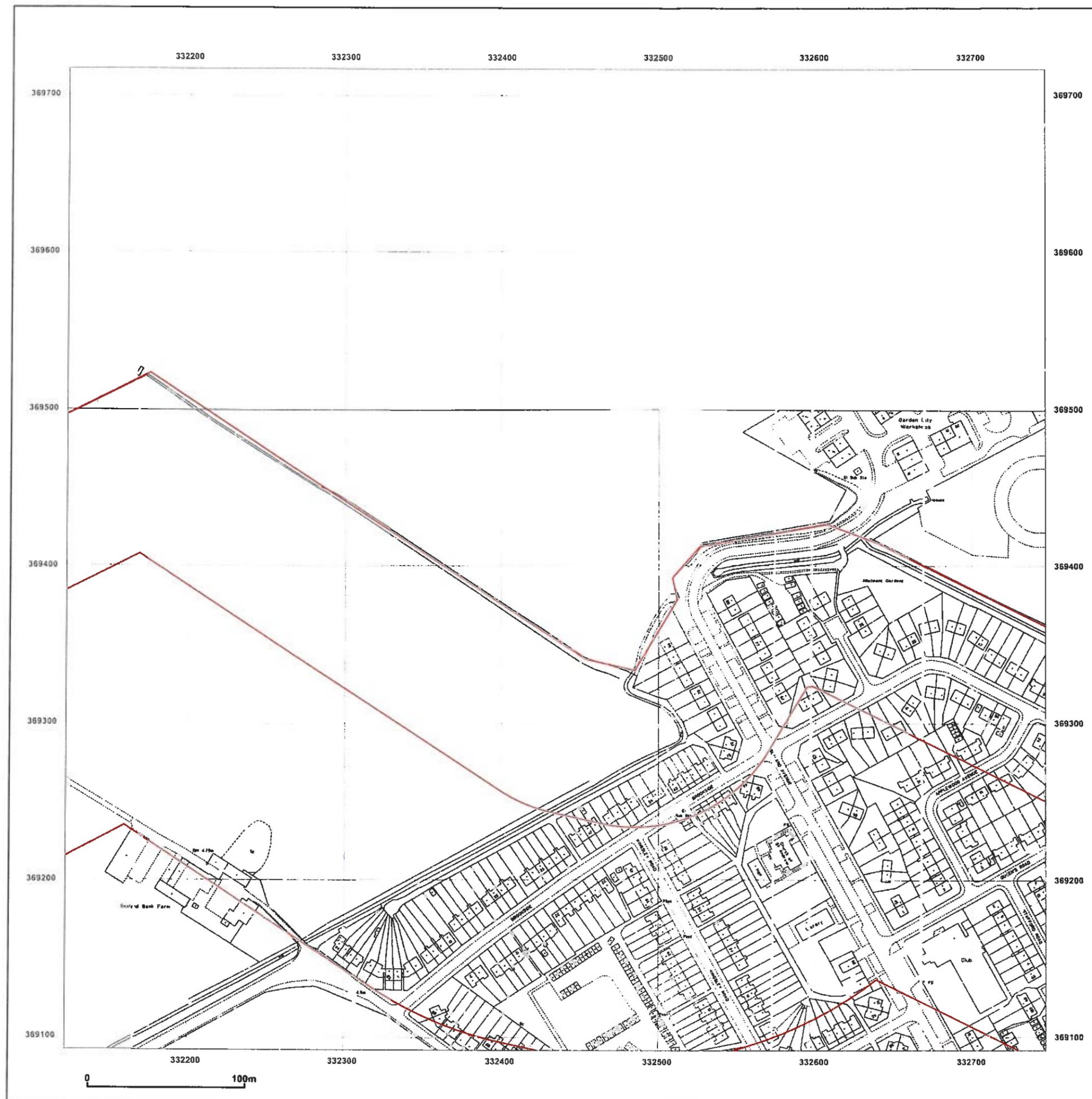
Printed at: 1:2,500



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Edition NA
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Surveyed 1992 Revised 1992 Edition NA Copyright NA Levelled NA	Surveyed 1992 Revised 1992 Edition NA Copyright NA Levelled NA

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Client Ref: 8521
Report Ref: CMAPS-CM-333050-8521-100614HIS_LS_C2
Grid Ref: 333034, 369404

Map Name: National Grid

Map date: 1992

Scale: 1:1,250

Printed at: 1:2,500



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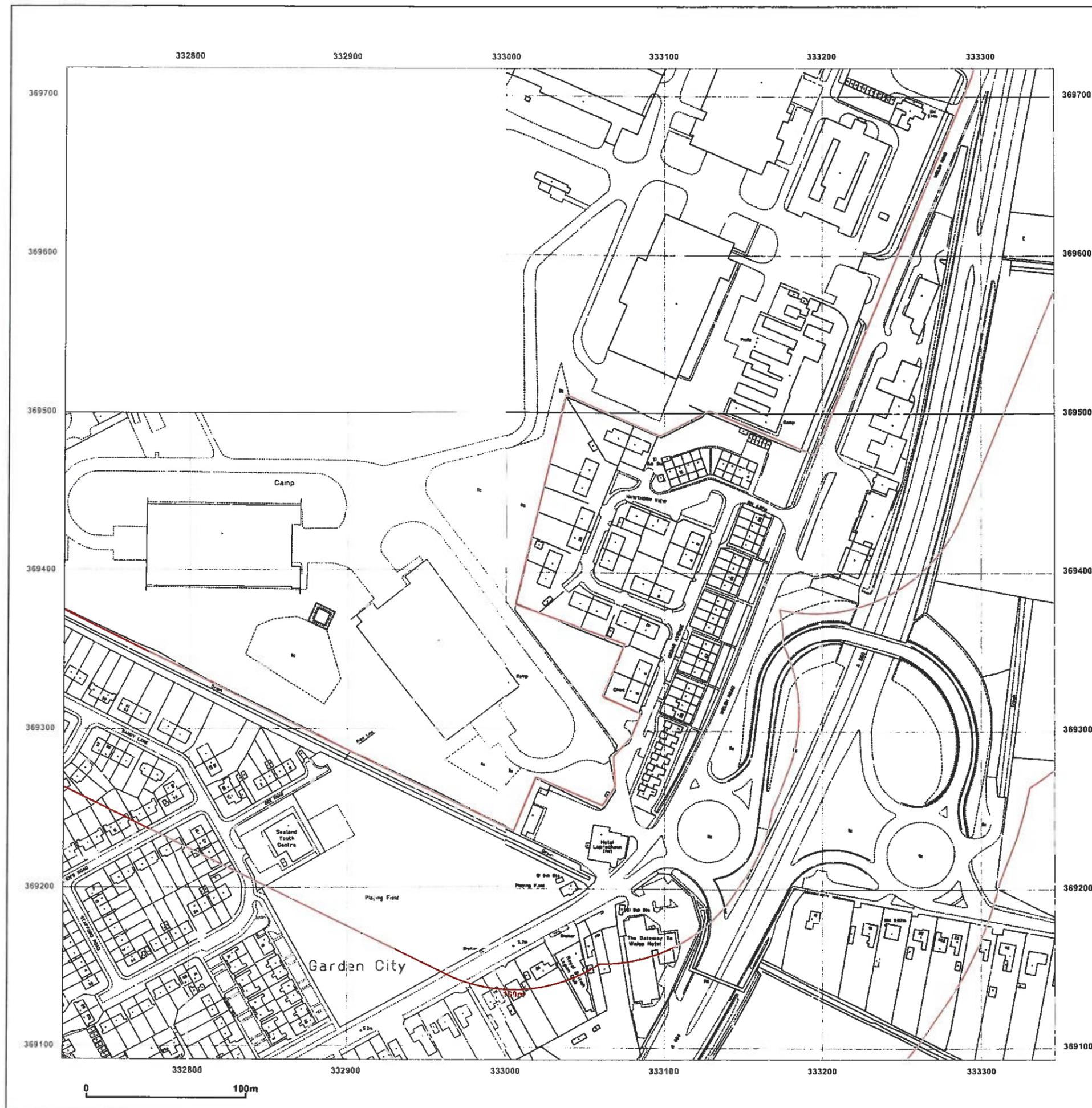


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Grid Ref: 331835, 369404

Map Name: National Grid

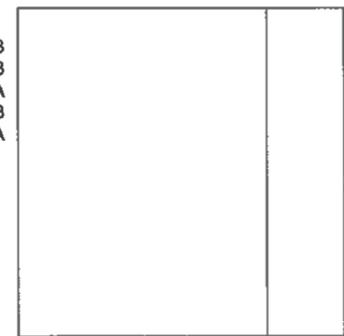
Map date: 1993

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1993
Revised 1993
Edition N/A
Copyright 1993
Levelled N/A



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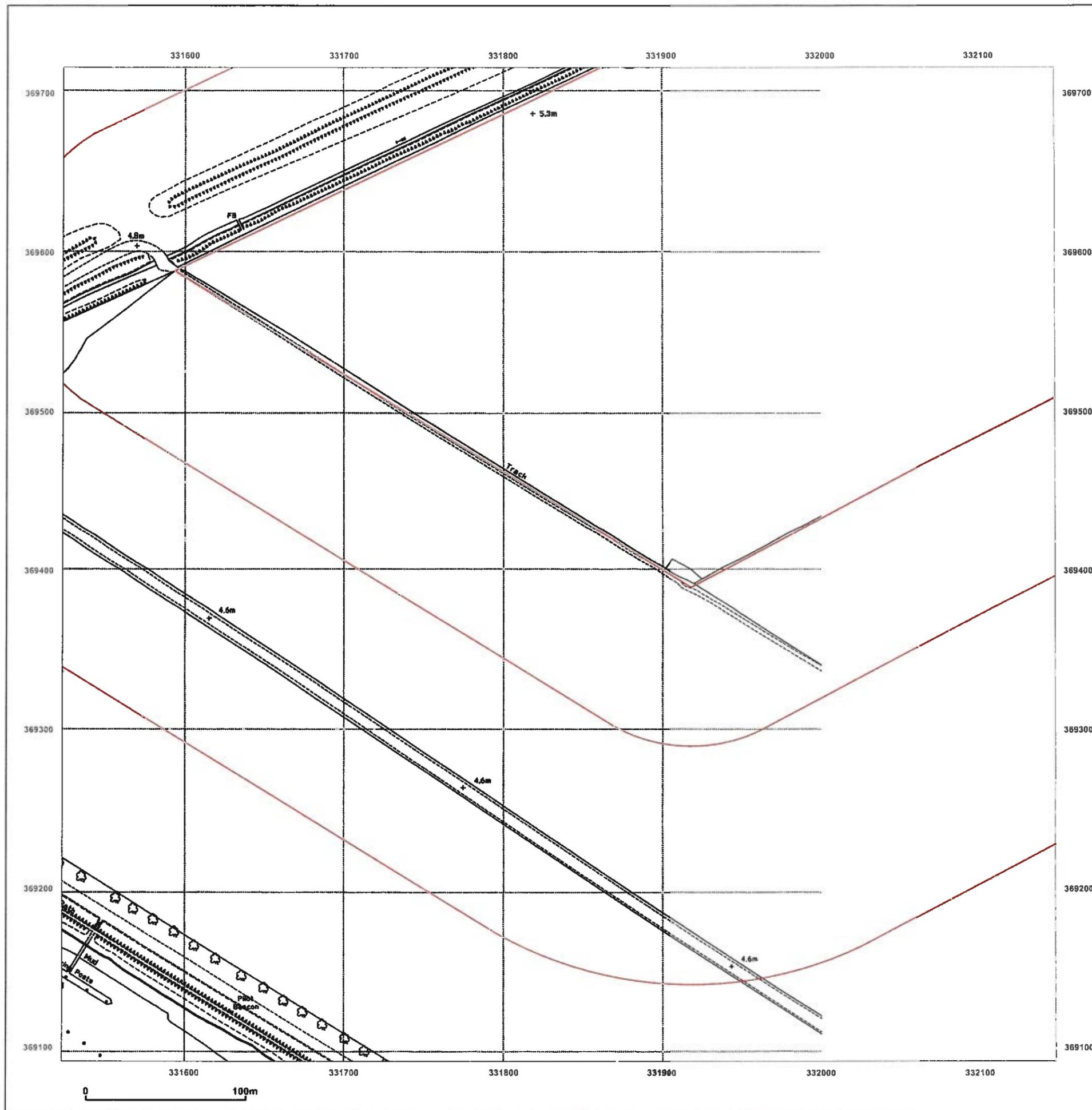


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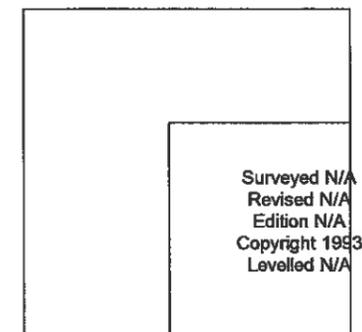
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Scale: 1:1,250

Printed at: 1:2,500



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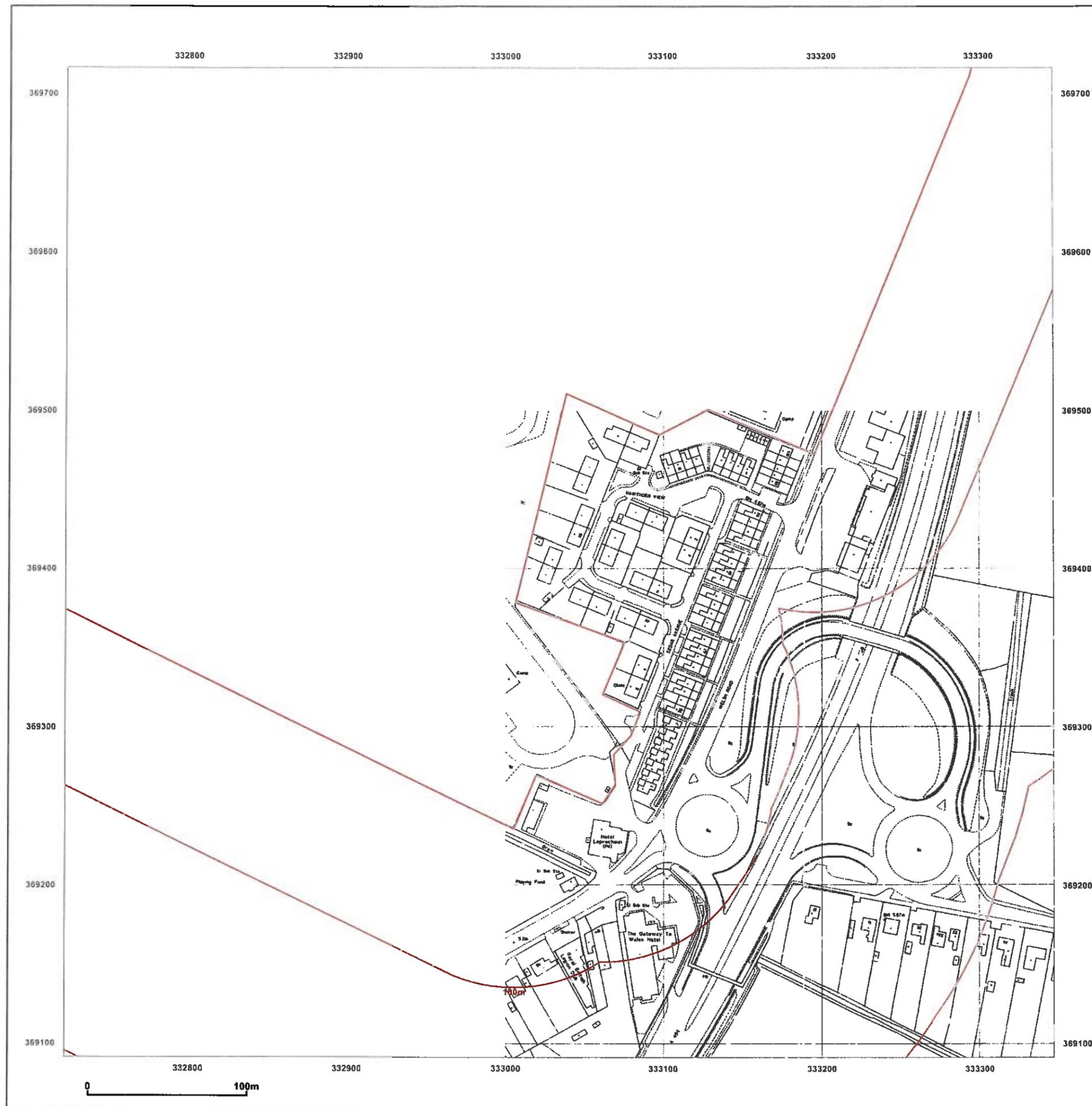


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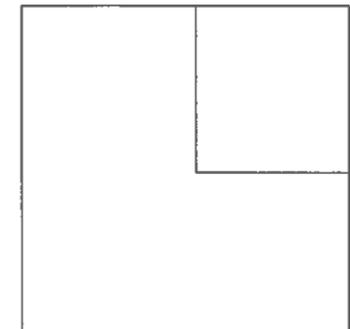
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Revised N/A
Edition N/A
Copyright 1994
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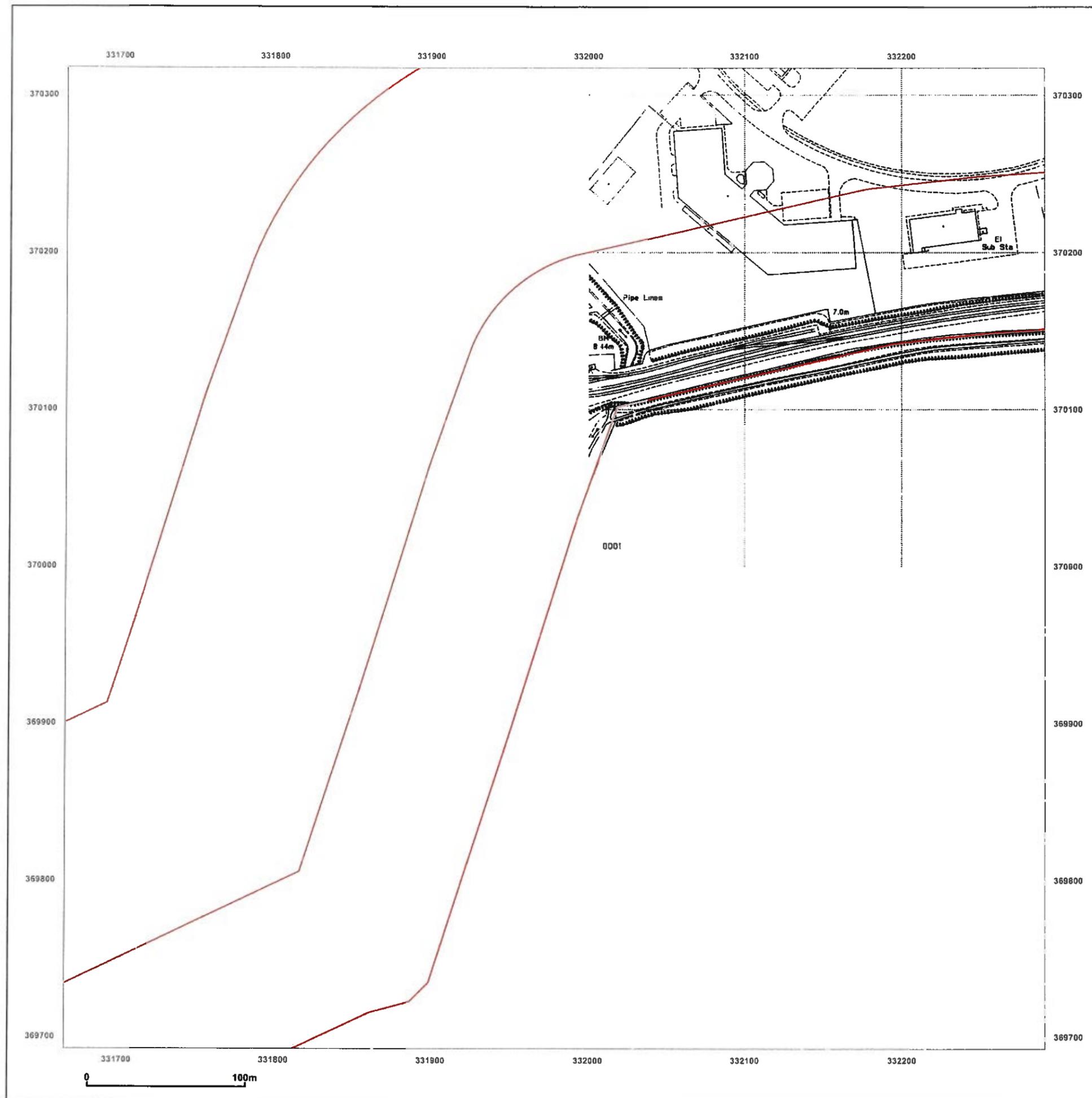


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Map Name: National Grid

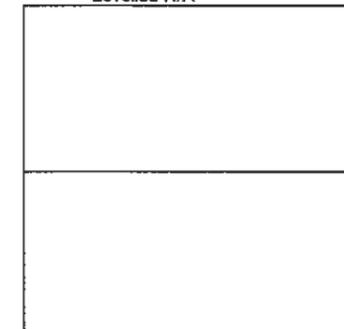
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Surveyed N/A
Revised N/A
Edition N/A
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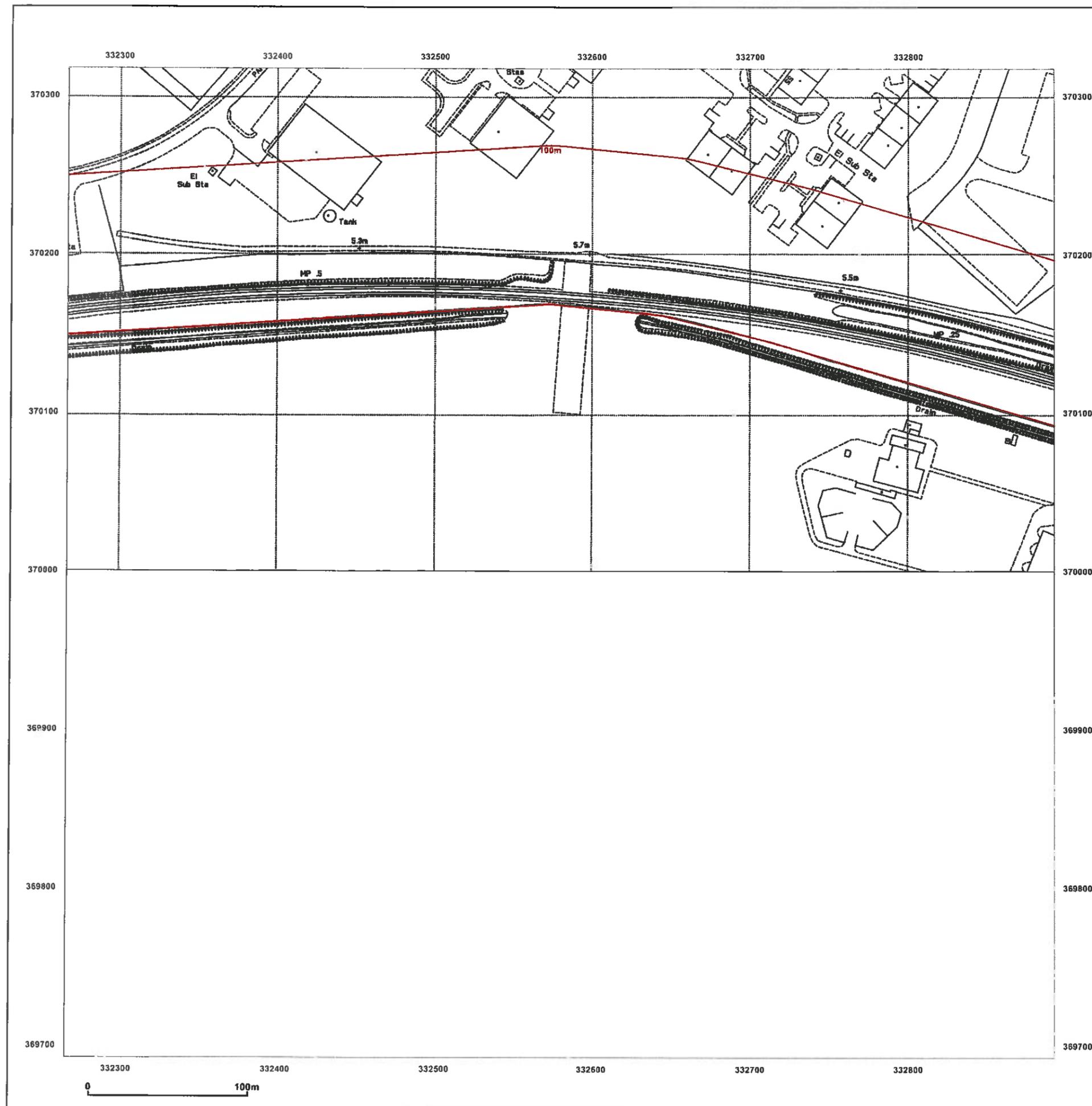


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Grid Ref: 331979, 370005

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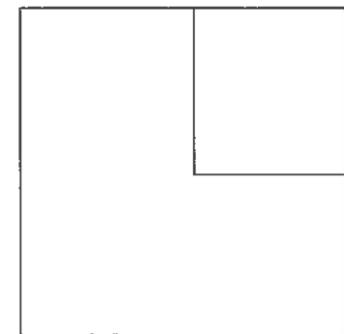
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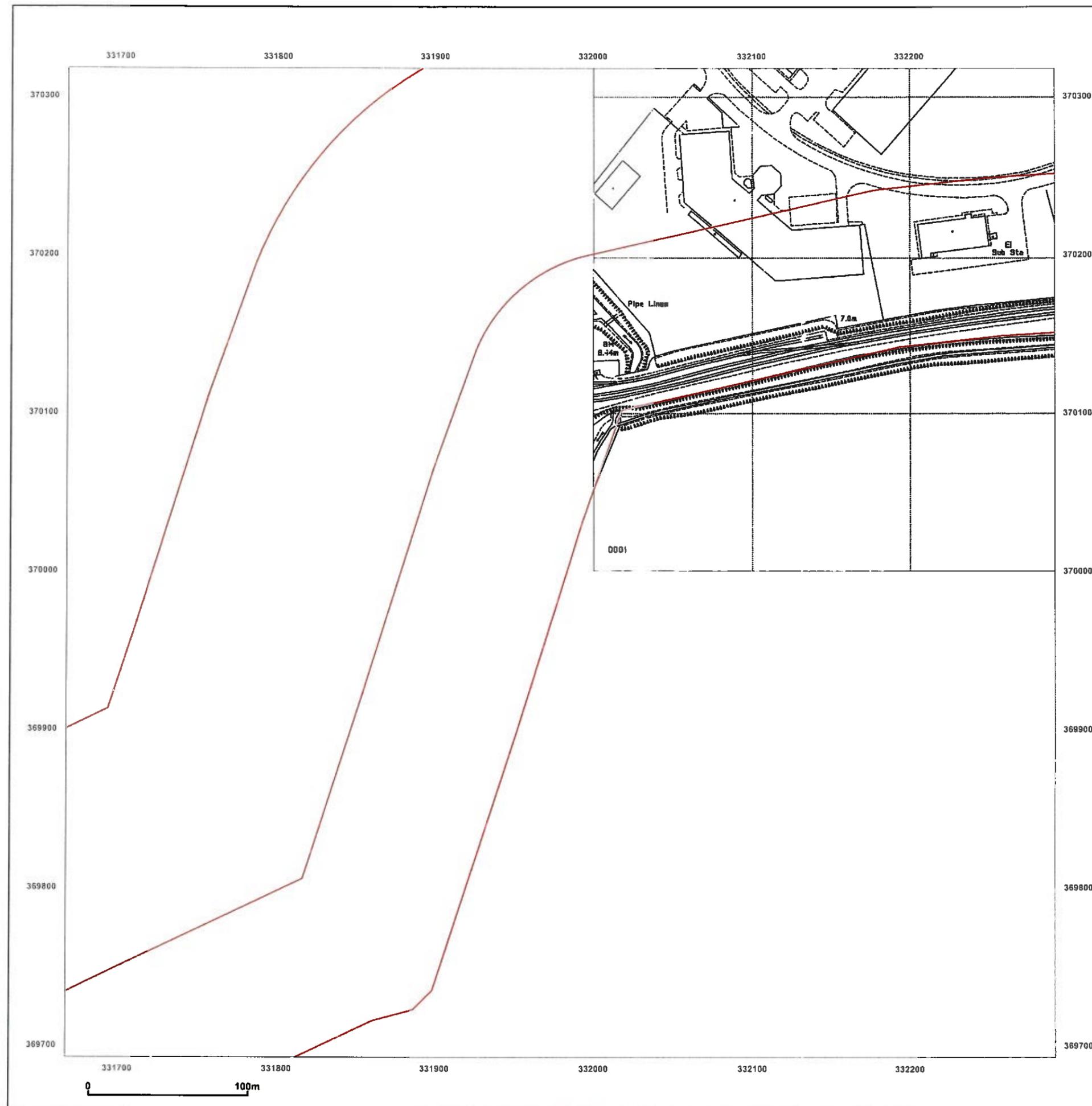


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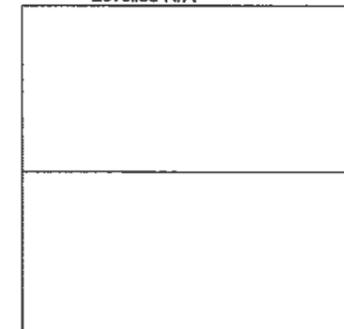
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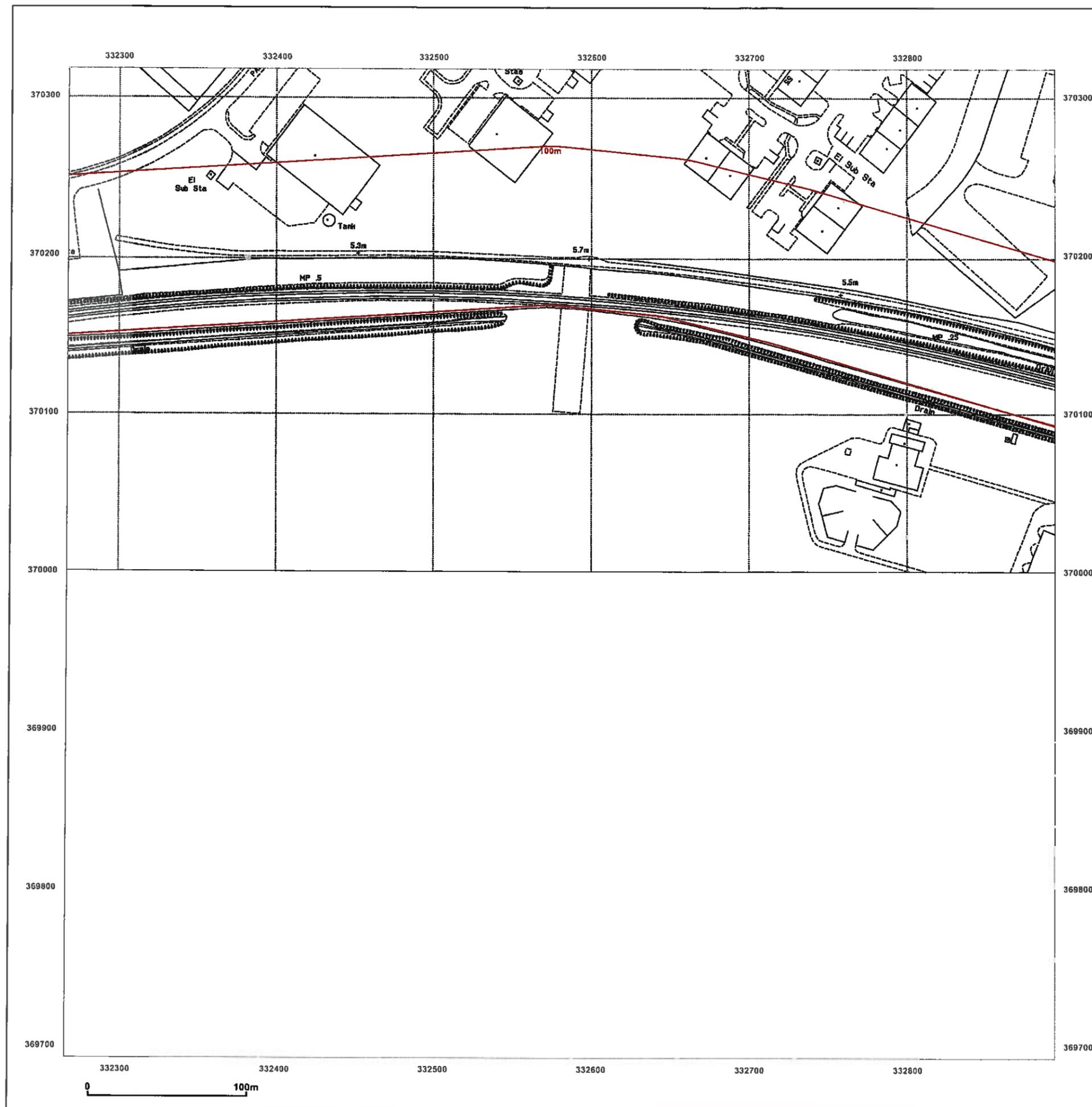


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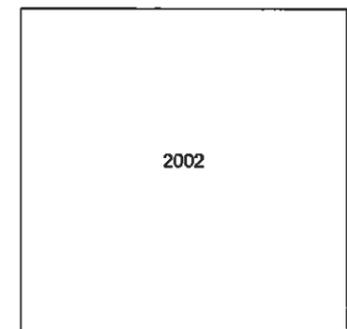
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Grid Ref: 332476, 369703

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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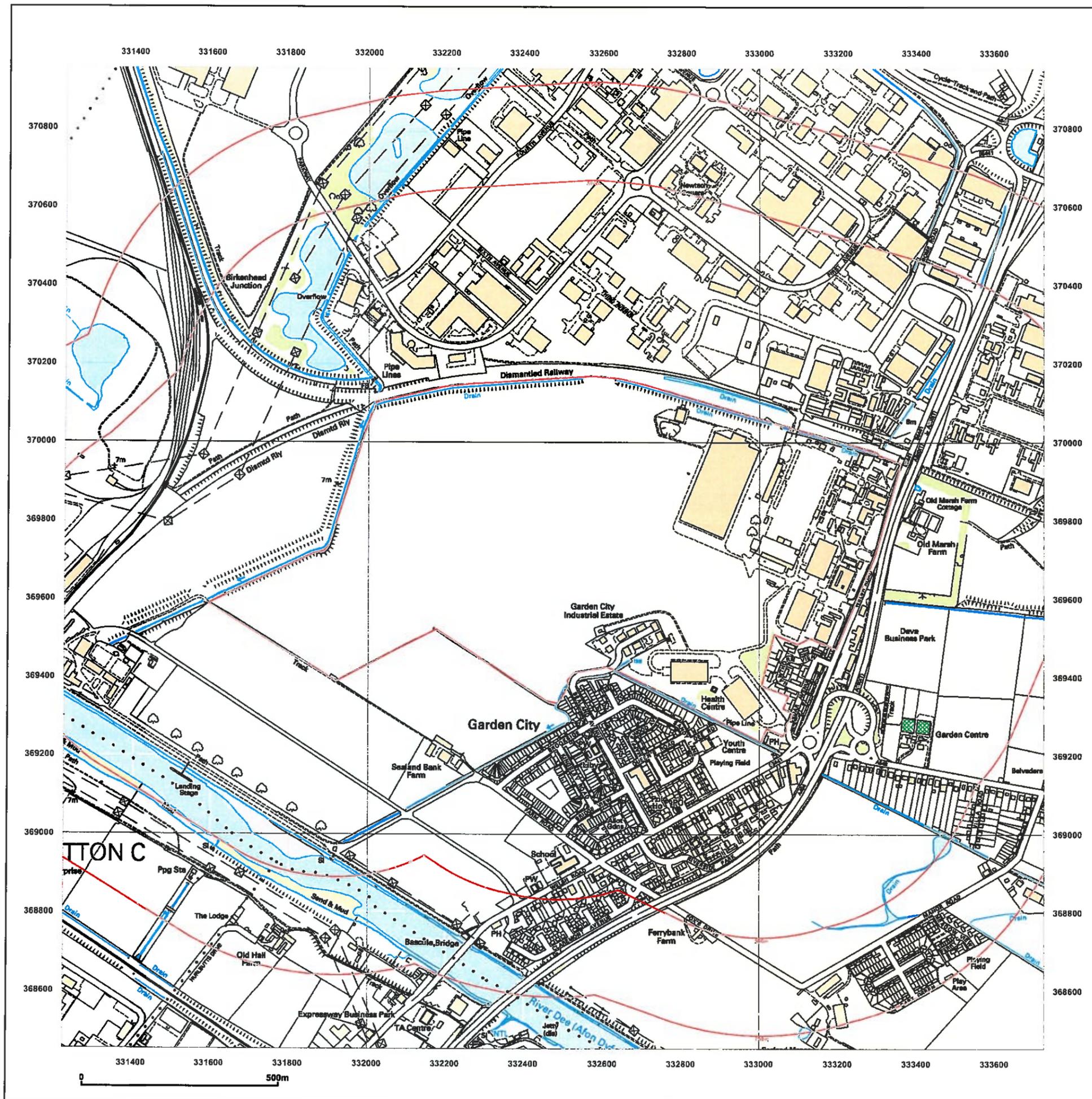


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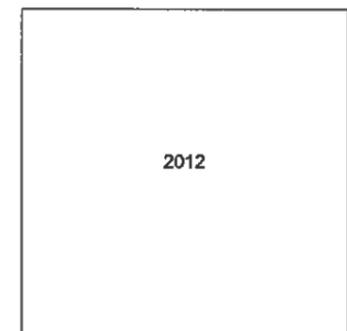
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Map Name: National Grid

Map date: 2012

Scale: 1:10,000

Printed at: 1:10,000



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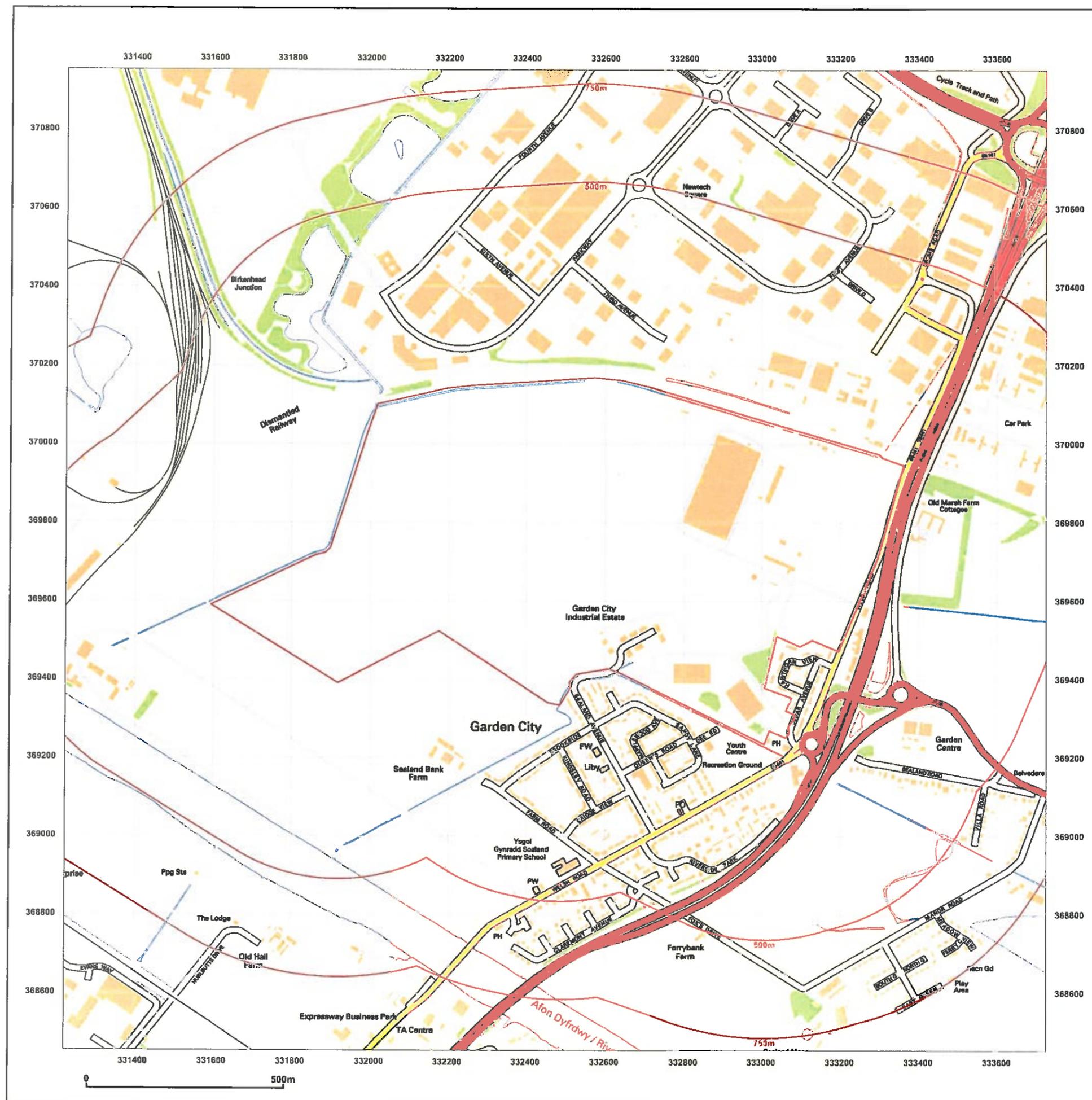


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Appendix D Notes on Limitations



General

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

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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 Ltd to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and groundwater.

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 may need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

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 of 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 that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather related effects.

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 in to 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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