

**Geotechnical & Geo-environmental Site
Investigation Report:**

Proposed Residential Development
Herbert Road
Newport

Phase 2

Prepared For:
Engie

July 2018

Job No: 12032/P2




terrafirma

REPORT TITLE : **Geotechnical and Geoenvironmental Report Site Investigation Report:**
Proposed Residential Development, Herbert Road, Newport

Phase 2

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Executive Summary

Site Location	<i>The site is situated along the River Usk, Newport, and is centred on an approximate National Grid Reference of 331680 189228. It occupies a plan area of approximately 0.25 hectares.</i>
Site History	<i>The site in 1883 comprised field land alongside the River Usk. Several buildings were present on site over the years, all of unspecified use, although one property named Glen Usk was likely residential. The site has remained vacant since 1978. Historical maps indicate that the site level was raised in the 1980s.</i>
Ground Conditions	<i>Made ground of variable medium dense to dense sand and gravel deposits extend to a depth of 2.9m and 3.9m, overlying alluvial clays with peat bands to 13.2m/1.40m depth. A thin band of red silt site below the alluvium. Weathered St Maughan's Group mudstone bedrock was confirmed below 14.5m and 15.2m depth.</i>
Radon	<i>No radon protection is required for new development.</i>
Ground Gas/Landfill Gas	<i>In-situ gas monitoring has confirmed that gas protection measures will be required for the new apartments in accordance with BRE C665 Gas Characteristic Situation 2.</i>
Laboratory Chemical Testing and Proposed Remediation	<i>Laboratory analysis of made ground on site was undertaken. Lead and cyanide were found to be elevated. Chrysotile and crocidolite asbestos fibres were also identified.</i> <i>Upon development all communal garden and soft landscaped areas should be capped with 600mm imported clean material and underlying double layer no-dig barrier.</i> <i>Any imported soils should be validated as clean and suitable for use in accordance with 'Requirements for the Chemical testing of Imported Soils for Various End Uses and Validation Cover Systems'.</i> <i>For proposed new supply water pipes, the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' should be consulted.</i>
Foundation Solution	<i>Due to the presence of made ground and soft alluvial clays beneath the site traditional shallow foundations are not recommended. Such foundations will lead to high total and differential settlements.</i> <i>A piled foundation is advised for the proposed apartment blocks. Precast concrete driven piles founded within the underlying weathered red mudstone and/or sandstone is recommended. For a 275mm square precast concrete pile driven to an appropriate set within the underlying competent mudstone a safe working load of typically 500kN should be achieved. Based upon the site investigation data, pile lengths should vary between 17.5m and 18m beneath current ground levels.</i> <i>Measurements should be kept on pile vibrations during driving. Measures should also be taken to dampen such vibrations. If, however, vibrations exceed permissible values then consideration should be given to using a contiguous flight auger (cfa)/bored pile solution.</i> <i>Floor slabs should be designed as suspended.</i>

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SECTION 1 Introduction and Proposed Development

1.1 Introduction

Engie is proposing the residential development of an area of land off Herbert Street, Newport. This is scheduled to be carried out in three phases. Phase 1 is currently nearing completion.

The majority of the Phase 2 was investigated by Terra Firma in 2013, as reported in Geotechnical and Geo-environmental Report No. 12032. This area has therefore been excluded from this report as ground conditions have been proved and all soil chemical data has already been assessed and approved.

This report covers the southern portion of Phase 2 (referred to as 'the site' throughout) that has not previously been investigated, as illustrated in **Figure 1.1**.



Figure 1.1: Report Study Area

Terra Firma (Wales) Limited has been commissioned to undertake a geo-environmental assessment and geotechnical investigation of the site.

The main objectives of the geoenvironmental assessment programme were to:

- Investigate the potential environmental liabilities at the site associated with any soil contamination
- Provide a summary of the environmental conditions at the site, together with any necessary further intrusive works and / or remediation works to render the site fit for its intended use

The main objectives of the geotechnical site investigation were to:

- Determine the type, strength and bearing characteristics of the shallow superficial and underlying solid geology
- Provide engineering foundation and floor slab recommendations for the development
- Provide recommendations with regard to any other geotechnical aspects pertaining to the development

In order to achieve the above objectives, Terra Firma (Wales) Limited carried out an assessment programme including a review of existing data, followed by a field investigation to collect geotechnical and environmental data from selected locations.

1.2 Limitations and Exceptions of Investigation

Engie has requested that a Geoenvironmental Site Assessment (GSA) and Geotechnical Investigation (GI) be performed in order to determine if contamination is present beneath the site and to determine an appropriate foundation and floor slab solution for the proposed development.

The GSA and GI were conducted and this report has been prepared for the sole internal reliance of Engie and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geoenvironmental and geotechnical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

SECTION 2 Review of Existing Data

2.1 Physical Setting and Current Site Use

The site is situated along the River Usk, Newport, and is centred on an approximate National Grid Reference of 331680 189228. It occupies a plan area of approximately 0.25 hectares.



Figure 2.1: Site Location – OS Map 152 Newport and Pontypool

The site lies within boundaries of the entire Engie Herbert Road development area and currently comprises a section of land used only for storing building materials for the Phase 1 development.

The site is relatively level but raised in comparison to the River Usk and land immediately east.

The new site access road runs along the front/western side of the site.

The eastern edge of the site is defined by a new gabion retaining wall, acting to retain the site from the adjacent property, some of which is currently housing the offices and welfare compound for the development.

2.2 Site History

The history of the site has been traced using historical Ordnance Survey maps from Landmark Information Group. The maps may be found in **Annex A**. Please note that the boundary of the site is not specified on these plans. Distances, where quoted, are approximate.

The site in 1883 is seen to comprise field land alongside the River Usk, intersected roughly centrally by an east to west aligned drain. A single building overlapped on to the north of the site at this time. Its use is unspecified but given its secluded location it may have been used to house animals. By 1902 this building was smaller and by 1920 it was absent. Uskside saw mills located approximately 50m east of the site in 1920. By 1938 a collection of five to six buildings had been established in the south of the site. Again, no particular use was assigned to these. The 1955 edition map shows these buildings to have been demolished. However, a cart track looped through the north of the site leading to several buildings in the south, one known as Glen Usk. By 1966 the only building remaining on site was Glen Usk and the northern half of the site was indicated to be scrubland. A paint works and light engineering works had been established on land directly east, north of the saw mills, and a scout hall to the southeast. Glen Usk was no longer present in 1978. The 1987 map indicates that site levels may have been raised, with a short embankment illustrated just outside and roughly paralleling the site's eastern boundary. The saw mills had also closed at this point. Further earthworks are indicated on the 1994 map, where a batter now defines the site's eastern boundary. The site has remained disused since 1994.

2.3 Geological Setting

2.3.1 Geology

The 1:50,000 scale geological map of the area (Sheet 249) was consulted. This shows the site to be underlain by rocks of the by the St Maughan's Formation, belonging to the Devonian Period. These rocks comprise interbedded argillaceous rocks with subordinated sandstone.

The solid geology is shown to be overlain by estuarine alluvium. This often includes peat layers.

Made ground is anticipated to be present across the entire site.

2.3.2 Coal Mining

The site lies outside the South Wales Coalfield. The site will not be affected by past mining.

2.3.3 Radon

A radon report acquired for the site (**Annex B**) details that NO RADON PROTECTION will be required for new buildings on site.

2.4 Hydrogeology and Hydrology

The bedrock beneath the site is detailed to be a Secondary A aquifer. These aquifers are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

The estuarine alluvium is classified as unproductive strata.

Any surface or shallow groundwater flows along the river will either be towards the River Usk or adjacent land to the east.

Deeper groundwater flow within the underlying bedrock will be controlled by the strata dip and any fractures or bedding planes within the rock units.

2.5 Environmental Setting

Relevant data sourced from the Environment Agency online 'What's in Your Back Yard' database in 2013 is summarised in the following sections.

2.5.1 Industrial Operator Scores

There are no sites within a 1km radius of the site where pollution is regulated.

2.5.2 Industrial Pollution

There are no industrial pollution scores within a 1km radius of the site where pollution is regulated.

2.5.3 Pollution Incidents

No pollution incidents are recorded within 250m of the site.

2.5.4 Landfills

One historical landfill facilities is located within influencing distance of the part of the site to be residentially developed.

Shaftsbury Park historic landfill is located approximately on the opposing side of the River Usk. No information is provided regarding the date at which the landfill was active. Shaftsbury Park received industrial and household waste.

2.5.5 Groundwater Source Protection Zones

The site does not locate within a groundwater protection zone.

SECTION 3 Preliminary Human Health and Environmental Risk Assessment

3.1 General

The contaminated land regime is set out in Part IIA of the Environmental Protection Act (EPA) 1990 and was introduced on the 1st April 2000 in England and 1st July 2001 in Wales. A similar regime was introduced in Scotland on 14th July 2000. Part IIA was introduced to achieve two aims:

- (1) The identification of contaminated land
- (2) The remediation of contaminated land that poses an unacceptable risk to human health and/or the environment

Under Part IIA the statutory definition of 'contaminated land' is: any land which appears to the local authority in whose area it is situated, to be in such a condition, by reason of substances in, on, or under the land, that:

- (a) Significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) Pollution of controlled waters is being, or is likely to be, caused."

For land to be classified as 'Contaminated Land' there must be a 'pollutant linkage'.

For our definitions of pollution linkage and how we define risk please refer to **Annex C** which includes our classifications of consequence and probability and risk assessment matrix.

3.2 Preliminary Site Conceptual Model

The preceding sections enable a preliminary conceptual model of the site to be drawn up, to illustrate the likely ground conditions beneath the site together with a preliminary assessment of the nature of any underlying aquifers and groundwater movement. The preliminary site conceptual model is used as a model for the design and implementation of the site investigation, whereby areas of potential contamination can be targeted as well as investigating the site as a whole.

3.3 Potential Sources of Contamination and Gas

The potential contamination beneath the site, whether in the matrix of soil or any groundwater will be related to the sites site past use and the history of the surrounding area.

No specific site use has been identified but given the size and location of former buildings on site these are no anticipated to represent any significant industrial activity.

The site is known to have been historically raised and made ground of several metres thickness may be anticipated. The source or type of fill is unknown. Any fill is considered to be a potential source of contamination.

Made ground and underlying bands of peat known to exist within the alluvium present a risk from ground gas.

The risk from landfill gas is negligible given that the historical landfill identified within influencing distance of the site lies on the opposing side of the River Usk.

3.4 Potential Receptors and Pollution Pathways

There are both human and hydrological receptors to be considered should any contamination be detected on site.

Construction workers will be excavating in soils and will be exposed via dermal contact with soils and dust, ingestion of soil/soil dust and inhalation of soil dust. Workers may also be exposed to asbestos fibres, if present in fill soils.

A residential end use is proposed. Once developed, future site residents will potentially be at risk from any contamination from the same pathways as well as through intake of potable water and inhalation of ground gas.

Passers-by and neighbouring site users are potentially at risk from site soils via soil dust and asbestos fibre inhalation.

If any contamination is identified this may be leachable, enabling it to mobilise through perched groundwater within site soils and impact the river or deeper groundwater.

A qualitative preliminary Human Health and Environmental Risk Assessment summarises the above and is detailed in the **Tables 3.1 and 3.2** on the following pages.

Table 3.1 - Qualitative Preliminary Human Health Risk Assessment

Potential Source	Pathway	Receptor During Construction	Level of Risk	Receptor Post Construction	Level of Risk
Made ground	Ingestion, inhalation and dermal contact with soil and soil dust	Construction Workers	Medium Risk	Future residents	Medium Risk
Made ground	Inhalation of soil dust	Neighbouring site users and passers-by	Low Risk	Neighbouring site users and passers-by	Low Risk
Made ground	Inhalation of asbestos fibres	Construction Workers Neighbouring site users and passers-by	Medium Risk	Future residents Neighbouring site users and passers-by	Medium Risk
Radon Gas	Inhalation <i>Accumulation of gas indoors in confined spaces- asphyxiation and explosion</i>	N/A	N/A	Future residents	Acceptable Risk <i>BGS confirm no Radon Protection required for new buildings</i>
Landfill Gas	Inhalation <i>Accumulation of gas indoors in confined spaces- asphyxiation and explosion</i>	N/A	N/A	Future residents	No Risk <i>Landfill lies on opposing side of River Usk</i>
Ground Gas	Inhalation <i>Accumulation of gas indoors in confined spaces- asphyxiation and explosion</i>	N/A	N/A	Future residents	High Risk <i>Potential gas where made ground and peat present.</i>
Made Ground	Ingestion of potable water <i>Absorption of contamination from made ground into potable water pipes</i>	N/A	N/A	Future Residents	Medium Risk

Table 3.2 – Qualitative Preliminary Environmental Risk Assessment

Potential Source	Pathway	Receptor During Construction	Level of Risk	Receptor Post Construction	Level of Risk
Surface Water	Run-off	Site and Adjacent Sites Shallow/Perched Groundwater	Low	Site and Adjacent Sites Shallow/Perched Groundwater	Low
Accidental spillage	Run-off , digging foundations, moving contaminated soil, drainage misconnections, discharges to local surface waters or the ground, construction materials and/or exposed ground, wheel washings, oil or chemical spills	Site and Adjacent Sites	Low <i>On site procedures will ensure that all efforts are made to prevent accidental spillage</i>	N/A	N/A
Made Ground	Leaching of contamination	Shallow/Perched Groundwater	Medium Risk	Shallow/Perched Groundwater	Medium Risk
Contaminated Groundwater	Direct migration and Perched Groundwater migration	Secondary A Aquifer	Low Risk <i>Superficial alluvium acts to confine perched groundwater above underlying bedrock</i>	Secondary A Aquifer	Low Risk <i>Superficial alluvium acts to confine perched groundwater above underlying bedrock</i>
Contaminated Groundwater	Groundwater Migration	River Usk	Low Risk	River Usk	Low Risk

SECTION 4 Field Investigation

4.1 Site Works

A geo-technical and geo-environmental site investigation was carried out during June 2018. This comprised six machine excavated trial holes and three cable percussive boreholes.

The trial pits were excavated by JCB.

The boreholes were sunk using a Shell and Auger drilling rig. Standard penetration tests were undertaken at regular depths in the boreholes. The boreholes were terminated within the Mercia Mudstone after one hour of chiselling.

The fieldworks were supervised by Terra Firma (Wales) Limited and the trial pits and boreholes were logged to the requirements of BS5930:2015.

The trial pit logs may be found in **Annex D** and the borehole logs are available in **Annex E**. Exploratory locations are given on **Drawing 01**.

4.2 Ground Conditions

A summary of the ground conditions identified in the trial pits and boreholes beneath the site is given in **Table 4.1**.

Table 4.1 Summary of Ground Conditions		
Depth (m)	Thickness (m)	Stratum
0.0 - 2.9/3.9	2.9/3.9	MADE GROUND: Variable medium dense to dense SAND and GRAVEL deposits. Variable content of brick, concrete, glass, timber and wire / Soft to firm grey CLAY with variable content of timber, metal, china, glass, plastic, brick and tile fragments / Firm to stiff red brown CLAY
2.9/3.9 - 5.4/6.0	2.1/2.5	Firm grading into soft to very soft grey CLAY (Alluvium)
5.4/6.0 - 13.2/14.0	7.6/8.0	Very soft grey peaty CLAY (Alluvium) with soft PEAT bands
13.2/14.0 - 13.8/15.2	0.5/1.2	Red sandy SILT
13.8/13.9 - 14.5/14.6	0.7	Stiff red purple CLAY (BH1) / Medium dense red GRAVEL of mudstone (BH2)
14.5/15.2 - 16.0/19.0	-	Weathered red MUDSTONE and SANDSTONE (St Maughan's Formation)

4.3 Water Strikes

Groundwater inflow was not encountered in the trial pits.

Water strikes were made in the boreholes, at 13.5m in BH1, 13.9m in BH2, and 14.0m in BH3.

4.4 Stability and Obstructions

Trial holes were generally stable during excavation. Obstructions were encountered in the boreholes or trial pits.

4.5 Soil Laboratory Chemical Testing

4.5.1 Exploratory Strategy and Sampling Regime

During the intrusive investigation, small disturbed soil samples were collected. The sampling regime was conducted in accordance with BS5930: 1999 in order to satisfy the following criteria:

- Identify and confirm suspected sources of contamination
- Determine type and concentration of contamination
- Determine lateral and vertical spread of contaminants
- Ensure representation of the entire site
- Provide sufficient data to determine suitable remedial measures if necessary

The sample locations and depths are listed in the following table.

Table 4.2 Sample Locations and Depths		
Sample	Depth (m)	MCerts Sample Matrix Description
TP1	0.6	Brown gravelly clayey SAND (possible made ground – brick)
TP1	1.2	Dark brown gravelly clayey SAND
TP2	0.3	Dark brown gravelly clayey SAND (possible made ground – brick)
TP3	0.4	Brown gravelly sandy CAY
TP4	0.2	Dark brown gravelly sandy CLAY
TP5	0.1	Brown gravelly clayey SAND
TP5	0.6	Red gravelly sandy CLAY
TP6	0.3	Dark brown gravelly clayey SAND (possible made ground-brick)

4.5.2 Laboratory Analysis

The soil samples taken were despatched to the laboratories of Derwentside Environmental Testing Services Limited.

The following chemical tests were undertaken:

Metals and Metalloids

Lead
Arsenic
Mercury
Chromium
Copper
Nickel
Zinc

In-Organics

Cyanide
Sulphate

Others

pH (acidity)
Organic Matter
Asbestos

Organic Chemicals

Phenol
Polycyclic Aromatic Hydrocarbons (PAHs)

The laboratory soil chemical test results are presented in **Annex F**.

SECTION 5 Soil Analytical Results

5.1 Soil Assessment Methodology

Comparison of the analytical results has been made with the 2015 residential (including plant uptake) Suitable 4 Use Levels (S4ULs) provided by Land Quality Management Limited and the Chartered Institute of Environmental Health (CIEH). Where CIEH thresholds are not available reference has been made to Category 4 Screening Levels (C4SLs) or CLEA SGVs.

Sulphate results have been compared to British Research Establishment (BRE) guidelines as sulphate levels need only be considered for buried concrete risk assessment only, not human health related.

5.2 Soil Test Results

A summary of the chemical test results which include the regulatory soil guideline values used in the Tier 1 assessment are given in **Tables 5.1 to 5.3**.

Table 5.1 Summary of Soil Chemical Test Results Standard Suite					
Substance	SGV/GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Arsenic	40	CLEA	2.3	17	0
Cadmium	85	CLEA	<0.1	0.8	0
Chromium III	910	CIEH	13	31	0
Chromium VI	6	CIEH	<1.0	<1.0	0
Copper	2400	CIEH	9.5	82	0
Lead	310	C4SL	9.8	530	1
Mercury	56	CLEA	<0.05	0.52	0
Nickel	180	CIEH	9.1	36	0
Selenium	430	CLEA	<0.5	0.6	0
Zinc	40000	CIEH	52	170	0
Cyanide	8	CLEA	<0.1	11	1
Phenols	420	CLEA	<0.3	<0.3	0
Sulphate	2400	BRE	500	16000	2
Aqueous sulphate	500	BRE	940	1500	2
Organic Matter	-	-	0.4	4.3	-
pH	-	-	8.2	11.3	-
Total PAH	-	-	0.59	11	See Table 5.2

Notes:

- no available guideline

5.2 Soil Test Results (Continued)

All samples were tested for speciated PAH testing.

Table 5.2 Summary of Soil Chemical Test Results Speciated PAH					
Substance	GAC (mg/kg)	Source	Measured Concentrations of Tested Substances (mg/kg)		Number of Exceedences
			Minimum	Maximum	
Naphthalene	2.3	CIEH	<0.03	0.13	0
Acenaphthylene	2900	CIEH	<0.03	0.13	0
Acenaphthene	3000	CIEH	<0.03	0.23	0
Fluorene	2800	CIEH	<0.03	0.2	0
Phenanthrene	1300	CIEH	0.07	0.97	0
Anthracene	31000	CIEH	<0.03	0.31	0
Fluoranthene	1500	CIEH	0.12	1.9	0
Pyrene	3700	CIEH	0.17	1.6	0
Benzo(a)anthracene	11	CIEH	0.09	1.1	0
Chrysene	30	CIEH	0.09	1.1	0
Benzo(b)fluoranthene	3.9	CIEH	0.08	1.4	0
Benzo(k)fluoranthene	110	CIEH	0.03	0.55	0
Benzo(a)pyrene	3.2	CIEH	0.04	0.87	0
Indeno(123cd)pyrene	45	CIEH	<0.03	0.38	0
Dibenzo(ah)anthracene	0.31	CIEH	<0.03	0.11	0
Benzo(ghi)perylene	360	CIEH	<0.03	0.57	0

Notes:

- Thresholds based on 1.0% SOM

Asbestos testing was undertaken on samples of made ground. **Table 5.3** below summarises the findings:

Table 5.3 Summary of Soil Test Results Asbestos		
Location	Depth (m)	Result
TP1	0.6	Bundle of chrysotile fibres. <0.001% mass
TP1	1.2	No asbestos detected
TP2	0.3	
TP3	0.4	
TP4	0.2	
TP5	0.1	
TP5	0.6	
TP6	0.3	Bundles of crocidolite fibres <0.001% mass

SECTION 6 Gas Monitoring

Three gas wells were installed to assess if there are any risks from ground gas/landfill gas on site, in all three boreholes.

One round of gas monitoring has been carried out to date.

Methane concentrations were found to be between 0.3% and 3.8% V/V.

Carbon dioxide levels varied between being 0.1% to 4.1% V/V.

Oxygen concentrations varied between 0.2% and 19.5% V/V.

The gas flow rate from the boreholes was also assessed. No flow was recorded.

Based on the gas monitor flow rate detection limit of 0.1l/hr and the highest recorded methane concentration of 4.1%, a gas screening value of 0.0041l/hr is calculated, as follows:

$$(4.1/100) \times 0.1 = 0.0041\text{l/hr}$$

When this result is compared with Table 8.5 of CIRIA report C665, the site is classified as 'gas characteristic situation 1'.

No gas protection measures are required for 'gas characteristic situation 1' sites.

However, given that the maximum methane level exceeds 1% it is considered that gas protection should be incorporated into the development in accordance with '**gas characteristic situation 2**'.

The gas monitoring results are presented in **Annex G**.

SECTION 7 Quantitative Risk Assessment

7.1 Contaminants of Concern

7.1.1 Contaminants of Concern in Soil

Contaminants of concern are those that were found to exceed their residential threshold level.

Only lead and cyanide were identified as contaminants of concern.

Lead was found to be present at a concentration of 530mg/kg in made ground in TP6 (0.3m), exceeding the residential threshold level of 310mg/kg.

Cyanide was found to be present at a concentration of 11mg/kg in made ground in TP1 (0.6m), exceeding the residential threshold level of 8mg/kg.

Chrysotile asbestos fibres were identified in made ground in TP1 (0.6m) and bundles of crocidolite asbestos fibres were found in TP6 (0.3m)

Sulphate was exceeded in two samples when compared to BRE concrete criteria. Sulphate does not present a risk to human health.

7.1.2 Leachable Contaminants of Concern

No substances were present at levels deemed sufficiently high to produce unacceptable leachate concentrations.

7.2 Potential Receptors and Pathways

7.2.1 Human Receptors

Receptors are at risk from lead and cyanide contamination through dermal contact with soil/dust, ingestion of soil/soil dust and inhalation of soil dust.

Inhalation of asbestos is also a risk to all human receptors.

In-situ gas monitoring has identified a risk from methane gas and gas protection is required for all new buildings.

7.2.2 Aquatic Environment

The aquatic environment is not considered to be at risk.

7.3 Mitigation and Remedial Measures

7.3.1 Human Health

As good practice, construction workers should adhere to good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate. This should include appropriate protection from asbestos fibres.

7.3.1 Human Health (Continued)

Dust suppression should be in place during site works to protect workers, neighbouring site users and passers-by.

Upon development all communal garden and soft landscaped areas should be capped with 600mm of clean imported soils.

A double 'no-dig' barrier comprising an orange geotextile and underlying geogrid will be required between the made ground and overlying capping layer.

Any imported soils should be validated as clean and suitable for use in accordance with 'Requirements for the Chemical testing of Imported Soils for Various End Uses and Validation Cover Systems'.

For proposed new supply water pipes, the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' should be consulted.

Gas protection measures should be installed in accordance with CIRIA C665.

In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM3 soils destined for off-site disposal should be classified on the basis of their hazard phrases prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties. Terra Firma (Wales) Ltd offer this service if required.

7.3.2 Aquatic Environment

During the construction period, there is a risk to the environment/adjacent sites from de-watering, digging foundations, moving contaminated soil, drainage misconnections, discharges to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills.

The risk is considered to be negligible as any adverse effects will be easily preventable by due diligence to good construction practise and housekeeping in preventing surface runoff and the spillage of materials.

The basic measures that should be taken are as follows:

- Prepare a drainage plan and mark the manholes to prevent pollutants accidentally reaching the surface water sewers;
- Carry out any activities that could cause pollution in a designated, bunded area, away from rivers or boreholes. Where possible it should drain to the foul sewer;
- Use settlement ponds to remove silty water;
- Store all oils and chemicals in a fully bunded area to prevent leaks or spills;
- Get advice on whether you need an environmental permit and apply in good time

SECTION 8 Engineering Recommendations

8.1 Preparation of Site

Contingencies should be made for the protection/diversion any underground/overhead services present beneath the site brought about as a result of the proposed works.

Allowances should be made for the excavation of any soft spots/areas and their replacement with well compacted imported granular materials.

Any reduced levels should be brought up to the required levels with suitable inert mainly granular materials. Department of Transport (DoT) type 2 sub base or similar should be used and should be compacted in layers to the requirements of the Specification for Highway works.

In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM3 soils and other materials destined for off-site disposal should be classified on the basis of their hazard phrases prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties. Terra Firma (Wales) Ltd offer this service if required.

8.2 Foundation and Floor Slab Solution

Due to the presence of made ground and soft alluvial clays beneath the site traditional shallow foundations are not recommended. Such foundations will lead to high total and differential settlements.

A piled foundation is advised for the proposed apartment blocks. Precast concrete driven piles founded within the underlying weathered red mudstone and/or sandstone is recommended.

For a 275mm square precast concrete pile driven to an appropriate set within the underlying competent mudstone a safe working load of typically 500kN should be achieved. Based upon the site investigation data, pile lengths should vary between 17.5m and 18m beneath current ground levels.

The estimated working loads, pile type and lengths should be confirmed by a specialist piling contractor. It may be prudent to test drive piles at select locations.

For the quoted pile size, founded within the competent bedrock, total settlements should not exceed 10mm with differential movements between adjacent piles being less than half this value.

Allowances should be made for re-driving piles should buried obstructions be encountered.

Floor slabs should be designed as suspended.

Measurements should be kept on pile vibrations during driving. Measures should also be taken to dampen such vibrations. If, however, vibrations exceed permissible values then consideration should be given to using a contiguous flight auger (cfa)/bored pile solution.

All foundation formations should be inspected by a suitably qualified Engineer before being concreted.

8.3 Excavations and Formations

Shallow excavations will be possible with normal soil excavating machinery.

Shallow perched water flows are not expected. Any water inflows together with rainwater infiltration should be dealt with by conventional pumping techniques.

The sides of any excavations deeper than 1.0m, or shallower if unstable, should be supported by planking and strutting or other proprietary means.

The sub-formations/formations are likely to be susceptible to loosening, softening and deterioration by exposure to weather (rain, frost and drying conditions), the action of water (flood water or removal of groundwater) and site traffic.

Formations should never be left unprotected and continuously exposed to rain causing degradation, or left exposed/uncovered overnight, unless permitted by a qualified engineer.

Construction plant and other vehicular traffic should not be operated on unprotected formations.

As a minimum the formation/excavation surfaces must be protected by blinding concrete immediately after exposure.

Allowances should be made for the removal of soft spots/areas and their replacement with well compacted granular materials.

Allowances should also be made for special precautions to prevent formation deterioration in addition to the above.

8.4 Protection of Buried Concrete

Levels of total sulphate within the in-situ materials measured between 500mg/kg to 16000mg/kg and the pH varied between 8.2 and 11.3. Aqueous sulphate levels ranged between 940mg/l and 1500mg/l.

Buried concrete should as a minimum conform to Class AC-2 (Table C2 of BRE Digest 1:2005).

8.5 Access Roads and Car Parking Areas

For car parking and road areas, formations within the in-situ soils a CBR value of up to 5% may be applicable for design purposes.

Allowances should be made for the removal of any 'soft spots/areas' and their replacement with well-compacted granular materials as previously described.

ANNEX A
Landmark Historical Maps



Monmouthshire

Published 1883 - 1884

Source map scale - 1:500

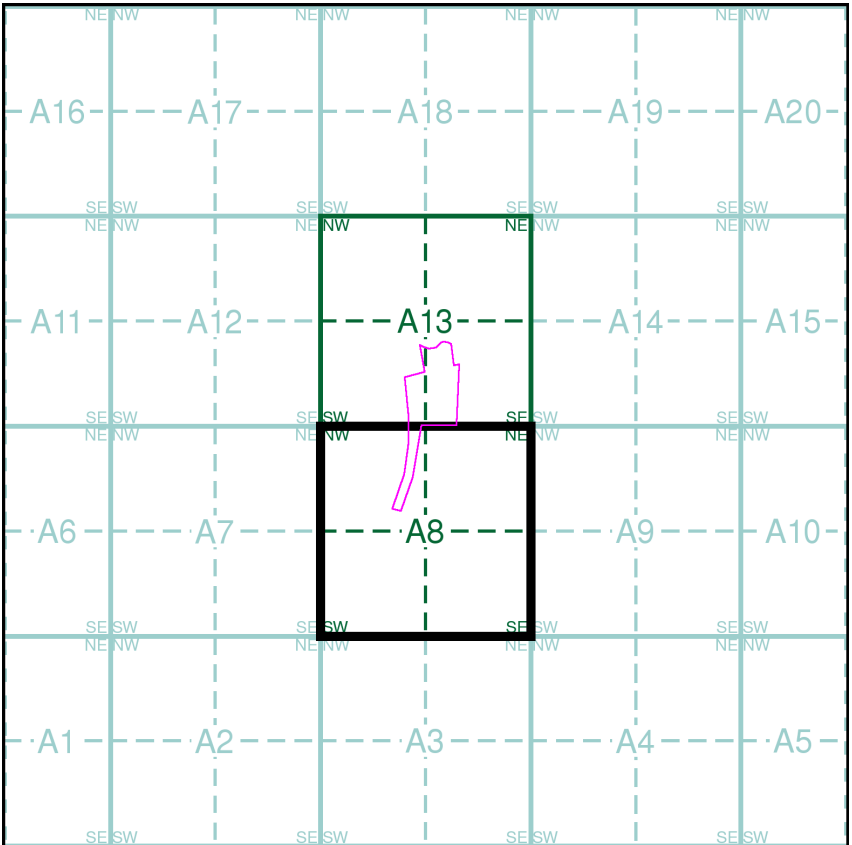
The 1:500 scale Ordnance Survey mapping was introduced in 1855 as a replacement for the 1:528 scale and to compliment the 1:2500 scale that had been implemented in 1853. By 1895, the 1:500 scale covered most towns over a population of about 4000 at the time of survey, although very few towns were mapped more than once at this scale, and none have been since 1910. The 1:500 scale gives particular emphasis to such features as lamp posts, man holes, arched passages and minor building projections. Also often featured are divisions between tenements, interior ground floor layouts of public buildings, and on earlier plans, the functions of the various parts of larger industrial premises are also indicated. Content of the plans does vary however, from one town to the next in terms of, for example, the completeness of railway tracks and the coverage of public buildings.

Please note: Due to the partial coverage of Historical Town Plans, it is possible that not all segments within an order will contain mapping. Only the segments that have Town Plan coverage will be generated.

Map Name(s) and Date(s)

028_16_009 1883 1:500	028_16_010 1884 1:500
028_16_014 1884 1:500	028_16_015 1883 1:500

Historical Town Plan - Segment A8



Order Details

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National Grid Reference: 331690, 189280
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Site Area (Ha): 4.52
Search Buffer (m): 0

Site Details

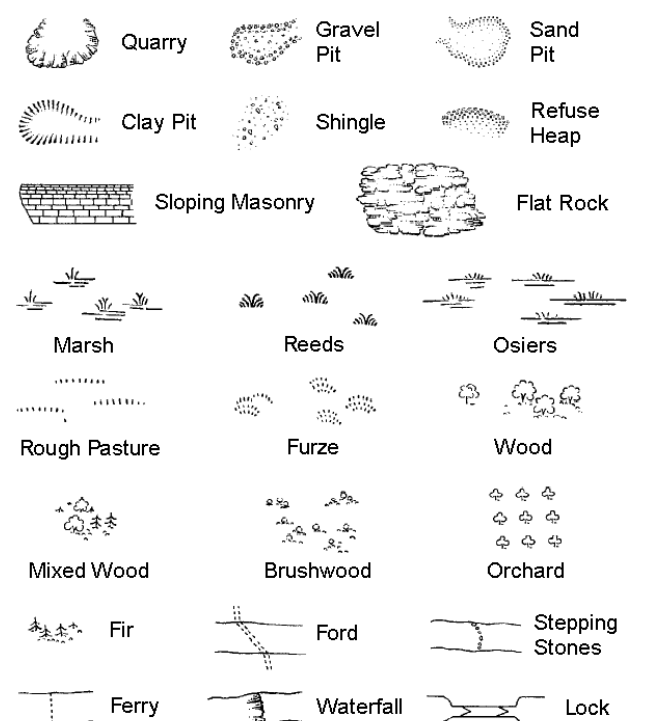
., Herbert Road, NEWPORT, Gwent, NP19 7BH



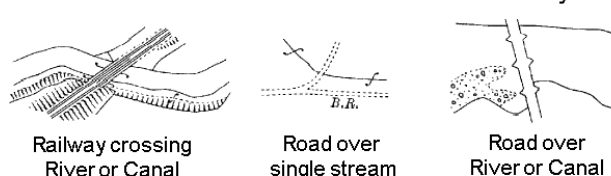
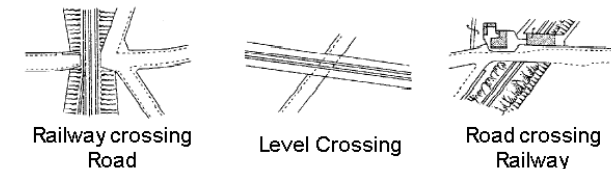
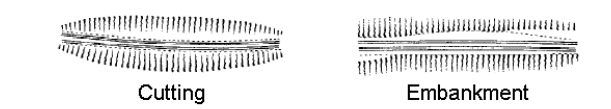
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Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Historical Mapping Legends

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



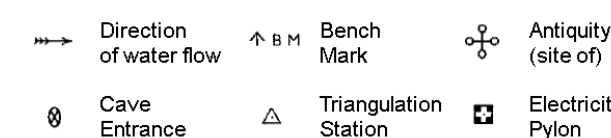
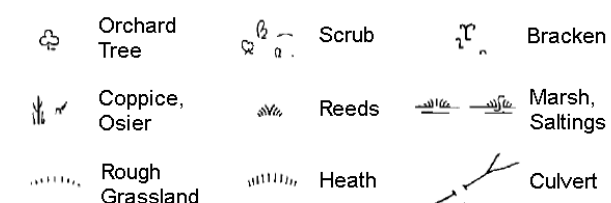
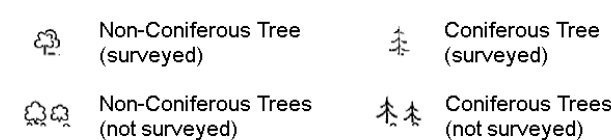
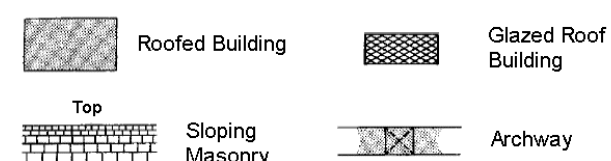
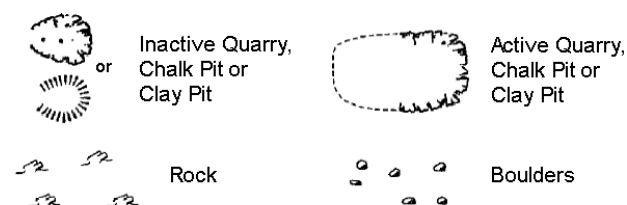
	Trig. Station	507 	Altitude at Trig. Station
<i>B.M. 325-9</i> 	Bench Mark	342 +	Surface Level
	Arrow denotes flow of water		Antiquities (site of)



-----	County Boundary (Geographical)
- . - . - .	County & Civil Parish Boundary
+ . + . + .	Administrative County & Civil Parish Boundary
-----	County Borough Boundary (England)
-----	County Burgh Boundary (Scotland)

<i>B.P.B.S.</i>	Boundary Post or Stone	<i>P.C.B.</i>	Police Call Box
<i>B.R.</i>	Bridle Road	<i>P.</i>	Pump
<i>E.P.</i>	Electricity Pylon	<i>S.P.</i>	Signal Post
<i>F.B.</i>	Foot Bridge	<i>Sl.</i>	Sluice
<i>F.P.</i>	Foot Path	<i>Sp.</i>	Spring
<i>G.P.</i>	Guide Post or Board	<i>T.C.B.</i>	Telephone Call Box
<i>M.S.</i>	Mile Stone	<i>Tr.</i>	Trough
<i>M.P.M.R.</i>	Mooring Post or Ring	<i>W.</i>	Well

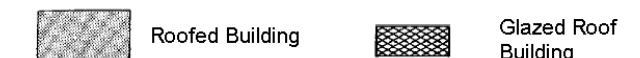
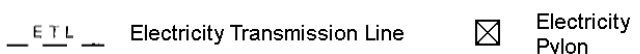
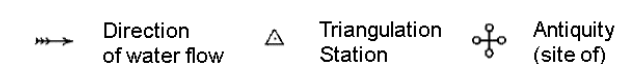
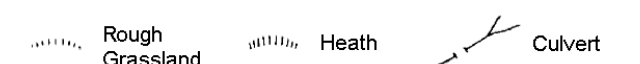
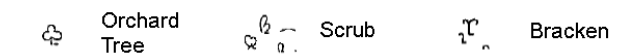
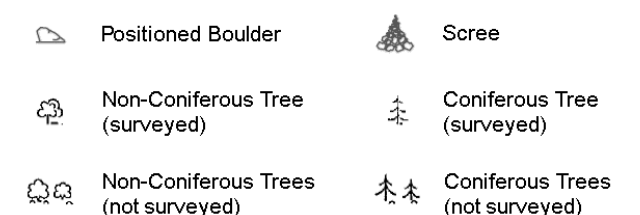
Ordinance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information



	County Boundary (Geographical)
	County & Civil Parish Boundary
	Civil Parish Boundary
	Admin. County or County Bor. Boundary
	London Borough Boundary
	Symbol marking point where boundary mereing changes

BH	Beer House	P	Pillar, Pole or Post
BP, BS	Boundary Post or Stone	PO	Post Office
Cn, C	Capstan, Crane	PC	Public Convenience
Chy	Chimney	PH	Public House
D Fn	Drinking Fountain	Pp	Pump
El P	Electricity Pillar or Post	SB, S Br	Signal Box or Bridge
FAP	Fire Alarm Pillar	SP, SL	Signal Post or Light
FB	Foot Bridge	Spr	Spring
GP	Guide Post	Tk	Tank or Track
H	Hydrant or Hydraulic	TCB	Telephone Call Box
LC	Level Crossing	TCP	Telephone Call Post
MH	Manhole	Tr	Trough
MP	Mile Post or Mooring Post	Wr Pt, Wr T	Water Point, Water Tap
MS	Mile Stone	W	Well
N TL	Normal Tidal Limit	Wd Pp	Wind Pump

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



• • • •	Civil parish/community boundary
— —	District boundary
— • — —	County boundary
o	Boundary post/stone
⌘	Boundary mereing symbol (note: these always appear in opposed pairs or groups of three)

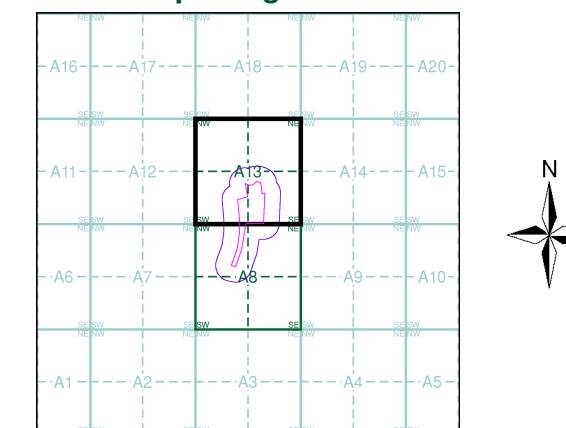
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismdt Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity Pole, Pillar	SB, S Br	Signal Box or Bridge
El Sub Sta	Electricity Sub Station	SP, SL	Signal Post or Light
FB	Filter Bed	Spr	Spring
Fn / D Fn	Fountain / Drinking Ftn.	Tk	Tank or Track
Gas Gov	Gas Valve Compound	Tr	Trough
GVC	Gas Governor	Wd Pp	Wind Pump
GP	Guide Post	Wr Pt, Wr T	Water Point, Water Tap
MH	Manhole	Wks	Works (building or area)
MP, MS	Mile Post or Mile Stone	W	Well



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Page
Monmouthshire	1:2,500	1883	2
Monmouthshire	1:2,500	1901 - 1902	3
Monmouthshire	1:2,500	1920	4
Monmouthshire	1:2,500	1936 - 1937	5
Ordnance Survey Plan	1:2,500	1955 - 1957	6
Ordnance Survey Plan	1:1,250	1955 - 1957	7
Additional SIMs	1:1,250	1957 - 1989	8
Ordnance Survey Plan	1:1,250	1966 - 1968	9
Ordnance Survey Plan	1:2,500	1969 - 1970	10
Supply of Unpublished Survey Information	1:1,250	1974	11
Ordnance Survey Plan	1:1,250	1977	12
Additional SIMs	1:1,250	1978 - 1989	13
Additional SIMs	1:1,250	1989	14
Large-Scale National Grid Data	1:1,250	1993	15
Large-Scale National Grid Data	1:1,250	1994 - 1995	16
Large-Scale National Grid Data	1:1,250	1995 - 1997	17
Large-Scale National Grid Data	1:1,250	1995	18

Historical Map - Segment A13



Order Details

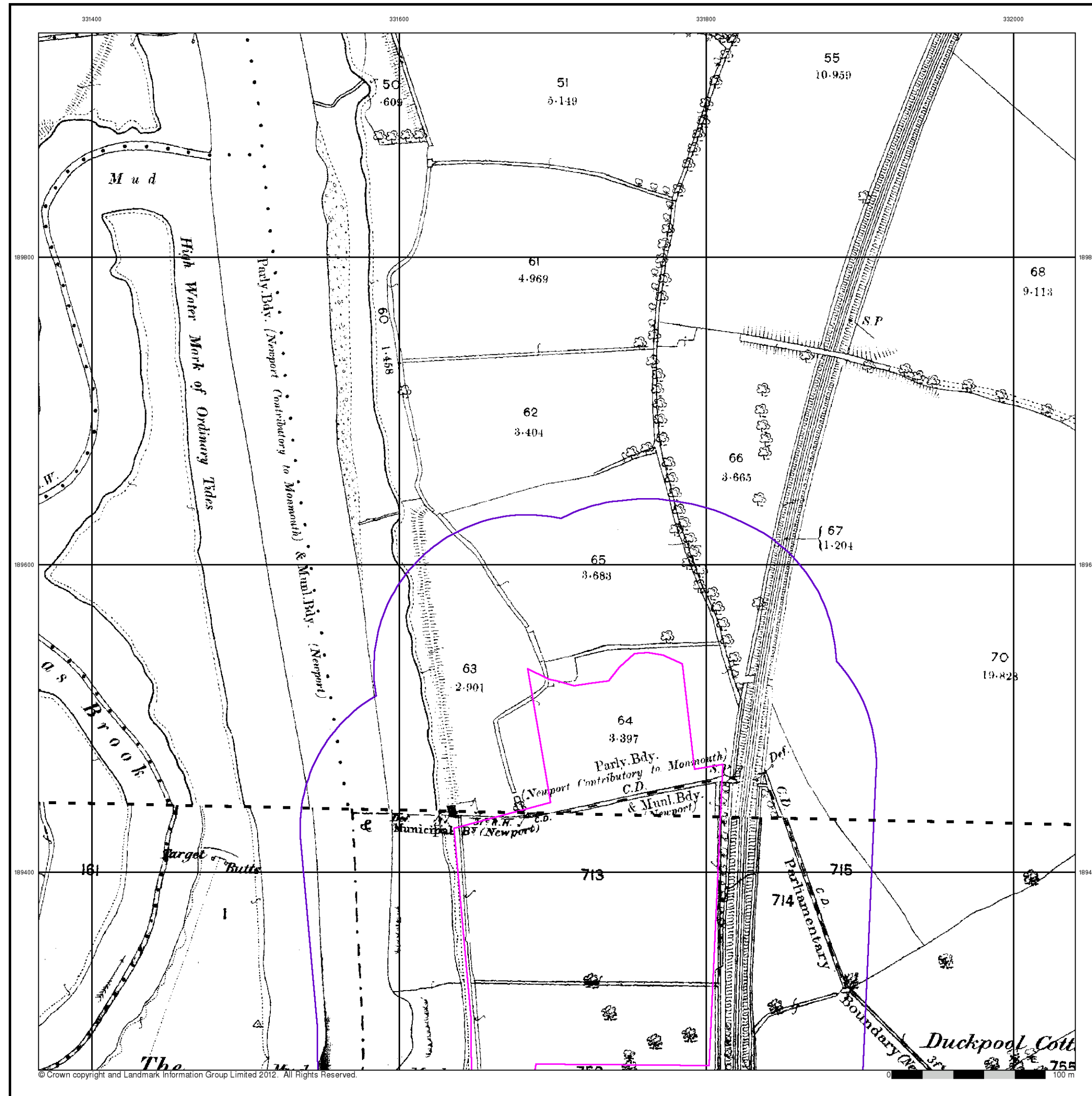
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Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

.. Herbert Road, NEWPORT, Gwent, NP19 7BH



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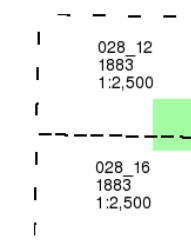
Monmouthshire

Published 1883

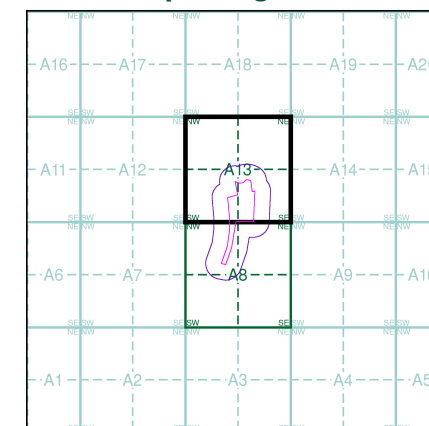
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
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Monmouthshire

Published 1901 - 1902

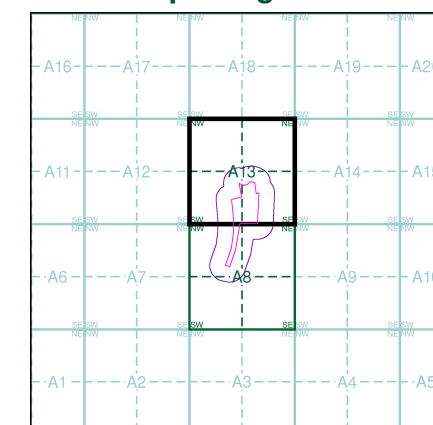
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The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

028_12
1901
1:2,500
028_16
1902
1:2,500

Historical Map - Segment A13



Order Details

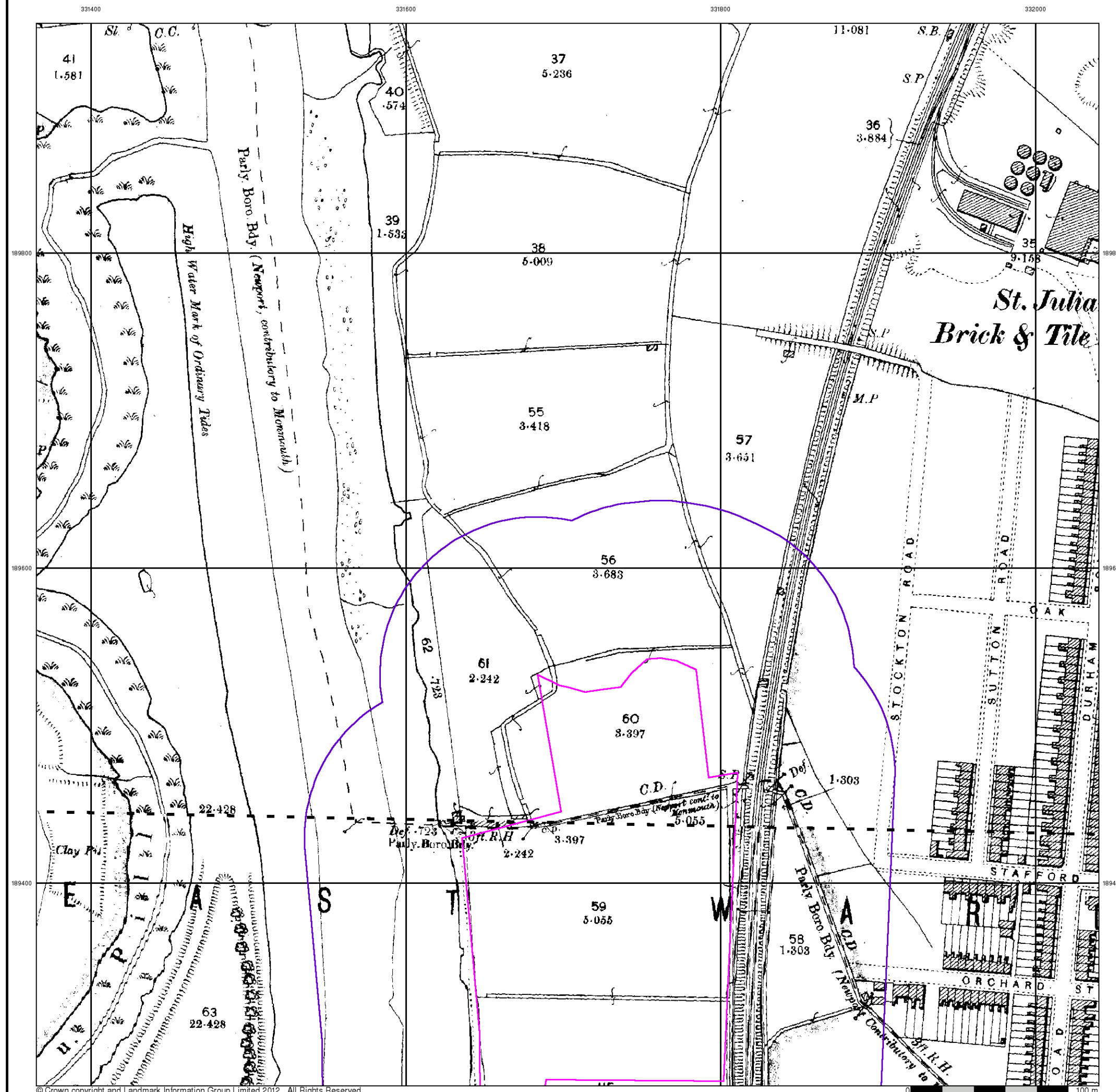
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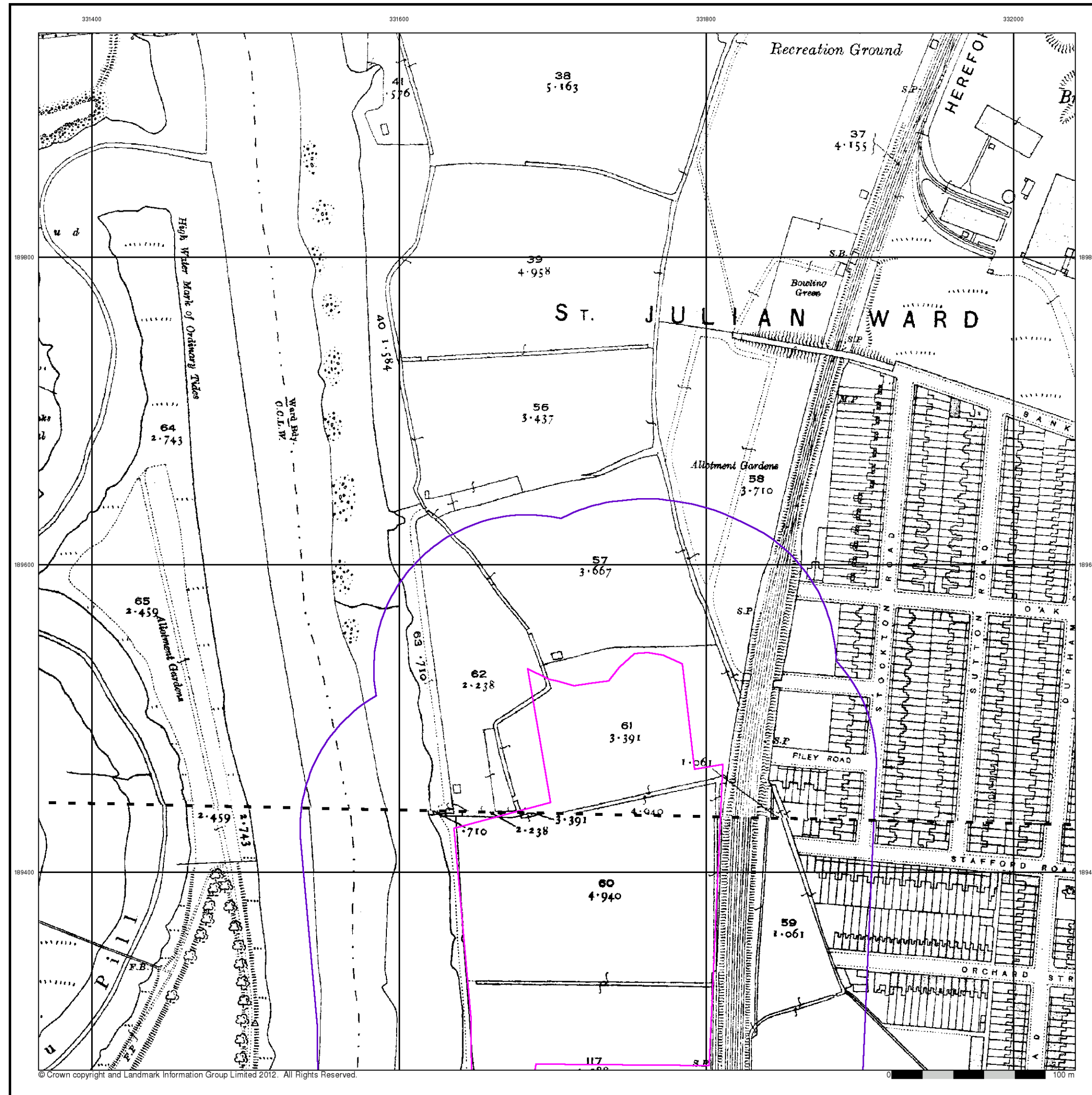
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Monmouthshire

Published 1920

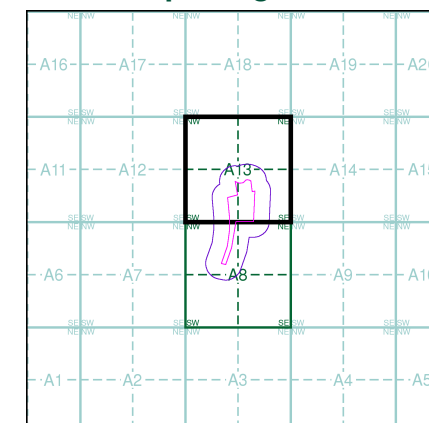
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

028_12
1920
1:2,500
028_16
1920
1:2,500

Historical Map - Segment A13



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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Monmouthshire

Published 1936 - 1937

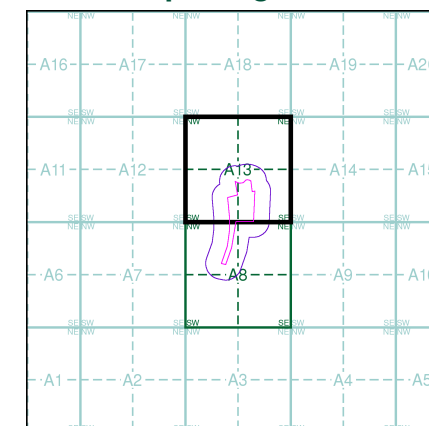
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

028_12
1936
1:2,500
028_16
1937
1:2,500

Historical Map - Segment A13



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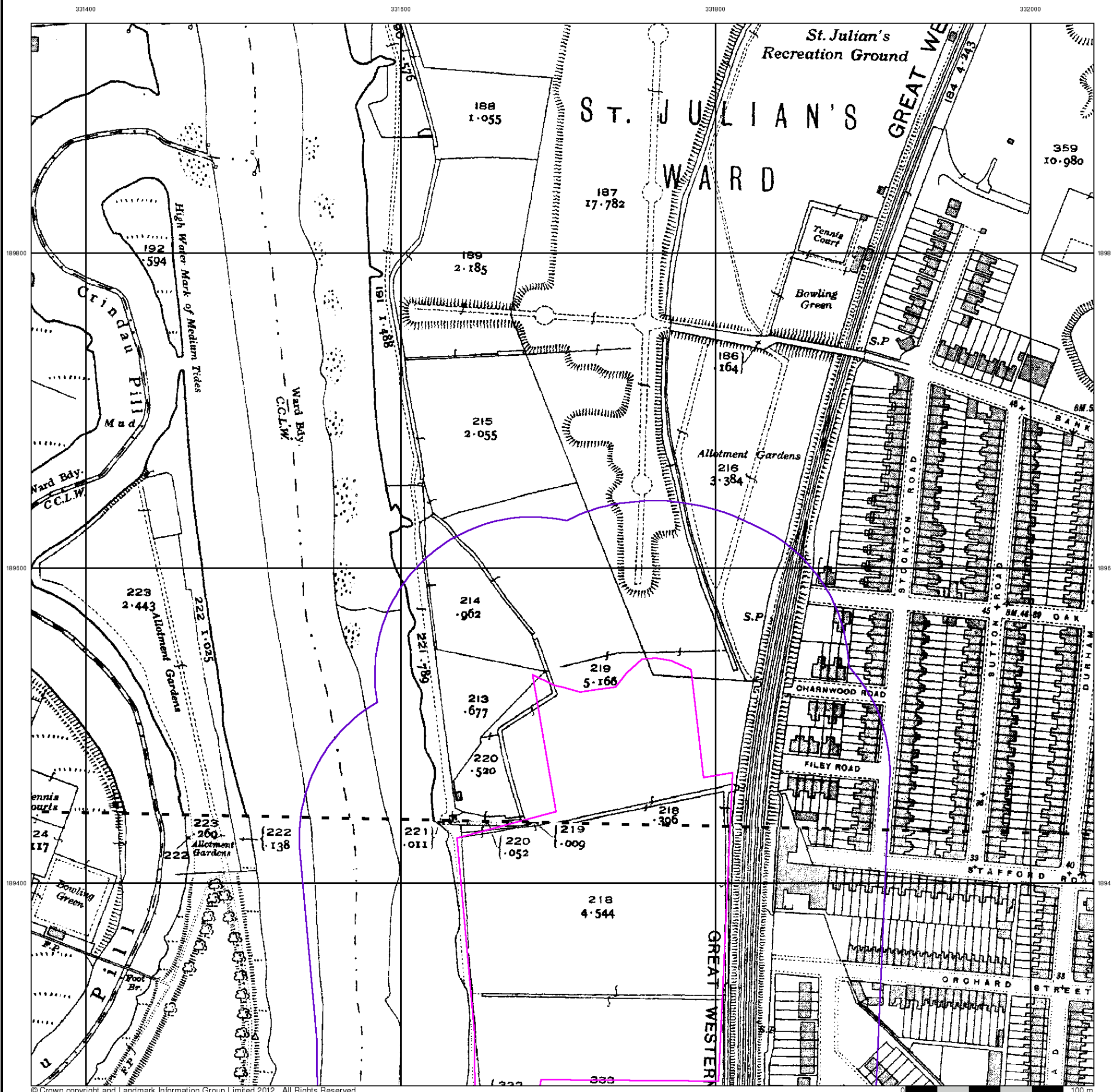
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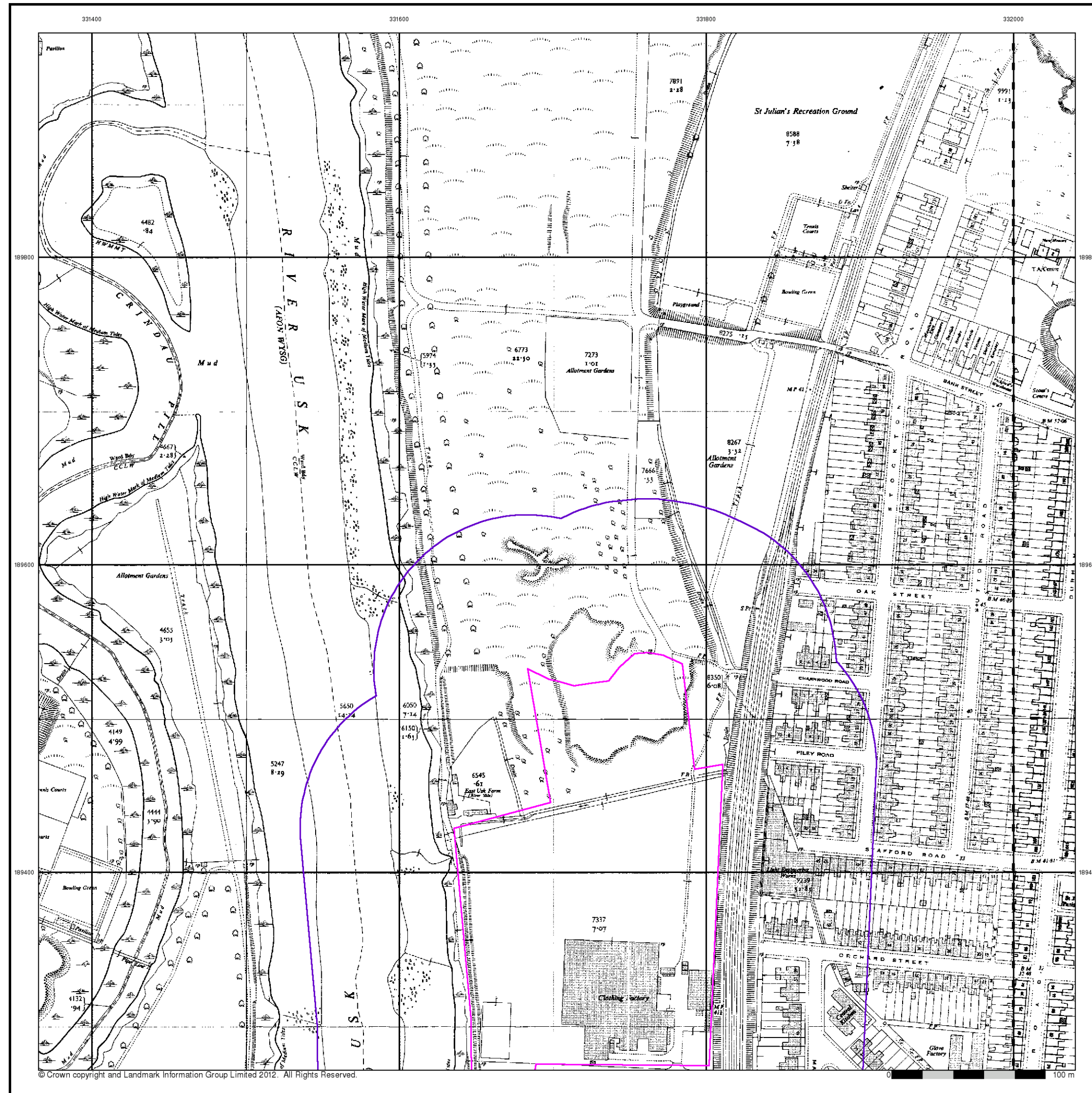
Site Details

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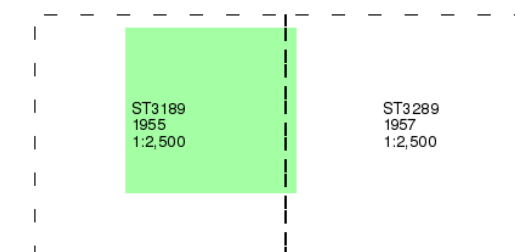
Ordnance Survey Plan

Published 1955 - 1957

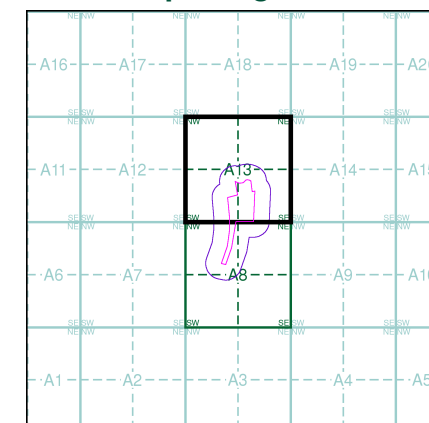
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Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

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Ordnance Survey Plan

Published 1955 - 1957

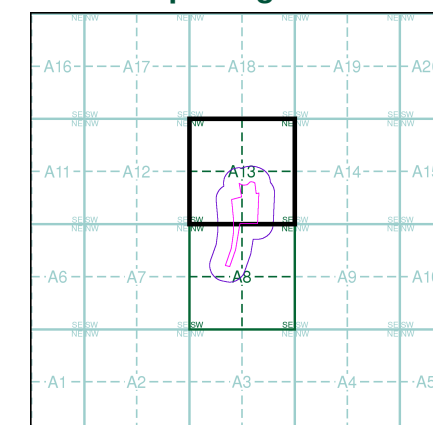
Source map scale - 1:1,250

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Map Name(s) and Date(s)

ST3189NW 1955 1:1,250	ST3189NE 1955 1:1,250	ST3289NW 1957 1:1,250
ST3189SW 1955 1:1,250	ST3189SE 1955 1:1,250	ST3289SW 1957 1:1,250

Historical Map - Segment A13



Order Details

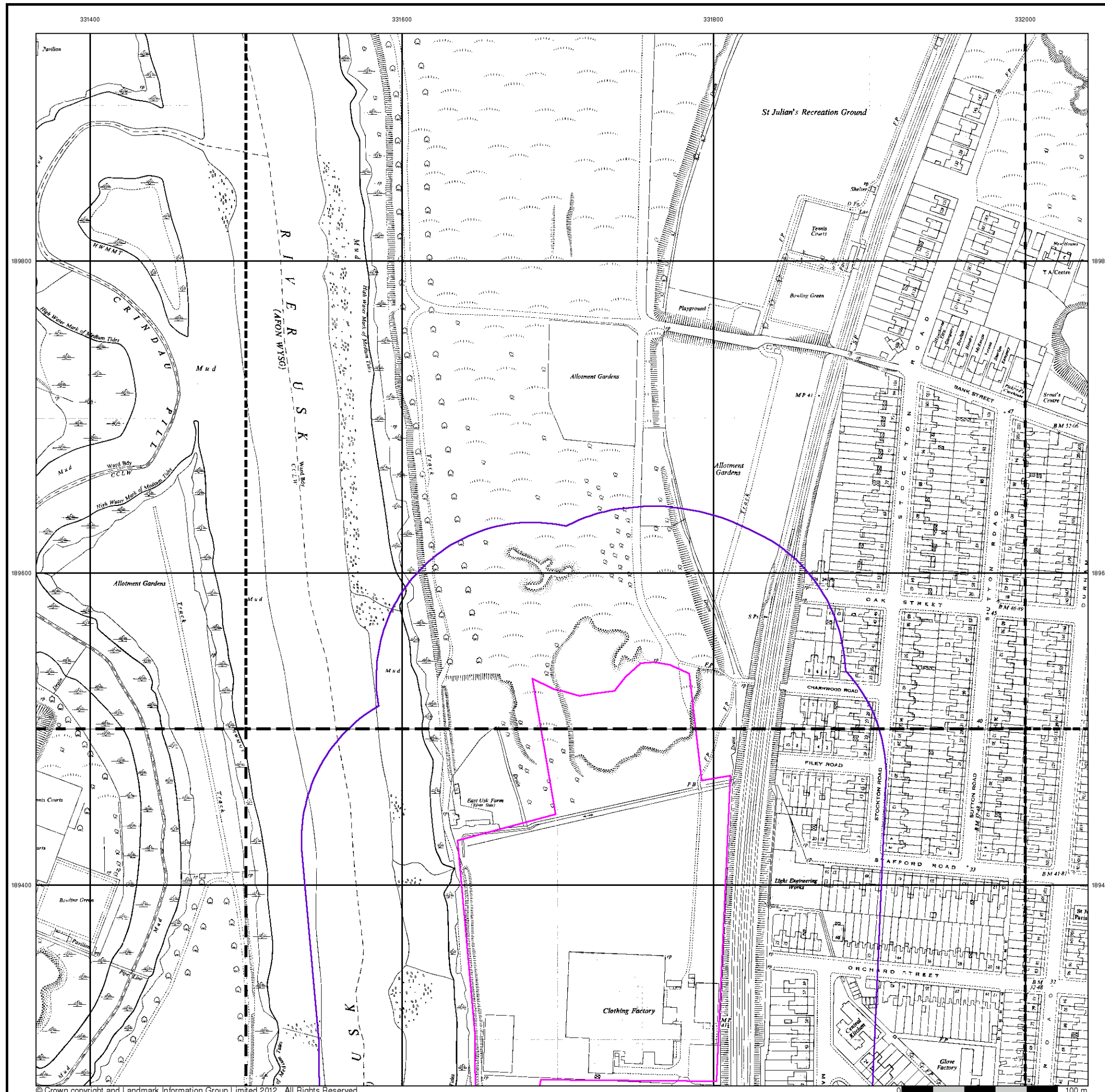
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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Additional SIMs

Published 1957 - 1989

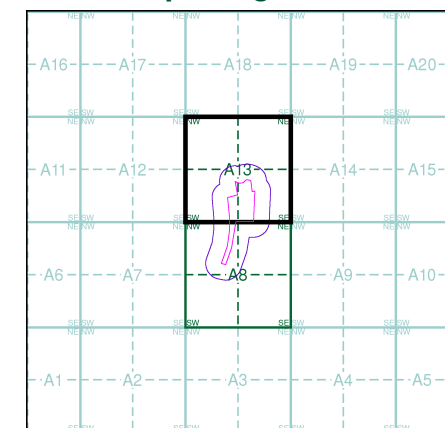
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

ST3 189NW 1989 1:1,250	ST3 189NE 1986 1:1,250	ST3 289NW 1988 1:1,250
ST3 189SW 1982 1:1,250	ST3 189SE 1978 1:1,250	ST3 289SW 1957 1:1,250

Historical Map - Segment A13



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1966 - 1968

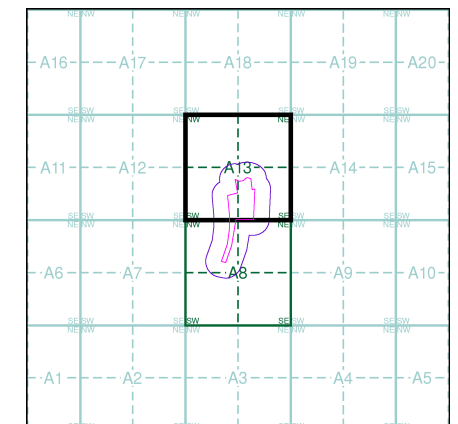
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

ST3189NW 1968 1:1,250	ST3189NE 1968 1:1,250	ST3289NW 1968 1:1,250
ST3189SW 1967 1:1,250	ST3189SE 1966 1:1,250	

Historical Map - Segment A13



Order Details

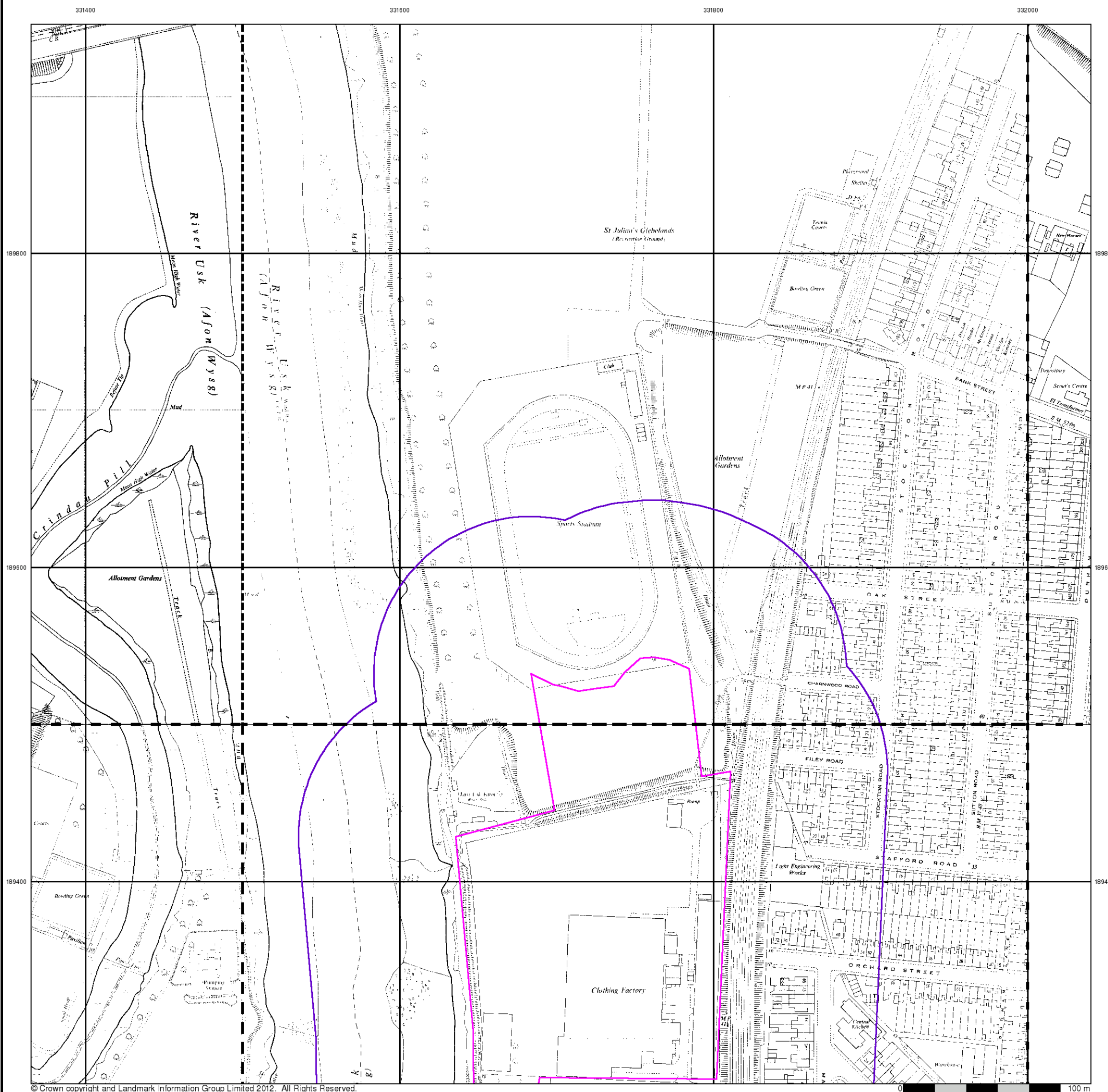
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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Supply of Unpublished Survey Information

Published 1974

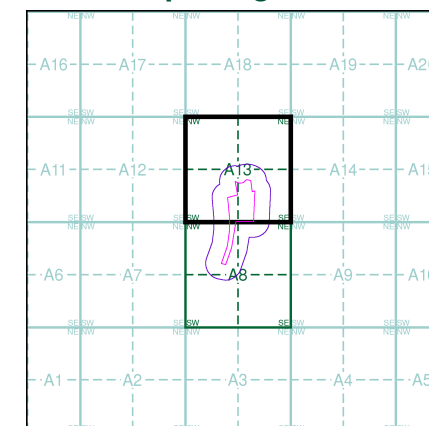
Source map scale - 1:1,250

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

Map Name(s) and Date(s)

ST3189NW	1974	1:1,250
ST3189SW	1974	1:1,250

Historical Map - Segment A13



Order Details

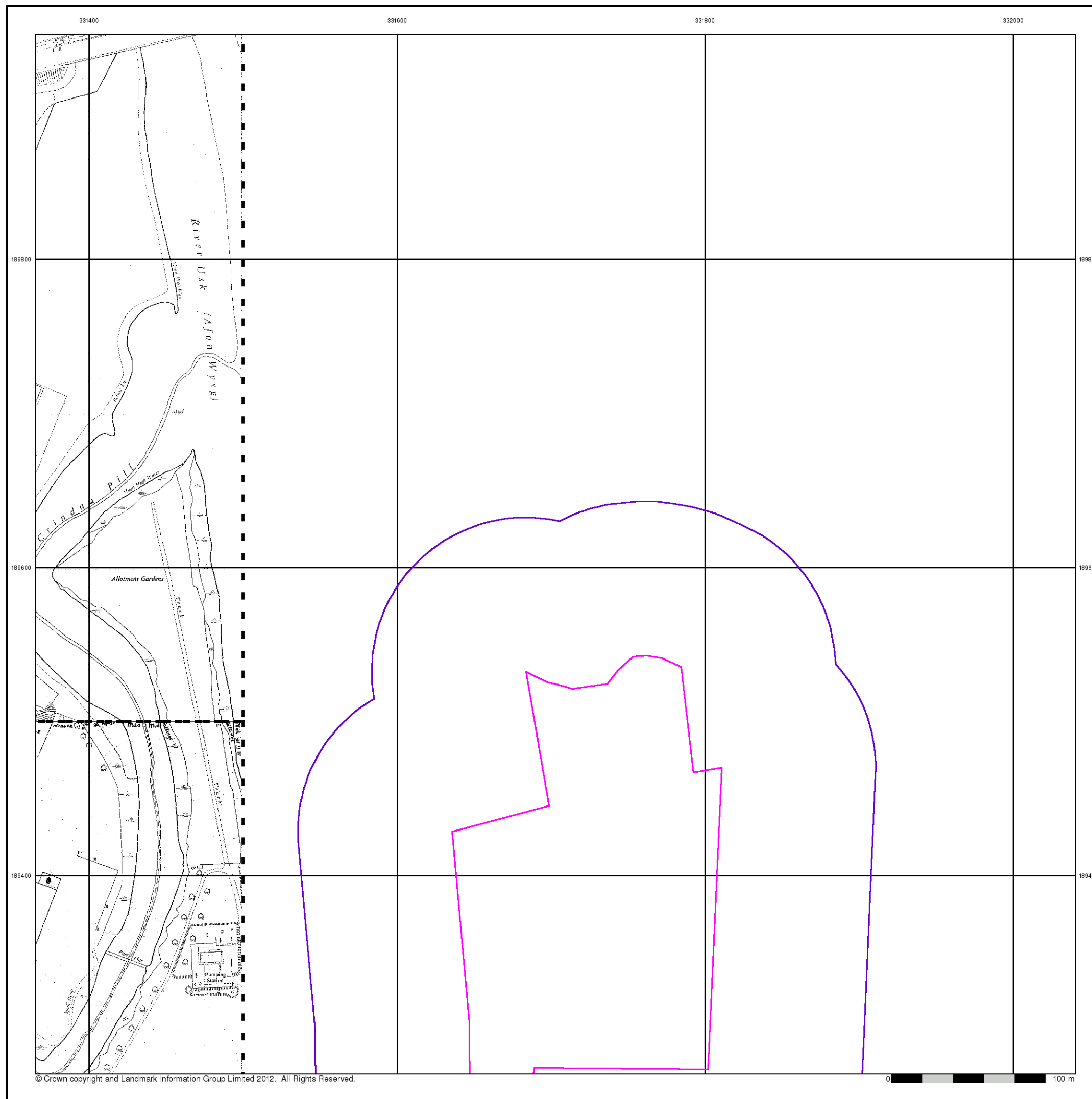
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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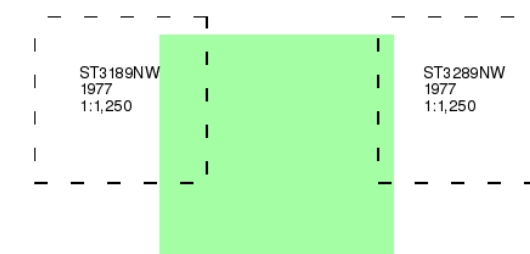
Ordnance Survey Plan

Published 1977

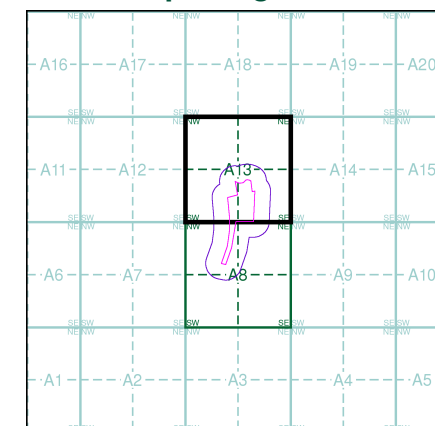
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

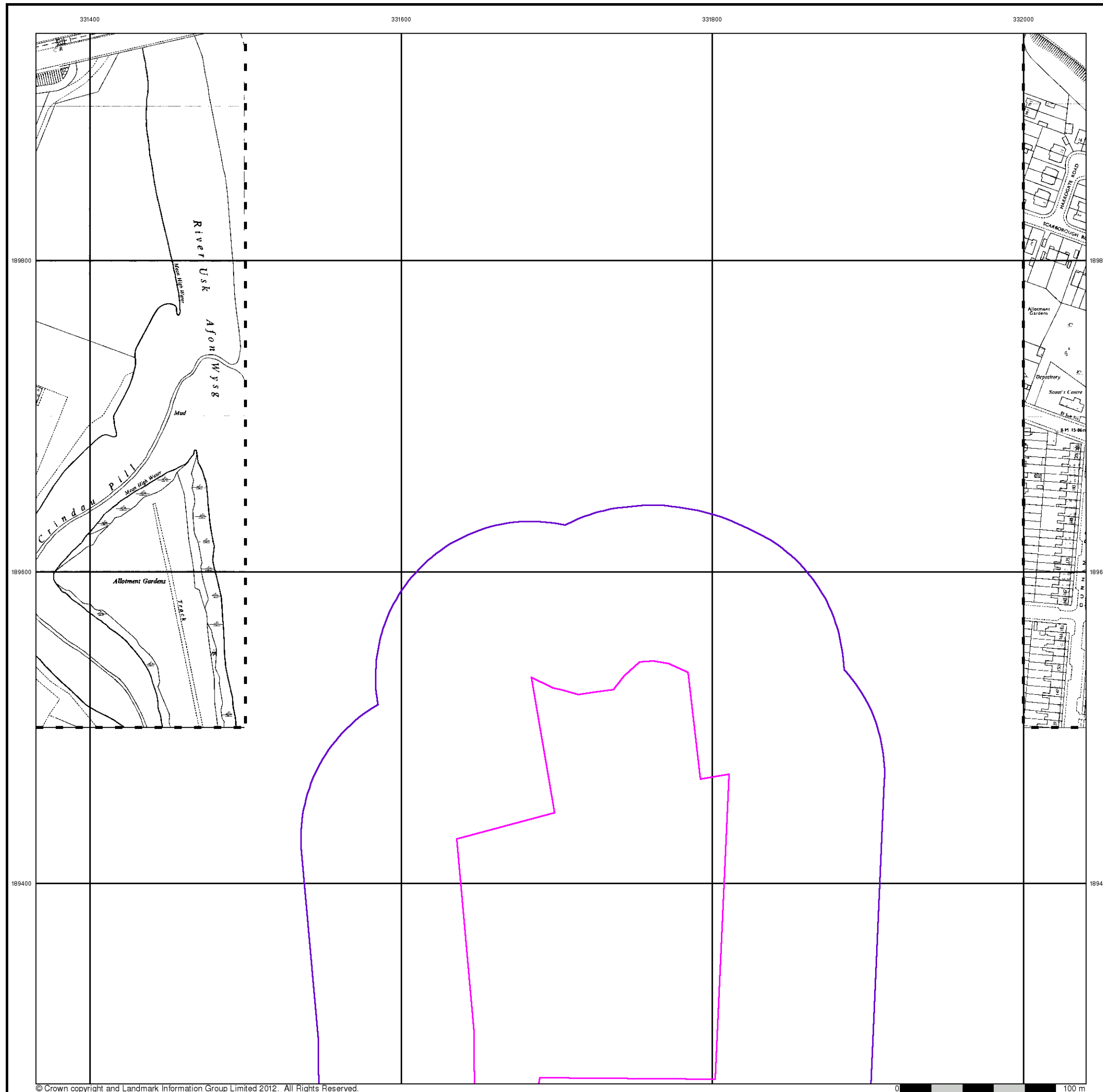
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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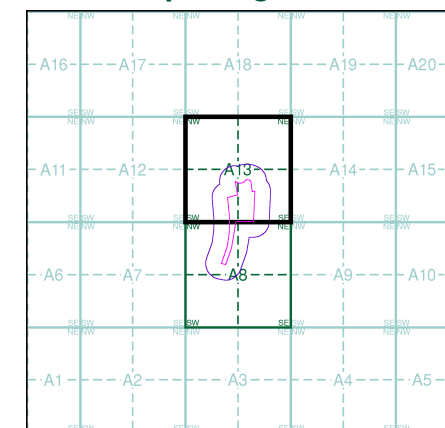
Additional SIMs
Published 1978 - 1989
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

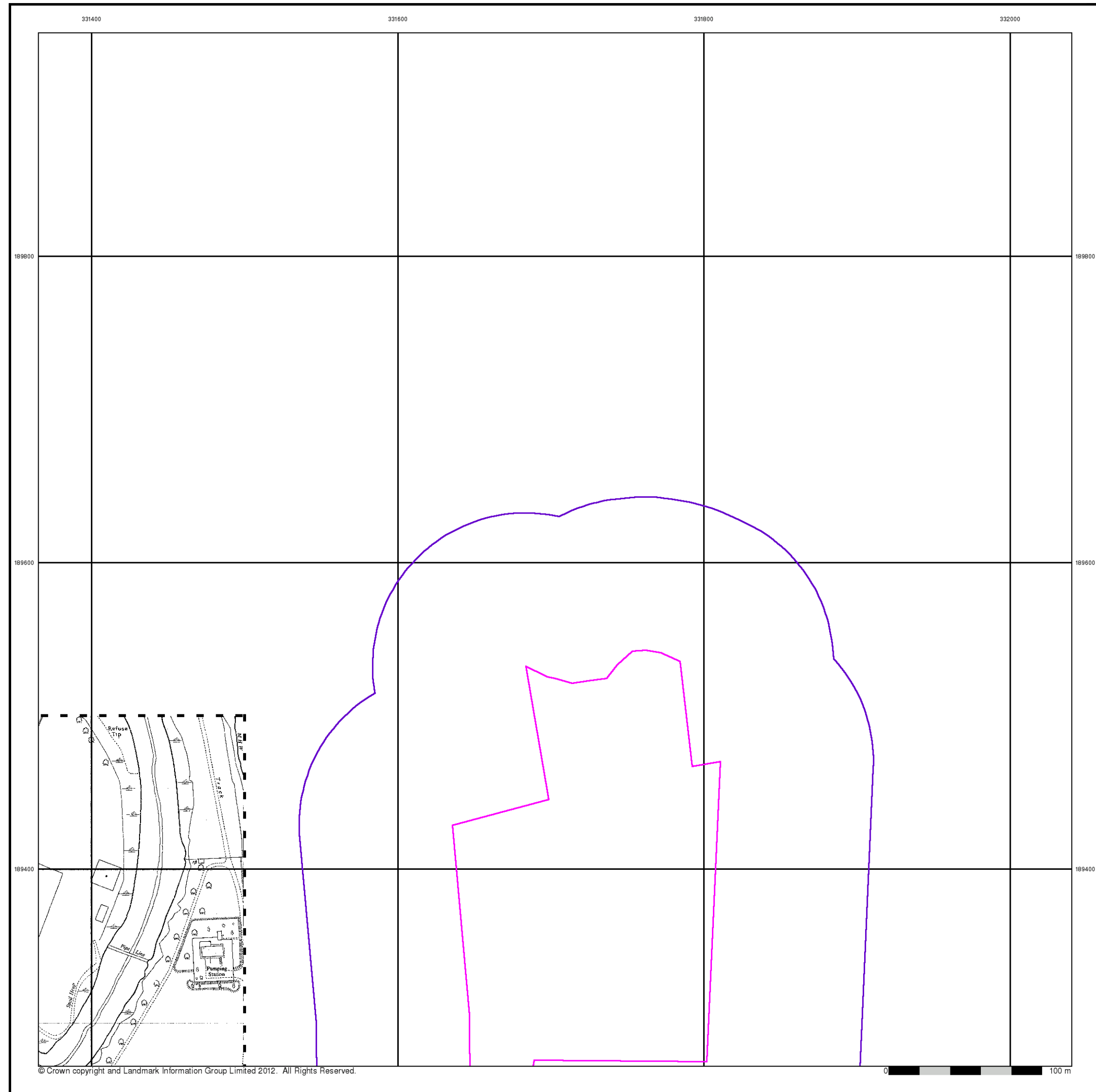
		ST3289NW 1989 1:1,250
ST3189SW 1987 1:1,250	ST3189SE 1987 1:1,250	ST3289SW 1978 1:1,250

Historical Map - Segment A13



Order Details
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100
Site Details
., Herbert Road, NEWPORT, Gwent, NP19 7BH

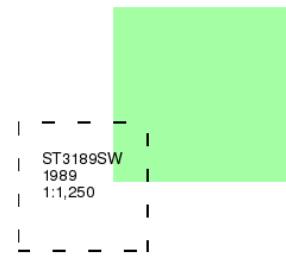
Landmark
Information Group
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



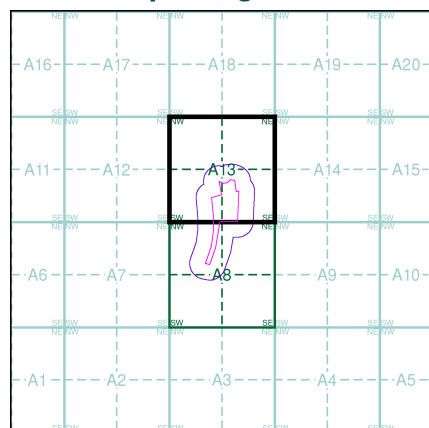
Additional SIMs
Published 1989
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

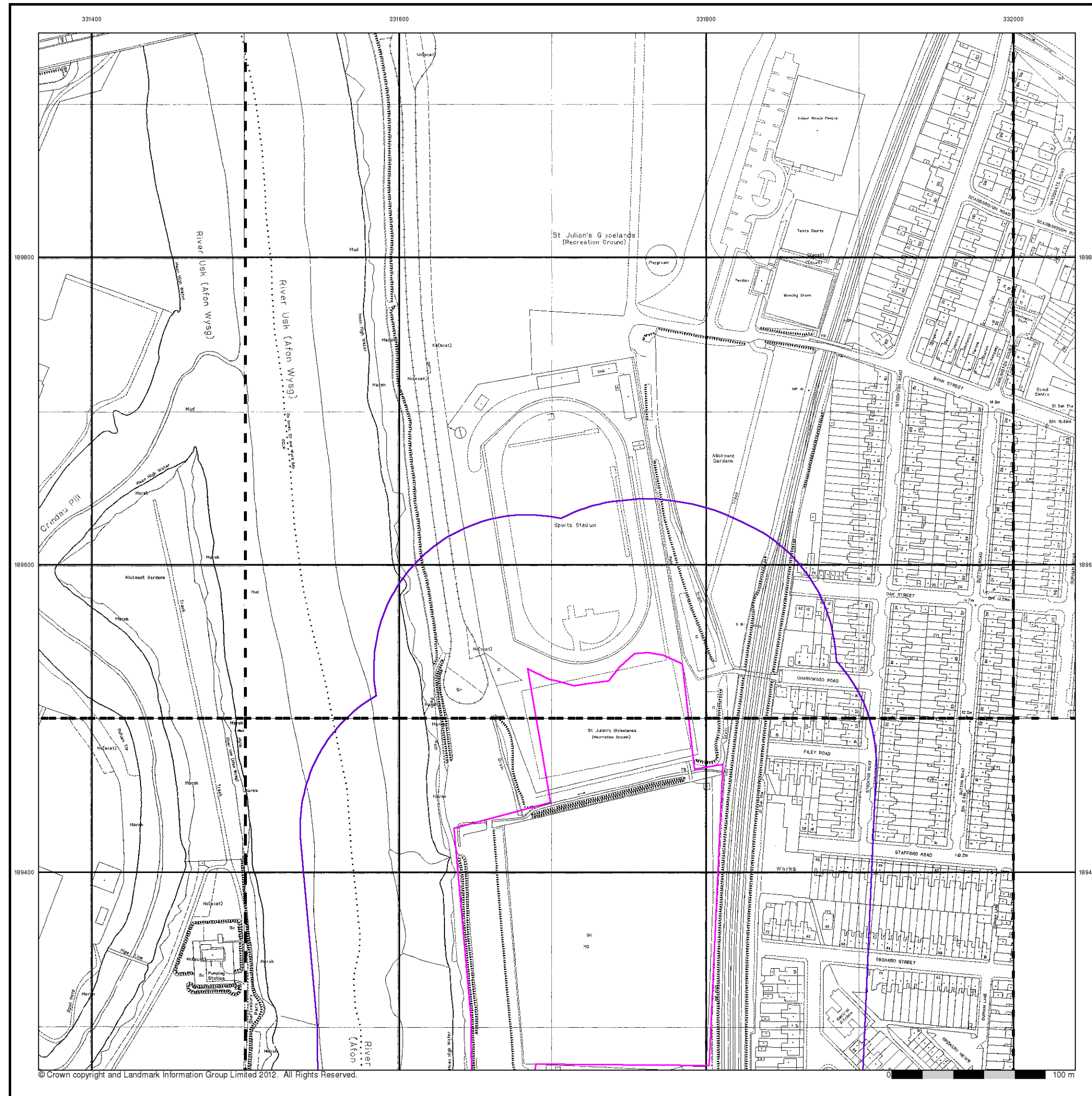


Historical Map - Segment A13



Order Details
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details
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Large-Scale National Grid Data

Published 1994 - 1995

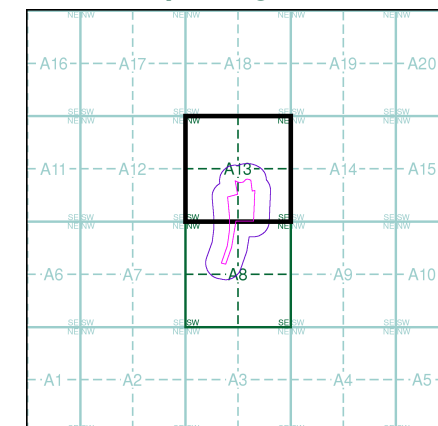
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

ST3 189NW	ST3 189NE	ST3 289NW
1994	1995	1995
1:1,250	1:1,250	1:1,250
ST3 189SW	ST3 189SE	
1994	1994	
1:1,250	1:1,250	

Historical Map - Segment A13



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

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Large-Scale National Grid Data

Published 1995 - 1997

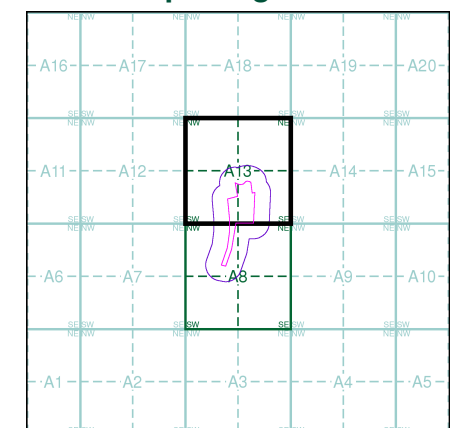
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

ST3189NW 1995 1:1,250	ST3189NE 1995 1:1,250
ST3189SW 1997 1:1,250	

Historical Map - Segment A13



Order Details

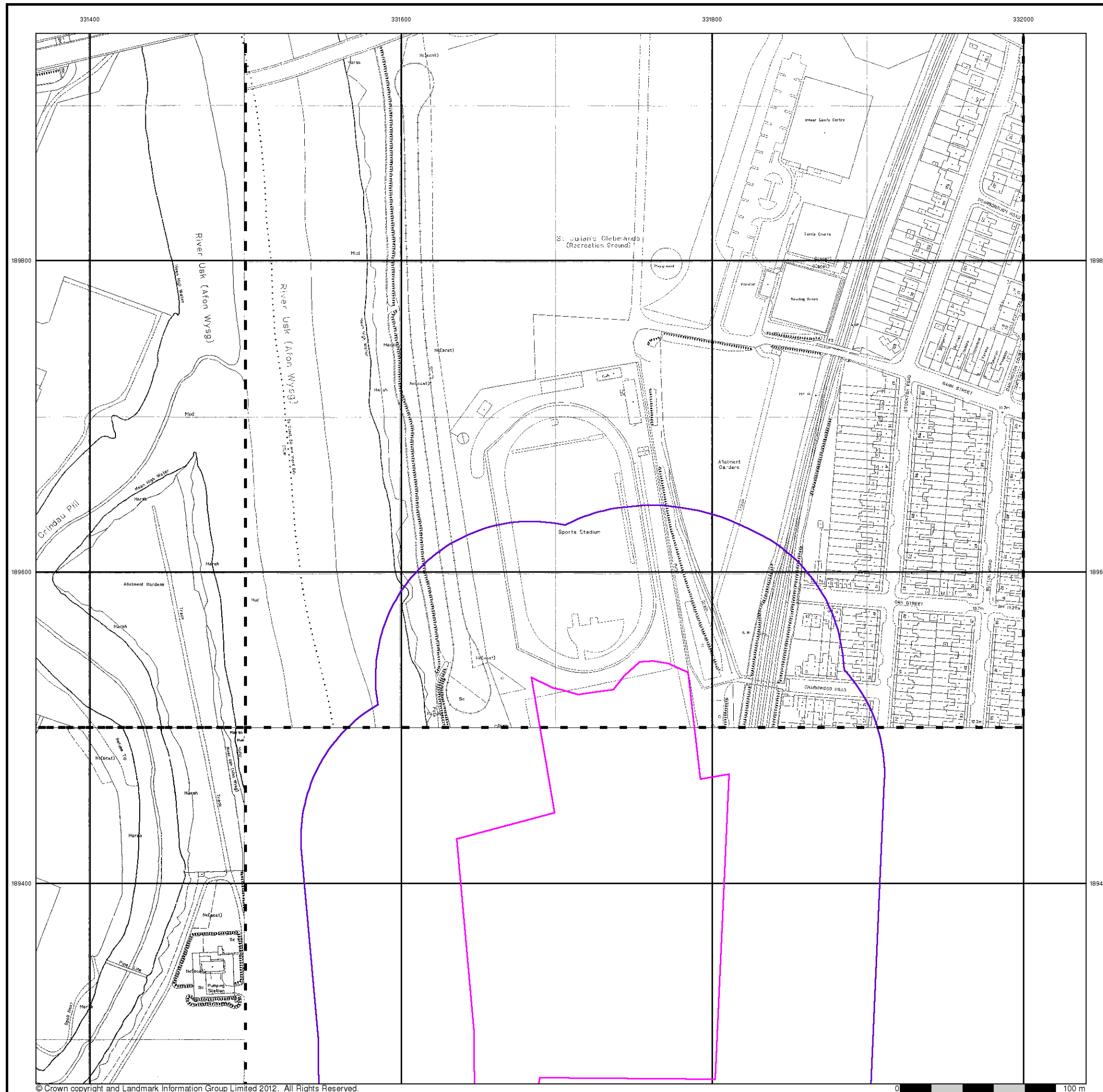
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

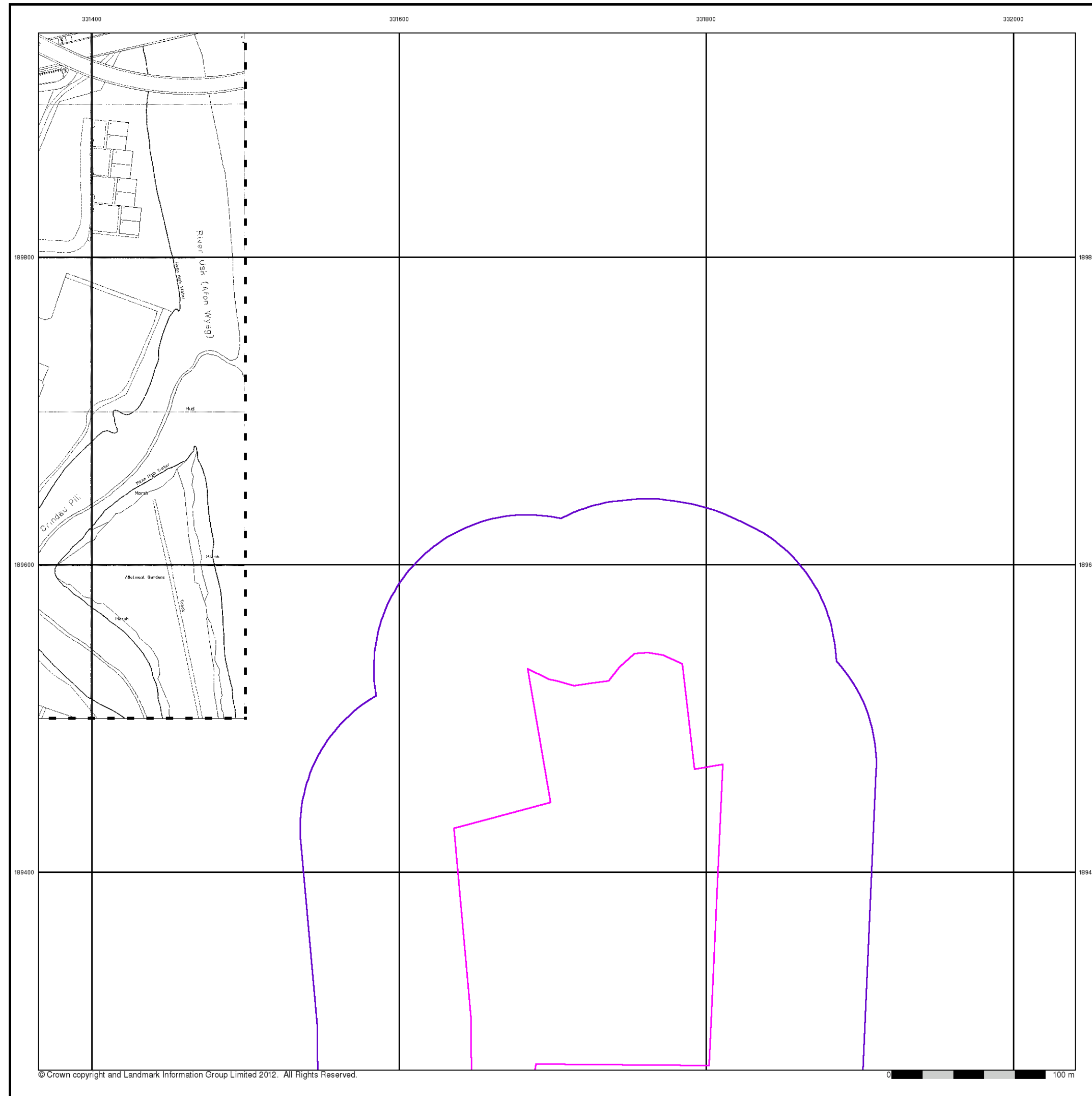
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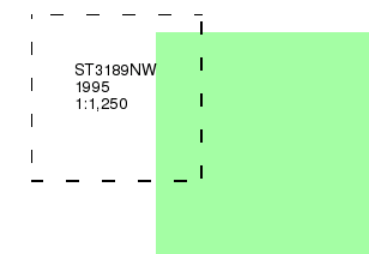
Large-Scale National Grid Data

Published 1995

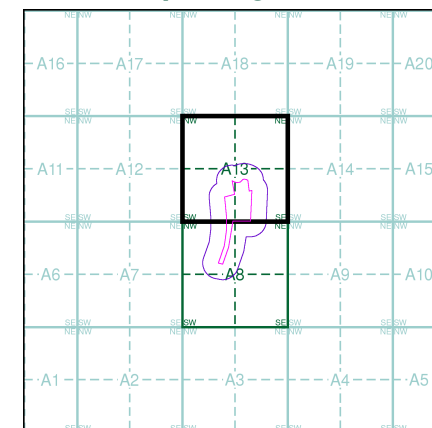
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

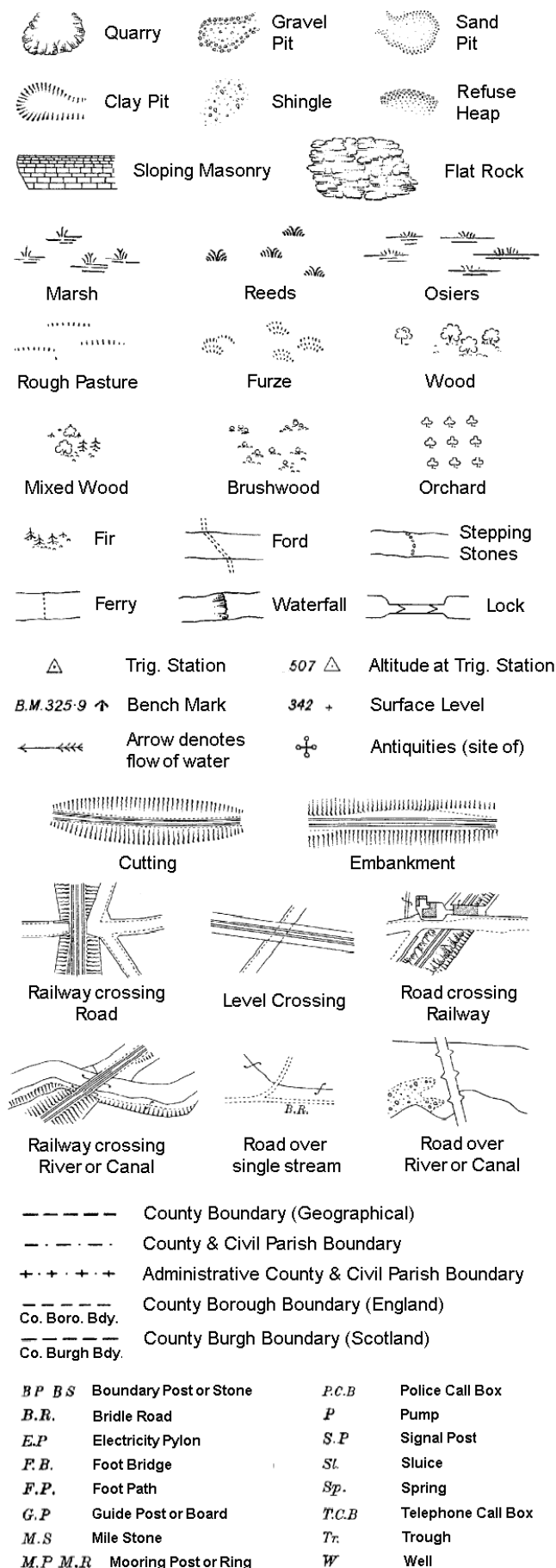
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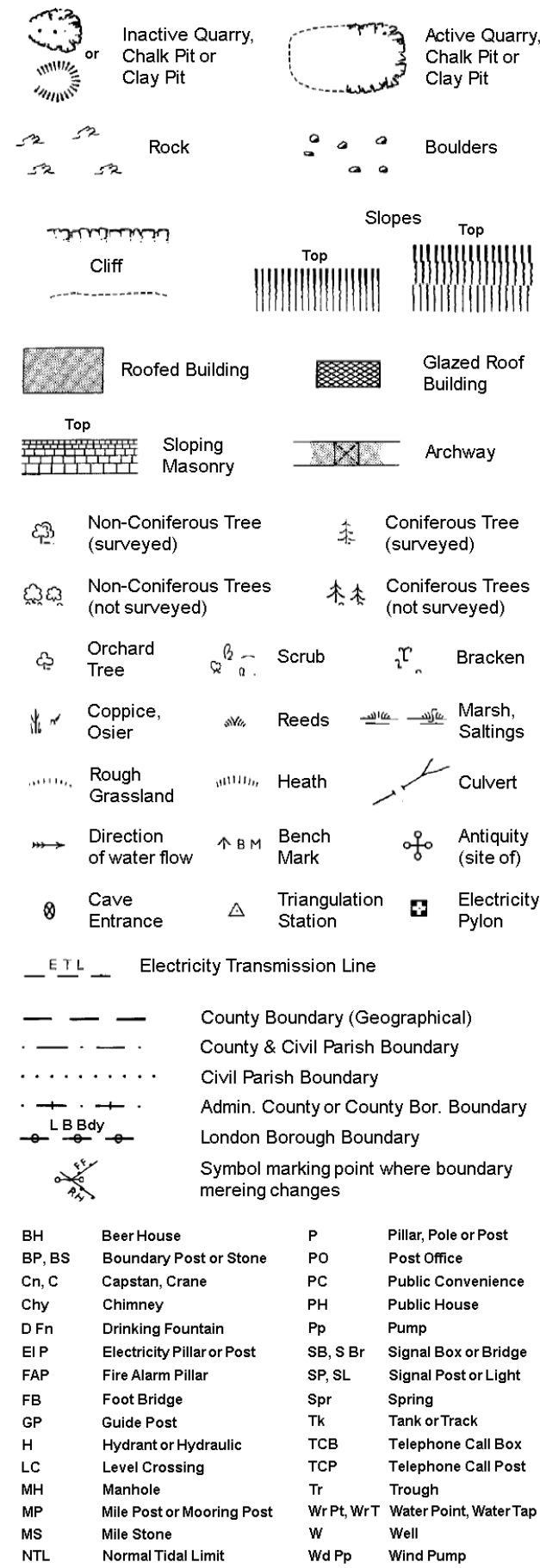
Tel: 0844 844 9952
Fax: 0844 844 9951
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Historical Mapping Legends

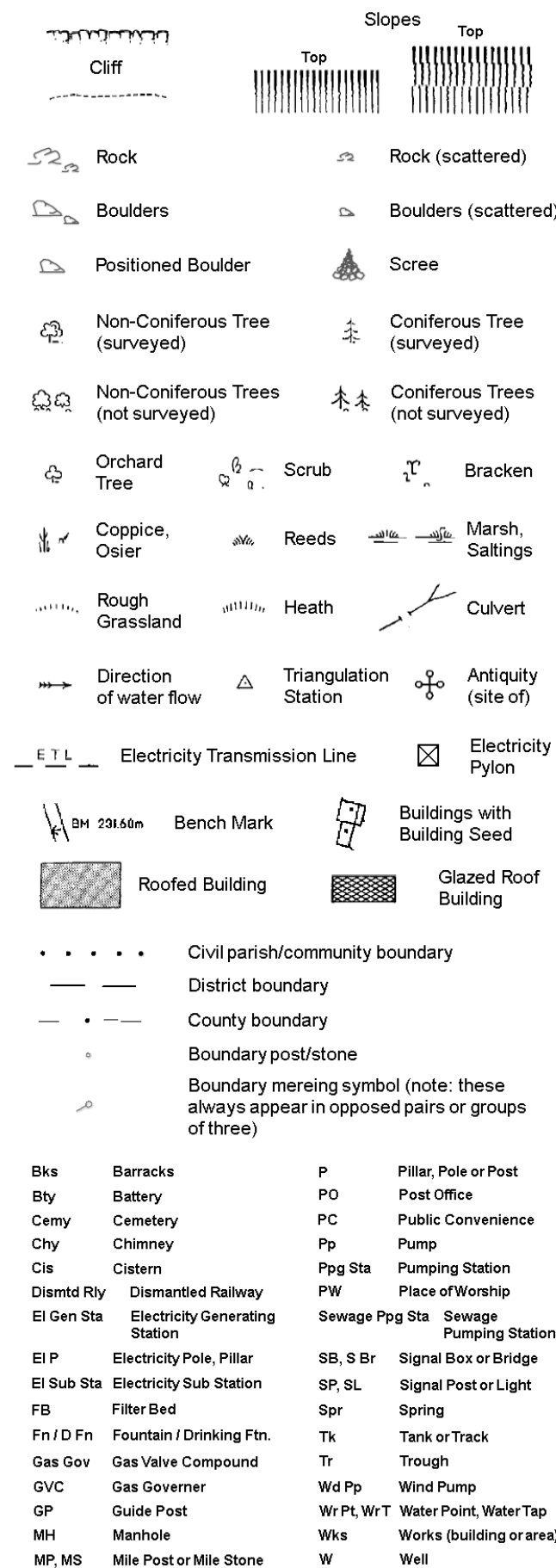
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



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



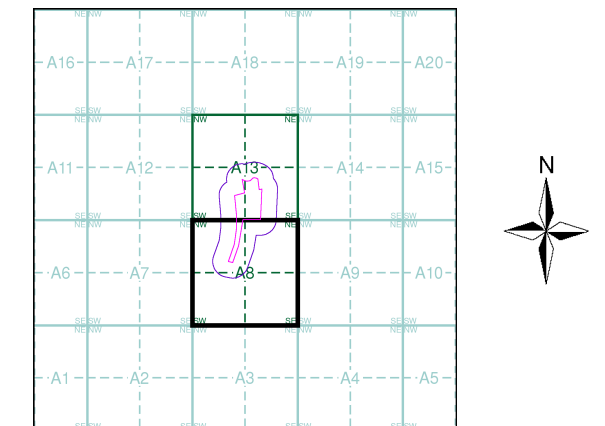
Large-Scale National Grid Data 1:2,500 and 1:1,250



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Monmouthshire	1:2,500	1883	2
Monmouthshire	1:2,500	1902	3
Monmouthshire	1:2,500	1920	4
Monmouthshire	1:2,500	1937	5
Ordnance Survey Plan	1:1,250	1955 - 1957	6
Ordnance Survey Plan	1:2,500	1955 - 1957	7
Additional SIMs	1:1,250	1957 - 1992	8
Ordnance Survey Plan	1:1,250	1966 - 1976	9
Ordnance Survey Plan	1:2,500	1969 - 1970	10
Supply of Unpublished Survey Information	1:1,250	1974	11
Additional SIMs	1:1,250	1978 - 1991	12
Additional SIMs	1:1,250	1989	13
Large-Scale National Grid Data	1:1,250	1993	14
Large-Scale National Grid Data	1:1,250	1994 - 1997	15
Large-Scale National Grid Data	1:1,250	1997	16

Historical Map - Segment A8



Order Details

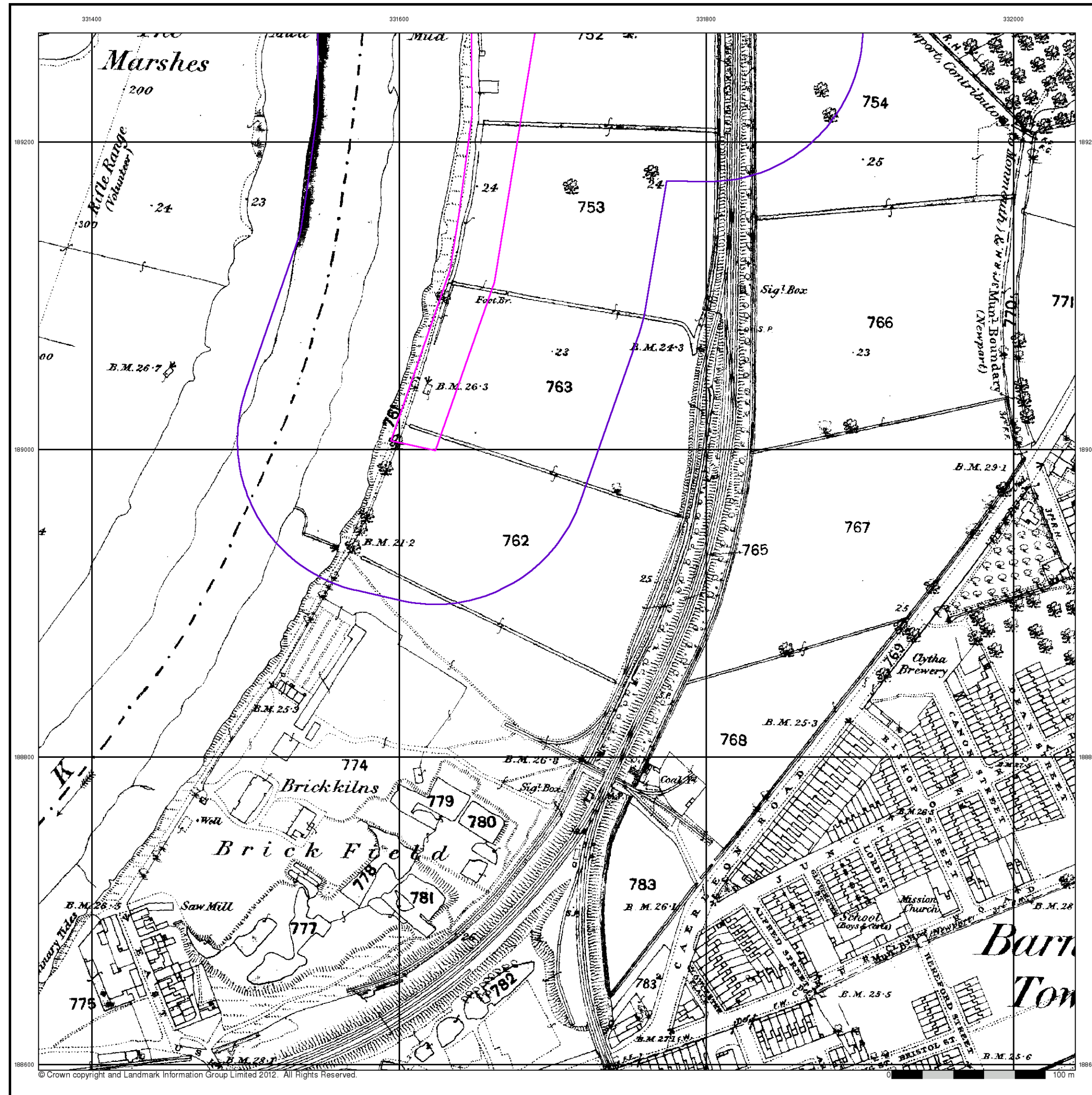
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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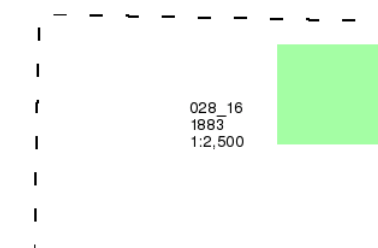
Monmouthshire

Published 1883

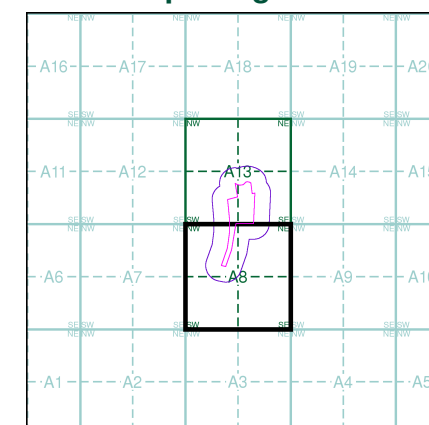
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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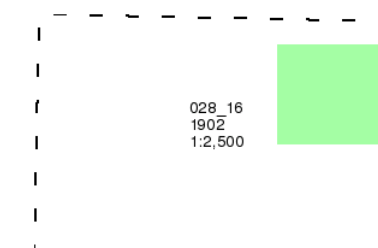
Monmouthshire

Published 1902

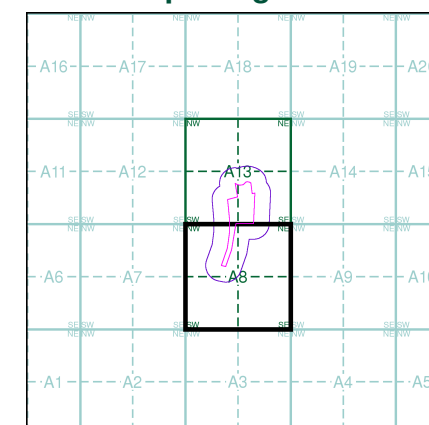
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

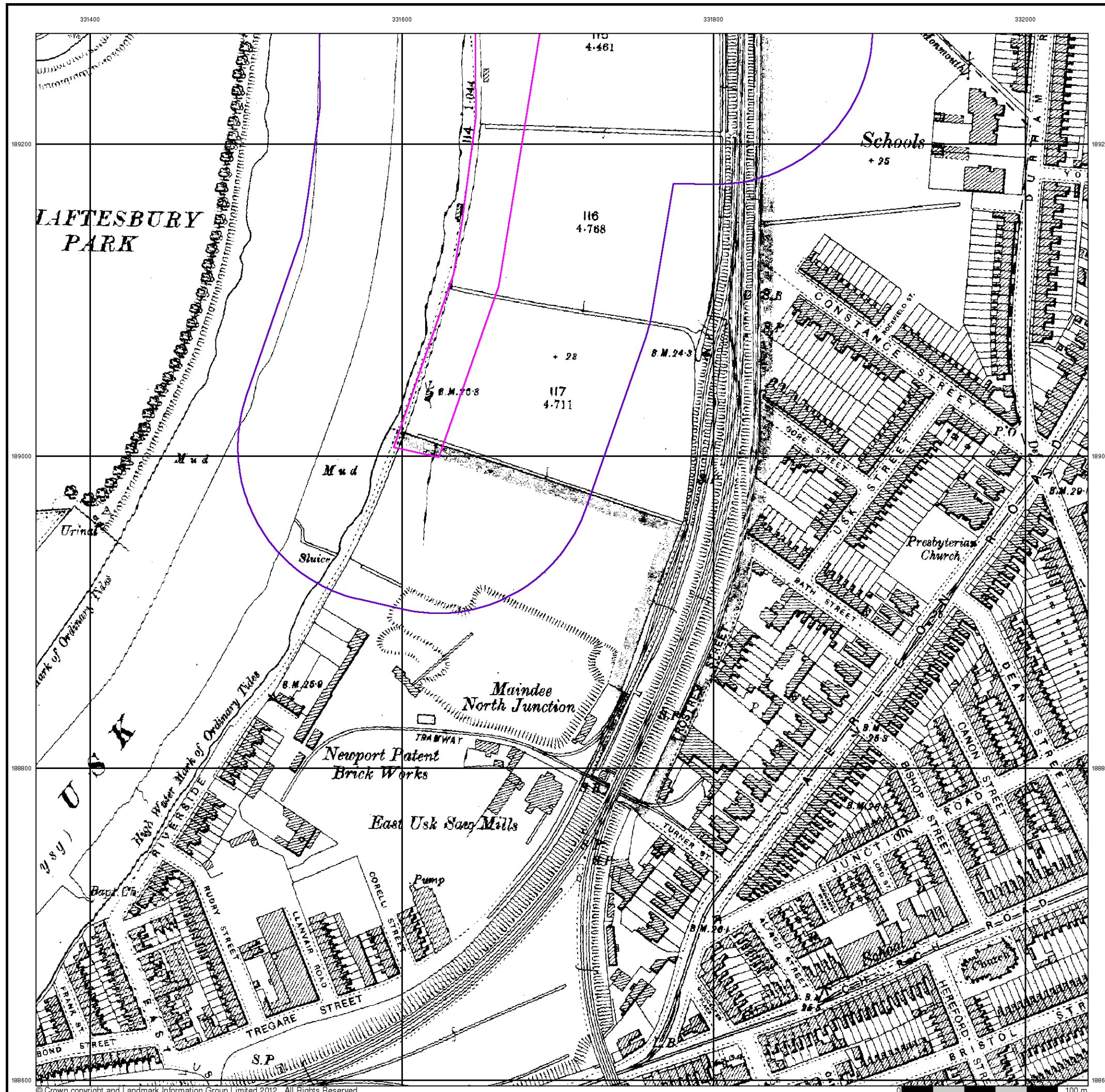
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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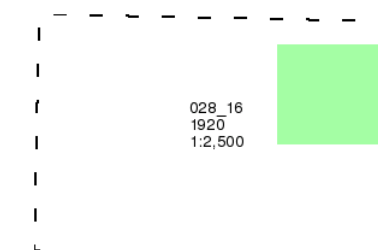
Monmouthshire

Published 1920

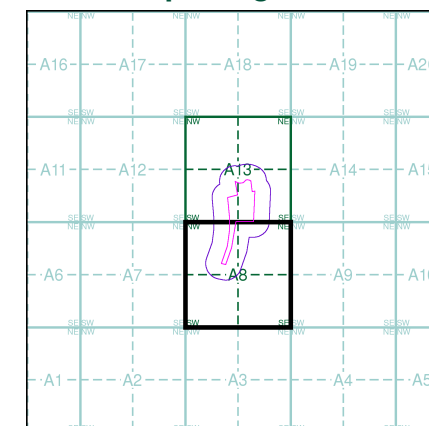
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

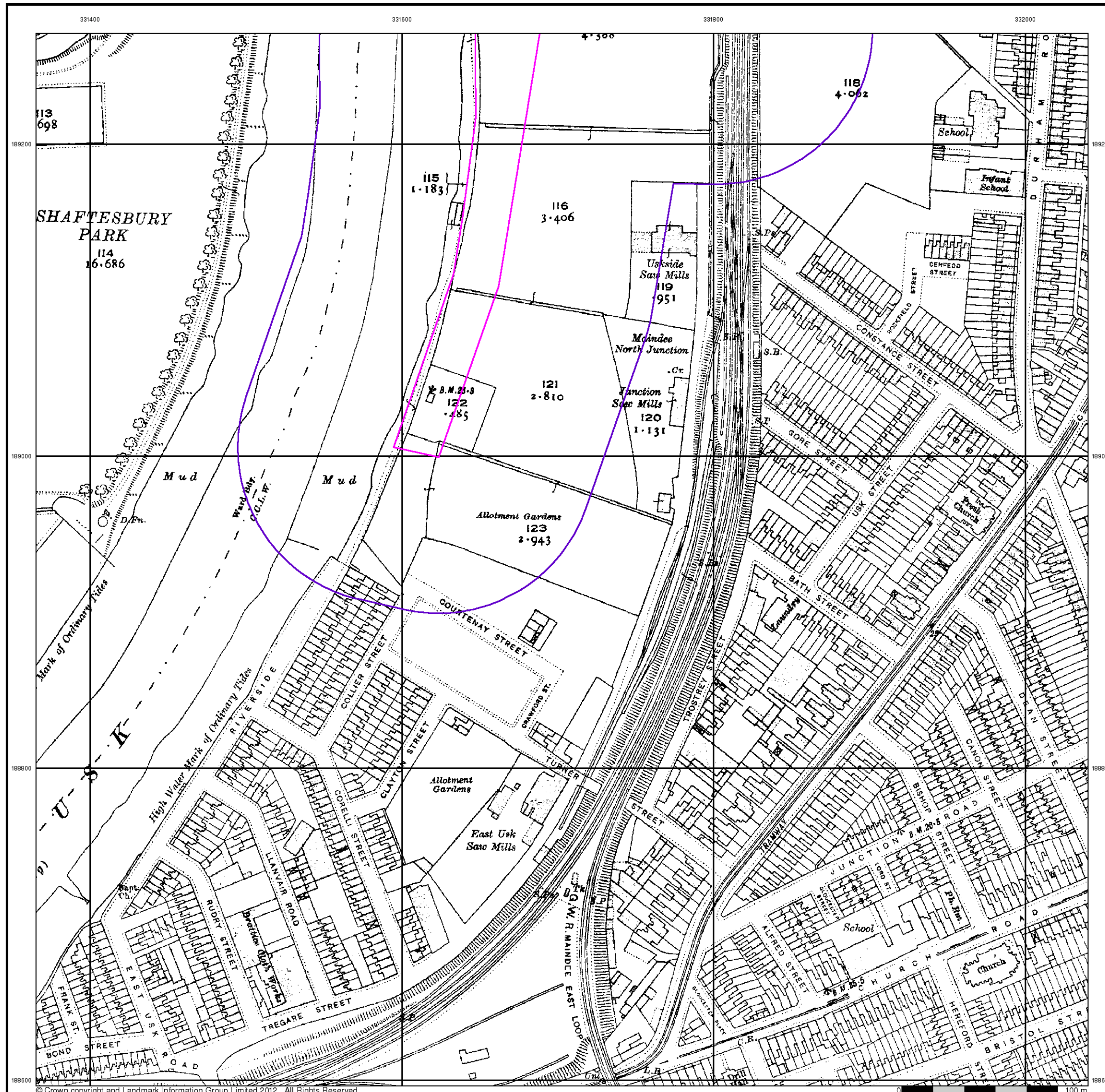
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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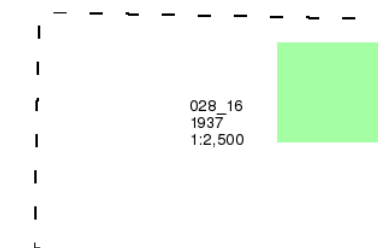
Monmouthshire

Published 1937

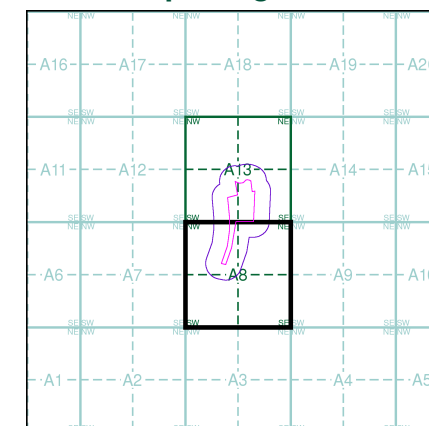
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

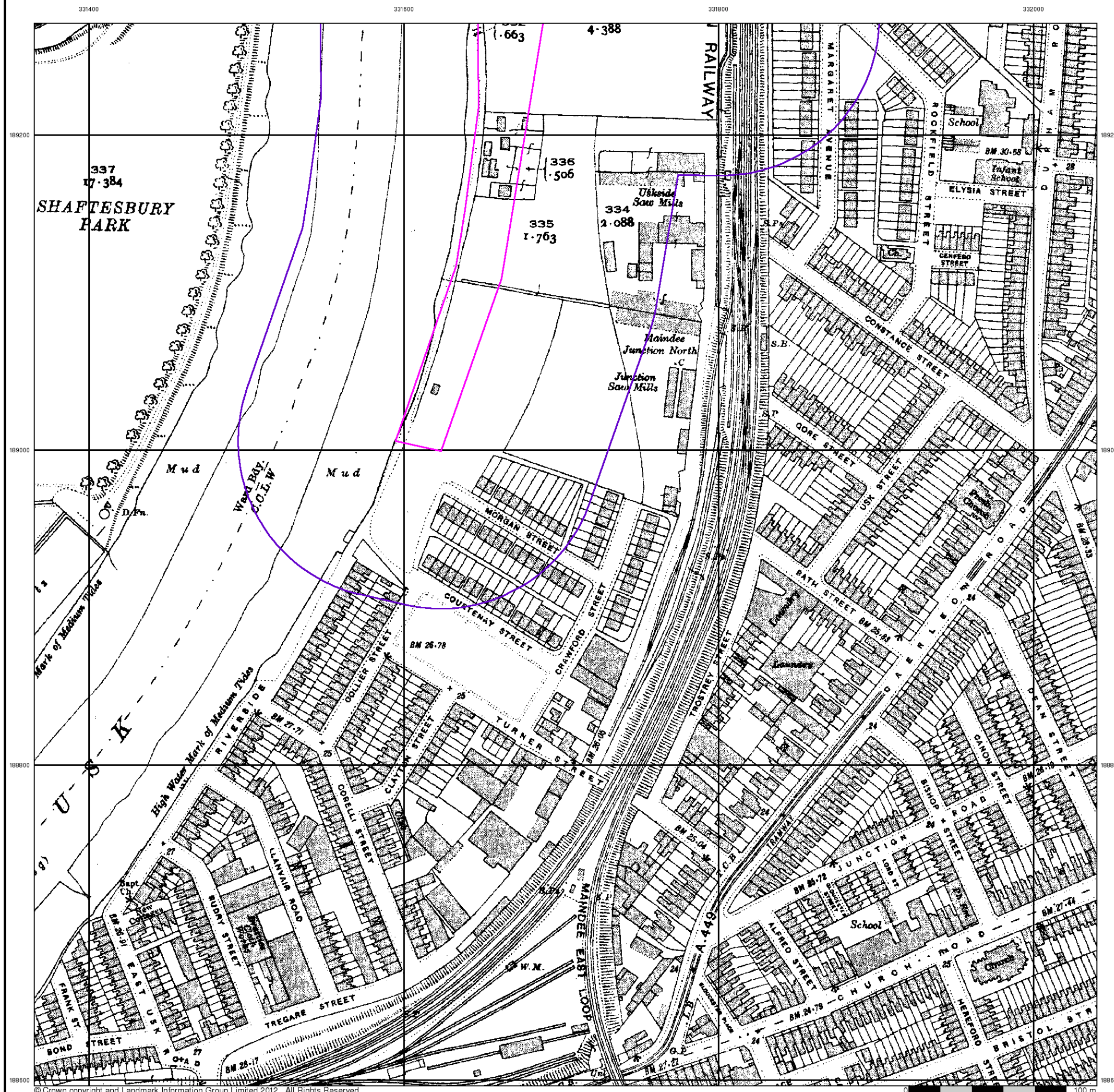
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

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Ordnance Survey Plan

Published 1955 - 1957

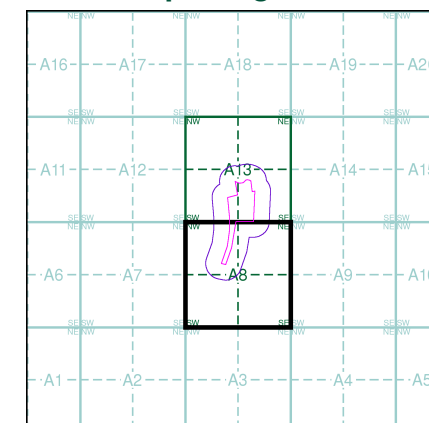
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

ST3189SW 1955 1:1,250	ST3189SE 1955 1:1,250	ST3289SW 1957 1:1,250
ST3188NW 1955 1:1,250	ST3188NE 1955 1:1,250	ST3288NW 1956 1:1,250

Historical Map - Segment A8



Order Details

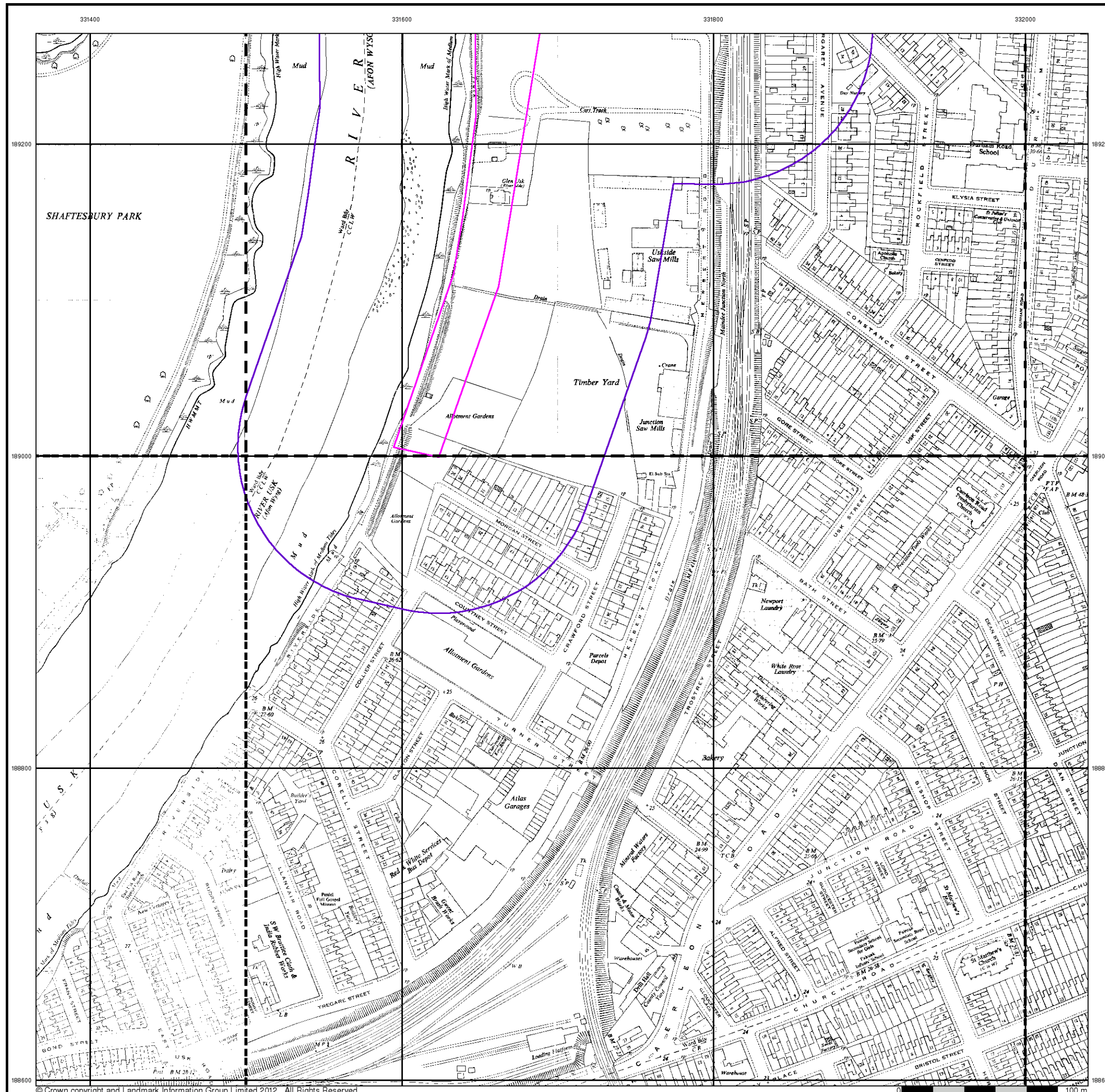
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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





Ordnance Survey Plan

Published 1955 - 1957

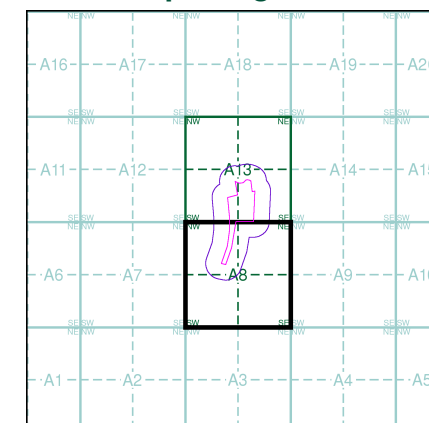
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

ST3189 1955 1:2,500	ST3289 1957 1:2,500
ST3188 1956 1:2,500	ST3288 1956 1:2,500

Historical Map - Segment A8



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

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Additional SIMs

Published 1957 - 1992

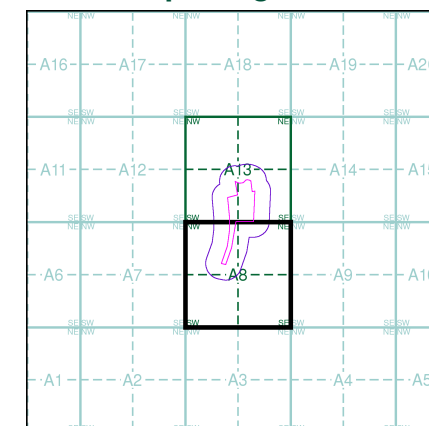
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

ST3189SW 1982 1:1,250	ST3189SE 1978 1:1,250	ST3289SW 1957 1:1,250
ST3188NW 1982 1:1,250	ST3188NE 1992 1:1,250	ST3288NW 1990 1:1,250

Historical Map - Segment A8



Order Details

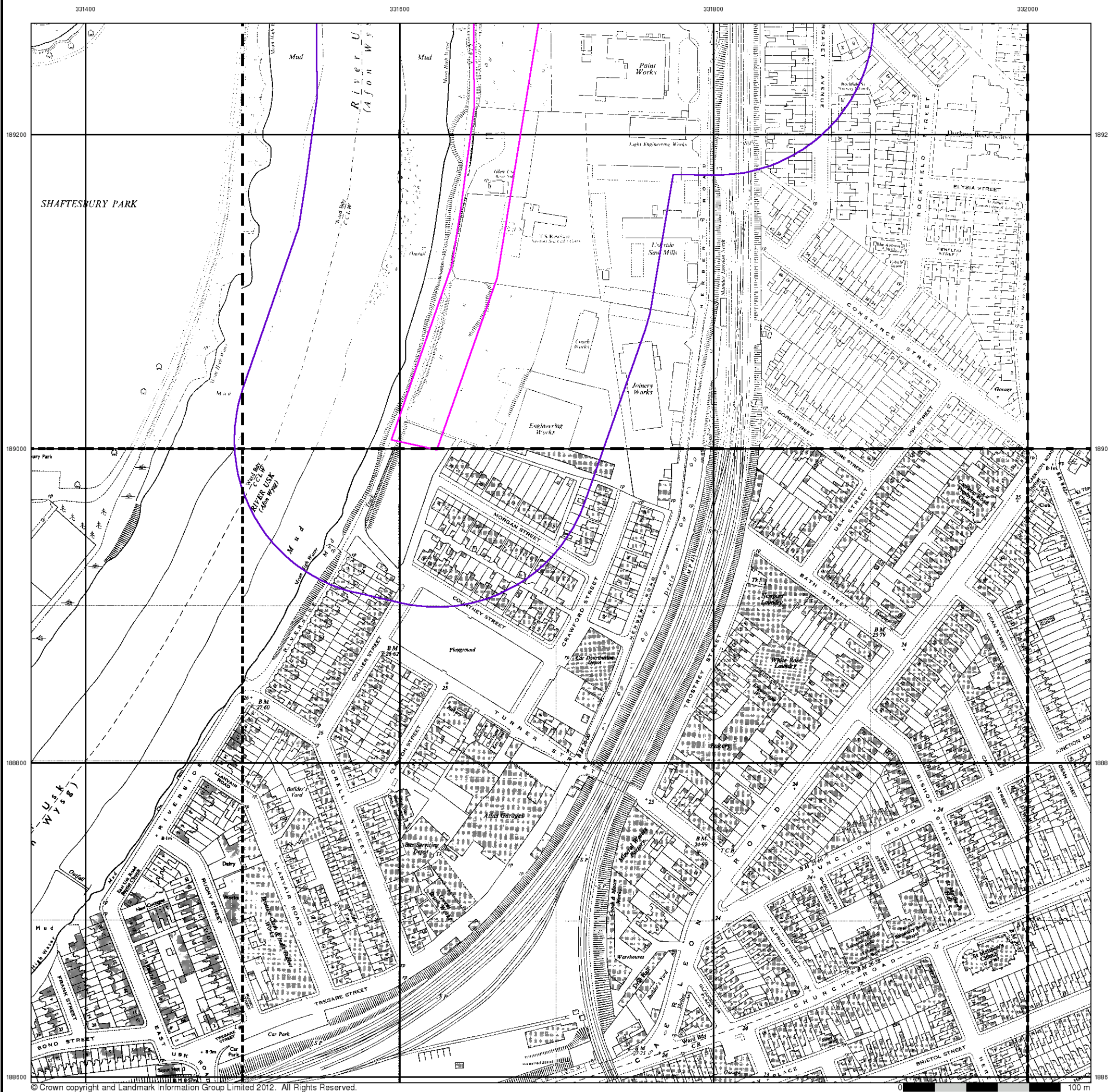
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

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Ordnance Survey Plan

Published 1966 - 1976

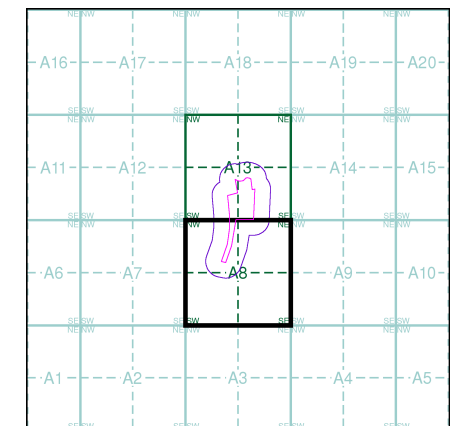
Source map scale - 1:1,250

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

ST3189SW 1967 1:1,250	ST3189SE 1966 1:1,250	
ST3188NW 1976 1:1,250	ST3188NE 1966 1:1,250	ST3288NW 1974 1:1,250

Historical Map - Segment A8



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

Site Details

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Ordnance Survey Plan

Published 1969 - 1970

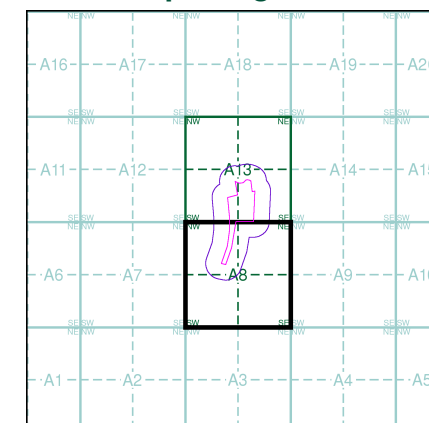
Source map scale - 1:2,500

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas.

Map Name(s) and Date(s)

ST3189 1970 1:2,500	ST3289 1969 1:2,500
ST3188 1970 1:2,500	ST3288 1970 1:2,500

Historical Map - Segment A8



Order Details

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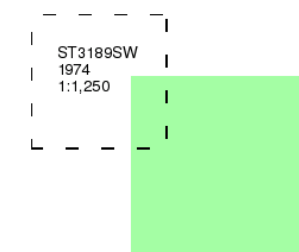
Supply of Unpublished Survey Information

Published 1974

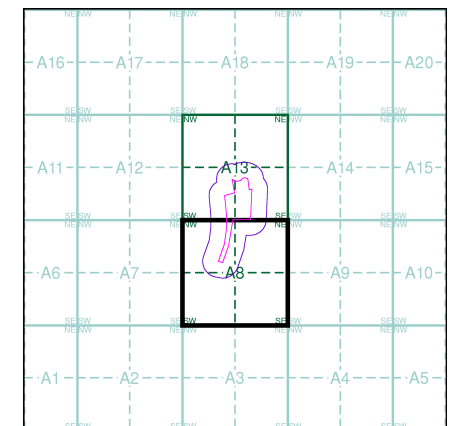
Source map scale - 1:1,250

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

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

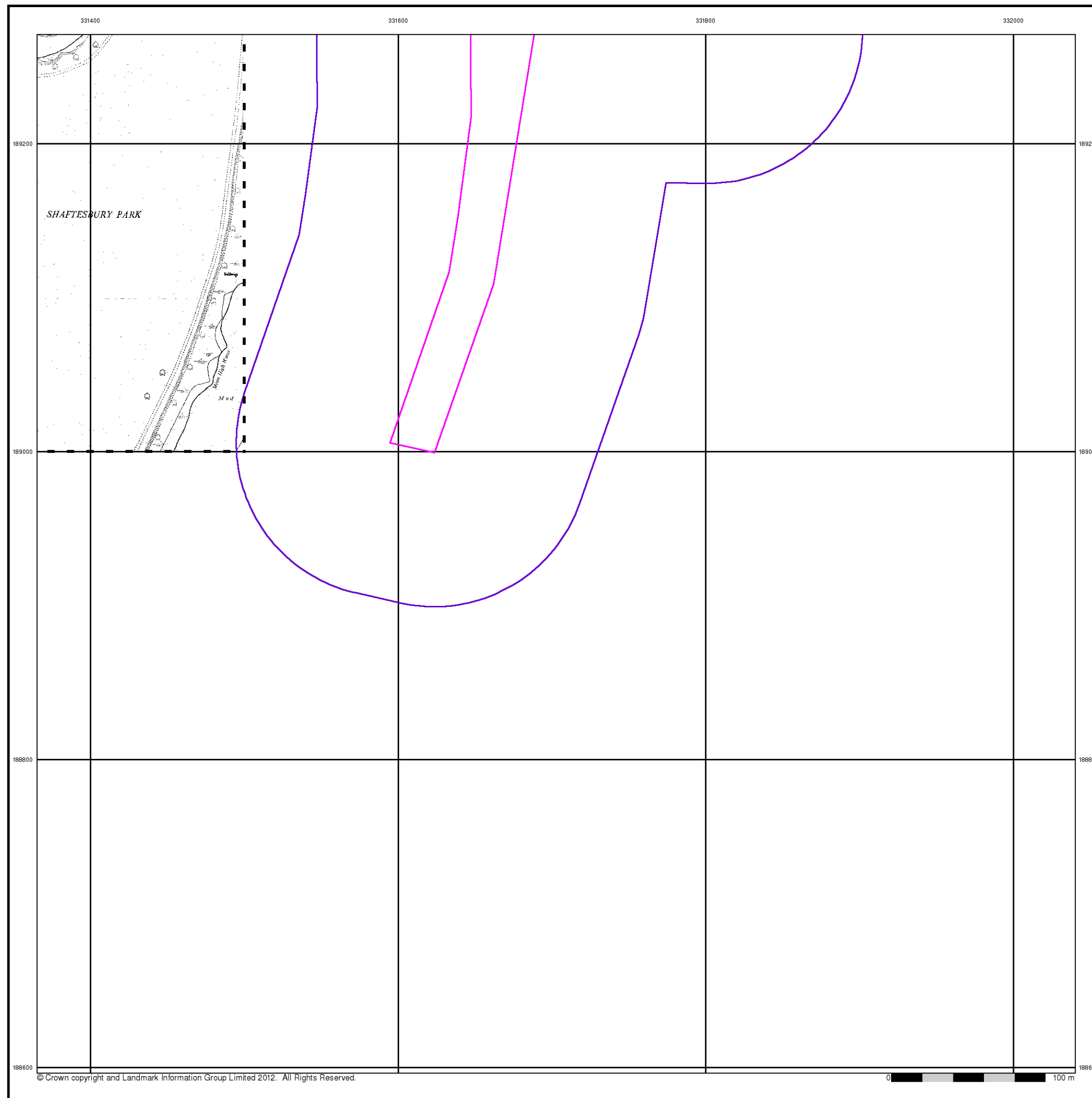
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Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

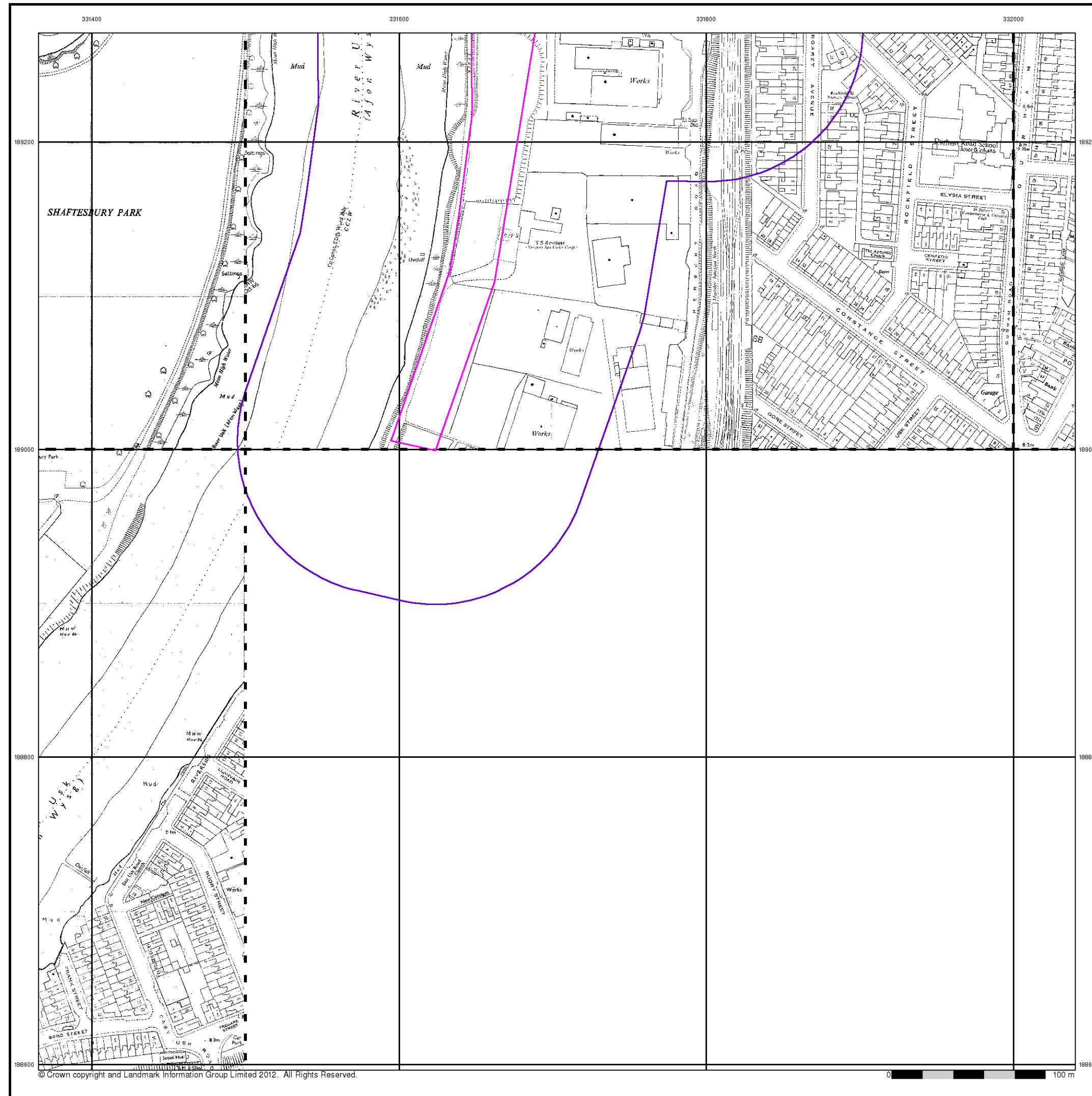
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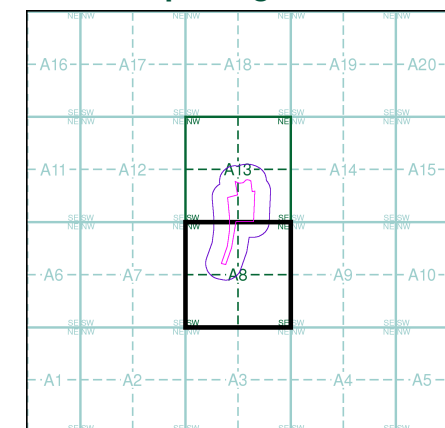
Additional SIMs
Published 1978 - 1991
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

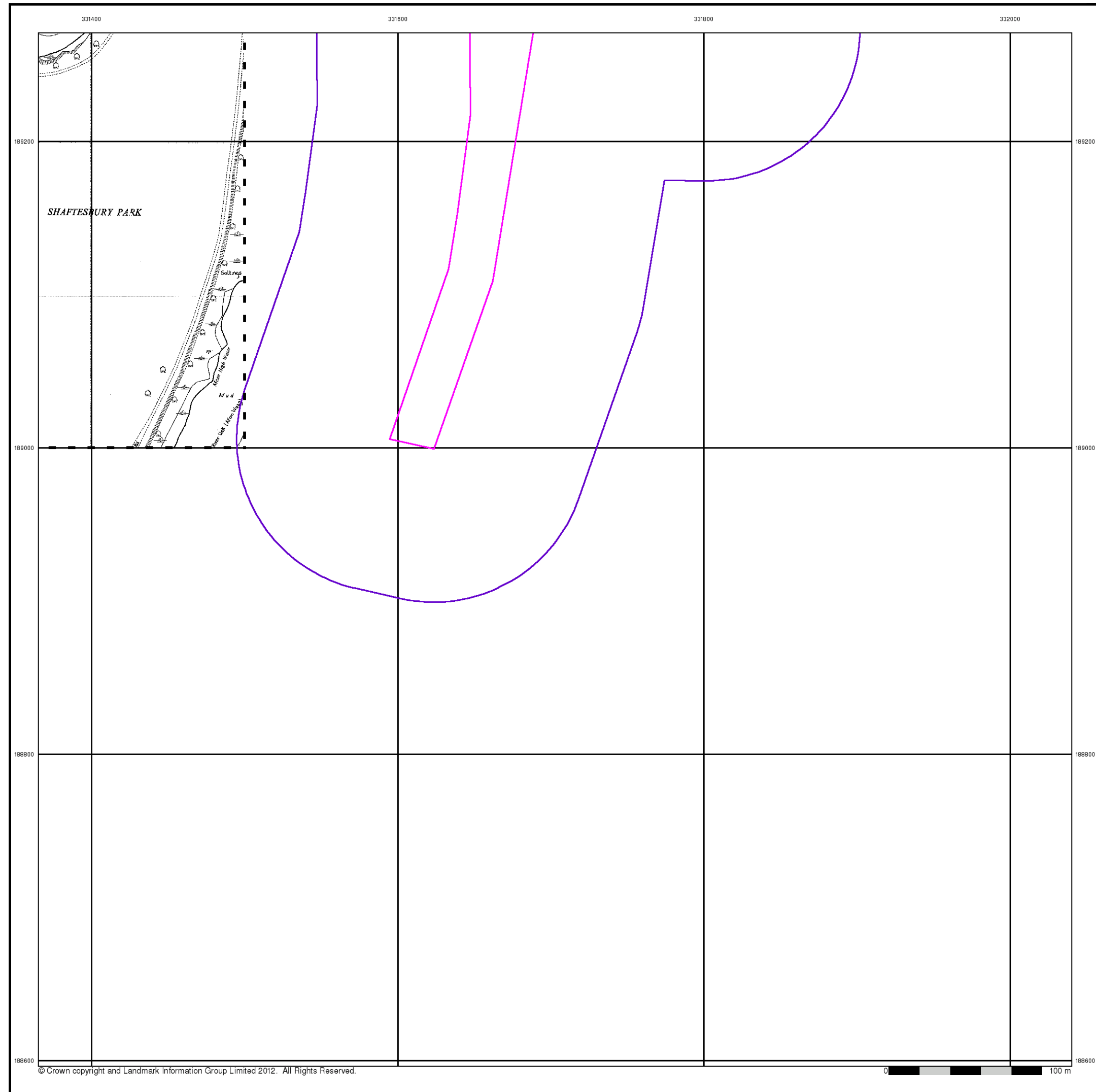
ST3189SW 1987 1:1,250	ST3189SE 1987 1:1,250	ST3289SW 1978 1:1,250
ST3188NW 1991 1:1,250		

Historical Map - Segment A8



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Site Details
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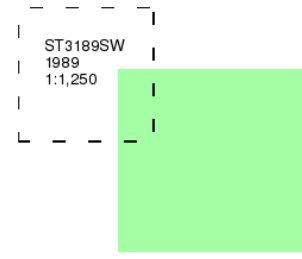
Additional SIMs

Published 1989

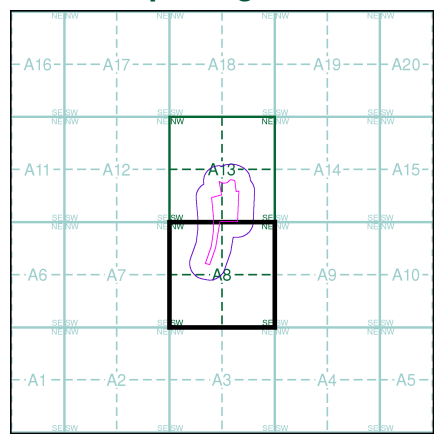
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A8



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Large-Scale National Grid Data

Published 1993

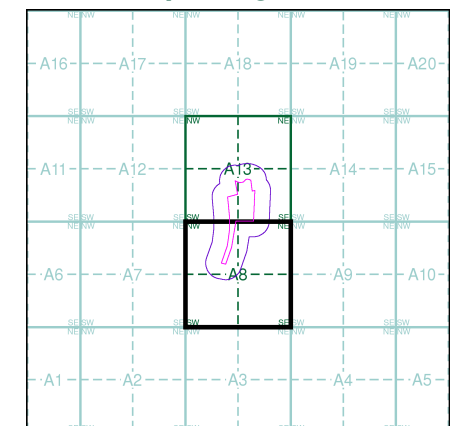
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

ST3189SW 1993 1:1,250	ST3189SE 1993 1:1,250	ST3289SW 1993 1:1,250
ST3188NW 1993 1:1,250	ST3188NE 1993 1:1,250	ST3288NW 1993 1:1,250

Historical Map - Segment A8



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 100

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Large-Scale National Grid Data

Published 1994 - 1997

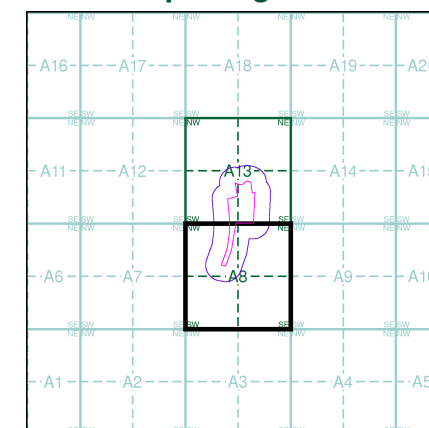
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

ST3189SW 1994 1:1,250	ST3189SE 1994 1:1,250	
ST3188NW 1995 1:1,250	ST3188NE 1994 1:1,250	ST3288NW 1997 1:1,250

Historical Map - Segment A8



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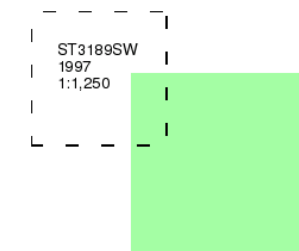
Large-Scale National Grid Data

Published 1997

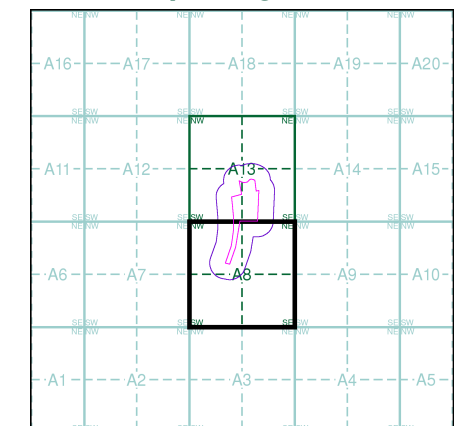
Source map scale - 1:1,250

'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A8



Order Details

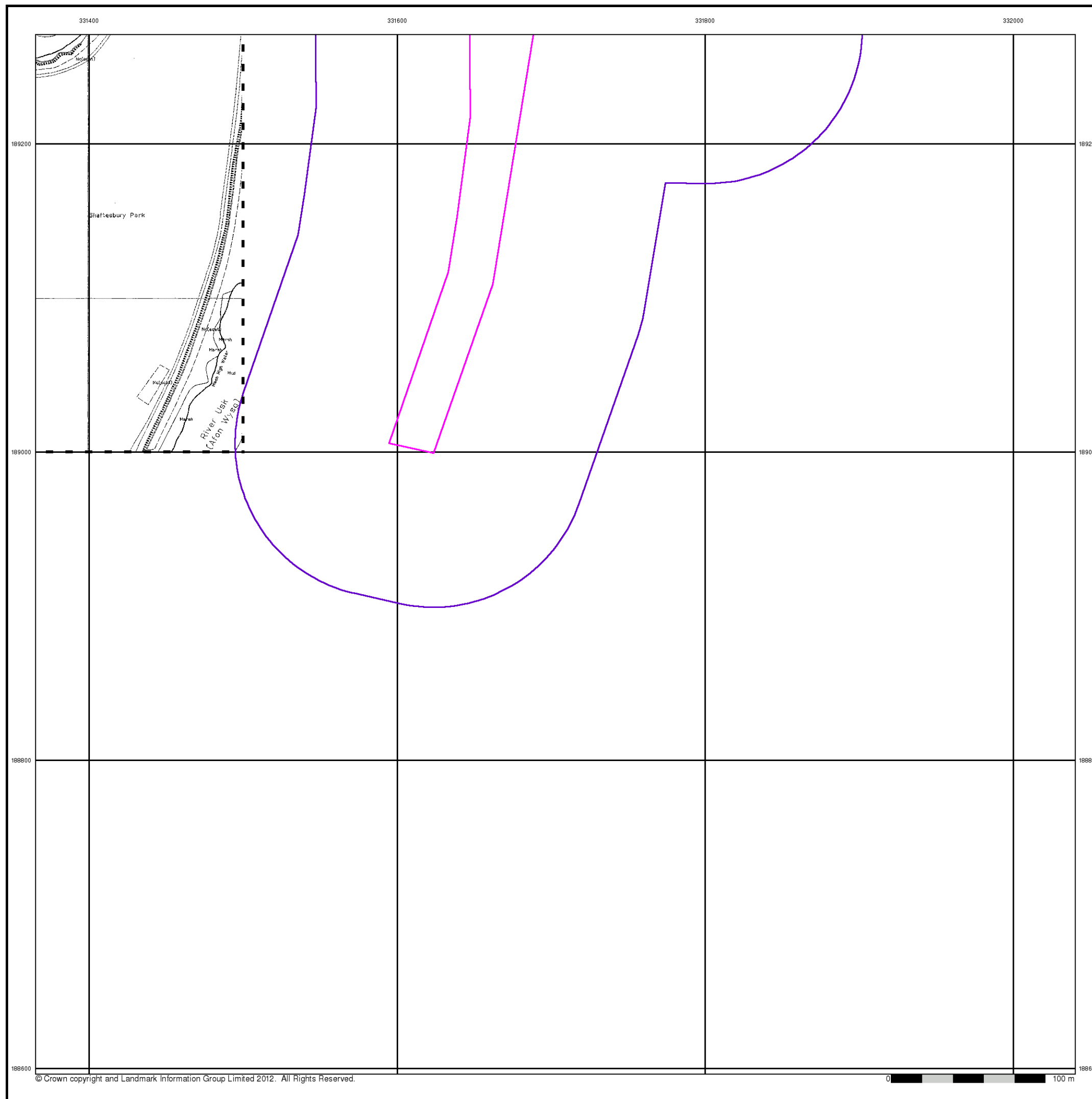
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
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Historical Mapping Legends

Ordnance Survey County Series 1:10,560

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

Ordnance Survey Plan 1:10,000

	Chalk Pit, Clay Pit or Quarry		Gravel Pit
	Sand Pit		Disused Pit or Quarry
	Refuse or Slag Heap		Lake, Loch or Pond
	Dunes		Boulders
	Coniferous Trees		Non-Coniferous Trees
	Orchard		Scrub
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		Standard Gauge Single Track
	Siding, Tramway or Mineral Line		Narrow Gauge
	Geographical County		Administrative County, County Borough or County of City
	Municipal Borough, Urban or Rural District, Burgh or District Council		Borough, Burgh or County Constituency
	Civil Parish		
	BP, BS Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

1:10,000 Raster Mapping

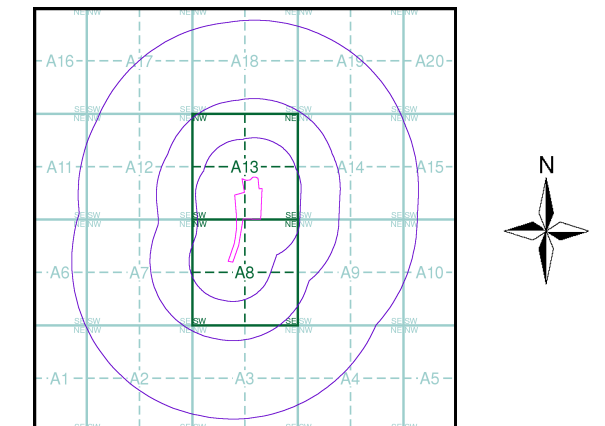
	Gravel Pit		Refuse tip or slag heap
	Rock		Rock (scattered)
	Boulders		Boulders (scattered)
	Shingle		Mud
	Sand		Sand Pit
	Slopes		Top of cliff
	General detail		Underground detail
	Overhead detail		Narrow gauge railway
	Multi-track railway		Single track railway
	County boundary (England only)		Civil,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



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Monmouthshire	1:10,560	1886	3
Monmouthshire	1:10,560	1902	4
Monmouthshire	1:10,560	1922	5
Monmouthshire	1:10,560	1938	6
Historical Aerial Photography	1:10,560	1947	7
Historical Aerial Photography	1:10,560	1947	8
Monmouthshire	1:10,560	1954	9
Ordnance Survey Plan	1:10,000	1964 - 1965	10
Ordnance Survey Plan	1:10,000	1972 - 1973	11
Ordnance Survey Plan	1:10,000	1981 - 1983	12
Newport	1:10,000	1983	13
Ordnance Survey Plan	1:10,000	1987	14
10K Raster Mapping	1:10,000	2006	15
10K Raster Mapping	1:10,000	2012	16

Historical Map - Slice A



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

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Russian Military Mapping Legends

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

a. Not drawn to scale b. Drawn to scale

Government and Administrative Buildings Military and Industrial Buildings

Military and Communication Areas Subway Entrance

Fireproof Building Prominent Fireproof Building

Non-fireproof Building Non-fireproof Building (non-dwelling)

Factory, mill, and flour mill, with chimneys Factory, mill, and flour mill, without chimneys

Power Station, drawn to scale Hydroelectric Power Station

Radio Station, drawn to scale Telephone Station, drawn to scale

Abandoned Open-pit Mine or Quarry Open-pit Salt Mine

Pit Oil Deposit or Well Oil Seepage

Tailings Pile Fuel Storage Tanks Natural Gas Tank

Bench Mark Drill Hole Burial Mound Triangulation Point on Burial Mound

Single-track Railroad Double-track Railroad and Station Building

Coniferous Forest Deciduous Forest Mixed Forest

Lawns Citrus Orchard Wet Ground Scattered Vegetation

243.8 Values for prominent elevations

186.0 Numbers for spot elevations, depth soundings, contour lines, etc.

0.2 Velocity of the current, width of river bed, depth of river

180/12 Fractional terms: length and capacity of bridges; depth of fords and condition of the river bottom; height of forest and the diameter of trees

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

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

1:25,000 mapping

a. Not drawn to scale b. Drawn to scale

Government and Administrative Buildings Military and Industrial Buildings

Military and Communication Areas Subway Entrance

Partly Demolished Buildings Demolished Buildings

Built-Up Area with Fireproof Buildings Predominant Built-Up Area with Non-Fireproof Buildings Predominant

Individual Fireproof Building Prominent Industrial Building

Individual Dwelling, Fireproof Ruins of an Individual Dwelling

Factory or Mill Chimney Factory or Mill with Chimney Factory or Mill without Chimney Mine or Open Pit Mine

Operating Shaft or Mine Non-Operating Shaft or Mine Salt Mine Tailings Pile

Pit Stone Quarry Gas Pump or Service Station Fuel Storage or Natural Gas Tank

Oil or Natural Gas Derrick Small Hydroelectric Power Station Power Station Transformer Station

Cemetery Burial Mound (height in metres) Triangulation Point on Burial Mound Triangulation Point

Bench Mark Bench Mark (monumented) Telegraph Office Telephone Station

Radio Station Radio Tower Airfield or Seaplane Base Landing Strip

Telegraph/Telephone Lines Main Highway Highway under Construction Improved Dirt Road (former truck road)

Double-track Railroad with First Class Station Dismantled Railroad Railroad Under Construction

Shore Embankment River or Ditch with Embankment Direction and velocity of current Water Gauge Water Level Mark

Well Water Reservoir or Rain Water Pit Spring Isobath with value

Heavy (Index) Contour Line Contour Line and Value Half Contour Line Spot Elevation Value

Coniferous Deciduous Mixed Scrub

Key to Numbers on Mapping

ST38NW_Newport

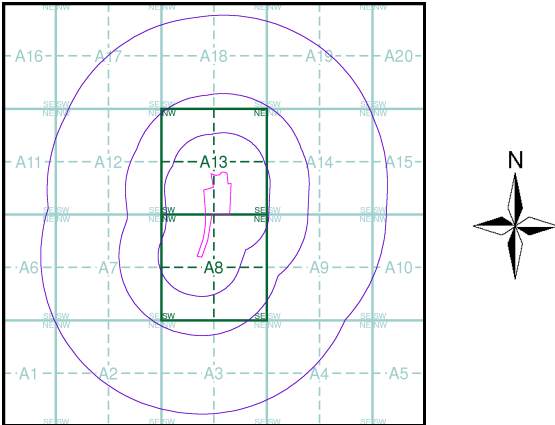
No.	Description
15	Factory (Gas)
16	Factory (Gas)
21	Factory (Machinery)
23	Factory (Metals)
35	Factory (Non-Ferrous Metals)
40	Council/Government Buildings/Courts
44	Police Station/Headquarters
58	Post Office
59	Warehouses (Use Unknown)
63	Warehouses (Use Unknown) And Port Buildings
73	Railway Station



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Monmouthshire	1:10,560	1886	3
Monmouthshire	1:10,560	1902	4
Monmouthshire	1:10,560	1922	5
Monmouthshire	1:10,560	1938	6
Historical Aerial Photography	1:10,560	1947	7
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Ordnance Survey Plan	1:10,000	1981 - 1983	12
Newport	1:10,000	1983	13
Ordnance Survey Plan	1:10,000	1987	14
10K Raster Mapping	1:10,000	2006	15
10K Raster Mapping	1:10,000	2012	16

Russian Map - Slice A



Order Details

Order Number: 41914630_1_1
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Search Buffer (m): 1000

Site Details

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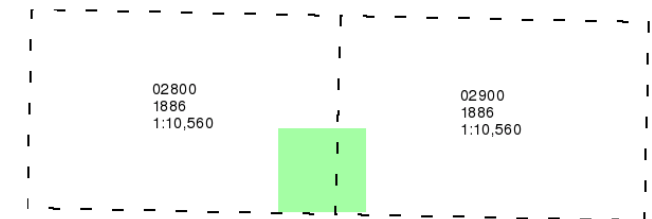
Monmouthshire

Published 1886

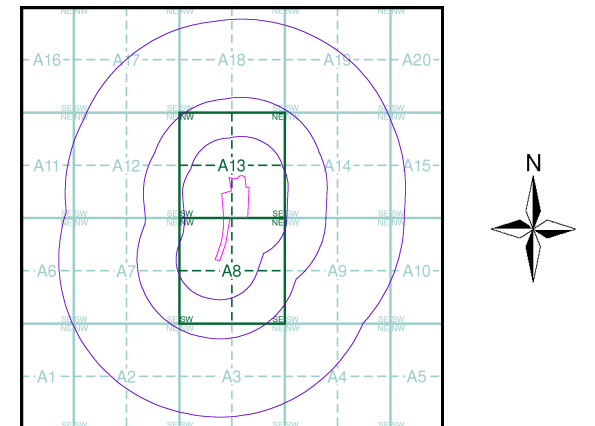
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



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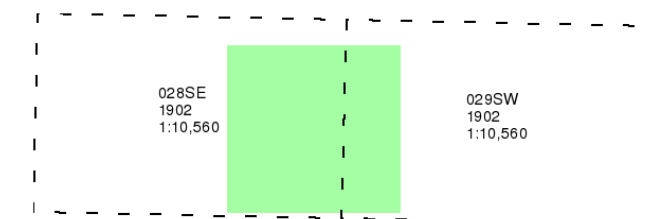
Monmouthshire

Published 1902

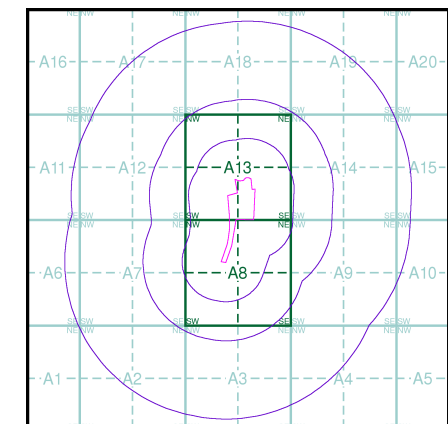
Source map scale - 1:10,560

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

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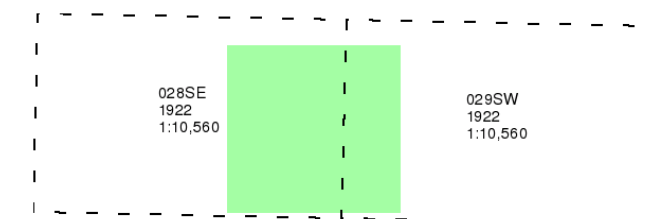
Monmouthshire

Published 1922

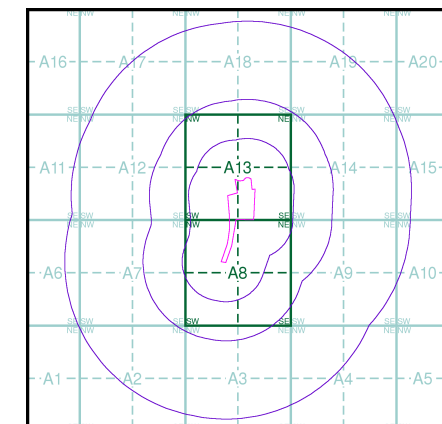
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A

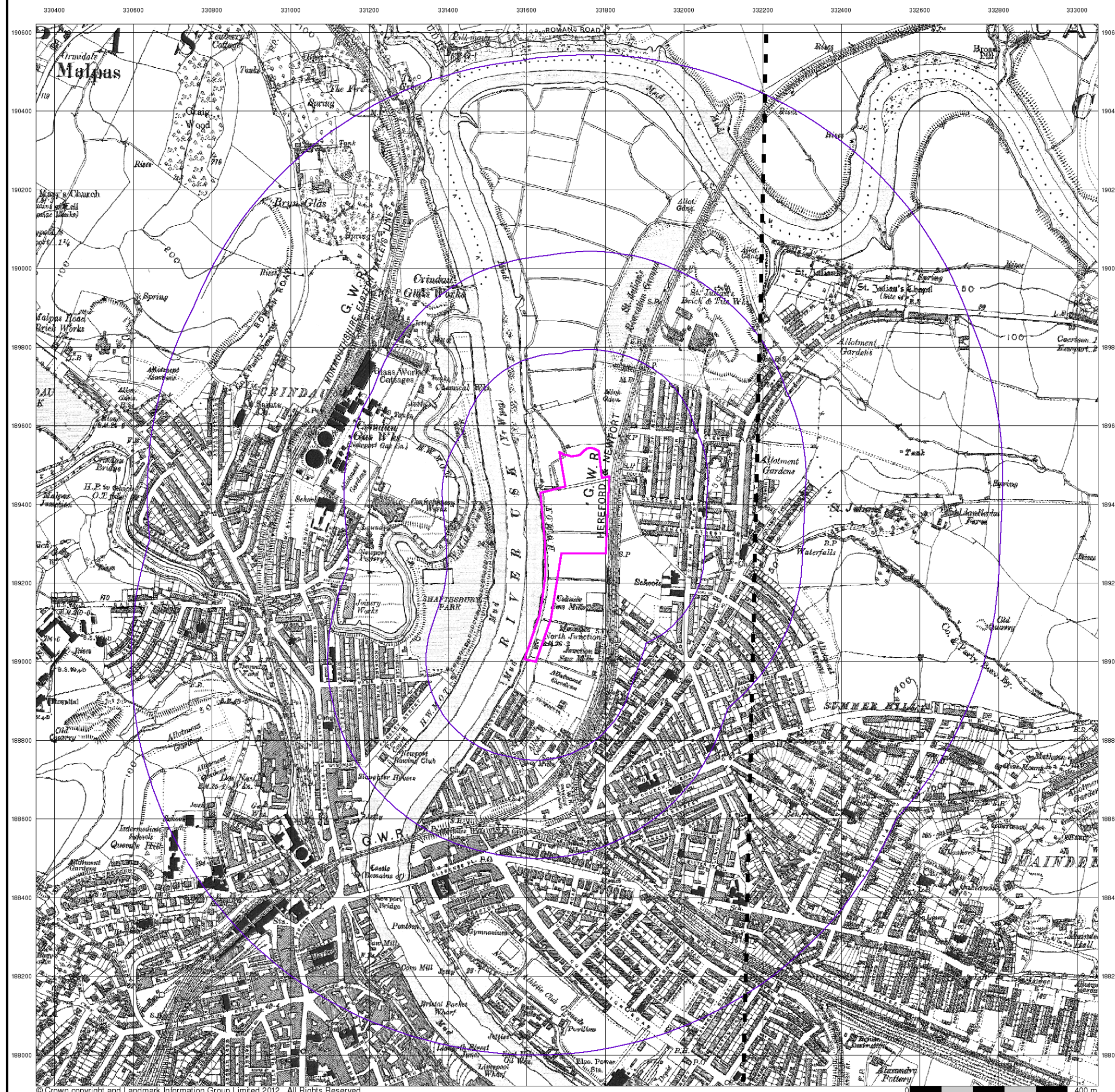


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Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



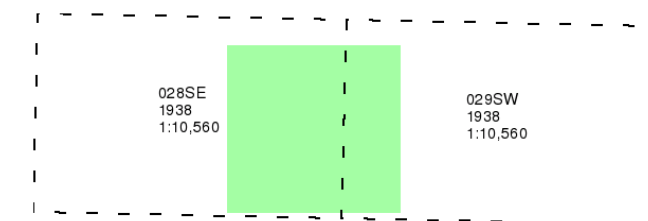
Monmouthshire

Published 1938

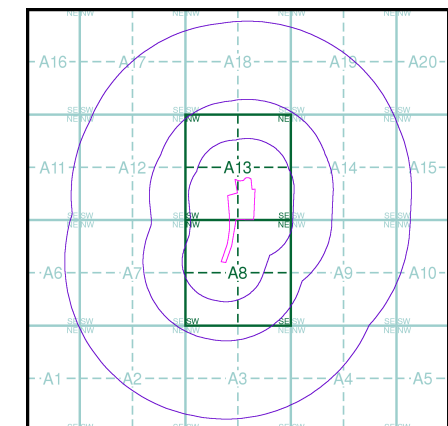
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A

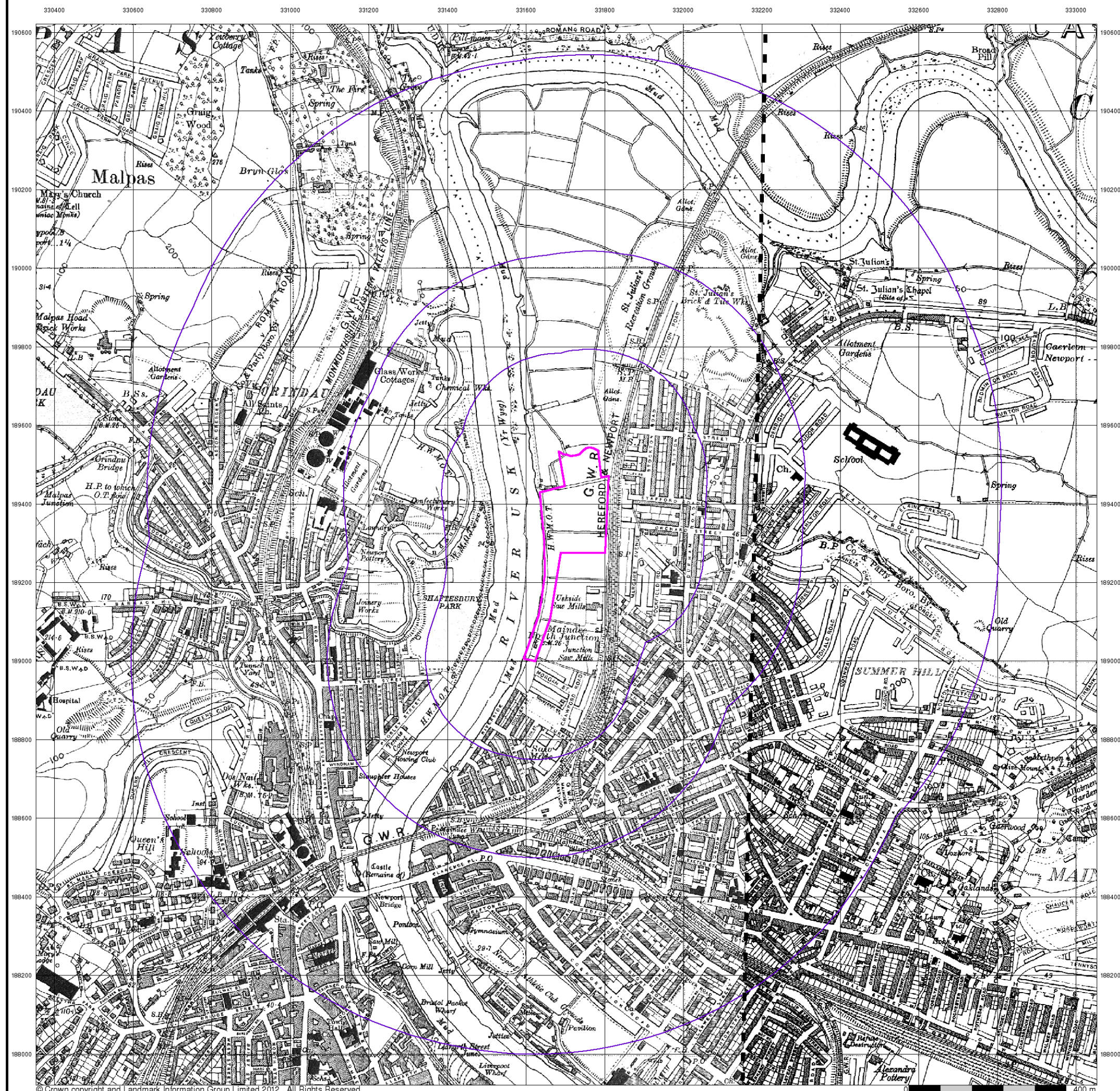


Order Details

Order Number: 41914630_1_1
 Customer Ref: 12044
 National Grid Reference: 331690, 189280
 Slice: A
 Site Area (Ha): 4.52
 Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH





Historical Aerial Photography

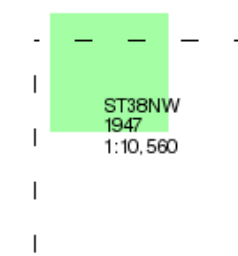
Published 1947

Source map scale - 1:10,560

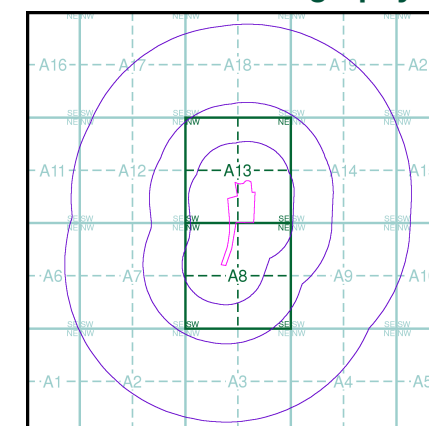
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the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

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Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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



Historical Aerial Photography

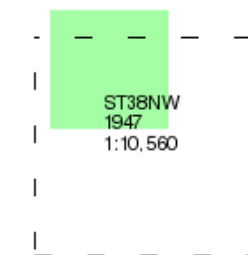
Published 1947

Source map scale - 1:10,560

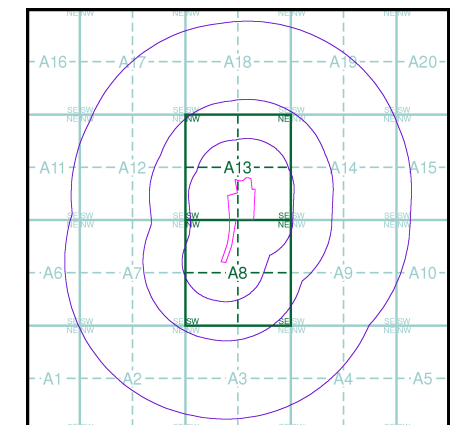
The Historical Aerial Photos were produced by the Ordnance Survey at a scale of 1:1,250 and 1:10,560 from Air Force photography. They were produced between 1944 and 1951 as an interim measure, pending preparation of conventional mapping, due to post war resource shortages. New security measures in the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

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Map Name(s) and Date(s)



Historical Aerial Photography - Slice A



LIBRARY
HSILIRB

Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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



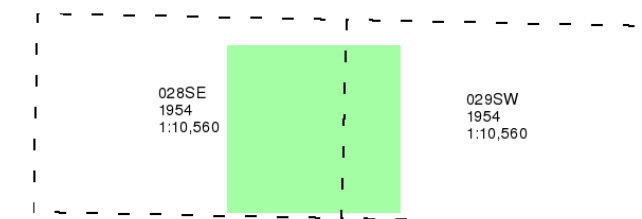
Monmouthshire

Published 1954

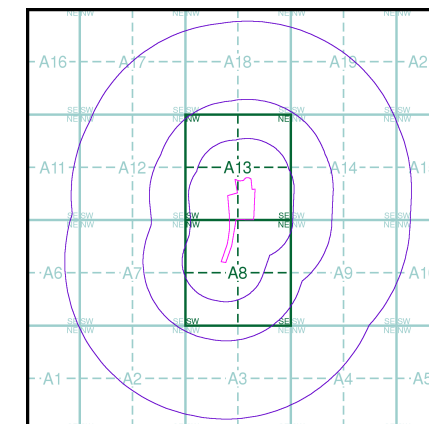
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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Ordnance Survey Plan

Published 1964 - 1965

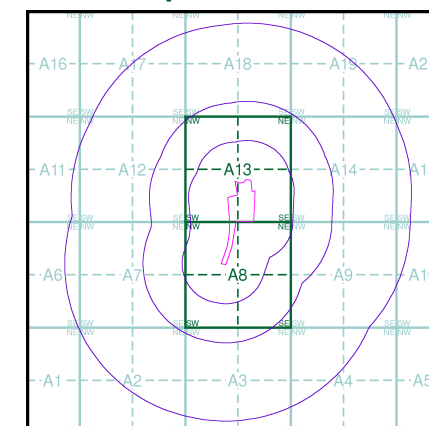
Source map scale - 1:10,000

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

Map Name(s) and Date(s)

ST39SW	1964
1:10,560	
ST38NW	1965
1:10,560	

Historical Map - Slice A



Order Details

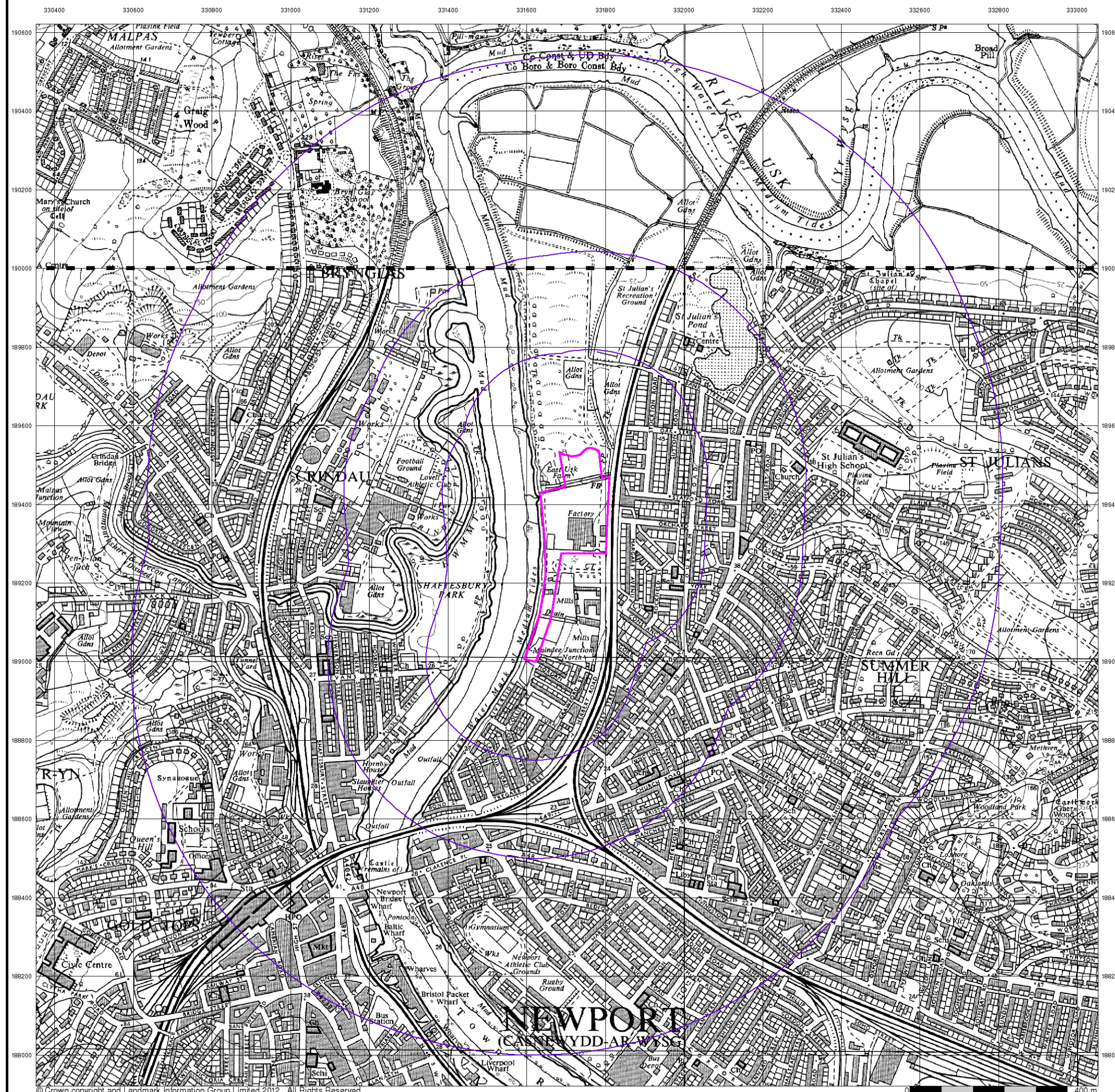
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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Fax: 0844 844 9951
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Ordnance Survey Plan

Published 1972 - 1973

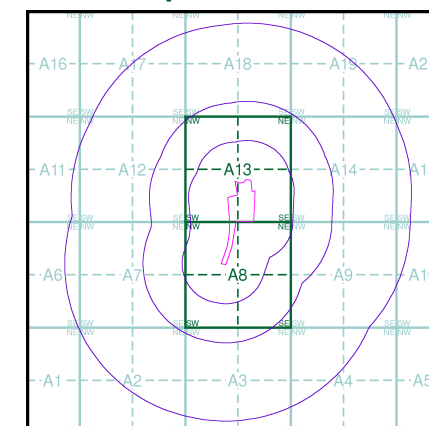
Source map scale - 1:10,000

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

Map Name(s) and Date(s)

ST39SW	1972
1:10,000	
ST38NW	1973
1:10,000	

Historical Map - Slice A



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

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Ordnance Survey Plan

Published 1981 - 1983

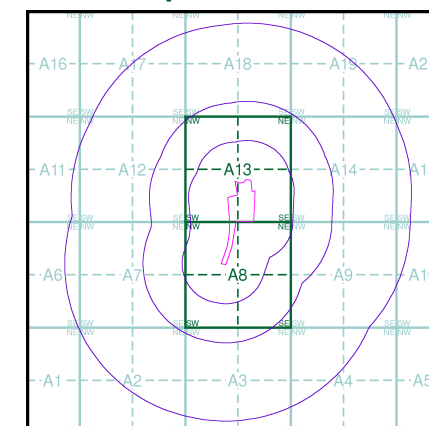
Source map scale - 1:10,000

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

Map Name(s) and Date(s)

ST39SW	1983
1:10,000	
ST38NW	1981
1:10,000	

Historical Map - Slice A



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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Newport

Published 1983

Source map scale - 1:10,000

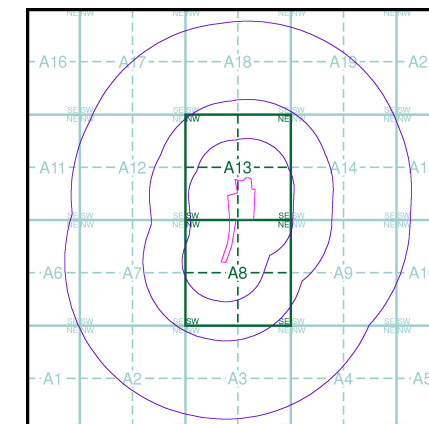
These maps were produced by the Russian military during the Cold War between 1950 and 1997, and cover 103 towns and cities throughout the U.K. The maps are produced at 1:25,000, 1:10,000 and 1:5,000 scale, and show detailed land use, with colour-coded areas for development, green areas, and non-developed areas. Buildings are coloured black and important building uses (such as hospitals, post offices, factories etc.) are numbered, with a numbered key describing their use.

They were produced by the Russians for the benefit of navigation, as well as strategic military sites and transport hubs, for use if they were to have invaded the U.K. The detailed information provided indicates that the areas were surveyed using land-based personnel, on the ground, in the cities that are mapped.

Map Name(s) and Date(s)

ST39SW
1983
1:10,000
ST38NW
1983
1:10,000

Russian Map - Slice A



Order Details

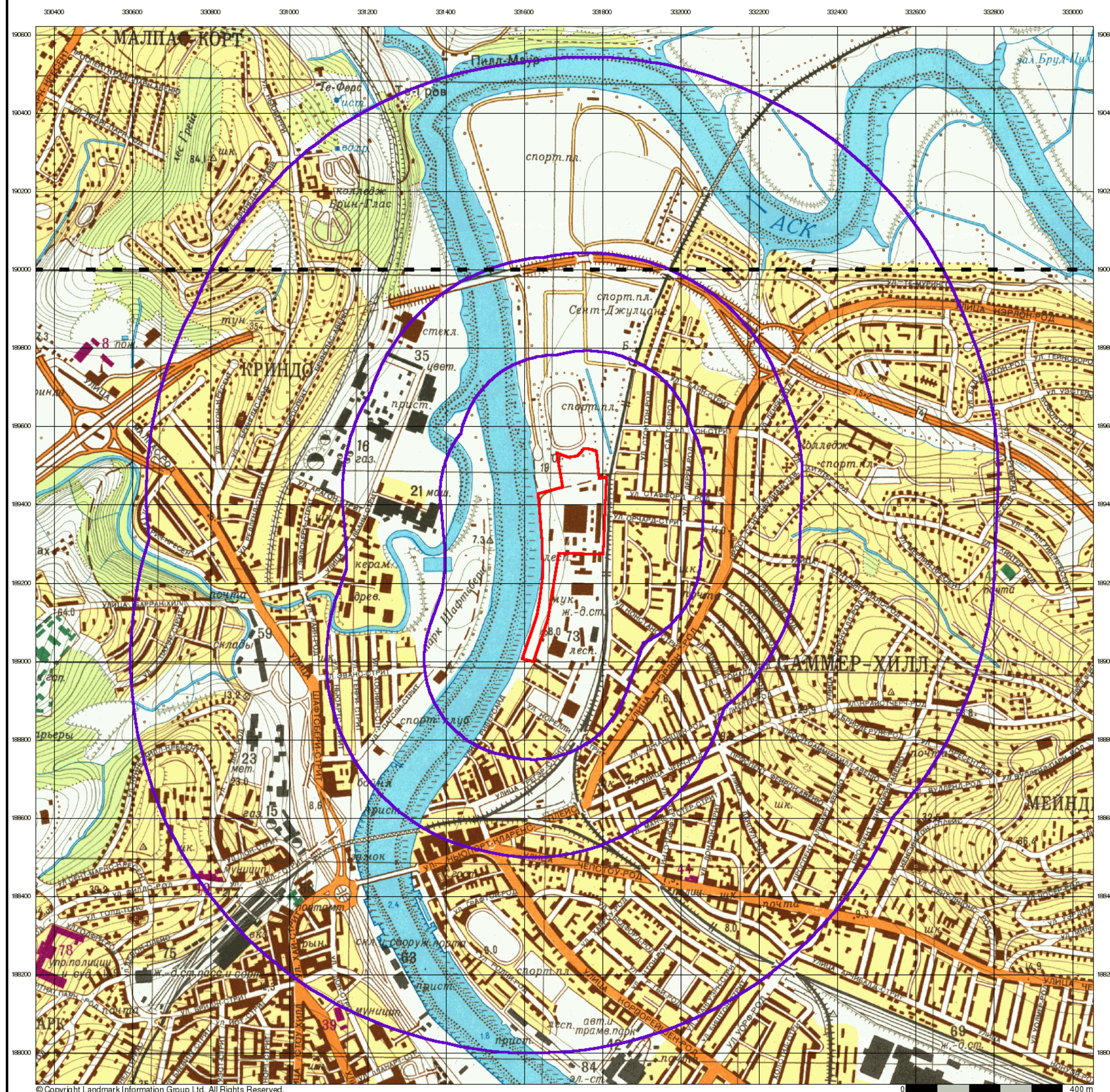
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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Web: www.envirocheck.co.uk





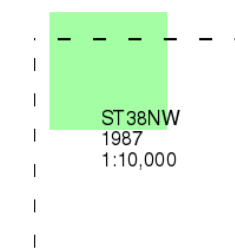
Ordnance Survey Plan

Published 1987

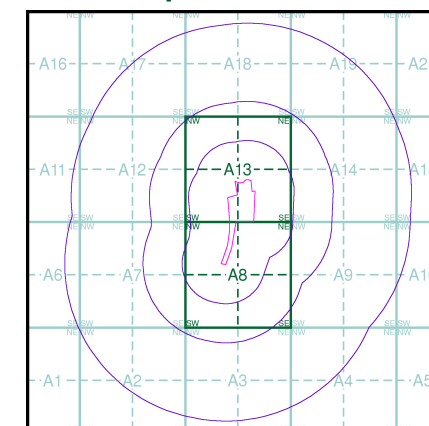
Source map scale - 1:10,000

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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



10k Raster Mapping

Published 2006

Source map scale - 1:10,000

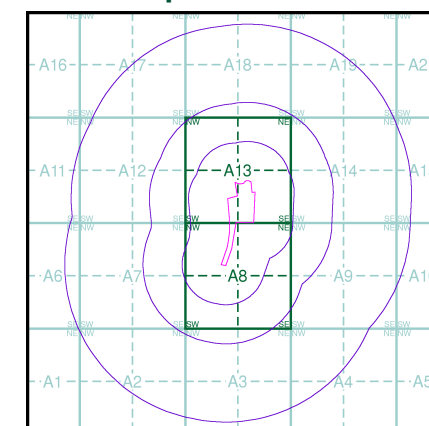
The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

ST39SW
2006
1:10,000

ST38NW
2006
1:10,000

Historical Map - Slice A



Order Details

Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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



10k Raster Mapping

Published 2012

Source map scale - 1:10,000

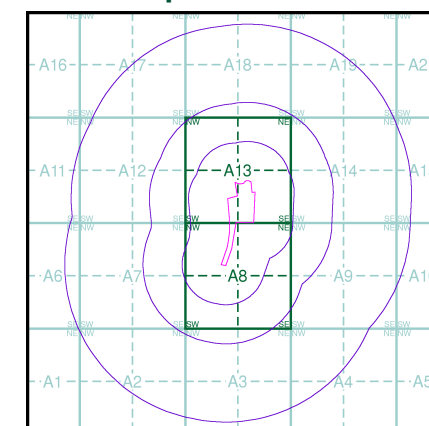
The historical maps shown were produced from the Ordnance Survey's 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

Map Name(s) and Date(s)

ST39SW
2012
1:10,000

ST38NW
2012
1:10,000

Historical Map - Slice A



Order Details

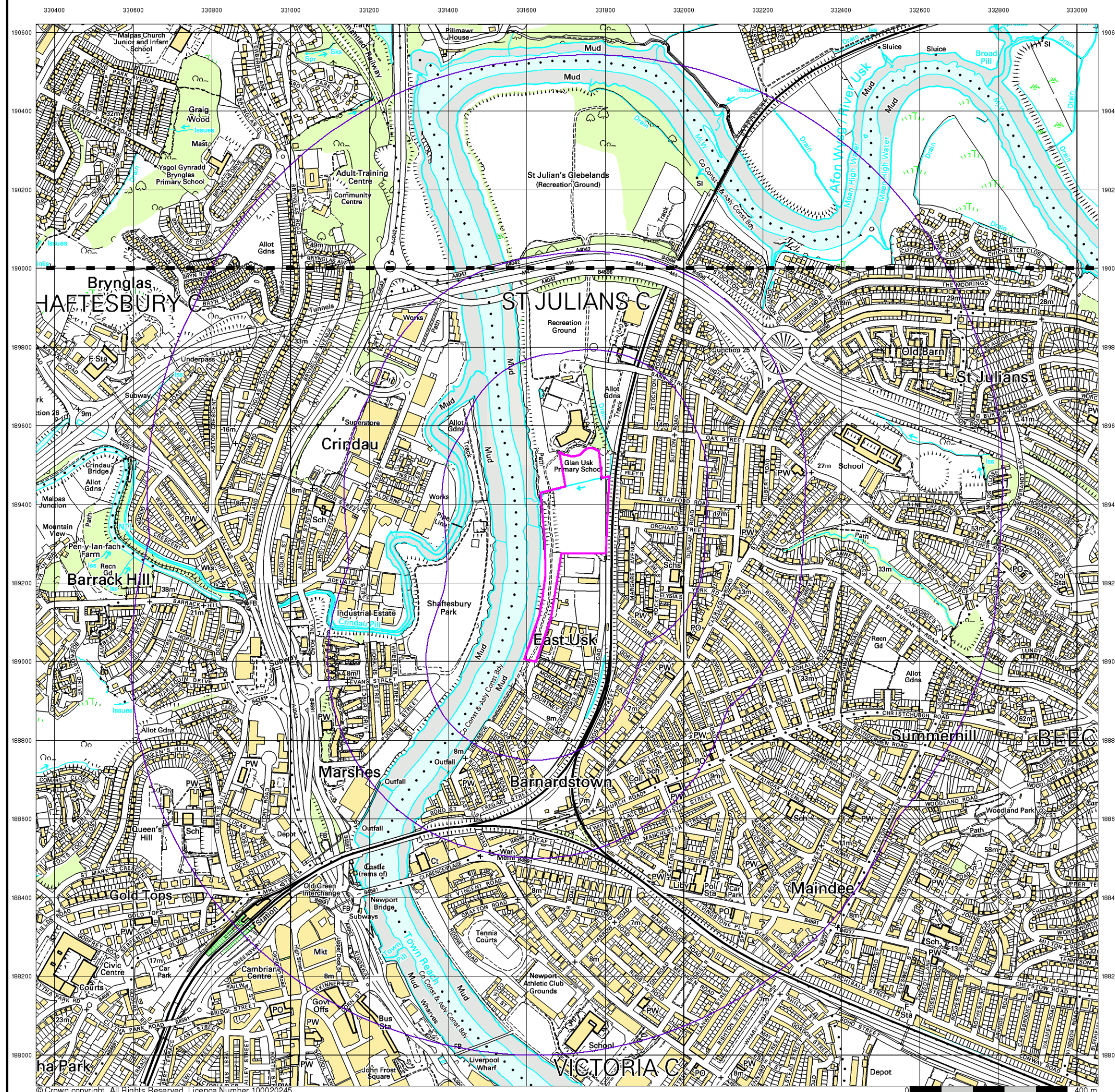
Order Number: 41914630_1_1
Customer Ref: 12044
National Grid Reference: 331690, 189280
Slice: A
Site Area (Ha): 4.52
Search Buffer (m): 1000

Site Details

., Herbert Road, NEWPORT, Gwent, NP19 7BH



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



**ANNEX B
Radon Report**

Groundsure Radon Check

Address: HERBERT ROAD DEVELOPMENT SITE PHASE 2, COURTNEY STREET, NEWPORT, NP19
7AY

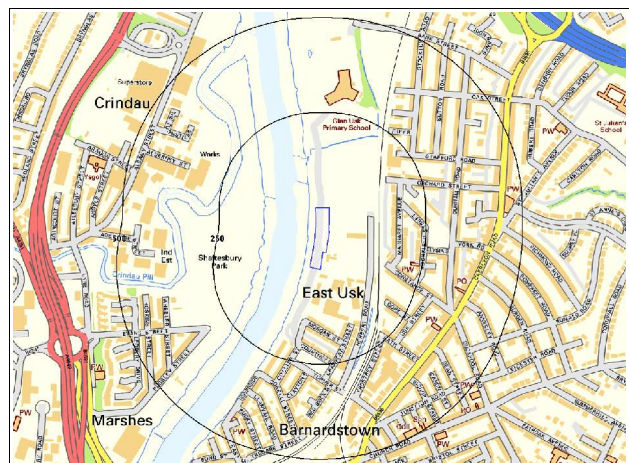
Date: 10 Jul 2018

Groundsure Reference: GS-5221500

Your Reference: 12032

Grid Reference: 331670,189210

Client: TerraFirma Wales



Brought to you by Groundsure



Report Reference: GS-5221500

Brought to you by Groundsure

If you would like any further assistance regarding this report then please contact
Groundsure on (T) 08444 159 000, email: info@groundsure.com

1. Residential Radon Potential Result

1.1 Is the property in a Radon Affected Area?

The information in this section provides an answer to one of the standard legal enquiries on house purchase in England and Wales, known as *CON29 standard Enquiry of Local Authority; 3.13 Radon Gas: Location of the Property in a Radon Affected Area*.

Question: Is the property in a Radon Affected Area as defined by Public Health England(PHE) and if so what percentage of homes are above the Action Level?

Answer: The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

1.2 Are radon protective measures required?

The information in this section will detail the level of protection required for new dwellings under as described in the latest Building Research Establishment guidance on radon protective measures for new dwellings. This may include extensions to the property.

Question: Is the property in an area where radon protection measures are required for new properties or extensions to existing ones as described in either publications BR211 (England and Wales) or BR376 (Scotland) by the Building Research Establishment?

Answer: No radon protective measures are necessary.

1.3 Radon Guidance

Radon is a colourless, odourless radioactive gas which is present in all areas of the United Kingdom, usually at levels that pose a negligible risk to homebuyers. However, in some areas levels of radon are much higher than in others, and in these cases it can pose a health risk. The data supplied by the Public Health England (PHE) and the British Geological Survey (BGS) is not able to determine exact Radon levels, as this information can only be obtained through site-specific, in-situ testing. As 1-3% of properties in the area may be radon affected the PHE recommend carrying out a site-specific radon assessment. This costs £49.80 including VAT and the results are confidential to the client. Please contact the PHE (01235 831 600) for further information and advice.

If planning on building an extension or a new build property, no radon protective measures are required.

1.4 Further details on radon

Radon is a naturally occurring radioactive gas, which enters buildings from the ground. Outdoors, it is diluted to very low levels. However, in some cases the radon level indoors can build up to high concentrations. In such cases, it does pose a serious risk to health. Exposure to high concentrations increases the risk of lung cancer. Public Health England recommends that radon levels should be reduced in homes where the annual average is at or above 200 becquerels per cubic metre (200 Bq m⁻³). This is termed the Action Level. Public Health England defines Radon Affected Areas as those with 1% chance or more of a house having a radon concentration at or above the Action Level of 200 Bq m⁻³.

The joint PHE-BGS digital Radon Potential Dataset used in this report provides the current definitive map of Radon Affected Areas in England and Wales.

Indoor radon levels can usually be substantially reduced at a cost comparable to many home improvements, such as replacing carpets. Details of methods of reducing radon levels are given on the Building Research Establishment Website. <http://www.bre.co.uk/radon/index.html>

2. Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com



Local Authority - Newport City Council. Address:
Civic Centre, Newport, South Wales, NP20 4UR.
Web: www.newport.gov.uk. Tel: 01633 656656

British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk
BGS Geological Hazards Reports and general
geological enquiries



Public Health England

Public information access office, Public Health
England
Wellington House, 133-155 Waterloo Road,
London, SE1 8UG
[https://www.gov.uk/government/organisations/
public-health-england](https://www.gov.uk/government/organisations/public-health-england)
Email: enquiries@phe.gov.uk



Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505



CoPSO
29 Harley Street, London W1G 9QR
Tel: 020 7927 6836
(www.copso.org.uk)



This report is produced by Groundsure Ltd, whose correspondence address is Groundsure Ltd, Sovereign House, Church Street, Brighton, BN1 1UJ (Tel: 08444 159 000, Fax: 01273 763569, Email: info@groundsure.com). Groundsure's registered address is Greater London House, Hampstead Road, London NW1 7EJ. Registration Number: 3421028. VAT Number 486 4004 42.

This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

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The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

COMPLAINTS

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if they find that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Website: www.tpos.co.uk
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk.

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

COMPLAINTS PROCEDURE

If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

Complaints should be sent to: Groundsure Ltd, Sovereign House, Church Street, Brighton, BN1 1UJ. Tel: 08444 159 000. Email: info@groundsure.com

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail: admin@tpos.co.uk.

We will co-operate fully with the Ombudsman during an investigation and comply with their final decision.

3. Standard Terms and Conditions

Groundsure's Terms and Conditions can be viewed online at this link:
<https://www.groundsure.com/terms-and-conditions-may25-2018>

ANNEX C
Risk Assessment Definitions

Risk Assessment Definitions

Environmental risk assessment evaluates the risk to receptors via an analysis of the 'source-pathway-receptor' linkage.

- (1) A **CONTAMINANT** (hazard) - a substance that is in, on or under the land and has the potential to cause harm or to cause pollution of controlled waters
- (2) A **RECEPTOR** (target) - something which could be adversely affected by a contaminant
- (3) A **PATHWAY** - a route or means which either allows the contaminant to cause significant harm to that receptor, or that there is a significant possibility of such harm being caused to the receptor, or that pollution of controlled waters is being or likely to be caused.

The term 'Risk' is widely used in different contexts and situations, but a prescriptive definition is given by the Guidelines for Environmental Risk Assessment and Management (DEFRA *et al*, 2000):

'Risk is a combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence'.

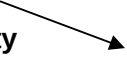
A 'Hazard' is defined as *'a property or situation that in particular circumstances could lead to harm'.*

The classification of consequences and probability and determining the risk category are defined in the following sections.

Table 1 Classification of Consequence	
Classification	Definition
Severe	• Short term (acute) risk to human health likely to result in significant harm • Short term risk to controlled waters • Catastrophic damage to buildings/structures • Short term risk to an ecosystem or organism within the particular ecosystem
Medium	• Chronic damage to human health (long term risk) • Pollution of a sensitive water resource • A significant change in an ecosystem or organism within the ecosystem
Mild	• Pollution of non-sensitive water resources • Significant damage to buildings/structures
Negligible	• Harm (not necessarily significant) which may result in financial loss • Non permanent health effects to humans (easily prevented by PPE for example) • Easily repairable effects of structural (building) damage

Table 2 Classification of Probability	
Classification	Definition
High	• There is a complete pollution linkage and an event appears very likely to occur in the short term and is inevitable in the long term. • Evidence of harm to the receptor
Medium	• There is a complete pollution linkage which means that it is probable that an event will occur • The event is not inevitable but possible in short term and likely in the long term
Low	• There is a complete pollution linkage and circumstances are possible under which an event could occur • It is not certain that an event will occur in the long term, and it is less likely to occur in the short term
Negligible	• There is a complete pollution linkage but circumstances are such that it is improbable that an event would occur even in the long term

By comparing the consequences of a risk and the probability of the risk of a pollution linkage, the likely risk category can be determined as shown in **Table 3** below.

Table 3 Risk Assessment Matrix					
Increasing acceptability 		Consequence			
		Severe	Medium	Mild	Negligible
Probability	High	High	High	Medium / Low	Near zero
	Medium	High	Medium	Low	Near zero
	Low	High / medium	Medium / Low	Low	Near zero
	Negligible	High / medium / Low	Medium / Low	Low	Near zero

High Risk

There is a high probability that severe harm could risk a receptor, or there is evidence that a receptor is being harmed. The risk if realised is likely to result in liability, and urgent investigation or remediation will be required.

Medium Risk

It is probable that harm will arise to a receptor. However it is relatively unlikely that such harm would be severe, or if harm does occur the harm is likely to be relatively mild. Investigation will be required to determine the liability, and some remedial works may be required in the long term.

Low Risk

It is possible that harm may arise to a receptor, but it is likely that the harm would be mild.

Near Zero Risk

There is a very low risk of harm to the receptor. In the event of harm being realised the harm is

ANNEX D
Trial Pit Logs



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CF23 7HA

Trial Pit No:

TP1

Sheet 1 of 1

Project Name: Hebert Road (Phase 2)

Project No:
12032-P2

Co-ords: -
Level:

Date:
22/06/2018

Location: Newport

Dimensions:

Depth
1.70



Scale:
1:25
Logged:

Client: Engie

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			MADE GROUND: Dense grey SAND and fine to coarse angular GRAVEL
				0.50			MADE GROUND: Dense red brown and dark grey SAND and fine to coarse angular GRAVEL
				0.70			Medium dense brown SAND and fine to coarse angular GRAVEL. Fragments of glass, brick, china, red tile, concrete, ceramic tile.
							MADE GROUND: Soft to firm dark grey brown gravelly CLAY. Fragments of china, metal, plastic, red tile. Cobble of stone and concrete.
				1.70			End of Pit at 1.700m

Stability:

Remarks:



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Trial Pit No:

TP2

Sheet 1 of 1

Project Name: Hebert Road (Phase 2)

Project No:
12032-P2

Co-ords: -
Level:

Date:
22/06/2018

Location: Newport

Dimensions:

Depth
1.20



Scale:
1:25
Logged:

Client: Engie

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.60			MADE GROUND: Dense grey brown SAND and fine to coarse angular GRAVEL. Gravel to cobble size fragments of concrete and breeze block. Occasional plastic.	
				1.20			MADE GROUND: Firm red brown gravelly CLAY with grey green inclusions	1
							End of Pit at 1.200m	2
								3
								4
								5

Stability:

Remarks:



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Trial Pit No:

TP3

Sheet 1 of 1

Project Name: Hebert Road (Phase 2)

Project No:
12032-P2

Co-ords: -
Level:

Date:
22/06/2018

Location: Newport

Dimensions:

Depth
1.70



Scale:

1:25

Logged:

Client: Engie

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Medium dense grey SAND and fine to coarse angular GRAVEL	
							MADE GROUND: Stiff red brown gravelly CLAY	
				1.00			MADE GROUND: Soft dark grey brown sandy gravelly CLAY. Fragments of brick, tile, plastic, concrete and timber.	1
				1.70			End of Pit at 1.700m	2
								3
								4
								5

Stability:

Remarks:



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Trial Pit No:

TP4

Sheet 1 of 1

Project Name: Hebert Road (Phase 2)

Project No:
12032-P2

Co-ords: -
Level:

Date:
22/06/2018

Location: Newport

Dimensions:

Depth
1.70



Scale:
1:25
Logged:

Client: Engie

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				1.70			MADE GROUND: Soft to firm grey brown and red brown gravelly cobbly CLAY. Fragments of glass, brick, concrete and rare slag. Concrete plinth.
							End of Pit at 1.700m

Stability:

Remarks:



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CF23 7HA

Trial Pit No:

TP5

Sheet 1 of 1

Project Name: Hebert Road (Phase 2)

Project No:
12032-P2

Co-ords: -
Level:

Date:
22/06/2018

Location: Newport

Dimensions:

Depth
1.70



Scale:
1:25
Logged:

Client: Engie

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30			MADE GROUND: Dense grey brown SAND and fine to coarse angular GRAVEL and COBBLE of stone, brick and concrete (Building Rubble)	
							MADE GROUND: Firm red brown gravelly CLAY	1
				1.70			End of Pit at 1.700m	2
								3
								4
								5

Stability:

Remarks:



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Trial Pit No:

TP6

Sheet 1 of 1

Project Name: Hebert Road (Phase 2)

Project No:
12032-P2

Co-ords: -
Level:

Date:
22/06/2018

Location: Newport

Dimensions:

Depth
1.70



Scale:
1:25
Logged:

Client: Engie

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				1.20			MADE GROUND: Dense grey brown sandy very gravelly cobbly CLAY. Fragments of brick, concrete, gals, timber, china and wire.	1
				1.70			MADE GROUND: Soft dark grey gravelly CLAY. Fine roots. Occasional brick and glass fragments.	
							End of Pit at 1.700m	2
								3
								4
								5

Stability:

Remarks:

ANNEX E
Borehole Logs

Project Name:	Hebert Road (Phase 2)	Project No:	12032-P2	Co-ords:		Hole Type	CP
Location:	Newport	Level:				Scale	1:50
Client:	Engie	Dates:	20/06/2018 -			Logged By	

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description	
	Depth (m)	Type	Results						
	1.00	SPT	N=29 (16,13/8,6,6,9)					MADE GROUND: Building rubble of brick and crushed concrete	1
	2.00	SPT	N=4 (1,0/1,1,1,1,1)	1.70				MADE GROUND: Very soft grey CLAY. Timber.	2
	3.00	SPT	N=9 (2,1/1,2,3,3)	2.90				Firm grey mottled CLAY (Alluvium)	3
	4.00	SPT	N=13 (2,2/3,3,3,4)						4
	5.00	SPT	N=11 (1,2/3,3,3,2)	5.40				Firm grey peaty CLAY (Alluvium)	5
	6.00	SPT	N=8 (1,1/2,2,2,2)						6
	7.00								7
	8.00	SPT	N=5 (1,0/1,1,1,2)	7.90				Soft PEAT	8
	9.20								9

Chiseling	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Remarks
	0.70	1.20	01:00	

Remarks:



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Borehole No.

BH1

Sheet 2 of 2

Project Name:	Hebert Road (Phase 2)	Project No:	12032-P2	Co-ords:		Hole Type	CP
Location:	Newport	Level:				Scale	1:50
Client:	Engie	Dates:	20/06/2018 -			Logged By	

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description	
	Depth (m)	Type	Results						
▼	10.00	SPT	N=3 (2,1/1,1,0,1)	10.10				Very soft grey peaty CLAY (Alluvium)	10
								Soft PEAT	
				11.00				Soft grey peaty CLAY (Alluvium)	11
	12.00	SPT	N=13 (1,2/3,3,3,4)	12.20				Firm PEAT	12
				12.90				Firm grey peaty CLAY (Alluvium)	13
				13.20				Red sandy slightly cobbly SILT	
	14.00	SPT	N=21 (2,3/4,4,5,8)	13.80				Stiff red purple CLAY with angular gravel of mudstone	14
				14.50				Weathered red MUDSTONE (St Maughan's Formation)	15
	15.30	SPT	N=50 (6,8/10,10,14,16)						
	16.00	SPT	56 (10,14/56 for 225mm)						16
	16.50	SPT	50 (25 for 95mm/50 for 115mm)	16.50				End of Borehole at 16.500m	17
									18
Chiseling	Depth Top (m)	Depth Base (m)		Duration (hh:mm)		Remarks			
	16.00	16.50		01:00					

Remarks:



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Borehole No.

BH2

Sheet 1 of 3

Project Name:	Hebert Road (Phase 2)	Project No:	12032-P2	Co-ords:		Hole Type	CP
Location:	Newport	Level:				Scale	1:50
Client:	Engie	Dates:	21/06/2018 -			Logged By	

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description	
	Depth (m)	Type	Results						
				0.70				MADE GROUND: Building rubble of crushed brick and concrete	
	1.00	SPT	N=3 (1,0/1,1,0,1)					MADE GROUND: Very soft red CLAY	1
	2.00	SPT	N=1 (1,0/0,0,1,0)						2
	3.00	SPT	N=21 (6,12/10,5,3,3)	2.90				MADE GROUND: Dense brick and tarmac	3
				3.20				Grey mottled CLAY (Alluvium)	4
									5
				5.60				Very soft grey peaty CLAY (Alluvium)	6
	6.00	SPT	N=3 (1,0/0,1,1,1)						7
									8
				8.30				PEAT	9
	9.00	SPT	N=9 (1,1/2,2,2,3)						
Chiseling	Depth Top (m)	Depth Base (m)		Duration (hh:mm)		Remarks			

Remarks:



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Borehole No.

BH2

Sheet 2 of 3

Project Name:	Hebert Road (Phase 2)	Project No:	12032-P2	Co-ords:		Hole Type	CP
Location:	Newport	Level:				Scale	1:50
Client:	Engie	Dates:	21/06/2018 -			Logged By	

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description	
	Depth (m)	Type	Results						
▼				9.50				PEAT	
								Soft to firm grey peaty CLAY (Alluvium)	10
				10.40				PEAT	
				11.10				Very soft grey peaty CLAY (Alluvium)	11
	12.00	SPT	0 (0 for 0mm/0 for 0mm)						12
				12.60				PEAT	
				13.20				Red sandy SILT	13
	14.00	SPT	N=7 (1,1/1,2,2,2)	13.90				Medium dense red fine to coarse angular GRAVEL of mudstone	14
	14.70	SPT	N=28 (2,3/5,7,7,9)	14.60				Highly weathered red MUDSTONE/SANDSTONE (St Maughan's Formation)	15
	15.50	SPT	N=31 (22,17/10,8,7,6)	15.20				Highly weathered red MUDSTONE (St Maughan's Formation)	16
	17.00	SPT	N=21 (2,3/4,5,6,6)						17
	18.00	SPT	N=25 (2,4/5,5,7,8)	17.90				Weathered red MUDSTONE (St Maughan's Formation)	18
Chiseling	Depth Top (m)	Depth Base (m)		Duration (hh:mm)		Remarks			

Remarks:



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Borehole No.

BH2

Sheet 3 of 3

Project Name:	Hebert Road (Phase 2)	Project No:	12032-P2	Co-ords:		Hole Type	CP
Location:	Newport	Level:				Scale	1:50
Client:	Engie	Dates:	21/06/2018 -			Logged By	

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description	
	Depth (m)	Type	Results						
	19.00	SPT	86 (25 for 132mm/86 for 95mm)	19.00				Weathered red MUDSTONE (St Maughan's Formation)	
								End of Borehole at 19.000m	19
									20
									21
									22
									23
									24
									25
									26
									27

Chiseling	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Remarks
	18.50	19.00	01:00	

Remarks:



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Borehole No.

BH3

Sheet 1 of 2

Project Name:	Hebert Road (Phase 2)	Project No:	12032-P2	Co-ords:		Hole Type	CP
Location:	Newport	Level:				Scale	1:50
Client:	Engie	Dates:	25/06/2018 -			Logged By	

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description	
	Depth (m)	Type	Results						
	1.00	SPT	N=39 (9,8/13,13,7,6)					MADE GROUND: Dense building rubble of crushed brick and concrete grading into sandstone cobbles	1
	2.00	SPT	N=19 (2,5/7,4,4,4)						2
	3.00	SPT	N=41 (2,3/3,8,11,19)						3
	4.00	SPT	N=12 (1,2/2,3,3,4)	3.90				Firm grey mottled CLAY (Alluvium)	4
	5.00	SPT	N=13 (1,2/3,3,3,4)						5
	6.00			6.00				Soft grey peaty CLAY (Alluvium)	6
	6.50	SPT	N=5 (1,1/1,1,1,2)						7
									8
				8.90				PEAT	9

Chiseling	Depth Top (m)	Depth Base (m)	Duration (hh:mm)	Remarks
	0.30	0.60	01:00	
	3.50	3.90	01:00	

Remarks:



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Borehole No.

BH3

Sheet 2 of 2

Project Name:	Hebert Road (Phase 2)	Project No:	12032-P2	Co-ords:		Hole Type	CP
Location:	Newport	Level:				Scale	1:50
Client:	Engie	Dates:	25/06/2018 -			Logged By	

Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Well	Legend	Stratum Description	
	Depth (m)	Type	Results						
	9.50	SPT	N=9 (1,1/2,2,3,2)	10.00				PEAT	
								Soft grey peaty CLAY (Alluvium)	10
				11.00				PEAT	11
				11.70				Soft grey peaty CLAY (Alluvium)	
	12.50	SPT	N=3 (1,0/1,0,1,1)	13.30				PEAT	13
				14.00				Dense red gravelly sandy SILT	14
				15.20				Weathered red MUDSTONE (St Maughan's Formation)	15
	15.50	SPT	50 (12,13/50 for 120mm)						
	16.00	SPT	50 (25 for 60mm/50 for 25mm)	16.00				End of Borehole at 16.000m	16
									17
									18
Chiseling	Depth Top (m)	Depth Base (m)		Duration (hh:mm)		Remarks			
	15.20	16.00		02:00					

Remarks:

ANNEX F
Laboratory Soil Chemical Test Results



Certificate of Analysis

Certificate Number 18-15385-1

09-Jul-18

Client Terra Firma (Wales) Ltd
5 Deryn Court
Wharfdale Road
Pentwyn
Cardiff
CF23 7HB

Our Reference 18-15385-1

Client Reference 12032P2RH

Order No 12032PSRH

Contract Title H.Rd P2 (Herbert Road Phase 2)

Description 8 Soil samples.

Date Received 26-Jun-18

Date Started 26-Jun-18

Date Completed 09-Jul-18

Test Procedures Identified by prefix DETSn (details on request).

Notes This report supersedes 18-15385. Extra testing

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Matrix Descriptions

Our Ref 18-15385-1

Client Ref 12032P2RH

Contract Title H.Rd P2 (Herbert Road Phase 2)

Sample ID	Depth	Lab No	Completed	Matrix Description
TP1	0.6	1358057	03/07/2018	Brown gravelly, clayey SAND (Possible made ground - brick)
TP1	1.2	1358058	03/07/2018	Dark brown gravelly, clayey SAND
TP2	0.3	1358059	03/07/2018	Dark brown gravelly, clayey SAND (Possible made ground - brick)
TP3	0.4	1358060	03/07/2018	Brown gravelly, sandy CLAY
TP4	0.2	1358061	03/07/2018	Dark brown gravelly, clayey SAND
TP5	0.1	1358062	03/07/2018	Brown gravelly, clayey SAND
TP5	0.6	1358063	03/07/2018	Red gravelly, sandy CLAY
TP6	0.3	1358064	03/07/2018	Dark brown gravelly, clayey SAND (Possible made ground - brick)

Summary of Chemical Analysis

Soil Samples

Our Ref 18-15385-1

Client Ref 12032P2RH

Contract Title H.Rd P2 (Herbert Road Phase 2)

Lab No	1358057	1358058	1358059	1358060	1358061	1358062
Sample ID	TP1	TP1	TP2	TP3	TP4	TP5
Depth	0.60	1.20	0.30	0.40	0.20	0.10
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	22/06/18	22/06/18	22/06/18	22/06/18	22/06/18	22/06/18
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Asbestos Quantification	DETSC 1102	0		Y					
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	8.8	17	17	3.5	12	8.5
Cadmium	DETSC 2301#	0.1	mg/kg	0.5	0.3	0.5	< 0.1	0.5	0.2
Chromium	DETSC 2301#	0.15	mg/kg	24	22	25	22	23	13
Chromium III	DETSC 2301*	0.15	mg/kg	24	22	25	22	23	13
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	30	61	52	17	82	13
Lead	DETSC 2301#	0.3	mg/kg	78	130	150	15	73	17
Mercury	DETSC 2325#	0.05	mg/kg	0.13	0.36	0.46	0.05	0.21	< 0.05
Nickel	DETSC 2301#	1	mg/kg	9.7	27	20	29	24	9.1
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.6	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	92	130	150	52	140	65
Inorganics									
pH	DETSC 2008#			11.1	8.2	10.0	8.8	8.6	11.3
Cyanide, Total	DETSC 2130#	0.1	mg/kg	11	2.7	0.7	< 0.1	0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	2.4	4.3	4.0	0.6	2.9	0.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	940					1500
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.52	0.09	0.23	0.05	0.10	1.6
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	0.04	0.05	< 0.03	< 0.03	0.13	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	0.08	0.13	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	< 0.03	< 0.03	0.06	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	0.08	0.04	< 0.03	< 0.03	0.06	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.57	0.36	0.23	0.18	0.35	0.17
Anthracene	DETSC 3303	0.03	mg/kg	0.16	0.10	0.05	0.04	0.11	0.07
Fluoranthene	DETSC 3303#	0.03	mg/kg	1.3	1.0	0.52	0.21	0.66	0.56
Pyrene	DETSC 3303#	0.03	mg/kg	1.3	1.2	0.44	0.17	0.55	0.56
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.75	0.55	0.28	0.09	0.30	0.33
Chrysene	DETSC 3303	0.03	mg/kg	0.97	0.85	0.36	0.09	0.37	0.36
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	1.3	1.2	0.44	0.11	0.49	0.51
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.49	0.43	0.17	0.03	0.17	0.22
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.87	0.85	0.26	0.07	0.30	0.36
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.38	0.38	0.12	< 0.03	0.12	0.12
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.11	0.10	0.04	< 0.03	0.04	0.04
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.57	0.54	0.17	0.03	0.18	0.20
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	9.1	7.9	3.1	0.96	3.9	3.5
Phenols									
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 18-15385-1

Client Ref 12032P2RH

Contract Title H.Rd P2 (Herbert Road Phase 2)

Lab No	1358063	1358064
Sample ID	TP5	TP6
Depth	0.60	0.30
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	22/06/18	22/06/18
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Asbestos Quantification	DETSC 1102	0			Y
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	2.3	13
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.8
Chromium	DETSC 2301#	0.15	mg/kg	31	23
Chromium III	DETSC 2301*	0.15	mg/kg	31	23
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	9.5	50
Lead	DETSC 2301#	0.3	mg/kg	9.8	530
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.52
Nickel	DETSC 2301#	1	mg/kg	36	23
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	57	170
Inorganics					
pH	DETSC 2008#			8.7	9.0
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	0.9	3.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l		
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.05	0.15
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.04
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.23
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.20
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.07	0.97
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.31
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.12	1.9
Pyrene	DETSC 3303#	0.03	mg/kg	0.11	1.6
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.05	1.1
Chrysene	DETSC 3303	0.03	mg/kg	0.09	1.1
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	1.4
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.55
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.04	0.87
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.30
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.11
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.43
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.59	11
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3

Summary of Asbestos Analysis Soil Samples

Our Ref 18-15385-1

Client Ref 12032P2RH

Contract Title H.Rd P2 (Herbert Road Phase 2)

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1358057	TP1 0.60	SOIL	Chrysotile	Bundle of Chrysotile fibres	Keith Wilson
1358058	TP1 1.20	SOIL	NAD	none	Keith Wilson
1358059	TP2 0.30	SOIL	NAD	none	Keith Wilson
1358060	TP3 0.40	SOIL	NAD	none	Keith Wilson
1358061	TP4 0.20	SOIL	NAD	none	Keith Wilson
1358062	TP5 0.10	SOIL	NAD	none	Keith Wilson
1358063	TP5 0.60	SOIL	NAD	none	Keith Wilson
1358064	TP6 0.30	SOIL	Crocidolite	Bundles of Crocidolite fibres	Keith Wilson

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * -not included in laboratory scope of accreditation.

Summary of Asbestos Quantification Analysis

Soil Samples

Our Ref 18-15385-1

Client Ref 12032P2RH

Contract Title H.Rd P2 (Herbert Road Phase 2)

Lab No	1358057	1358064
Sample ID	TP1	TP6
Depth	0.60	0.30
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	22/06/18	22/06/18
Sampling Time		

Test	Method	Units		
Total Mass% Asbestos (a+b+c)	DETSC 1102	Mass %	< 0.001	0.001
Gravimetric Quantification (a)	DETSC 1102	Mass %	na	na
Detailed Gravimetric Quantification (b)	DETSC 1102	Mass %	<0.001	0.001
Quantification by PCOM (c)	DETSC 1102	Mass %	na	na
Potentially Respirable Fibres (d)	DETSC 1102	Fibres/g	na	na

Breakdown of Gravimetric Analysis (a)

Mass of Sample		g	1149.61	899.34
ACMs present*		type		
Mass of ACM in sample		g		
% ACM by mass		%		
% asbestos in ACM		%		
% asbestos in sample		%		

Breakdown of Detailed Gravimetric Analysis (b)

% Amphibole bundles in sample		Mass %	na	0.001
% Chrysotile bundles in sample		Mass %	<0.001	na

Breakdown of PCOM Analysis (c)

% Amphibole fibres in sample		Mass %	na	na
% Chrysotile fibres in sample		Mass %	na	na

Breakdown of Potentially Respirable Fibre Analysis (d)

Amphibole fibres		Fibres/g	na	na
Chrysotile fibres		Fibres/g	na	na

* Denotes test or material description outside of UKAS accreditation.
 % asbestos in Asbestos Containing Materials (ACMs) is determined by
 by reference to HSG 264.
 Recommended sample size for quantification is approximately 1kg
 # denotes deviating sample

Information in Support of the Analytical Results

Our Ref 18-15385-1
 Client Ref 12032P2RH
 Contract H.Rd P2 (Herbert Road Phase 2)

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1358057	TP1 0.60 SOIL	22/06/18	GJ 250ml, PT 1L		
1358058	TP1 1.20 SOIL	22/06/18	GJ 250ml, PT 1L		
1358059	TP2 0.30 SOIL	22/06/18	GJ 250ml, PT 1L		
1358060	TP3 0.40 SOIL	22/06/18	GJ 250ml x2, PT 1L		
1358061	TP4 0.20 SOIL	22/06/18	GJ 250ml x2, PT 1L		
1358062	TP5 0.10 SOIL	22/06/18	GJ 250ml, PT 1L		
1358063	TP5 0.60 SOIL	22/06/18	GJ 250ml x2, PT 1L		
1358064	TP6 0.30 SOIL	22/06/18	GJ 250ml x2, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO ₄	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO ₄	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

ANNEX G
Gas Monitoring Results

					BH1	BH2	BH3
Round	1			% CH ₄	3.8	1.9	0.3
Date	11.07.2018			% CH ₄ Peak	4.2	1.9	0.3
Weather	Sunny			% LEL	76	0	6
Barometric pressure	1021	mb		% CO ₂	4.1	2.7	0.1
				% O ₂	8.5	0.2	19.5
				CO (ppm)	0	0	0
				H ₂ S (ppm)	0	0	0
				Flow (l/hr)	0	0	0

DRAWINGS



Drawing Number
01

Drawing Title
SITE LAYOUT

Job Number
12032

Job Title
**HERBERT ROAD
PHASE 2**

NOT TO SCALE

