



**PRELIMINARY GEOENVIRONMENTAL
APPRAISAL & PRELIMINARY MINING
RISK ASSESSMENT**
of land at
PARK PLACE, MANCHESTER, M4 4FY

Prepared on behalf of Roscoe

Report 7241/1

Date August 2023

FOREWORD (Preliminary Geoenvironmental Investigation Report)

This report has been prepared for the sole use and reliance of Roscoe and cannot be relied upon by any other parties without the express written authorisation of Calabrian Limited (Calabrian). Any unauthorized third party relies on this report at their own risk and the authors owe them no duty of care.

The report presents observations and factual data obtained during our site investigation and provides an assessment of geoenvironmental issues with respect to information provided by the Client regarding the proposed development. Further advice should be sought from Calabrian prior to significant revision of the development proposals.

The report should be read in its entirety, including all associated drawings and appendices. Calabrian cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in any Desk Study section of the report (including review of any third-party reports) are based on information obtained from the sources listed, which Calabrian understands are reliable. All reasonable skill, care and diligence has been applied in examining the information obtained. However, Calabrian accept no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data.

Where the report refers to the potential presence of invasive weeds such as Japanese Knotweed, or the presence of asbestos containing materials, it should be noted that the observations are for information only and should be verified by a suitably qualified expert.

Calabrian reserve the right to amend their conclusions and recommendations in the light of further information that may become available.



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1 INTRODUCTION

1.1 THE COMMISSION AND SCOPE

Calabrian Limited (Calabrian), were commissioned by Roscoe to carry out a preliminary geoenvironmental appraisal and preliminary mining risk assessment of land at Park Place, Manchester, M4 4FY.

The agreed scope for this report is summarised below with full details of Calabrian's appointment included in Appendix A:

- A review of third-party reports;
- a site walkover and inspection;
- an assessment of the land use history;
- determination of the site's environmental setting;
- assessment of anticipated ground conditions, including potential contaminants;
- assessment of anticipated foundation and engineering issues associated with redevelopment for a mixed commercial and residential end-use; and,
- provision of recommendations for an appropriate ground investigation.

This preliminary appraisal comprised inspection of historical and geological maps and data provided by the British Geological Survey and Landmark along with additional information provided by the Coal Authority, and Alpha Associates. In addition, a site walkover survey has been carried out by Calabrian.



1.2 OBJECTIVES

To identify salient geoenvironmental issues affecting the site to enable Roscoe to obtain budget costs for the necessary site preparatory and remediation works, and to support the initial submission of a planning application to the local authority.

1.3 DEVELOPMENT PROPOSALS

The proposed redevelopment comprises the demolition of existing building and erection of a part 25 and part 15 storey residential building comprising 154 units with ground floor commercial units (Class E), associated residents amenity space, cycle parking, substation, servicing, and associated landscaping works. A copy of the proposed ground floor layout is copied as Drawing 7241/2.

1.4 LIMITATIONS

General notes and limitations relevant to all Calabrian preliminary investigations are described in the Foreword and should be read in conjunction with this report. The text of the report draws specific attention to any modification to these procedures and to any other special techniques employed.

2 SITE DESCRIPTION

2.1 GENERAL

Details of the site are given below:

- Location: 1.8km north of Oxford Street Railway Station in Manchester city centre
- National Grid Reference: SJ 840 993
- Nearest Postcode: M4 4FY
- Area: 1,017m² (approx.)

2.2 SITE FEATURES

Calabrian completed a walkover survey of the site on 1st July 2023.

The site is currently predominately occupied by a single-storey structure with a mix of flat and pitched (likely) asbestos cement sheet roofing. There is a small yard area to the rear (east) that is accessed via a locked gate.

The building has most recently been used for hair and fashion accessory retail with the car park areas to the south and west being operated by NCP as paid for parking.

Existing salient features, at the time of the walkover are presented on Drawing No. 7241/3. A selection of site photographs are included on Drawing 7241/4.

3 SITE HISTORY

In order to investigate the development history and previous land uses at the site and immediate surrounding land, site centred extracts from Ordnance Survey (OS) plans dating back to 1848 have been examined. These plans are presented in Appendix B.

Dates	On Site Features	Off Site Feature
1848	The site itself was unoccupied (1850 Town map). The 1:10,000 OS map of 1848 appears to show a building on site; however, this is likely an overlay error as this appears to be the chapel to the south.	Park Place formed the sites northern boundary with York Street to the east. Residential dwellings were located immediately north with open land and a chapel to the south, open land to the west and further domestic properties beyond York Street to the east.
1891	The site appears within its current boundaries with a Synagogue at its centre. This was noted to be of two-storey construction with a basement (see Drawing 7241/4).	Extensive development has occurred around the site with Clinical Hospital and a Carriage Works to the west.
1949	The synagogue has been replaced by an elongate building slightly to the north of the former building that is noted as a 'Hall' (see Drawing 7241/4).	Clothing factories are located immediately south and west.
1962	The 'Hall' is now referred to as a 'Clothing Factory' or 'Works' on the 1963 OS map.	

Dates	On Site Features	Off Site Feature
1984	The 'Hall' has been replaced by a 'Warehouse' on the footprint of the existing building.	Extensive redevelopment has occurred around the site.
Present	No further significant changes	

It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site. Significant former uses/operations are highlighted in bold text for ease of reference.

4 ENVIRONMENTAL SETTING

4.1 GENERAL

Information supplied by the Coal Authority, the BGS, Alpha Associates and Landmark is summarised in the table below and presented in Appendix C.

Issue Data Reviewed	Remark
Geology 1:50,000 BGS map Borehole Data	Superficial - Till (likely stiff gravelly clay). Solid - Chester Formation (sandstone). Shallowest coal seam - None. Strata Dip – Not recorded. Faults – None beneath the site. Archive exploratory hole (see Appendix C) close to the site found around 1.5m (possibly up to 4m) of made ground overlying stiff sandy and gravelly clay. Ground investigation (see Section 5) on the opposite side of Cheetham Hill Road in 2017 found made ground to depths of between around 4m to 6m with very stiff gravelly clay and locally sand extending to approximately 19m where sandstone was encountered.
Mining Coal Authority BGS maps	The site is located within a Coal Mining Reporting Area (within the defined coalfield, but no known defined risks have been recorded by the Coal Authority; there may still be unrecorded issues). See Section 4.2 below.
Quarrying Landmark Report Historical OS Plans	None within 200m.
Radon Landmark	No protective measures required. The property is in a Lower probability radon area (less than 1% of homes are estimated to be at or above the Action Level).
Hydrogeology Landmark Report Groundwater Vulnerability map	Source Protection Zone? No. Aquifers: Secondary (Superficial); Principal (Bedrock). Groundwater abstractions? Nearest (numerous) 190m west, Interbrew UK Ltd for brewing. Pollution incidents? None relating to the site.
Hydrology Landmark Report	Nearest watercourse(s) – Un-named surface watercourse 86m east. Water quality – Irk (196m south), E. Pollution incidents? None relating to the site. Abstractions? None within 1.5km. Discharge consents? None relating to the site.
Landfill Sites Landmark Report	None within 500m. One area of potentially in-filled land is located 111m north-west, mapped in 1994 with four additional areas of potentially in-filled land (water) within 250m.
Flood Risk Landmark Report	The site lies in Flood Zone 1, where the risk of flooding from rivers or the sea is classified as low.

4.2 MINING

As of July 2011, the Coal Authority formalised their requirements in relation to planning applications and introduced some new terminology relating to coal mining development areas.

The site lies within the Coal Authority's Coal Mining Reporting Area; this is any area within the known extent of coal mining activity within the UK.

A Coal Authority (CA) mining report states that:

- There are no records of past underground mining beneath the site and no probable unrecorded shallow workings ;
- the property is not in the likely zone of influence of any present underground coal workings;
- there are no known mine entries within, or within 100 metres of, the boundary of the property;
- the Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining. This confirms the absence of any known significant geological faults below the site;
- the property is not within 500 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods; and,
- there is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Therefore, the mining risk at the site is considered to be negligible.

4.3 MINERAL SAFEGUARDED AREAS

Mineral Safeguarding Areas (MSAs) are areas of known mineral resources that are of sufficient economic or conservation value to warrant protection for generations to come. The purpose of MSAs is not to preclude automatically other forms of development, but to make sure that mineral resources are adequately and effectively considered in land-use planning decisions.

Specialist guidance on Mineral Safeguarding "A Guide to Mineral Safeguarding in England" has been produced by the British Geological Survey.

Paragraph 210 of the National Planning Policy Framework (NPPF) requires Local Authorities, when preparing Local Plans to:

- safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas; and adopt appropriate policies so that known locations of specific minerals resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked);*
- Set out policies to encourage the prior extraction of minerals, where practicable and environmentally feasible, if it is necessary for non-mineral development to take place.*

NPPF Paragraph 211 notes that when determining planning applications, '*great weight should be given to the benefits of mineral extraction, including to the economy*'.

Within the Greater Manchester Joint Minerals Development Plan the Local Authority do not consider the site to lie within an MSA; furthermore:

- There are no mineral resources such as sand & gravel, limestone, or sandstone at shallow depth;
- there are no shallow economically viable coal seams beneath the site; and,
- the small plan area and city centre location mean that any mineral extraction would be impossible without undermining of adjacent structures and infrastructure or causing significant transport impacts.

4.4 UNEXPLODED ORDNANCE (UXO) RISK ASSESSMENT

Military activities including those conducted as part of both the First and Second World Wars have resulted in a legacy of unexploded ordnance (UXO) being present within the shallow soils of the UK.

UXO result from various sources including both allied (military training) and German (bombing raids) with a guide figure of approximately 10% of all munitions failing to function as designed.

The likelihood of UXO being encountered on a development site is influenced by several factors including: the proximity to strategic targets; the nature of the development works being undertaken; and evidence of local damage in the post-war periods amongst others. To determine the likelihood of UXO being present on a site, a stepwise risk assessment process is followed. This process is outlined within CIRIA C681¹.

A Detailed Unexploded Ordnance (UXO) Threat Assessment has been carried out by Landmark and Alpha Associates and the risk assessment is included in Appendix D. The risk posed by UXO has been assessed as HIGH.

The following risk mitigation measures are recommended:

1. Operational UXO Emergency Response Plan; appropriate site management documentation should be held on-site to guide and plan for the actions which should be undertaken in the event of a suspected or real UXO;
2. UXO Safety & Awareness Briefings; the briefings are essential when there is a possibility of explosive ordnance encounter and are a vital part of the general safety All Activities in All Areas requirement. All personnel working on the site should receive a briefing on the identification of a UXB, what actions they should take to keep people and equipment away from such a hazard and to alert site management. Information concerning the nature of the UXB threat should be held in the site office and displayed for general information on notice boards, both for reference and as a reminder for ground workers. The safety awareness briefing is an essential part of the Health & Safety Plan for the site and helps to evidence conformity with the principles laid down in the CDM regulations 2015;

¹ CIRIA C681 Unexploded Ordnance: A Guide for the Construction Industry.

3. EOD Engineer in the Watching Brief Role; Where “open” intrusive works into previously undisturbed ground are proposed, an EOD Engineer should be present in the UXO Watching Brief role to monitor ongoing “open” intrusive works to identify any suspicious items that may be UXB or UXO.
4. Intrusive UXO Survey; Where “blind” intrusive works into previously undisturbed ground are proposed, an intrusive UXO survey (employing down-hole magnetometer or MagCone techniques) is strongly recommended. Such a survey should extend to the assessed average bomb penetration depth or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through which it is assessed a UXB would not penetrate, to identify for signs of subsurface anomalies Which may model as the target UXO in advance of said works.

5 PREVIOUS INVESTIGATIONS

5.1 GENERAL

A copy of the following report has been sourced from public records on the Manchester City Councils planning portal:

- Green Quarter Block 7. Phase 2 Ground Investigation & Assessment. Report prepared by Capita Property & Infrastructure Ltd (“Capita”) on behalf of Beaumont Morgan. Report referenced CS/087890, dated February 2017.

The report provides detailed of a ground investigation for the ‘Green Quarter Block 7’ on the opposite side of Cheetham Hill Road to the east.

Ground conditions at this site comprised made ground to depths of between around 4m to 6m with very stiff gravelly clay and locally sand extending to approximately 19m where sandstone was encountered.

Elevated concentrations of lead, mercury, and some PAH compounds were recorded within the made ground. The report recommended between 300mm and 600mm of ‘clean’ soil in garden and landscaped areas.

During six monitoring visits to the site no elevated concentrations of Methane or Carbon Dioxide were recorded exceeding the CS1/CS2 thresholds. The monitoring dataset indicates the site to fall into Characteristic Situation 1 (CS1).

The report recommended cast in-situ piles penetrating through the Made Ground into competent sandstone at depths of around 19.0m.

6 LAND CONTAMINATION - PART IIA & PLANNING

Local Authorities have responsibilities with respect to land contamination in the context both of Part IIA of the Environmental Protection Act 1990, and Planning.

The contaminated land regime in Part IIA was introduced specifically to address the historical legacy of land contamination. It applies where there is unacceptable risk, assessed on the basis of the current use and the relevant circumstances of the land. It is not directed to assessing risks in relation to a future use of the land that would require a specific grant of planning permission. This is primarily a task for the planning system, which aims to control development and land use in the future.

Planning

With respect to contamination and site investigation the Planning Policy Framework (NPPF) states that:

- 'Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner.

Planning policies and decisions should ensure that:

- the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses, and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;
- after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and
- adequate site investigation information, prepared by a competent person, is presented'.

Annex 2 of the NPPF states that 'all investigations of land potentially affected by contamination should be carried out in accordance with established procedures (such as BS10175 - 2011, Code of Practice for the Investigation of Potentially Contaminated Sites)'.

7 GROUND INVESTIGATION DESIGN

7.1 ANTICIPATED GROUND CONDITIONS

Based on the Environmental Setting and previous land use data reviewed anticipated ground conditions are expected to comprise:

- **Made Ground** - a general veneer associated with previous development of the site with possible deeper backfill to the former synagogue basement.
- **Natural Soils** - very stiff gravelly clay and locally.
- **Bedrock** – sandstone likely to be located at approximately 19m.
- **Mineworkings** – site not underlain by shallow coal seams.
- **Groundwater** – possibly perched within made ground at shallow depth.

7.2 POTENTIAL ISSUES

Based on the data above and that in Sections 2 (Site Description) and 3 (History), potential ground-related issues associated with this site are likely to include:

Potential on-site contamination sources:

1. Made ground (asbestos, inorganics, and organics).

Potential off-site contamination sources:

1. None.

Potential geotechnical hazards:

1. Possible deep made ground.

Other potential constraints:

1. None.

7.3 PRELIMINARY CONCEPTUAL SITE MODEL

The historical plans show that the site has been occupied by a synagogue and clothing factory/warehouse all of which are considered to have very limited potential to have caused ground contamination; however, there is likely to be made ground associated with demolition and redevelopment of the site during two previous building phases (synagogue and clothing factory).

Because of this assessment, anticipated potential contaminants, within soil and/or groundwater include:

- pH, and total metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc);
- asbestos;
- calorific Value (CV) within any ashy material;
- Poly Aromatic Hydrocarbons (PAH); and,
- Total Petroleum Hydrocarbons (TPH) includes BTEX.

Potential pollutant linkages are shown on a preliminary conceptual site model, presented as Drawing No 7241/6 and in the table below. Clearly the conceptual model will be subject to modification in light of data arising from the proposed intrusive ground investigation.

Preliminary Conceptual Site Model – the table below summarises the possible source-pathway-receptor linkages with risk definitions in accordance with CIRIA C552².

Source	Exposure Pathway	Potential Receptor	Probability of Exposure	Consequence of Exposure	Discussion of Pollutant Linkage	Risk
Made Ground associated with previous development, (Heavy metals, PAHs, asbestos, hydrocarbons).	Inhalation, Ingestion and Dermal Contact	Humans – future resident/users of site and infrastructure	Unlikely given proposed made ground removal. 'Clean' imported soil cover to be placed in any landscaped areas.	Medium (dependent on the types of contaminants someone is exposed to).	Residents and site users could come into contact with made ground if near surface in garden or landscaped areas.	Low to Moderate Risk
		Humans - construction & maintenance workers	Low (with appropriate use of PPE / RPE)	Medium (dependent on the types of contaminants someone is exposed to).	Potential for construction and maintenance workers to encounter contaminated soil. Exposure times likely to be limited and risks should be reduced by wearing appropriate personnel protective equipment (PPE/RPE).	Low to Moderate Risk
	Leaching and migration	Groundwater – underlying Secondary (superficial).	None	Low	No superficial aquifer present beneath the site.	Low Risk
		Groundwater - Underlying Principal (bedrock).	Low Likelihood	Severe	Hardstanding surfacing acts as a low permeability surface limiting infiltration. The cohesive areas of weathered Coal Measures deposits may also act as a buffer between surface and bedrock aquifer.	Low Risk
	Direct contact	Foundation	Likely	Mild	Potential for contaminants posing risk to new foundations and underground structures to be present.	Low to Moderate Risk

² Contaminated land risk assessment. A guide to good practice (C552), 2001.

Source	Exposure Pathway	Potential Receptor	Probability of Exposure	Consequence of Exposure	Discussion of Pollutant Linkage	Risk
Hazardous ground gases from made ground (on-site).	Migration towards surface.	Humans – construction & maintenance workers	Unlikely	Severe	Potential for hazardous gas migration into new structures; on-going gas monitoring will allow for risk assessment.	Low to Moderate Risk
		Risk of explosion with future buildings and infrastructure				

7.4 INVESTIGATION STRATEGY

The preliminary conceptual site model has used as a basis for design of an appropriate ground investigation, the scope of which is summarised below:

Exploratory Hole Type	Purpose
Window Sample Boreholes (Instead of trial pits due to existing access constraints)	To determine the general nature of soils underlying the site, including the: Nature, distribution, and thickness of made ground; • nature, degree, and extent of contamination; • proportion of undesirable elements eg biodegradable matter, foundations etc; and, • suitability of the ground for founding structures and pavements. To install monitoring wells across the site in order to monitor for hazardous gas.
Cable Percussion and Rotary Cored Boreholes	To retrieve geotechnical data from depth.

Proposed exploratory hole locations should be selected to provide a representative view of the strata beneath the site. A nominal 20m grid spacing should be appropriate, with additional exploratory locations scheduled as necessary in light of the ground conditions actually encountered.

The number of soil samples taken should be reflective of the geological complexity actually encountered, but in general about three samples should be taken from most exploratory holes.

8 CONCLUSIONS & RECOMMENDATIONS

8.1 GENERAL

Consideration is being given to redevelopment of the site with a mixed-use development of twenty-five storeys with commercial space at ground level and residential apartments above. Landscaping is not included within the development.

The main issues considered in this report, and in particular in Sections 3 and 4 are based on a review of historical data and available information. This report provides an assessment of geoenvironmental issues and implications associated with the proposed redevelopment of the site.

8.2 MINING AND QUARRYING

There are no quarries within 200m of the site.

This site is located within a Coal Mining Reporting Area (within the defined coalfield, but no known defined risks have been recorded by the Coal Authority; however, the mining risk at the site is considered to be negligible.

8.3 HAZARDOUS GAS

Information from historical OS plans and Landmark indicates that there are no known former landfill sites at or within 250m of the site. As such it is unlikely that the site will be affected by landfill gas.

However, the site might be underlain by a significant thickness of made and a hazardous gas risk assessment via monitored boreholes is likely to be required.

BRE Report BR211 (2015 Edition) indicates that radon protection measures are not required for new dwellings at the site.

8.4 FOUNDATIONS

At present, detailed no geotechnical ground investigation data is available for the site and consequently it is only possible to estimate the ground conditions. Before firm foundation recommendations can be given, it will be necessary to undertake an appropriate ground investigation. However, tentative recommendations are provided below.

The published geological data and information from an adjacent site suggests that the site will be directly underlain by made ground with very stiff gravelly clay and locally sand extending to approximately 19m where sandstone will likely be encountered.

It is likely that piles penetrating through the made ground and the superficial deposits into competent sandstone at depths of around 19.0m will be required for the proposed redevelopment.

8.5 FLOODING

The EA indicate that the site is not located within an indicative floodplain.

8.6 CONTAMINATION & REMEDIATION

The site has only previously been occupied by a synagogue and clothing factory/warehouse but there is the potential for made ground associated with demolition and possible basement backfilling; however, the risk of significant ground and groundwater contamination is low.

Give that the proposed new structure will cover the site with no soft landscaping proposed the likelihood of significant remediation being required is very low.

8.7 FURTHER INVESTIGATION

Whilst the site is considered suitable for its current and proposed use, the proposed change The proposed change in use will require intrusive investigation. This would include:

- Window(less) sample boreholes to determine near surface ground conditions including depth to natural soils, the presence of obstructions, groundwater, and stability;
- cable percussion and rotary cored boreholes for foundation design;
- geotechnical soils and rock analysis and to enable foundation recommendations;

- chemical testing on soil samples to assess the significance of contamination and assess Waste Acceptance Criteria; and,
- hazardous gas monitoring and risk assessment.

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APPENDIX A COMMISSION

APPENDIX B HISTORICAL OS PLANS

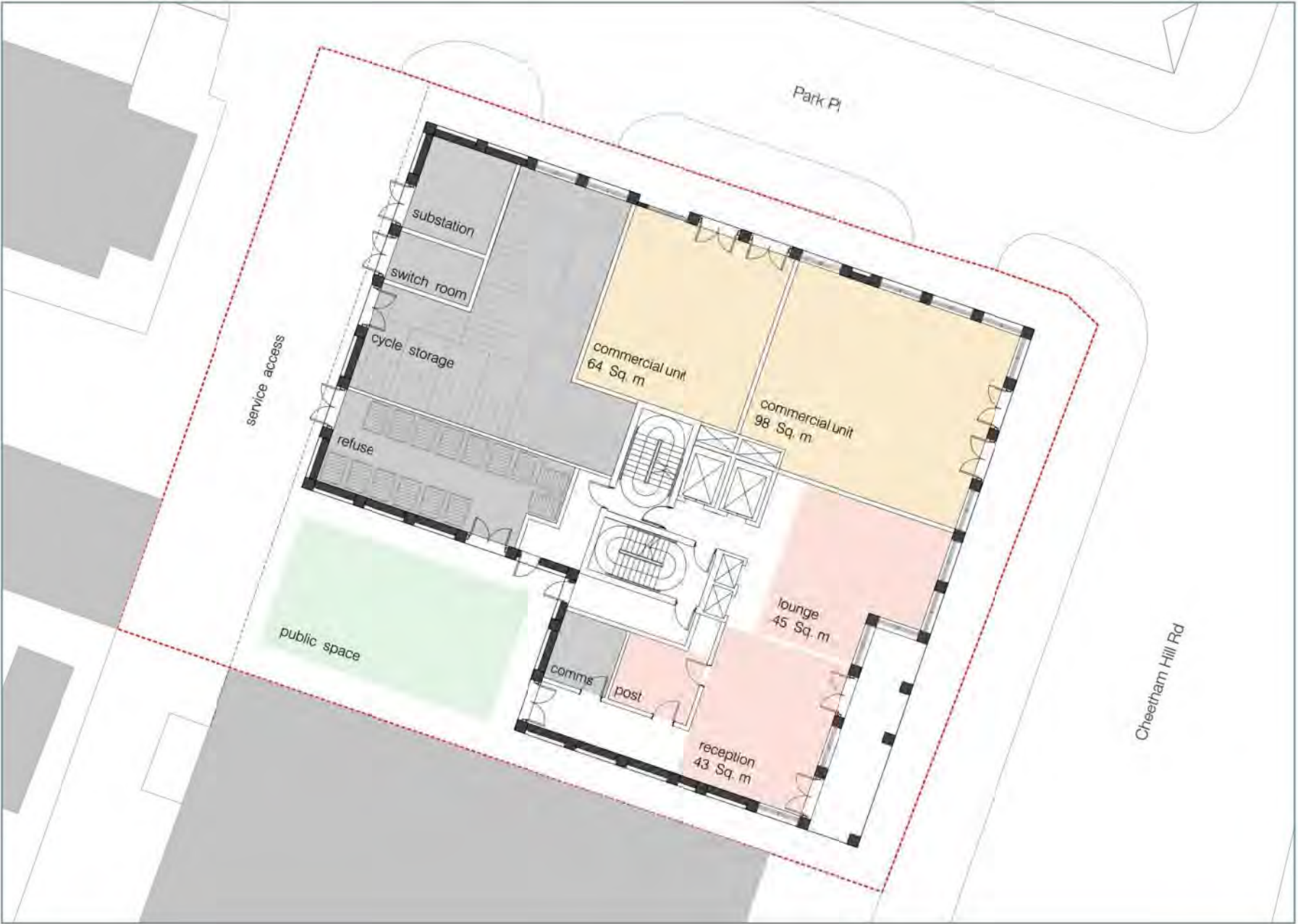
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PROJECT	
CLIENT	MANCHESTER METRO
DATE	
DESCRIPTION	
ADDRESS	
COORDINATES	S3 840 993
SCALE	1:25,000
DATE	10/08/2023
BY	SL
FOR	
 calabrian GEOTECHNICAL GEOENVIRONMENTAL info@calabrian.co.uk	



rev. description

client ROSCOE

project PARK PLACE, MANCHESTER, M4 4FY

drawing title PROPOSED LAYOUT

drawing number 7241/2

revision -

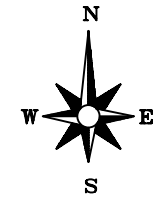
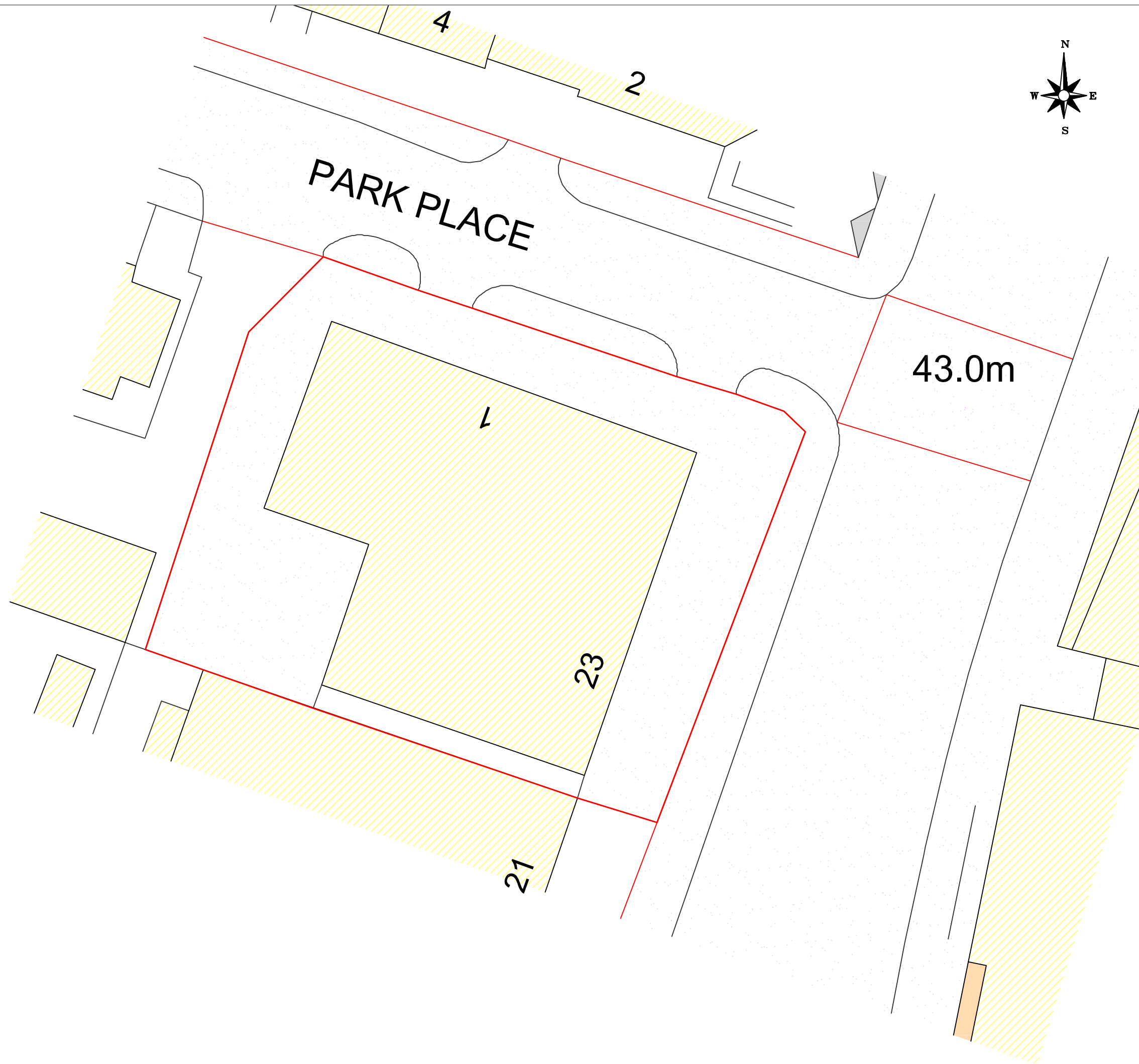
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date 18/08/2023

drawn by RJH

checked by -



- notes
- BUILDING
 - TARMAC HARDSTAND
 - APPROXIMATE SITE BOUNDARY

rev. description

client ROSCOE

project PARK PLACE, MANCHESTER, M4 4FY

SITE FEATURES

drawing title

drawing number 7241/3

revision -

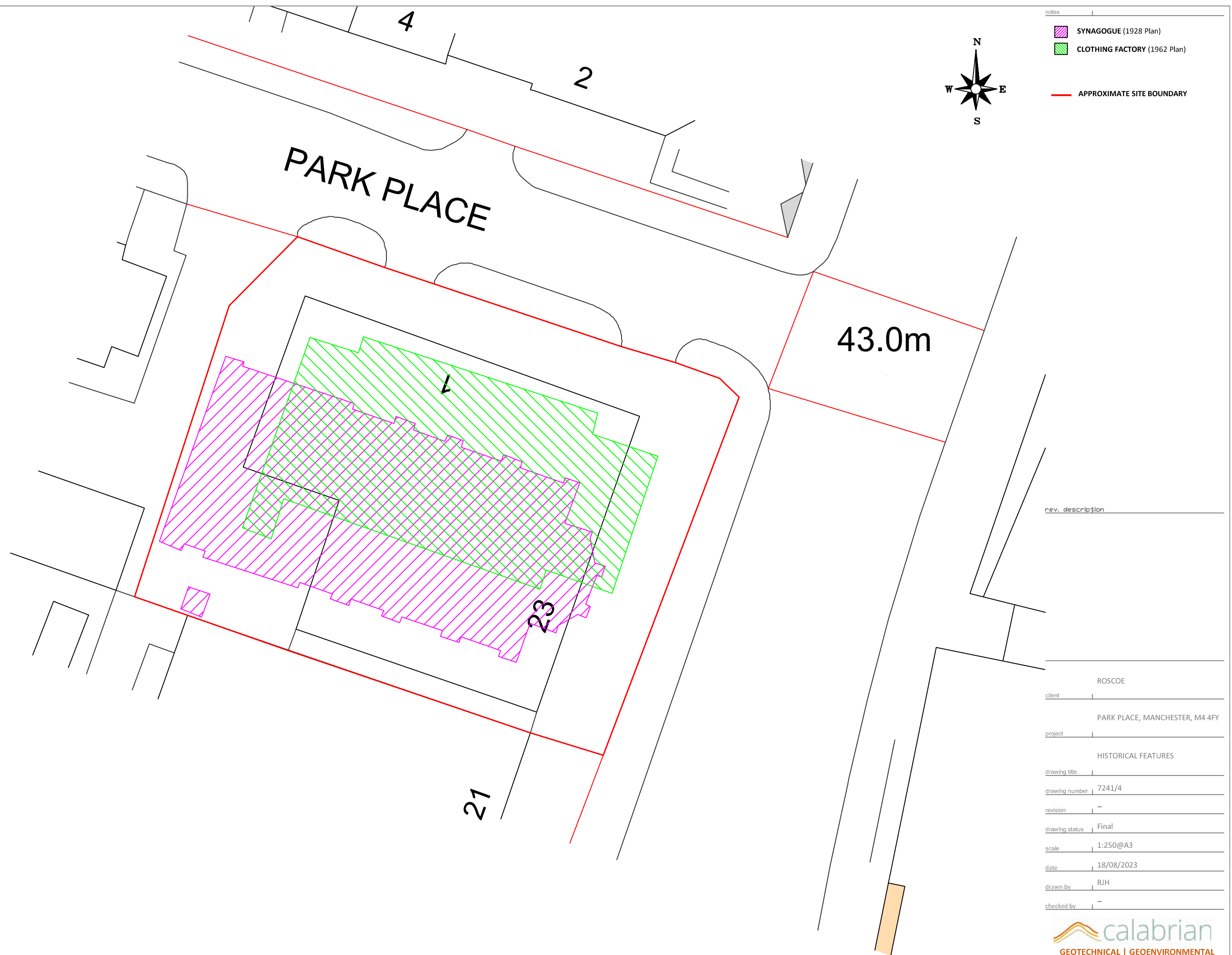
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date 18/08/2023

drawn by RJH

checked by -





rev. description

client ROSCOE

project PARK PLACE, MANCHESTER, M4 4FY

drawing title PHOTOGRAPHS

drawing number 7241/5

revision -

drawing status Final

scale 1:500@A3

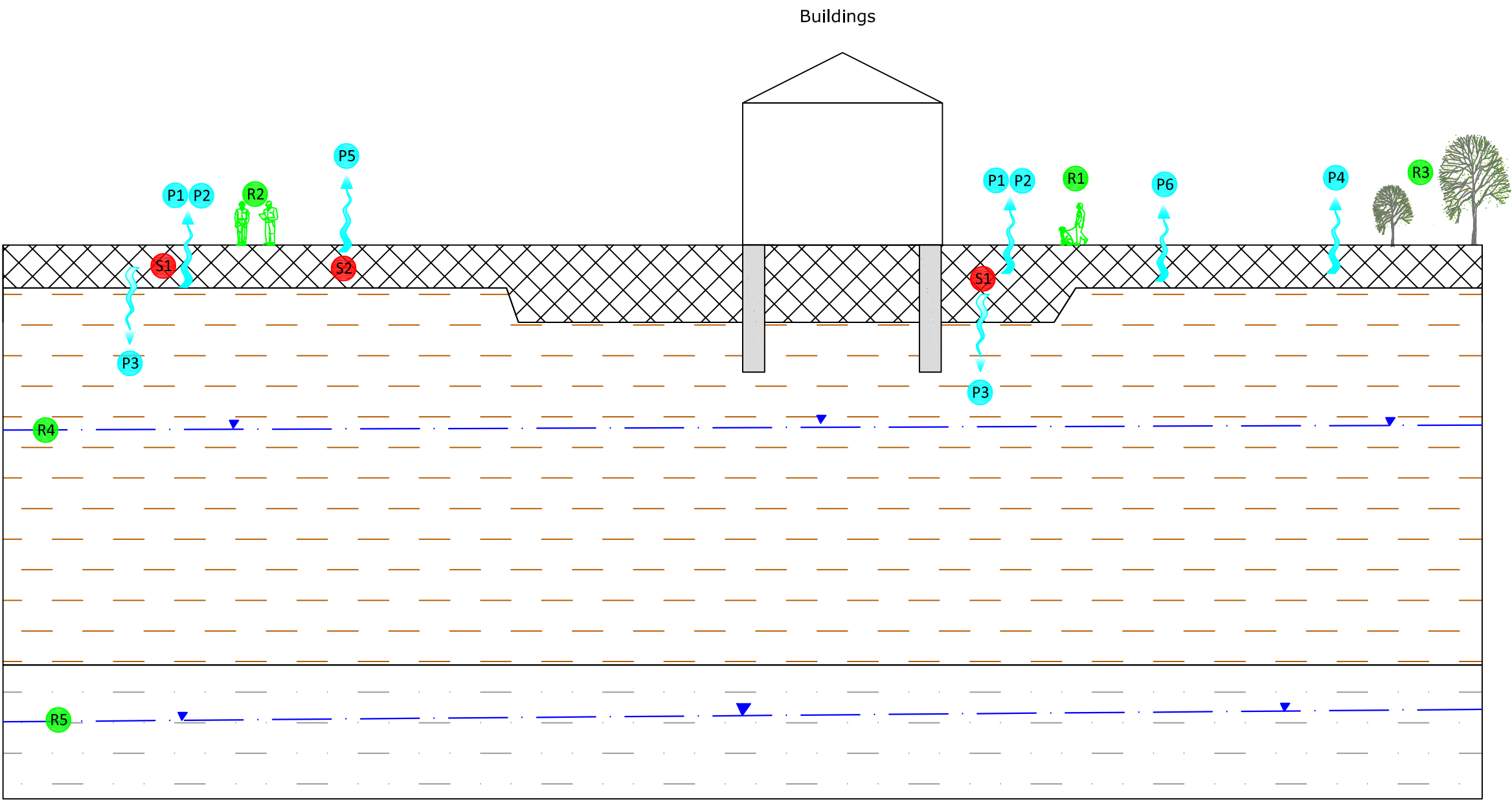
date 18/08/2023

drawn by RJH

checked by -



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GEOLOGY

-  **MADE GROUND**
-  **TILL** (Stiff clay and possibly sand)
-  **CHESTER FORMATION** (Sandstone)

SOURCES

-  **S1** **MADE GROUND** (Inorganics, asbestos, organics)
-  **S2** **MADE GROUND** (Hazardous gas)

POTENTIAL PATHWAYS

-  **P1** **DERMAL CONTACT**
-  **P2** **INGESTION\INHALATION**
-  **P3** **LEACHING OF CONTAMINANTS**
-  **P4** **UPTAKE BY PLANTS**
-  **P5** **MIGRATION OF GAS**
-  **P6** **VOLATILISATION**

SIGNIFICANT RECEPTORS

-  **R1** **END USERS** (Residents and staff)
-  **R2** **SITE WORKERS**
-  **R3** **VEGETATION**
-  **R4** **SECONDARY AQUIFER** (Superficial)
-  **R5** **PRINCIPAL AQUIFER** (Bedrock)

rev. description

client | ROSCOE

project | PARK PLACE, MANCHESTER, M4 4FY

drawing title | PRELIMINARY CONCEPTUAL SITE MODEL
drawing number | 7241/6

revision | -

drawing status | Final

scale | Not to Scale

date | 18/08/2023

drawn by | RJH

checked by | -



GEOTECHNICAL | GEOENVIRONMENTAL
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APPENDIX A COMMISSION

7241/002/RJH/rjh

3rd July 2023

Mr M Brady
Roscoe
1A Brewery Place
Brewery Wharf
Leeds
LS10 1NE

Dear Mark

Park Place, Manchester, M4 4FY

Please find enclosed our fee proposal for undertaking a site investigation on the above land.

Your drawing suggests that the site consists of a single parcel of land with a plan area of approximately 0.09 hectares. The site is currently predominately occupied by a single-storey structure with a mix of flat and pitched (likely) asbestos cement sheet roofing. There is a small yard area to the rear (east) that is accessed via a locked gate. The building has most recently been used for hair and fashion accessory retail with the car park areas to the south and west being operated by NCP as paid for parking.

The 'pre-application information' package suggests a mixed-use redevelopment of twenty-five storeys with commercial space at ground level and residential apartments above. Landscaping is not included within the development.

A brief review of our archives and publically available data suggests the site:

- The site appears to have first been developed around 1890 with a Synagogue. By 1949 this building was recorded as a 'Hall' and by the late 1950s as a 'Works'. By the early 1980's the original building had been replaced by a 'Warehouse' with footprint similar to that of today;
- is not within 250m of an area of current or known historical landfilling;
- is located in a coal mining Reporting Area (within the defined coalfield, but no known defined risks have been recorded by the Coal Authority; there may still be unrecorded issues); and,
- is not within a source protection zone.

The geological map for the area suggests the site is underlain by Till (likely stiff gravelly clay) with Chester Formation (sandstone) at depth. The nearest archive exploratory hole to the site indicates around 1.5m (possibly up to 4m) of made ground overlying stiff and very stiff sandy and gravelly clay.

Ground investigation for the 'Green Quarter Block 7' on the opposite side of Cheetham Hill Road in 2017 found made ground to depths of between around 4m to 6m with very stiff gravelly clay and locally sand extending to approximately 19m where sandstone was encountered.

Calabrian Limited

8 l'Anson Close | Leyburn | DL8 4LF | Tel: 01969 623803
email: info@calabrian.co.uk



We have visited site and reviewed available archive information in order to enable us to assess ground related development abnormalities and minimise the likelihood of further works beyond the scope of investigation outlined below; however, the nature of site investigation is such that it is not always possible to foresee all the potential issues. Very occasionally, it is necessary to recommend additional work during the course of the investigation. Where this necessary we will inform you immediately, provide costs, and seek your further instruction.

Ground investigation is generally best undertaken once site operations have ceased and preferably post-demolition; access constraints associated with existing buildings, operations, and underground service runs, can prevent thorough inspection of the ground via extensive trial pitting/trenching. Consequently, some uncertainties may remain and a supplementary, post-demolition ground investigation may be required by the relevant regulatory authorities; a provisional sum of £3,000 should be allowed for post-demolition investigation to include trial pitting along with sampling/analysis. Nonetheless, useful data can be obtained at this time and we will certainly aim to resolve as much uncertainty relating to ground as possible.

Our site investigation proposal allows for the following works:

Phase 1 Desk Study

Environmental search data and historical maps (obtained from Landmark) will be reviewed in order to determine whether any past land uses have had any effect on the proposed development. In addition, published geological plans of the area will be examined. We will also visit site to review current operations and undertake a walkover survey.

This site is located within the Coal Authority's 'Coal Mining Reporting Area', therefore a mining report will be obtained; however, at this stage an intrusive mining investigation is considered unlikely to be required.

Preliminary and detailed unexploded ordnance (UXO) risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'. An initial UXO threat assessment has been undertaken using the ZeticaUXO risk map. The site is located in a moderate-risk area and a Detailed UXO Threat Assessment should be undertaken, and our proposal allows for this.

Fieldwork

We have allowed for the drilling of two combined cable percussion and rotary cored boreholes to 30m depth and one day's windowless sampling using a mini percussion drilling rig, equipped with a concrete corer (around six shallow boreholes). All boreholes will be supervised and logged by an experienced geoenvironmental engineer.

Representative soil samples of natural and man-made ground, including any contaminated samples, will be taken during the works. In-situ shear strengths of any cohesive soils encountered will be determined by the use of a hand-held shear vane.

The windowless sampling boreholes are primarily intended to enable the retrieval of geoenvironmental data and samples from shallow depth but will also allow the installation of gas wells.



Given the likely presence of relatively deep made ground beneath and close to the site, we have allowed for the installation of wells in four of the windowless sample boreholes and monitoring for hazardous gas (and any shallow groundwater).

The generation potential of this gas source is considered likely to be Very Low. Therefore, in accordance with CIRIA Report C665, we have initially allowed for six visits over a three-month period. A hazardous gas risk assessment will be issued on completion of monitoring.

This proposal has been put together following a visit to the site and it has been assumed that access is available to all external areas for a track mounted drilling rig and associated roadgoing vehicles and compressor.

Soils/rock Testing: This will comprise routine geotechnical soils analysis, typical of that normally required for greenfield sites. Although no allowance has been made for in-situ or laboratory CBR testing, CBR values will be estimated from the strata descriptions and classification test results, where appropriate (i.e. if no significant regrading or reworking of made ground is proposed).

We have allowed for one-dimensional analysis to assess the effects of down-drag (negative skin friction) on twelve undisturbed samples along with twelve unconsolidated total strength laboratory tests. We have also allowed for twenty pH and soluble sulphate to assess concrete classification for deeply embedded piles. Unconfined Compressive strength (UCS) and point load strength testing will be undertaken on six samples and twelve samples of rock respectively.

Appropriate chemical analyses, based on our review of knowledge of the site's history, have been allowed for; this will comprise eighteen samples for a suite including asbestos, heavy metals, TPH and PAH. In the event that ground contamination is more significant or different to that anticipated, it might be necessary to carry out additional chemical testing.

'Two Stage' Waste Acceptance Criteria (WAC) analysis will be undertaken on four samples of soils that are likely to require removal from site to landfill.

Reporting & Timescales

In order to provide you with sufficient information to enable assessment of abnormal costs at the earliest opportunity we will issue a concise overview report within five days of fieldwork completion.

On completion of the desk study, fieldwork and laboratory testing a comprehensive, factual, and interpretative report will be issued. This will contain detailed engineering records, laboratory test results, copies of all relevant correspondence and drawings of the site. The report will include qualitative risk assessment with respect to both controlled waters and human health.

The report will also provide technically feasible options for redevelopment of the site, including consideration of foundation types and treatment\removal of contamination.

Fieldwork could be commenced within around three weeks of receipt of your written instruction to proceed. Our comprehensive geoenvironmental appraisal report will be issued within four weeks of fieldwork completion. This report will comment on issues associated with hazardous gas, but the gas risk assessment will not be issued until monitoring is completed.

Given previous usage of this land, it is considered highly likely that significant contamination will be encountered. Consequently, a Remediation Strategy report will be required by the Local Authority at an early stage in the planning approval process, and our proposal allows for this.

Calabrian Limited

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email: info@calabrian.co.uk



It should be noted that a Remediation Strategy outlines the remediation objectives necessary to protect environmental receptors and render a site suitable for the proposed end use. A Remediation Strategy is not the same as a Method Statement; the latter should be prepared subsequently, usually by a Contractor, in order to detail how the objectives will be achieved.

Given the proposed total hardcover of the proposed development remediation verification is unlikely to be required but it would be prudent to allow £2,500 within your budget for any soils analysis and assessment.

Copies of the final report will be issued to the relevant regulatory authorities on receipt of written instruction from yourselves.

Invoicing: The attached proposal provides a breakdown of the costs associated with this project. This breakdown is for information only and the proposal can be regarded as a lump sum price of £**,*** plus VAT. Variation will only occur in the event that a given item is not undertaken or that substantial additional works are recommended, in which case we will inform you immediately, provide costs for the required works, and seek your prior consent.

Our proposal allows for submission of the report to the Local Authority and for submission of a single piece of subsequent correspondence with each regulator to address any queries they may have. Any further meetings, correspondence etc, would be chargeable.

The investigation should be considered to comprise four elements. Each will be invoiced on completion of the relevant report as defined below:

1. Items A to E within five days of fieldwork completion, with exploratory hole logs and an interim letter report outlining our initial findings and Preliminary Recommendations Report;
2. Items F to I on issue of the comprehensive geoenvironmental appraisal report;
3. Item J on issue of the Remediation Strategy Report; and,
4. Item K after completion of the gas monitoring/issue of the Hazardous Gas risk Assessment Report.

Health, Safety & Welfare

The works outlined above will be carried out in accordance with Calabrian task- and site- specific Risk Assessments and Method Statements.

Details of welfare will be included within the Method Statements; however, this investigation is expected to last for at seven working days and therefore this proposal includes for provision of a Welfare Unit, with the benefit of full canteen facilities, hot water with full size sink, toilet, and drying room. Temporary 'Heras' type fencing will be provided around the borehole locations.

Utility plans are required in order to protect operatives from the hazards associated with striking buried services and avoid potentially substantial disruption\repair costs. We will make every effort not to damage any services (including review of utility plans and use of a CAT detector) but will not be responsible for striking services that we are not made aware of.

Calabrian will obtain copies of the necessary utility plans in a Landmark Utility Report; however, if you already hold these it would be appreciated if you could forward these prior to the proposed fieldworks.

It is highly likely that the site is underlain by many "private" services and drains etc which will not be shown on statutory utility plans. It is advisable that a detailed services/utility survey is undertaken including a GPR survey ahead of our works.

Terms & Conditions

This work will be undertaken in accordance with our Standard Terms and Conditions, a copy of which are enclosed.

Should you require any further information, please contact the undersigned.

Yours sincerely



Richard Hey - Managing Director
for and on behalf of
CALABRIAN LIMITED

enc



Terms and Conditions for the Appointment of Calabrian Limited

1 DEFINITIONS AND INTERPRETATION

- 1.1 In this Agreement, unless the context otherwise requires, the following words and expressions have the following meanings:
- “Agreement” shall mean these Terms (entitled “Terms and Conditions for the Appointment of Calabrian Limited”), the Proposal, any document recording the Client’s unequivocal acceptance of the Proposal and any other documents or parts of other documents expressly referred to in any of the foregoing;
- “Client” shall mean the party for whom the Services are being provided by Calabrian;
- “Documents” shall mean all documents of any kind and includes plans, drawings, reports, programmes, specifications, Bills of Quantities, calculations, letters, e-mails, faxes, memoranda, films and photographs (including negatives), or any other form of record prepared or received by, or on behalf of Calabrian, and whether in paper form or stored electronically or on disk, or otherwise;
- “Calabrian” shall mean Calabrian Limited whose registered office is at Spring Royd, Clapham Road, Austwick, Lancaster, LA2 8BE.
- “Intellectual Property” includes all rights to, and any interests in, any patents, designs, trade marks, right, know-how, trade secrets and any other proprietary rights or forms of intellectual property (protectable by registration or not) in respect of any technology, concept, idea, data, programme or other software (including source and object codes), specification, plan, drawing, schedule, minutes, correspondence, scheme, programme, design, system, process logo, mark, style, or other matter or thing, existing or conceived, used, developed or produced by any person;
- “Parties” shall mean the Client and Calabrian
- “Project” shall mean the project described in the Proposal and any enquiry from the Client on which Calabrian has based its Proposal;
- “Proposal” means the offer document prepared by Calabrian in response to an enquiry or otherwise, in connection with the proposed provision of the Services;
- “Services” means the work and services relating to the Project to be provided by Calabrian pursuant to the Agreement and as set out in the Proposal and shall include any additions or amendments thereto made in accordance with these Terms;
- “Terms” means these terms entitled “Calabrian Terms of Appointment”;
- 1.2 Words importing the singular only shall also include the plural and vice versa, where the context requires.
- 1.3 Words importing persons or parties shall include firms, corporations and any organisation having legal capacity and vice versa, where the context requires; and words importing a particular gender include all genders.
- 1.4 The sub-headings to the clauses of these Terms are for convenience only and shall not affect the construction of the Agreement.
- 1.5 A reference to legislation includes that legislation as from time to time amended, re-enacted or substituted and any Orders in Council, orders, rules, regulations, schemes, warrants, by-laws, directives or codes of practice issued under any such legislation.
- 1.6 In the event of conflict between the documents forming part of the Agreement, the Proposal shall prevail, followed by the Terms.

2 APPOINTMENT

- 2.1 The Client agrees to engage Calabrian and Calabrian agrees to provide the Services in accordance with the provisions of the Agreement.
- 3 OBLIGATIONS OF CALABRIAN
- 3.1 Calabrian shall perform the Services using the reasonable standard of skill and care normally exercised by similar professional Environmental firms in performing similar services under similar conditions.
- 3.2 Calabrian shall use all reasonable endeavours to perform the Services in accordance with all relevant environmental and safety legislation.

4 OBLIGATIONS OF THE CLIENT

- 4.1 Throughout the period of this Agreement the Client shall afford to Calabrian or procure the affording to Calabrian of access to any site where access is required for the performance of the Services.
- 4.2 The Client accepts responsibility for ensuring that Calabrian is notified in writing of all special site and/or plant conditions, including without prejudice to the generality of the foregoing, the existence and precise location of all underground services, cables, pipes, drains or underground buildings, constructions or any hazards known or suspected by the Client, which the Client shall clearly mark on the ground or identify on accurate location plans supplied to Calabrian prior to the commencement of the Services. The Client shall also inform Calabrian in writing of any relevant operating procedures including any site safe operating procedures and any other regulations relevant to the carrying out of the Services. The Client shall indemnify Calabrian against all costs, claims, demands and expenses arising as a result of any non-disclosure in this respect, including but not limited to indemnification against any action brought by the owner of the land or otherwise.
- 4.3 If the Client discovers any conflict, defect or other fault in the information or designs provided by Calabrian pursuant to the Agreement, he will advise Calabrian in writing of such defect, conflict or other fault and Calabrian shall have the right to rectify the same or where necessary, to design the solution for rectification of any works carried out by others pursuant the conflicting, defective or in any other way faulty information or designs.

5 INTELLECTUAL PROPERTY

- 5.1 The copyright in all Intellectual Property prepared by or on behalf of Calabrian in connection with the Project for delivery to the Client shall remain vested in Calabrian.
- 5.2 The Client shall have a non-exclusive licence to copy and use such Intellectual Property for purposes directly related to the Project. Such licence shall enable the Client to copy and use the Intellectual Property but solely for its own purposes in connection with the Project and such use shall not include any licence to reproduce any conceptual designs or professional opinions contained therein nor shall it include any licence to amend any drawing, design or other Intellectual Property produced by Calabrian.
- 5.3 Should the Client wish to use such Intellectual Property in connection with any other works or for any other purpose not directly related to the Project or wish to pass any Intellectual Property to any third party, it must obtain the prior written consent of Calabrian. The giving of such consent shall be at the discretion of Calabrian and shall be upon such terms as may be required by Calabrian. Calabrian shall not be liable for the use by any person of such Intellectual Property for any purpose other than that for which the same were prepared by or on behalf of Calabrian.
- 5.4 Ownership of any proposals submitted to the Client that are not subsequently confirmed as part of the Services to be provided for the Client remain with Calabrian and such proposals must not be used as the basis for any future work undertaken by the Client or a third party and no liability can be accepted howsoever arising from such proposals.
- 5.5 In the event of the Client being in default of payment of any fees or other amounts due, Calabrian may suspend further use of the licence on giving 2 days’ notice of the intention to do so. Use of the licence may be resumed on receipt of the outstanding amounts

6 TITLE

- 6.1 Calabrian shall transfer only such title or rights in respect of the Documents as it has, and if any part is purchased from a third party Calabrian shall transfer only such title or rights as that party had and has transferred to Calabrian.
- 6.2 Title in the Documents shall remain with and shall not pass to the Client until the amount due under the invoice(s) (including interest and costs) has been paid in full.
- 6.3 Until title passes, the Client shall hold the Documents as bailee for Calabrian and shall store or mark them so that they can at all times be identified as the property of Calabrian.
- 6.4 At any time before title passes (save and except where payment is not due), but only after prior consultation with the Client, Calabrian may without any liability to the Client repossess and use or sell all or any of part of the Documents and by doing so terminate the right of the Client to use, sell or otherwise deal in the Documents.
- 6.5 Calabrian may maintain an action for the price of the Documents notwithstanding that title in them has not passed to the Client.

7 CONFIDENTIALITY

- 7.1 Calabrian undertakes not to divulge or disclose to any third party without the written consent of the Client information which is designated confidential by the Client or which can reasonably be considered to be confidential and arises during the performance of the Services unless required to do so by law or necessary in the proper performance of its duties in relation to the Project, or in order to make full frank and proper disclosure to its insurers or intended insurers, or to obtain legal or accounting advice.
- 7.2 Subject to the above, Calabrian shall be permitted to use information related to the Services it provides in connection with the Project for the purposes of marketing its services and in proposals for work of a similar type.

8 THIRD PARTIES

- 8.1 The Agreement or any part thereof or any benefit or interest thereunder may not be assigned by the Client without the prior written consent of Calabrian. The giving of such consent shall be at the discretion of Calabrian and Calabrian will only agree to an assignment on its terms and in return for payment of a fee by the Client to Calabrian to cover Calabrian’s legal and other costs associated with any assignment.
- 8.2 The Agreement shall not confer and shall not purport to confer on any third party any benefit or any right to enforce any term of this Agreement for the purposes of the Contracts (Rights of Third Parties) Act 1999 or otherwise.
- 8.3 Calabrian will consider and may consent to any request from the Client for Calabrian to enter a collateral warranty with a third party with regard to the Services provided under the Agreement. The giving of such consent shall be at the discretion of Calabrian and Calabrian will only enter a collateral warranty on its terms and in return for payment of a fee by the Client to Calabrian to cover Calabrian’s legal and other costs associated with any collateral warranty.

9 INSURANCE

- 9.1 Calabrian warrants to the Client that there is in force a policy of Professional Indemnity insurance covering its liabilities for negligence under this Agreement, with a limit of indemnity of £5,000,000 (FIVE MILLION POUNDS) any one Single Claim, Defence Costs in addition. This policy is annually renewable and whilst renewal is not automatic, Calabrian agrees to use reasonable endeavours to maintain such insurance at all times until six years from the date of the completion (or termination) of the Services under the Agreement, provided such insurance is available at commercially reasonable rates having regard, inter alia, to premiums required and policy terms obtainable.
- 9.2 If for any period such insurance is not available at commercially reasonable rates, Calabrian shall forthwith inform the Client and shall obtain in respect of such period such reduced level of Professional Indemnity insurance as is available and as would be fair and reasonable in the circumstances for Calabrian to obtain.

10 LIMITATIONS ON LIABILITY

- 10.1 Unless otherwise agreed in writing, Calabrian’s liability under or in connection with the Agreement whether in contract, tort, negligence, breach of statutory duty or otherwise (other than in respect of personal injury or death) shall be limited to and shall not exceed the lesser of either five million pounds in the aggregate or 10 times the total value of invoices issued to the Client for consultancy work instructed under the Agreement.
- 10.2 No action or proceedings under or in respect of the Agreement whether in contract, tort, negligence, under statute or otherwise shall be commenced against Calabrian after the expiry of a period of six years from the date of the completion (or termination) of the Services under the Agreement.
- 10.3 Whilst Calabrian will scan all potential exploratory locations with a Cable Avoidance Tool, Calabrian shall not be liable for any damage to underground services, cables, pipes, drains or underground buildings, constructions and the like which were either not marked on site or for which accurate plans were not provided.
- 10.4 Calabrian shall not be liable for the cost of rectifying any defect, conflict or other fault in the information or designs provided by Calabrian or for the cost of designing a solution for and rectifying any subsequent works carried out by others pursuant to the conflicting, defective or in any other way faulty information or designs, unless Calabrian has been advised in writing of the same by the Client and has been given the opportunity to rectify the same or where necessary, to design the solution for rectification of any subsequent works carried out by others pursuant to the same.

11 PAYMENT

- 11.1 Invoices for services rendered will be submitted for payment in accordance with the Proposal.
- 11.2 The due date for payment is the date of the invoice and the final date for payment is 28 days from the date of the invoice.
- 11.3 If the Client disputes the amount included for payment in an invoice a written notice must be served on Calabrian by the Client not later than 14 days before the final date for payment. If no notice is given the amount due shall be the amount stated in the invoice.
- 11.4 In the event of failure on the part of the Client to pay any monies in accordance with the foregoing payment provisions, Calabrian will be entitled to charge interest on any monies owed to it by the Client, such interest to be at a rate of 8% above the base rate of a clearing bank from time to time calculated from the final date for payment to the date of actual payment on a compound basis.

12 DELAY

- 12.1 Calabrian will comply with any timescale agreed for completion of the Services unless delayed or prevented by circumstances beyond its reasonable control and in the event of any such circumstances arising Calabrian undertakes to complete the Services within a reasonable period, but will not be liable to the Client for any delay as a result.

13 TERMINATION

- 13.1 The Agreement may be determined by either party in the event of the other making a composition or arrangement with its creditors, becoming bankrupt, or being a company, making a proposal for a voluntary arrangement for a composition of debts, or has a provisional liquidator appointed, or has a winding-up order made, or passes a resolution for voluntary winding-up (except for the purposes of a bona fide scheme of amalgamation or reconstruction), or has an administrator or an administrative receiver appointed to the whole or any part of its assets. Notice of determination must be given to the party which is insolvent by the other party.
- 13.2 If for any reason the performance of the Services by Calabrian is suspended for a period in excess of three calendar months then Calabrian shall be entitled to determine its appointment in respect of the Services by seven days written notice to the Client.
- 13.3 If the Client shall fail to pay in full any sum due under the terms of the Agreement by the final date for payment for that sum and no effective notice of intention to withhold payment has been issued, Calabrian may serve written notice on the Client demanding payment within 14 days of such notice. If the Client shall fail to comply with such notice, Calabrian shall be entitled to terminate its employment under the Agreement forthwith.
- 13.4 Any determination of the appointment of Calabrian howsoever caused shall be without prejudice to the right of Calabrian to require payment for all services performed up to the date of such determination including but not limited to payment of a fair and reasonable proportion of any figure identified in the Proposal or otherwise for fees in respect of a particular service which Calabrian has started, but not completed.

14 NOTICES

- 14.1 Any notice provided for in the Agreement shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post to the address of the relevant party as may have been notified by each party to the other or, in the absence of notification, to the address of Calabrian set out above or to the registered address of the Client.
- 14.2 Such notice shall be deemed to have been received on the day of delivery if delivered by hand or on the second working day after the day of posting if sent by first class post.

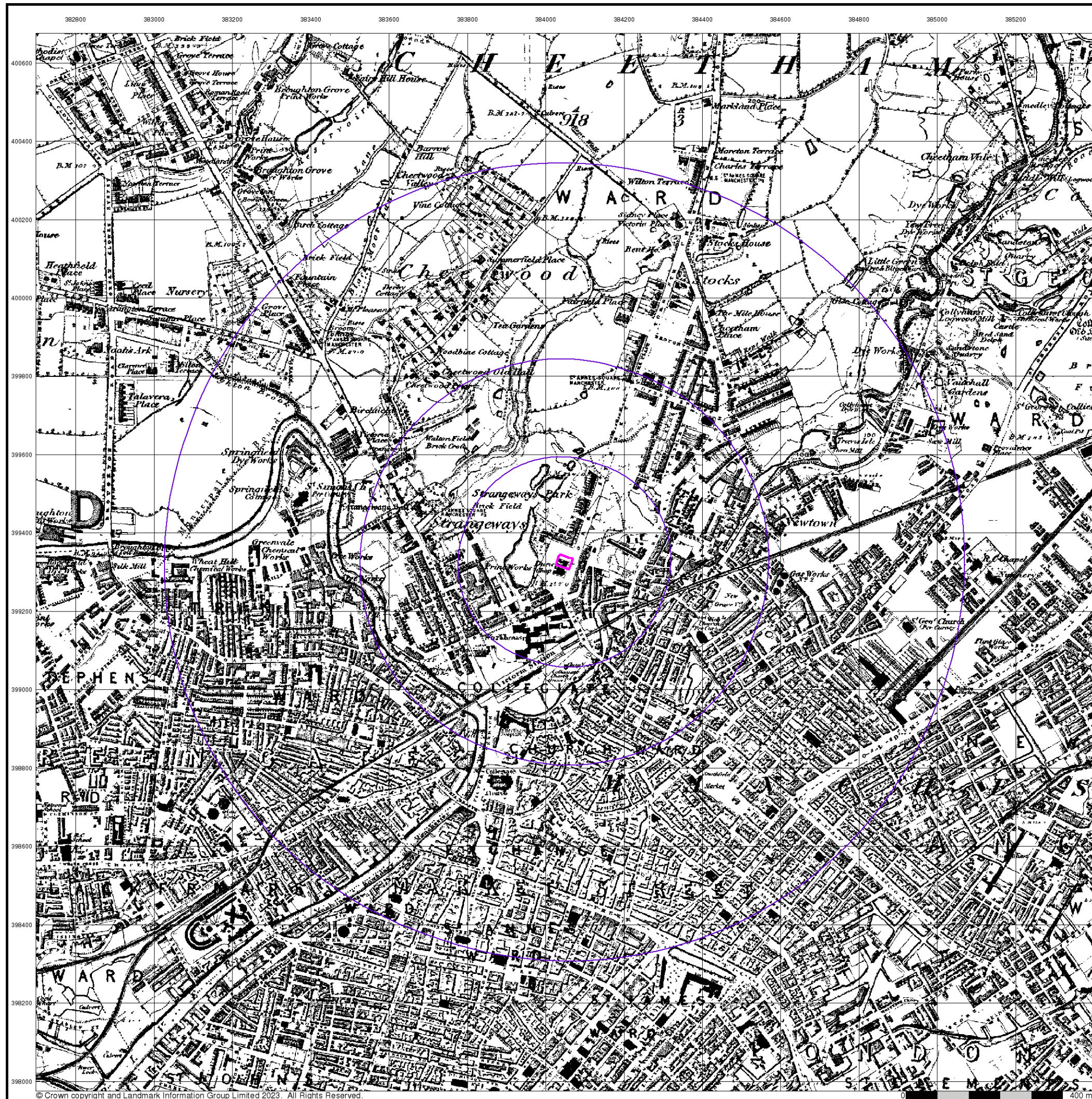
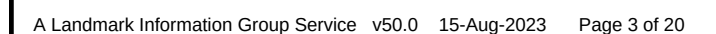
15 ENTIRE AGREEMENT

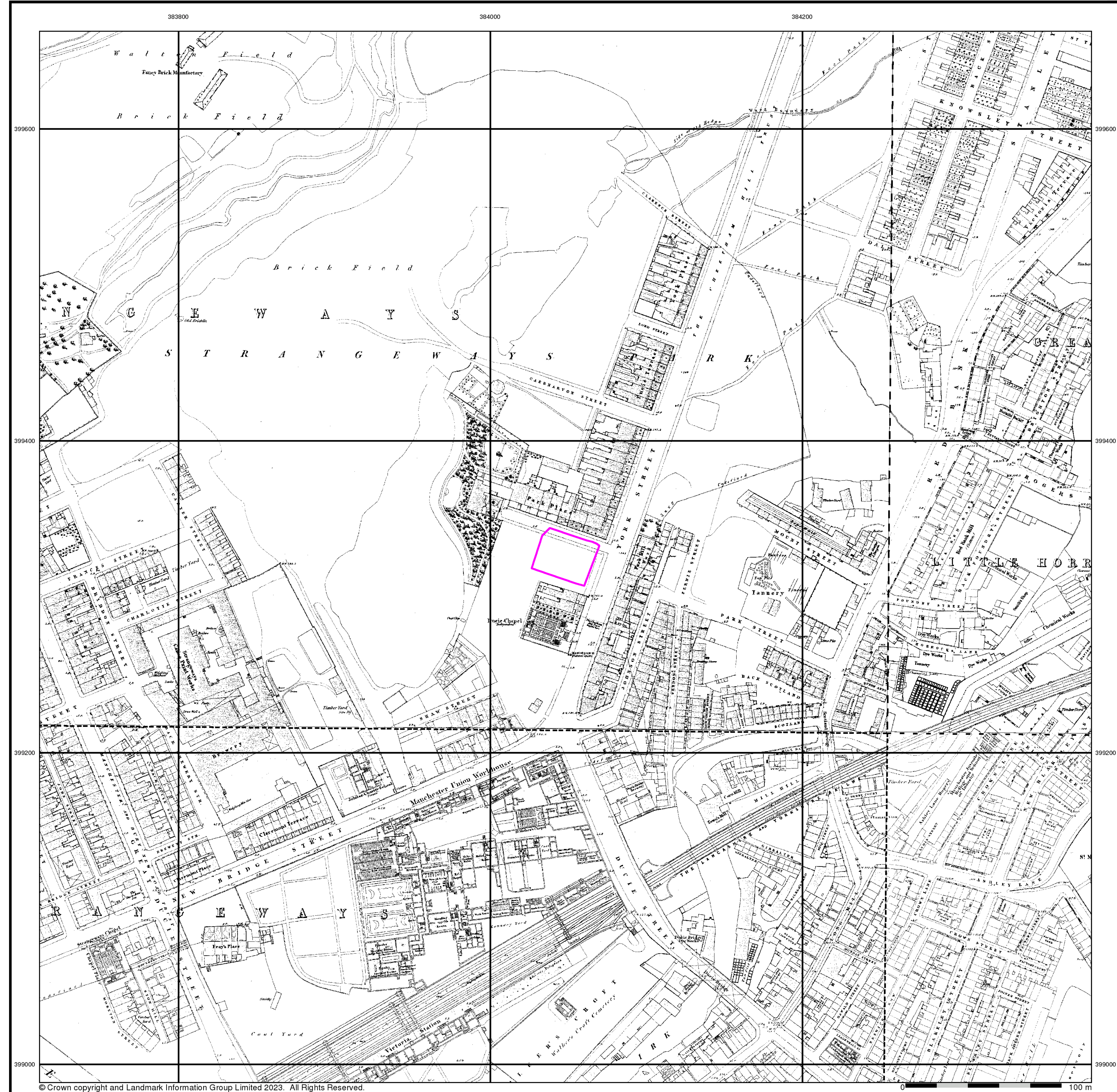
- 15.1 The Agreement constitutes the complete and entire agreement between the Client and Calabrian with respect to the Services and supersedes any prior oral and/or written warranties, terms, conditions, communications and representations, whether express or implied and any claim against Calabrian in respect of the Services can only be made in contract under the provisions of the Agreement and not otherwise under the law or tort or otherwise.
- 15.2 No amendments, modifications or variation of the Agreement shall be valid unless made in writing and agreed to by both the Client and Calabrian; such agreement must be recorded in writing by at least one of the Parties.
- 15.3 Calabrian will not be bound by any standard or printed terms or conditions furnished by the Client in any of its documents unless Calabrian specifically states in writing separately from such documents that it intends such terms and conditions to apply.

16 DISPUTES AND GOVERNING LAW

- 16.1 The Agreement shall be governed by and construed in accordance with English law and the Parties irrevocably and unconditionally submit to the jurisdiction of the English Courts.
- 16.2 Where the Housing Grants, Construction and Regeneration Act 1996 applies, any dispute between the Parties may be referred to adjudication in accordance with The Scheme for Construction Contracts Regulations 1998 or any amendment or modification thereof being in force at the time of the dispute, as applicable to England, Wales, Scotland and Northern Ireland.

APPENDIX B HISTORICAL OS PLANS







Lancashire And Furness

Published 1850

Source map scale - 1:1,056

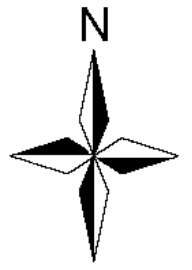
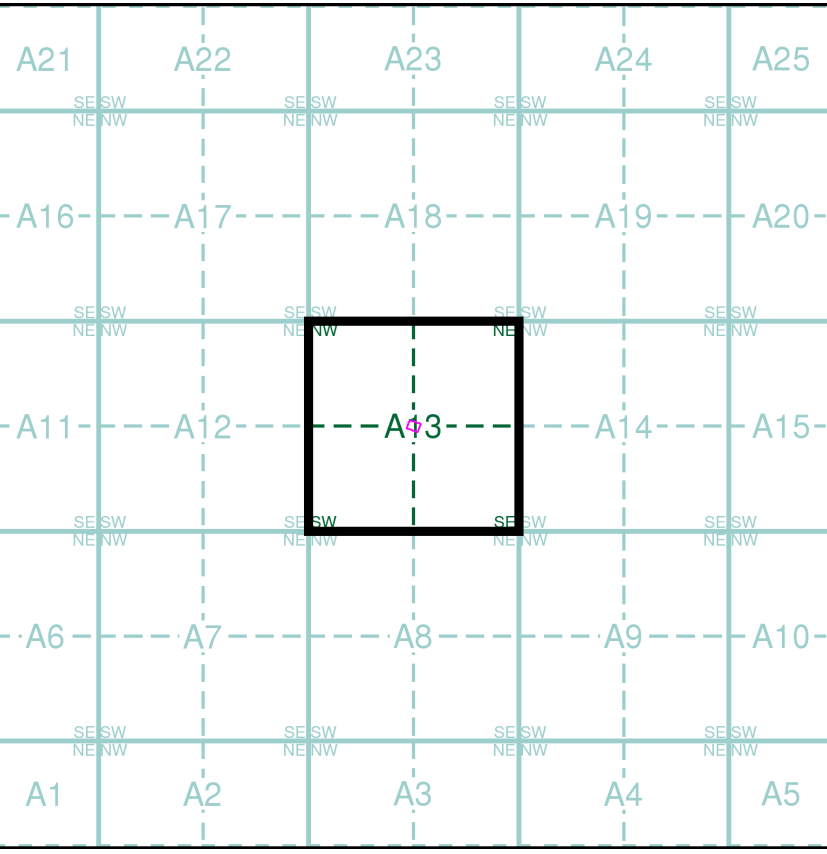
The 1:1056 scale of Ordnance Survey mapping was adopted from Ireland in 1848 and was used to survey towns with a population of over 4000, plus county towns of lesser population, in those counties mapped at the six-inch scale in 1841-55. The scale was the largest scale at which London was mapped by the Ordnance Survey and a 'skeleton' survey of the capital, showing little more than streets, street names, frontages and altitudes, was undertaken between 1848 and 1850. The majority of the 1:1056 surveys were later replaced by 1:500 surveys; although almost all the remainder were revised at this scale, sometimes more than once before 1895. The type of detail shown on the 1:1056 scale is broadly similar to that on 1:500; the apparent omission of minor details such as sewer access points and street lights may be as much a reflection of the generally earlier date of these plans, as of the specification of the map.

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)

000_00_017 1850 1:1,056	000_00_018 1850 1:1,056
000_00_023 1850 1:1,056	000_00_024 1850 1:1,056

Historical Town Plan - Segment A13



Order Details

Order Number:	315643938_1_1
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Slice:	A
Site Area (Ha):	0.11
Search Buffer (m):	0

Site Details

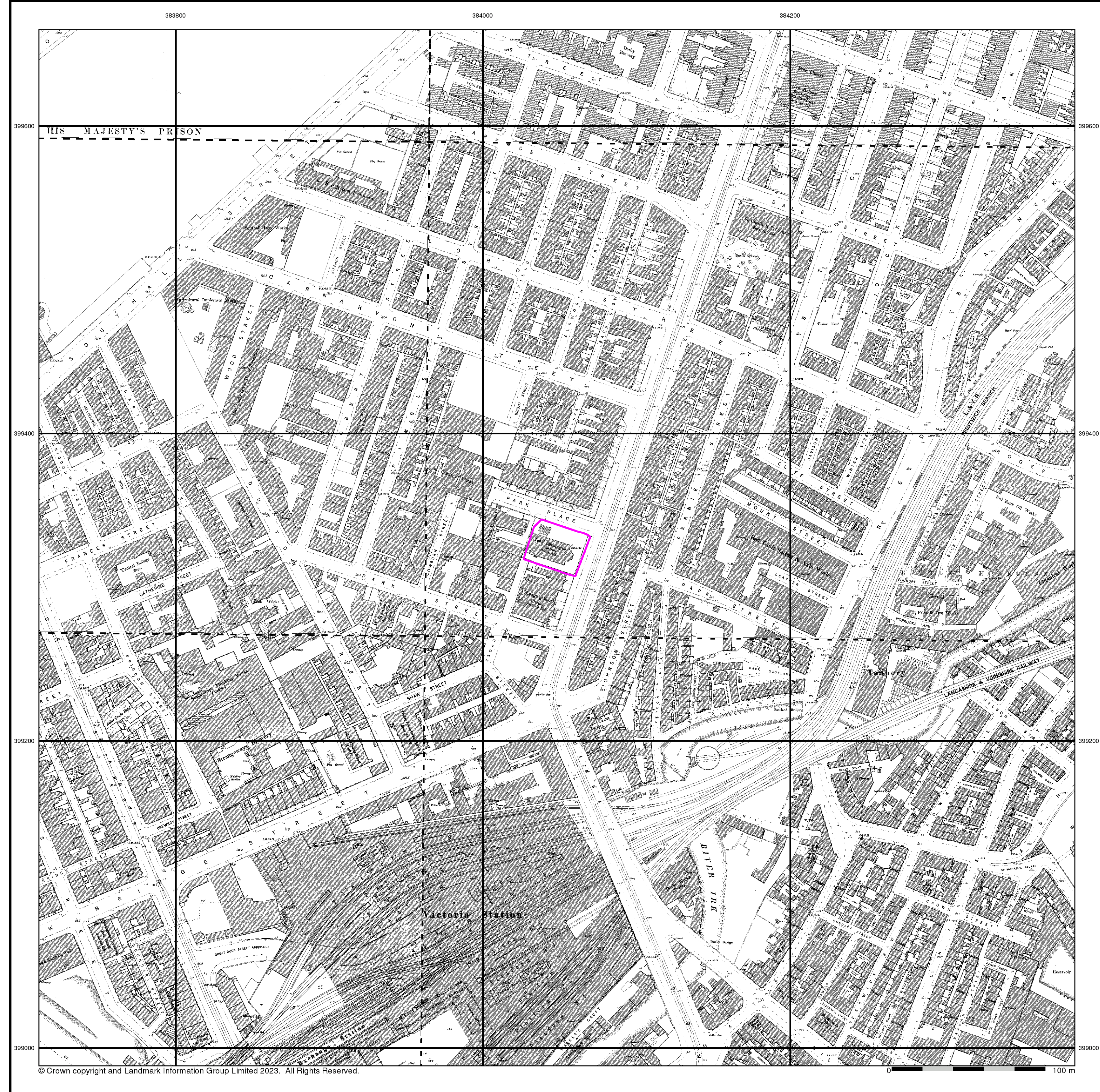
Site at 384048,399326



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

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0 100 m





Lancashire And Furness

Published 1890 - 1891

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 complement 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.

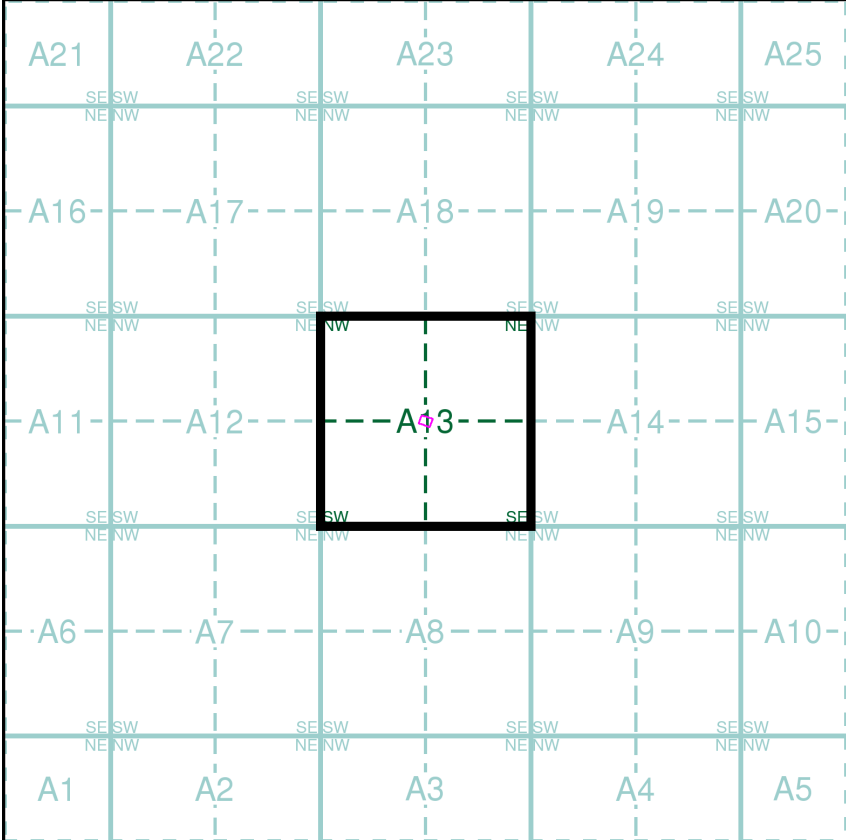
Map Name(s) and Date(s)

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1:500	1:500

104_06_009	104_06_010
1891	1891
1:500	1:500

104_06_014	104_06_015
1891	1891
1:500	1:500

Historical Town Plan - Segment A13



Order Details

Order Number:	315643938_1_1
Customer Ref:	7241
National Grid Reference:	384050, 399330
Slice:	A
Site Area (Ha):	0.11
Search Buffer (m):	0

Site Details

Site at 384048,399326



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A Landmark Information Group Service v50.0 15-Aug-2023 Page 2 of 2

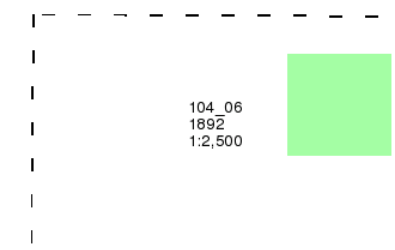
Lancashire And Furness

Published 1892

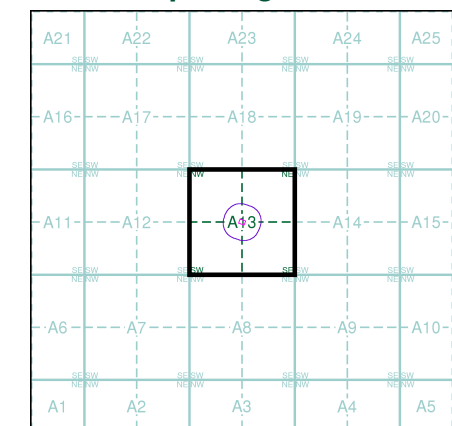
Source map scale - 1:2,500

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

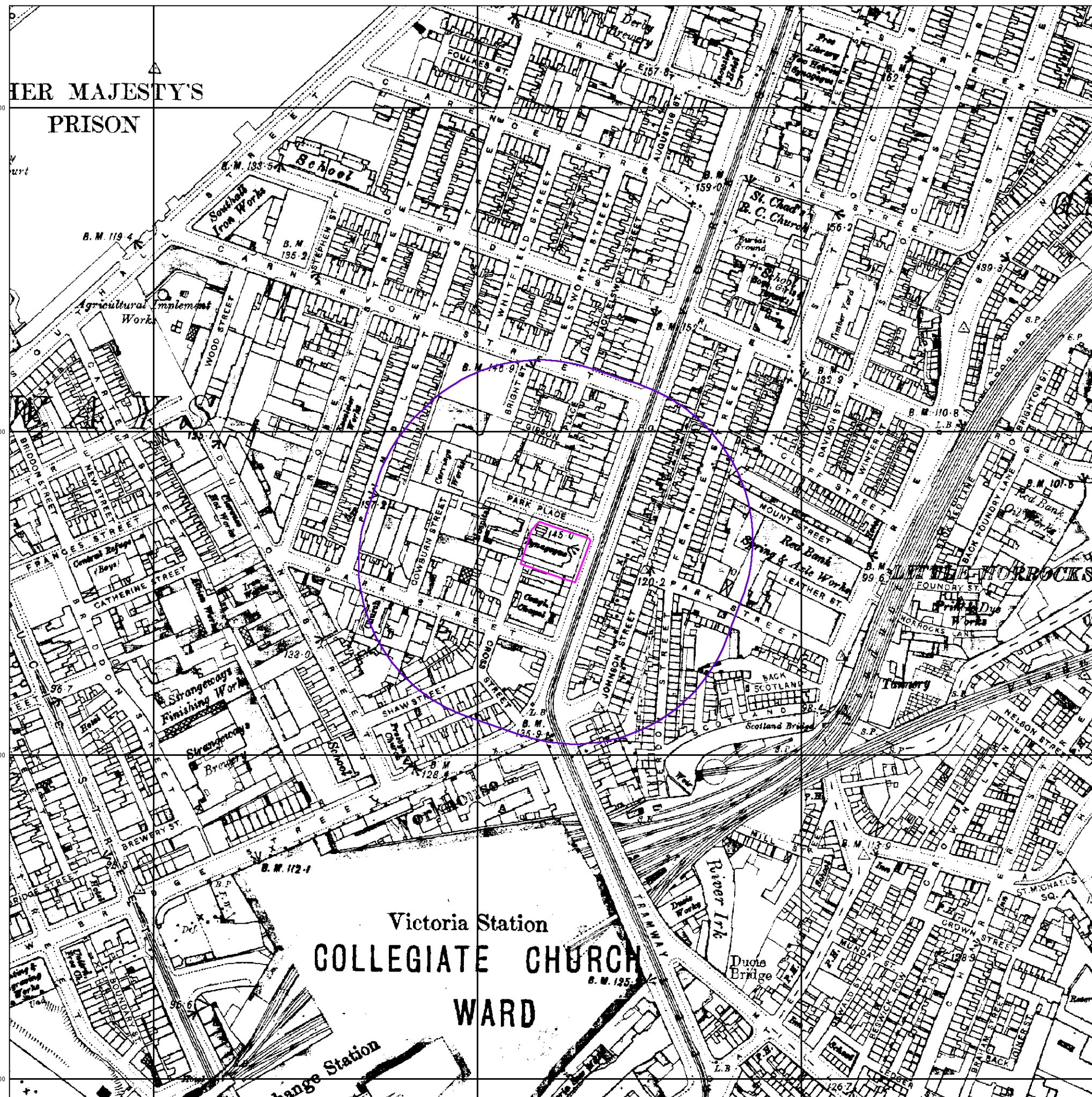


Order Details

Order Number: 315643938_1_1
Customer Ref: 7241
National Grid Reference: 384050, 399330
Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 100

Site Details

Site at 384048,399326







Lancashire And Furness

Published 1908

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)

104_06

1908

1:2,500

Historical Map - Segment A13

A21A22A23A24A25

A16A17A18A19A20

A11A12A13A14A15

A6A7A8A9A10

A1A2A3A4A5

N

Order Details

Order Number:	315643938_1_1
Customer Ref:	7241
National Grid Reference:	384050, 399330
Slice:	A
Site Area (Ha):	0.11
Search Buffer (m):	100

Site Details

Site at 384048,399326

Landmark

INFORMATION GROUP

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0844 844 9952

Fax:

0844 844 9951

Web:

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A Landmark Information Group Service v50.0 15-Aug-2023

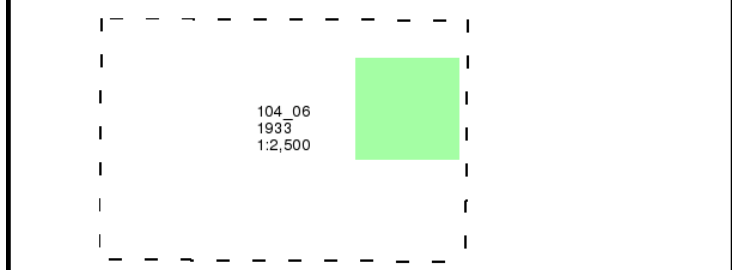
Page 3 of 19



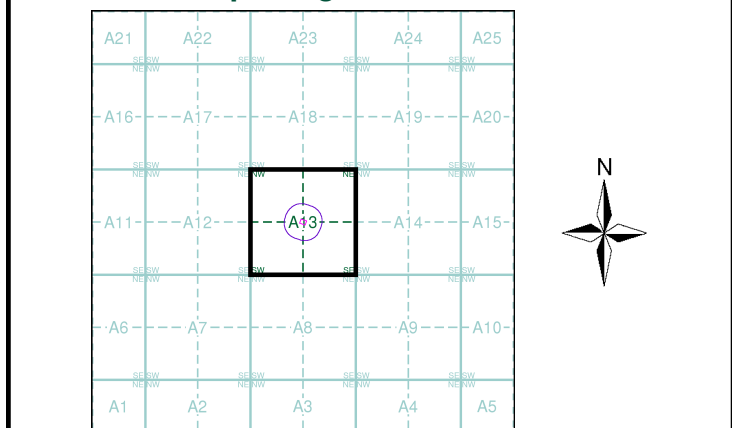
Lancashire And Furness
Published 1933
Source map scale - 1:2,500

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:	315643938_1_1
Customer Ref:	7241
National Grid Reference:	384050, 399330
Slice:	A
Site Area (Ha):	0.11
Search Buffer (m):	100
Site Details	
Site at 384048,399326	

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Ordnance Survey Plan

Published 1949 - 1951

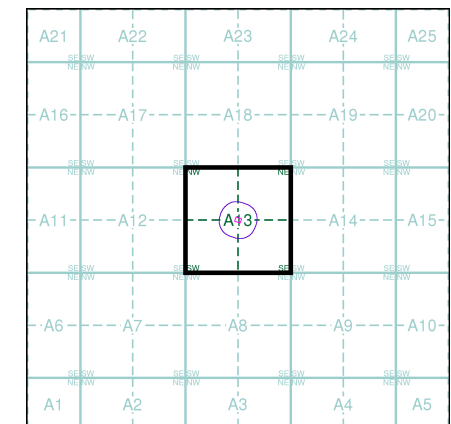
Source map scale - 1:1,250

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)

SJ8399NE	1951	1:1,250
SJ8399SE	1949	1:1,250
SJ8399SW	1949	1:1,250
SJ8398NE	1949	1:1,250

Historical Map - Segment A13

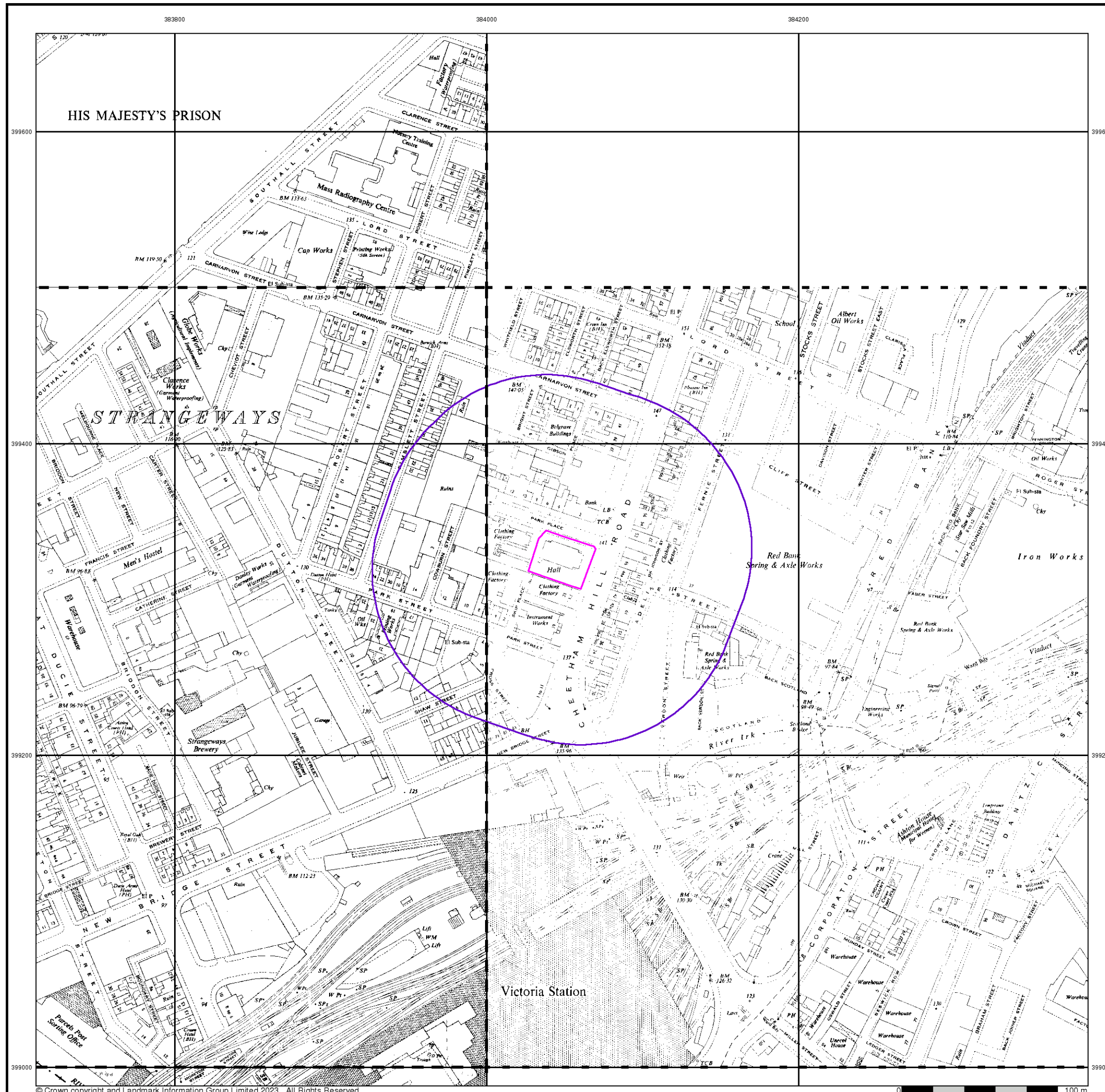


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326



Ordnance Survey Plan

Published 1951 - 1952

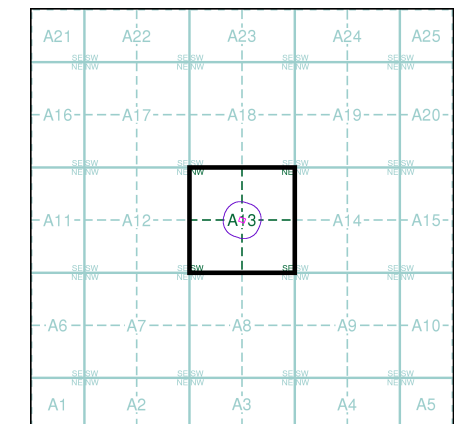
Source map scale - 1:2,500

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)

SJ8399	SJ8499
1952	1951
12,500	12,500
SJ8398	SJ8498
1951	1951
12,500	12,500

Historical Map - Segment A13

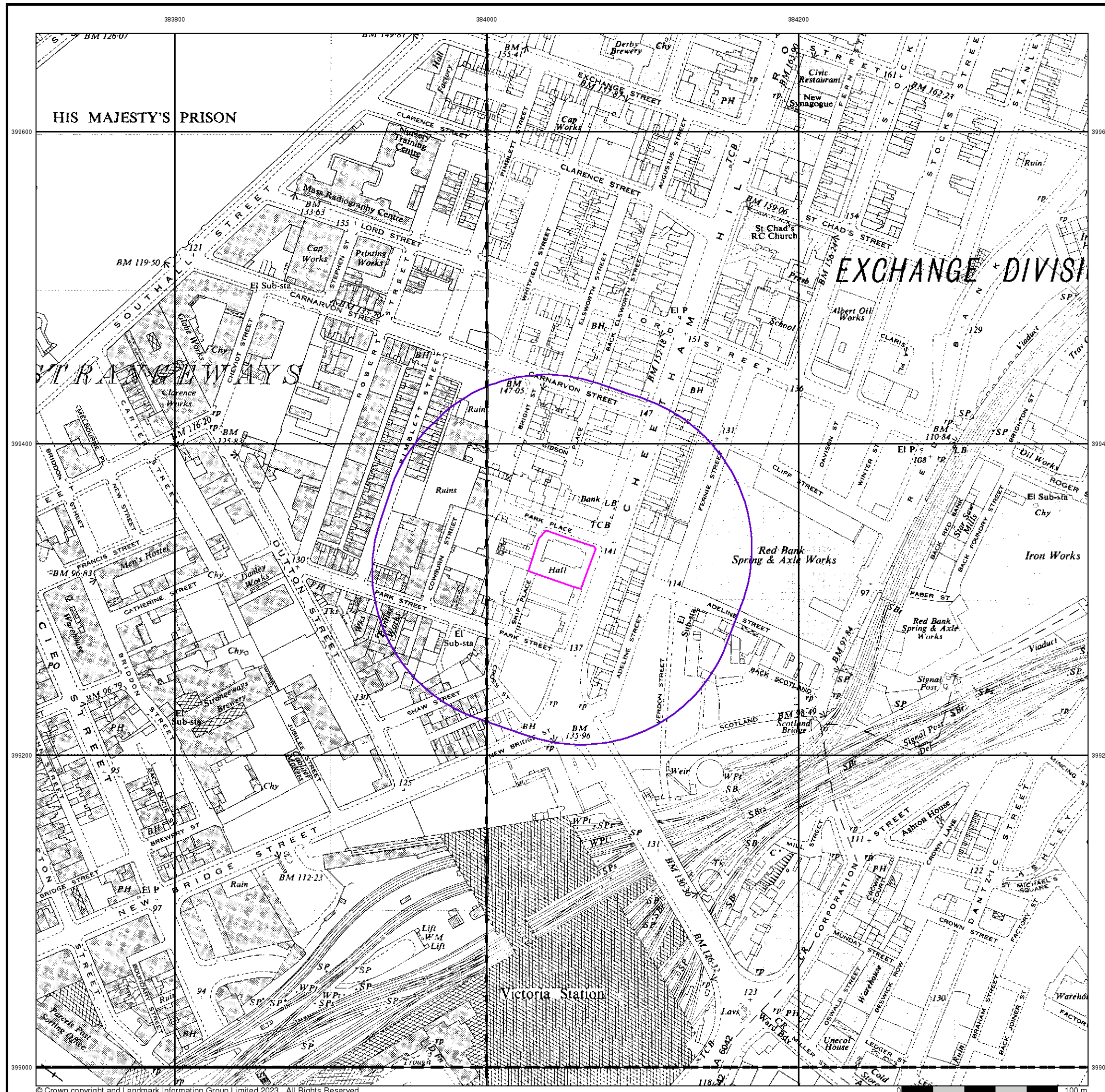


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326



Ordnance Survey Plan

Published 1952 - 1955

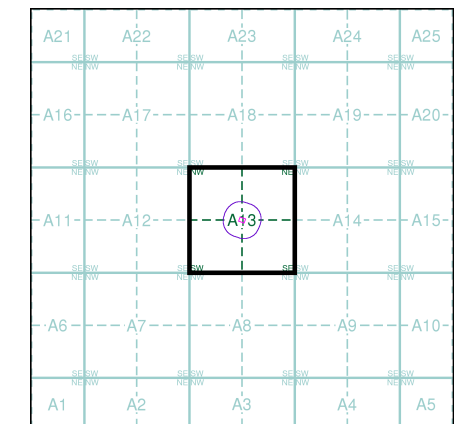
Source map scale - 1:1,250

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)

SJ8499NW	1952	1:1,250
SJ8399SE	1952	1:1,250
SJ8499SW	1952	1:1,250
SJ8398NE	1955	1:1,250

Historical Map - Segment A13

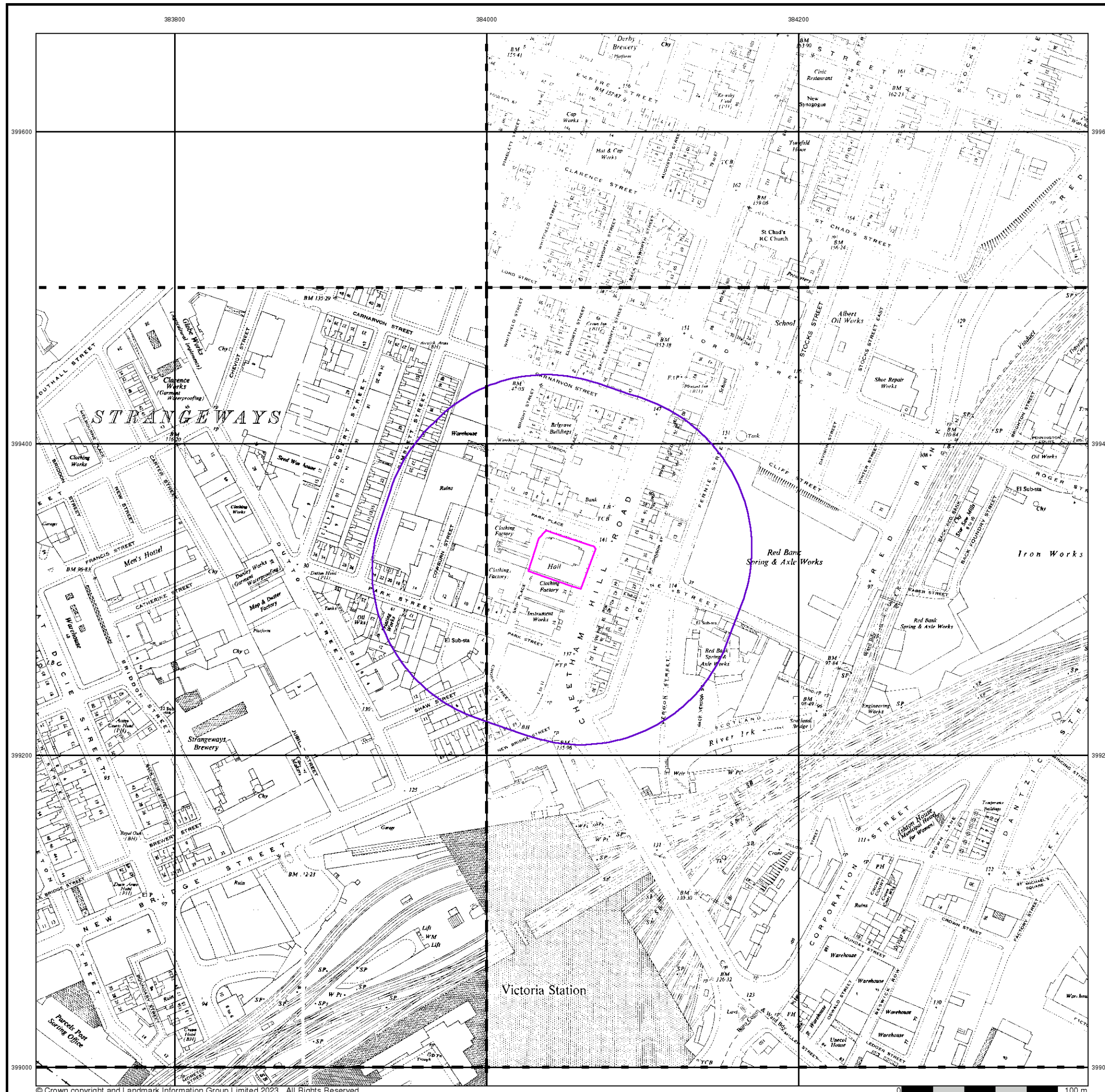


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326



Ordnance Survey Plan

Published 1953 - 1958

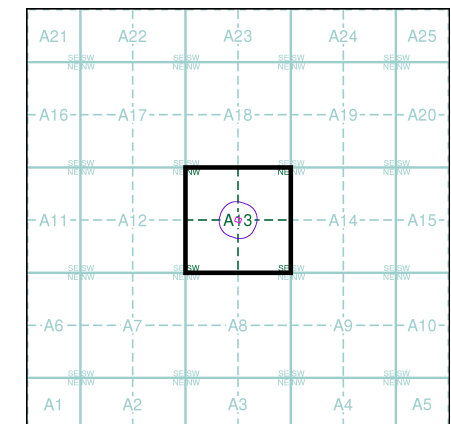
Source map scale - 1:2,500

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)

		SJ8499 1953 1:2,500
SJ8398 1958 1:2,500		SJ8498 1955 1:2,500

Historical Map - Segment A13

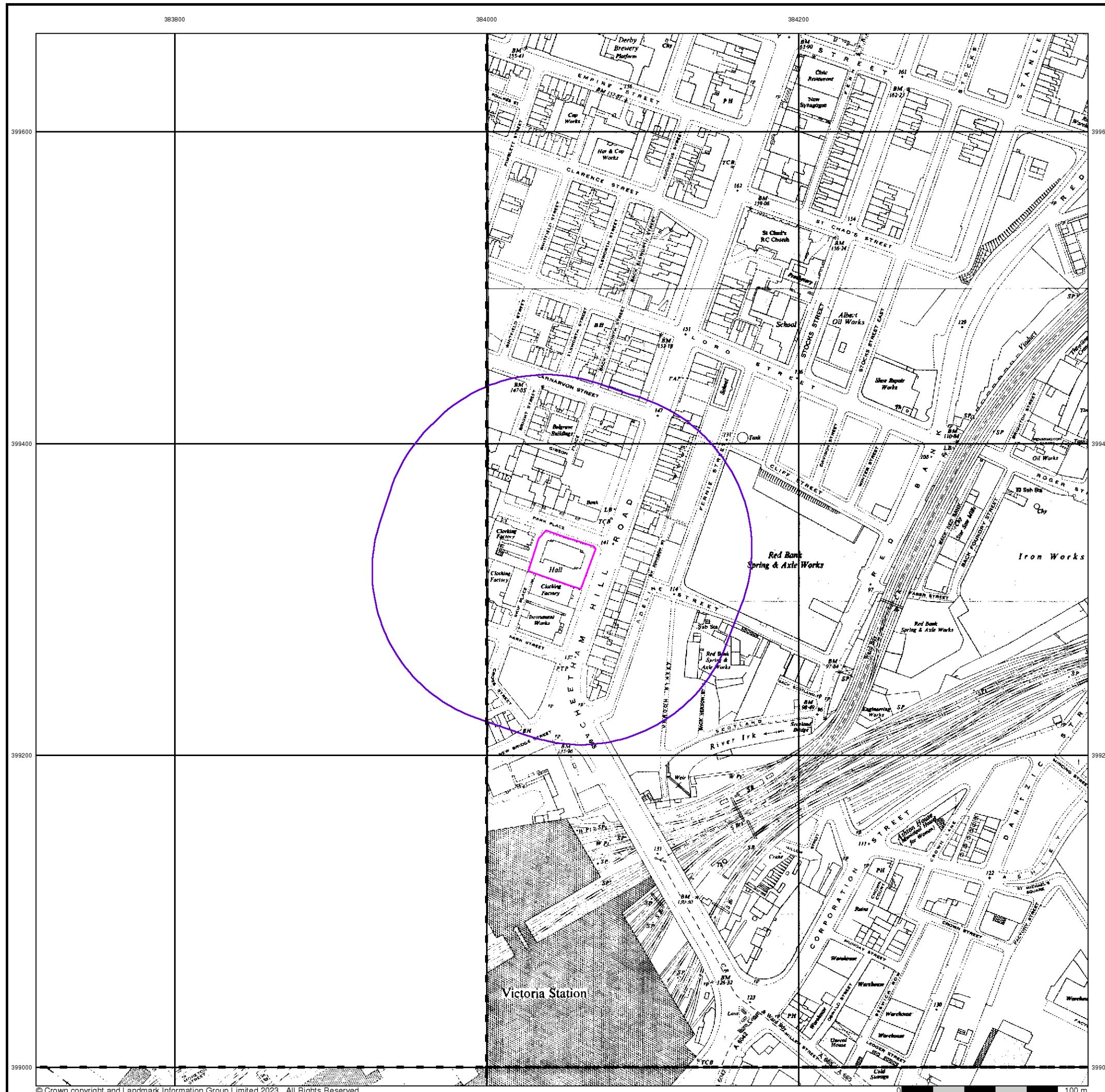


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326



Ordnance Survey Plan

Published 1958 - 1970

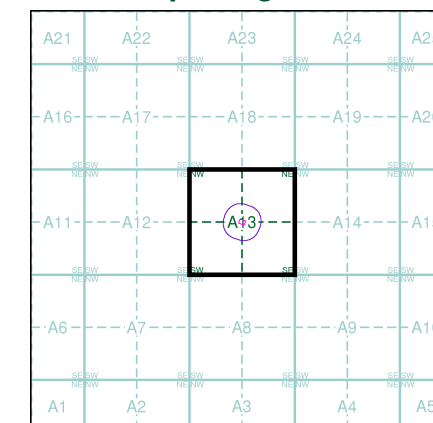
Source map scale - 1:1,250

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)

SJ8499NW	1958	1:1,250
SJ8499SW	1963	1:1,250
SJ8398NE	1970	1:1,250
SJ8498NW	1963	1:1,250

Historical Map - Segment A13

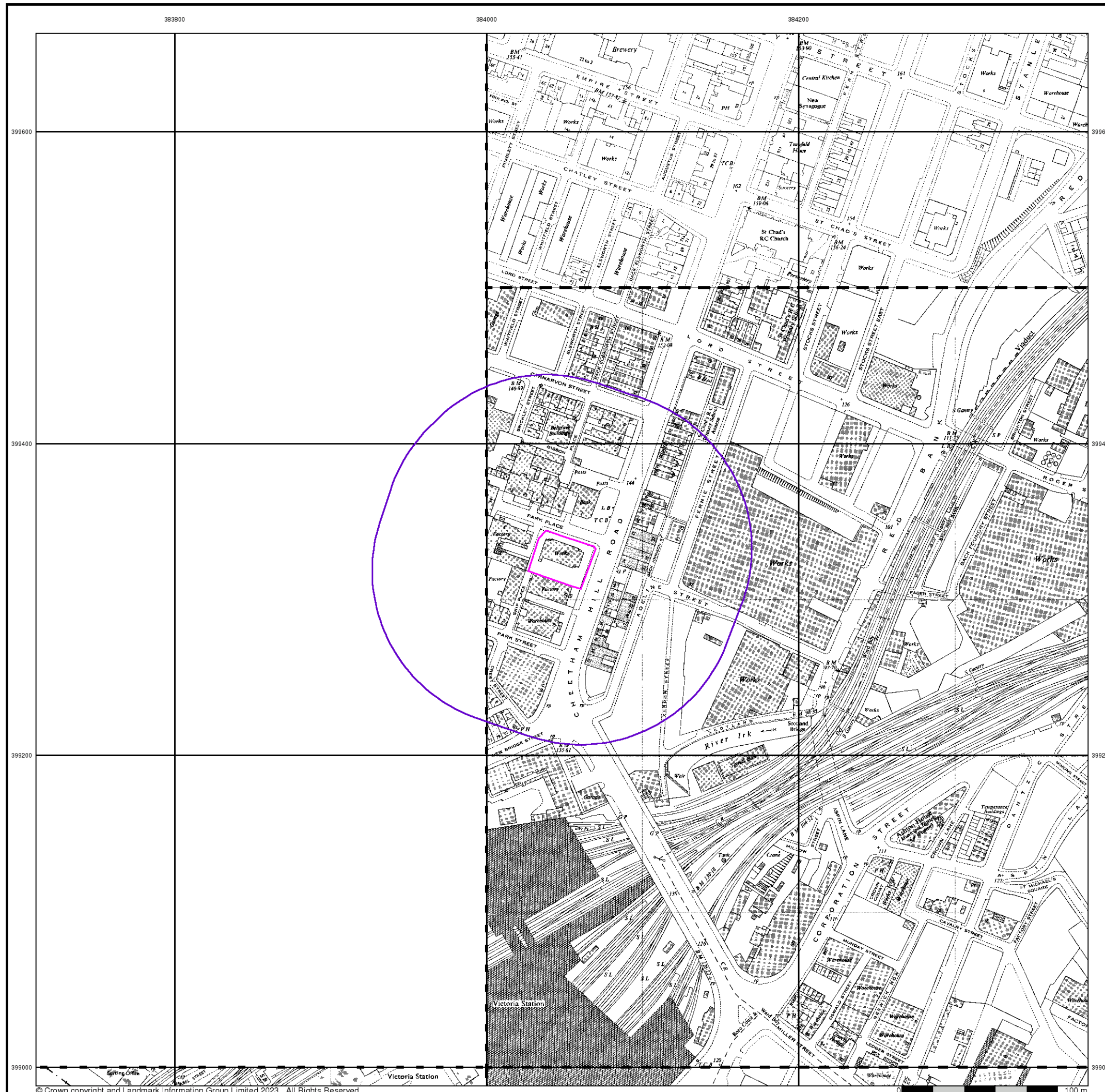


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326



Ordnance Survey Plan

Published 1959 - 1965

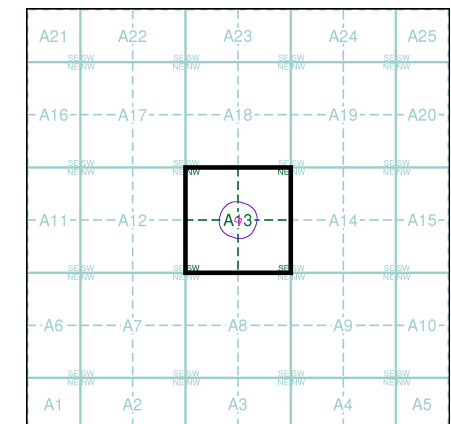
Source map scale - 1:2,500

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)

		SJ8499 1959 12,500
SJ8398 1963 12,500		SJ8498 1965 12,500

Historical Map - Segment A13

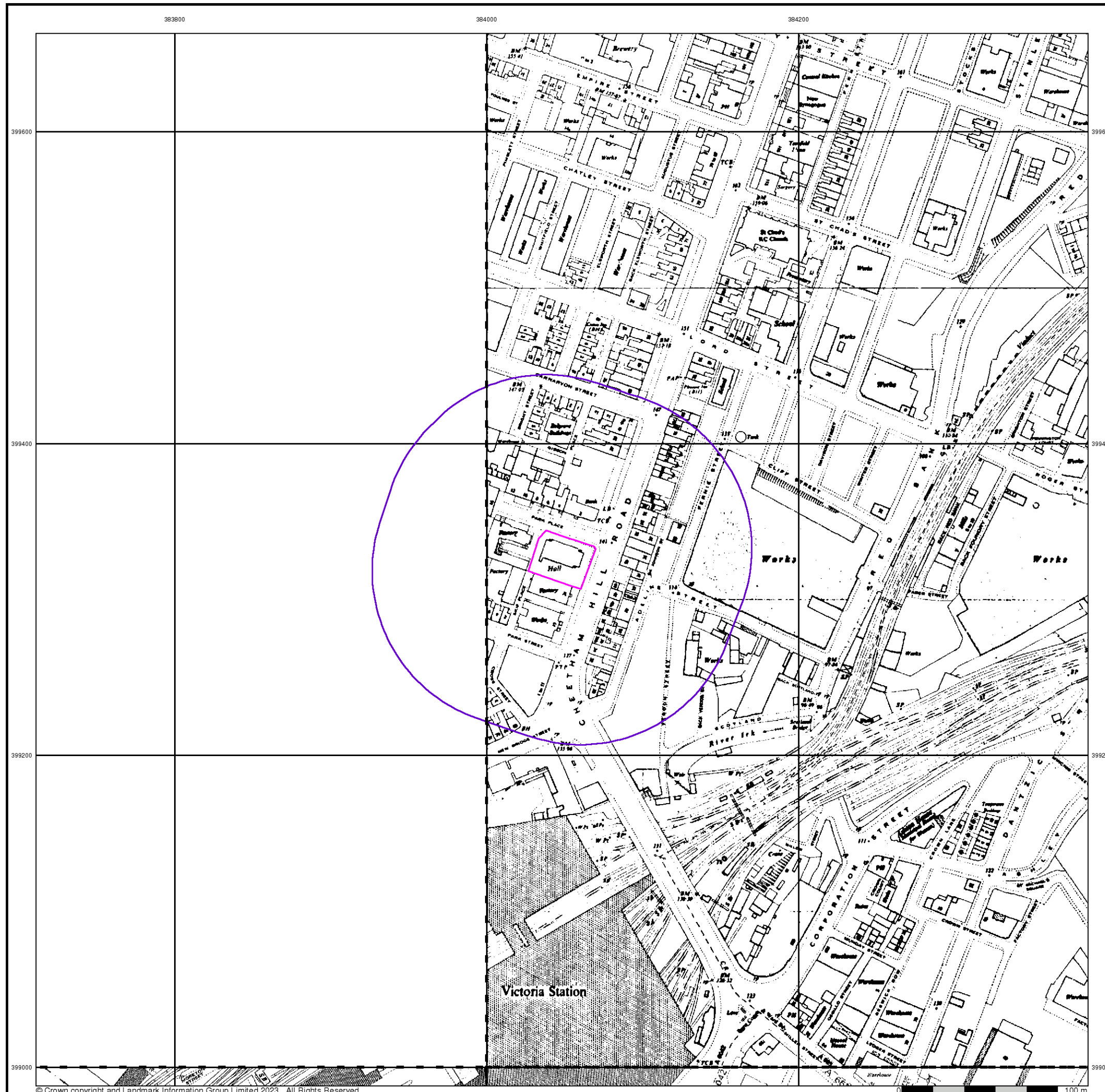


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326



Ordnance Survey Plan

Published 1966 - 1971

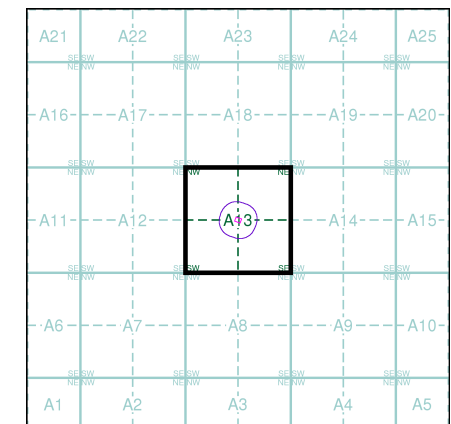
Source map scale - 1:2,500

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)

		SJ8499 1966 12,500
SJ8398 1971 12,500		SJ8498 1969 12,500

Historical Map - Segment A13

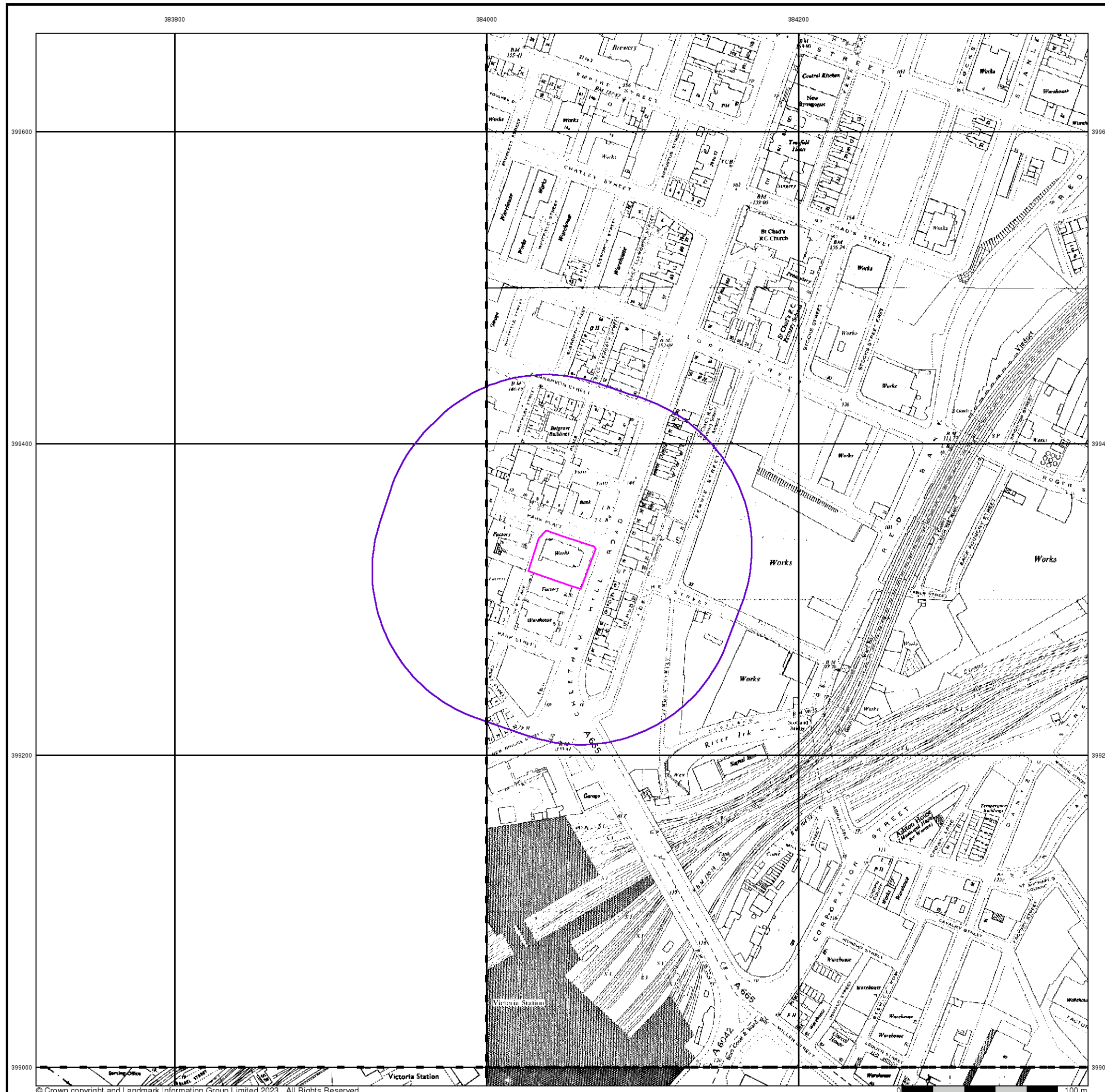


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326



Ordnance Survey Plan

Published 1968 - 1990

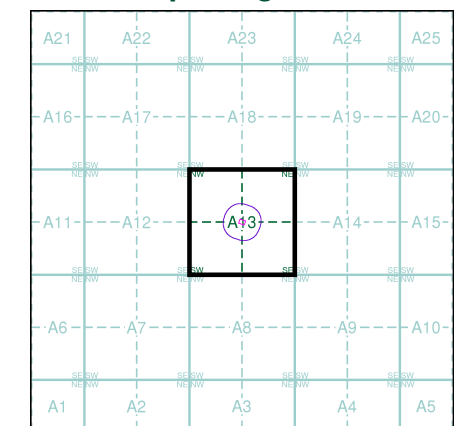
Source map scale - 1:1,250

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)

SJ8399NESJ8499NW	1975	1968
1:1,250	1:1,250	1:1,250
SJ8399SESJ8499SW	1975	1990
1:1,250	1:1,250	1:1,250
SJ8398NESJ8498NW	1989	1986
1:1,250	1:1,250	1:1,250

Historical Map - Segment A13

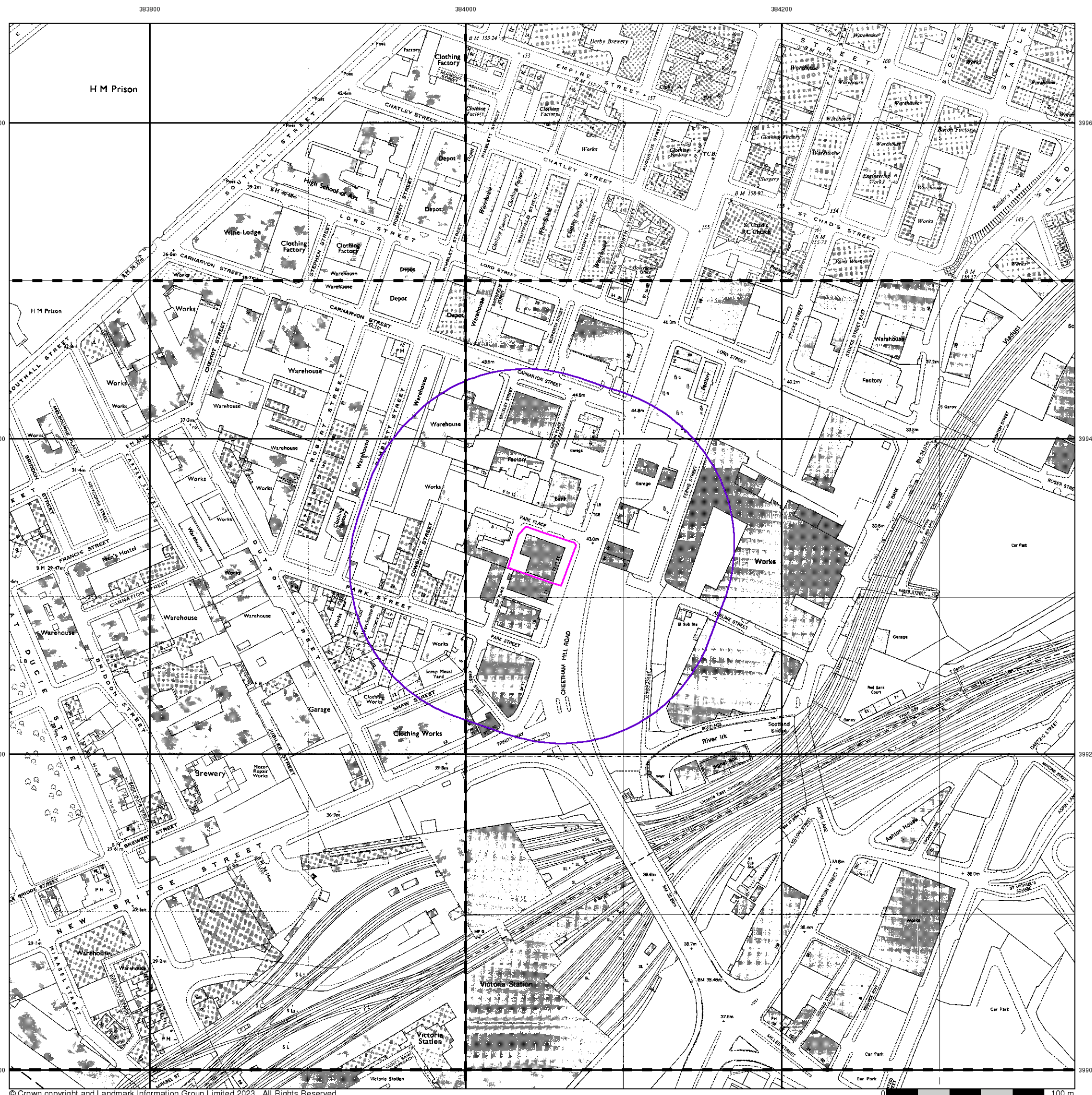


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326





Additional SIMs

Published 1978 - 1989

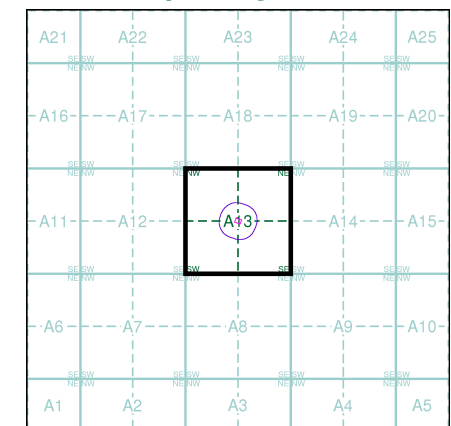
Source map scale - 1:1,250

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)

BJ8399NE	BJ8499NV
1989	1978
1:1,250	1:1,250
BJ8399SE	BJ8499SV
1987	1984
1:1,250	1:1,250
BJ8398NE	BJ8498NV
1979	1980
1:1,250	1:1,250

Historical Map - Segment A13



Order Details

Order Number:	315643938_1_1
Customer Ref:	7241
National Grid Reference:	384050, 399330
Slice:	A
Site Area (Ha):	0.11
Search Buffer (m):	100

Site Details

Site at 384048,399326

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Large-Scale National Grid Data

Published 1992

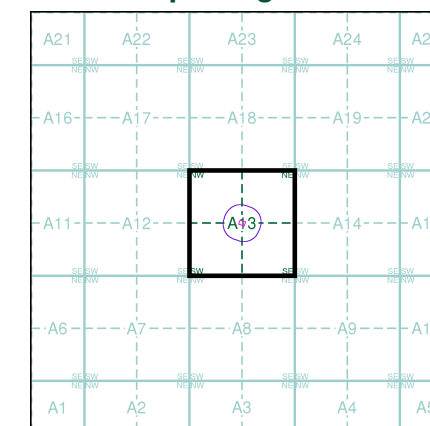
Source map scale - 1:1,250

'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)

BJ8399NEBJ8499NW	1992	1992
1:1,250	1:1,250	1:1,250
BJ8399SEBJ8499SW	1992	1992
1:1,250	1:1,250	1:1,250
BJ8398NEBJ8498NW	1992	1992
1:1,250	1:1,250	1:1,250

Historical Map - Segment A13

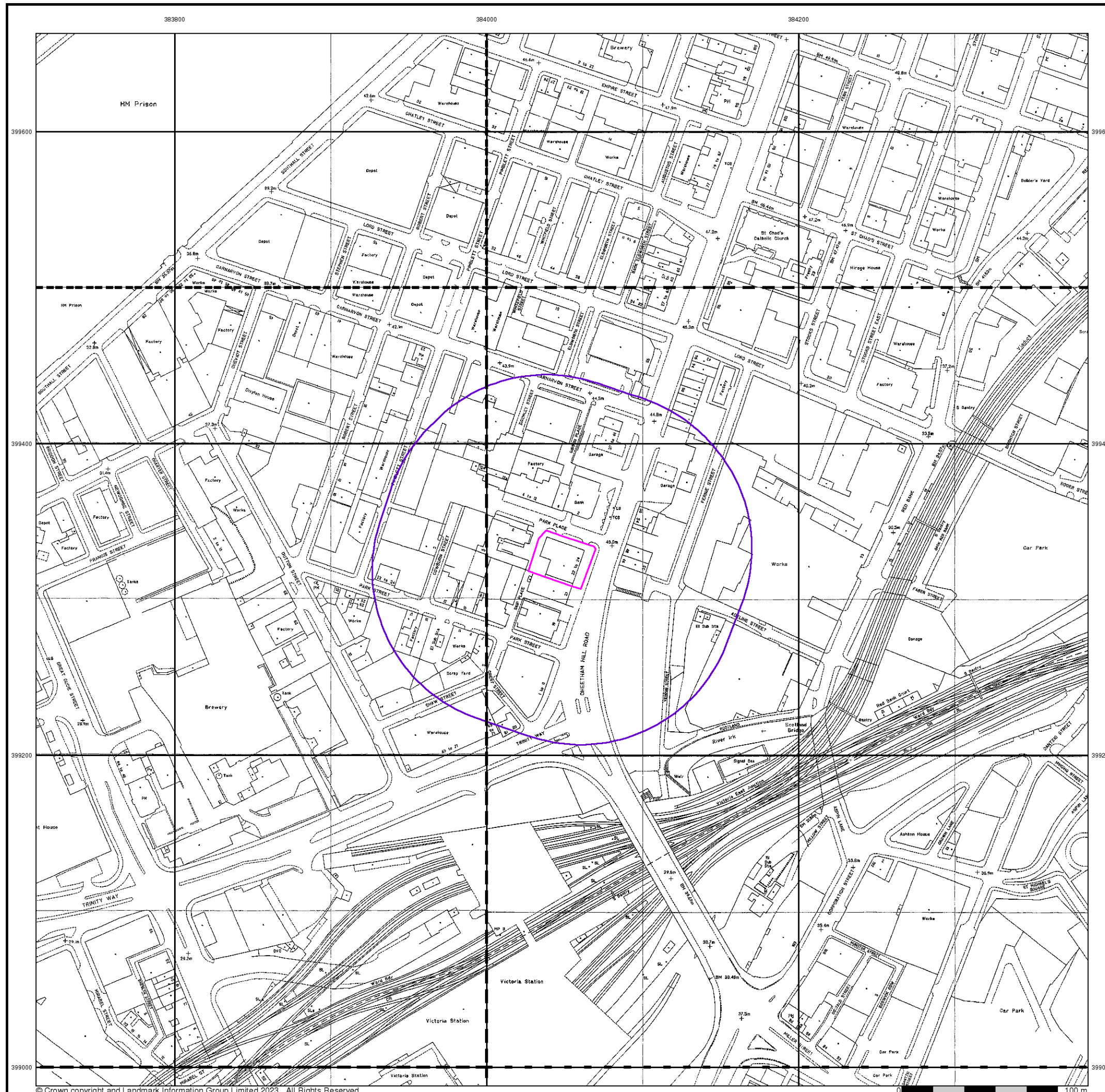


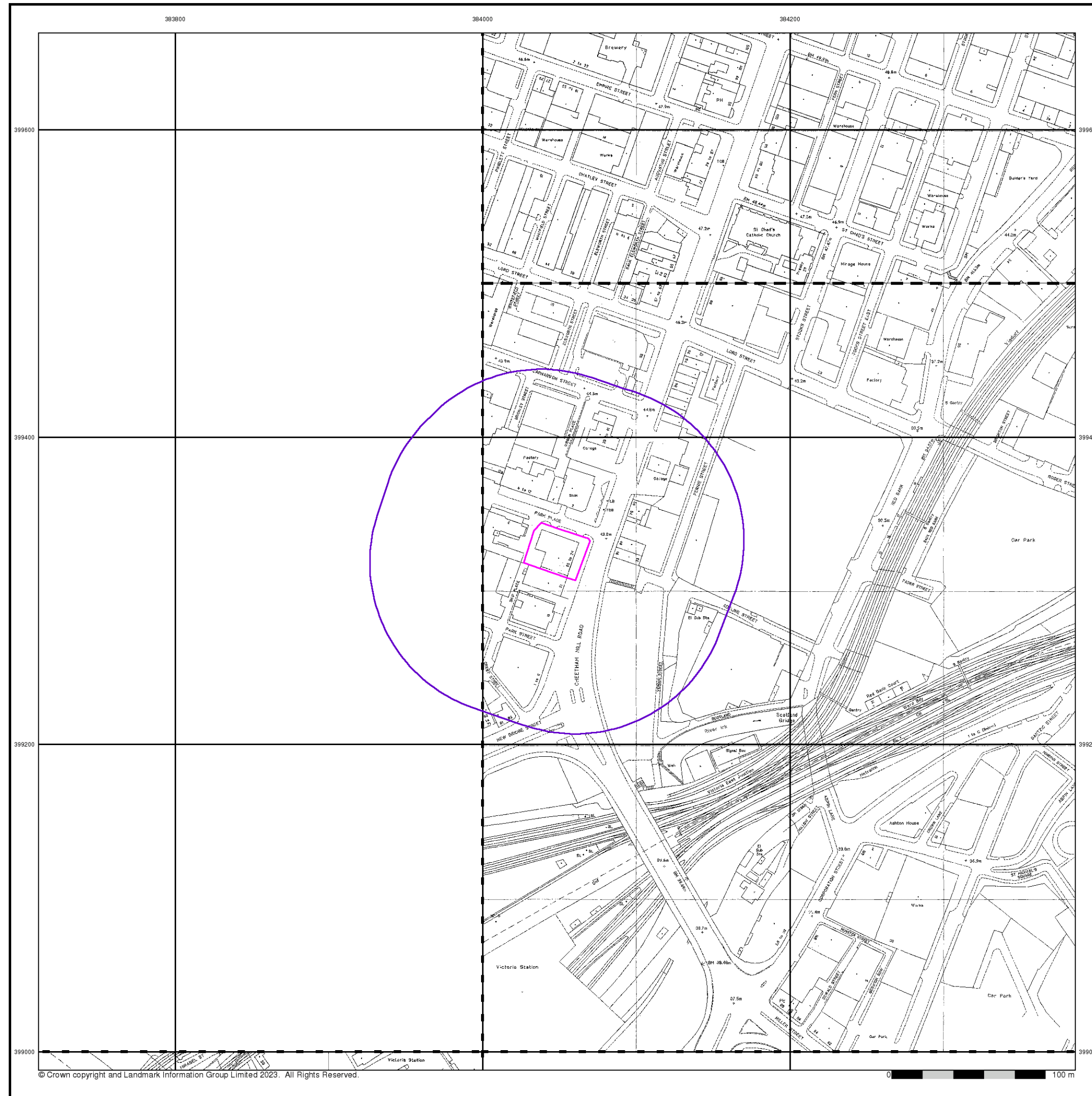
Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 100

Site Details

Site at 384048,399326





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0 100 m



Large-Scale National Grid Data

Published 1993 - 1995

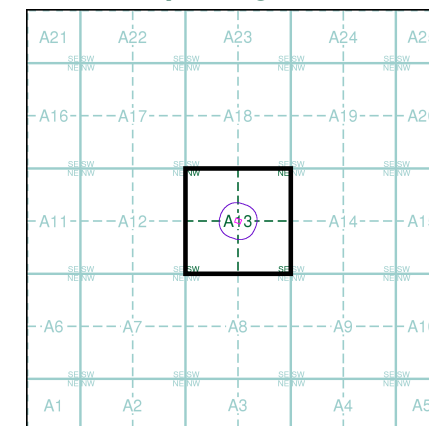
Source map scale - 1:1,250

'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)

BJ8499NW
1993
1:1,250
BJ8499SW
1995
1:1,250
BJ8398NE
1994
1:1,250

Historical Map - Segment A13



Order Details

Order Number: 315643938_1_1
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Slice: A
Site Area (Ha): 0.11
Search Buffer (m): 100

Site Details

Site at 384048,399326



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APPENDIX C	SEARCHES
Landmark	Envirocheck Report
Coal Authority	Consultants Mining Report
BGS	Archive Exploratory Hole Records
Alpha Associates & Landmark	Detailed UXO Threat Assessment

Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

315643938_1_1

Customer Reference:

7241

National Grid Reference:

384050, 399330

Slice:

A

Site Area (Ha):

0.11

Search Buffer (m):

1000

Site Details:

Site at 384048,399326

Client Details:

Mr R Hey
Calabrian Limited
8 L'Anson Close
Leyburn
DL8 5LF

Prepared For:

Roscoe

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Agency & Hydrological					
BGS Groundwater Flooding Susceptibility	pg 1	Yes	Yes	Yes	n/a
Contaminated Land Register Entries and Notices					
Discharge Consents	pg 4		8	41	53
Prosecutions Relating to Controlled Waters			n/a	n/a	n/a
Enforcement and Prohibition Notices					
Integrated Pollution Controls	pg 29				9
Integrated Pollution Prevention And Control					
Local Authority Integrated Pollution Prevention And Control					
Local Authority Pollution Prevention and Controls	pg 31		3	5	11
Local Authority Pollution Prevention and Control Enforcements	pg 33				1
Nearest Surface Water Feature	pg 33		Yes		
Pollution Incidents to Controlled Waters	pg 33		1	4	13
Prosecutions Relating to Authorised Processes	pg 36				1
Registered Radioactive Substances	pg 37			1	
River Quality	pg 37		1	1	
River Quality Biology Sampling Points					
Substantiated Pollution Incident Register	pg 38			2	4
River Quality Chemistry Sampling Points	pg 38			1	
Water Abstractions	pg 39		18	4	3 (*14)
Water Industry Act Referrals					
Groundwater Vulnerability Map	pg 49	Yes	n/a	n/a	n/a
Groundwater Vulnerability - Soluble Rock Risk			n/a	n/a	n/a
Groundwater Vulnerability - Local Information			n/a	n/a	n/a
Bedrock Aquifer Designations	pg 49	Yes	n/a	n/a	n/a
Superficial Aquifer Designations	pg 49	Yes	n/a	n/a	n/a
Source Protection Zones					
Extreme Flooding from Rivers or Sea without Defences	pg 49		Yes	n/a	n/a
Flooding from Rivers or Sea without Defences	pg 49		Yes	n/a	n/a
Areas Benefiting from Flood Defences				n/a	n/a
Flood Water Storage Areas				n/a	n/a
Flood Defences				n/a	n/a
OS Water Network Lines	pg 50		5	5	19

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Waste					
BGS Recorded Landfill Sites	pg 54				1
Historical Landfill Sites	pg 54				4
Integrated Pollution Control Registered Waste Sites					
Licensed Waste Management Facilities (Landfill Boundaries)					
Licensed Waste Management Facilities (Locations)	pg 55		1	1	9
Local Authority Landfill Coverage		1	n/a	n/a	n/a
Local Authority Recorded Landfill Sites					
Potentially Infilled Land (Non-Water)	pg 57		1	3	12
Potentially Infilled Land (Water)	pg 58		5	9	11
Registered Landfill Sites					
Registered Waste Transfer Sites	pg 59			1	4
Registered Waste Treatment or Disposal Sites	pg 61				2
Hazardous Substances					
Control of Major Accident Hazards Sites (COMAH)					
Explosive Sites					
Notification of Installations Handling Hazardous Substances (NIHHS)					
Planning Hazardous Substance Consents					
Planning Hazardous Substance Enforcements					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Geological					
BGS 1:625,000 Solid Geology	pg 63	Yes	n/a	n/a	n/a
BGS Estimated Soil Chemistry	pg 63	Yes	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 67		1		5
BGS Urban Soil Chemistry	pg 68			Yes	Yes
BGS Urban Soil Chemistry Averages	pg 70	Yes			
CBSCB Compensation District			n/a	n/a	n/a
Coal Mining Affected Areas	pg 71	Yes	n/a	n/a	n/a
Mining Instability	pg 71	Yes	n/a	n/a	n/a
Man-Made Mining Cavities					
Natural Cavities					
Non Coal Mining Areas of Great Britain				n/a	n/a
Potential for Collapsible Ground Stability Hazards	pg 71	Yes		n/a	n/a
Potential for Compressible Ground Stability Hazards	pg 71		Yes	n/a	n/a
Potential for Ground Dissolution Stability Hazards				n/a	n/a
Potential for Landslide Ground Stability Hazards	pg 71	Yes	Yes	n/a	n/a
Potential for Running Sand Ground Stability Hazards	pg 71	Yes	Yes	n/a	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 71	Yes		n/a	n/a
Radon Potential - Radon Affected Areas			n/a	n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a	n/a
Industrial Land Use					
Contemporary Trade Directory Entries	pg 72		66	121	555
Fuel Station Entries	pg 134		2	1	7
Points of Interest - Commercial Services	pg 135		11	27	78
Points of Interest - Education and Health					
Points of Interest - Manufacturing and Production	pg 145		23	36	119
Points of Interest - Public Infrastructure	pg 160		9	4	20
Points of Interest - Recreational and Environmental	pg 163				5
Gas Pipelines					
Underground Electrical Cables					

Data Type	Page Number	On Site	0 to 250m	251 to 500m	501 to 1000m (*up to 2000m)
Sensitive Land Use					
Ancient Woodland					
Areas of Adopted Green Belt					
Areas of Unadopted Green Belt					
Areas of Outstanding Natural Beauty					
Environmentally Sensitive Areas					
Forest Parks					
Local Nature Reserves					
Marine Nature Reserves					
National Nature Reserves					
National Parks					
Nitrate Sensitive Areas					
Nitrate Vulnerable Zones	pg 164	1	1		
Ramsar Sites					
Sites of Special Scientific Interest					
Special Areas of Conservation					
Special Protection Areas					
World Heritage Sites					

- General**
- Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
- Agency and Hydrological**
- Contaminated Land Register Entry or Notice (Location)
 - Contaminated Land Register Entry or Notice
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention and Control
 - Local Authority Integrated Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control Enforcement
 - Pollution Incident to Controlled Waters
 - Prohibition Relating to Authorised Processes
 - Prosecution Relating to Controlled Waters
 - Registered Radioactive Substance
 - River Network or Water Feature
 - River Quality Sampling Point
 - Substantiated Pollution Incident Register
 - Water Abstraction
 - Water Industry Act Retention
- Hazardous Substances**
- COMAH Site
 - Explosive Site
 - HAHS Site
 - Planning Hazardous Substance Consent
 - Planning Hazardous Substance Enforcement
- Geological**
- BGS Recorded Mineral Site
- Waste**
- BGS Recorded Landfill Site (Location)
 - BGS Recorded Landfill Site
 - EA Historic Landfill (Antiques Road)
 - EA Historic Landfill (Polygon)
 - Integrated Pollution Control Registered Waste Site
 - Licensed Waste Management Facility (Landfill boundary)
 - Licensed Waste Management Facility (Location)
 - Local Authority Recorded Landfill Site (Location)
 - Local Authority Recorded Landfill Site
 - Potentially Infiltrated Land (Non-water)
 - Potentially Infiltrated Land (Non-water)
 - Potentially Infiltrated Land (Non-water)
 - Potentially Infiltrated Land (Water)
 - Potentially Infiltrated Land (Water)
 - Potentially Infiltrated Land (Water)
 - Registered Landfill Site (Location)
 - Registered Landfill Site (Point Buffered to 100m)
 - Registered Landfill Site (Point Buffered to 250m)
 - Registered Waste Transfer Site (Location)
 - Registered Waste Transfer Site
 - Registered Waste Treatment or Disposal Site (Location)
 - Registered Waste Treatment or Disposal Site

Site Sensitivity Map - Slice A



Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

Site at 384048,399326

Industrial Land Use Map

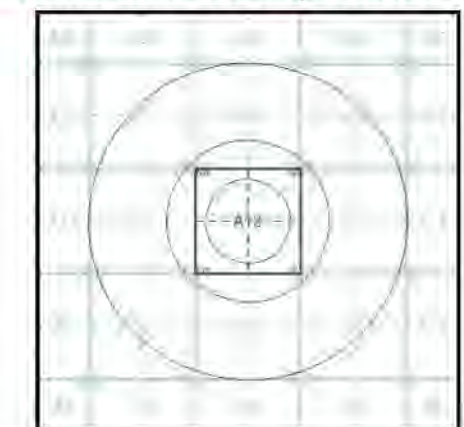
General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Site
-  Map ID

Industrial Land Use

-  Contemporary Trade Directory Entry
-  Fuel Station Entry
-  Gas Pipeline
-  Points of Interest - Commercial Services
-  Points of Interest - Education and Health
-  Points of Interest - Manufacturing and Production
-  Points of Interest - Public Infrastructure
-  Points of Interest - Recreational and Environmental
-  Underground Electrical Cables

Industrial Land Use Map - Slice A

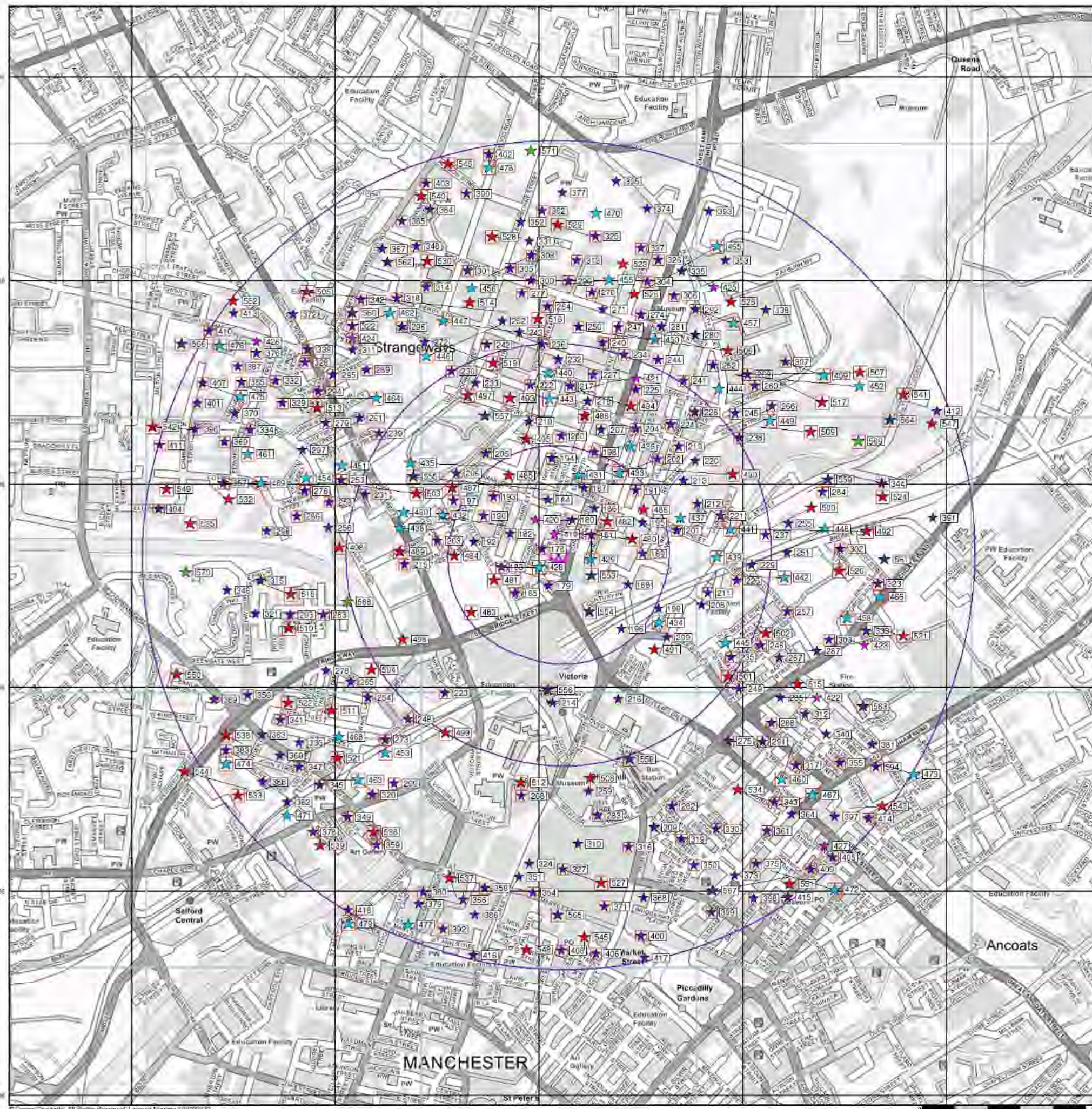


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

Site at 384048,399326



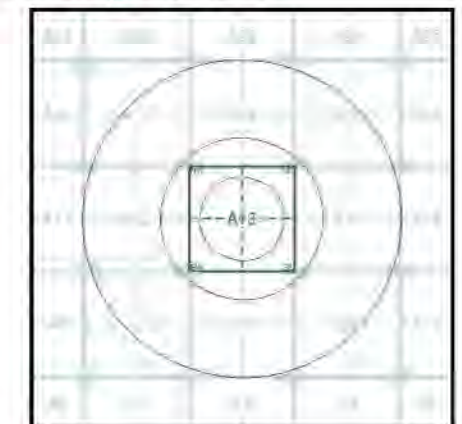
General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point

Agency and Hydrological (Flood)

-  Extreme Flooding from Rivers or Sea without Defences (Zone 2)
-  Flooding from Rivers or Sea without Defences (Zone 3)
-  Area Benefiting from Flood Defence
-  Flood Water Storage Areas
-  Flood Defence

Flood Map - Slice A

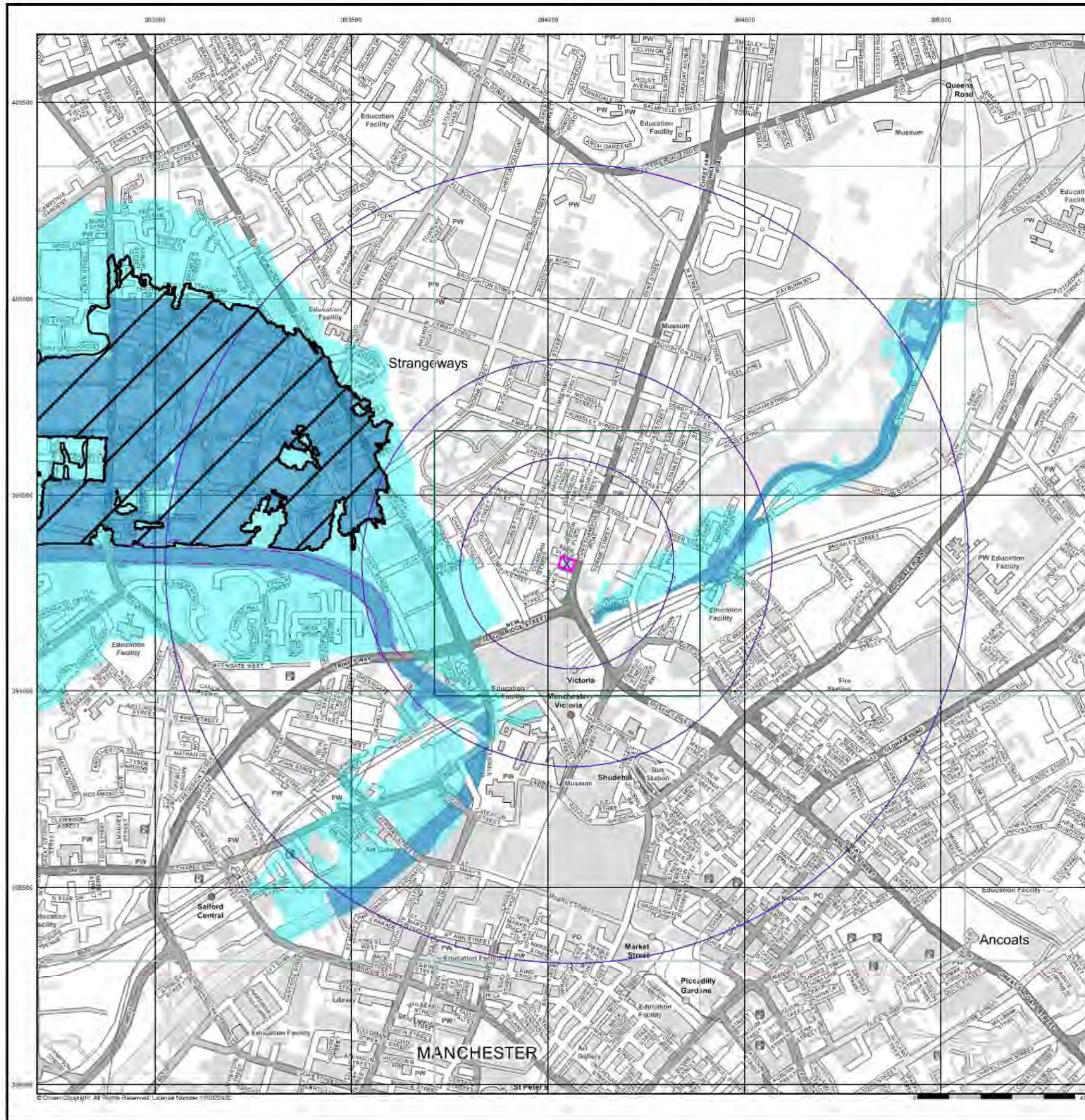


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

Site at 384048,399326



General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Map ID
-  Several of Type of Location

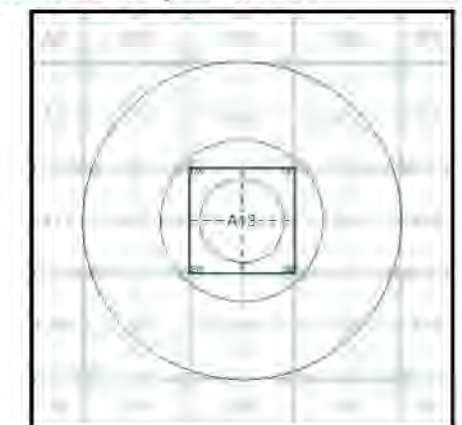
Agency and Hydrological (Boreholes)

-  BGS Borehole Depth 0 - 10m
-  BGS Borehole Depth 10 - 30m
-  BGS Borehole Depth 30m +
-  Confidential
-  Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A

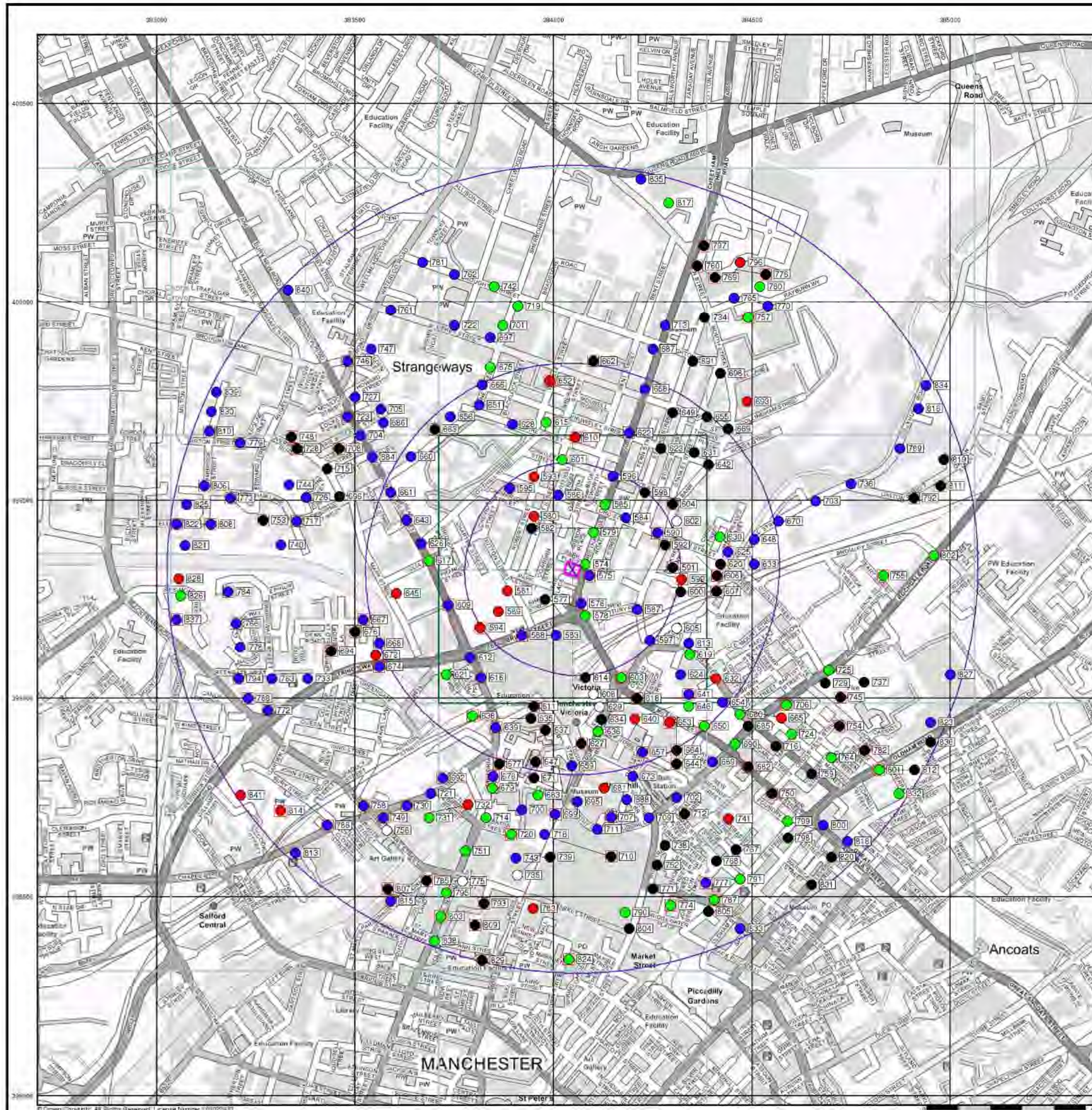


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

Site at 384048,399326



General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point

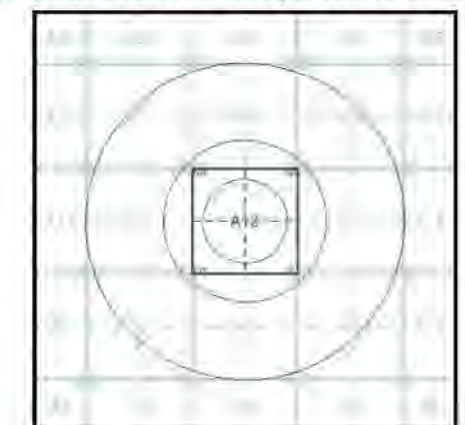
OS Water Network Data

- | | |
|--|---|
|  Canal |  Drain |
|  Reservoir |  Other |
|  Foreshore |  Lake |
|  Marsh |  Transfer |
|  Tidal River |  Lock Or Flight Of Locks |
|  Inland River |  Sea |

Contours (height in meters)

- Standard Contour   Mean Low Water
- Master Contour   Mean High Water
- Spot Height 

OS Water Network Map - Slice A

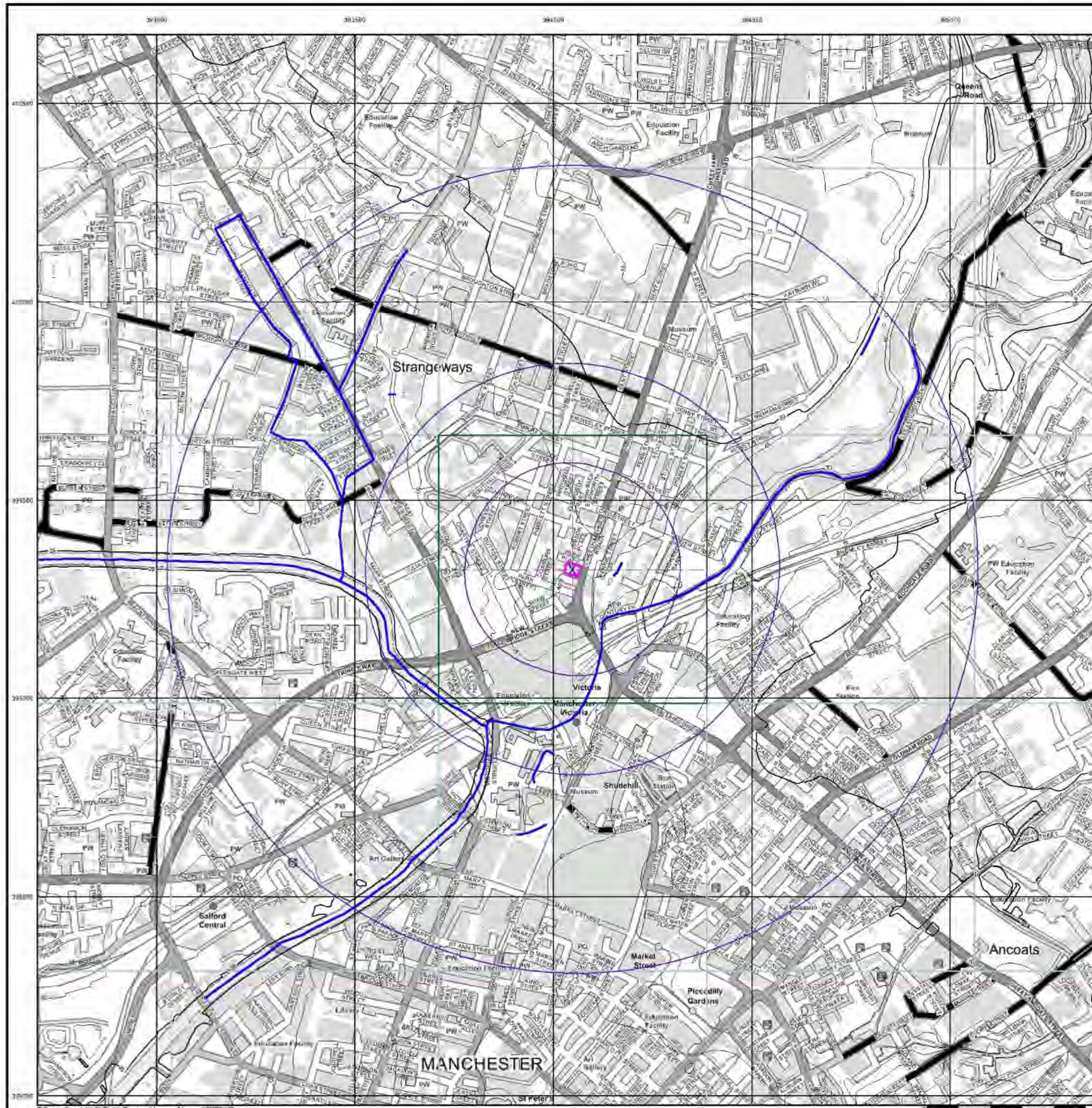


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

Site at 384048,399326



General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point

Risk of Flooding from Surface Water

-  High - 30 Year Return
-  Medium - 100 Year Return
-  Low - 1000 Year Return

Suitability

See the suitability map below:

-  National to county
-  County to town
-  Town to street
-  Street to parcels of land
-  Property

EANRW Suitability Map - Slice A

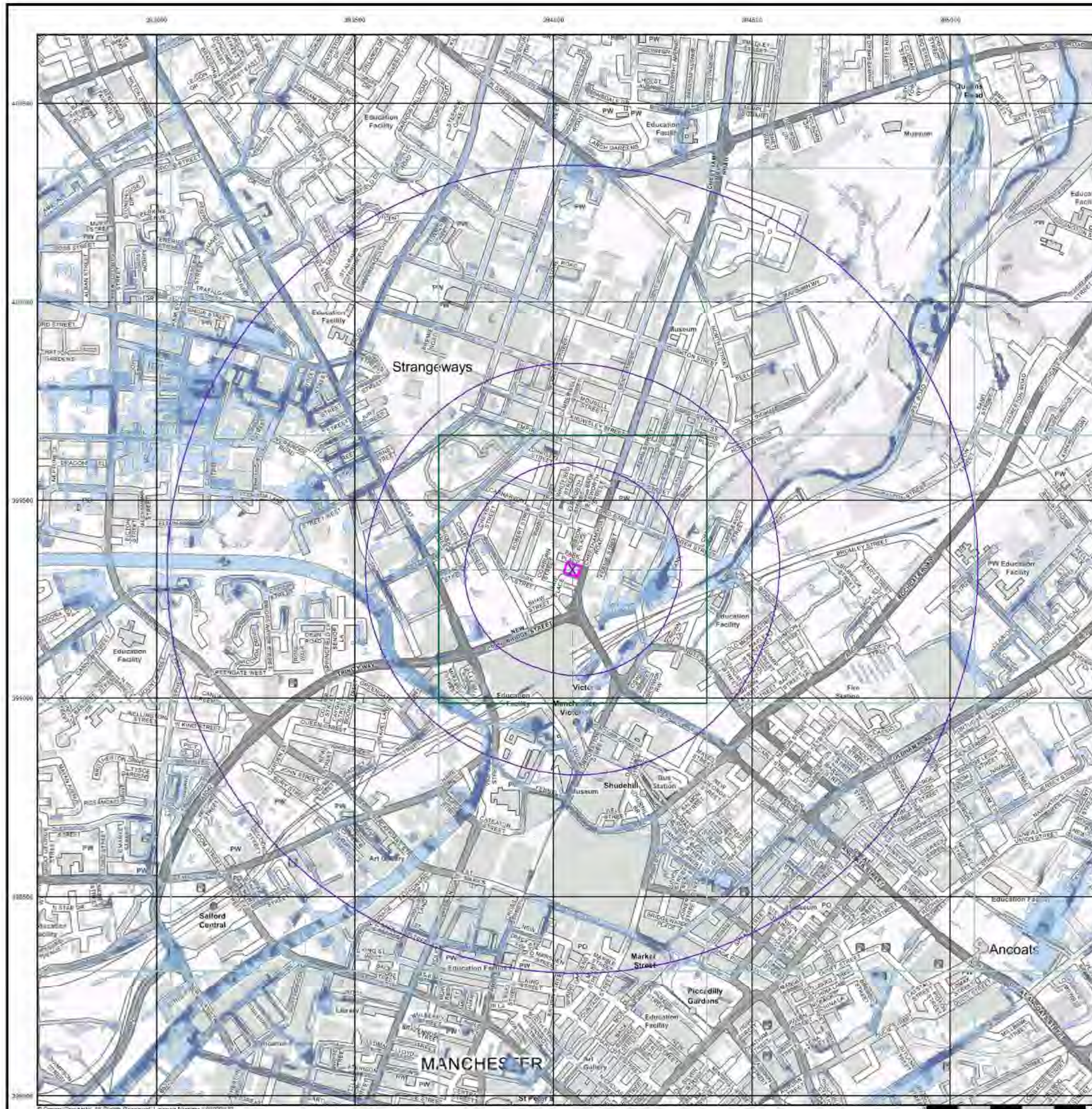


Order Details

Order Number: 315643938_1_1
 Customer Ref: 7241
 National Grid Reference: 384050, 399330
 Slice: A
 Site Area (Ha): 0.11
 Search Buffer (m): 1000

Site Details

Site at 384048,399326



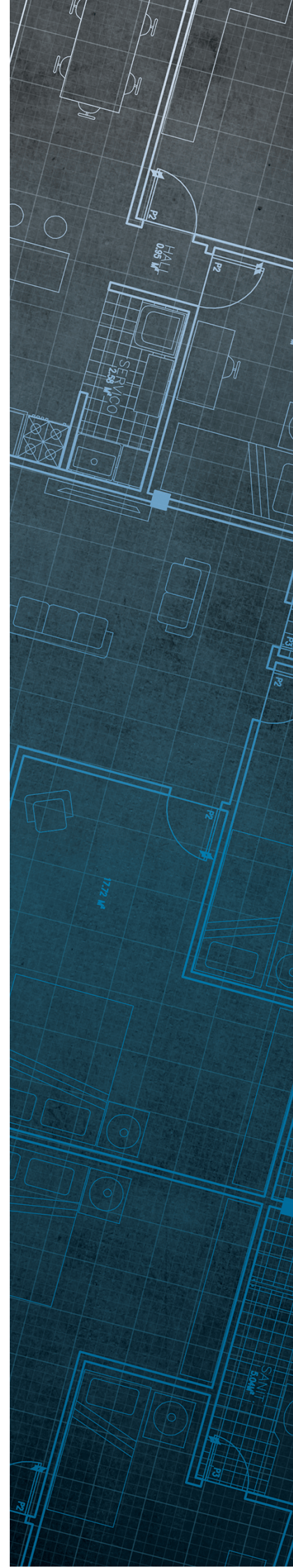


The Coal
Authority

Consultants Coal Mining Report

Site At 384048,399326
Greater Manchester

Date of enquiry:	15 August 2023
Date enquiry received:	15 August 2023
Issue date:	15 August 2023
Our reference:	51003372802001
Your reference:	315643938_3



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

NLIS Hub

Enquiry address

Site At 384048,399326
Greater Manchester

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

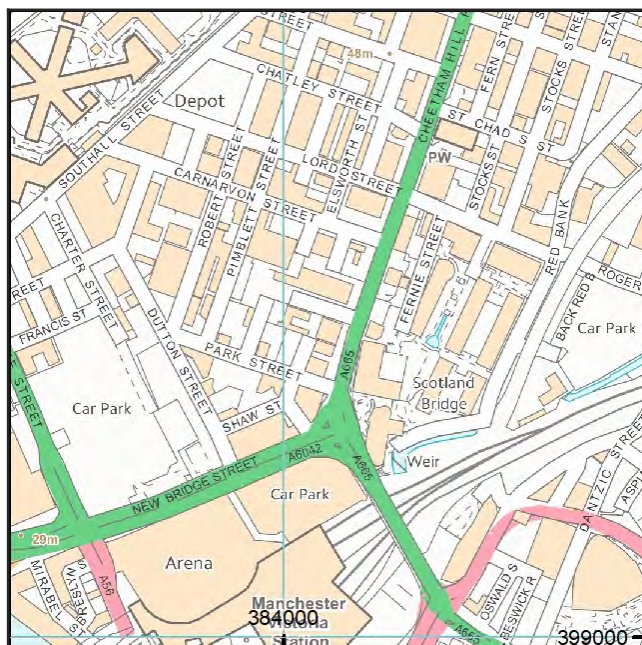
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

No past mining recorded.

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

None available.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

Based on the responses in this report, no further information has been highlighted.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

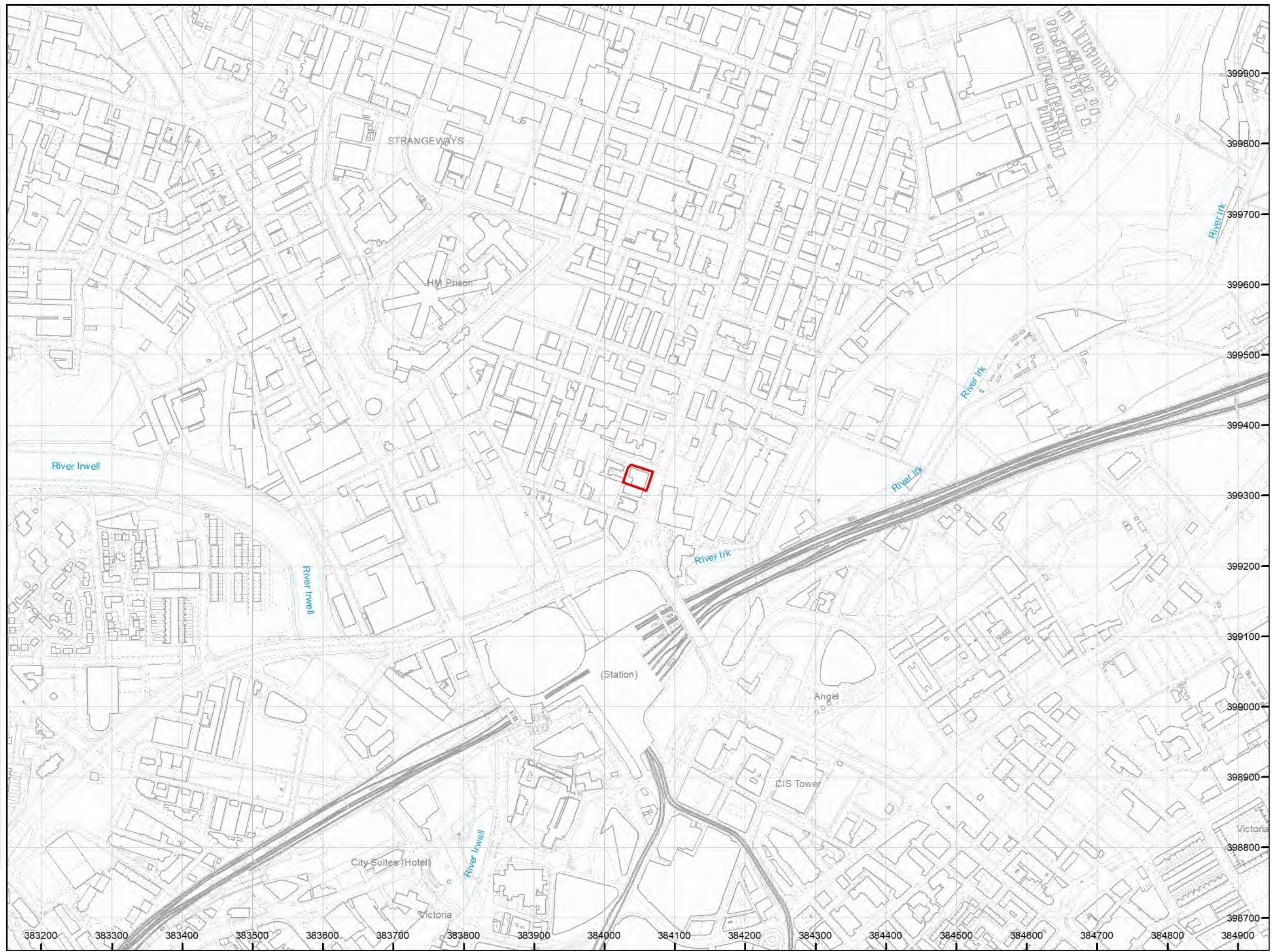
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

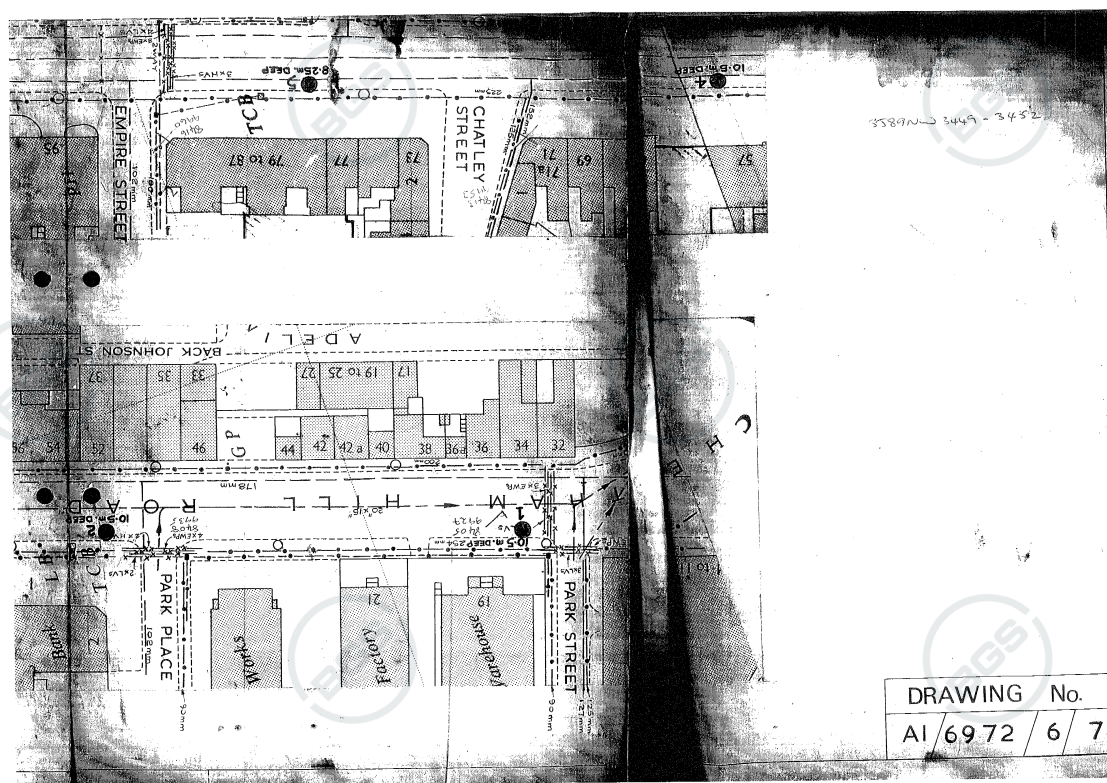
Approximate position of the enquiry boundary shown 

How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com





Sampling		Properties			Strata SI 8409 9931 SI 89NW 495							
Depth	Type	Strength kN/m ²	w %	SPT N	Description	Depth	Level	Legend				
GL - 1.00	B				MADE GROUND: Very loose dark brown very silty gravelly sand and brick and rubble, occasional clayey pockets.	GL	42.25					
1.00-1.45	C			5								
1.00-2.70	B											
2.00-2.45	C			4								
2.70-3.15	B				MADE GROUND: Soft dark orange brown and grey silty very sandy CLAY. Occasional brick fragments and much rootlet material.	2.70	39.55					
3.15-3.65	U(18)	17	40									
3.80-4.30	U(75)	130	15		Stiff dark orange brown silty slightly sandy slightly gravelly fissured CLAY (fine gravel) trace grey mottling on fissures. Occasional partings of fine orange brown very silty sand with depth.	3.80	38.45					
4.40	D											
4.60-5.10	U(75)											
5.20	D											
5.60-6.10	U(55)	30	21		Soft becoming firm to stiff below 5.60m with occasional dark grey sandy silty clay lenses.							
6.20	D											
6.60-7.10	U(65)	75	16									
					End of Borehole.	7.10	35.15					
Drilling					Ground Water							
Type	From	To	Size	Fluid	Struck	Behaviour	Sealed	Date	Hole	Cased	Water	
Shell and Auger	GL	7.10	0.15	-	Nil			22.7.87	7.10	4.00	-	
Remarks												
Borehole Record					Project City of Manchester, Manchester and Salford Inner Relief Route Jubilee Street to Cheetham Hill Road.				Contract E6531/4			
exploration associates									Borehole 1 Sheet 1 of 1			



MANCHESTER CITY COUNCIL
CITY ENGINEER AND SURVEYORS DEPARTMENT

558944 3450
8408 9934

SITE INVESTIGATION FOR MAIN DRAINAGE				DATE COMMENCED 16.2.83					
LOCATION CHEETHAM HILL ROAD REF. 83/2				BORING METHOD CABLE PERCUSSIVE					
BOREHOLE N° 2				BORING DIAMETER 150mm					
GRID REFERENCE SJ 9934684080.				SCALE:					
DATE	CASING DEPTH (m)	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW GL	REDUCED LEVEL	DESCRIPTION	N° AND TYPE OF SAMPLE	SAMPLE DEPTH / PENETRATION FROM TO	N° OF BLOWS	LEGEND
16.2.83			0.1		H.R.A.				
			0.15		CONCRETE				
			0.25		SETTS				
			0.45		CONCRETE				
			0.50		SAND				
			1.20		Clayey, Ashes, stones, bricks etc. Made ground.	D1	0.6		
			1.30		Grey silty clay - made ground				
			1.95		Firm grey/brown silty clay with root and organic inclusions	U1	1.5	1.95	
16.2.83	4.50	Dry			Stiff and very stiff brown silty and sandy CLAY with stone inclusions and grey fissures in upper zone.	D2	2.0		
						U2	2.50	2.95	
						D3	3.0		
						U3	3.5	3.95	
						D4	4.0		
						U4	4.5	4.95	
						D5	5.0		
						U5	5.5	5.95	
						D6	6.0		
						U6	6.5	6.95	
						D7	7.0		
17.2.83		Dry				U6	7.5	7.95	
						D8	8.0		
						U8	8.5	8.95	
17.2.83	9.0	Dry				D9	9.0		
						U9	9.5	9.95	
						D10	10.0		
17.2.83	9.0	Dry	10.95			U11	10.5	10.95	

WATER OBSERVATIONS DURING BORING				WATER LEVEL IN CASSED / UNCASSED BOREHOLE ON COMPLETION		
DEPTH OF WATER ENTRY (m)	ESTIMATED SEE PAGE	STANDING LEVEL (m)	DEPTH OF CASING WHEN SEALED (m)	DATE	WATER LEVEL	DEPTH OF CASING
None						

SAMPLE TEST KEY	D - DISTURBED SAMPLE	B - BULK SAMPLE	U - UNDISTURBED SAMPLE
	S - SPT SAMPLE	W - WATER SAMPLE	

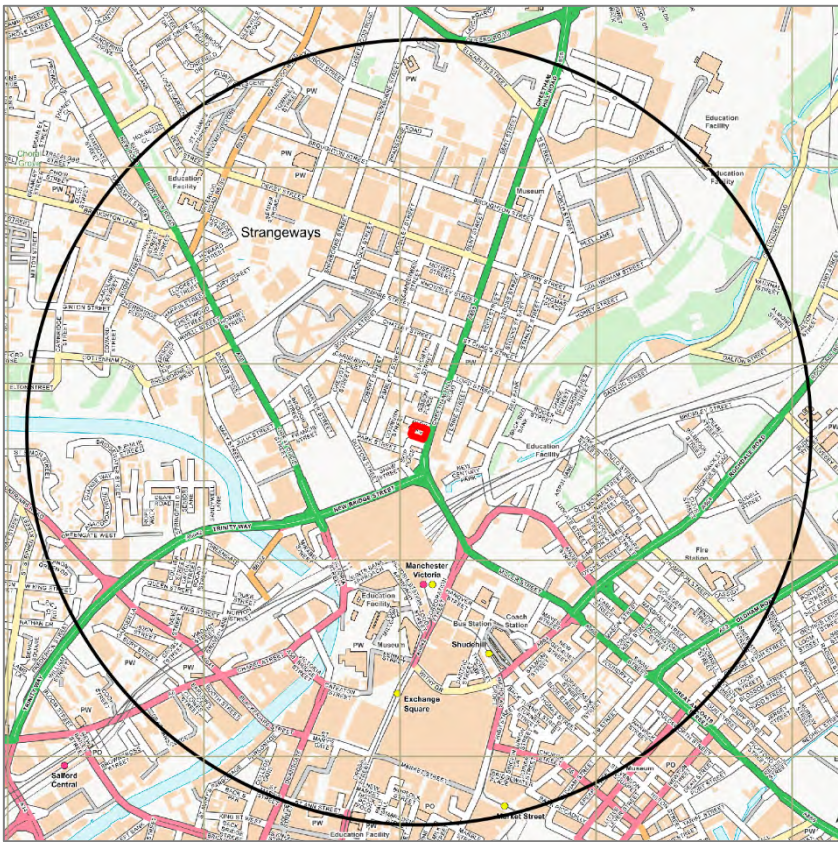
NOTE: WHERE FULL 0.3 PENETRATION HAS NOT BEEN ACHIEVED, THE NUMBER OF BLOWS FOR THE QUOTED PENETRATION IS GIVEN (NOT N-VALUE)

ALL DEPTHS AND REDUCED LEVELS IN (m) UNLESS OTHERWISE STATED.

REMARKS
 Trial hole excavated to 1.0m
 Borehole backfilled on completion, no final overnight water level observed.

Detailed Unexploded Ordnance (UXO) Threat & Risk Assessment

Meeting the requirements of CIRIA C681 ‘Unexploded Ordnance (UXO)
A guide for the Construction Industry’ Risk Management Framework



6 ALPHA PROJECT NUMBER	10757	ORIGINATOR	B. Skoulding
LANDMARK ORDER NUMBER	315643938_2	REVIEWED BY	B. Wilkinson
CLIENT REFERENCE	7421	RELEASED BY	L. Gregory
PROJECT	Park Place	DATE	24 th August 2023
UXO RISK RATING	HIGH – This Study Site requires further action to reduce risk to ALARP during intrusive activities.		



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FIGURES

- Figure One - Study Site Location
- Figure Two - Study Site Boundary
- Figure Three - Aerial Photography (Current)
- Figure Four - WWII High Explosive Bomb Density
- Figure Five - WWII Luftwaffe Bombing Targets
- Figure Six - WWII Consolidated Bomb Strikes



Acronyms and Abbreviations

AA	Anti-Aircraft	NEQ	Net Explosive Quantity
AAA	Anti-Aircraft Ammunition	NFF	National Filling Factory
ALARP	As Low As Reasonably Practicable	NGR	National Grid Reference
AOD	Above Ordnance Datum	OD	Ordnance Datum
ARP	Air Raid Precaution	OS	Ordnance Survey
AXO	Abandoned Explosive Ordnance	PM	Parachute Mine
BD	Bomb Disposal	PoW	Prisoner of War
BDO	Bomb Disposal Officer	RADAR	Radio Detection And Ranging
bgl	Below Ground Level	RAF	Royal Air Force
BGS	British Geological Survey	RN	Royal Navy
BH	Borehole	RNAS	Royal Naval Air Service
BPD	Bomb Penetration Depth	ROF	Royal Ordnance Factory
CDP	Cast Driven Piles	SAA	Small Arms Ammunition
CFA	Continuous Flight Auger	TA	Territorial Army
CIRIA	Construction Industry Research and Information Association	TNT	Trinitrotoluene
CPT	Cone Penetration Testing	UK	United Kingdom
CS	County Series	UN	United Nations
EO	Explosive Ordnance	USAAF	United States Army Air Force
EOC	Explosive Ordnance Clearance	UXB	Unexploded Bomb
EOD	Explosive Ordnance Disposal	UXO	Unexploded Ordnance
GI	Ground Investigation	V Weapons	<i>Vergeltungswaffen</i> – Vengeance Weapons
GIS	Geographic Information Systems	WD	War Department
GL	Ground Level	WWI	World War One
GP	General Purpose	WWII	World War Two
GPS	Global Positioning Systems		
HAA	Heavy Anti-Aircraft		
HE	High Explosive		
HO	Home Office		
HSE	Health and Safety Executive		
IB	Incendiary Bomb		
kg	Kilograms		
km	Kilometres		
LAA	Light Anti-Aircraft		
LCC	London County Council		
LE	Low Explosive		
LSA	Land Service Ammunition		
m	Metres		
MoD	Ministry of Defence		
mm	Millimetres		



EXECUTIVE SUMMARY

Study Site

The Client has defined the Study Site as “Site at 384048, 399326” and it is centred on NGR 384050, 399330.

Risk Level

HIGH

Potential Threat Sources

The most probable UXO threat is posed by WWII-era *German* HE bombs, whilst IBs and *British* AAA projectiles (which were used to defend against *German* bombing raids) pose a residual threat.

Risk Pathway

Given the types of UXO that might be present on-site, all types of aggressive intrusive engineering activities may generate a significant risk pathway.

Key Findings

During WWII, the Study Site was situated within *Manchester County Borough*, which recorded six HE bomb strikes per 100 hectares, a “very low” level of bombing.

Luftwaffe aerial reconnaissance photography and target mapping did not identify the Study Site itself as a primary bombing target but numerous such targets were documented in the Site’s immediate vicinity. The closest of these were *Victoria Railway Station* (65m south-east of the Site) and *Exchange Railway Station* (210m south-west) as primary bombing targets.

ARP records associated with the Study Site did not document any HE bomb strikes within the Study Site; though an IB strike was recorded in the centre of the Study Site, with others recorded 20m north/north-east on the opposite side of *Park Place*. A total of at least 63 HE bomb strikes were also recorded impacting within 1,000m of the Study Site during WWII, with the closest dropped 95m west-north-west of the Site on *Pimblett Street* close to the junction with *Park Street*.

Official bomb damage mapping associated with the Study Site evidences that the Site sustained damage as a consequence of the aforementioned IB bomb strike. Further damage is depicted from both IB and HE bomb strikes within a close proximity to the Study Site. Such damage was specifically inflicted upon buildings in *Park Place* (20m north-north-east of the Site), *Park Street* (approximately 80m south-west), on *Carnavon Street/Bright Street* (100m to the north-west) and between *Robert Street* and *Wood Street* (150m west-north-west) where evidence of both HE and IB bomb strikes is indicated.

The CS mapping prior to WWII (1933 & 1938) and post-WWII aerial photography shows that the Study Site was located within a developed urban area during WWII and consisted of a synagogue during WWII. Therefore, it is likely that footfall within the Study Site would have been relatively high. However, given that bomb damage was recorded on-site and in the immediate vicinity, it is possible that bomb damage debris may have concealed a UXB entry hole causing it to have gone unnoticed.

The buildings currently located on-site appear to have been built between 1945 and 1953, and was then expanded southwards between 1986 and 1989. The hardstanding surrounding the existing building may have been laid pre-WWII but this could not be confirmed. Consequently, it is considered likely that any UXO within post-war disturbed and developed ground would potentially have been discovered and removed. However, the potential for deep buried UXO to be present within any remaining areas of undisturbed ground is assessed to be extant.

Given the Study Site and its immediate vicinity was subjected to bombing and sustained bomb damage during WWII, combined with the potential for the proposed works to encounter ground not previously disturbed since WWII below ground level, the following risk mitigation measures are recommended as a minimum in order to reduce risks ALARP during intrusive works in **all previously undisturbed ground** (i.e., that which has not previously been excavated, probed, drilled or otherwise intrusively disturbed since it was potentially contaminated with UXO).



EXECUTIVE SUMMARY (...continued)

Recommended Risk Mitigation Measures Overview

“Open” Intrusive Works

Engineering Methodology	UXO Emergency Response Plan	UXO Safety and Awareness Briefing	On-Call EOD Engineer	Non-Intrusive Magnetometer Survey	EODE Watching Brief	Intrusive Magnetometer Survey	UXO Risk Rating (Post-Mitigation)
Trial Pits	✓	✓	✗	✗	✓	✗	ALARP
Excavations	✓	✓	✗	✗	✓	✗	

“Blind” Intrusive Works

Engineering Methodology	UXO Emergency Response Plan	UXO Safety and Awareness Briefing	On-Call EOD Engineer	Non-Intrusive Magnetometer Survey	EODE Watching Brief	Intrusive Magnetometer Survey	UXO Risk Rating (Post-Mitigation)
Boreholes	✓	✓	✗	✗	✗	✓	ALARP

A full and detailed guide to the recommended risk mitigation measures is presented at Section 5 of this report.

For further information, please contact 6 Alpha Associates:

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ASSESSMENT METHODOLOGY

Approach

6 Alpha Associates is an independent, specialist risk management consultancy practice, which has assessed the prospective UXO risk at this Study Site by employing a process advocated by *CIRIA*. The *CIRIA* guide for managing UXO risks in the construction industry (C681) not only represents industry best practice but has also been endorsed by the UK's *HSE*. *6 Alpha* were the lead technical author of the *CIRIA* C681 guide.

UXO hazards can be identified through the investigation of local and national archives associated with the Study Site, *MoD* archives, local historical sources, historical mapping as well as contemporary aerial photography (where it is available). Prospective hazards will have only been recorded if there is specific information that could reasonably place them within the boundaries of the Study Site. The amalgamation of information is then assessed within a Semi-Quantitative Risk Assessment (as per industry best practice outlined in *CIRIA* C681) in order to form the basis of a proportional UXO risk mitigation strategy in circumstances where the SQRA evidences that further action is necessary in order to reduce the UXO risk at the Study Site.

The assessment of UXO risk is a measure of the probability of UXO encounter and initiation and the consequence of an inadvertent UXO initiation; the former being a function of the identified hazard and proposed development methodology and the latter being a function of the type of hazard and the proximity of personnel (and/or other 'sensitive receptors', such as equipment) to the hazard. UXO risk is thus calculated using the following formula:

$$\text{Risk (R)} = \text{Probability (P)} \times \text{Consequence (C)}$$

If intolerable UXO risks are identified, the methods of mitigation we have recommended are considered reasonable and sufficiently robust to reduce them to ALARP. We advocate the adoption of the ALARP legal principle because it is a key factor in efficiently and effectively ameliorating UXO risks. It also provides a ready means for assessing the Client's tolerability of UXO risk. In essence, the principle states that if the cost of reducing a risk significantly outweighs the benefit, then the risk may be considered tolerable. This does not mean that there is never a requirement for UXO risk mitigation, but that any mitigation must demonstrate that it is beneficial. Any additional mitigation that delivers diminishing benefits and that consume disproportionate time, money and effort are considered *de minimis* and thus unnecessary. Because of this principle, UXB and UXO risks will rarely be reduced to zero (nor need they be).

Important Notes

Although this report is up to date and accurate at the time of writing, *6 Alpha's* UXO threat databases are continually being populated and updated as and when additional information becomes available. Nonetheless, *6 Alpha* have exercised all reasonable care, skill and due diligence in providing this service and producing this report.

The assessment levels are also based upon our professional opinion and have been supported by our interpretation of historical records and third-party data sources. Wherever possible, *6 Alpha* has sought to corroborate and to verify the accuracy of all data we have employed, but we are not accountable for any inherent errors that may be contained in third party data sets (e.g., *National Archive* or other library sources), and over which *6 Alpha* cannot exercise control.



STAGE ONE – STUDY SITE LOCATION AND DESCRIPTION

Study Site

The Client has defined the Study Site as “Site at 384048,399326”. The Study Site is centred at NGR 384050, 399330 as presented at *Figures 1 and 2* respectively.

Location Description

The Study Site is situated within the *City of Manchester* and totals an area of 0.10 hectares (ha).

Furthermore, the Study Site is bounded by:

- North: *Carnarvon Street*;
- East: *Cheetham Hill Road*;
- South: A multi-storey structure and a small area of hardstanding;
- South-West: A multi-storey structure and a small area of hardstanding.

Aerial Photography (Current) (*Figure 3*)

Current aerial photography corroborates the information above and shows that the Study Site is situated within a densely developed urban area. The Study Site itself consists of an industrial structure surrounded by small areas of hardstanding.

Proposed Works

The Client has described the following:

- “*Medium Trial Pit between 1m and 5m below ground level*;
- *Two boreholes to 30m depth and six to 3m depth*;
- *Excavation Depth: 30m.*”

Ground Conditions

It is important to establish the specific ground conditions in order to determine the maximum *German UXB* penetration depth as well as the potential for other types of munitions to be buried.

If the site investigations and/or construction methodologies change, and/or if a specific methodology is to be employed, and/or if the scope of work is focused upon a specific part of the Study Site, then *6 Alpha* are to be informed so that the prospective UXO risks and the associated risk mitigation methodology might be re-assessed. Certain ground conditions may also constrain certain types of UXO risk mitigative works e.g., magnetometer survey is adversely affected in mineralised and made ground.

The Client has described the ground conditions as follows:

“Till (likely stiff gravelly clay) with Chester Formation (sandstone) at depth. The nearest archive exploratory hole to the site indicates around 1.5 (possibly up to 4m) of made ground overlying stiff and very stiff sandy and gravelly clay.”

It is important to establish the provenance of made ground, where this is recorded as being part of the ground make-up, in order to accurately determine the ground levels at the time when UXO contamination may have occurred so as to accurately determine the average/maximum bomb penetration depths and subsequently to make appropriate recommendations aimed at reducing the risk to ALARP.



STAGE ONE – STUDY SITE LOCATION AND DESCRIPTION (...continued)

Ground Conditions

BGS borehole log “SJ89NW3450 - CHEETHAM HILL ROAD SEWER REPLACEMENT 2” (located immediately north-east of the Study Site), recorded the following strata:

Depth bgl (m)	Strata	Description
0.00m to 0.10m	Made Ground	H.R.A
0.10m to 0.15m	Made Ground	Concrete
0.15m to 0.25m	Made Ground	Setts
0.25m to 0.40m	Made Ground	Concrete
0.40m to 0.90m	Fill	Bricks, ash, clay, stones etc.
0.90m to 9.40m	Clay	Stiff and very stiff brown silty and sandy CLAY with stone inclusions and lenses and bands of silty and sand.
9.40m to 10.5m	Sand	Very dense brown SAND with carbonaceous shale and coal inclusions.



STAGE TWO – REVIEW OF HISTORICAL DATASETS

Sources of Information Consulted

The following primary information sources have been used in order to establish the background UXO threat:

1. *6 Alpha's Azimuth Database*;
2. *Home Office WWII Bomb Census Maps*;
3. *WWII and post-WWII aerial photography*;
4. *Official Abandoned Bomb Register*;
5. *Manchester County Borough Bomb Damage maps*;
6. Information gathered from the *National Archives at Kew*;
7. Historic UXO information provided by *33 Engineer Regiment (Explosive Ordnance Disposal)* at *Carver Barracks, Wimbish*.

Potential Sources of UXO Contamination - Overview

In general, there are several activities that might have contaminated a site with UXO, but the three most common ways are: legacy munitions from military training/exercises; deliberate or accidental dumping (AXO) and ordnance resulting from war fighting activities (also known as the Explosive Remnants of War (ERW)).

During WWII, the *Luftwaffe* undertook bombing campaigns all over the *UK* and although the *Luftwaffe* had designated primary bombing targets across the *UK*, their high-altitude night bombing was not accurate. There was also a period of indiscriminate bombing of civilian and industrial areas alike in *British* cities in an attempt to cripple the morale of the *British* people. As a result, thousands of buildings were damaged across industrial and residential areas and civilian fatalities were common. Bombs were also jettisoned over opportunistic targets and more rural locations were also attacked in this manner.

As the threat of invasion lingered over *Britain* during WWII, defensive actions were undertaken. The *British* and *Allied Forces* requisitioned large areas of land for military training and bomb storage (including HE bombs, naval shells, artillery and tank projectiles, explosives, LSA and SAA). Thousands of tonnes of these munitions were used for the *Allied Forces* weapon testing and military training alone. It has been estimated that at least 20 per cent of the *UK's* land has been used for military training at some point.

The most common type of UXO discovered today in the *UK* is the aerially delivered high explosive (HE) bomb, which are comparatively thick-skinned and were dropped from *Luftwaffe* aircraft. If the bomb did not detonate when it was dropped, the force of impact enabled the UXO to penetrate the ground, often leaving behind it a UXB entry hole. These entry holes were not always apparent, and some went unreported, leaving the bomb buried and unrecorded. *British* AXO/LSA/SAA is also commonly encountered in areas that were formerly occupied by military forces (such as RAF airfields, military camps and/or military training areas). More rarely, additional forms of *German* UXO are occasionally discovered including *inter alia* Incendiary Bombs (IBs), and Anti-personnel (AP) bomblets and fragments of V1 and V2 rockets.

"The best practice guide for dealing with your UXO risks on land" (CIRIA publication C681) suggests that approximately 10 per cent of all munitions deployed during WWII failed to function as designed. ERW are therefore, still commonly encountered, especially whilst undertaking construction and civil engineering groundwork.

Furthermore, in exceptional circumstances, UXO is discovered unexpectedly and without apparent rational explanation. There are several ways this might occur:

- When *Luftwaffe* aircraft wished to swiftly escape e.g., from an aerial attack, they would jettison some or all of their bombs and flee. This is commonly referred to as *tip and run* and it has resulted in bombs being found in unexpected locations;
- Transportation of aggregate containing munitions to an area that was previously free of UXO, usually related to construction activities employing material dredged from a contaminated offshore borrow site;
- *British* decoy sites were also constructed to deliberately cause incorrect targeting. For obvious reasons, such sites were often built in remote and uninhabited areas – few historical records concerning these sites are available.



WWII Bombing of Manchester

Manchester's importance to the *British* war economy as an inland port, industrial centre, and aircraft manufacturer, meant the city and surrounding area represented a significant bombing target for the *Luftwaffe*. The first air raids occurred during August 1940 and continued until 1942.

The *Luftwaffe* bombing campaign of *Manchester* peaked between the 22nd and the 24th December 1940 (the *Manchester* (or *Christmas*) *Blitz* as it was colloquially known and involved over 400 aircraft delivering more than 460 tons of HE bombs and 37,000 IBs. An estimated 684 people were killed, and a further 2,364 people were injured.

Manchester continued to be bombed throughout the war and on the 24th December 1944 V1 rockets were launched towards the city.

WWII HE Bomb Density (Figure 4)

The Study Site was located within *Manchester County Borough*, which recorded six HE bombs per 100 hectares, a “very low” level of bombing.

WWII Luftwaffe Bombing Targets (Figure 5)

Prior to WWII, the *Luftwaffe* conducted numerous aerial photographic reconnaissance missions over *Britain*, recording key military, industrial and commercial targets for attack, in the event of war. In addition, logistics infrastructure and public services, such as railways, canals, power stations, reservoirs, water and gas works were also considered viable bombing targets.

Luftwaffe aerial reconnaissance photography and target mapping associated with the Study Site identified both *Victoria Railway Station* (located 65m south-east of the Study Site) and *Exchange Railway Station* (210m south-west) as primary bombing targets in the Site. Furthermore, the *Henry Wallwork and Co Iron Foundry and Machine Works* (215m east) and a *Gas Works* (500m east) were recorded as additional primary targets. Aerial photography revealed that further railway works (670m south-east and 950m south-west) were also designated as primary bombing targets during WWII.

WWII HE Bomb Strikes (Figure 6)

During WWII, ARP wardens compiled detailed logs of bomb strikes across their respective districts. ARP records associated with the Study Site did not document any HE bomb strikes within the Study Site; though an IB strike was recorded in the centre of the Study Site, with others recorded 20m north/north-east on the opposite side of *Park Place*. A total of at least 63 HE bomb strikes were also recorded impacting within 1,000m of the Study Site during WWII, with the closest dropped 95m west-north-west of the Site on *Pimblett Street* close to the junction with *Park Street*.

In addition to IBs and HE bomb strikes, during the latter part of the war when aerial bombing had significantly declined, the main threat came from V type weapons. V1 and V2 rockets were thin-skinned, unmanned and inaccurate weapons. Despite this, there is no evidence to suggest that the Study Site (or its immediate vicinity) was subjected to rockets strikes during WWII.

One Unexploded Bomb (UXB) was additionally recorded 950m south of the Study Site. The potential penetration depth of an UXB was dependent on a number of factors including but not restricted to those prior to striking the ground e.g. velocity and orientation of the UXB which in turn will be influenced on factors such as the release altitude from the aircraft and encounters with infrastructure during its fall; those encountered at the point of impact i.e. was the impact on concrete, grass, water etc. and finally, the below ground level conditions which were encountered such as infrastructure e.g. services, basements, foundations, and geology e.g. made ground, clay, sand, etc. Further, as the UXB penetrated the ground, it's velocity naturally slowed where, it either came to an abrupt stop e.g., against foundations or would continue for 10's of feet along a route of least resistance which often resulted in a curving of the trajectory back towards the surface. This is known as the “J Curve” effect and often resulted in a considerable horizontal off-set from the point of entry. This is often the reason why UXBs have been discovered against or under the foundations of buildings, which were present during WWII, or many meters from the point of impact.



WWII Bomb Damage

An analysis of official bomb damage mapping associated with the Study Site evidences that the Site sustained damage as a consequence of the aforementioned IB bomb strike. Further damage is depicted from both IB and HE bomb strikes within a close proximity to the Study Site. Such damage was specifically inflicted upon buildings in *Park Place* (20m north-north-east of the Site) *Park Street* (approximately 80m south-west), on *Carnavon Street/Bright Street* (100m to the north-west) and between *Robert Street* and *Wood Street* (150m west-north-west) where evidence of both HE and IB bomb strikes is indicated.

Moreover, the significant degree of bomb damage sustained in the Site's immediate vicinity particularly is further corroborated by an analysis of post-WWII mapping and aerial photography which records a number of "ruins" and/or demolished structures in the immediate vicinity.

Abandoned Bombs

An examination of the official abandoned bomb records has not identified any abandoned bombs on-site nor within 1,000m.

Records of WWII UXB Disposal Tasks

An examination of pertinent historical records listing UXBs dealt with in *Manchester County Borough* from 1940-45 has identified the following task within the Study Site's vicinity:

- One UXB was recorded 950m north of the Study Site on WWII bomb strike mapping. However, further information was unavailable.

Nonetheless, records of UXB disposal tasks during WWII are known to be incomplete, some having been destroyed by *Luftwaffe* action during WWII.

Military Activity

There is no evidence to suggest that the Study Site has previously been occupied by military personnel. Therefore, it is considered unlikely that munitions were previously stored, located and/or fired from this Study Site during WWII. An analysis of *Luftwaffe* records suggests that the *Henry Wallwork and Co Iron Foundry and Machine Works* may have been involved in the production of munitions during WWII. However, further supplementary research could not corroborate this. Whilst the possibility cannot be ruled out at this stage, there is no evidence to suggest that the Study Site itself was involved in munitions production and therefore, it munitions production is not likely to have generated a UXO contamination threat at the Study Site.

WWII Site Use

The CS mapping prior to WWII (1933 & 1938) and post-WWII aerial photography shows that the Study Site was located within a developed urban area during WWII and consisted of a synagogue during WWII. Therefore, it is likely that footfall within the Study Site would have been relatively high and as a result, a local civilian/resident/employee would likely have observed and reported any clearly visible UXB entry holes within the Study Site (which would have been dealt with at the time). However, given that bomb damage was recorded on-site and in the immediate vicinity, it is possible that bomb damage debris may have concealed a UXB entry hole causing it to have gone unnoticed.

Post-WWII UXO Encounters

An examination of the post-WWII BDO tasks associated with the Study Site has not identified any BDO operations within the Study Site itself, nor within 1,000m of its boundary.

Sources of UXO Contamination

Given the historic military activity documented at the Study Site, the most likely source of UXO contamination is German aurally delivered ordnance, which ranges from small IBs through to large HE bombs. Additional residual contamination may be present from British AAA projectiles (which were used to defend the UK against German bombing raids).



Post-WWII Study Site Development

Generally, the probability of encountering UXO in ground that has been disturbed since it may have been contaminated with UXO is considered to be remote (up to the depth below ground level previously disturbed by any intrusive works). Therefore, an understanding of the Study Site's previous development history is crucial when assessing the likelihood that UXO might be encountered at the Study Site.

Study Site Development History

From an analysis of the CS and OS historical mapping associated with the Study Site, the following history can be deduced:

Year	Analysis
1892 CS Map	The Study Site was located within a densely populated urban area. The Site itself consisted of a <i>Synagogue</i> .
1902 CS Map	Changes were not recorded at the Study Site.
1933 CS Map	Changes were not recorded at the Study Site.
1938 CS Map	Changes were not recorded at the Study Site.
1951-52 OS Map	The <i>Synagogue</i> appears to have been demolished and cleared (potentially as a result of bomb damage sustained during WWII) and a <i>Hall</i> had been built in the centre of the Site.
1966-79 OS Map	The Study Site was utilised as <i>Works</i> . No changes were recorded to the structure's footprint.
1980-86 OS Map	Changes were not recorded at the Study Site.
1989 OS Map	The existing <i>Works</i> structure had been extended southwards across more of the Study Site.
1990-94 OS Map	<i>Works</i> to the east of the Study Site were demolished.
2000 Aerial Photography	Changes were not recorded at the Study Site.
2017 Aerial Photography	Changes were not recorded at the Study Site.
2023 Aerial Photography	Changes were not recorded at the Study Site.

The Study Site history assessment is our best interpretation of the data available at the time of writing. Given that yearly revisions of neither CS and OS mapping, nor aerial photography, are available for analysis, there are gaps between the mapping revisions.

Consequently, it should not be assumed that any new structures and/or features that are labelled on a map revision were constructed, developed, installed or demolished in the exact year that the mapping illustrates the change. It is possible – and indeed likely – that the exact date of development occurred somewhere between the two closest mapping revisions. Specifically, this may be particularly relevant where there is a gap between pre and post-WWII mapping, as it may not be clear whether structures were present during WWII or if they were constructed in the post-WWII period.



STAGE THREE – DATA ANALYSIS

Variable	Result	Comment
Was the area considered to be a primary bombing target during WWII?	✓	Multiple primary bombing targets were recorded in the area; the closest was <i>Victoria Railway Station</i> (65m south-east of the Site).
Was the Study Site or the immediate area bombed during WWII?	✓	One IB bomb was dropped on-site, with multiple others dropped in the immediate vicinity. Significant HE bombing was also recorded, with the closest strike documented 95m north-west of the Site.
Did the Study Site or the immediate area experience bomb damage?	✓	Official bomb damage mapping recorded damage on-site, with significant damage also sustained in the Site's immediate vicinity.
Would munitions have been manufactured, stored and/or fired from the Study Site previously?	✗	There is no evidence to suggest munitions were located or fired from this Study Site.
Was the ground undeveloped during WWII?	✗	The Study Site was located in a densely developed urban area and consisted of a synagogue.
Would the footfall have been high in the area?	✓	Given that the Site comprised of a synagogue within a densely developed urban setting during WWII, it would likely have been accessed frequently.
Would a UXB entry hole have been observed during WWII?	✗	Given that bomb damage was recorded on-site and nearby, it is possible that bomb damage debris could have masked or otherwise obscured a UXB entry hole.
Has UXO been encountered previously at the Study Site?	✗	There have been no documented post-WWII encounters at the Site.
Have previous intrusive works removed the potential for UXO to be present?	✗	It is likely that any UXO within post-war disturbed and developed ground would potentially have been discovered and removed. The potential for a UXO encounter in areas of undisturbed ground remains extant.
Are proposed intrusive works likely to extend into previously undisturbed ground?	✓	Areas of the Study Site have remained undeveloped since WWII and therefore the proposed works may extend into previously undisturbed ground.
Is there potential for an unplanned encounter with UXO to occur during proposed intrusive works?	✓	Given that bomb strikes and bomb damage were recorded both on-site and within a close proximity, it is considered possible for an unplanned encounter with UXO to occur.
Does the probability of a UXO encounter vary across the Study Site?	✓	The probability of encountering UXO within post-war disturbed and developed ground is considered to be remote. However, the probability of a UXO encounter within all previously undisturbed areas of the Study Site is extant.

N.B. The ✓ / ✗ symbology is intended to act only as a succinct visual indicator as to whether the data analysis has returned a positive (i.e. ✓) or negative (✗) answer to each question concerning the potential for UXO contamination at the Study Site.



STAGE FOUR – UXO RISK ASSESSMENT

Threat Items

The most probable UXO threat items are *German* HE bombs, whilst IBs and *British* AAA projectiles pose a residual threat. The consequences of initiating *German* HE bombs are generally more severe than initiating IBs or AAA projectiles, and thus they pose the greatest prospective risk to intrusive works.

Bomb Penetration Depth

Considering the ground conditions (highlighted in Stage 1), the average BPD for a 250kg *German* HE bomb within clays is assessed to be approximately 7m bgl, with the maximum BPD considered to be approximately 16m bgl. Although it is possible that the *Luftwaffe* deployed larger bombs in the area, their deployment was infrequent, and to use such larger (or the largest) bombs for BPD calculations are not justifiable on either technical or risk management grounds. WWII *German* bombs have a greater penetration depth when compared to IBs and AAA projectiles, which are unlikely to be encountered at depths greater than 1m bgl. However, due to the “J Curve” and the potential for structures to impede the penetration into the ground, HE bombs have been discovered at much shallower depths than the average.

Risk Pathway

Given the types of UXO that might be present on-site, all types of aggressive intrusive engineering activities (i.e., investigative groundworks and construction methodologies) may generate a significant risk pathway. Whilst not all UXO encountered aggressively will initiate upon contact, such a discovery could lead to serious impact on the project especially in terms of critical injury to personnel, damage to equipment and project delay.

Prospective Consequences

Consequences of an inadvertent UXO initiation may include:

1. Fatalities or serious injuries to personnel;
2. Severe damage to plant and equipment;
3. Deliver blast and fragmentation damage to nearby buildings;
4. Rupture and damage underground utilities/services.

Consequences of an inadvertent UXO discovery may include:

1. Delay to the project and blight;
2. Disruption to local community/infrastructure;
3. The expenditure of additional risk mitigation resources and EOD clearance;
4. Incurring additional time and cost.

UXO RISK CALCULATION

Site Activities

Although there is some variation in the probability of encountering and initiating items of UXO when conducting different types of intrusive activities, a number of ground intrusive methodologies have been described for analysis at this Study Site. The consequences of initiating UXO vary greatly, depending upon, *inter alia* the mass of HE in the UXO and how aggressively it might be encountered. For this reason, *6 Alpha* has conducted separate risk rating calculations for each intrusive methodology that might be employed.

Risk Rating Calculation

6 Alpha's Semi-Quantitative Risk Assessment assesses and rates the risks posed by the most probable threat items when conducting a number of different activities on the site. UXO risk is determined by calculating the probability of encountering and initiating UXO and the consequences of an inadvertent UXO detonation.



UXO Risk Calculation Table – All Areas

Activity	Threat Item	Probability (SH+EM=P)	Consequence (D+PSR=C)	UXO Risk (PxC=R)
Trial Pits (up to 5m bgl)	HE Bombs	2+2=4	3+3=6	4x6=24
	AAA Projectiles	1+2=3	3+1=4	3x4=12
	IBs	2+2=4	3+1=4	4x4=16
Boreholes (between 3m and 30m bgl)	HE Bombs	2+3=5	3+2=5	5x5=25
	AAA Projectiles	1+3=4	3+1=4	4x4=16
	IBs	2+3=5	3+1=4	5x4=20
Excavations (up to 30m bgl)	HE Bombs	2+2=4	3+3=6	4x6=24
	AAA Projectiles	1+2=3	3+1=4	3x4=12
	IBs	2+2=4	3+1=4	4x4=16

Abbreviations – Site History (SH), Engineering Methodology (EM), Probability (P), Depth (D), Consequence (C), Proximity to Sensitive Receptors (PSR) and Risk Rating (RR).



STAGE FIVE – RECOMMENDED RISK MITIGATION MEASURES

Mitigation Measures to Reduce Risk to 'ALARP'

Activity	Risk Mitigation Measures	Final Risk Rating
All Activities in All Areas	1. Operational UXO Emergency Response Plan; appropriate site management documentation should be held on-site to guide and plan for the actions which should be undertaken in the event of a suspected or real UXO discovery (this plan can be supplied by <i>6 Alpha</i>); 2. UXO Safety & Awareness Briefings; the briefings are essential when there is a possibility of explosive ordnance encounter and are a vital part of the general safety requirement. All personnel working on the site should receive a briefing on the identification of a UXB, what actions they should take to keep people and equipment away from such a hazard and to alert site management. Information concerning the nature of the UXB threat should be held in the site office and displayed for general information on notice boards, both for reference and as a reminder for ground workers. The safety awareness briefing is an essential part of the <i>Health & Safety Plan</i> for the site and helps to evidence conformity with the principles laid down in the <i>CDM regulations 2015</i> (this brief can be delivered directly, or in some cases remotely, by <i>6 Alpha</i>).	ALARP
Trial Pits and Excavations into Previously Undisturbed Ground	3. EOD Engineer in the Watching Brief Role; Where “open” intrusive works into previously undisturbed ground are proposed, an EOD Engineer should be present in the UXO Watching Brief role to monitor ongoing “open” intrusive works to identify any suspicious items that may be UXB or UXO related (this service can be provided by <i>6 Alpha</i>).	
Boreholing into Previously Undisturbed Ground	4. Intrusive UXO Survey; Where “blind” intrusive works into previously undisturbed ground are proposed, an intrusive UXO survey (employing down-hole magnetometer or MagCone techniques) is strongly recommended. Such a survey should extend to the <i>assessed average bomb penetration depth</i> or to the maximum depth of the works, whichever is encountered first, or until geology is encountered through which it is assessed a UXB would not penetrate, to identify for signs of sub-surface anomalies which may model as the target UXO in advance of said works. (this service can be provided by <i>6 Alpha</i>).	

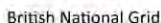
This assessment has been conducted partially based on the information provided by the Client, should the proposed works change then *6 Alpha* should be re-engaged to refine this risk assessment



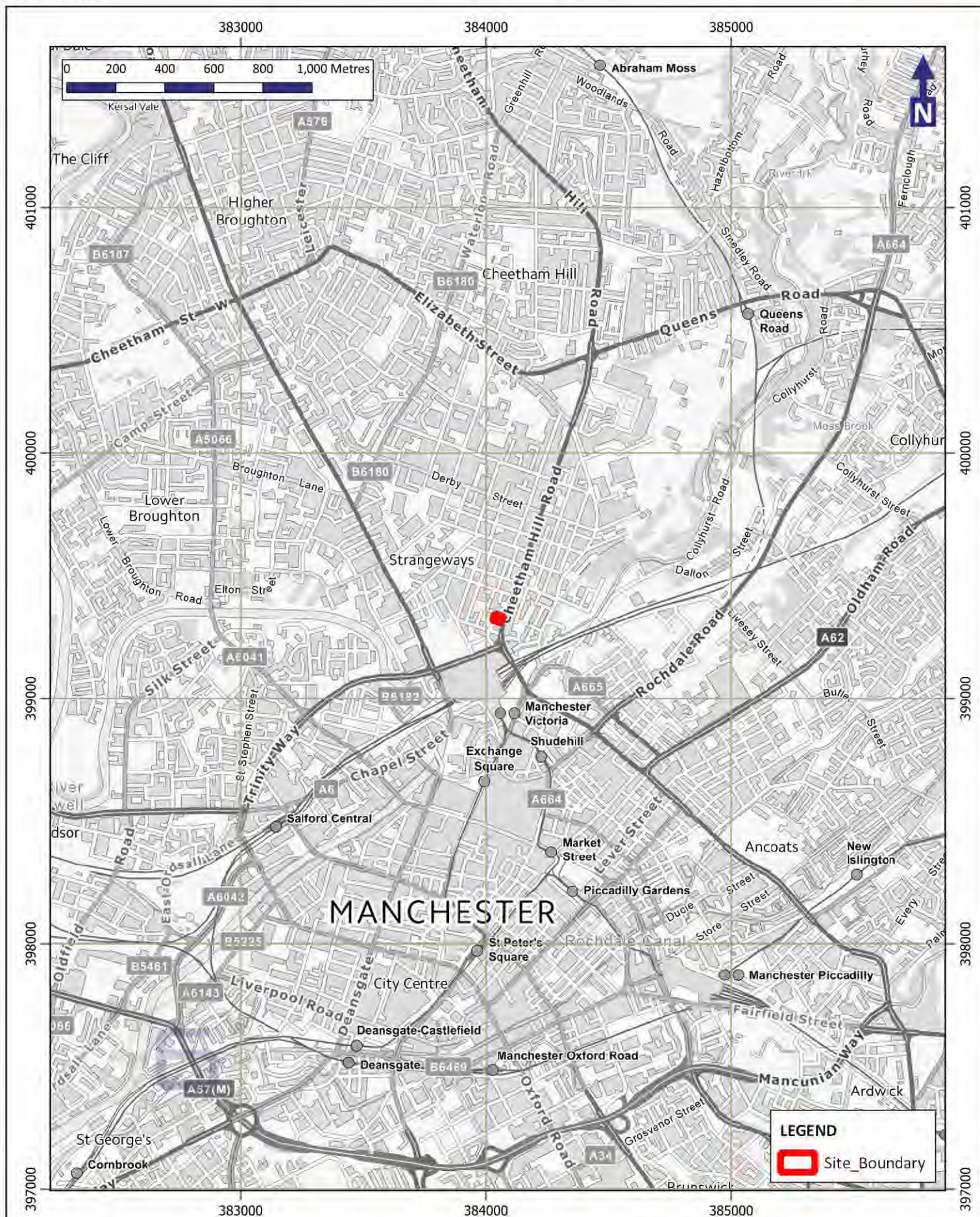
Report Figures



Figure One - Study Site Location



Site Location



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10757	1	LH	LG	17/08/2023			



Figure Two - Study Site Boundary



British National Grid

SITE AT 384048,399326



Site Boundary

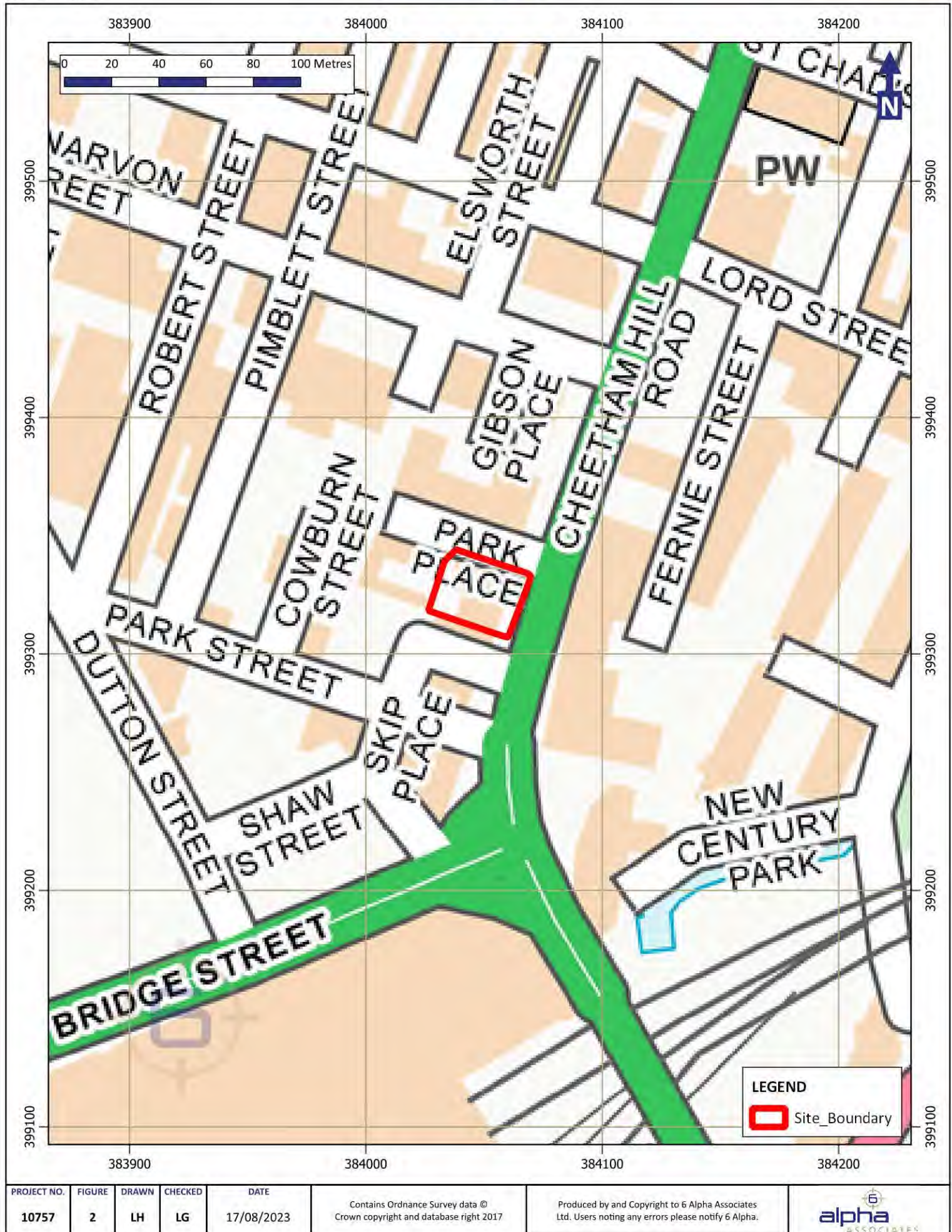




Figure Three - Aerial Photography (Current)

Aerial Photography (Current)



PROJECT NO.	FIGURE	DRAWN	CHECKED	DATE	Map data: Google, The GeoInformation Group, Infoterra Ltd, Bluesky, Getmapping plc	Produced by and Copyright to 6 Alpha Associates Ltd. Users noting any errors please notify 6 Alpha.	alpha ASSOCIATES
10757	3	LH	LG	17/08/2023			



Figure Four - WWII High Explosive Bomb Density

WWII High Explosive Bomb Density

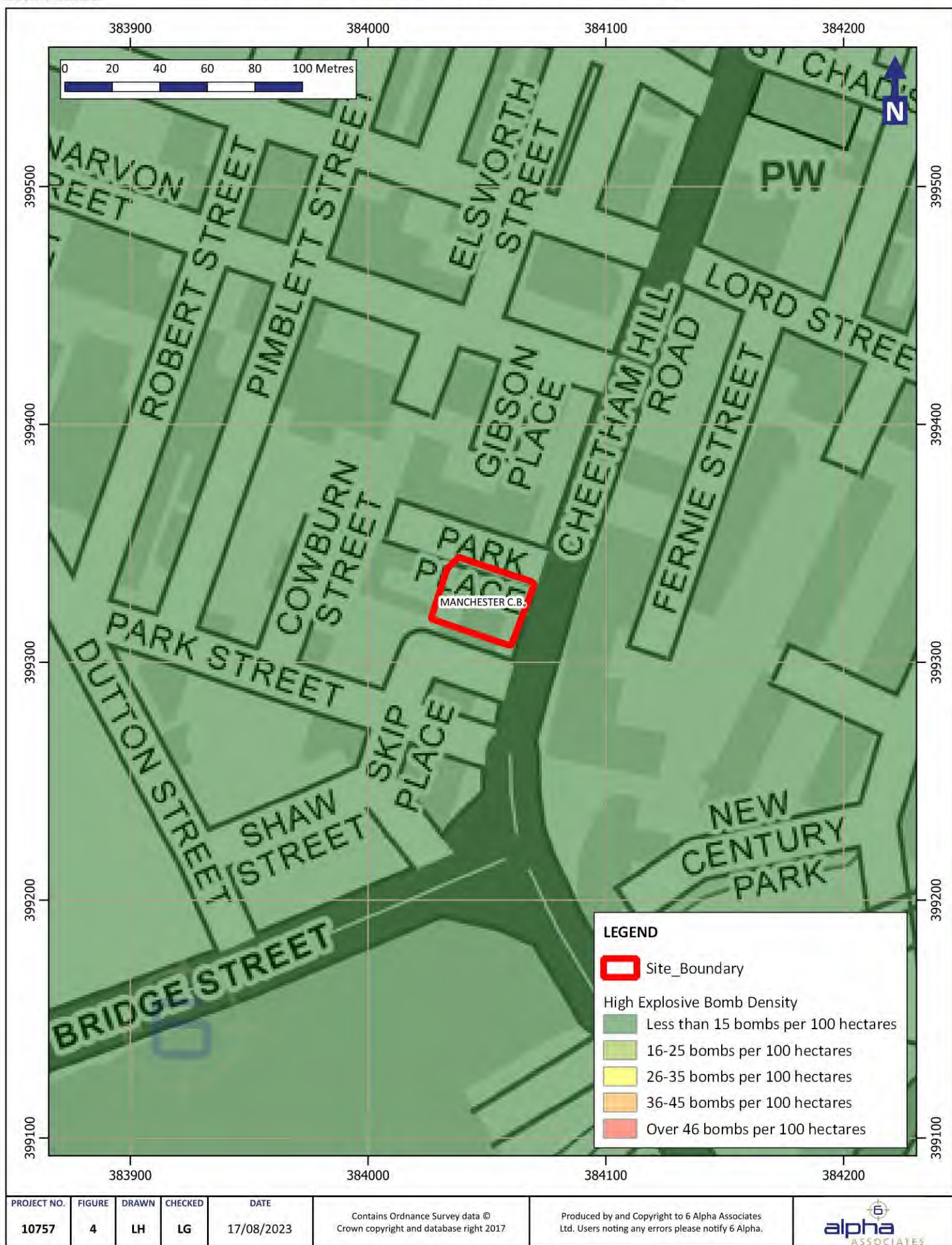




Figure Five - WWII Luftwaffe Bombing Targets



British National Grid

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WWII Luftwaffe Bombing Targets

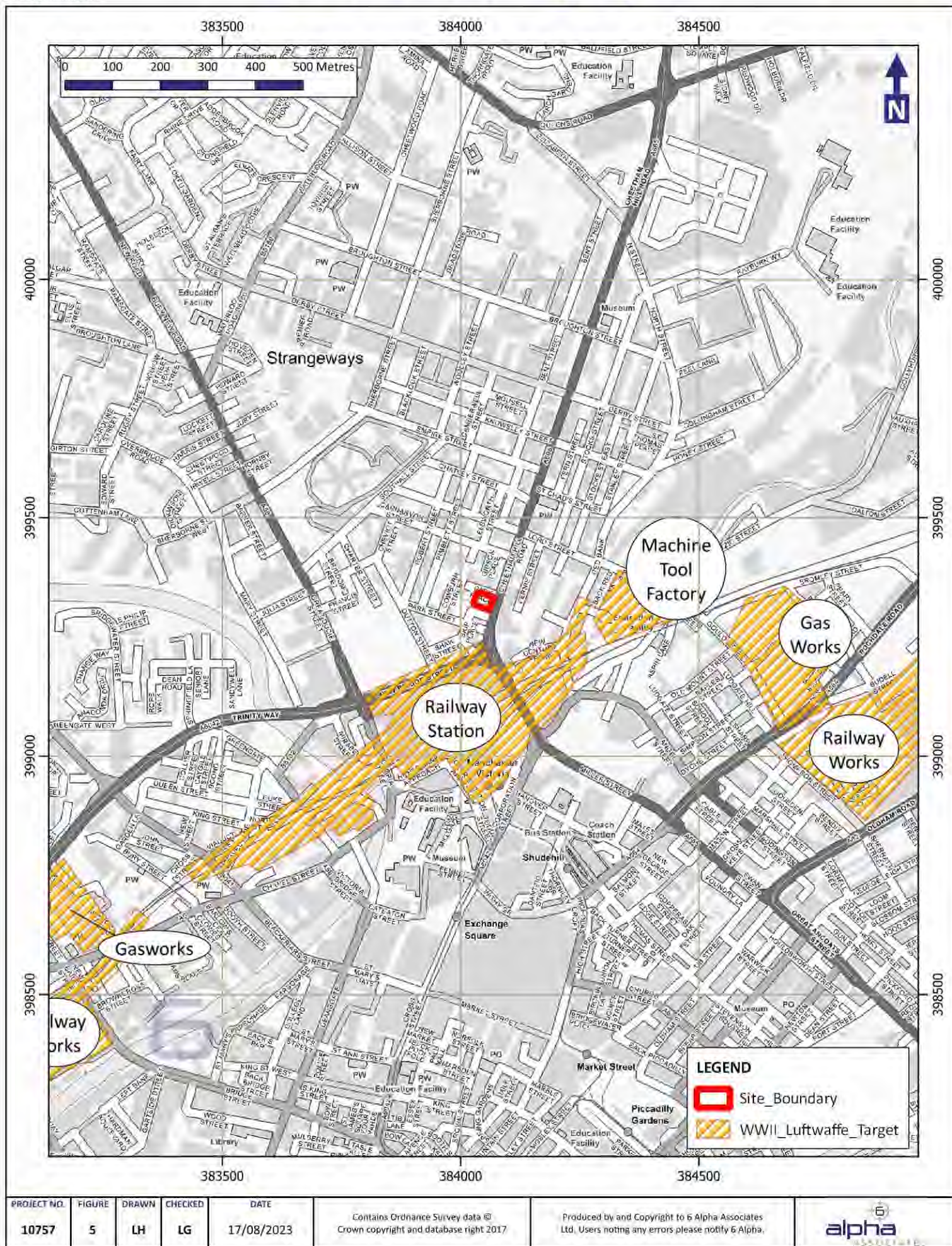




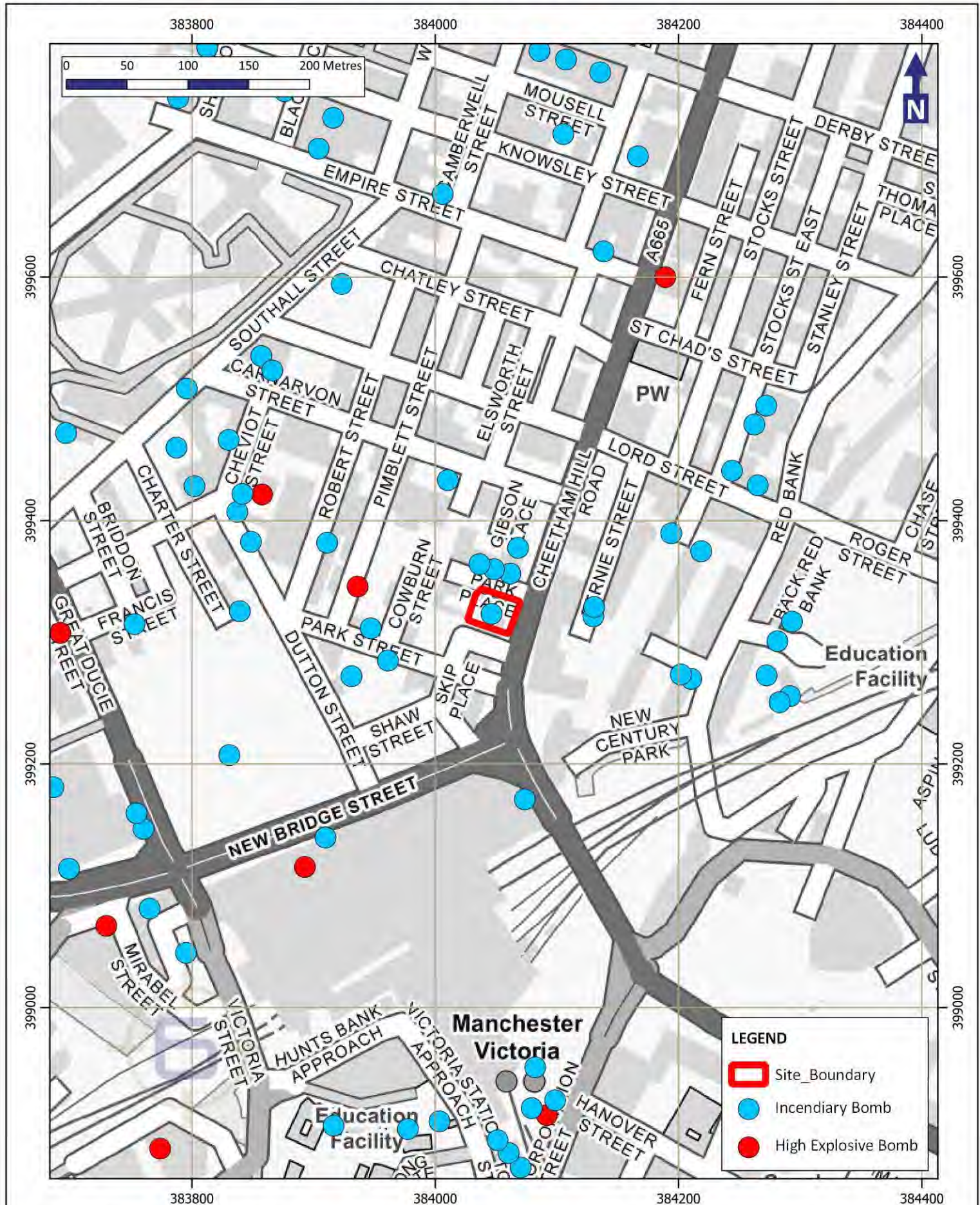
Figure Six - WWII Consolidated Bomb Strikes



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WWII Consolidated Bomb Strikes



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