MURRAY RIX

CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

PROPOSED NEW SELF STORAGE BUILDING
16-18 HYDE ROAD
MANCHESTER
M12 6AW

PHASE II GEO-ENVIRONMENTAL INVESTIGATION AND RISK ASSESSMENT

PREPARED FOR:

CROWN ADVISORY
11 VIRGIL STREET
MANCHESTER
M15 6AW

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UKAS TESTING 1380

EXECUTIVE SUMMARY

Site Address	Proposed New Self Storage Building 16-18 Hyde Road, Manchester M12 6AW.	
Grid Reference	NGR 385431 E, 396989 N	
Site Area	Approximately 0.29 Ha	
Current Site Use	The site is currently used as a car sales forecourt.	
Proposed Development	The proposed development will compromise a New Self Storage Building, Bin Store and Car Park.	
Environmental Setting	**Drift Geology**	Till, Devensian - Diamicton
	Bedrock Geology	Chester Formation
	Hydrogeology	Drift - Secondary Undifferentiated Aquifer, Bedrock – Principal Aquifer
	Hydrology	No watercourses have been identified within 250m of the site.
	Flood Risk	The site is not located within a flood risk zone
Site History	1848 & 1851 SITE Buildings associated with Hyde Road House are present in the northern and southern parts of the site. A pump is located in the central northern area. Gardens are present to the south of the northern buildings. Ardwick Hall and associated grounds are to the immediate north beyond Hyde Road. SURROUNDING AREA Ardwick Villa, Apsley House and Apsley Place within 100m to the west. Open ground to the south. Ardwick Cemetery c.100m northeast of the site. 1891 SITE Hyde Road House has been demolished and replaced by a Drill Shed which dominates the central and eastern areas. The pump is no longer shown. SURROUNDING AREA Residential and commercial building development to the east and south of the site. 1889-1893 SITE No significant change. SURROUNDING AREA Union Carriage Works and Corporation Works c.200m south. 1908 SITE The Drill Shed building has extended into the south western corner of the site. SURROUNDING AREA No significant change. 1922 SITE No significant change. SURROUNDING AREA The onsite Drill Shed has extended to the immediate west. Engraving Works c.150m north. The Carriage Works 200m to the south has become a saw mill. 1948-49 SITE No significant change. SURROUNDING AREA Methylated Spirit Works c.80m north east. Paint and Varnish Works c.100m north east. Waterproof Garment Works c.90m north.	

	1950-54 SITE TA Centre depicted on site together with a war memorial in the north east corner. SURROUNDING AREA Automobile Works c.50m north west. 1969-74 SITE War memorial no longer present and several buildings demolished. SURROUNDING AREA Depot c.10m east. Residential properties to the south and east demolished. Automobile Works now a Clothing Works. 1974-76 SITE Drill Shed replaced by a sports centre. SURROUNDING AREA Increased demolition of buildings in the general area. 1984-89 SITE No change. SURROUNDING AREA Depot to the east demolished and replaced with a playground. 2023 SITE Buildings onsite demolished. SURROUNDING AREA No significant change.
Utility Locations	A Formal drainage survey has not been completed.
Landfill Sites and Ground Gases	There are no records of historic landfill sites located within 250m of the site.
Radon	Groundsure Radon check indicates the site is not in a Radon affected area, however comments made in the phase 1 should be considered, further clarification maybe required.
Coal Mining Land Stability	See Phase 1 risk assessment included in Appendix C
Brine Workings	The site is not located within areas identified as subject to the abstraction of Brine, Gypsum, Tin or Clay.
Hazardous Installations	No Hazardous installations that could potentially prejudice the proposed construction of a commercial development have been identified.

SITE INVESTIGATION

Ground Investigation Works	Murray Rix has completed an intrusive investigation comprising continuous flight auger boreholes and environmental monitoring installations.
Ground Conditions	**MADE GROUND GL-2.90m bgl** Made Ground was encountered in all exploratory hole locations to a maximum proven depth of 2.90m bgl (TP 1). Made Ground encountered was generally seen as Asphalt Surfacing, Concrete Slab, clayey brick rubble fill with some clinker, dark silty clay fill with brick fragments and clay fill with brick fragments.
	Drift 0.80 – 2.8m bgl Drift deposits were encountered within all exploratory locations to a proven depth of 2.80m bgl. The drift deposits generally comprised orange brown and or dark brown silty and or sandy Clay to depths of between 0.80 and 2.80m.

	SOLID – 2.00 – 6.00 m bgl Solid bedrock geology was encountered during the ground investigation in all boreholes. The bedrock was seen to be weathered to a depth of between 3.20 and 4.00m bgl.
	GROUNDWATER Groundwater was not encountered during the intrusive ground investigation works.

CONTAMINATED LAND ASSESSMENT

Human Health	The preliminary Tier 1 Human Health risk assessment has identified the presence of asbestos fibres in BH's 1 and 2 quantified as 0.002% in borehole 1 and <0.001% in borehole 2. No further contaminants of concern were found in the twenty number samples tested, including Speciated hydrocarbons, based upon the long-term protection of human health for a commercial end use. Therefore, one primary exposure pathway exists; pathway 4 – Dust/asbestos inhalation. Remediation measures will be required in the vicinity of Boreholes 1 & 2 where Asbestos was identified to break the pollutant-pathway-receptor linkage, should these locations not be beneath hardstanding. As asbestos fibres have been identified within the Made Ground, a suitably detailed remediation strategy will be required to document the safe handling, management and placement of all Made Ground so as to ensure that no unacceptable degree of risk is presented to construction workers and / or future site occupants. Additional investigations to delineate and quantify the asbestos may be required to inform the aforementioned strategy. Whilst it is possible that the asbestos contaminated made ground material (once delineated and segregated from other non-contaminated fill materials) will be allowed to remain on site in a suitably designed containment, this should be discussed with the Local Authority Contaminated Land Officer prior to works commencing. It is possible, but unlikely, that as yet unidentified contaminant impact is present within localised hotspots at the site. It is considered that any such contamination could be addressed by the delineation, excavation and treatment of impacted soils, if identified. The site is deemed to pose a very low risk to human health.
Controlled Waters	The site is deemed to pose a low risk to controlled waters.
Ground Gas	A ground gas assessment has not been completed we understand it is intended to incorporate gas protection measures into the building design,

	thus negating the need for ground gas monitoring / assessment. Three number monitoring standpipes have been installed to allow future monitoring to take place if required.
Potable Water Infrastructure	It is considered that the ground poses a low risk to the potable water supply and barrier pipes will not be required but further testing may be required to confirm this.

GEOTECHNICAL ASSESSMENT

Underground Obstructions	Possible buried structures or old foundations have been encountered during the investigation at the following locations BH1
Allowable Bearing Pressure	The underlying natural Sand deposits have been assessed as being dense with a net allowable bearing pressure (ABP) of circa 360 kN/m^2 at 2.00 & 3.00m bgl which generally increases with depth.
Foundation Options	Prior to the detailed design of suitable foundation solutions, a programme of enabling works will be required to cut and fill the site to provide suitable development platform levels. In consideration of the likely loadings and ground conditions it is considered that depending on the load requirements consideration could be given to the use of trench fill or pad foundations for the proposed structure. Consideration could also be given to the use of a Vibro Stone Column ground improvement foundation solution. Further advice should be sought from an experienced Vibro Stone Column contractor. However, the final foundation solution will be dependent on the structural loadings and elevation and should be designed by a suitable qualified structural engineer.
Soakaway Drainage	BRE Special Digest 365 Soakaway infiltration testing was outside the scope of this investigation. However, it would appear that The use of SuDS drainage within the natural ground is not feasible at the site due to the presence of cohesive soils which are capable of low soil infiltration rates.
Sulphate Assessment	Concrete classification will be DS1 AC1s.
CBR Design %	Outside the scope of this investigation.
Cut Fill	Development levels unknown at this time.
Civil Engineering Excavations	Buried structures or old foundations have been encountered during the investigation at the following locations Trial Pits 4, 4A and 5
Waste Characterisation	Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: Waste Classification – Guidance on the classification and assessment of waste.

RECOMMENDATIONS

Based on the findings of the intrusive investigation, the following additional works are recommended to be completed in due course:

- Plot-specific foundation schedule (upon receipt of the final development levels);
- Geotechnical earthworks survey (infrastructure);
- Remediation Strategy.

Table of Contents

EXECUTIVE SUMMARY			2
1.		INTRODUCTION	8
	1.1.	Background	8
	1.2.	Proposed Development	8
	1.3.	Objectives	8
	1.4.	Limitations	8
	1.5.	Confidentiality	9
	1.6.	Previous Reports	9
2.		GROUND INVESTIGATION	10
	2.1.	General Overview	10
	2.2.	In-Situ Standard Penetration Testing (SPT)	11
	2.3.	In-Situ California Bearing Ratio (CBR)	11
	2.4.	Permeability Tests	11
	2.5.	Laboratory Analysis	11
3.		GROUND AND GROUNDWATER CONDITIONS	12
	3.1.	Summary of Ground Conditions	12
	3.2.	Made Ground	12
	3.3.	Drift Deposits	12
	3.4.	Solid Geology	13
	3.5.	Groundwater	13
	3.6.	Visual and Olfactory Evidence of Contamination	13
	3.7.	Soil Consistency	13
	3.8.	Side Stability and Ease of Excavation	14
	3.9.	Soil Infiltration	18
	3.10.	Soil Plasticity	18
	3.11.	California Bearing Ratio	19
	3.12.	pH and Sulphate	19
	3.13.	Ground Gas	20
	3.14.	Investigation Rationale	20
	3.15.	Monitoring Methodology	20
4.		TIER 1 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT	21
	4.1.	Human Health Risk Assessment	21
	4.2.	Controlled Waters Risk Assessment	24
	4.3.	Potable Water Supply	26
	4.4.	Conceptual Site Model	27

5. GEOTECHNICAL ASSESSMENT 28
5.1. Proposed Development 28
5.2. Summary of Ground Conditions 28
5.3. Site Preparation 28
5.4. Foundation Conditions and Assessment of Potential Bearing Capacities 29
5.5. Concrete Durability 31
5.6. Excavations 32
5.7. Further Works 32
5.8. Construction Activity and Inspection 32

6. CONCLUSIONS AND RECOMMENDATIONS 33
Contaminated Land Assessment 33
Geotechnical Assessment 34

APPENDIX A LIMITATIONS

APPENDIX B GLOSSARY

APPENDIX C PHASE 1 RISK ASSESSMENT (DESK STUDY)

APPENDIX D DRAWINGS

APPENDIX E EXPLORATORY HOLE LOGS

APPENDIX F CHEMICAL TEST RESULTS

APPENDIX G ORIGIN OF TIER 1 GENERIC ASSESSMENT CRITERIA

APPENDIX H GEOTECHNICAL TEST RESULTS

Drawing List MRN 24210-1 – Borehole locations
MRN 24210-2 – Proposed site plan

1 INTRODUCTION

1.1 BACKGROUND

A Phase II Geo-Environmental ground investigation has been commissioned by Crown Advisory, 11 Virgil Street, Manchester M15 4ED (The Client) at Proposed New Self Storage Building 16-18 Hyde Road, Manchester M12 6AW.

1.2 PROPOSED DEVELOPMENT

Murray Rix understands that Crown Advisory are intending to redevelop the client site for a commercial end use.

A proposed development layout has been provided and is shown in Appendix D, we understand the proposed development will compromise a New Self Storage Building, Bin Store and Car Park.

1.3 OBJECTIVES

The objectives of the Geo-Environmental investigation are as follows:

Undertake a preliminary stage of sampling and analysis to provide an overview of environmental issues identified.

Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future end use of the site and in relation to off-site receptors.

Asses the geotechnical information and provide preliminary recommendations in relation to foundations.

Provide recommendations regarding future works required.

1.4 LIMITATIONS

The report is written in the context of an instructed scope of works and budget and should not be used in a different context. New information, improved practices or changes in legislation may require a reinterpretation of the report in whole or in part. Murray Rix (Northern) Ltd reserve the right to amend either conclusions or recommendations in light of any further information that may become available. As with any site there may be differences in soil conditions between exploratory hole positions. See Appendix A for full limitations.

1.5 CONFIDENTIALITY

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

1.6 PREVIOUS REPORTS

A Phase 1 Preliminary Risk Assessment was completed by Groundtech Consulting Limited (Ref: GRO-22366-4225) and the pertinent points of which are summarised below:

The study site is located circa 2 miles south east of Manchester City Centre, and is approximately centred on National Grid Reference 385431, 396989.;

The site is underlain by Superficial Deposits of Till which are classed as a Secondary Undifferentiated Aquifer;

Potentially contaminative operations within 100m of the site include; Petrol Stations, Tanks, Knitwear Company, electricity substation, former depot, former automobile works, former methylated spirt works, paint varnish/works, Ardwick Cemetery and Vehicle repair and servicing.

Within 500m of the site, additional potentially contaminative operations identified from the historic maps include; Petrol Stations, Tanks, Pollution incidents, former engraving works, former carriage/corporation works, former Sawmill and historical waste site.

The potential low permeability of the underlying strata should form a barrier to migration of contaminants both vertically and laterally and to and from the site.

There are no records of Historic Landfill within 250m of the client site.

The site is generally considered to be at moderate to Low Risk of significant contamination being present on site.

There is some potential for Made Ground associated with demolition of the former site buildings.

RADON: See desk study;

Overall environmental risk of contamination is considered to be moderate to Low Risk, Phase II investigation recommended.

2. GROUND INVESTIGATION

2.1. GENERAL OVERVIEW

A ground investigation has been designed based on the findings of the desk study, with exploratory holes advanced to target specific potential contaminant sources and spatially distributed to offer the maximum representative coverage of the site, summarised in table 2.1.

The investigation has also been used to collect geotechnical information to assist in the design and construction of the proposed development.

Exploratory fieldwork was completed on the 4th of March to the 6th of March 2024. The works are summarised in Table 2.1.

Table 2.1 SUMMARY OF FIELDWORK

POTENTIAL SOURCE / RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
General ground conditions including site history.	BH 1	Limited Access Continuous Flight Auger Borehole	2.90	-
	BH 2		6.00	0.3 - 6.0
	BH 3		6.00	-
	BH 4		6.00	
	BH 5		6.00	0.3 - 6.0
	BH 6		6.00	0.3 - 6.0
	BH 7		6.00	-
	BH 8		6.00	
	BH 9		6.00	
	BH 10		6.00	

Continuous flight auger boreholes were advanced to undertake detailed geotechnical testing, obtain environmental samples and install groundwater and ground gas monitoring wells.

It should be noted that at the time of the Murray Rix intrusive works, the site was still in use as a car sales forecourt. Which restricted access to planned borehole locations, with meant several borehole locations had to be relocated.

First Defence Ltd were on site carrying out Intrusive Magnetometer surveys during construction of the boreholes.

The sampling locations are illustrated in Appendix D. The ground conditions encountered are indicated in the borehole logs, which are provided in Appendix E.

2.2 IN-SITU STANDARD PENETRATION TESTING (SPT)

In-situ geotechnical testing was conducted using the standard penetration test (SPT) and, where the ground is granular, a 60° cone (SPT(C)) was used instead of the sampling tube.

The results are shown in the borehole logs in Appendix E and presented in Table 3.4 and discussed in Section 5.

2.3 IN-SITU CALIFORNIA BEARING RATIO (CBR)

In-situ CBR tests were outside the scope of this investigation.

2.4 PERMEABILITY TESTS

BRE 365 Soakaway Infiltration tests were outside the scope of this investigation.

2.5 LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis comprising:

Metals;

Speciated polycyclic aromatic hydrocarbons (PAHs);

pH, Organic Matter;

Asbestos identification and quantification; and

Speciated total petroleum hydrocarbons and Monoaromatics Oxygenates (TPH CWG)

Envirolab undertook the analytical work and the testing results are included in Appendix F and discussed in Section 4.

Selected samples were submitted to the Murray Rix UKAS accredited Northwest Regional Laboratory where the following geotechnical and chemical tests were undertaken:

Moisture Content

2:1 water soluble sulphate; and

Liquid and Plastic Limits.

Laboratory test certificates are included in Appendix H and are summarised in Section 3.

3. GROUND AND GROUNDWATER CONDITIONS

3.1 SUMMARY OF GROUND CONDITIONS

The ground investigation generally confirms the published geology and identifies the strata set out in Table 3.1.

TABLE 3.1 SUMMARY OF STRATA

HOLE	DEPTH TO STRATUM (m bgl)					
	TOPSOIL	MADE GROUND	CLAY	CLAYEY SAND*	SAND *	BEDROCK (Chester Formation, Sandstone) **
BH 1	None Encountered	GL-2.90	-	-	-	-
BH 2	None Encountered	GL-1.10	1.10-2.00	None Encountered	2.00-3.50	3.50-6.00
BH 3	None Encountered	GL-1.20	1.20-2.10	None Encountered	2.10-3.20	3.20-6.00
BH 4	None Encountered	GL-1.60	1.60-2.30	None Encountered	2.30-4.00	4.00-6.00
BH 5	None Encountered	GL-0.80	0.80-2.70	None Encountered	2.70-4.00	4.00-6.00
BH 6	None Encountered	GL-1.70	1.70-2.20	None Encountered	2.20-4.00	4.00-6.00
BH 7	None Encountered	GL-1.10	1.10-2.80	None Encountered	2.80-4.00	4.00-6.00
BH 8	None Encountered	GL-1.20	1.20-2.80	None Encountered	2.80-4.00	4.00-6.00
BH 9	None Encountered	GL-1.40	1.40-2.30	None Encountered	2.30-4.00	4.00-6.00
BH 10	None Encountered	GL-1.60	1.60-2.30	None Encountered	2.30-4.00	4.00-6.00

*Weathered Bedrock, **Un-weathered Bedrock

3.2. MADE GROUND

Made Ground was encountered in all exploratory hole locations to a maximum proven depth of 2.90m bgl (TP 1).

Made Ground encountered was generally seen as Asphalt Surfacing, Concrete Slab, clayey brick rubble fill with some clinker, dark silty clay fill with brick fragments and clay fill with brick fragments.

3.3. DRIFT DEPOSITS

Drift deposits were encountered within all exploratory locations to a proven depth of 2.80m bgl.

The drift deposits generally comprised orange brown and or dark brown silty and or sandy Clay to depths of between 0.80 and 2.80m.

3.4. SOLID GEOLOGY

Solid bedrock geology was encountered during the ground investigation in all boreholes. The bedrock was seen to be weathered to a depth of between 3.20 and 4.00m bgl.

3.5 GROUNDWATER

Groundwater was not encountered during the intrusive ground investigation works. The depth of the strikes are shown on the exploratory hole records in Appendix E and are summarised in Table 3.2.

TABLE 3.2 SUMMARY GROUNDWATER STRIKES

Location	DEPTH TO STRIKE (m)	NOTES
-	-	-

Monitoring was carried out using an electronic dip meter and interface probe to record the depth to groundwater and the thickness of any free-phase hydrocarbon product, if present.

These results are summarised in Table 3.10.

3.6. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

No visual and olfactory evidence of potential contamination had been identified during the site investigation.

3.7. SOIL CONSISTENCY

Undrained shear strength values were measured using field hand shear vane tests. Results of the tests are presented in Table 3.3, which indicate the clay soils to be soft and firm.
Strength test data is generally consistent with the field descriptions of the aforementioned soils.

TABLE 3.3 SUMMARY OF HAND SHEAR VANE TESTS

LOCATION	DEPTH (m)	SHEAR STRENGTH (kPA)	CALCULATED ALLOWABLE BEARING PRESSURE (F.O.S=3) (kN/m^2)
BH2	1.50	50	98
BH3	1.50	60	118
BH4	2.00	45	89
BH5	1.00	55	108
BH5	2.00	65	128
BH6	2.00	30	59
BH7	1.50	35	69
BH7	2.50	55	108
BH8	1.50	30	59
BH8	2.00	50	98
BH9	1.50	30	59
BH9	2.00	60	118
BH10	2.00	35	69

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 3.4.

Strength test data is generally consistent with the field descriptions of the aforementioned soils.

3.8. SIDE STABILITY AND EASE OF EXCAVATION

The sides of the exploratory boreholes within the natural strata appeared to be generally stable; none of the exploratory boreholes were seen to cave in.

The near surface materials were drilled with relative ease.

TABLE 3.4 STANDARD PENETRATION TEST RESULTS

BOREHOLE	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	SPT "N" VALUE	RELATIVE DENSITY	CONSISTENCY (BS 5930)	ALLOWABLE BEARING PRESSURE (kN/m^2)
BH2	1.10	CLAY	10	N/A	Firm	100
BH2	2.00	SAND	38	Dense	N/A	380
BH2	3.00	SAND	42	Dense	N/A	420
BH2	4.00	SAND	100	Very Dense	N/A	>500
BH2	5.00	SAND	100	Very Dense	N/A	>500
BH2	6.00	SAND	100	Very Dense	N/A	>500
BH3	1.20	CLAY	12	N/A	Firm	120
BH3	2.00	CLAY/SAND	36	Dense	N/A	360
BH3	3.00	SAND	38	Dense	N/A	380
BH3	4.00	SAND	100	Very Dense	N/A	>500
BH3	5.00	SAND	100	Very Dense	N/A	>500
BH3	6.00	SAND	100	Very Dense	N/A	>500
BH4	2.00	CLAY	9	N/A	Firm	90
BH4	3.00	SAND	40	Dense	N/A	400
BH4	4.00	SAND	100	Very Dense	N/A	>500
BH4	5.00	SAND	100	Very Dense	N/A	>500
BH4	6.00	SAND	100	Very Dense	N/A	>500

BOREHOLE	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	SPT "N" VALUE	RELATIVE DENSITY	CONSISTENCY (BS 5930)	ALLOWABLE BEARING PRESSURE (kN/m^2)
BH5	1.00	CLAY	11	N/A	Firm	110
BH5	2.00	CLAY	13	N/A	Firm	130
BH5	3.00	SAND	40	Dense	N/A	400
BH5	4.00	SAND	100	Very Dense	N/A	>500
BH5	5.00	SAND	100	Very Dense	N/A	>500
BH5	6.00	SAND	100	Very Dense	N/A	>500
BH6	2.00	CLAY	6	N/A	Soft	60
BH6	3.00	SAND	36	Dense	N/A	360
BH6	4.00	SAND	100	Very Dense	N/A	>500
BH6	5.00	SAND	100	Very Dense	N/A	>500
BH6	6.00	SAND	100	Very Dense	N/A	>500
BH7	2.00	CLAY	11	N/A	Firm	110
BH7	3.00	SAND	39	Dense	N/A	390
BH7	4.00	SAND	100	Very Dense	N/A	>500
BH7	5.00	SAND	100	Very Dense	N/A	>500
BH7	6.00	SAND	100	Very Dense	N/A	>500
BH8	2.00	CLAY	13	N/A	Firm	130
BH8	3.00	SAND	44	Dense	N/A	440
BH8	4.00	SAND	86	Very Dense	N/A	>500
BH8	5.00	SAND	100	Very Dense	N/A	>500
BH8	6.00	SAND	100	Very Dense	N/A	>500

BOREHOLE	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	SPT "N" VALUE	RELATIVE DENSITY	CONSISTENCY (BS 5930)	ALLOWABLE BEARING PRESSURE (kN/m^2)
BH9	2.00	CLAY	12	N/A	Firm	120
BH9	3.00	SAND	38	Dense	N/A	380
BH9	4.00	SAND	92	Very Dense	N/A	>500
BH9	5.00	SAND	100	Very Dense	N/A	>500
BH9	6.00	SAND	100	Very Dense	N/A	>500
BH10	2.00	CLAY	12	N/A	Soft	120
BH10	3.00	SAND	38	Dense	N/A	380
BH10	4.00	SAND	92	Very Dense	N/A	>500
BH10	5.00	SAND	100	Very Dense	N/A	>500
BH10	6.00	SAND	100	Very Dense	N/A	>500

*Allowable bearing capacity to be reduced by 50% if the ground water would be close to underside of a traditional foundation solution, usually defined as within one foundation width.

3.9. SOIL INFILTRATION

BRE Special Digest 365 Soakaway infiltration testing was outside the scope of this investigation.

However, it would appear that The use of SuDS drainage within the natural ground is not feasible at the site due to the presence of cohesive soils which are capable of low soil infiltration rates.

3.10. SOIL PLASTICITY

The liquid and plastic limits of samples of natural in-situ clay are determined using the cone penetrometer method and the rolling thread test. These tests enable determination of an average plasticity index (PI) for each "type" of clay, although judgement is applied where variable results are reported.

PI can be related to shrinkability (low, medium, or high) and then to minimum founding depth.

Murray Rix typically only considers a soil to be shrinkable if the proportion finer than 63 µm is > 35%.

PI results are compared against guidance given in NHBC standards, Chapter 4.2 (revised January 2014), which advocates the use of modified plasticity index (I'p), defined as:

$$I'p = Ip \times (\%<425\ \mu m/100)$$

In other words, if PI is 30%, but the soil contains 80% <425 µm, then I'p = 30 x 80/100 = 24%

It should be noted that in accordance with the requirements of BS EN ISO 17892-12 2018+A2 2022, the % passing the 425 µm test sieve is reported as part of the test.

Murray Rix applies engineering judgement where PI results are spread over a range of classifications. Consideration is given to the average values for each particular soil type (differentiate between residual soil and alluvium), the number of results in each class and the actual values.

The Plasticity Index results, summarised in Table 3.6, show the clay to be of predominantly medium plasticity clay.

TABLE 3.6 PLASTICITY INDEX RESULTS

LOCATION	DEPTH (m)	NATURAL MOISTURE CONTENT (%) *	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425 µM SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
BH 2	1.50	24.9	16	45	29	88	26	Medium
BH 3	2.00	23.1	14	42	28	100	28	Medium
BH 4	2.00	24.5	15	44	29	83	24	Medium
BH 5	1.00	22.4	14	42	28	100	28	Medium
BH 6	2.00	24.5	14	42	28	100	28	Medium
BH 7	1.50	27.8	14	42	28	100	28	Medium
BH 8	2.00	24.0	14	43	29	94	27	Medium
BH 9	2.00	21.3	14	39	25	82	23	Medium
BH 10	2.00	27.1	14	41	27	91	25	Medium

Notes
*Natural moisture content uncorrected for gravel content, NP = Non-Plastic

The results of the Plasticity Index testing confirmed that the soils would be deemed to be "Medium Volume Change Potential" in accordance with the classification system utilised by the LABC/NHBC industry guidance.

3.11. CALIFORNIA BEARING RATIO

In-situ CBR testing was outside the scope of the investigation.

3.12. pH AND SULPHATE

Chemical analyses for pH and 2:1 soluble sulphate content contained in Appendix H (summarised in Table 3.8), shows that the soils at the site meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005).

TABLE 3.8 SUMMARY OF pH AND SULPHATE DATA

LOCATION	DEPTH (m)	SO_4 IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
BH 2	1.50	0.37	7.4	DS-1 AC-1S
BH 2	3.00	0.12	7.2	DS-1 AC-1S
BH 3	2.00	0.32	6.8	DS-1 AC-1S
BH 4	2.00	0.41	7.5	DS-1 AC-1S
BH 5	1.00	0.40	6.6	DS-1 AC-1S
BH 6	2.00	0.35	6.9	DS-1 AC-1S
BH 7	1.50	0.31	6.7	DS-1 AC-1S
BH 8	2.00	0.37	7.5	DS-1 AC-1S
BH 9	2.00	0.38	7.8	DS-1 AC-1S
BH 10	2.00	0.29	6.8	DS-1 AC-1S
BH 10	3.00	0.10	7.2	DS-1 AC-1S

3.13. GROUND GAS

A ground gas assessment has not been completed we understand it is intended to incorporate gas protection measures into the building design, thus negating the need for ground gas monitoring / assessment. Three number monitoring standpipes have been installed to allow future monitoring to take place if required.

4. TIER 1 QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

Murray Rix has undertaken a Tier 1 risk assessment to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.

4.1. HUMAN HEALTH RISK ASSESSMENT

At Tier1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations or organic and inorganic compounds with reference values published in LQM/CIEH S4UL.

The results of this comparison have been summarised within Table 4.1.

TABLE 4.1 SUMMARY OF INORGANIC, ORGANIC AND HYDROCARBON TOXICITY ASSESSMENT FOR A COMMERCIAL END USE

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX.	PATH -WAY	ASSESSMENT
pH	pH Units	N/A	20	6.8-8.6	-	1	-
Organic Matter	%	N/A	20	0.3-12.3	-	1	-
Arsenic	mg/kg	640	20	13	-	1	No Further Action
Beryllium	mg/kg	12	20	1.7	-	1	No Further Action
Boron	mg/kg	240000	20	1.2	-	1	No Further Action
Cadmium	mg/kg	190	20	0.6	-	1	No Further Action
Chromium Hexavalent	mg/kg	33	20	<1.0	-	1	No Further Action
Chromium III	mg/kg	8600	20	32	-	1	No Further Action
Chromium	mg/kg	N/A	20	32	-	1	No Further Action
Copper	mg/kg	68000	20	130	-	1	No Further Action
Lead	mg/kg	2330	20	942	-	1	No Further Action
Mercury	mg/kg	58	20	0.72	-	3	No Further Action
Nickel	mg/kg	980	20	35	-	1	No Further Action
Selenium	mg/kg	12000	20	2	-	1	No Further Action
Vanadium	mg/kg	9000	20	37	-	1	No Further Action
Zinc	mg/kg	730000	20	113	-	1	No Further Action
Asbestos	Type	NFD	20	FD	BH1 0.1-0.3m BH3 0.1-0.3m	4	Further Action Required - Quantification conducted
Naphthalene	mg/kg	190	20	0.06	-	3	No Further Action
Acenaphthylene	mg/kg	83000	20	0.06	-	2	No Further Action
Acenaphthene	mg/kg	84000	20	0.37	-	1	No Further Action
Fluorene	mg/kg	63000	20	0.16	-	1	No Further Action
Phenanthrene	mg/kg	22000	20	2.10	-	2	No Further Action
Anthracene	mg/kg	520000	20	0.38	-	2	No Further Action
Fluoranthene	mg/kg	23000	20	3.86	-	2	No Further Action
Pyrene	mg/kg	54000	20	5.73	-	2	No Further Action
Benzo(a)anthracene	mg/kg	170	20	2.72	-	2	No Further Action
Chrysene	mg/kg	350	20	2.52	-	2	No Further Action
Benzo(b)fluoranthene	mg/kg	44	20	3.64	-	2	No Further Action
Benzo(k)fluoranthene	mg/kg	1200	20	1.30	-	2	No Further Action
Benzo(a)pyrene	mg/kg	35	20	3.00	-	2	No Further Action
Indeno(1,2,3-cd)pyrene	mg/kg	500	20	1.94	-	2	No Further Action
Dibenz(a,h)anthracene	mg/kg	3.5	20	0.32	-	2	No Further Action
Benzo(ghi)perylene	mg/kg	3900	20	1.51	-	2	No Further Action
TPH CWH Aliphatic		-					
EC5 - EC6	mg/kg	3200	20	<0.01	-	3	No Further Action
EC6 – EC8	mg/kg	7800	20	<0.01	-	3	No Further Action
EC8 – EC10	mg/kg	2000	20	<1	-	3	No Further Action
EC10 – EC12	mg/kg	9700	20	<1	-	3	No Further Action
EC12 – EC16	mg/kg	59000	20	2	-	3	No Further Action
EC16 – EC21	mg/kg	1600000	20	9	-	1	No Further Action
EC21 – EC35	mg/kg		20	141	-	1	No Further Action
TPH CWH Aromatic		-					
EC5 – EC7	mg/kg	26000	20	<0.01	-	3	No Further Action
EC7 – EC8	mg/kg	56000	20	<0.01	-	3	No Further Action
EC8 – EC10	mg/kg	3500	20	2	-	3	No Further Action
EC10 – EC12	mg/kg	16000	20	1	-	3	No Further Action
EC12 – EC16	mg/kg	36000	20	11	-	3	No Further Action
EC16 – EC21	mg/kg	28000	20	45	-	1	No Further Action
EC21 – EC35	mg/kg	28000	20	168	-	1	No Further Action

Notes
Main exposure pathways: 1 = soil ingestion, 2 = dermal contact and ingestion, 3 = vapour inhalation (indoor), 4 = dust inhalation.
Abbreviations: GAC – general assessment criteria (based upon 1% SOM), n= number of samples, MC = maximum concentrations; LOC of EX = location of exceedance; FD = fibres detected, NFD = no fibres detected.

Referring to Table 4.1, the result of this direct comparison indicates that the data does not exceed the screening criteria for a commercial end use for any of the contaminants assessed, with the exception of Asbestos.

Asbestos was detected as seen in Table 4.11:

TABLE 4.11 SUMMARY OF DETECTED ASBESTOS

Parameter	BH1	BH 2	-	Assessment Criteria (%)
	0.20 – 0.50m	0.30 – 0.80m	-	
Asbestos in Soil Screen / Identification Name	Chrysotile Loose Fibres	Chrysotile Loose Fibres	-	NFD
Asbestos in Soil	Detected	Detected	-	NFD
Asbestos Quantification (Stage 2) %	0.002	<0.001	-	<0.001
Asbestos Quantification Total %	0.002	<0.001	-	<0.001

HUMAN HEALTH RISK ASSESSMENT AND MITIGATION

No elevated potential contaminants of concern were found in the twenty number samples assessed, including Speciated hydrocarbons, based upon the long-term protection of human health for a commercial end use with the exception of Asbestos.

Therefore, one primary exposure pathway exists, pathway 4 – Dust/asbestos inhalation.

Remediation measures be required in the vicinity of Boreholes 1 & 2 where Asbestos was identified to break the pollutant-pathway-receptor linkage, should these locations not be beneath hardstanding.

As asbestos fibres have been identified within the Made Ground, a suitably detailed remediation strategy will be required to document the safe handling, management and placement of all Made Ground so as to ensure that no unacceptable degree of risk is presented to construction workers and / or future site occupants. Additional investigations to delineate and quantify the asbestos may be required to inform the aforementioned strategy.

Whilst it is possible that the asbestos contaminated made ground material (once delineated and segregated from other non-contaminated fill materials) will be allowed to remain on site in a suitably designed containment, this should be discussed with the Local Authority Contaminated Land Officer prior to works commencing. Disposal to a suitably licenced waste facility may be required for the material encountered at the location of boreholes 3 & 6.

If Topsoil, sub-soil, or gravel deposits are to be reused on site a CL:AIRE MMP will be required.

If any material is removed for off-site disposal a WM-3 waste classification will be required.

4.2. CONTROLLED WATERS RISK ASSESSMENT

The site sensitivity with respect to controlled waters is summarised within Table 4.2.

TABLE 4.2 CONTROLLED WATERS SENSITIVITY PROFILE

RISK PROFILE	DISCUSSION	SENSITIVITY RATING
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site does not lie within Zone 3 (Total Catchment) within a Groundwater Source Protection Zone. Secondary Undifferentiated Aquifer	Low Vulnerability
Distance to the Closest Groundwater Abstraction Point	No groundwater abstraction licence has been identified within 500m of the site	Low Vulnerability
Aquifer Classification in Superficial Drift Deposits	Secondary Undifferentiated Aquifer	N/A
Aquifer Classification in Bedrock	The Principal Aquifer within the Bedrock is not considered a sensitive receptor in this instance.	Medium Vulnerability
Viability for Anthropogenic Soil in Direct Contact with Aquifer (Drift or Bedrock)	Made Ground encountered on site. No contamination identified.	Low
Is the Site Located Within 50 m of a Surface Watercourse	No	Low

SUMMARY The ICSM developed within the context of the site setting has not identified any viable pollutant pathways.

To further refine the ICSM, Murray Rix has undertaken an initial qualitive assessment of the soil data analysis to assess the potential for a source of separate-phase or dissolved phase contamination originating from either a defined on-site source or from impacted soils.

This assessment is summarised in Table 4.3.

TABLE 4.3 QUALITATIVE RISK TO CONTROLLED WATERS FROM SOIL ANALYTICAL RESULTS

BTEX > 1 mg/kg	The soil data analysis has not identified any detectable concentrations of TPH C5 to C6 that might otherwise be indicative of SVOC or VOC impact.
Total VOC > 1 mg/kg	
Total SVOC > 1 mg/kg	
C5-C10 > 5 mg/kg	All concentrations are below 5 mg/kg.
C10-C12 > 10 mg/kg	Concentrations of TPH C10-C12 compounds greater than 10 mg/kg have not been detected.
C12-C16 > 50 mg/kg	Concentrations of TPH C12-C16 compounds greater than 50 mg/kg have not been detected.
Naphthalene > 2 mg/kg	Naphthalene has not been identified at concentrations greater than 2 mg/kg
Total PAH >10 mg/kg	Concentrations of low-solubility PAH compounds greater than 10 mg/kg have been detected in two samples
PCB > 1 mg/kg	No potential sources of PCB have been identified on the site. One electricity substation has been identified off site, but would be expected to be post 1990 and therefore not a source of PCB's
Heavy metals > 500 mg/kg	Concentrations of heavy metals above 500 mg/kg have been identified at the site for Lead – non mobile.

CONTROLLED WATER RISK ASSESSMENT AND MITIGATION

With due consideration of the ICSM, which in the absence of any contaminated Made Ground on the site or the presence of a venerable surface watercourse within 50 m of the site; did not identify any viable potential pollutant linkages associated with migration of any mobile contaminants towards the Principal Aquifer or any surface watercourse. Therefore, a Tier 1 assessment has not been carried out.

It is also noted that the Boreholes were found to remain dry during the drilling operations.

In the absence of a viable receptor the site is considered to pose an acceptable level of risk to controlled waters.

4.5 POTABLE WATER SUPPLY

Contaminant Group	PE-threshold (mg/kg)	Concentrations at Current pipeline depth (mg/kg)
Total VOC	0.5	<1.0
Total BTEX and MTBE	0.1	N/A
Total SVOCs (Excluding PAH and those substances marked with an*)	2	N/A
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	<1.0
EC10-EC16 Aliphatic and Aromatic Hydrocarbons	10	10
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	<500
Phenols (From SVOC Analysis)*	2	N/A
Cresols and Chlorinated Phenols (From SVOC Analysis)*	2	N/A
Ethers*	0.5	N/A
Nitrobenzene*	0.5	N/A
Ketones*	0.5	N/A
Aldehydes*	0.5	N/A
Amines*	Fail	N/A
Other Considerations		
Are there any exceedances of the PE threshold outside of the PE depth	No	
Is free product present in soil and groundwater	None	
Could hydrocarbon impact at greater depth than current pipeline depth be mobilised by rising groundwater	No	
Will soils impacted with above determinands likely be utilised elsewhere on site	No	
Will soils be imported to site as part of any future earthworks	Currently unknown, however it is unlikely soils will be required to be imported to site.	

Notes – Pipeline depth normally between 0.75m-1.35m

Based on the assessment of current site conditions it is unlikely that barrier pipe will be required at the proposed development, although further testing maybe required to confirm.

4.6. CONCEPTUAL SITE MODEL

Following the completion of the intrusive investigation, chemical analysis and risk assessment, the conceptual model shown in Table 4.6 has been prepared for the site.

TABLE 4.6 CONCEPTUAL MODEL

POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL1	Made Ground / Natural Ground	Direct Contact with Building Materials	Buildings and Services)	Low Likelihood	Moderate Low	Very Low. No contamination identified
PL2	Made Ground	Dermal Contact, Inhalation and ingestion	Groundworkers End-user of site (commercial)	Likely – Asbestos fibres identified	Moderate/High	Very Low. Following installation of cover system or removal to licensed tip
PL3	Made Ground / Natural Ground	Uptake of Phytotoxic Contaminants	Vegetation	Unlikely	Very Low	Very Low. No contamination identified
PL4	Made Ground Off site sources	Vertical Migration	Controlled Waters	Unlikely	Low	Very Low. No contamination identified
PL5	Made Ground	Horizontal Migration	Controlled Waters	Unlikely	Very Low	Very Low No contamination identified
Assessment: Acceptable Risk following mitigation measures.						

5. GEOTECHNICAL ASSESSMENT

5.1. PROPOSED DEVELOPMENT

Murray Rix understands that Crown Advisory are intending to redevelop the client site for a commercial end use.

A proposed development layout has been provided and is shown in Appendix D, we understand the proposed development will compromise a New Self Storage Building, Bin Store and Car Park.

5.2. SUMMARY OF GROUND CONDITIONS

Made Ground
Made Ground was encountered in all exploratory hole locations to a maximum proven depth of 2.90m bgl (TP 1).

Made Ground encountered was generally seen as Asphalt Surfacing, Concrete Slab, clayey brick rubble fill with some clinker, dark silty clay fill with brick fragments and clay fill with brick fragments.

Drift Deposits
Drift deposits were encountered within all exploratory locations to a proven depth of 2.80m bgl.

The drift deposits generally comprised orange brown and or dark brown silty and or sandy Clay to depths of between 0.80 and 2.80m.

Solid Geology
Solid bedrock geology was encountered during the ground investigation in all boreholes. The bedrock was seen to be weathered to a depth of between 3.20 and 4.00m bgl.

Groundwater
Groundwater was not encountered during the intrusive ground investigation works.

5.3 SITE PREPARATION

The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Manual of Contract Documents for Highway Works (MCHW). This should include the following:

Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill;

Any redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill;

No invasive plant species have been identified on site. If identified during future works, this material and the infested soils will require treatment / removal by a suitable qualified contractor;

Possible buried structures or old foundations have been encountered during the investigation at the following locations Borehole 1, it was not possible to investigate the extent of the buried structures encountered due to space restrictions on site;

Should any be identified during future works they should be excavated from below the proposed development footprint with the resulting void backfilled;

Consideration should be given to any proposed retaining structures on the site and should be assessed by a structural engineer prior to development.

5.4 FOUNDATION CONDITIONS AND ASSESSMENT OF POTENTIAL BEARING CAPACITIES

In due consideration of the identified ground conditions, in-situ and laboratory testing, Murray Rix has undertaken an assessment of the net safe allowable bearing pressure (ABP) within the underlying natural stratum to assist in the detailed design of foundations and infrastructure and determine the target founding stratum.

The results of this assessment are summarised in Table 5.1.

TABLE 5.1 SUMMARY OF ABPS

COHESIVE SOILS – (HSV)			
Description	Depth (m bgl)	Undrained Shear Strength (Cu) (kN/m^2)	Allowable Bearing Pressure (kN/m^2)
Silty CLAY	1.00	55	108
	1.50	30 - 60	59 – 118
	2.00	30 - 65	59 – 128
	2.50	55	108

COHESIVE SOILS – (SPT N60 Values)			
Description	Depth (m bgl)	SPT N Value	Allowable Bearing Pressure (kN/m^2)
Silty CLAY	1.00	11	110
	1.10 BH2	10	100
	1.20 BH3	12	120
	2.00	6-13	60 - 130

GRANULAR SOILS (Sand / Sandstone SPT N60 Values)			
Description	Depth (m bgl)	Relative Density	Allowable Bearing Pressure (kN/m^2)
SAND	2.00		360-400
	3.00		360-440
	4.00		>500
	5.00		>500
	6.00		>500

*Allowable bearing capacity to be reduced by 50% if the ground water would be close to underside of a traditional foundation solution, usually defined as within one foundation width.

Based on the assessment of the undrained shear strengths and corresponding safe net allowable bearing pressure, the suitable founding stratum has been identified as the underlying Sand or Sandstone Deposits (Weathered and un-weathered Bedrock)

The underlying natural Sand deposits have been assessed as being dense with a net allowable bearing pressure (ABP) of circa 360 kN/m^2 at 2.00 & 3.00m bgl which generally increases with depth.

Prior to the detailed design of suitable foundation solutions, a programme of enabling works will be required to cut and fill the site to provide suitable development platform levels.

In consideration of the likely loadings and ground conditions it is considered that depending on the load requirements consideration could be given to the use of trench fill or pad foundations for the proposed structure.

TABLE 5.2 ANTICIPATED FOUNDATIONS

Strip Pad (depending on required loadings)

LOCATION	ANTICIPATED FOUNDING STRATA DEPTH (m bgl)	GROUND WATER (m bgl)	TARGET STRATUM	TREES	FOUNDATION TYPE	TYPE OF CONCRETE
BH 2	2.00	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 3	2.10	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 4	2.30	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 5	2.70	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 6	2.20	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 7	2.80	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 8	2.80	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 9	2.30	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s
BH 10	2.30	NGE	SAND	NK	Strip/Pad	DS-1/AC-1s

Notes Abbreviations: NGE – No Groundwater encountered, NK – Not Known, N/A – Not Applicable, * Borehole dry upon completion and during subsequent monitoring visits.

Consideration could also be given to the use of a Vibro Stone Column ground improvement foundation solution. Further advice should be sought from an experienced Vibro Stone Column contractor.

At this time, it is not possible to accurately define the foundation types due to the absence of final development levels; however, based upon our extensive experience of similar sites, we would anticipate that the final foundation solution would require an engineered design.

TABLE 5.4 GROUND IMPROVEMENT DESIGN MATRIX

RISK ITEM	COMMENT	PASS/FAIL
Soft clays with an undrained shear strength less than 30 kN/m^2	None identified	PASS
Ground with peat layers close to foundation levels or where intermediate layers of peat are thicker than 200mm, either as a single layer or the sum if the thicknesses of individual layers	None identified	PASS
Voided filled ground e.g., old water tanks, pottery, glass bottles, concrete or brick fill of unsuitable grading	None identified	PASS
Loose or non-engineered fill not previously subject to rising or fluctuating water levels saturation	None identified	PASS
Filled ground still settling or expected to settle under its own weight or due to the effects of surcharging/upfilling where there is a high organic content or where decay is continuing	None identified	PASS
Fill, containing degradable material where organic material forms more than 15% of fill by volume	None identified	PASS
Clays with a plasticity index greater than 40%	None identified	PASS
Highly sensitive soils liable to collapse or remoulding	None identified	PASS
Cohesive soils with trees in influencing distance	None identified	PASS
Overall Risk Rating and Stability for Vibratory Ground Improvement		PASS

5.5 CONCRETE DURABILITY

Based upon the results of the chemical analysis it is considered that subsurface concrete can be designed in accordance with Design Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with the recommendations provided in BRE Special Digest 1 (2005)

5.6. EXCAVATIONS

Continuous flight auger boreholes were advanced with relative ease though the near surface drift deposits. No borehole was found to cave in.

Site observations indicated that excavations will be feasible in the near surface with normal plant, however excavations at depth may be more difficult.

However, due to the nature of the clay and sand materials encountered it is considered that all deep excavations are supported or battered back in accordance with guidance in CIRIA R97.

TABLE 5.5 CIVIL ENGINEERING EXCAVATION RISK MATRIX

RISK ITEM	PRESENT	COMMENT
Running Sand	No	No Running sands were encountered. Care should be taken if excavating in poor weather conditions
Minor Water Ingress	Possibly	Rapid water ingress will require localised dewatering - sump pumping during the construction of site drainage infrastructure. Ingress of water into foundation excavation will potentially flood foundation excavations.
Shallow Bedrock	No	Shallow Bedrock has not been encountered

5.7. FURTHER WORKS

Based on the findings of the intrusive investigation, the following additional works are recommended to be completed in due course:

Plot-specific foundation schedule (upon receipt of the final development levels);

Geotechnical earthworks survey (infrastructure); and

Remediation Strategy.

5.8. CONSTRUCTION ACTIVITY AND INSPECTION

The following activities and inspections should be incorporated into the site works:

It is recommended that sufficient allowance is made for the inspection of formations and sub formations and pavement construction.

Excavations where access is required should be subject to a risk assessment from a competent person and, where appropriate, mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 should be utilised.

It is considered that dewatering may be required. Especially following periods of heavy rain fall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant regulatory body and be undertaken under a trade effluent discharge,

where requited. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond.

Where access to confined spaces is required, appropriate mitigation measures should be addressed within the construction stage health and safety plan. Particular account should be taken of the gas results.

6. CONCLUSIONS AND RECOMMENDATIONS

CONTAMINATED LAND ASSESSMENT

Human Health	The preliminary Tier 1 Human Health risk assessment has identified the presence of asbestos fibres in BH's 1 and 2 quantified as 0.002% in borehole 1 and <0.001% in borehole 2. No further contaminants of concern were found in the twenty number samples tested, including Speciated hydrocarbons, based upon the long-term protection of human health for a commercial end use. Therefore, one primary exposure pathway exists, pathway 4 – Dust asbestos inhalation. Remediation measures will be required in the vicinity of Boreholes 1 & 2 where Asbestos was identified to break the pollutant-pathway-receptor linkage, should these locations not be beneath hardstanding. As asbestos fibres have been identified within the Made Ground, a suitably detailed remediation strategy will be required to document the safe handling, management and placement of all Made Ground so as to ensure that no unacceptable degree of risk is presented to construction workers and / or future site occupants. Additional investigations to delineate and quantify the asbestos may be required to inform the aforementioned strategy. Whilst it is possible that the asbestos contaminated made ground material (once delineated and segregated from other non-contaminated fill materials) will be allowed to remain on site in a suitably designed

	containment, this should be discussed with the Local Authority Contaminated Land Officer prior to works commencing. It is possible, but unlikely, that as yet unidentified contaminant impact is present within localised hotspots at the site. It is considered that any such contamination could be addressed by the delineation, excavation and treatment of impacted soils, if identified. The site is deemed to pose a very low risk to human health, following asbestos mitigation measures.
Controlled Waters	The site is deemed to pose a low risk to controlled waters.
Ground Gas	A ground gas assessment has not been completed we understand it is intended to incorporate gas protection measures into the building design, thus negating the need for ground gas monitoring / assessment. Three number monitoring standpipes have been installed to allow future monitoring to take place if required.
Potable Water	It is considered that the ground poses a low risk to the potable water supply and barrier pipes will not be required, although further testing may be required to confirm this.

GEOTECHNICAL ASSESSMENT

The underlying natural Sand deposits have been assessed as being dense with a net allowable bearing pressure (ABP) of circa 360 kN/m^2 at 2.00 & 3.00m bgl which generally increases with depth.

Prior to the detailed design of suitable foundation solutions, a programme of enabling works will be required to cut and fill the site to provide suitable development platform levels.

In consideration of the likely loadings and ground conditions it is considered that depending on the load requirements consideration could be given to the use of trench fill or pad foundations for the proposed structure.

Consideration could also be given to the use of a Vibro Stone Column ground improvement foundation solution. Further advice should be sought from an experienced Vibro Stone Column contractor.

However, the final foundation solution will be dependent on the structural loadings and elevation and should be designed by a suitable qualified structural engineer.

Signed
For Murray Rix

S.J. Hutchings
Director

Date April 2024

END OF REPORT

APPENDIX A
LIMITATIONS

1. This report and its finding should be considered in relation to the terms of reference and objectives agreed between Murray Rix and the client as indicated in Section 1.3.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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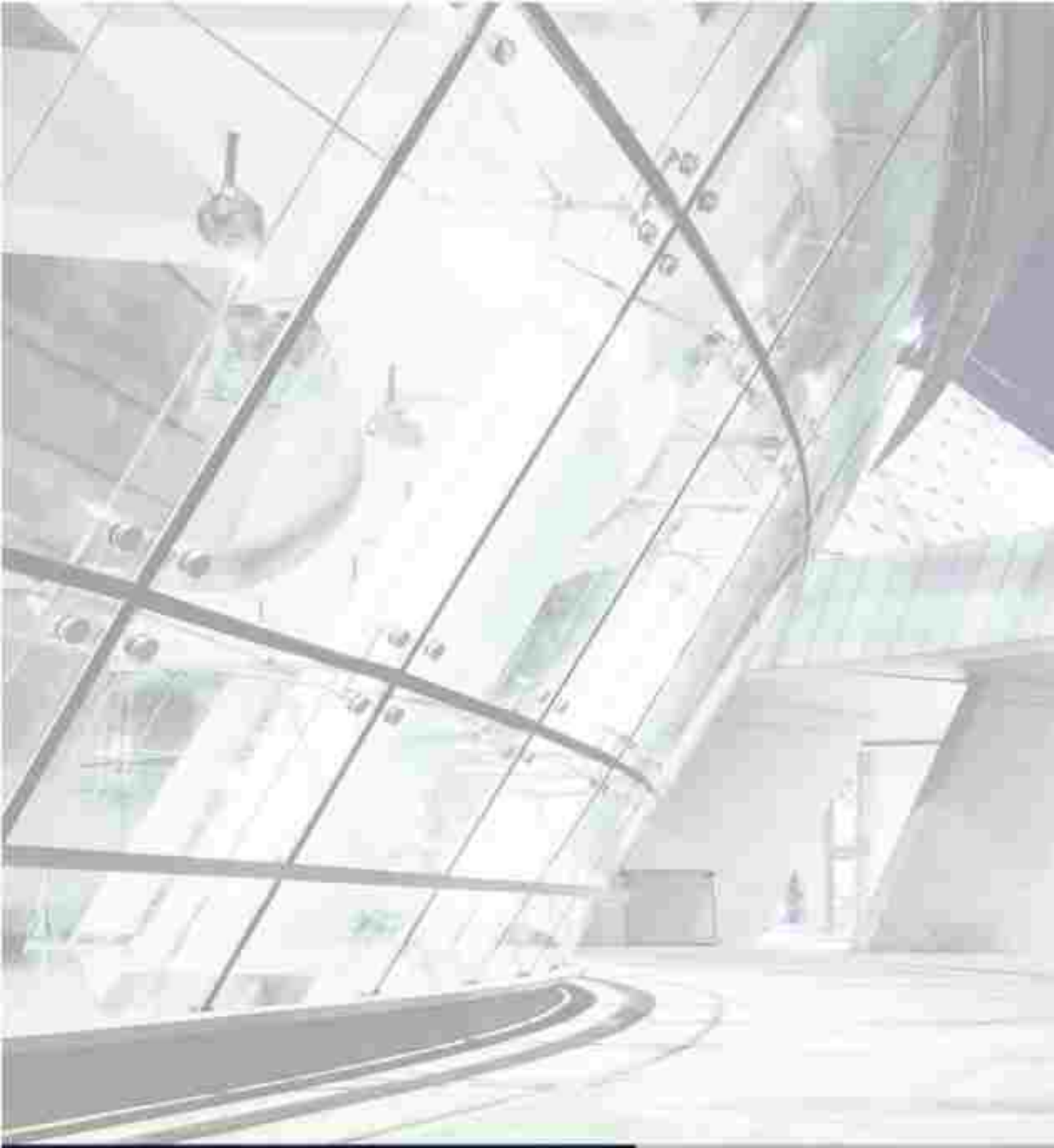
APPENDIX B
GLOSSARY

TERMS

ACM	Asbestos-containing material	**MMP**	Materials Management plan
ADS	Acoustic design Statement	**ND**	Not detected
AST	Above-ground storage tank	**NDP**	Nuclear density probe
BGS	British Geological Survey	**NMP**	Noise management plan
BSI	British Standards Institute	**NPSE**	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	**NR**	Not recorded
CA	Coal Authority	**PAH**	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	**PCB**	Polychlorinated biphenyl
CIEH	Charted institute of Environmental Health	**PI**	Plasticity Index
CIRIA	Construction Industry Research Association	**PID**	Photo ionisation detector
CLEA	Contaminated land exposure assessment	**POS**	Public open space
CML	Council of Mortgage Lenders	**PPE**	Personnel protective equipment
CoC	Contaminants of concern	**ProPG**	Professional practice guidance
CSM	Conceptual site model	**QA**	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	**SGV**	Soil guideline value
DWS	Drinking water standard	**SPH**	Separate-phase hydrocarbon
EA	Environment Agency	**SPT**	Standard penetration test
EQS	Environmental quality standard	**SVOC**	Semi-volatile organic compound
FFL	Finished floor Level	**TPH**	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	**TPH CWG**	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	**UKWIR**	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	**UST**	Underground storage tank
HCV	Health criteria value	**VCC**	Vibro-concrete column
ICSM	Initial conceptual site model	**VOC**	Volatile Organic compound
LEL	Lower explosive limit	**VRSC**	Vibro-replacement stone columns

LMRL	Lower method reporting limit	**VSC**	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	**WHO**	World Health Organisation
MCV	Moisture condition value	**WRAP**	Waste and Resources Action Programme
MIBK	Methyl isobutyl ketone	**WTE**	Water table elevation
m	Metres	**ppm**	Parts per million
Km	Kilometres	**mg/m³**	Milligram per metre cubed
% v/v	Percent volume in air	**m bgl bgl**	Metres below ground level
Mb	Millibars (atmospheric pressure)	**m bcl**	Metre below cover level
l/hr	Litres per hour	**mAOD**	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	**kN/m²**	Kilonewtons per metre squared
ppb	Parts per billion	**µm**	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	**SSRT**	Site Specific Remediation Target
PSD	Particle Size Distribution	**DD**	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	**Mc**	Moisture Content
p	Bulk Density	**GPR**	Ground Penetrating Radar
NDP	Nuclear Density Probe	**FFL**	Finished Floor Level
LEL	Lower Explosive Limit	**UKWIR**	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	**LOD**	Limit of Detection

APPENDIX C
PHASE 1 RISK ASSESSMENT (DESK STUDY)



GROUNDTECH
CONSULTING

Job title:	Hyde Road, Ardwick
Report type:	Preliminary Risk Assessment
Prepared for:	Crown Advisory /
Date:	March 2023

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PROJECT OBJECTIVES 1
1.2 PROPOSED DEVELOPMENT 1
1.3 LIMITATIONS 1
2.0 SITE SETTING 3
2.1 LOCATION 3
2.2 SITE DESCRIPTION 3
3.0 ENVIRONMENTAL SETTING 5
3.1 SITE HISTORY 5
3.2 GEOLOGY 6
3.3 HYDROGEOLOGY 7
3.4 HYDROLOGY 8
3.5 ENVIRONMENTAL CONSULTATIONS 8
3.6 RADON 8
3.7 COAL AUTHORITY CONSULTATION 9
3.8 UXO RISK 10
4.0 LAND QUALITY CONCEPTUAL SITE MODEL AND RISK ASSESSMENT 12
4.1 INTRODUCTION 12
4.2 POTENTIAL CONTAMINATION SOURCES 12
4.3 POLLUTION LINKAGES 13
4.4 RECEPTORS 13
4.5 PRELIMINARY CONCEPTUAL SITE MODEL (CSM) 14
5.0 GROUND ENGINEERING RECOMMENDATIONS AND POTENTIAL LIMITATIONS 20
5.1 PRELIMINARY FOUNDATION ASSESSMENT 20
5.2 ADDITIONAL LIMITATIONS 20
6.0 CONCLUSIONS AND GROUND INVESTIGATION SCOPE RATIONALE 21
6.1 LAND QUALITY 21
6.2 GROUND ENGINEERING 21
6.3 ADDITIONAL CONSIDERATIONS 21
6.4 RECOMMENDED GROUND INVESTIGATION SCOPE OF INVESTIGATION 22

APPENDIX 1 – PLANS
APPENDIX 2 – PHOTOGRAPHS
APPENDIX 3 – HISTORICAL MAPS
APPENDIX 4 – BGS RECORDS
APPENDIX 5 – GROUNDSURE REPORT
APPENDIX 6 – COAL AUTHORITY REPORT
APPENDIX 7 – PRELIMINARY UXO RISK ASSESSMENT
APPENDIX 8 – CIRIA RISK ASSESSMENT METHODOLOGY
APPENDIX 9 – RELEVANT LEGISLATIVE BACKGROUND
APPENDIX 10 – LIMITATIONS

Plans		
Plan Reference	Revision	Title
GRD-22366-P01	-	Project Location Plan
GRD-22366-P02	-	Preliminary Development Constraints Plan
GRD-22366-P03	-	Illustrative Preliminary CSM

1.0 INTRODUCTION

1.1 Project Objectives

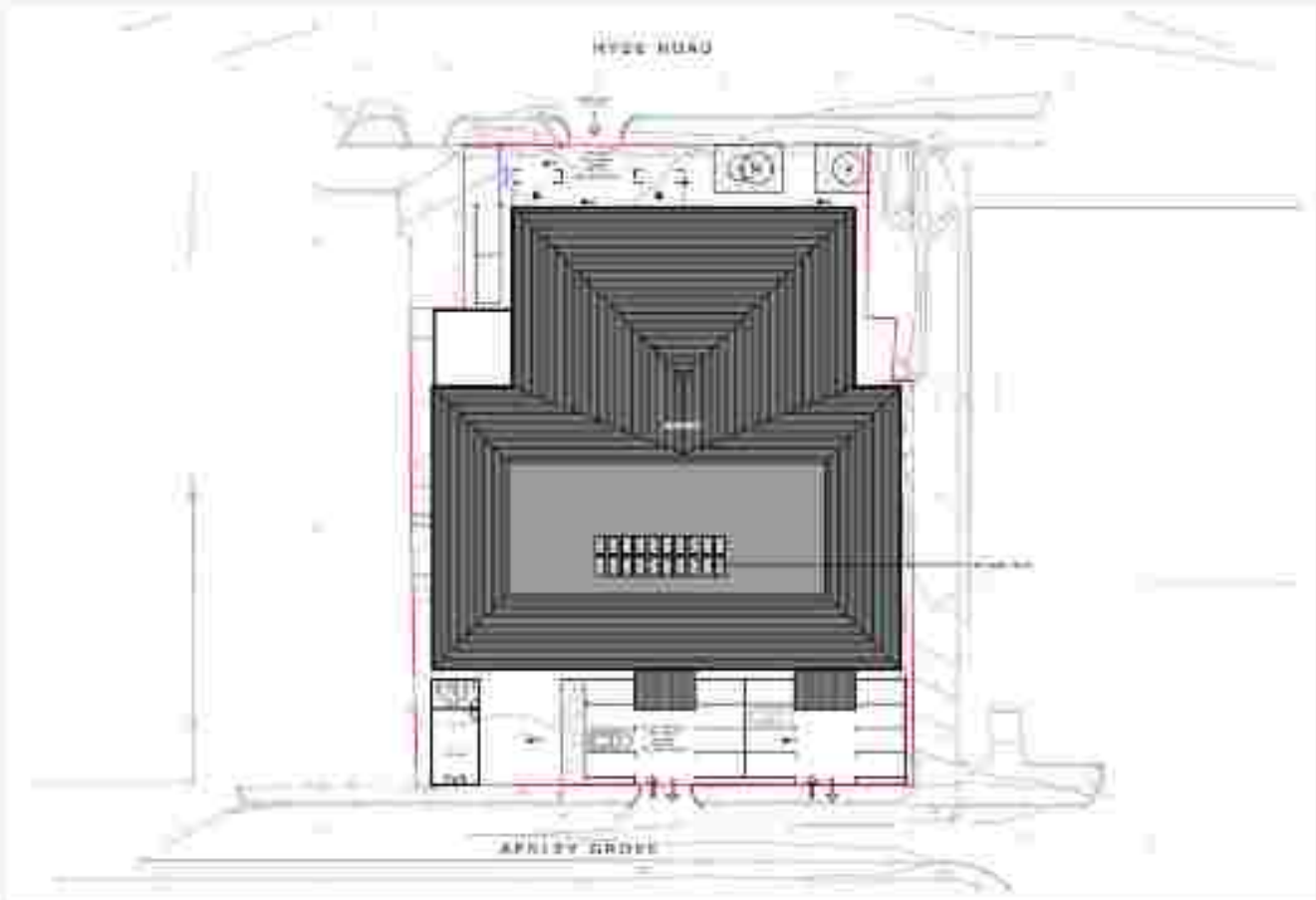
Groundtech Consulting Limited have been instructed by Paul Butler Associates on behalf of Crown Advisory to undertake a Preliminary Risk Assessment for a site at 14 Hyde Road in Ardwick.

The objectives of the Preliminary Risk Assessment were to establish the site's environmental and geotechnical background in order to generate a Conceptual Site Model to identify any potential constraints and linkages which may affect the redevelopment of the site.

The report has been undertaken to fulfil the requirements of a preliminary risk assessment in accordance with LCRM "Land Contamination Risk Management".

1.2 Proposed Development

The proposed development is for commercial end use comprising of a self-storage building, bin store and car park.



Proposed Development

1.3 Limitations

This Preliminary Risk Assessment is based on information obtained from a number of sources, and the information is assumed to be correct.

Other conditions may exist on the site that have not been taken into account in this assessment as they are outside the scope of works. Groundtech Consulting are not responsible for these circumstances that are not outlined in the report.

The assessment has been prepared for the exclusive use of the client. No third parties may rely on or reproduce the contents of the report without the written permission of Groundtech Consulting Limited. If any unauthorised third party comes into possession of the report they rely on it at their own risk and Groundtech Consulting Limited will not be obliged to provide a duty of care.

2.0 SITE SETTING

2.1 Location

The site is located circa 2 miles south-east of Manchester City Centre, as shown on the Project Location Plan GRO-22366-P01 and is approximately centred on National Grid Reference 385431, 396989.



Project Location

Access to the site is gained off Hyde Road to the north and Apsley Grove to the south.

2.2 Site Description

The site is circa 0.29 ha in area and is roughly rectangular in shape. The topography of the site slopes down gently from north to south however, a sharp change in level of circa 0.5m to 1.0m occurs across the central area.

Onsite Features
Currently, the site is utilised for car sales and is predominantly formed by a tarmac surfaced car park.

Two storage containers used as commercial buildings are located on the central part of the site, at the top of the land that slopes down sharply. A lean-to car wash is situated midway along the western site boundary.

No trees are present onsite however, overgrown shrubs and bushes are present around the perimeter.

Boundaries and Surrounding Land Use
Metal security fencing runs along the northern, eastern and southern site boundaries whereas, brick walls associated with neighbouring buildings are present along the western boundary.

The site is surrounded by the following land uses / features:

- *North* - *Hyde Road followed by a car park and commercial buildings.*
- *East* - *Hardsurfaced public footpath followed by commercial buildings and car parking.*
- *West* - *Commercial buildings including a public house and a car service/repair centre.*
- *South* - *Apsley Grove and a public car park.*

Photographs are presented in *Appendix 2*, and any relevant features are recorded on the Preliminary Development Constraints Plan *GRO-22366-P02*.

3.0 ENVIRONMENTAL SETTING

3.1 Site History

Available historical maps have been obtained, a list of dates and scale are listed in the table below:

Scale	Date
1:500	1851
1:1,056 and 1:1,250	1851, 1939, 1950-54, 1960, 1969-74, 1974-75, 1977-78, 1983, 1984-93, 1991-92, 1994, 1992-95, 1993-95, 1994-95, 1993, 2003
1:2,500	1889-93, 1908, 1922, 1932-33, 1948-49, 1949-50, 1950-51, 1965, 1970, 1995
1:10,000/10,560	1848, 1890-94, 1905, 1923, 1931-34, 1938, 1956, 1968, 1972, 1980-81, 1987, 1988-91, 1994, 2001, 2010, 2022

The plans were examined and potential issues have been identified and summarised in the table below:

Date	Site	Surrounding Area
1848 & 1851	Buildings associated with Hyde Road House are present in the northern and southern parts of the site. A pump is located in the central northern area. Gardens are present to the south of the northern buildings.	Ardwick Hall and associated grounds are to the immediate north beyond Hyde Road. Ardwick Villa, Abbey House and Abbey Place within 100m to the west. Open ground to the south. Ardwick Cemetery c.100m north east of the site.
1891	Hyde Road House has been demolished and replaced by a Drill Shed which dominates the central and eastern area. The pump is no longer shown.	Residential and commercial building development to the east and south of the site.
1889-1893	No significant change.	Union Carriage Works and Corporation Works c.200m south.
1908	The Drill Shed building has extended into the south western corner of the site.	No significant change.
1922	No significant change.	The onsite Drill Shed has extended to the immediate west. Engraving Works c.130m north. The Carriage Works 200m to the south has become a saw mill.
1948-49	No significant change.	Methylated Spirit Works c.80m north east. Paint and Varnish Works c.100m north east. Waterproof Garment Works c.50m north.
1950-54	TA Centre depicted on site together with a war memorial in the north east corner.	Automobile Works c.50m north west.
1969-74	War memorial no longer present and several buildings demolished.	Depot c.10m east. Residential properties to the south and east demolished. Automobile Works now a Clothing Works.
1974-75	Drill Shed replaced by a sports centre.	Increased demolition of buildings in the general area.
1984-93	No change.	Depot to the east demolished and replaced with a playground.
2023	Buildings onsite demolished.	No significant change.

The historical plans are presented in Appendix B.

3.2 Geology

The following British Geological Survey (BGS) records and other available information were inspected to accurately determine the geology underlying the site:

- *1:50,000 Scale Geological Sheet 85, Manchester – Solid and Drift Edition.*
- *BGS Records.*

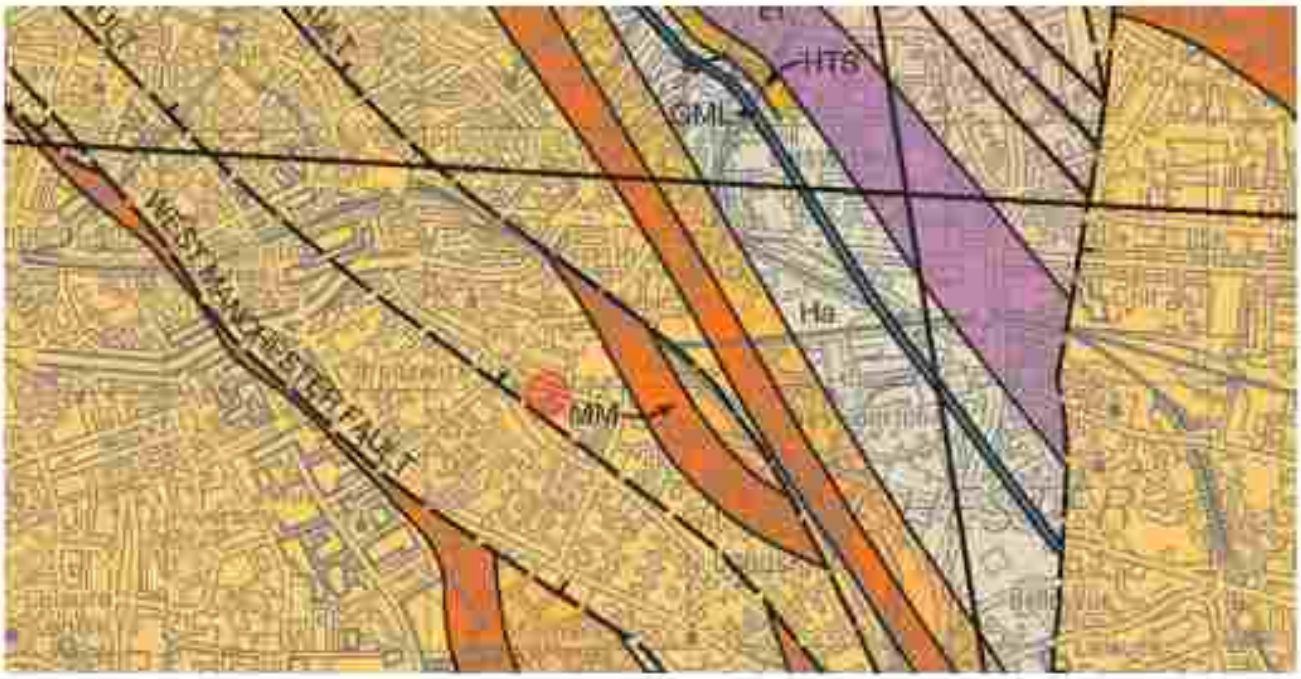
Made Ground
The available geological plans do not indicate any Made Ground to be present beneath the site. However, numerous onsite buildings have been demolished therefore, Made Ground is anticipated.

Superficial Deposits
The site is indicated to be underlain by Glacial Till which typically consists of clay with common pebbles, cobbles and some boulders.



Geological Map – Superficial Deposits

Solid Geology
The site is indicated to be underlain by the Chester Pebble Beds Formation which typically comprises sandstone



Geological Map – Solid Geology

Geological Faults

The Eastern Manchester Fault runs approximately 50m south of the site in an approximate north west to south east direction with strata downthrown to the north east.

BGS Records

The nearest borehole record is approximately 35m east of the site. Records indicate fill material consisting of black organic clay, topsoil, bricks and ash to around 2.5m bgl followed by stiff sandy Clay to depths of 2.9m bgl underlain by weathered Sandstone.

A second borehole is located 30m north of the site. Records from this identify fill material consisting of soft clay, brick and topsoil to depths of 2.0m bgl. This is underlain by soft sandy Clay with fissures and stone to 3.2m bgl where a sewer pipe is the encountered. Weathered Sandstone is recorded after the sewer pipe from 3.65m bgl.

The BGS records are presented in *Appendix 4*.

3.3 Hydrogeology

The superficial Glacial Till deposits in this area are classified by the Environment Agency as a Secondary Undifferentiated Aquifer. This is assigned when it is not possible to attribute either category A or B to a soil type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

The bedrock is classified as a Principal Aquifer. This is where the geology is of high intergranular and/ or fracture permeability which usually provides a high level of water storage and may support water supply/ river base flow on a strategic scale. Generally, principal aquifers were previously major aquifers.

The soils beneath the site are indicated to be of low leaching potential. Pollutants are unlikely to move down through the soil due to low permeability.

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

Nineteen groundwater abstraction licences are present within 2000m of the site, six of which are active. The nearest active abstraction point is 1225m west of the site.

There are no potable water abstraction licenses onsite or within 2000m.

3.4 Hydrology

The Corn Brook, an underground watercourse, is shown to cross the north western corner of the site. This is likely to be culverted.

There are no surface water features located within 250m of the site.

There are no surface water abstraction licences within 2000m.

The Risk of Flooding from Rivers and Seas (RoFRaS) is low and the site is not located within a flood risk zone.

There are no records of historical flood events onsite or within 250m.

3.5 Environmental Consultations

A request has been submitted to the Contaminated Land Officer at Manchester City Council for information pertaining to the site. This information will be forwarded on once received.

An environmental search has been conducted through Groundsure, which accesses British Geological Survey and Environment Agency databases. The complete Groundsure Report can be found in *Appendix 5* and a summary of the more relevant points is presented in the table below.

Record	<250m	250—500m	Description
Authorised Processes	*3*	*1*	*No Part A authorisations are within 500m of the site.* *The nearest current Part B authorisation to the site is located 181m north west and relates to the unloading of petrol into storage at service stations*
Pollution Incidents	*0*	*4*	*The nearest incident was 466m north east of the site which had a minor impact to land relating to commercial and household waste.*
Landfill and Waste Treatment	*0*	*2*	*Historical waste site located c.343m south east of the project location and a licensed metal recycling site is c.499m north.*
Discharge Consents	*0*	*0*	-
Petrol Filling Stations	*1*	*0*	*One open petrol filling station is present 150m west of the site.*
Current Industrial Uses	*40*	*N/A*	*Knitwear company to the immediate east.* *Electricity substation 8m east.* *Vehicle repair and servicing c.17m west.*

3.6 Radon

The new radon map launched by UKHSA in December 2022 has been examined which defines areas requiring radon protective measures. The maximum radon potential of the southern half of the site is less than 1%

indicating no radon measures are required. However, the maximum radon potential of the northern site area is 5 to 10% indicating full radon measures are needed in proposed structures.



Radon Map

The radon data in the Groundsure report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland and indicates that the percentage is less than 1% and radon measures are not required. However, the Groundsure report is pre-December 2022 when the updated radon maps were released.

Given the differing requirements for radon measures at the site based on the above searches, a site-specific radon search should be carried out through the BGS to confirm the level of radon protection required.

3.7 Coal Authority Consultation

The site lies in an area where the Law Society and Coal Authority recommends a mining search is undertaken due to past or current mining possible affecting the site.

A search was carried out with the Coal Authority. The report is presented in *Appendix 6* and the main findings are outlined below.

Past Mining
The site is not within a surface area that could be affected by any past recorded underground coal mining.

Present Mining
The site is not within the zone of influence of any present underground coal workings.

Future Mining
The property is not in an area where the Coal Authority has received an application for and is currently considering whether to grant a licence to remove or work coal by underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

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

Mine Entries
There are no records of any mine entries on or within 20m of site boundary.

Coal Mining Geology
The Authority is not aware of any damage arising due to geological faults or lines of weakness that have been affected by coal mining.

Opencast Coal Mining
The property is not in an area affected by past or present coal mining extracted by opencast methods. The property is also not in an area affected by a proposed opencast coal mine.

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
There is no record of mine gas emission requiring action by the Coal Authority within the boundary of the property.

Withdrawal of Support
The property is not in an area which notice of entitlement to withdraw support has been published.

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.

Online Coal Authority Interactive Map
The online Coal Authority Interactive Map has been examined and the follow information has been determined:

- *No mine entries are shown onsite or within the surrounding area.*
- *The site is not within a Development High Risk Area.*
- *The site is not in an area affected by past or present surface mining.*
- *The site is not shown to be affected by past or probable shallow coal mine workings.*

3.8 UXO Risk

A Provisional Explosive Ordnance Desk Top Study has been commissioned for the site. The full report is presented in Appendix 7 and a summary of the findings is presented below:

- *There are no recorded incidents of the site being subject to bombardment throughout WW1.*
- *Manchester was the subject of several attacks throughout WW2, the most devastating being the Christmas raids over 3 nights (22nd – 24th December 1940).*
- *Both the Site and its surrounding area was the subject of heavy bombing throughout this period.*
- *The site area may have been utilised by military personnel.*

It is recommended that a Full UXO Desk Top Study is carried out before intrusive works begin on site or a UXO Risk Mitigation Engineer is present on site during all ground works.

4.0 LAND QUALITY CONCEPTUAL SITE MODEL AND RISK ASSESSMENT

4.1 Introduction

The potential level of risk posed by contaminants in soil and/or groundwater will be influenced by the type and concentration of the contamination at source, the likelihood of exposure occurring, the potential pollution linkages and the likely chronic or acute effects on the receptors.

A contaminant is defined as a substance that has the potential to cause harm, a risk is considered to exist if such a substance is present at sufficient concentrations to cause harm and if a pathway is present a receptor could be exposed to the contaminant.

Section 4.0 compiles the information from the previous sections to assemble a Conceptual Site Model to inform the risk assessment process. The potential sources identified on the site and off the site that are within influencing distance are assessed to determine if pollution linkages exist and an unacceptable risk is posed to human health and controlled waters. The assessment has been carried out on a qualitative basis and aims to produce a complete and comprehensive Preliminary Conceptual Site Model, the potential pollution linkages are displayed on *GRO-22366-P03 - Illustrative Preliminary CSM*.

Three potential types of impacts exist for a site and all three need to be considered in the qualitative preliminary risk assessment:

- *Impacts from sources on the subject site.*
- *Impacts to the surrounding area from the subject site.*
- *Impacts to the subject site from the surrounding area.*

4.2 Potential Contamination Sources

Onsite Sources and Associated Contaminants (CoC)
From the information obtained during the preliminary risk assessment, several potential onsite sources of contamination have been identified which could affect the proposed commercial development.

The earlier historical records indicate that Hyde Road House and gardens were initially on the site. This building was then demolished, and a new building was erected which over the years has been used as a drill shed and sports centre. All buildings onsite have been demolished.

Made Ground is therefore likely to be present beneath the site associated with the demolition of the former buildings. Contaminants of Concern associated with Made Ground may include heavy metals, speciated Polycyclic Aromatic Hydrocarbons (PAHs), asbestos and permanent ground gases.

The site has more recently been used as a car sales yard with a small car wash in the western area therefore, there is the potential for localised hydrocarbon contamination to be present.

The northern half of the site is indicated to be in an area requiring full radon precautions.

Offsite Sources and Associated Contaminants (CoC)
A number of potential sources of contamination have been identified within influencing distance of the site that could impact the redevelopment of the site for commercial end use as outlined below:

- *Vehicle repair garage to the immediate west*

- *Electricity substation 8m east*
- *Former depot 10m east*
- *Former automobile works 50m north west*
- *Former methylated spirits works 80m north east*
- *Paint/varnish works 100m north east*
- *Ardwick Cemetery 100m north east*
- *Former Engraving Works 150m north*
- *Petrol station 190m west*
- *Former carriage/corporation works 200m south*
- *Former saw mill 200m south*

The vehicle repair garage, depot, automobile works, methylated spirits works, paint/varnish works, petrol station and carriage/corporation works could be a potential source of fuel derived hydrocarbons, oil, VOCs, SVOCs, acids and alkalis.

The electricity substation may be a source of PolyChlorinated Biphenyls (PCBs) used as cooling agents in transformers.

The engraving works could be a possible source of metals.

Ardwick cemetery could be a source of permanent ground gases. In addition, borehole records 25m east and 30m north indicate the presence of deep Made Ground to depths of between 2.0m and 2.6m bgl which could also be a possible source of ground gases.

The saw mill could be a source of resins/adhesives, resin hardeners, catalysts, sizing agents, inorganic and organic pigments, dyes, binders, organic solvents, additives and preservative treatment chemicals.

4.3 Pollution Linkages

The definition of a pollution linkage is a medium which allows a contaminant to impact a receptor. Potential pollution linkages have been recognised for the commercial development from the identified contamination sources that exist.

At this stage, the contaminants identified above are considered to potentially pose an unacceptable risk to human health and controlled waters through the following pollution linkages:

- *Direct soil and dust ingestion.*
- *Dermal contact with soil both indoors and outdoors.*
- *Indoor air inhalation from soil and vapour.*
- *Outdoor inhalation of soil and vapour.*
- *Migration and accumulation of ground gas into internal spaces.*
- *Impaction of groundwater from soil contamination (diffuse and point).*
- *Impaction of groundwater from groundwater plume.*
- *Migration of soil and groundwater contamination impacting surface waters.*

4.4 Receptors

Receptors generally fall into the categories of human health or controlled waters within the river basin system. The recognised receptors are listed below:

- *Commercial site end users.*
- *Principal bedrock Aquifer.*
- *Corn Brook (underground watercourse beneath the north west corner of the site.*
- *Potable water supply pipes.*

4.5 Preliminary Conceptual Site Model (CSM)

The factual information obtained from the searches and summarised in Section 2.0 and 3.0 has been used to compile a Preliminary CSM. Using Source-Pathway-Receptor assessment criteria that is applicable in the UK, a risk assessment has been completed to determine if a plausible pollution linkage exists between the identified contaminants and receptors. The risk classification has been estimated in accordance with the CIRIA C552 assessment criteria outlined in *Appendix B*.

Human Health Pollution Linkage Assessment



- The table below represents the first stage in the land quality risk assessment process - the Qualitative Risk Assessment.
- In order for a development site to be deemed suitable for use the level of risk needs to be reduced to an acceptable level - low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

	Conceptual Site Model					Qualitative Risk Assessment
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
PL1	Contaminated Soils	Ingestion of soil and dust. Dermal contact with soil.	Unlikely to Low Likelihood	Medium	Moderate to Low	*Pollution Linkage 1 refers to proposed site users coming into contact with contaminated soils on the site.* *The site is currently used as car parking for a car dealership and a small car wash is present in the western area. Historically, the site has also been used as a drill shed and sports centre as well as for residential purposes. All former buildings onsite have been demolished and therefore, Made Ground will be present beneath the site which could be a source of metals, PAHs and asbestos.* *Numerous industrial premises have been located within 250m of the site however, the Glacial Till deposits in the general area will have restricted the migration of potential mobile contamination onto the subject site. However, migration may have occurred from the neighbouring repair garage or former adjacent depot.* *The nearby electricity substation to the east may be a potential source of PCBs however, PCBs are immobile and will not have impacted the site.*

	Conceptual Site Model					Qualitative Risk Assessment
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						The proposed development is for a new commercial building which would likely encompass the majority of the site footprint together with car parking and a bin store. The hardstanding will effectively break the pathway to potentially contaminated soils. However, a pathway to contaminated soils will exist in any limited areas of soft landscaping and a potential pollution linkage exists.
PL2	Contaminated Soils	Inhalation of vapour.	Low likelihood	Medium to Severe	Moderate to Low	This pollution linkage refers to volatile vapours migrating into confined spaces within the proposed development. Contamination may be present within the underlying Made Ground soils beneath the site if hydrocarbons have migrated onto site from the adjacent garage or depot. Therefore, a potential pollution linkage may exist.
PL3	Contaminated Soils	Inhalation of soil dust by adjacent site users.	Unlikely	Medium	Low	Pollution Linkage 3 relates to contamination on the subject site affecting adjacent site users. Significant mobile contamination is not anticipated to be present beneath the site therefore, a realistic pollution linkage is not considered to exist.
PL4	Contaminated Soils	Attacking potable water supply pipe.	Unlikely to Low Likelihood	Medium	Moderate to Low	Pollution Linkage 4 refers to the possible contaminants permeating potable water supply pipes and consumption by the future site end users of the tainted water supply.

	Conceptual Site Model					Qualitative Risk Assessment
PL	Potential Source	Pollution Linkage	Likelihood	Consequence/ Severity	Risk Rating	Rationale and Action
						Made Ground is likely to be present at installation depth which may be contaminated with a range of Contaminants of Concern including localised hydrocarbons. *New water supply pipes will be included as part of the development therefore a potential pollution linkage is considered to exist. A local water company risk assessment is likely to be required prior to construction to advise on the level of protection required for the potable water supply.*
PL5	Ground Gas	Migration and accumulation of ground gas in internal spaces.	Likely	Medium to Severe	Moderate	*Made Ground is likely to be present beneath the site due to the presence of previous residential and commercial buildings which have been demolished. Depending on the composition of any backfill material, ground gases may be generated.* *Ardwick Cemetery is located 100m north east of the site which could be a source of ground gases. In addition, borehole records 25m east and 30m north indicate the presence of deep Made Ground to depths of between 2.0m and 2.6m bgl which could also be a possible source of ground gases.* *The north of the site is indicated to lie within an area requiring full radon precautions within foundations however, the southern area is in an area requiring none. A site-specific radon search should be carried out through the BGS to confirm the exact level of radon precautions required for the site.* *Potential sources of permanent ground gases and radon have been identified and a pollution linkage is considered to exist.*

Controlled Waters Pollution Linkage Assessment



- The table below represents the first stage in the land quality risk assessment process – Qualitative Risk Assessment.
- In order for a development site to be deemed suitable for use the level of risk needs to be reduced to an acceptable level – low to negligible risk. The purpose of each stage of risk assessment is to establish if there is a requirement for additional stages of assessment in order to have sufficient confidence to support a risk characterisation or remedial action.

	Conceptual Site Model					Qualitative Risk Assessment
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
PL5	Contaminated Soils	Impaction of groundwater from soil contamination (diffuse and point) Impaction of groundwater from groundwater plume.	Unlikely	Medium	Low	*Potentially contaminated Made Ground is likely to be present beneath the site as a consequence of both residential and commercial buildings being present on site in addition to a car park and small car wash. However, it is unlikely that gross mobile contamination is present at the site therefore contamination is likely to be relatively immobile.* *Geological maps indicate that the site is underlain by Glacial Till (Secondary Undifferentiated Aquifer) and the bedrock is the Chester Pebble Beds Formation (Principal Aquifer). However, a pollution linkage is not considered to exist between potentially contaminated soils and the Principal Aquifer as the cohesive superficial Glacial Till deposits will have restricted the downward migration of potential contaminants.* *The site is not within 500m of a Source Protection Zone and therefore the groundwater is not considered to be a sensitive resource. In addition, there are no potable water abstraction licences within 2000m.*

Conceptual Site Model						Qualitative Risk Assessment
PL	Potential source	Pollution linkage	Likelihood	Severity	Level of risk	Rationale
					Low	Furthermore, the proposed development will be predominantly covered with hardsurfacing and a new drainage system installed. This will considerably reduce infiltration and leaching of potential contaminants. Therefore, a viable pollution linkage is not considered to exist.
PL7	Contaminated Soils	Migration of soil and groundwater contamination impacting surface waters.	Unlikely	Medium		Pollution Linkage 7 refers to the impaction of the Corn Brook, which is an underground watercourse beneath the north west corner of the site, from contaminated soils and groundwater. The watercourse is likely to be culverted. A significant source of mobile contamination has not been identified onsite which may have impacted the brook. Therefore, a pollution linkage is not considered to exist at this stage.

5.0 GROUND ENGINEERING RECOMENDATIONS AND POTENTIAL LIMITATIONS

5.1 Preliminary Foundation Assessment

It is proposed construct a self-storage building onsite which will be surrounded by car parking and a bin store.

Geological plans show the site to be underlain by superficial Glacial Till and the bedrock is the Chester Pebble Beds Formation which typically comprises sandstone.

Made Ground is likely to be present beneath the site as a consequence of residential and commercial buildings onsite being demolished. In addition, borehole records 25m east and 30m north indicate the presence of deep Made Ground to depths of between 2.0m and 2.6m bgl.

Foundation designs will be dictated by the depth of Made Ground present beneath the site. If shallow Made Ground is present, traditional strip/trench fill and/or pad foundations may be a viable option constructed in the underlying natural Glacial Till deposits depending on the anticipated loadings of the proposed structure. However, if anticipated loadings for the proposed development are high or deep Made Ground is encountered, foundations may need to be piled transferring loads to the underlying sandstone bedrock.

Foundations will need to be designed such that they do not undermine the neighbouring structures.

The above preliminary foundation recommendations are based on desk-based information and should be confirmed by a ground investigation in accordance with current guidance.

5.2 Additional Limitations

UXO
A potential risk from UXO has been identified at the site. It is recommended that the following risk mitigation strategy be executed prior to any intrusive works.

- *Full UXO Desk Top Study be carried out for the Site prior to intrusive works*
  or
- *a UXO Risk Mitigation Engineer be on Site for all ground works*

Coal Mining
The site is not indicated to be within an area affected by a legacy shallow coal mining.

SuDS
Made Ground and natural Clay are likely to be present beneath the site therefore a SuDS drainage solution is unlikely to be feasible for the proposed commercial development.

Underground Watercourse
The Corn Brook, which is described as an underground watercourse, is shown to pass beneath the north western part of the site. This feature is probably culverted and therefore its position should be considered in the final development proposals.

6.0 CONCLUSIONS AND GROUND INVESTIGATION SCOPE RATIONALE

6.1 Land Quality

The earliest historical maps indicate that Hyde Road House was present onsite until the 1890s. Following its demolition, a new building was erected on site which has been historically utilised as both a drill shed and sports centre. This building no longer resides on site and the area is instead used as a hardsurfaced car park for a car dealership.

Based on the history of the site, there is the potential for contaminated soils to be present beneath the site. The site will be predominantly covered with hardsurfacing which will break the pathway to potentially contaminated soils. A potential pollution linkage will exist in any limited areas of soft landscaping. The risk to human health is therefore considered to be *Moderate to Low*.

The risk from volatile vapours is considered to be *Low*.

There is considered to be a *Moderate to Low* risk of contaminated soils attacking potable water supply pipes.

Potential onsite and offsite sources of ground gases have been identified therefore, the risk from permanent ground gases is considered to be *Moderate*.

The north of the site is indicated to lie within an area requiring full radon precautions within foundations however, the southern area is in an area requiring none. A site-specific radon search should be carried out through the BGS to confirm the exact level of radon precautions required for the site.

A significant source of mobile contamination has not been identified therefore the risk to controlled waters is considered to be *Low*.

6.2 Ground Engineering

Foundation designs will be dictated by the depth of Made Ground present beneath the site. If shallow Made Ground is present, traditional strip/trench fill and/or pad foundations may be a viable option constructed in the underlying natural Glacial Till deposits depending on the anticipated loadings of the proposed structure. However, if anticipated loadings for the proposed development are high or deep Made Ground is encountered, foundations may need to be piled transferring loads to the underlying sandstone bedrock.

6.3 Additional Considerations

A potential risk from UXO has been identified at the site. It is recommended that either a full UXO Desk Top Study be carried out for the Site prior to any intrusive works commencing or a UXO Risk Mitigation Engineer be on Site for all ground works.

Made Ground and natural Clay are likely to be present beneath the site therefore a SuDS drainage solution is unlikely to be feasible for the proposed commercial development.

The Corn Brook, which is described as an underground watercourse, is shown to pass beneath the north western part of the site. This feature is probably culverted and therefore its position should be considered in the final development proposals.

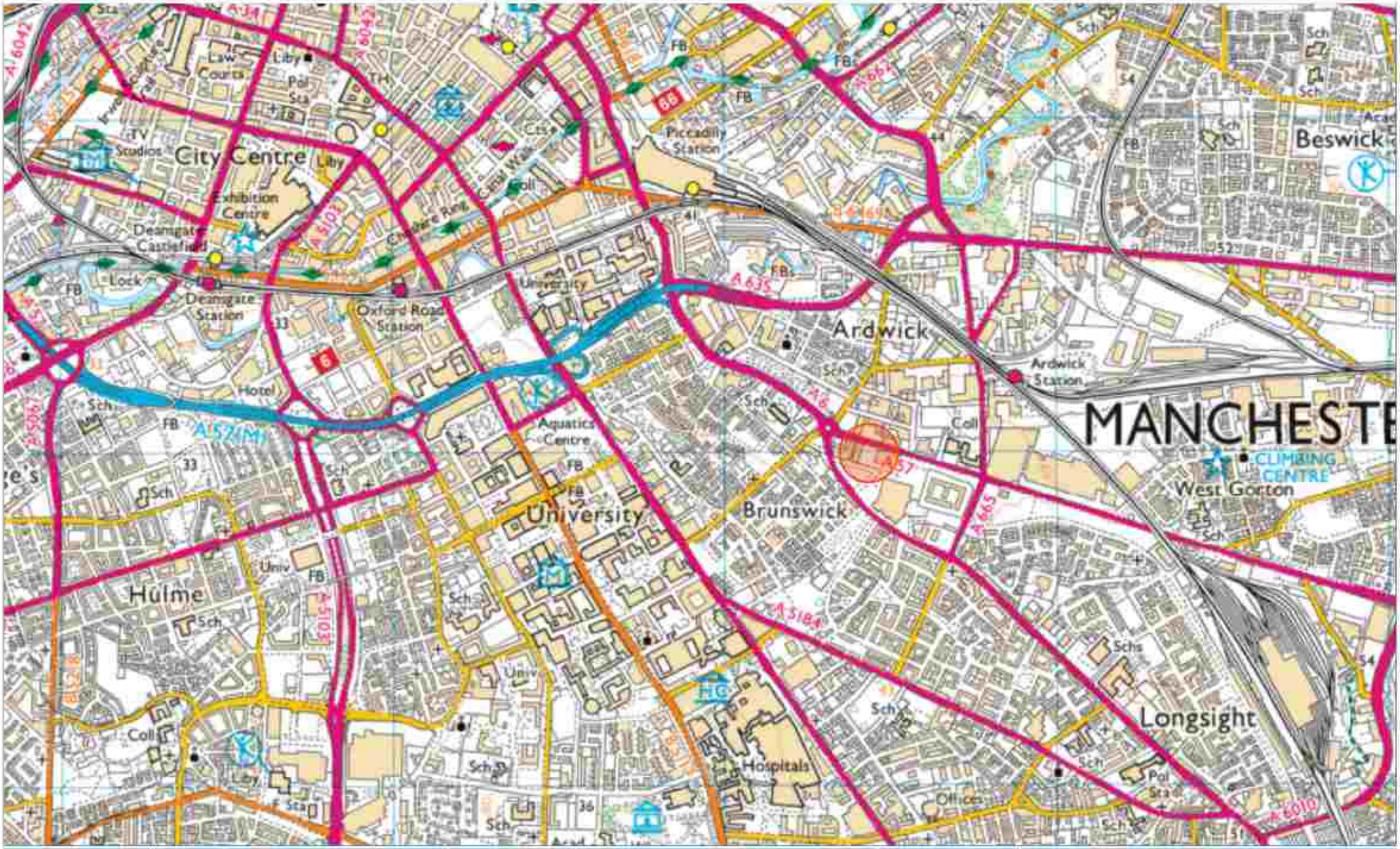
6.4 Recommended Ground Investigation Scope of Investigation

Based on the information in this report we consider a main investigation is required in accordance with BS 10175:2017 and BS 22475. The following scope of works is recommended based on the Preliminary CSM compiled, additional works may be required as the result of planning conditions for the proposed development:

Method of Investigation	G / E
UXO supervision or commission of a Detailed UXO Desk Top Study Report	-
10 No. windowless sample boreholes to c. 5m bgl	*G / E*
Shallow gas monitoring installations	*E*
Chemical testing comprising metals, PAHs, TPH CWG, VOCs, SVOCs and asbestos	*E*
Geotechnical testing comprising aggressivity, classification, strength and stiffness analysis	*G*
Ground gas and groundwater monitoring	*E*

Note *Environmental (E) / Geotechnical (G)*

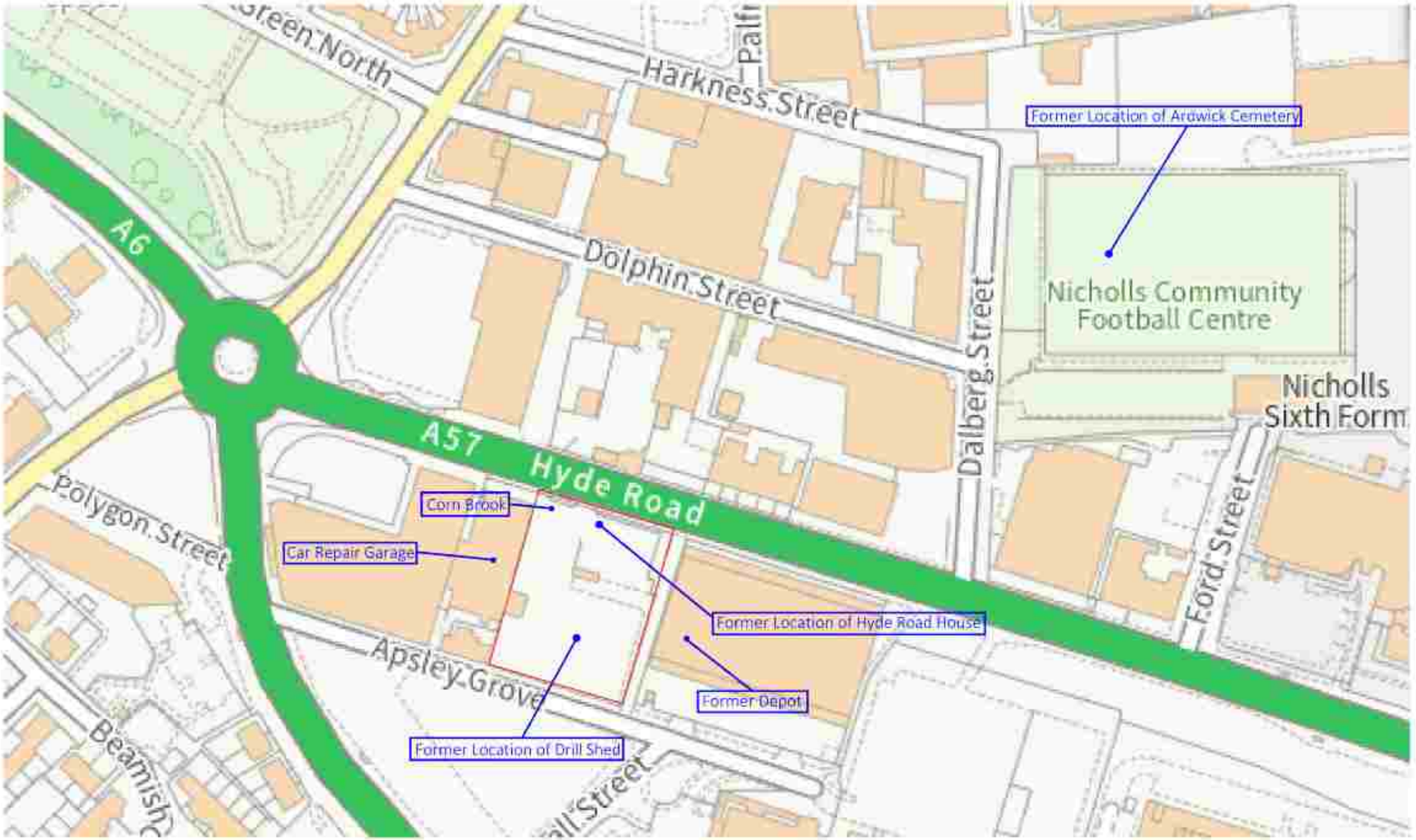
APPENDIX 1 - Plans



GROUNDTECH

CLIENT: DRIVEN ADVISORY	DATE: MARCH 2023		Status: Preliminary
PROJECT TITLE: 34 HYDE ROAD, ARDWICK	SCALE: NTS		Draft
			Issued
			For comment
PLAN TITLE: PROJECT LOCATION PLAN	PLAN NUMBER: GRO-22366-P01		Approved
		Rev. Details Date	

Notes

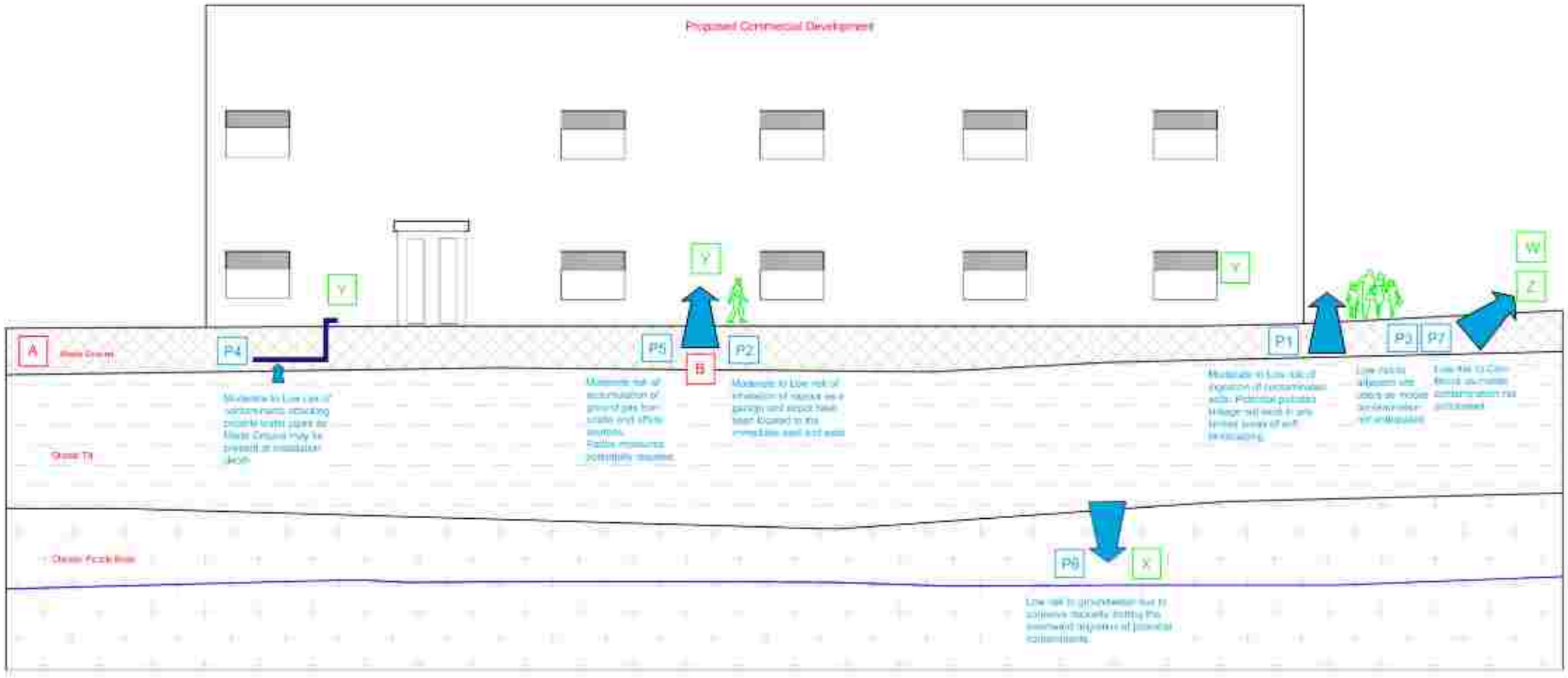


GROUNDTECH CONSULTING	CLIENT: CROWN ADVISORY	DATE: MARCH 2023				Status	Notes
	PROJECT TITLE: 1A HYDE ROAD, ARDWICK	SCALE: N°S				Preliminary	
						Draft	
	PLAN TITLE: PRELIMINARY DEVELOPMENT CONSTRAINTS PLAN	PLAN NUMBER: GRO 22355 P02				Issued	●
						For comment	
			Rev.	Details	Date	Approved	

SOURCES
A. Contaminated soils / Made ground. B. Ground gas.

POLLUTION LINKAGES
P1. Ingestion of soil and dust. P2. Inhalation of vapour. P3. Inhalation of soil dust by adjacent site users. P4. Attacking of potable water supply pipe. P5. Migration and accumulation of ground gas in informal places. P6. Impaction of groundwater from soil contamination. P7. Migration of soil and groundwater contamination impacting surface waters.

RECEPTORS
W. Corn Brook beneath the north west corner of the site X. Groundwater within the Principal Aquifer. Y. Site end users. Z. Adjacent site users.



GROUNDTECH CONSULTING	CLIENT: CROWN ADVISORY	DATE: MARCH 2023			Status: Preliminary ☐ Draft ☐ Issued ● For Comment ☐ Approved ☐
	PROJECT TITLE: 14 HYDE ROAD, ARDWICK	SCALE: NTS			Notes
	PLAN TITLE: ILLUSTRATIVE PRELIMINARY CSM	PLAN NUMBER: GRO-22366-P03	Rev.	Details / Date	

APPENDIX 2 - Photographs



Photograph 1 – North east of the site and one of the commercial units currently present on site



Photograph 2 – Southern half of the site



Photograph 3 – Northern half of the site



Photograph 4 – South west of the site including the car wash toilet area

APPENDIX 3 - Historical Maps



EMAPSITE™

Site Details:

14 Hyde Road, Manchester, M12 6BW

Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: 1056 Scale Town Plan
Map date: 1851
Scale: 1:1,056
Printed at: 1:1,056

N

Surveyed N/A
Revised N/A
Edition 1851
Copyright N/A
Levelled N/A

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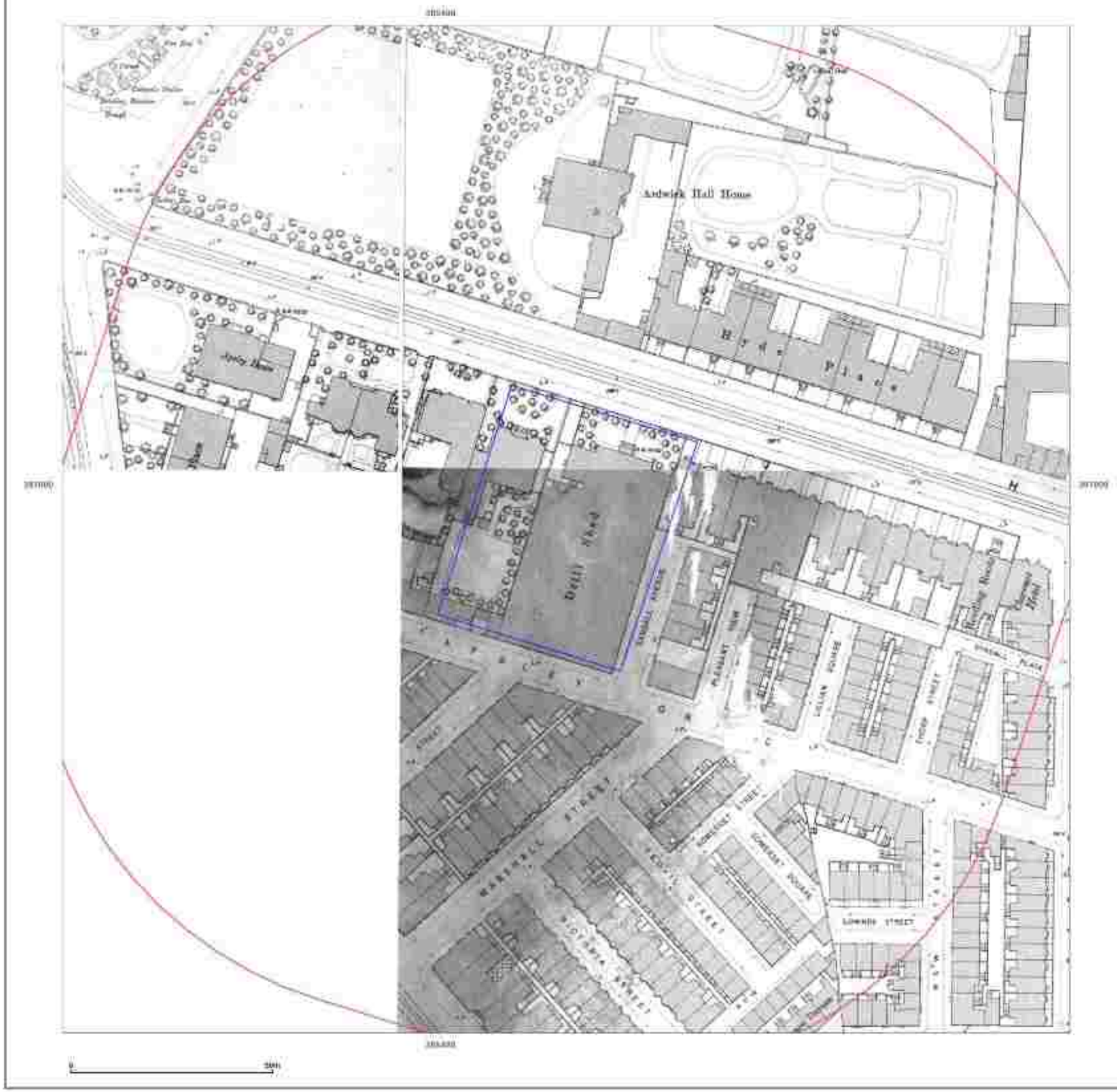
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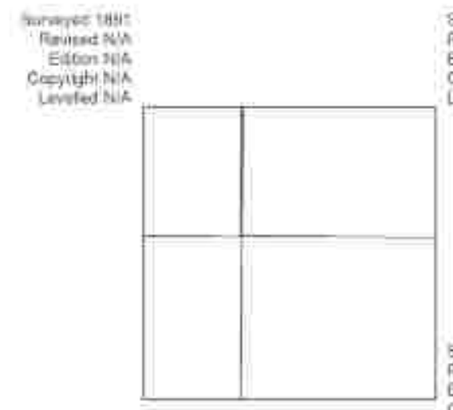
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Map Name: County Series Town Plan
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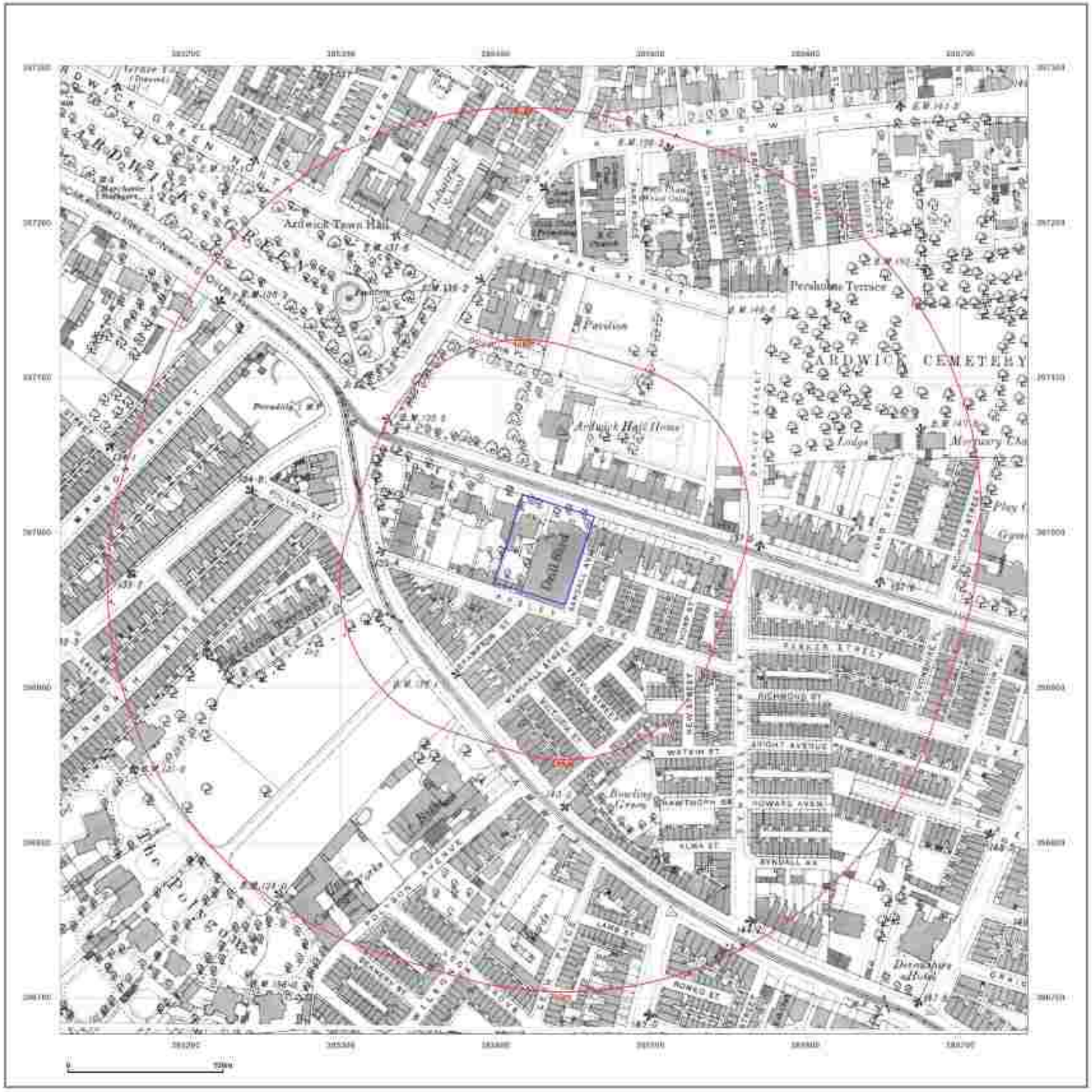
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
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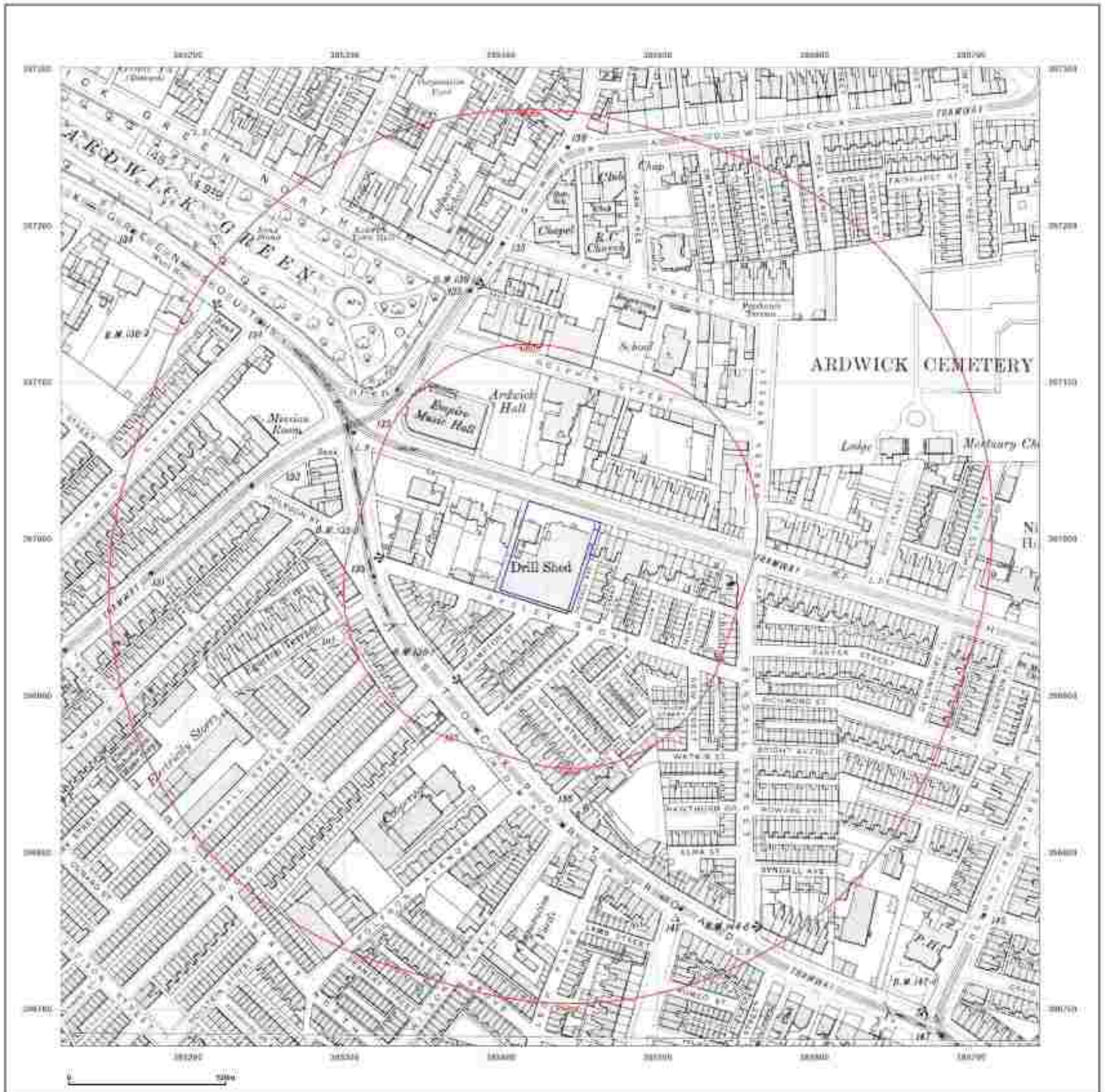
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Report Ref: EMS-816110_1049479
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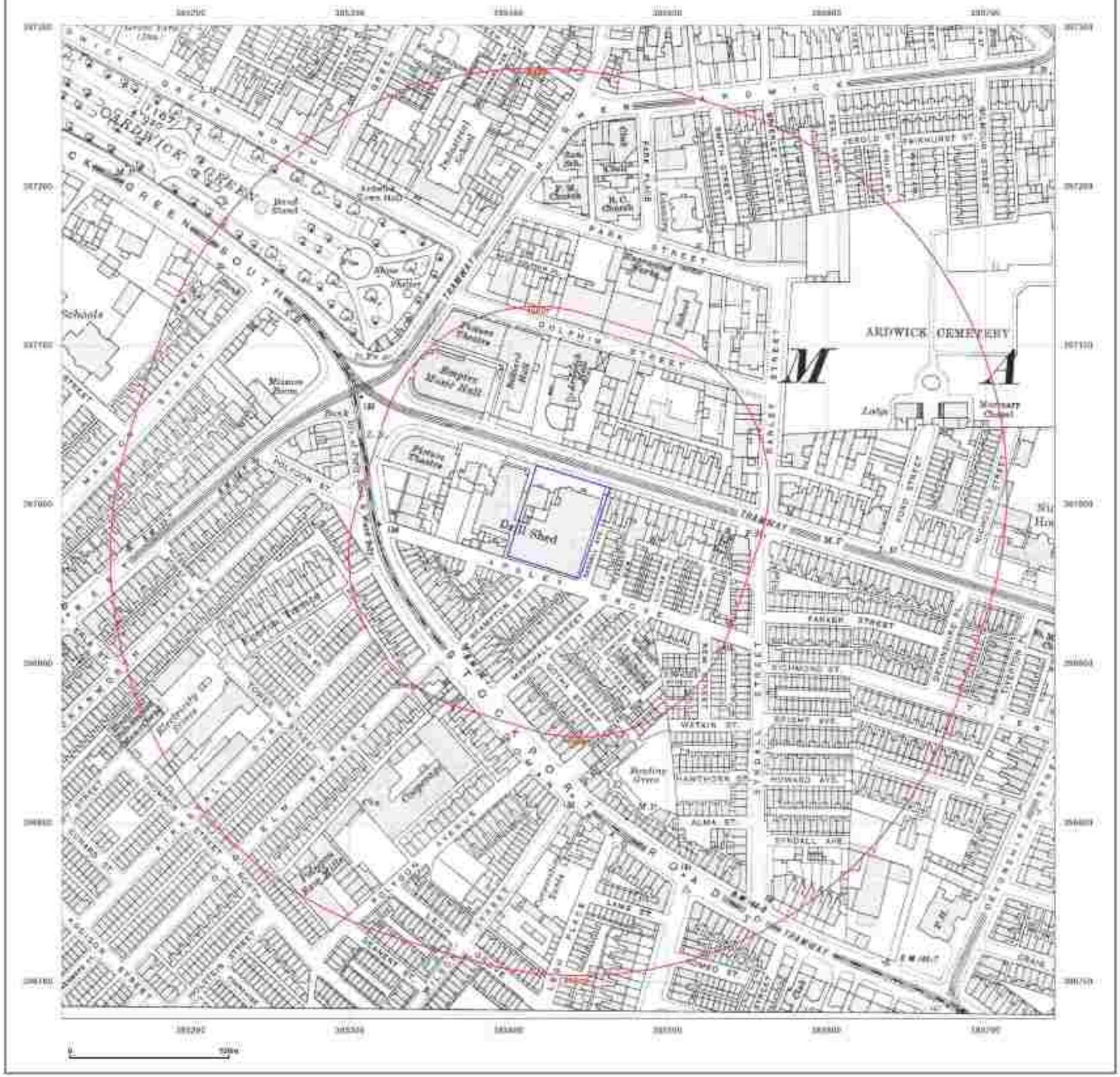
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Revised 1916
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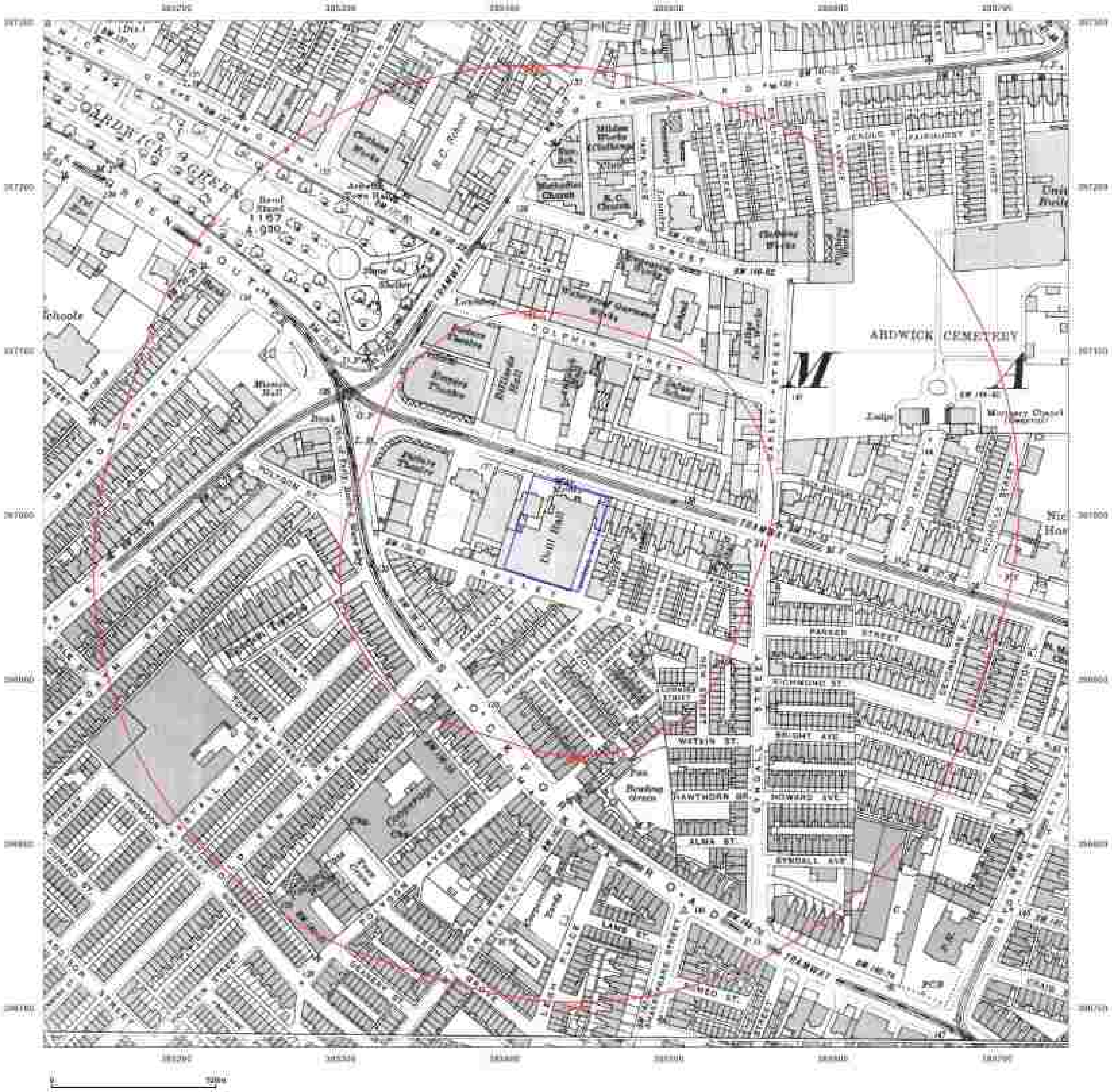
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Map Name: County Series

Map date: 1932-1933

Scale: 1:2,500

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Edition N/A
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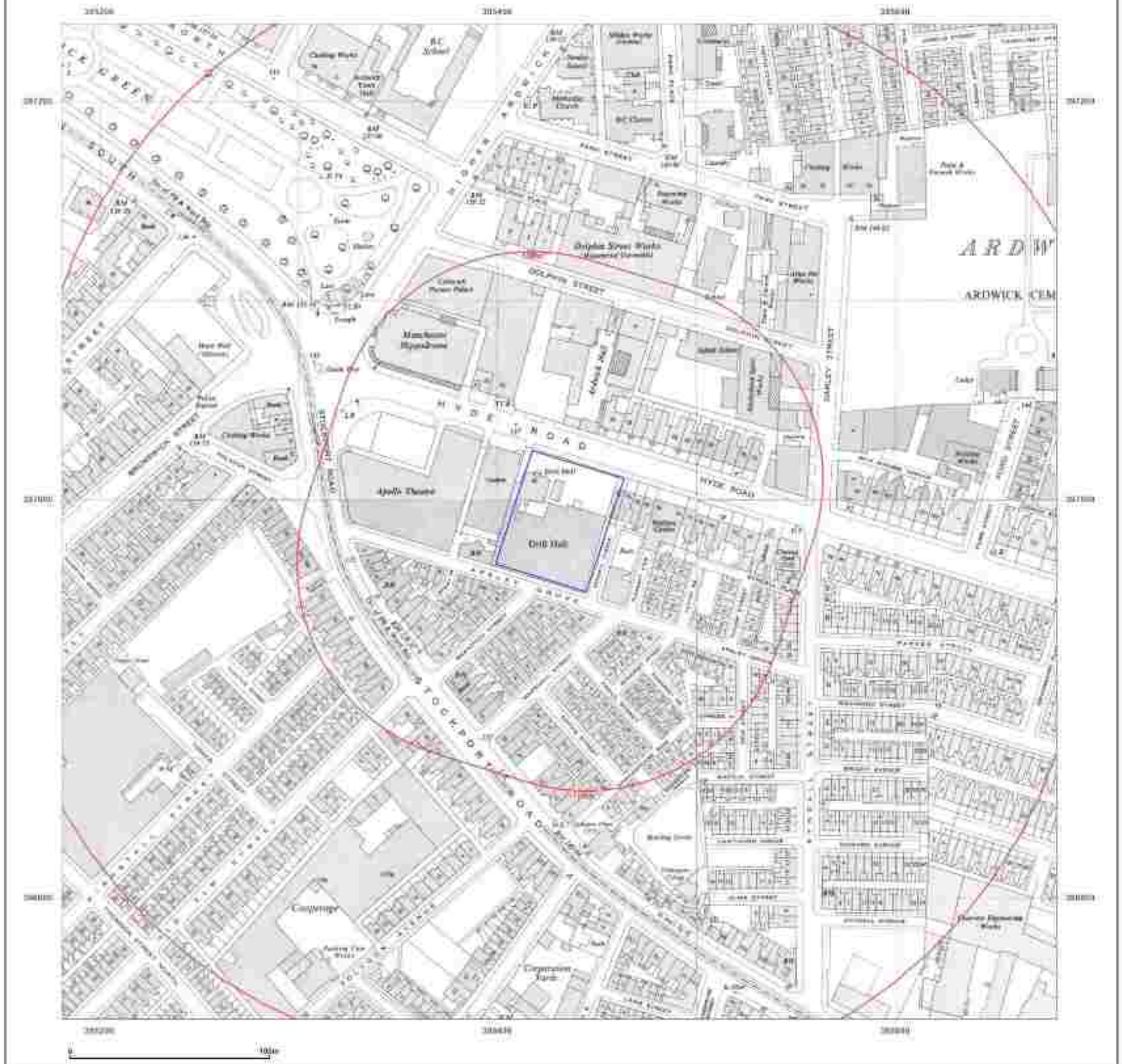
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Report Ref: EMS-816110_1049479
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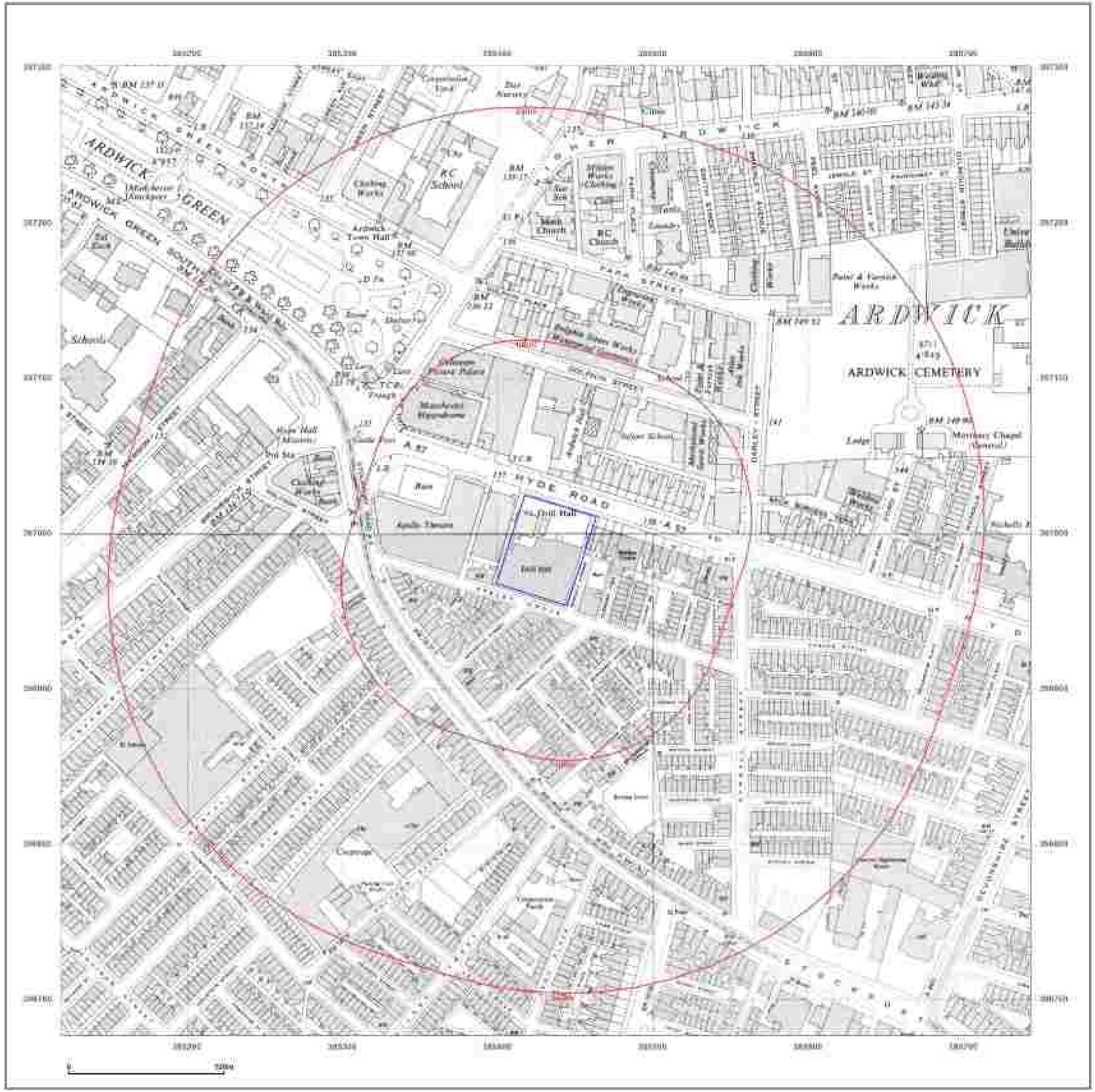
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Map date: 1949-1950

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Edition N/A
Copyright 1949
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Surveyed 1948
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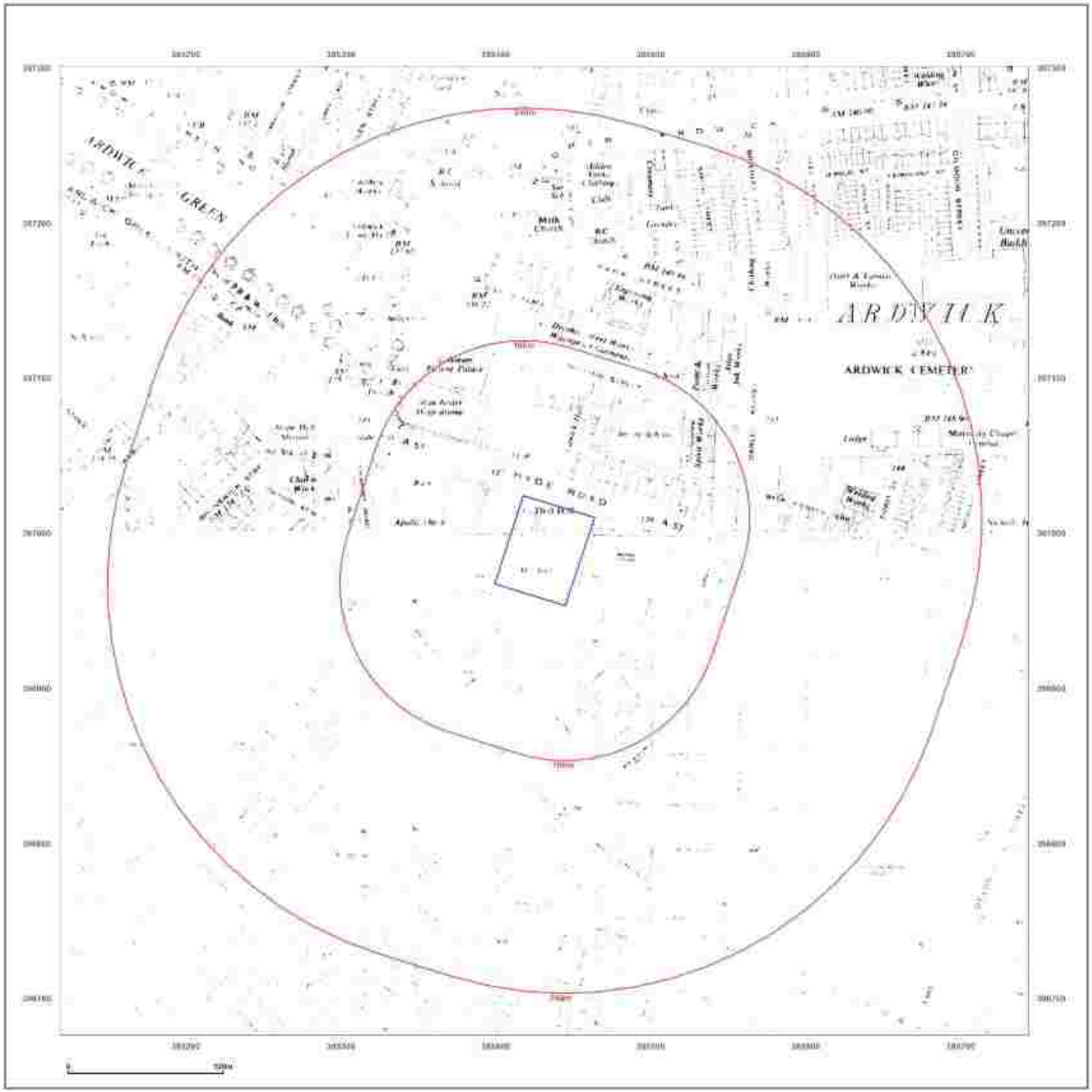
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Revised 1948
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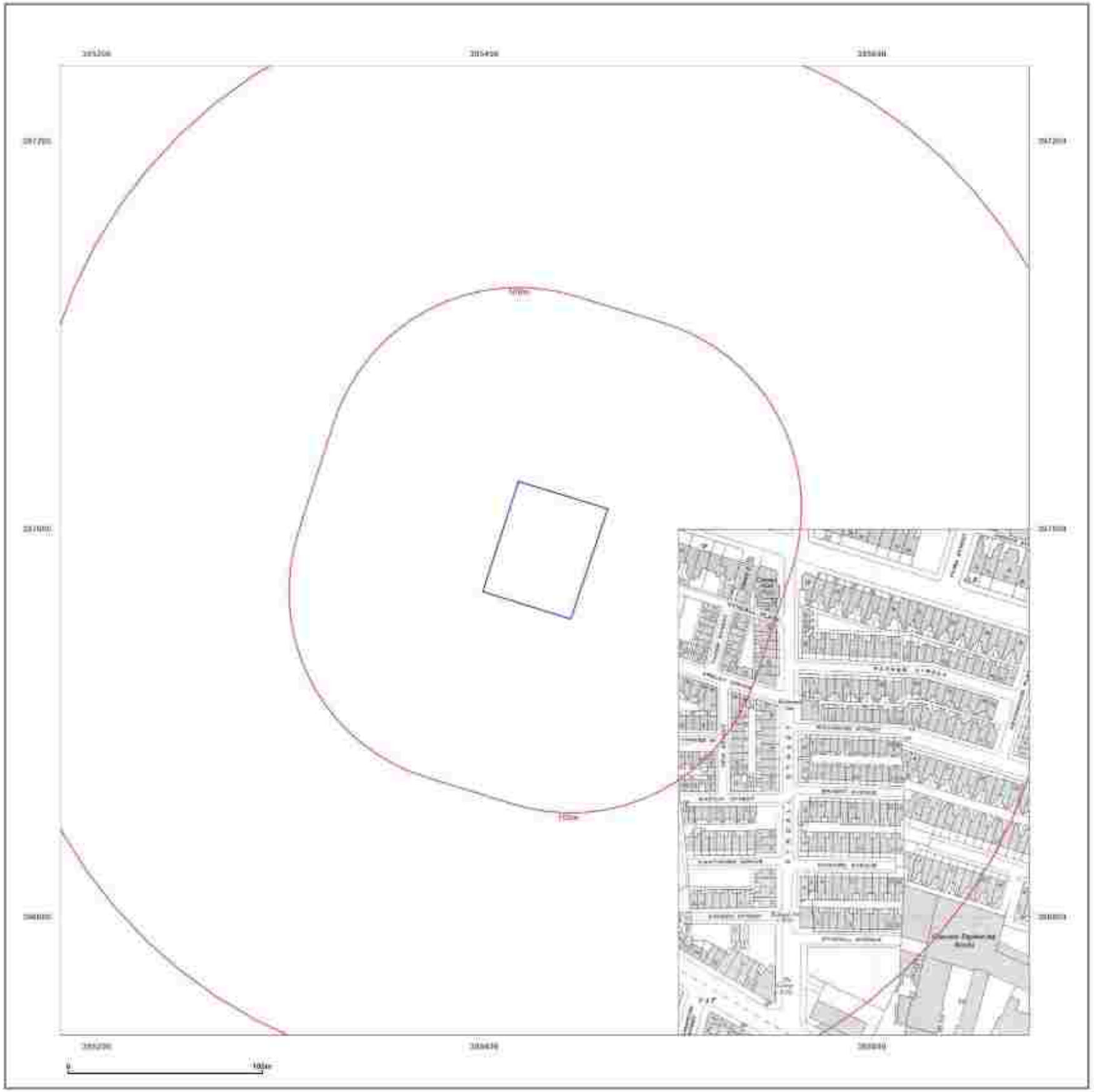
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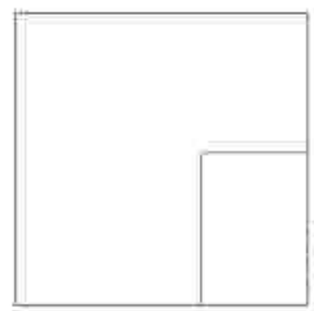
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Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

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Revised 1953
Edition N/A
Copyright 1953
Levelled 1929

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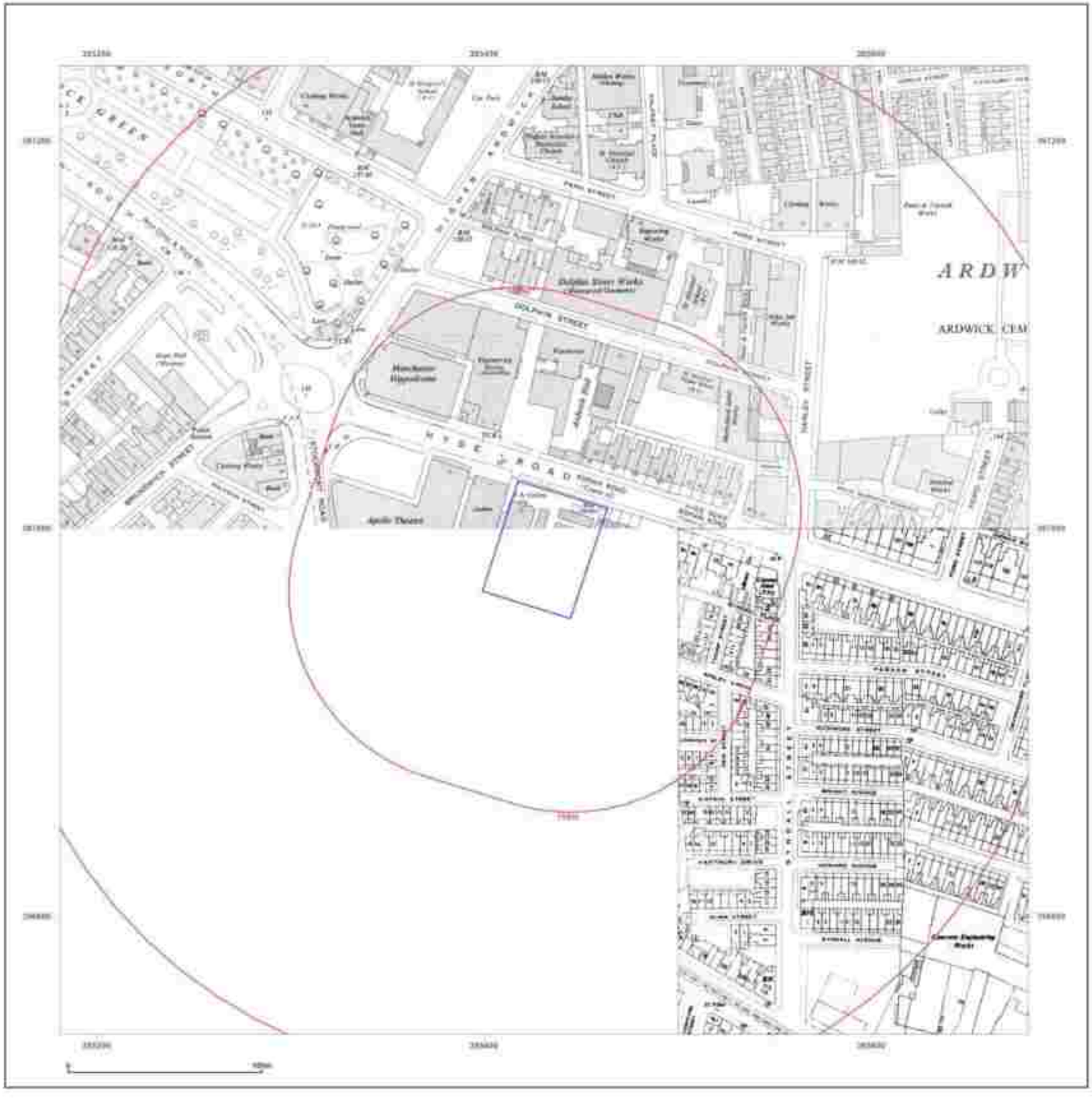
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Revised 1953
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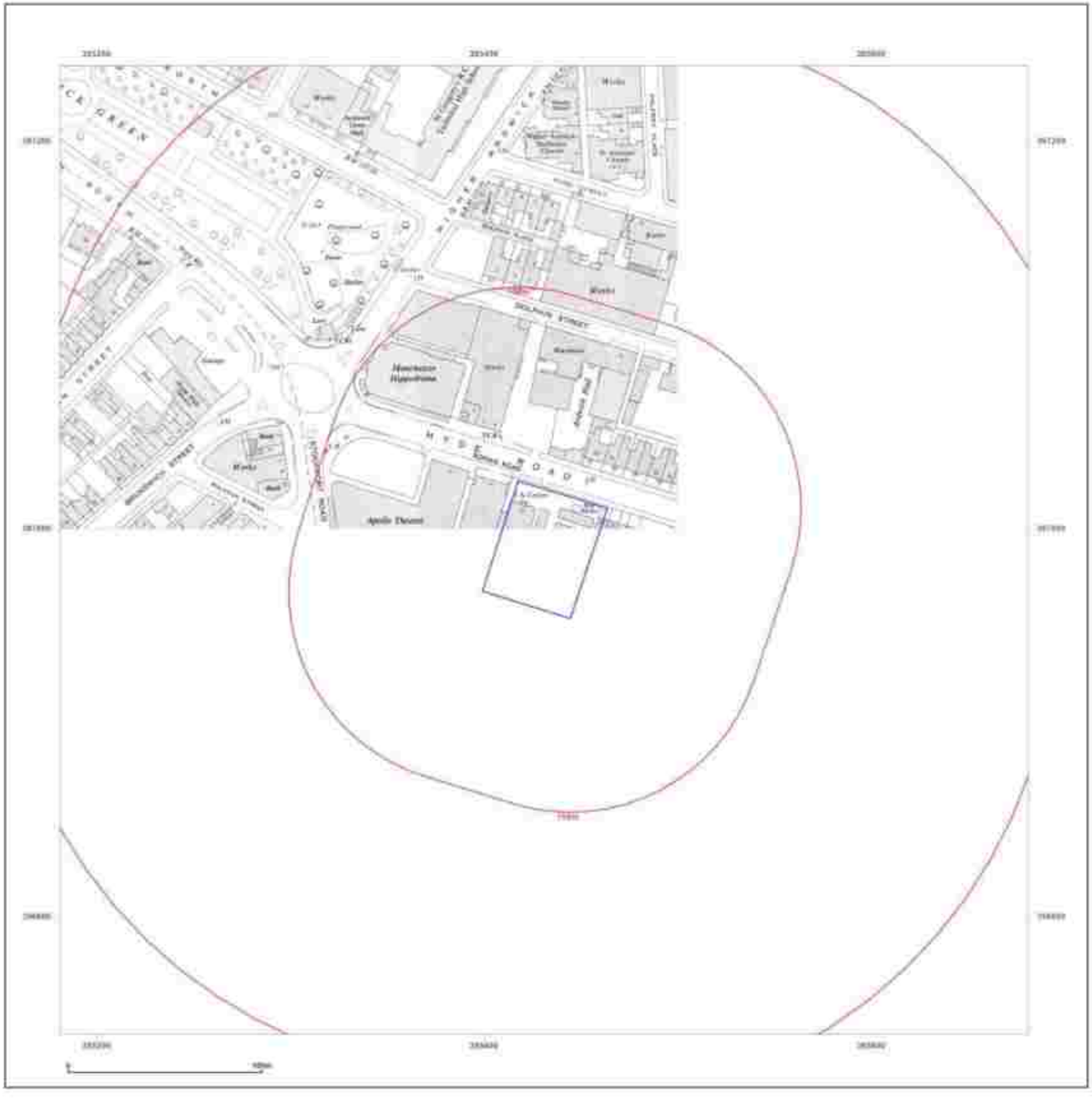
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Grid Ref: 385431, 396989

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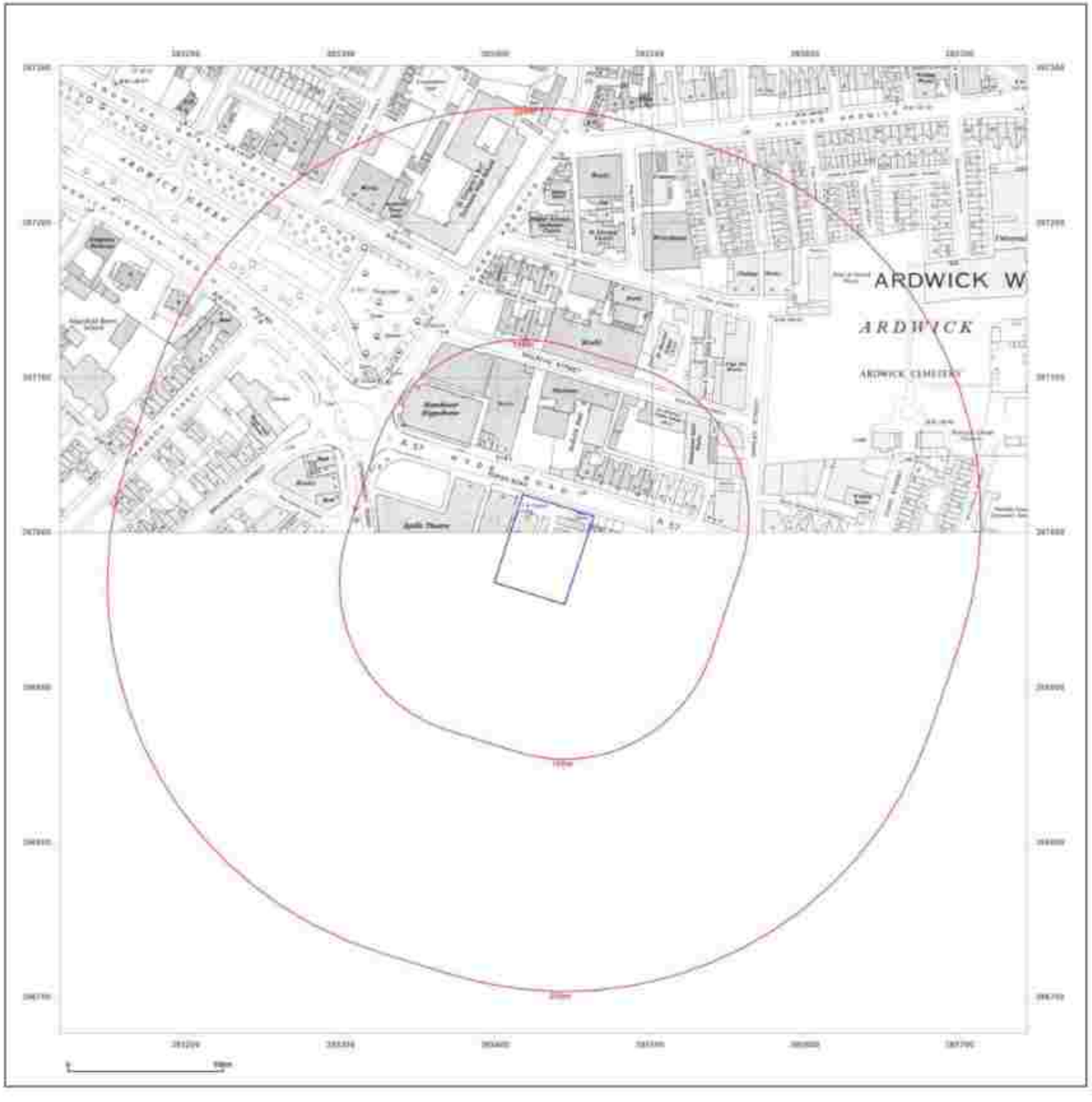
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Report Ref: EMS-816110_1049479
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Revised 1963
Edition N/A
Copyright 1965
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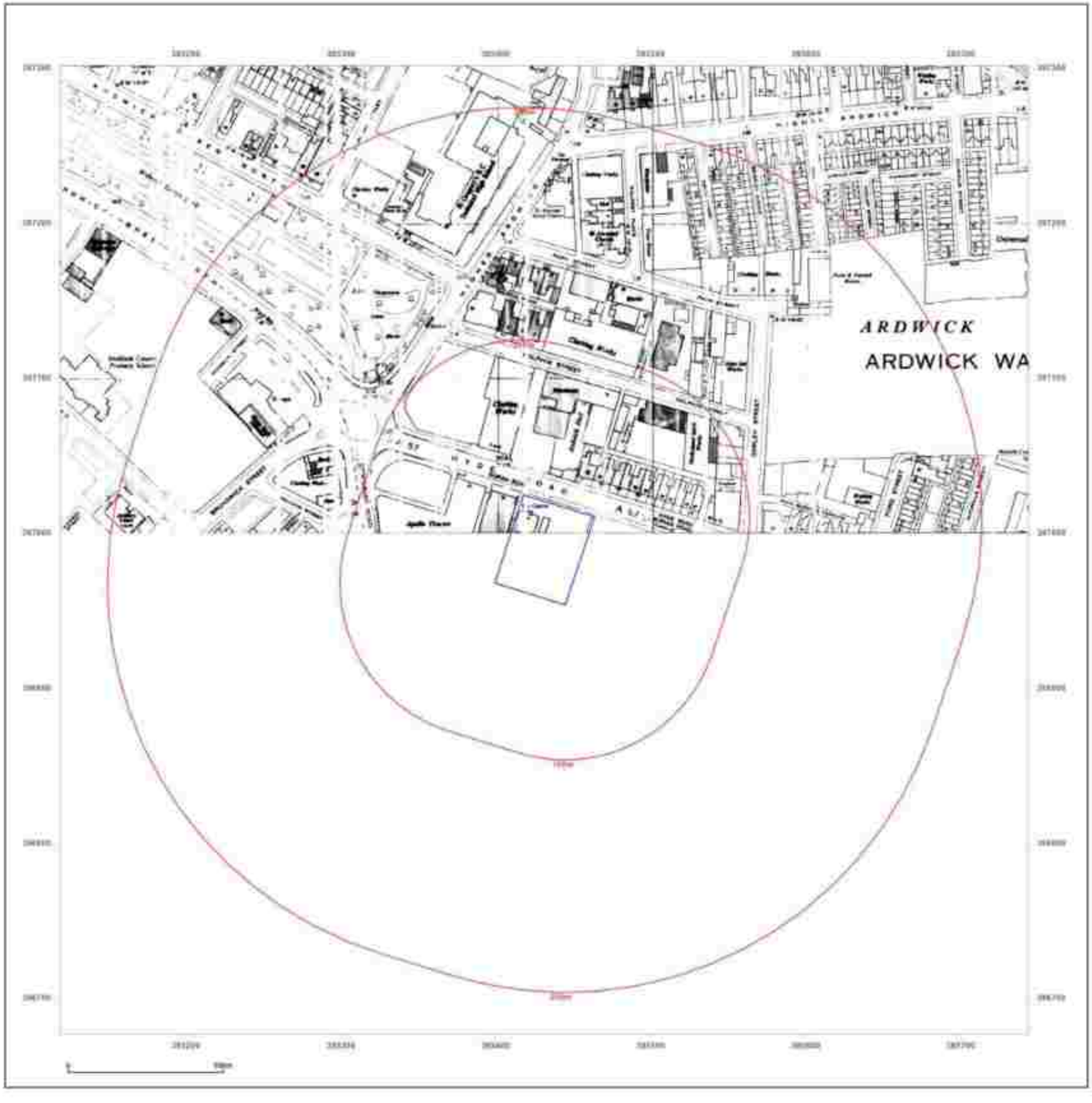
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1970
Scale: 1:2,500
Printed at: 1:2,500

N

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

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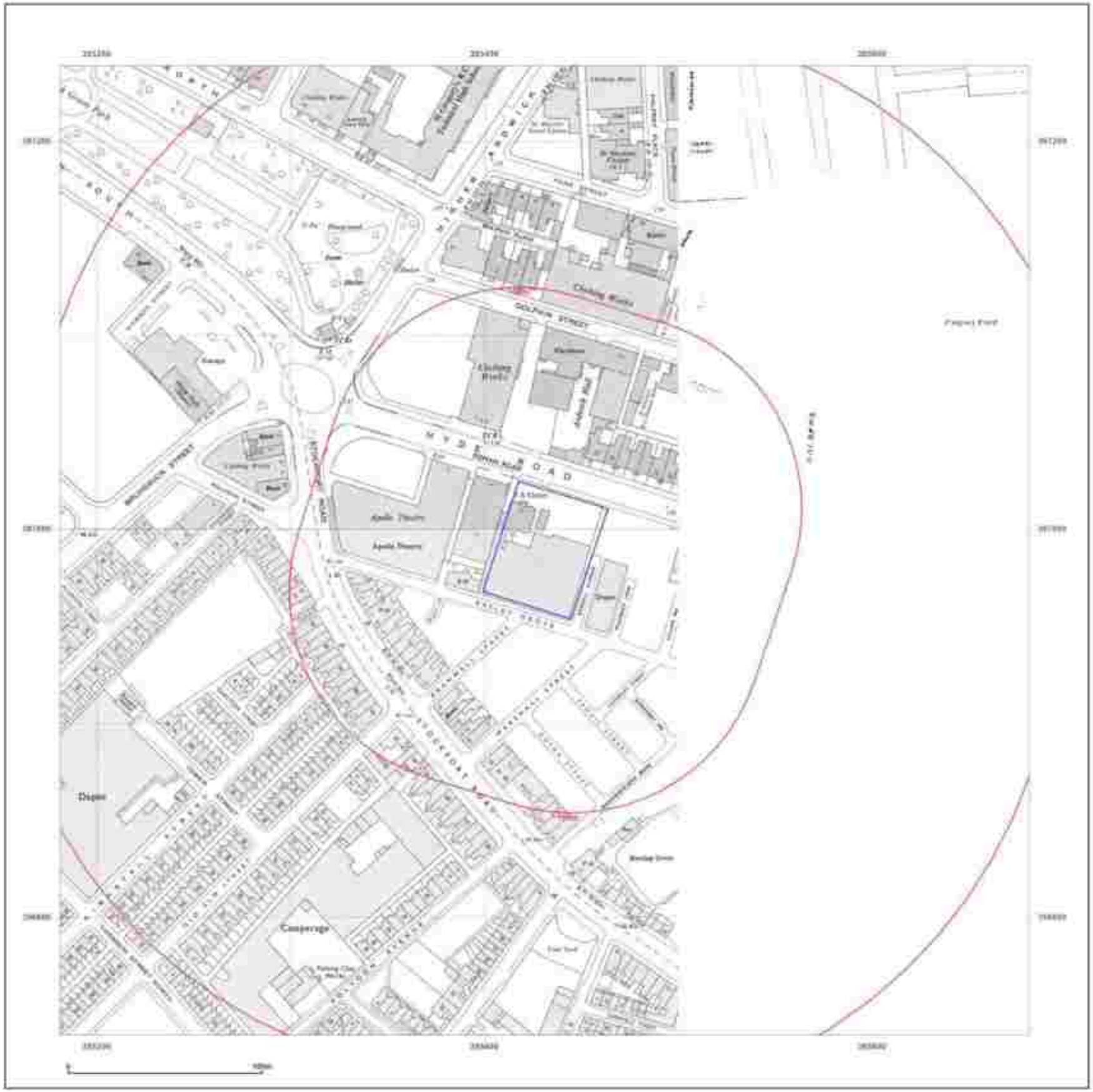
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Site Details:

14 Hyde Road, Manchester, M12 6BW

Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1969-1974
Scale: 1:1,250
Printed at: 1:2,000

N

Surveyed 1962
Revised 1968
Edition N/A
Copyright 1968
Levelled 1964

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

Surveyed 1949
Revised 1968
Edition N/A
Copyright 1970
Levelled 1964

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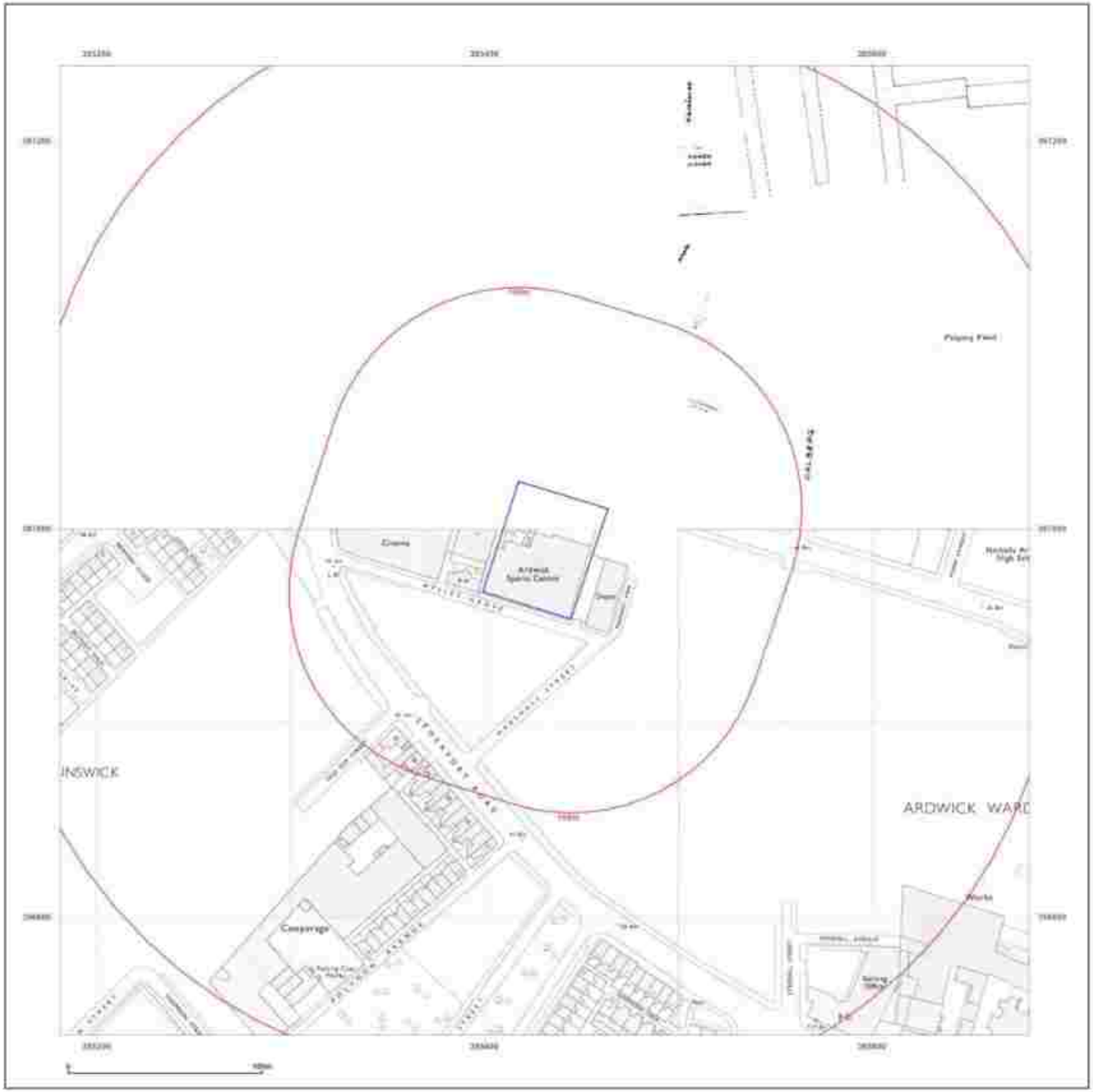
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14 Hyde Road, Manchester, M12 6BW

Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1974-1976
Scale: 1:1,250
Printed at: 1:2,000

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Groundsure

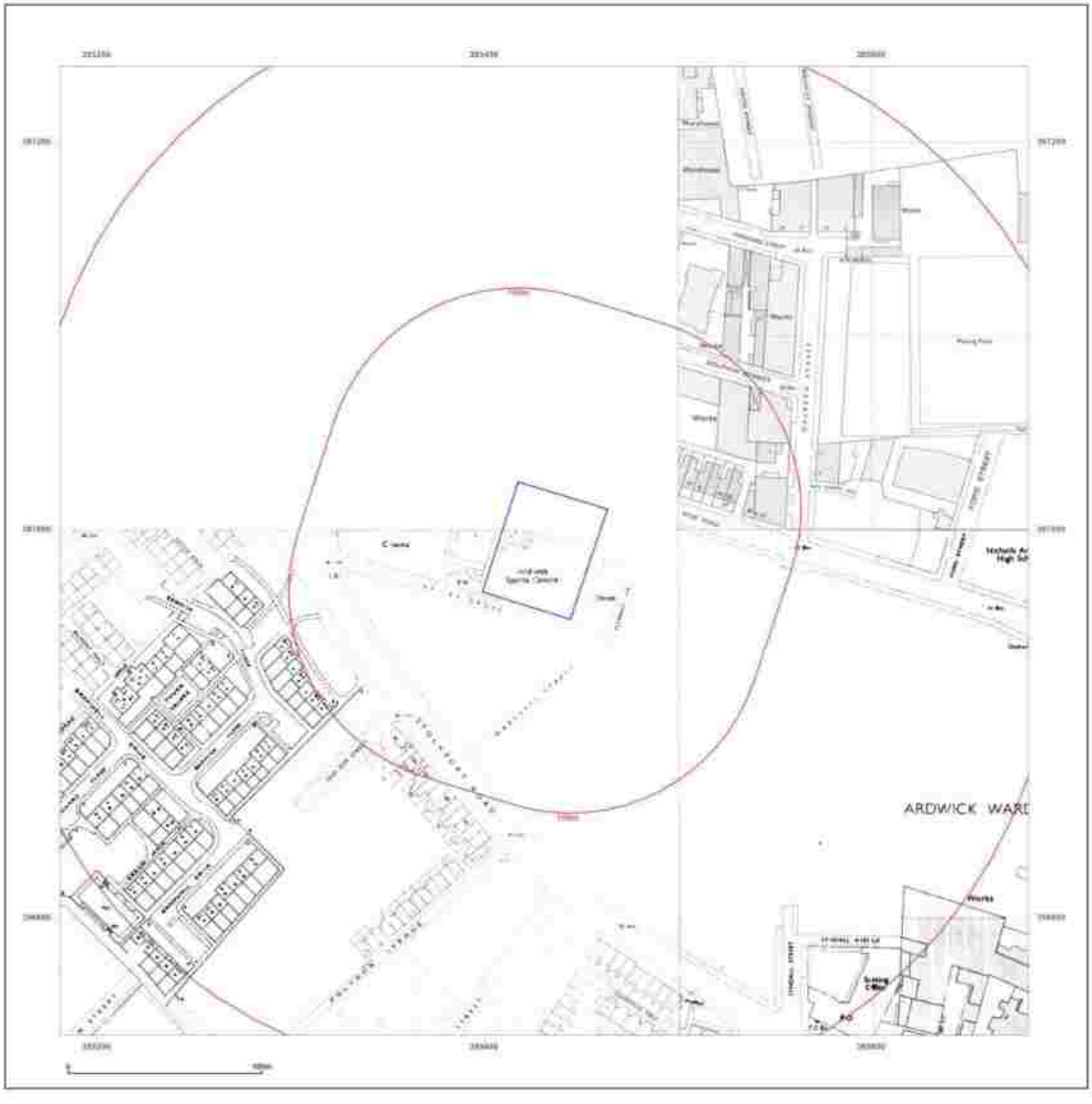
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1977-1978
Scale: 1:1,250
Printed at: 1:2,000

N

Surveyed 1948
Revised 1978
Edition N/A
Copyright 1977
Levelled 1964

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

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
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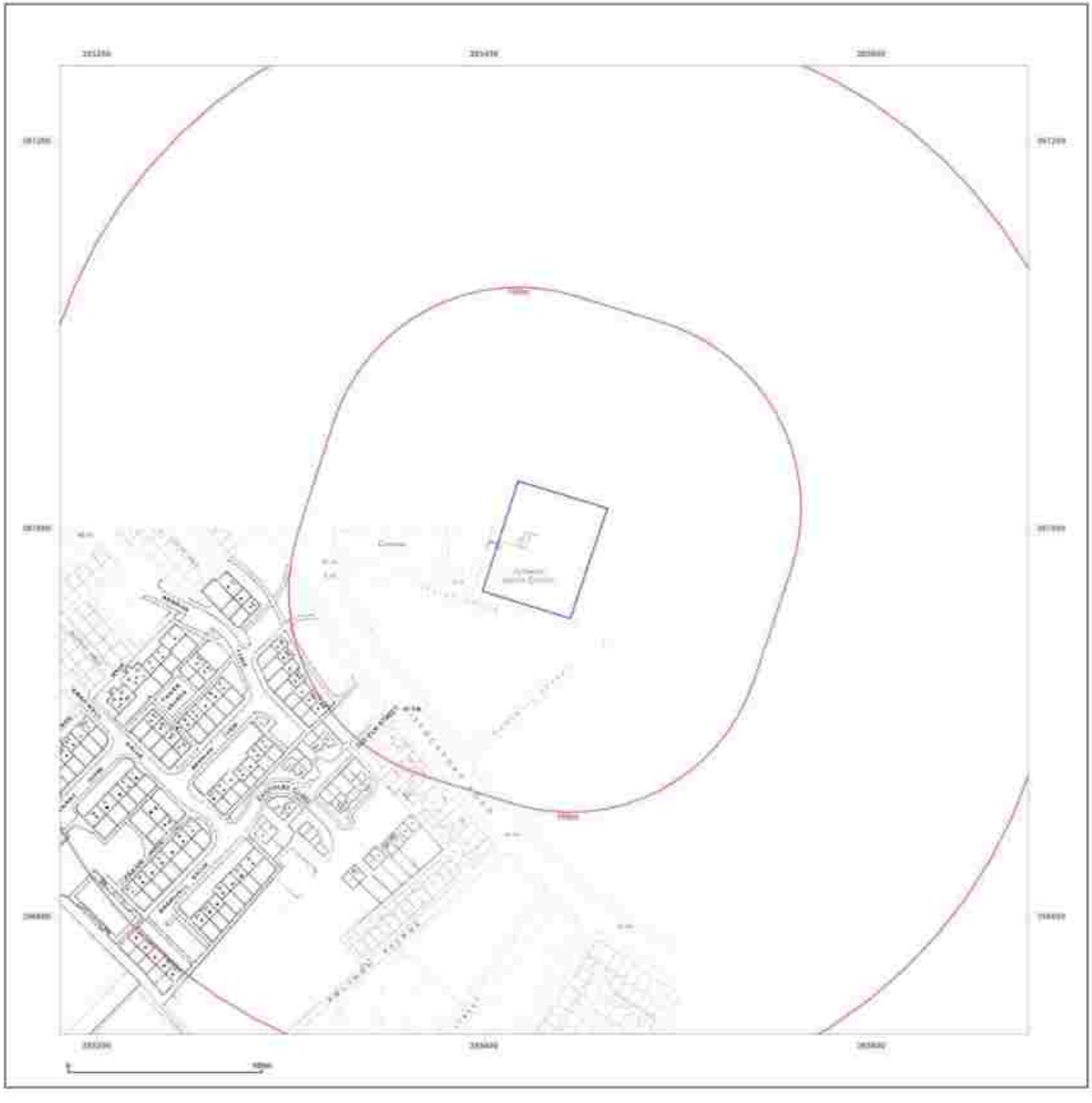
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1983
Scale: 1:1,250
Printed at: 1:2,000





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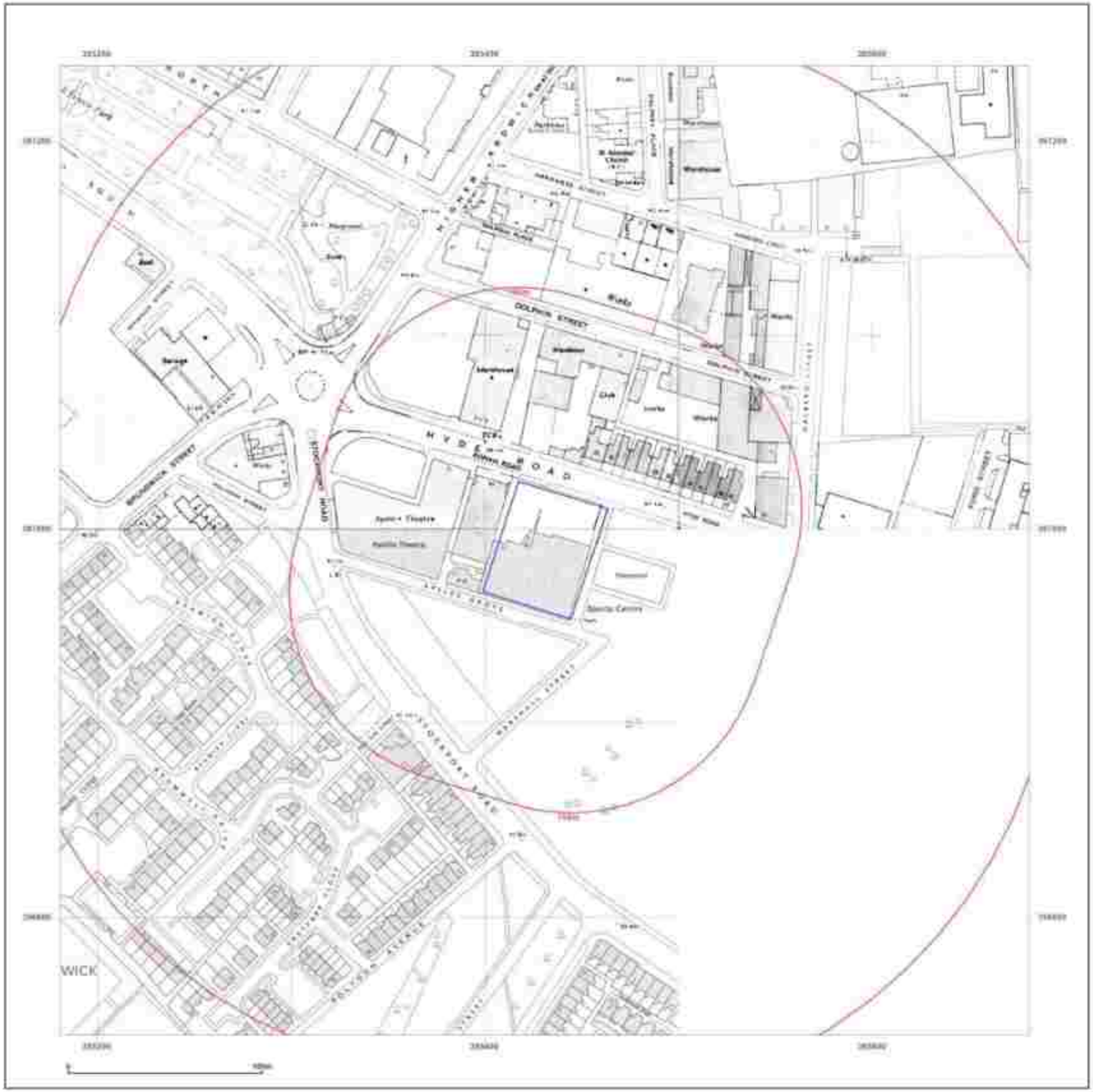
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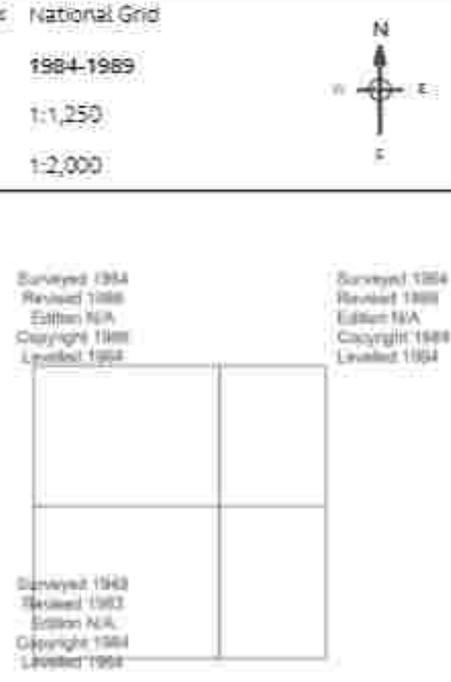
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1984-1989
Scale: 1:1,250
Printed at: 1:2,000

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Groundsure

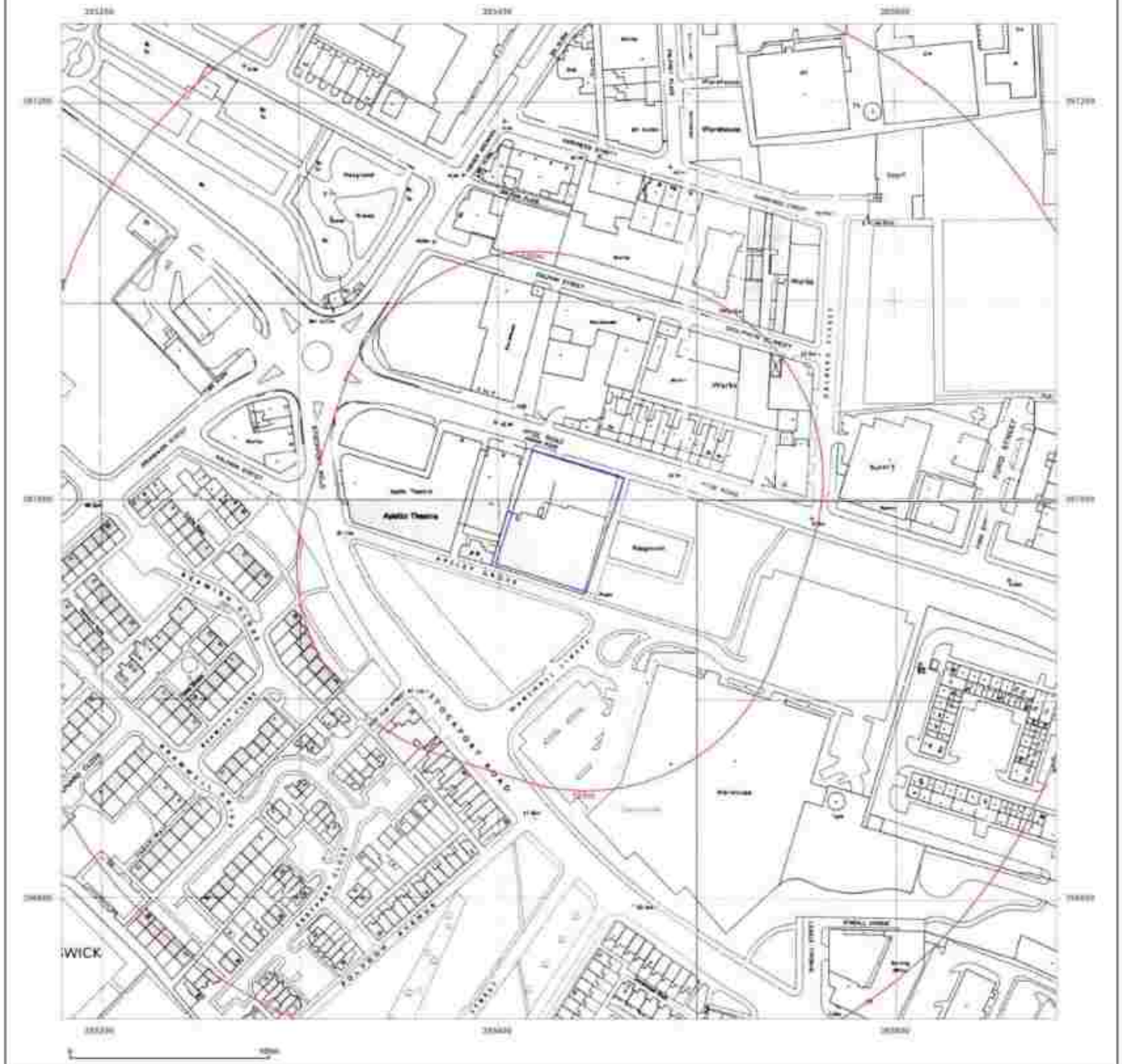
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1991-1992
Scale: 1:1,250
Printed at: 1:2,000

N



Groundsure

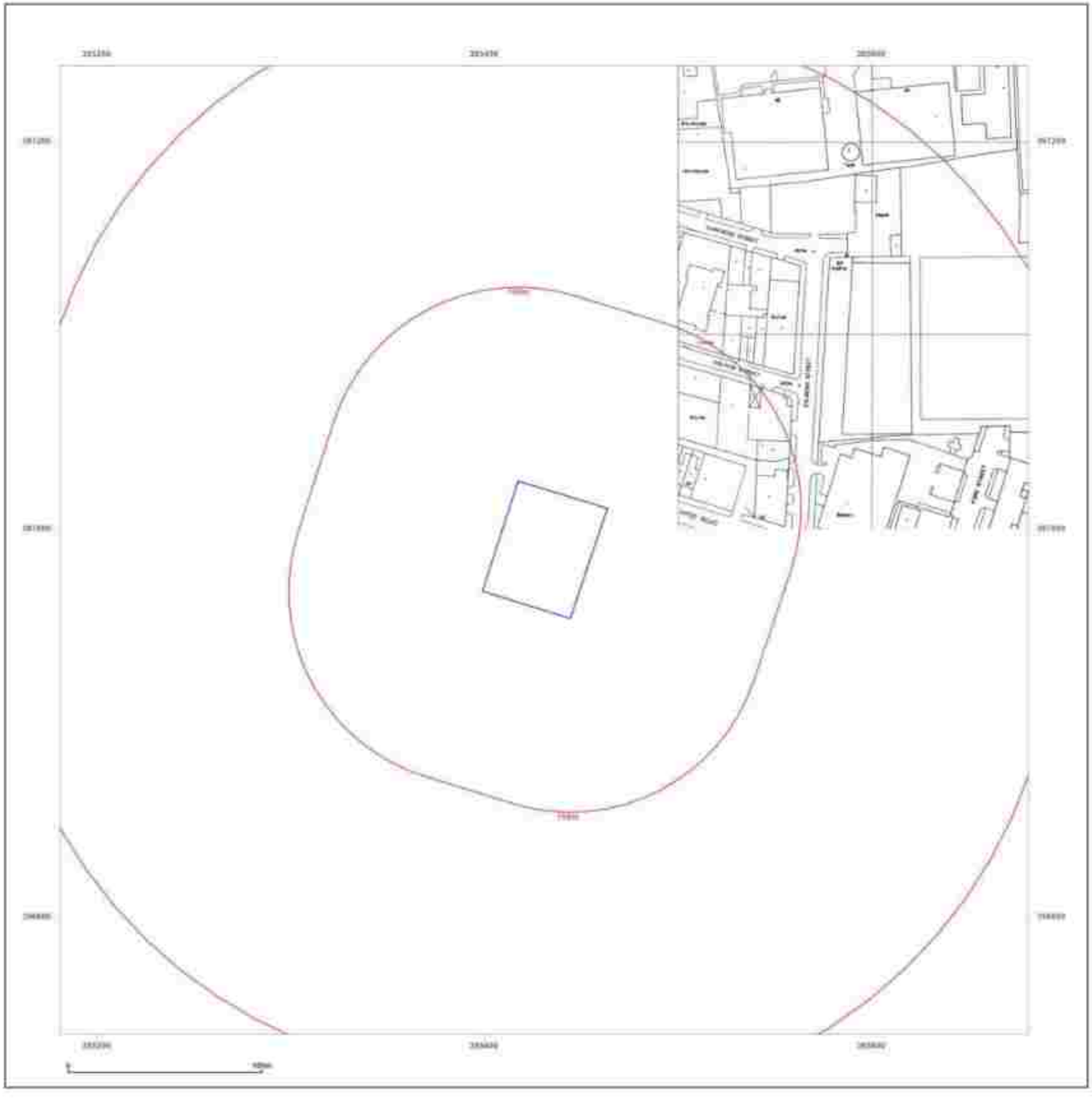
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1994
Scale: 1:1,250
Printed at: 1:2,000

N

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

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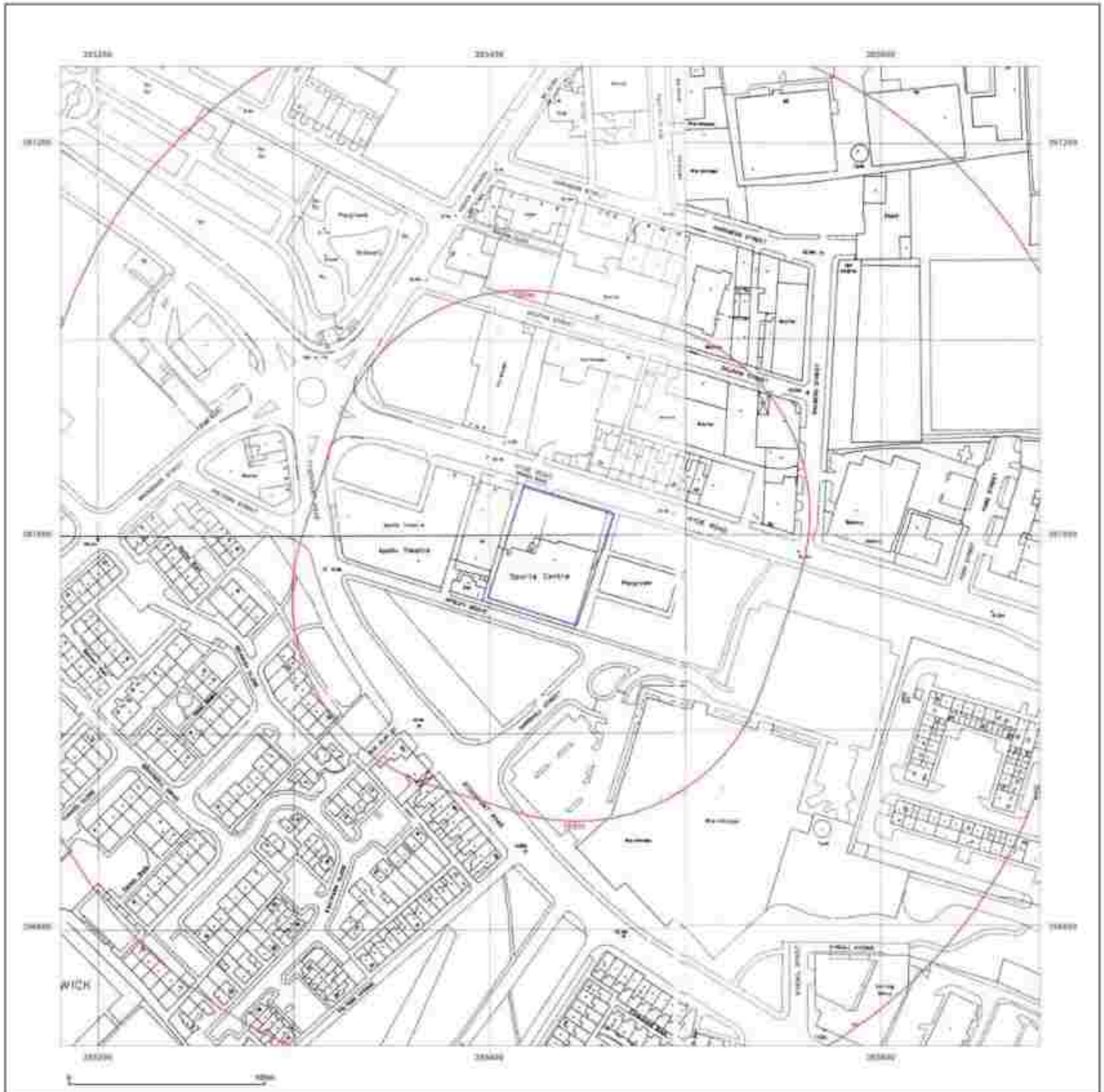
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1992-1995
Scale: 1:1,250
Printed at: 1:2,000

N



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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1993-1995
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N



Groundsure

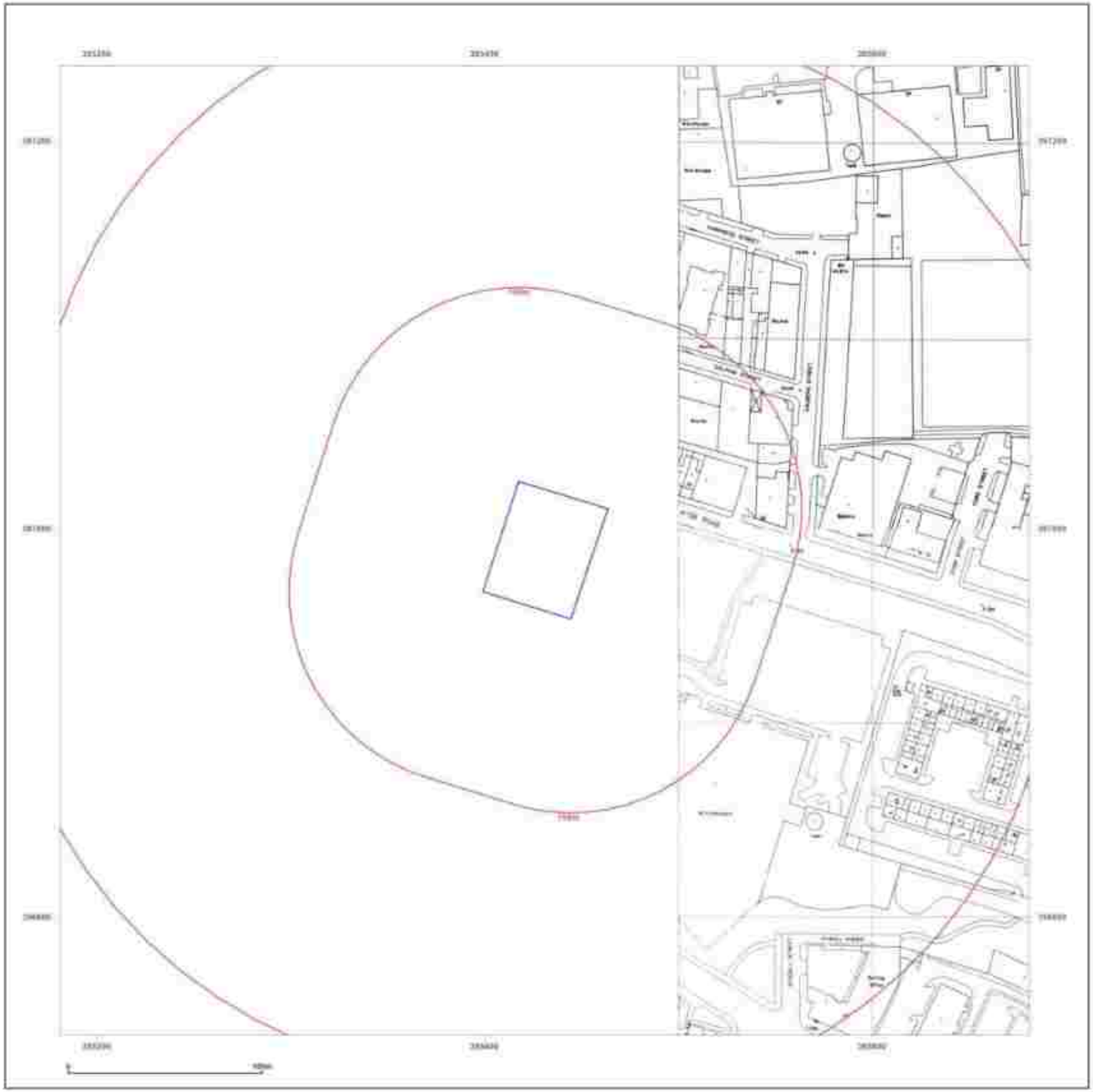
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1993-1995
Scale: 1:1,250
Printed at: 1:2,000

N



Groundsure

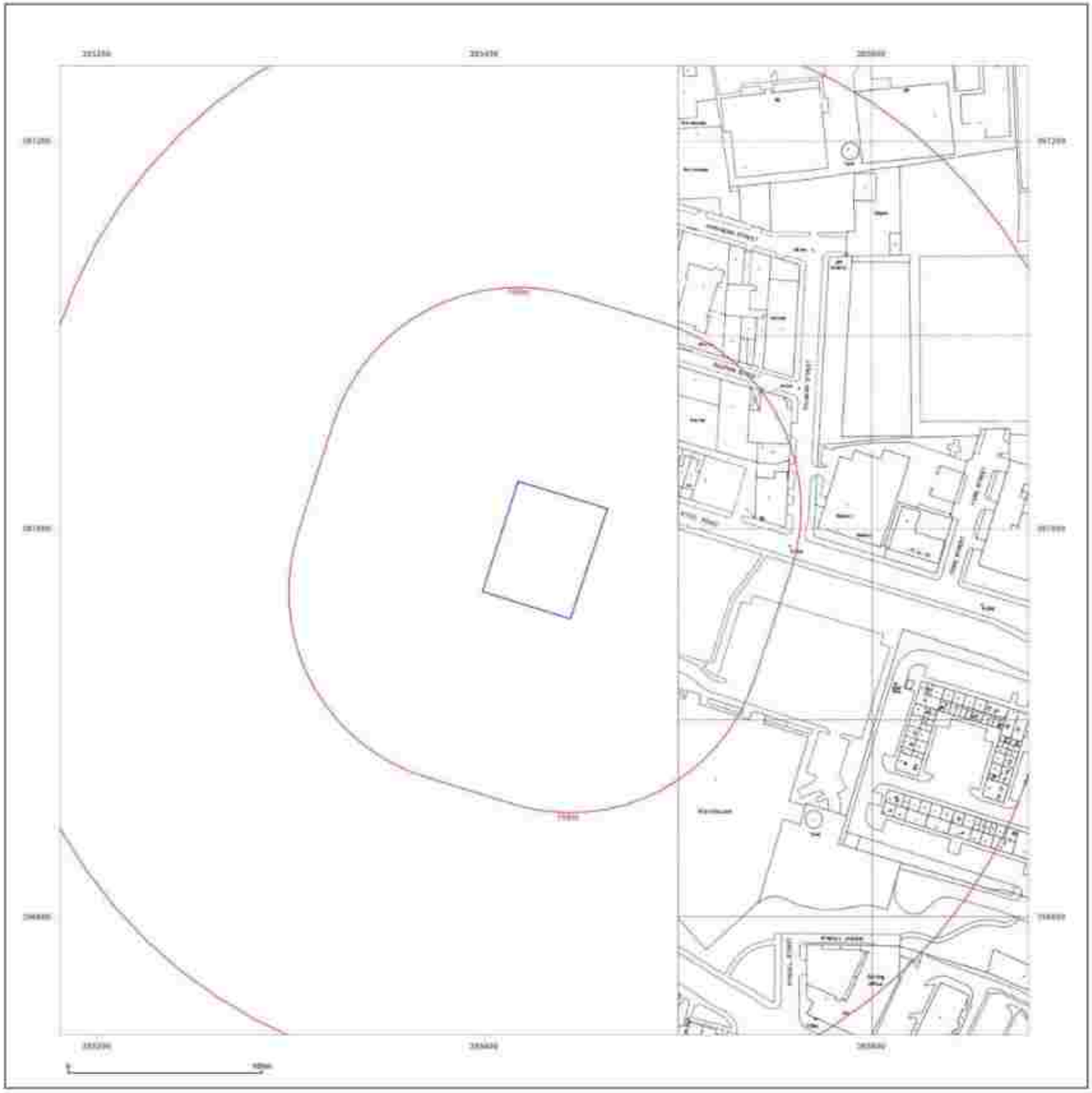
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1994-1995
Scale: 1:1,250
Printed at: 1:2,000

N

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

Surveyed 1995
Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

Groundsure

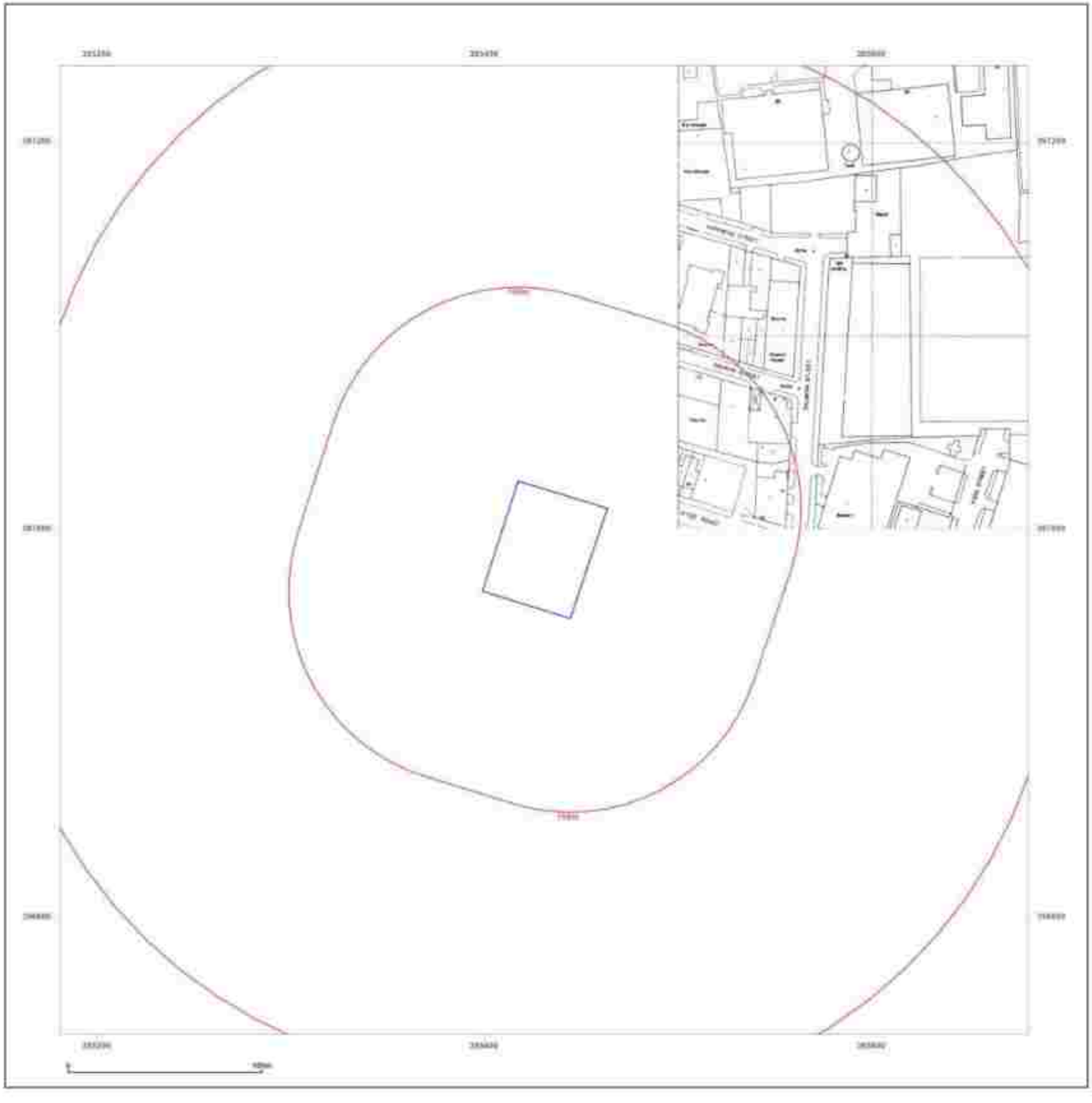
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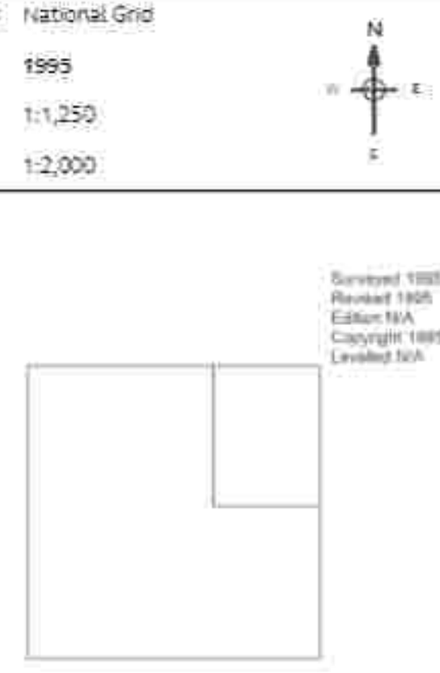
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Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1995
Scale: 1:1,250
Printed at: 1:2,000

N



Groundsure

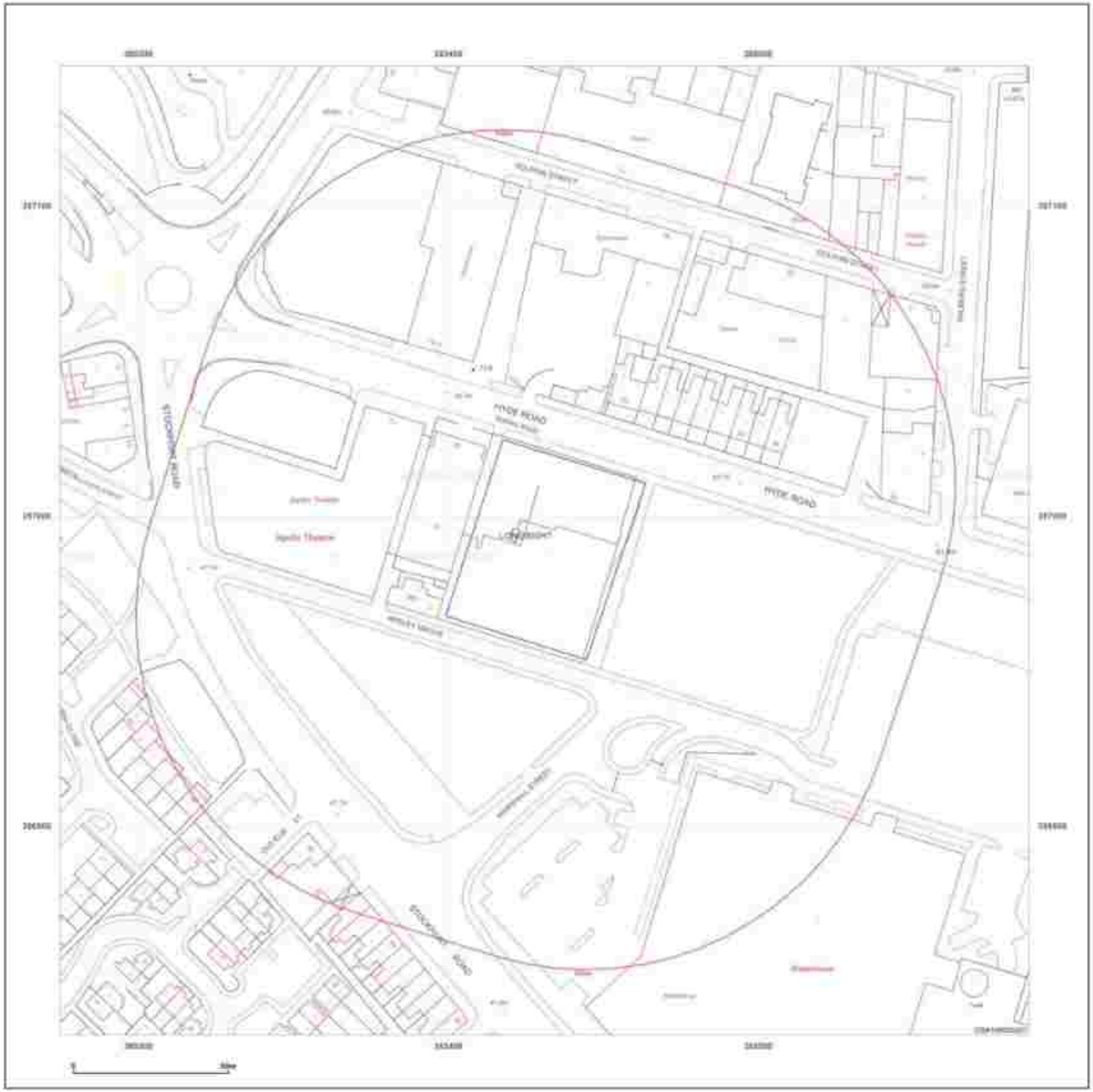
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: LandLine
Map date: 2003
Scale: 1:1,250
Printed at: 1:1,250

N

2000

Groundsure

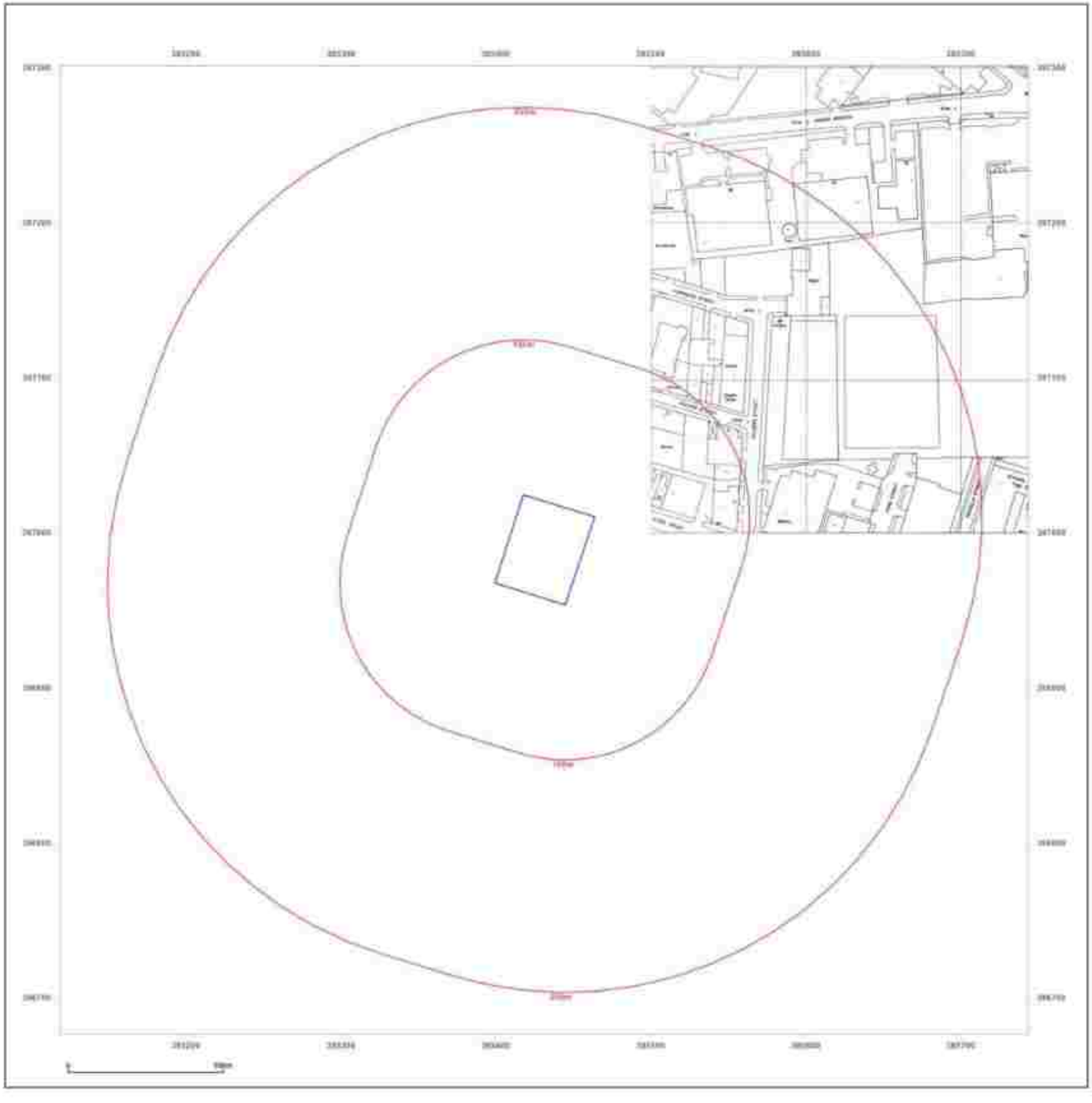
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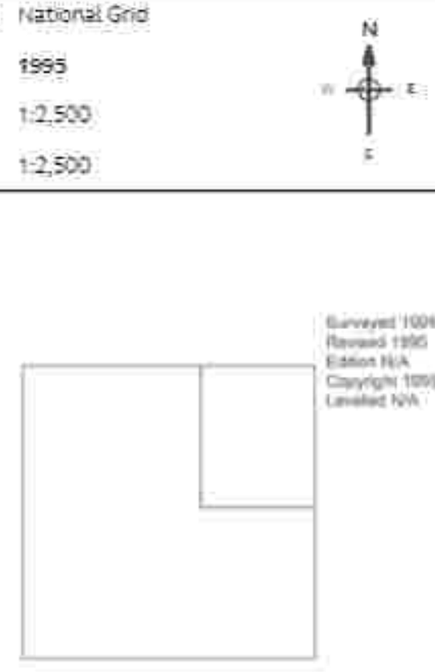
Site Details:

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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
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N



Groundsure

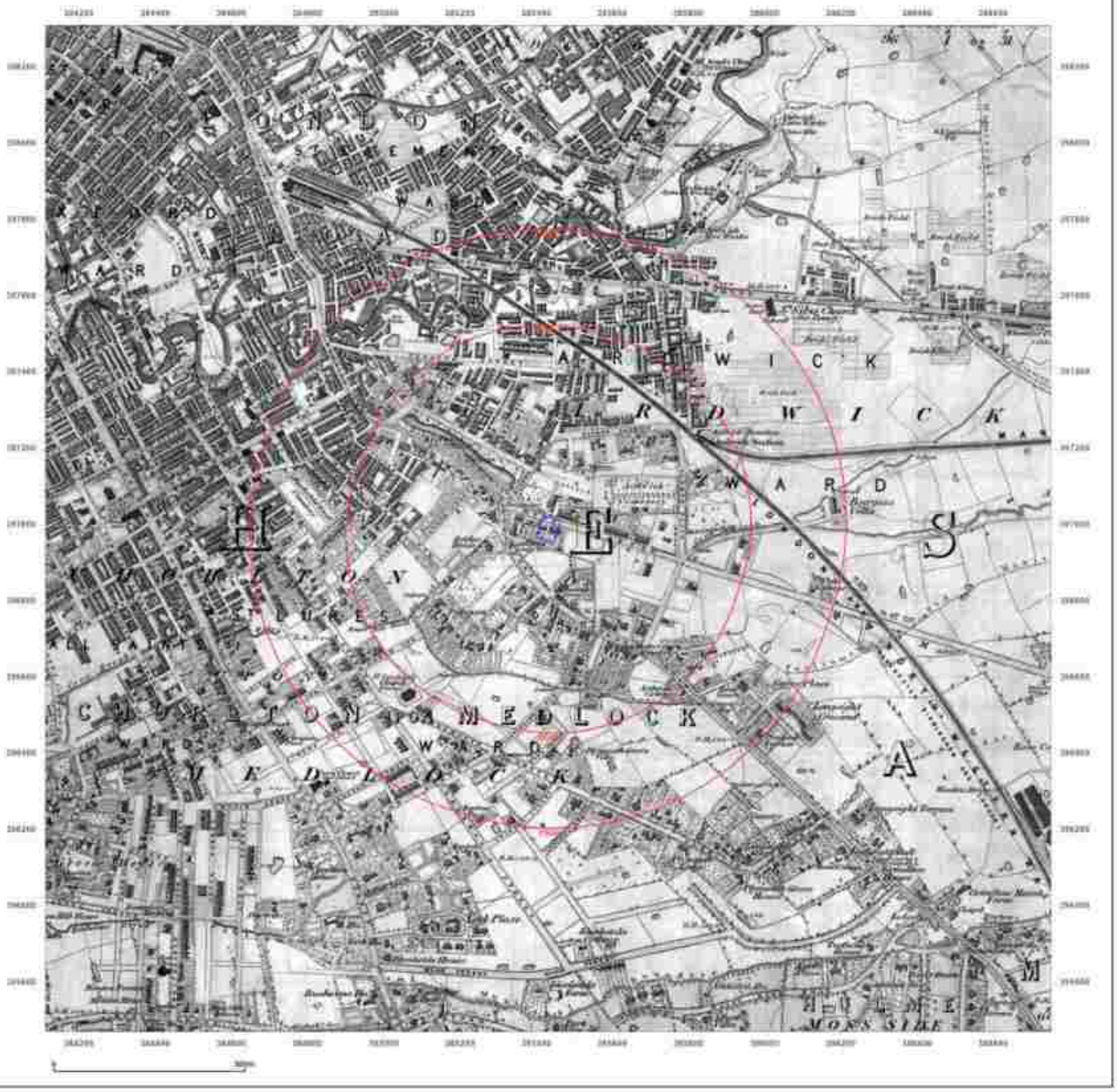
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: County Series
Map date: 1848
Scale: 1:10,560
Printed at: 1:10,560

N

Surveyed 1845
Revised N/A
Edition 1848
Copyright N/A
Levelled N/A

Groundsure

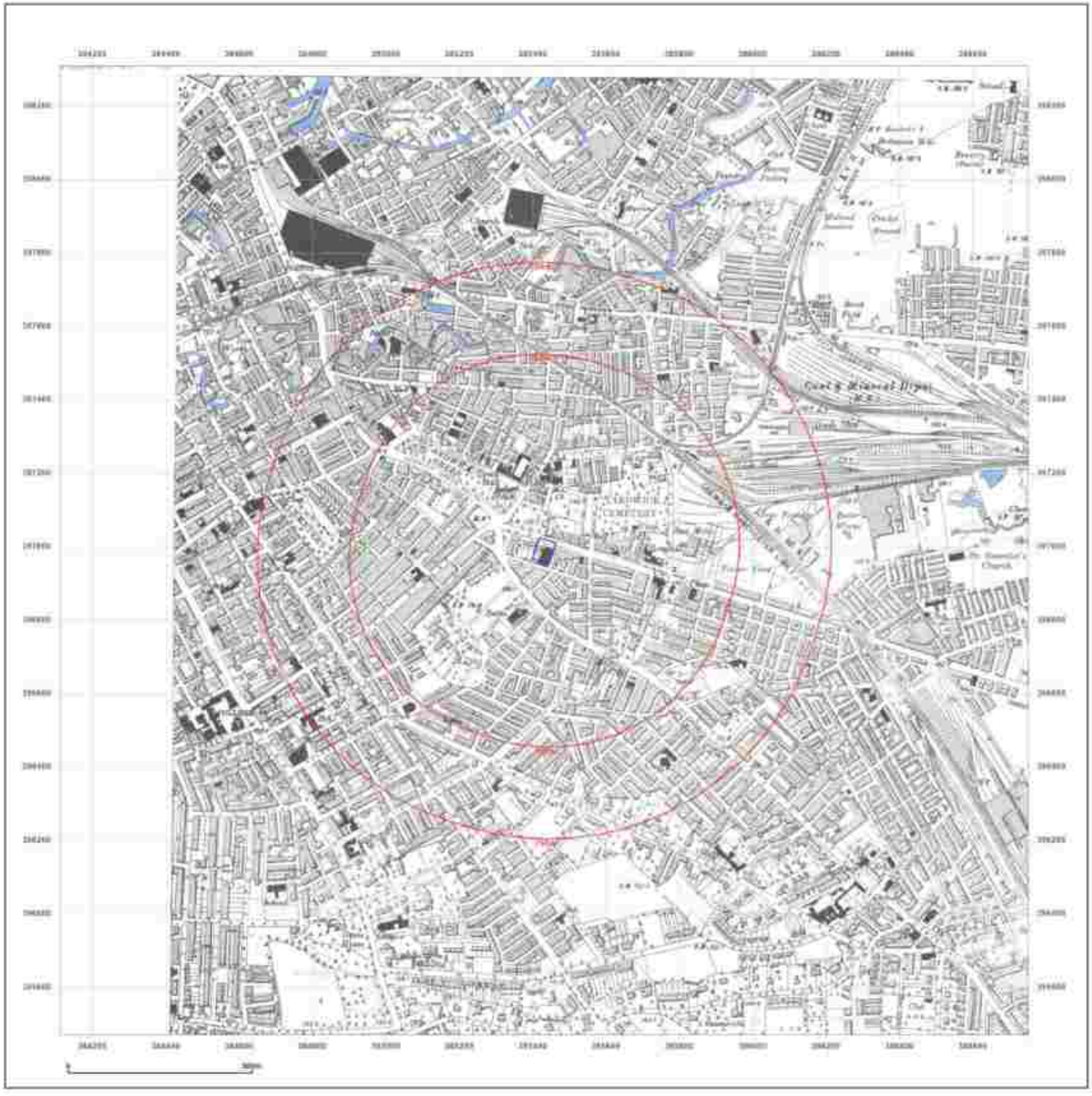
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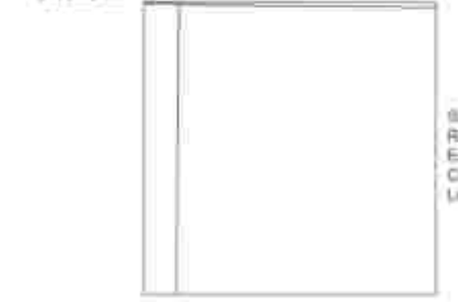
Site Details:

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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: County Series
Map date: 1890-1894
Scale: 1:10,560
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N



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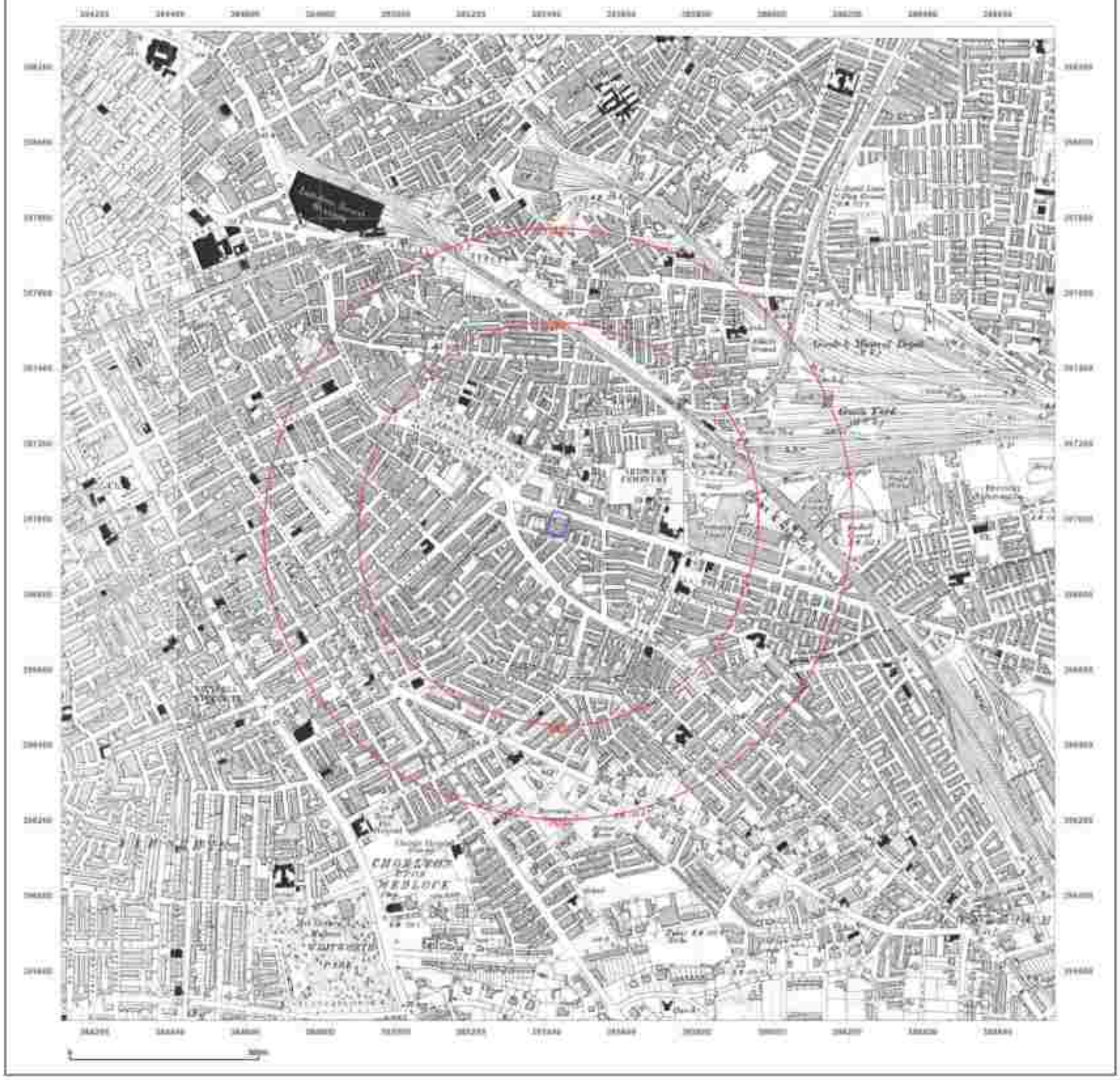
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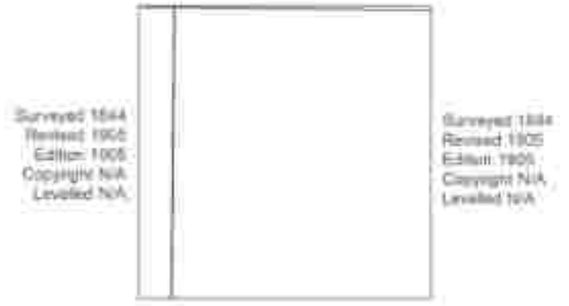
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: County Series
Map date: 1905
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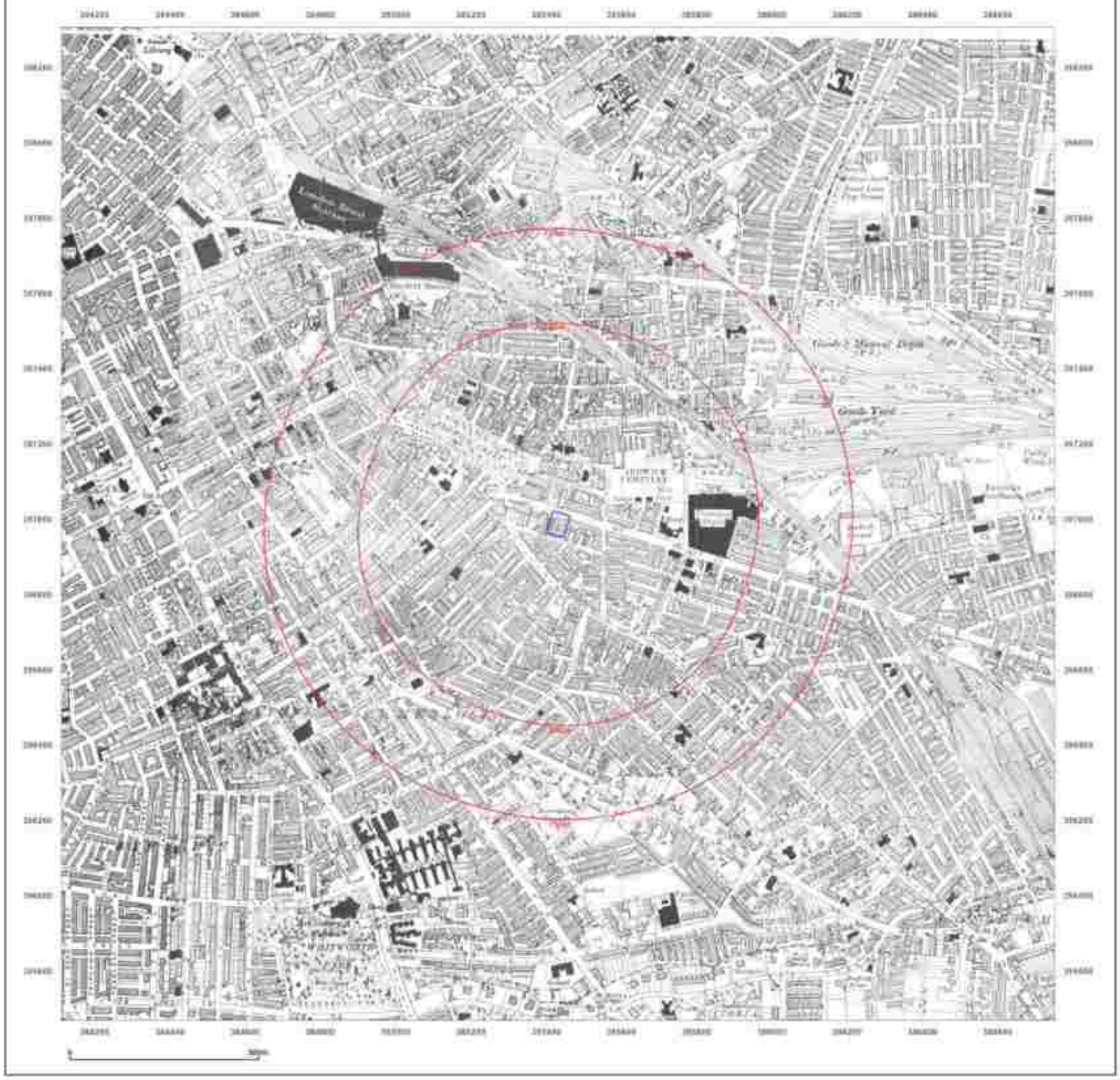
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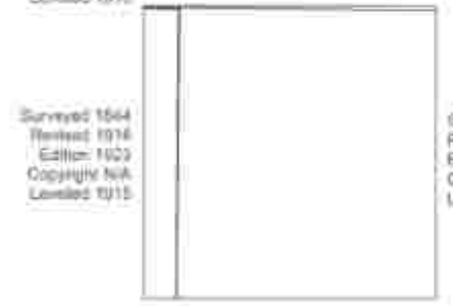
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: County Series
Map date: 1923
Scale: 1:10,560
Printed at: 1:10,560

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Groundsure

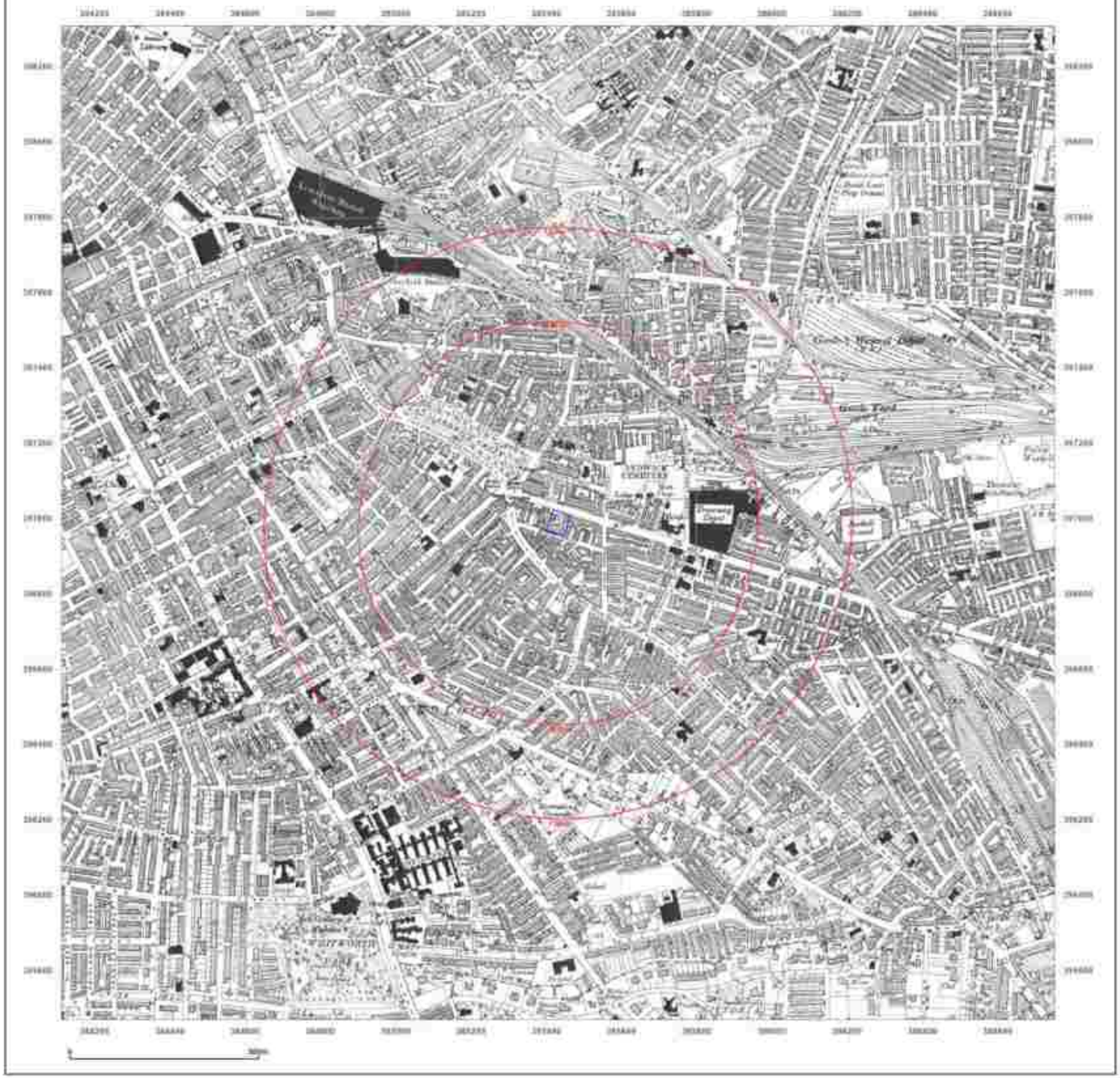
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: County Series
Map date: 1923
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Printed at: 1:10,560

N



Groundsure

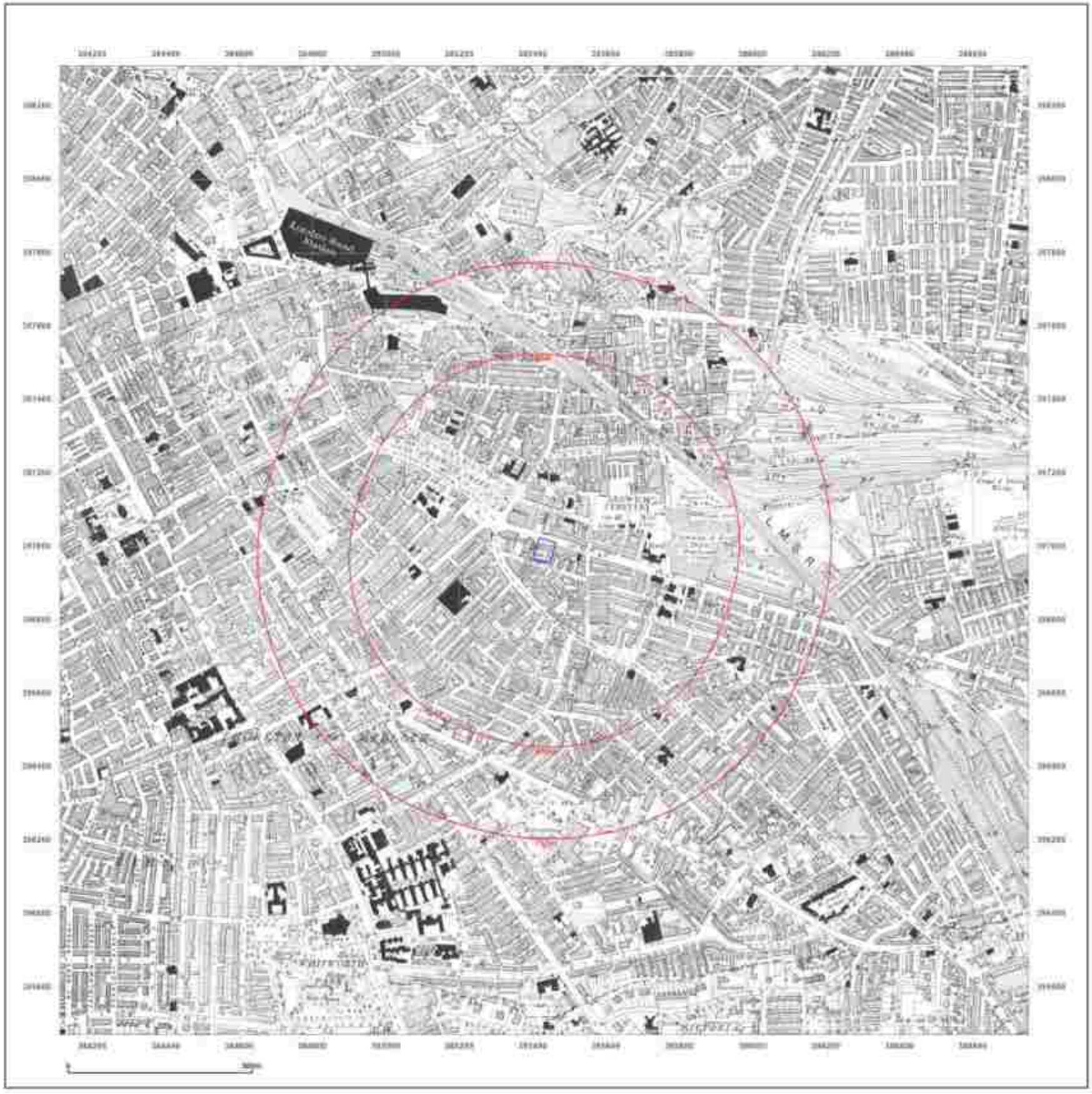
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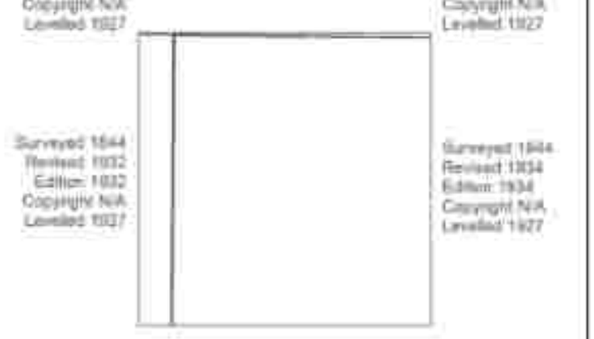
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: County Series
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Printed at: 1:10,560

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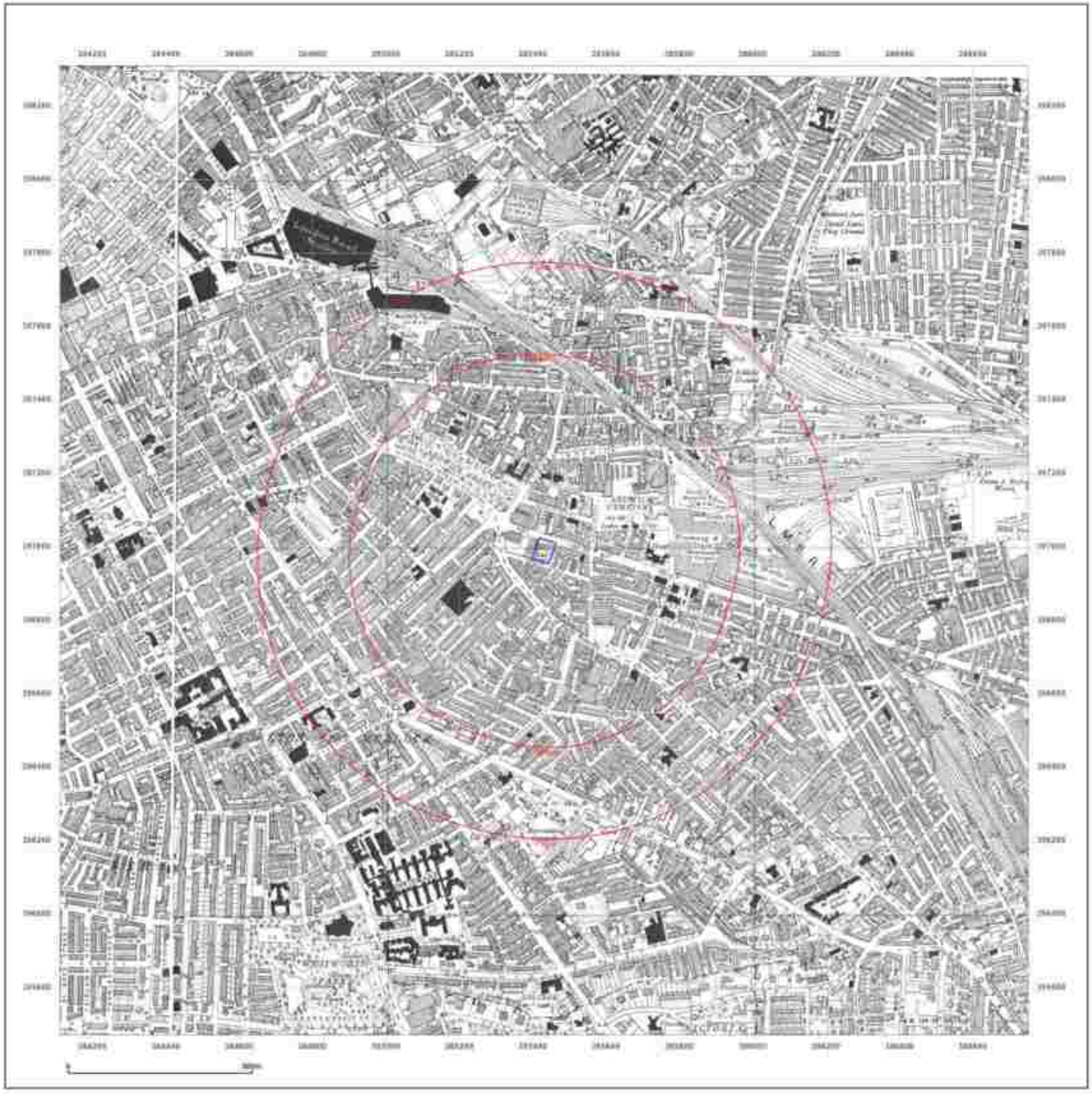
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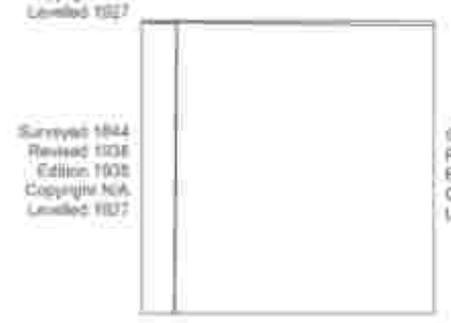
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14 Hyde Road, Manchester, M12 6BW

Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: County Series
Map date: 1938
Scale: 1:10,560
Printed at: 1:10,560

N



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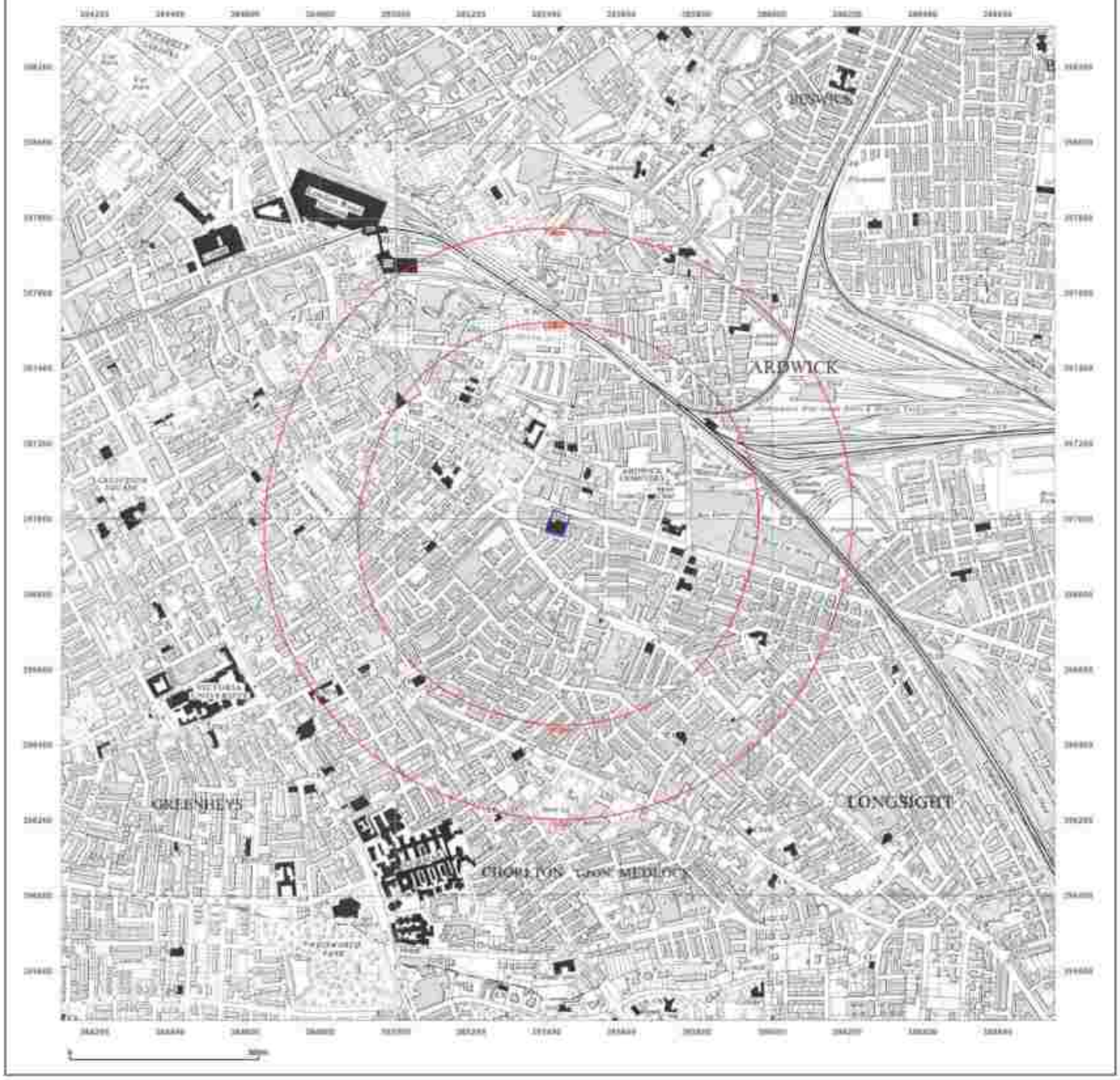
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Site Details:

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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: Provisional
Map date: 1956
Scale: 1:10,560
Printed at: 1:10,560

N

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

Groundsure

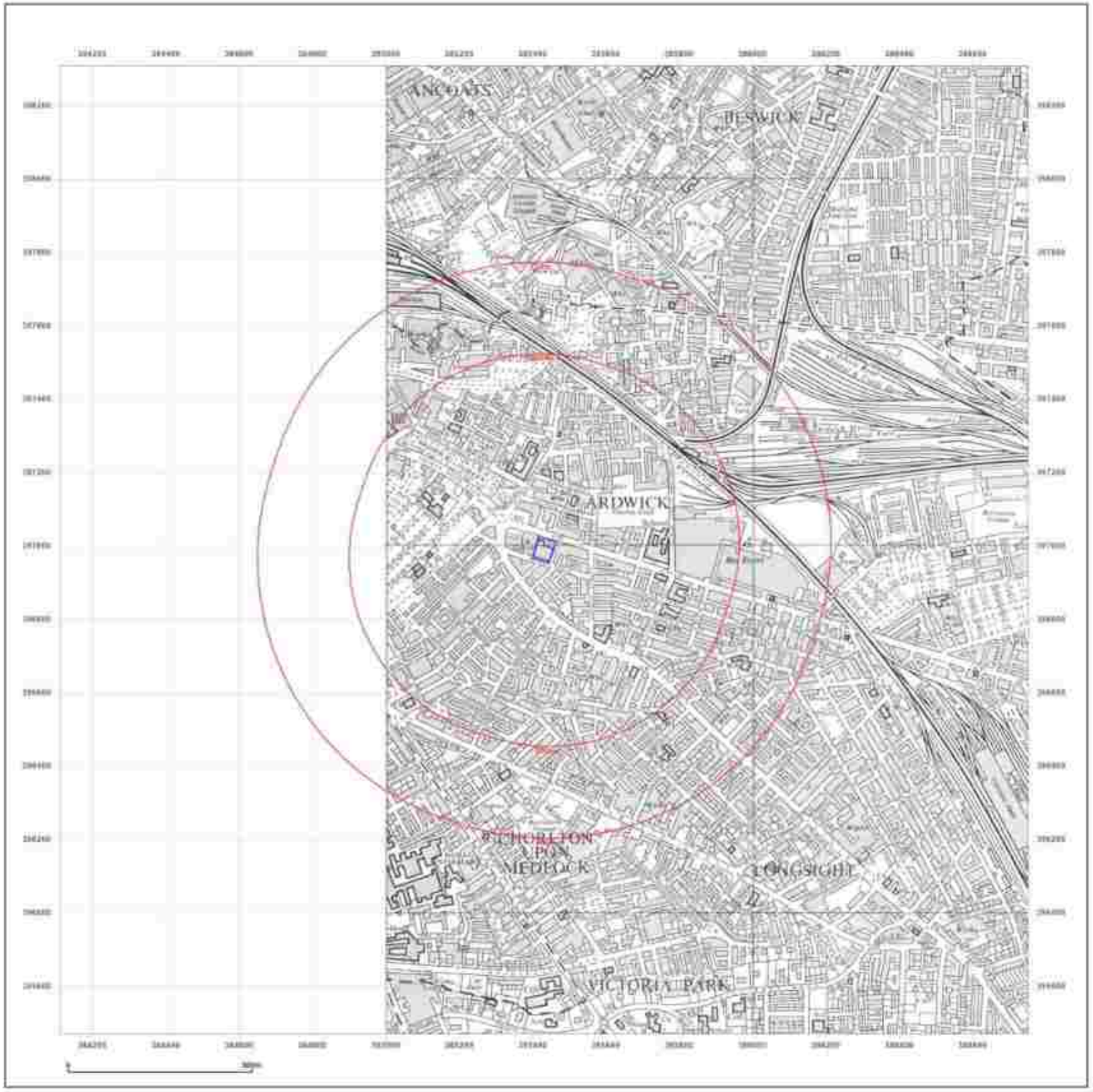
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: Provisional
Map date: 1968
Scale: 1:10,560
Printed at: 1:10,560

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Groundsure

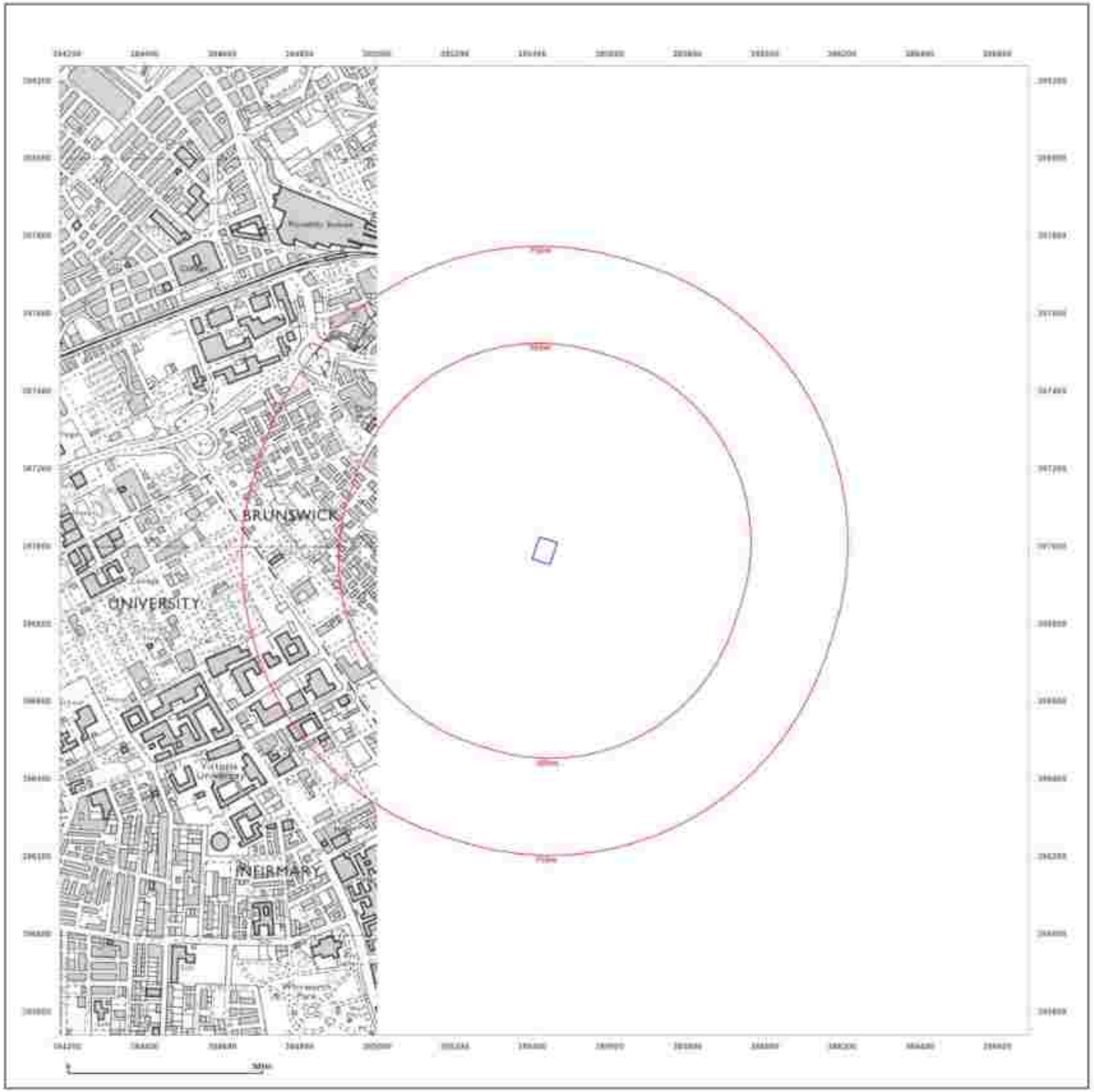
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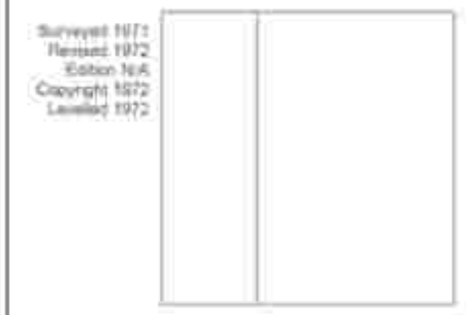
Site Details:

14 Hyde Road, Manchester, M12 6BW

Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1972
Scale: 1:10,000
Printed at: 1:10,000

N



Groundsure

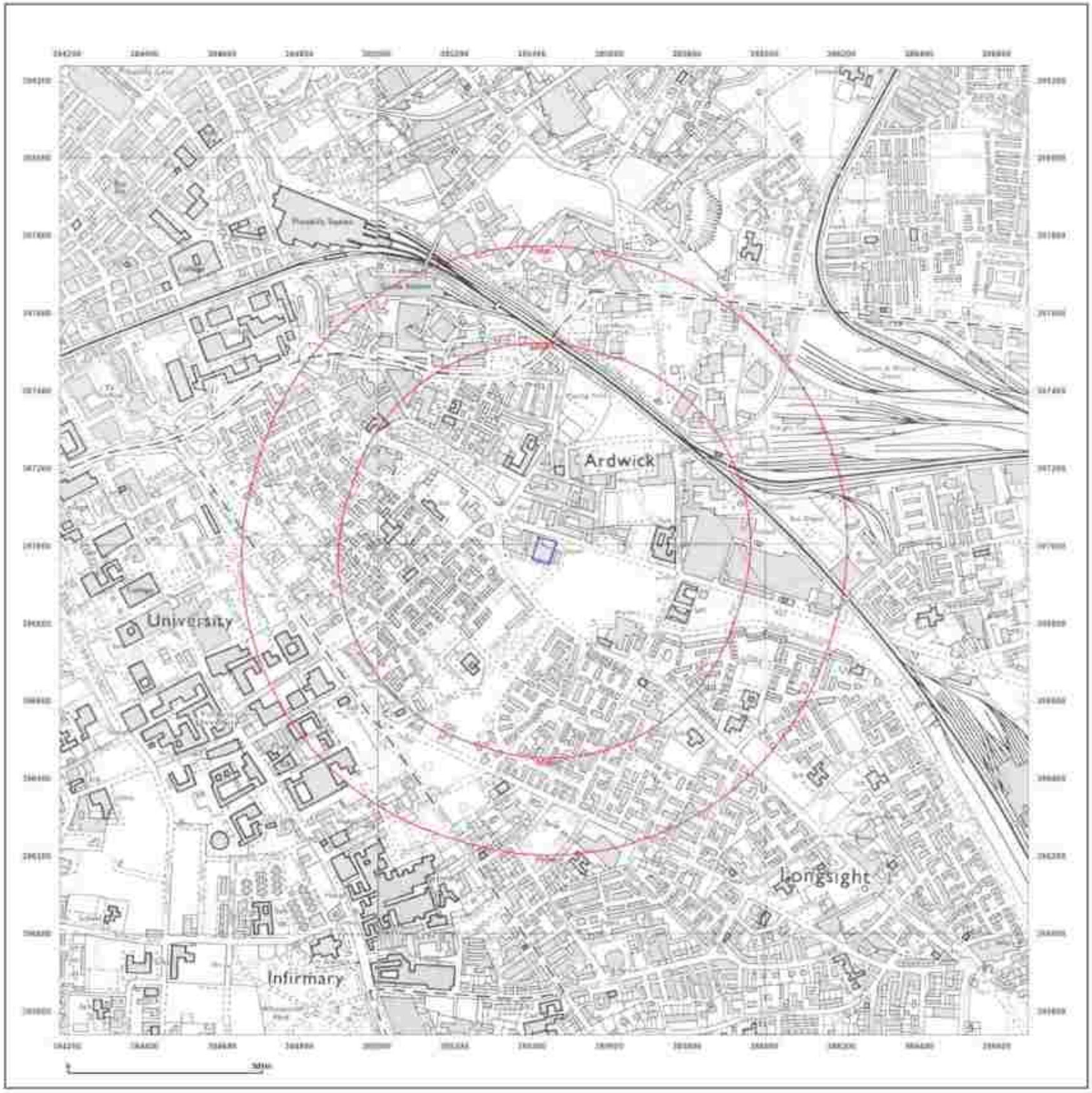
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1980-1981
Scale: 1:10,000
Printed at: 1:10,000

N

Surveyed 1976	Surveyed 1976
Revised 1980	Revised 1980
Edition N/A	Edition N/A
Copyright 1980	Copyright 1981
Levelled 1976	Levelled 1976

Groundsure

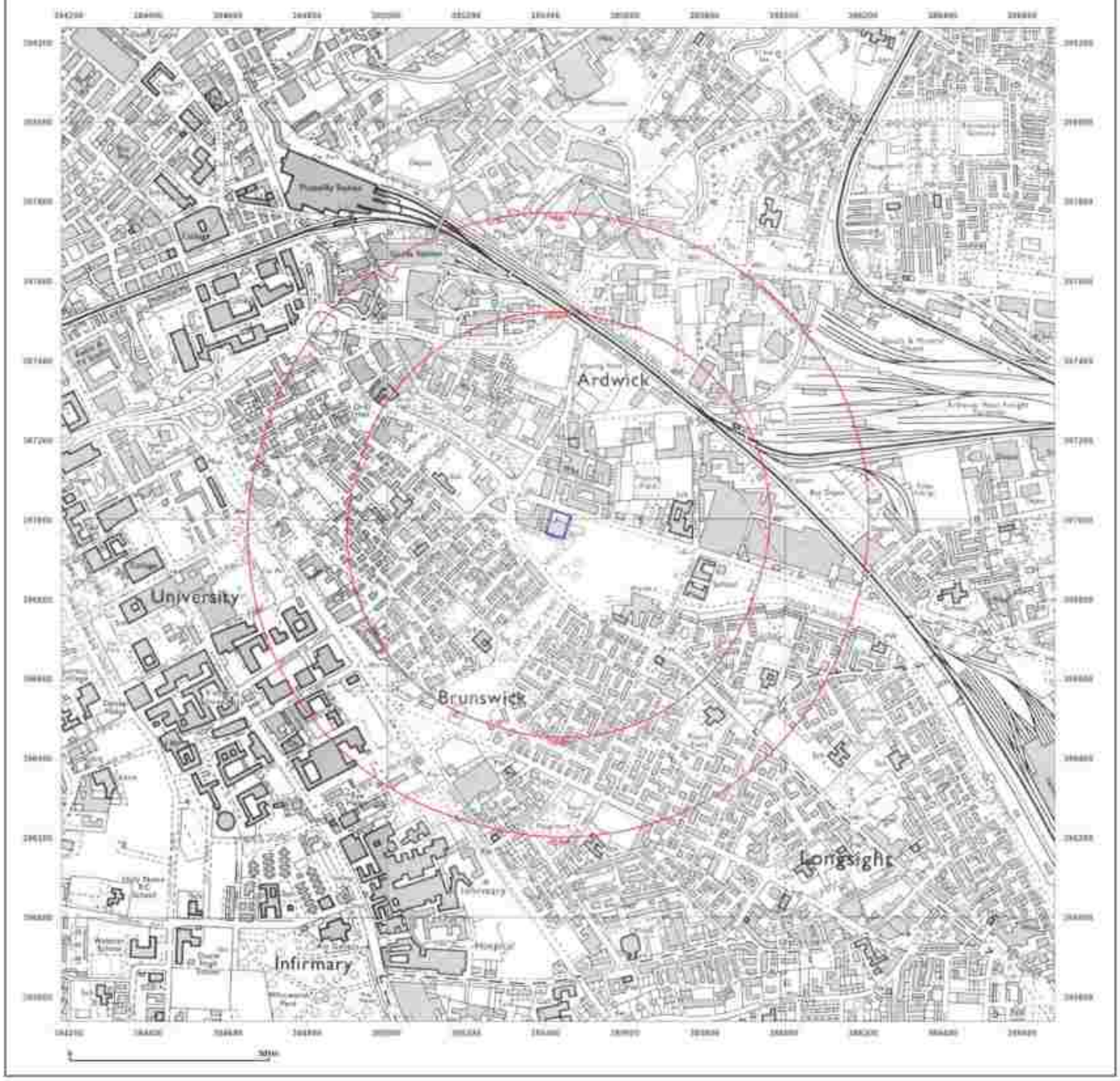
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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1985
Scale: 1:10,000
Printed at: 1:10,000

N
W E
S

Surveyed 1983
Revised 1985
Edition N/A
Copyright 1985
Levelled 1981

Surveyed 1985
Revised 1985
Edition N/A
Copyright 1985
Levelled 1981

Groundsure

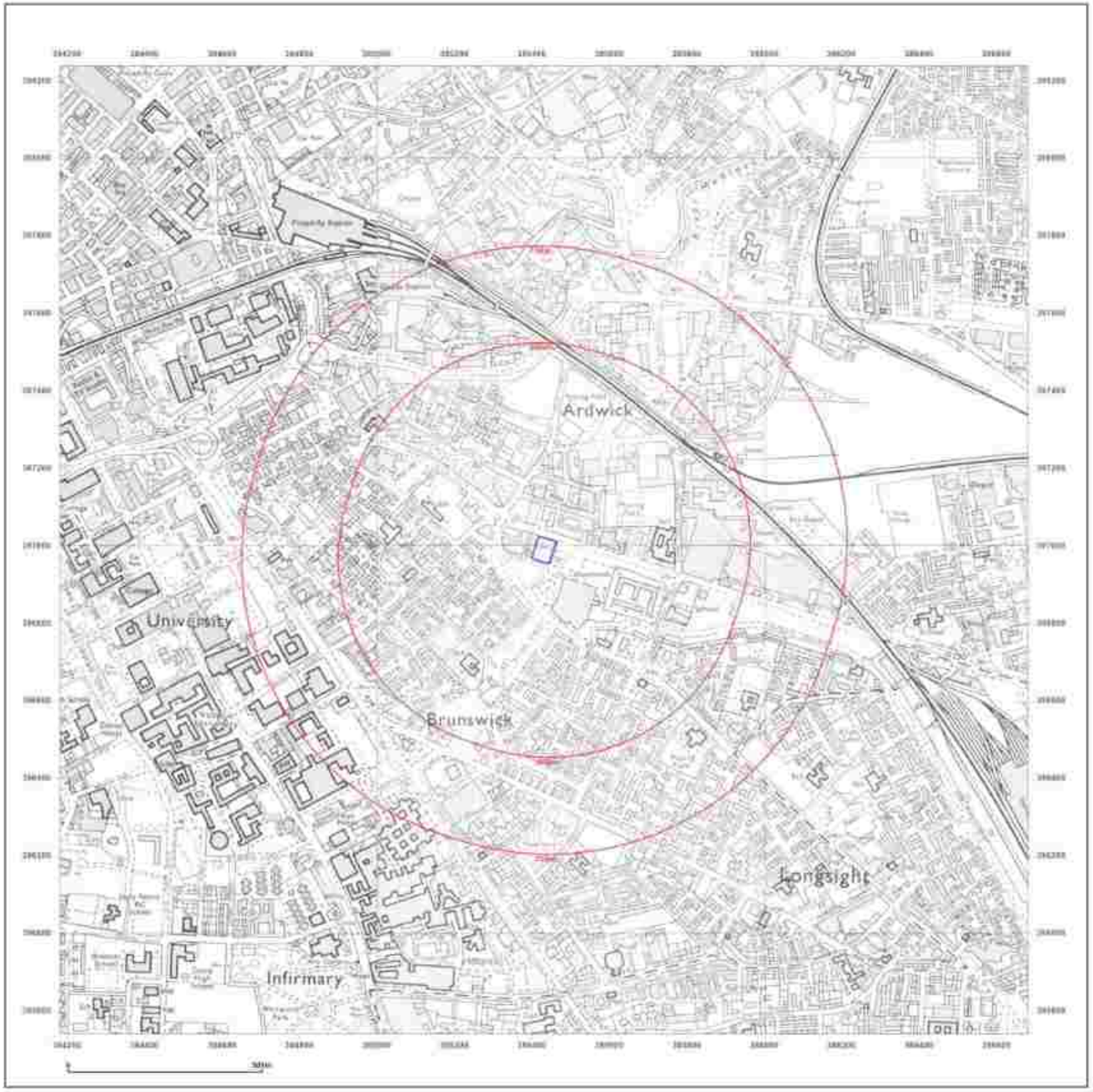
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Site Details:

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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1988-1991
Scale: 1:10,000
Printed at: 1:10,000

N

Surveyed 1989	Surveyed 1985
Revised 1988	Revised 1991
Edition N/A	Edition N/A
Copyright 1988	Copyright 1991
Levelled 1981	Levelled 1981

Groundsure

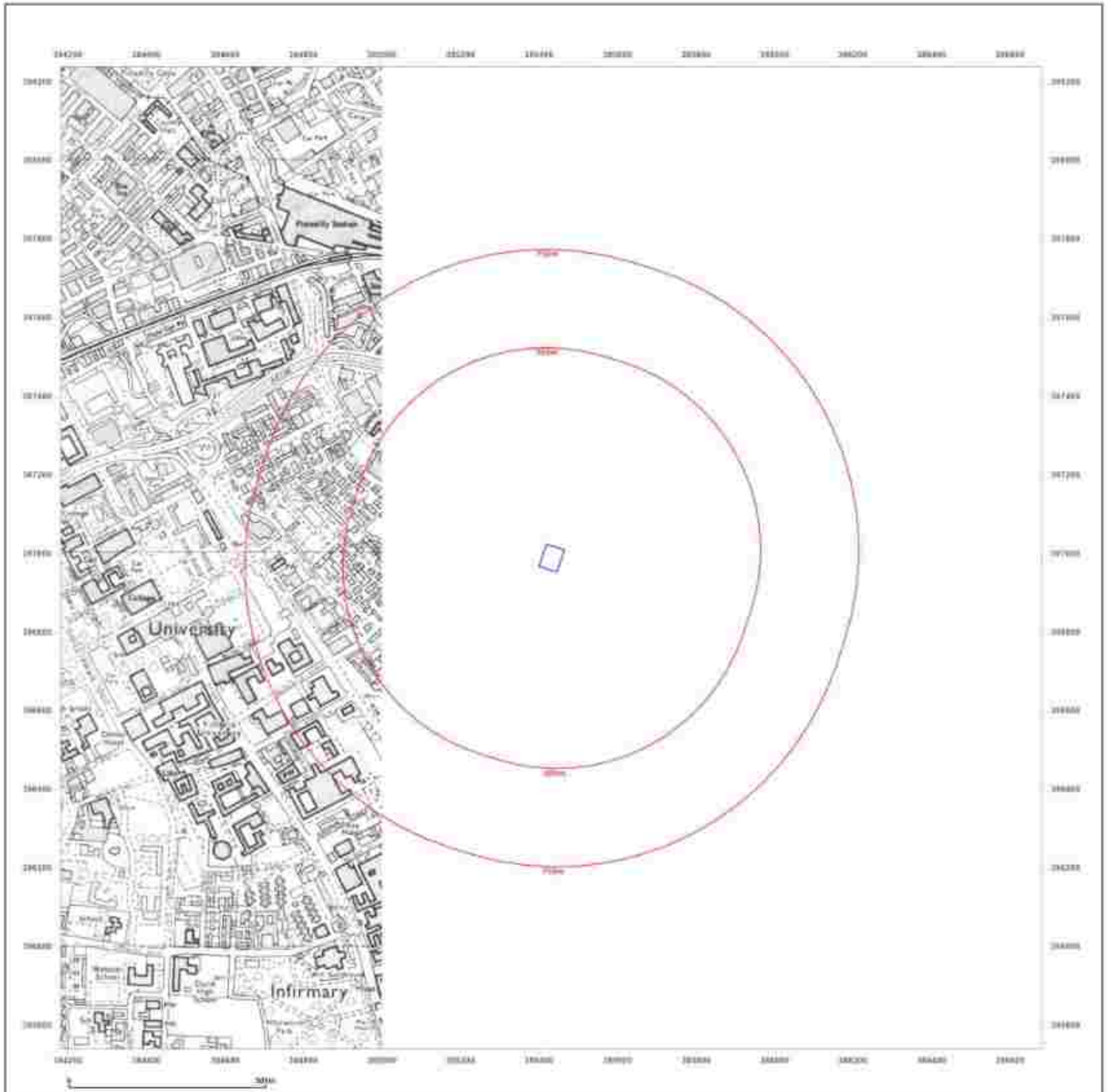
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Site Details:

14 Hyde Road, Manchester, M12 6BW

Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 1994
Scale: 1:10,000
Printed at: 1:10,000

N

Surveyed 1989
Revised 1994
Edition N/A
Copyright 1994
Levelled 1981

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Site Details:

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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 2001
Scale: 1:10,000
Printed at: 1:10,000

N

2001

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Site Details:

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Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

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

N
W E
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2010

Groundsure

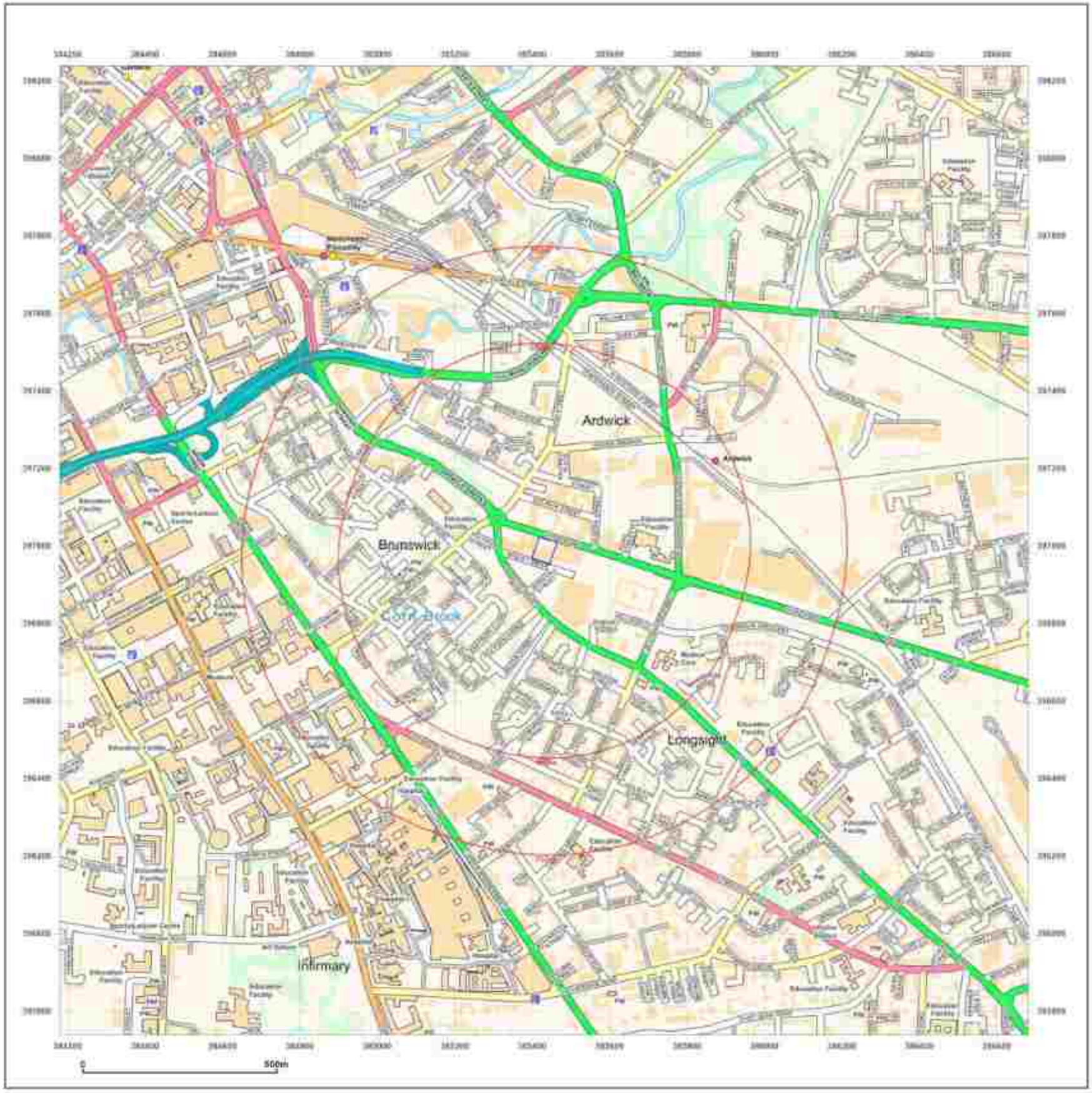
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Site Details:

14 Hyde Road, Manchester, M12 6BW

Client Ref: EMS_816110_1009512
Report Ref: EMS-816110_1049479
Grid Ref: 385431, 396989

Map Name: National Grid
Map date: 2022
Scale: 1:10,000
Printed at: 1:10,000

N

2022

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APPENDIX 4 – BGS Records

SUB SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE No. 22

EXPLORATORY BORING RECORD

Site Manchester Ref.: 70/73

Boring Method Shell Ground Level 139.7 O.D.

DATE	DIA. OF CASING & DEPTH BELOW G.L.	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW G.L.	STRATA APPROX. SCALE 5 FT. TO ONE INCH	NO. OF SAMP.	TYPE OF SAMP.	PENETRATION OF SAMPLER OR CORE BARREL FROM	PENETRATION OF SAMPLER OR CORE BARREL TO	NO. OF BLOWS	CORE RECOVERY
1.10.70	8"	NIL		Soft clay, brick pieces, tonsoil, etc Fill Material	1	X	4'0	5'0	10	
					2	U	5'6	8'0	20	
			6'6		3	U	8'0			
				Soft brown sandy clay with grey fissures and strps / nods.	4	X	12'6	13'6	77	
3.10.70	5'0				5	X	25'0	15'3	50	
1.10.70			10'6							
				Sewer Pipe						
			12'0							
				Soft to firm dark red fine grained sandstone with thin bands of red silty clay (marl). (Sand in upper zone)						
2.10.70	15'0		15'3							

Samples shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WHEN BORING (W.B. = WAT STRUCK)	ESTIMATED SWEPTAGE	WATER RISES AT FOLLOWING DEPTHS TO ABOUT BOREHOLE	WATER LEVEL IN OBSERVATION BOREHOLE OR CAVITIES		
				DATE	WATER LEVEL	DEPTH OF CASING
1. NONE						
2.						
3.						
4.						
5.						
6.						

REMARKS:

1) No initial penetration for S.P.T. samples Nos 4, 5.
Sewerage pipe struck at 10'6"

SUB SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE No. 24

EXPLORATORY BORING RECORD

Site Manchester Ref.: 70/73

Boring Method Shell Ground Level 137.24 O.D.

DATE	DIA. OF CASING & DEPTH BELOW G.L.	WATER LEVEL STRUCK & RISE	DEPTH OF STRATA BELOW G.L.	STRATA (APPROX. SCALE 5 FT. TO ONE INCH)	NO. OF SAMPLE	TYPE OF SAMPLE	PENETRATION OF SAMPLER OR CORE BARREL FROM	PENETRATION OF SAMPLER OR CORE BARREL TO	NO. OF BLOWS	CORE RECOVERY
25.9.70	8"	NIL		Black organic clay, topsoil, bricks and ashes etc., (Fill Material)	1	X	3'6	4'6	4	
					2	X	7'6	8'6	9	
			8'6		3	B	8'6	9'6		
				Dark brown sandy clay.	4	X	10'0	11'0	75	
					5	X	14'6	15'6	83	
			9'6		6	X	18'6	18'9	25	
				Soft red fine grained sandstone.	7	X	22'0	22'6	50	
26.9.70	8'0	NIL								
28.9.70		NIL								
28.9.70	15'0	NIL	22'6							

Samples shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WITH DRILLER (R.S. = REST RESULTS)	ESTIMATED SUPPLY	WATER ROSE AT FOLLOWING DEPTHS IN ABOVE HOLES	WATER LEVEL IN OBSERVATION STANDPIPE OR COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING
1. NONE						
2.						
3.						
4.						
5.						
6.						

REMARKS:

APPENDIX 5 - Groundsure Report

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

14 Hyde Road, Manchester, M12 6BW

Order Details

Date:	10/10/2022
Your ref:	EMS_816110_1009512
Our Ref:	EMS-816110_1049480

Site Details

Location:	385431 396989
Area:	0.29 ha
Authority:	Manchester City Council



Summary of findings p. 2
OS MasterMap site plan p.12
Aerial image p. 8
groundsure.com/insightuserguide

Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	2	1	25	69	-
17	1.2	Historical tanks	0	0	8	16	-
18	1.3	Historical energy features	0	0	7	14	-
19	1.4	Historical petrol stations	0	0	0	0	-
20	1.5	Historical garages	0	0	4	14	-
21	1.6	Historical military land	0	0	0	1	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
22	2.1	Historical industrial land uses	3	1	36	88	-
27	2.2	Historical tanks	0	0	19	29	-
29	2.3	Historical energy features	0	0	16	40	-
32	2.4	Historical petrol stations	0	0	0	0	-
32	2.5	Historical garages	0	0	6	25	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
34	3.1	Active or recent landfill	0	0	0	0	-
34	3.2	Historical landfill (BGS records)	0	0	0	0	-
35	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
35	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
35	3.5	Historical waste sites	0	0	0	1	-
36	3.6	Licensed waste sites	0	0	0	1	-
36	3.7	Waste exemptions	0	0	35	12	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
41	4.1	Recent industrial land uses	1	4	35	-	-
44	4.2	Current or recent petrol stations	0	0	1	0	-
44	4.3	Electricity cables	0	0	0	0	-
45	4.4	Gas pipelines	0	0	0	0	-
45	4.5	Sites determined as Contaminated Land	0	0	0	0	-

45	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
45	4.7	Regulated explosive sites	0	0	0	0	-
45	4.8	Hazardous substance storage/usage	0	0	0	0	-
46	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
46	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
46	4.11	Licensed pollutant release (Part A(2)/B)	0	0	3	1	-
47	4.12	Radioactive Substance Authorisations	0	0	0	0	-
47	4.13	Licensed Discharges to controlled waters	0	0	1	0	-
47	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
47	4.15	Pollutant release to public sewer	0	0	0	0	-
48	4.16	List 1 Dangerous Substances	0	0	0	0	-
48	4.17	List 2 Dangerous Substances	0	0	0	0	-
48	4.18	Pollution Incidents (EA/NRW)	0	0	0	4	-
48	4.19	Pollution Inventory substances	0	0	0	0	-
48	4.20	Pollution Inventory waste transfers	0	0	0	0	-
49	4.21	Pollution Inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
50	5.1	Superficial aquifer	Identified (within 500m)				
52	5.2	Bedrock aquifer	Identified (within 500m)				
54	5.3	Groundwater vulnerability	Identified (within 50m)				
55	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
55	5.5	Groundwater vulnerability- local information	None (within 0m)				
56	5.6	Groundwater abstractions	0	0	0	1	18
61	5.7	Surface water abstractions	0	0	0	0	0
62	5.8	Potable abstractions	0	0	0	0	0
62	5.9	Source Protection Zones	0	0	0	0	-
62	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
63	6.1	Water Network (OS MasterMap)	1	0	0	-	-

64	6.2	Surface water features	0	0	0	-	-
64	6.3	WFD Surface water body catchments	1	-	-	-	-
64	6.4	WFD Surface water bodies	0	0	0	-	-
65	6.5	WFD Groundwater bodies	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
66	7.1	Risk of flooding from rivers and the sea	Low (within 50m)				
67	7.2	Historical Flood Events	0	0	0	-	-
67	7.3	Flood Defences	0	0	0	-	-
67	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
67	7.5	Flood Storage Areas	0	0	0	-	-
68	7.6	Flood Zone 2	Identified (within 50m)				
69	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
70	8.1	Surface water flooding	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding					
72	9.1	Groundwater flooding	High (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
73	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
73	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
73	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
73	10.4	Special Protection Areas (SPA)	0	0	0	0	0
74	10.5	National Nature Reserves (NNR)	0	0	0	0	0
74	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
74	10.7	Designated Ancient Woodland	0	0	0	0	0
74	10.8	Biosphere Reserves	0	0	0	0	0
75	10.9	Forest Parks	0	0	0	0	0
75	10.10	Marine Conservation Zones	0	0	0	0	0
75	10.11	Green Belt	0	0	0	0	0
75	10.12	Proposed Ramsar sites	0	0	0	0	0

75	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
76	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
76	10.15	Nitrate Sensitive Areas	0	0	0	0	0
76	10.16	Nitrate Vulnerable Zones	0	0	0	0	1
77	10.17	SSSI Impact Risk Zones	1	-	-	-	-
78	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
79	11.1	World Heritage Sites	0	0	0	-	-
80	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
80	11.3	National Parks	0	0	0	-	-
80	11.4	Listed Buildings	0	1	3	-	-
81	11.5	Conservation Areas	0	0	0	-	-
81	11.6	Scheduled Ancient Monuments	0	0	0	-	-
81	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
82	12.1	Agricultural Land Classification	Urban (within 250m)				
83	12.2	Open Access Land	0	0	0	-	-
83	12.3	Tree Felling Licences	0	0	0	-	-
83	12.4	Environmental Stewardship Schemes	0	0	0	-	-
83	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
84	13.1	Priority Habitat Inventory	0	0	6	-	-
85	13.2	Habitat Networks	0	0	0	-	-
85	13.3	Open Mosaic Habitat	0	0	0	-	-
85	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
86	14.1	10k Availability	Identified (within 500m)				
87	14.2	Artificial and made ground (10k)	0	0	3	4	-
89	14.3	Superficial geology (10k)	1	0	0	2	-

90	14.4	Landslip (10k)	0	0	0	0	-
91	14.5	Bedrock geology (10k)	1	0	0	4	-
92	14.6	Bedrock faults and other linear features (10k)	0	1	0	2	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
93	15.1	50k Availability	Identified (within 500m)				
94	15.2	Artificial and made ground (50k)	0	0	1	3	-
95	15.3	Artificial ground permeability (50k)	0	0	-	-	-
96	15.4	Superficial geology (50k)	1	0	0	1	-
97	15.5	Superficial permeability (50k)	Identified (within 50m)				
97	15.6	Landslip (50k)	0	0	0	0	-
97	15.7	Landslip permeability (50k)	None (within 50m)				
98	15.8	Bedrock geology (50k)	1	0	0	3	-
99	15.9	Bedrock permeability (50k)	Identified (within 50m)				
99	15.10	Bedrock faults and other linear features (50k)	0	1	0	1	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
100	16.1	BGS Boreholes	0	2	15	-	-
Page	Section	Natural ground subsidence					
102	17.1	Shrink swell clays	Very low (within 50m)				
103	17.2	Running sands	Very low (within 50m)				
104	17.3	Compressible deposits	Negligible (within 50m)				
105	17.4	Collapsible deposits	Very low (within 50m)				
106	17.5	Landslides	Very low (within 50m)				
107	17.6	Ground dissolution of soluble rocks	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
109	18.1	Natural cavities	0	0	0	0	-
110	18.2	Brine Pits	0	0	0	0	-
110	18.3	Surface ground workings	0	0	5	-	-
110	18.4	Underground workings	0	0	0	0	0
111	18.5	Historical Mineral Planning Areas	0	0	0	0	-

111	18.6	Non-coal mining	0	0	0	0	1
111	18.7	Mining cavities	0	0	0	0	1
112	18.8	JPB mining areas	Identified (within 0m)				
112	18.9	Coal mining	Identified (within 0m)				
113	18.10	Brine areas	None (within 0m)				
113	18.11	Gypsum areas	None (within 0m)				
113	18.12	Tin mining	None (within 0m)				
113	18.13	Clay mining	None (within 0m)				

Page	Section	Radon					
114	19.1	Radon	Less than 1% (within 0m)				

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
115	20.1	BGS Estimated Background Soil Chemistry	3	4	-	-	-
115	20.2	BGS Estimated Urban Soil Chemistry	3	3	-	-	-
116	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
117	21.1	Underground railways (London)	0	0	0	-	-
117	21.2	Underground railways (Non-London)	0	0	0	-	-
117	21.3	Railway tunnels	0	0	0	-	-
117	21.4	Historical railway and tunnel features	0	0	0	-	-
117	21.5	Royal Mail tunnels	0	0	0	-	-
118	21.6	Historical railways	0	0	0	-	-
118	21.7	Railways	0	0	0	-	-
118	21.8	Crossrail 1	0	0	0	0	-
118	21.9	Crossrail 2	0	0	0	0	-
118	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 22/04/2019

Site Area: 0.29ha

Recent site history - 2015 aerial photograph



Capture Date: 11/06/2015

Site Area: 0.29ha

Recent site history - 2009 aerial photograph



Capture Date: 02/06/2009

Site Area: 0.29ha

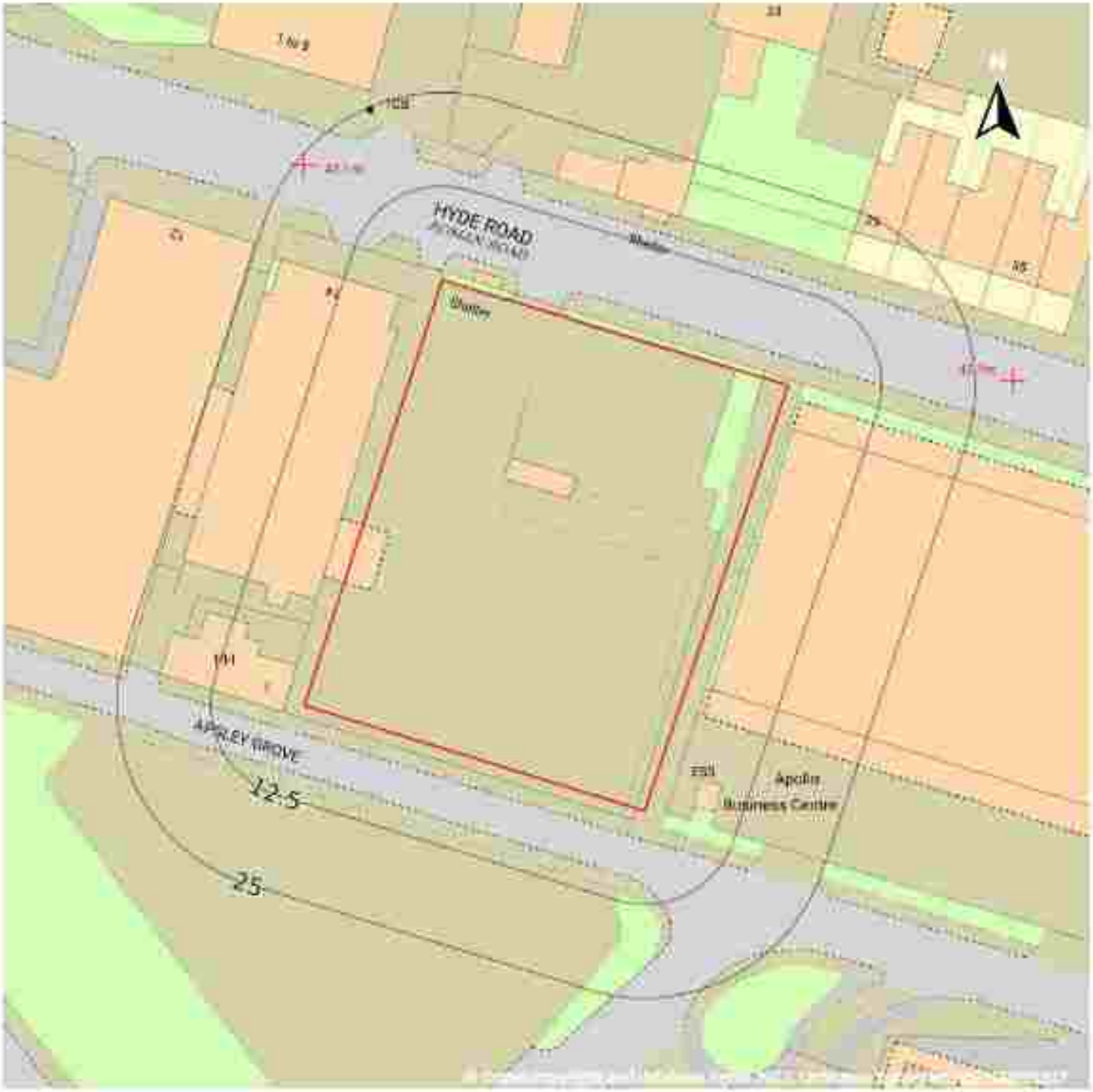
Recent site history - 2000 aerial photograph



Capture Date: 27/06/2000

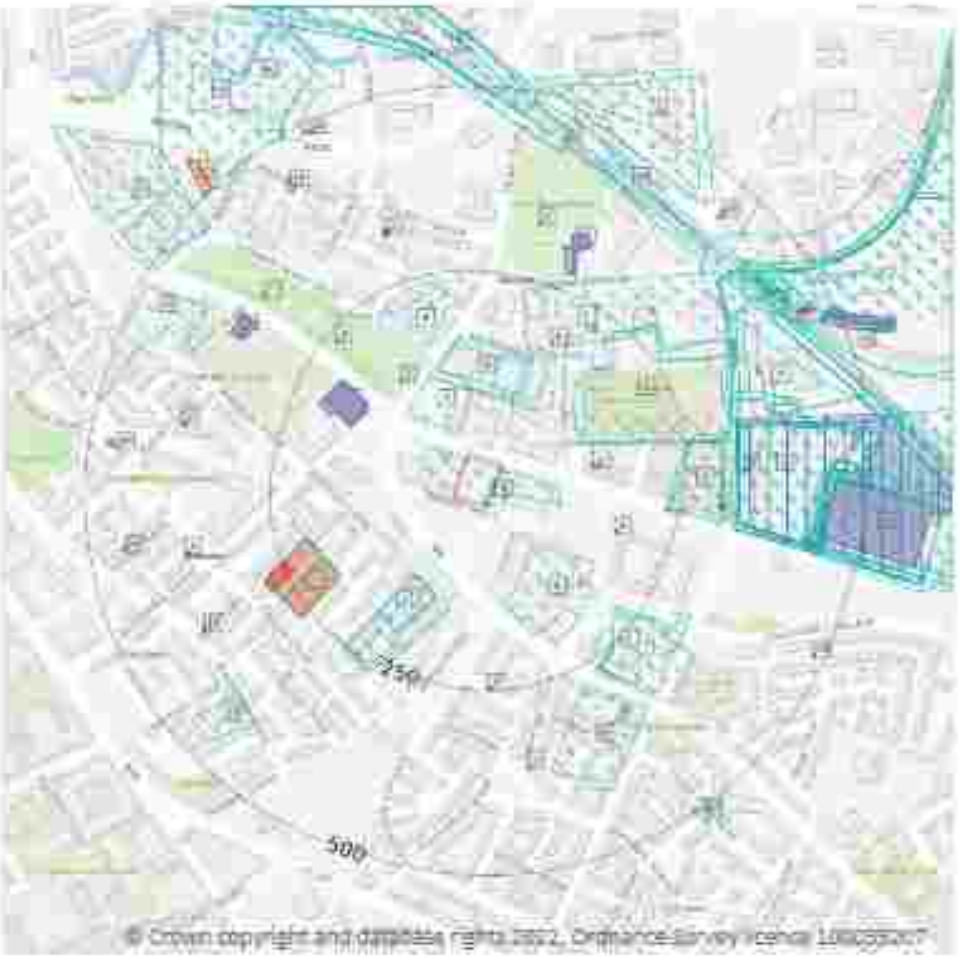
Site Area: 0.29ha

OS MasterMap site plan



Site Area: 0.29ha

1 Past land use



Site Outline
Search buffers in metres (m)
Historical industrial land uses
Historical tanks
Historical energy features
Historical garages
Historical military land

1.1 Historical industrial land uses

Records within 500m	97

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
A	On site	Unspecified Depot	1978	818418

ID	Location	Land use	Dates present	Group ID
A	On site	Drill Shed	1915 - 1923	979855
1	35m N	Unspecified Works	1978	830420
B	78m SE	Unspecified Warehouse	1991	807356
C	86m E	Cemetery	1851	851050
D	87m N	Unspecified Works	1915	873002
D	95m N	Unspecified Works	1985 - 1991	950514
D	99m N	Unspecified Commercial/Industrial	1978	796807
D	99m N	Unspecified Works	1963	977680
C	103m E	Cemetery	1905 - 1956	954544
C	111m E	Cemetery	1890	925381
E	116m SW	Cooperage	1915	911697
E	119m SW	Cooperage	1923	989794
E	120m SW	Cooperage	1934 - 1938	986972
H	155m N	Industrial School	1890	833220
G	165m N	Unspecified Works	1968 - 1978	979506
E	187m SW	Sawmills	1915 - 1923	851136
I	188m SW	Stores	1915	832276
I	189m SW	Unspecified Stores	1923	842021
I	196m SW	Electric Substation	1915 - 1923	925313
J	219m SE	Unspecified Works	1978	833157
J	222m SE	Unspecified Works	1968	965469
K	230m E	Hospital	1890	932220
K	230m E	Hospital	1915	945904
K	230m E	Hospital	1934 - 1938	988307
K	237m E	Hospital	1956	910970
K	237m E	Hospital	1923	942295
J	246m SE	Unspecified Works	1985	987509
M	276m SE	Unspecified Works	1968	830419

ID	Location	Land use	Dates present	Group ID
N	311m E	Tramways and Bus Depot	1934 - 1938	940086
N	311m E	Tramway Depot	1905 - 1915	977493
F	316m E	Goods and Mineral Yard	1923	948116
F	316m E	Goods and Mineral Yard	1905	901913
Q	316m E	Railway Sidings	1923	952334
Q	316m E	Railway Sidings	1905	955480
N	317m E	Sawmills	1890	913170
N	317m E	Tramway Depot	1923	882953
Q	317m E	Railway Sidings	1890	887070
N	321m E	Unspecified Commercial/Industrial	1978	796308
N	322m E	Bus Depot	1956	932316
F	322m E	Goods and Mineral Yard	1934	980978
F	322m E	Goods and Mineral Yard	1938	961883
Q	322m E	Railway Sidings	1915 - 1938	940311
N	322m E	Unspecified Works	1968	830422
F	336m E	Goods and Mineral Yard	1956	883525
Q	336m E	Railway Sidings	1956 - 1968	853106
Q	336m E	Railway Sidings	1978	875920
N	340m E	Unspecified Depot	1965 - 1991	926898
Q	365m NE	Goods Depot and Mineral Yard	1938	917886
F	370m E	Goods Shed	1923	988950
F	372m E	Goods Shed	1915	929274
F	372m E	Goods Shed	1934 - 1938	981520
W	395m NE	Railway Sidings	1956	950162
11	397m SW	Bakery	1915 - 1923	968962
12	399m NE	Railway Sidings	1851	923729
13	403m NW	Tyre Works	1915 - 1923	987435
14	407m NE	Railway Sidings	1934	950691

ID	Location	Land use	Dates present	Group ID
Q	413m NE	Goods Yard	1923	844569
Q	413m NE	Goods Yard	1905	892145
Q	415m NE	Goods Yard	1915	885562
Q	415m NE	Goods Depot and Mineral Yard	1934	978341
X	415m E	Timber Yard	1890	796315
Q	415m NE	Railway Sidings	1985	983601
Q	422m NE	Railway Station	1934 - 1938	882537
Q	422m NE	Railway Station	1915	960078
Q	422m NE	Railway Station	1956 - 1968	978085
Q	426m NE	Railway Station	1923	928595
Q	426m NE	Railway Station	1905	910392
Y	427m N	Railway Sidings	1934 - 1938	899923
Y	428m N	Railway Sidings	1923	879517
Q	428m NE	Railway Station	1851	936931
Q	429m NE	Railway Station	1890	851320
X	430m E	Car Works	1956	886177
X	435m E	Car Works	1934 - 1938	952875
X	435m E	Car Building and Repairing Shed	1915 - 1923	976073
X	440m E	Bus Depot	1968	832310
Q	442m NE	Goods Depot and Mineral Yard	1956	971110
Z	444m NE	Unspecified Works	1978	977776
Z	445m NE	Unspecified Works	1985 - 1991	987558
Y	464m N	Railway Sidings	1915	949007
Q	465m NE	Railway Building	1978	830052
17	465m NW	Unspecified Commercial/Industrial	1923	847985
Y	468m N	Railway Sidings	1956 - 1968	978187
Y	468m N	Railway Sidings	1978	900007
Y	468m N	Railway Sidings	1985 - 1991	992616

ID	Location	Land use	Dates present	Group ID
18	465m NW	Unspecified Commercial/Industrial	1956	930471
Q	476m NE	Railway Station	1985 - 1991	853358
Q	476m NE	Engine Shed	1915 - 1919	903872
Q	479m NE	Goods Shed	1934 - 1938	935512
X	482m E	Unspecified Depot	1979	969813
AE	482m NW	Unspecified Works	1985 - 1991	854317
Y	484m N	Railway Sidings	1968	885807
AC	493m NW	Unspecified Works	1915 - 1923	967647
Q	494m NE	Railway Building	1985	820083
AD	495m SE	Fire Engine Station	1915	857910
AD	495m SE	Fire Engine Station	1934	875535
AD	495m SE	Fire Station	1938	910749

This data is sourced from Ordnance Survey / Groundsure

1.2 Historical tanks

Records within 500m	24

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
3	151m NW	Unspecified Tank	1908	115786
B	153m SE	Unspecified Tank	1951 - 1957	131995
H	173m N	Unspecified Tank	1977	115785
H	197m N	Tanks	1948	129745
H	198m N	Tanks	1948 - 1954	149268
G	216m NE	Unspecified Tank	1993 - 1994	137510

ID	Location	Land use	Dates present	Group ID
G	213m NE	Unspecified Tank	1969 - 1991	143245
E	232m NW	Unspecified Tank	1889	143310
I	316m SE	Unspecified Tank	1976	115798
H	323m N	Unspecified Tank	1965 - 1968	133818
H	325m N	Unspecified Tank	1954	115784
T	345m NW	Unspecified Tank	1889 - 1922	141568
T	350m NW	Unspecified Tank	1922	146824
U	353m S	Unspecified Tank	1953	115797
U	359m S	Unspecified Tank	1961	115788
15	429m NW	Unspecified Tank	1955	115783
AA	447m W	Unspecified Tank	1987 - 1992	128178
AA	447m W	Unspecified Tank	1969	128537
AE	460m W	Unspecified Tank	1968 - 1970	129664
AE	461m W	Tanks	1984	107104
AB	467m W	Unspecified Tank	1970	125809
AB	468m W	Unspecified Tank	1968	126329
AJ	471m E	Unspecified Tank	1932	115858
20	483m NW	Unspecified Tank	1966 - 1968	125197

This data is sourced from Ordnance Survey / Groundsure

1.3 Historical energy features

Records within 500m	21

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
2	121m E	Electricity Substation	1955	62176
5	175m E	Electricity Substation	1992 - 1997	64889
I	189m SW	Electricity Stores	1908 - 1922	71133
I	239m SW	Electricity Substation	1945 - 1970	79775
I	239m SW	Electricity Substation	1945	81396
7	242m S	Electricity Substation	1976 - 1991	81221
I	246m SW	Electricity Substation	1908 - 1922	67994
K	299m E	Electricity Substation	1992 - 1997	70267
K	300m E	Electricity Substation	1976	73355
O	314m N	Electricity Substation	1968 - 1986	78617
O	315m N	Electricity Substation	1983	80906
O	318m N	Electricity Substation	1995 - 1996	66506
8	328m E	Electricity Substation	1977 - 1994	72367
9	366m W	Electricity Substation	1970 - 1991	68007
V	376m W	Electricity Substation	1955 - 1958	76549
V	376m W	Electricity Substation	1986	81305
V	376m W	Electricity Transformer	1968 - 1969	74844
10	380m SW	Electricity Substation	1976 - 1991	81090
W	447m N	Electricity Substation	1985 - 1998	69390
19	482m SE	Electricity Substation	1995 - 1997	72533
21	498m NW	Electricity Substation	1948	62177

This data is sourced from Ordnance Survey / Groundsure

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure

1.5 Historical garages

Records within 500m	18

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
F	147m NW	Garage	1968 - 1986	15652
F	147m NW	Garage	1965	15666
F	149m NW	Garage	1969	23582
F	149m NW	Garage	1960	23311
L	272m N	Garages	1968	23658
L	275m N	Garages	1965	26779
L	310m N	Garages	1948 - 1954	26051
M	324m SE	Garage	1953 - 1961	25142
S	336m NW	Garage	1965	15849
S	337m NW	Garage	1960	21337
S	343m NW	Garage	1953	21454
X	432m E	Car Building and Repairing Shed	1922	22953
X	435m E	Car Building and Repairing Shed	1908	20944
16	446m NE	Garage	1948 - 1968	19188
Q	474m NE	Carriage Shed	1932	22602
Q	482m NE	Carriage Shed	1948	21555
Q	487m NE	Carriage Shed	1954	23650
Q	487m NE	Carriage Shed	1948 - 1968	24310

This data is sourced from Ordnance Survey / Groundsure

1.6 Historical military land

Records within 500m	1

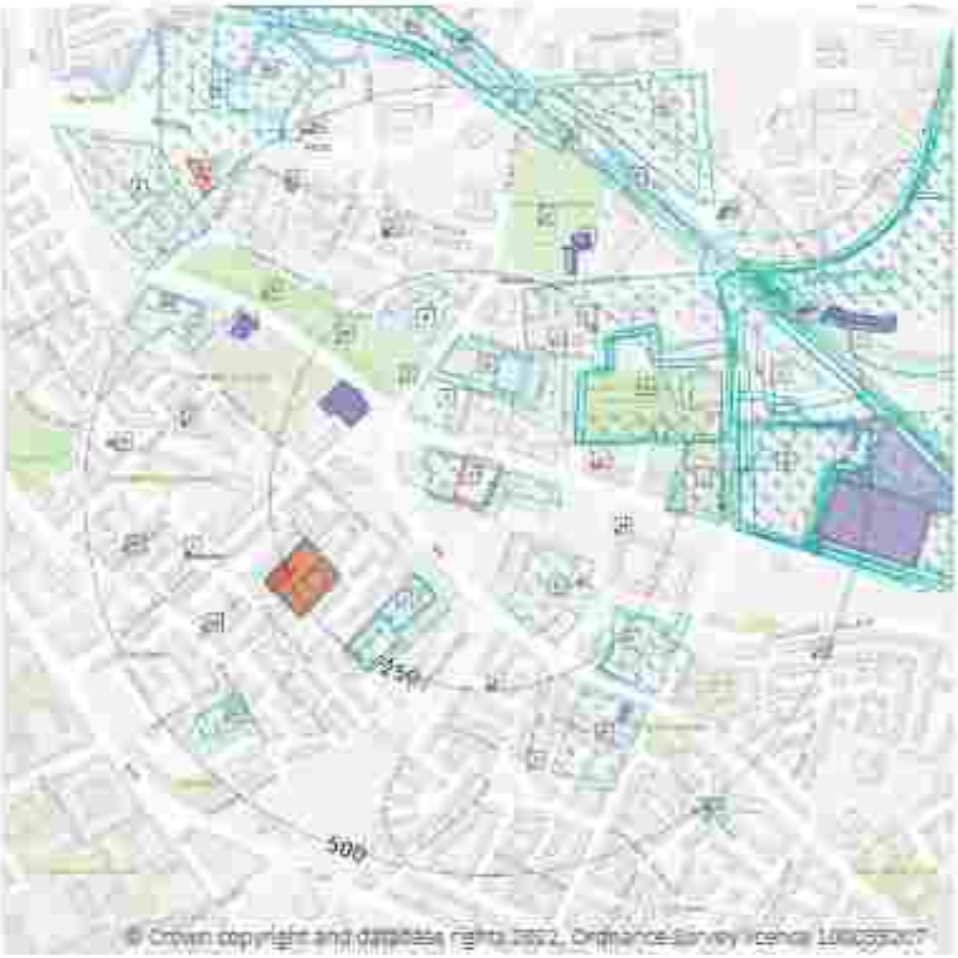
Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

Features are displayed on the Past land use map on **page 13**

ID	Location	Site Name	Date of Operation	Activities
N	313m E	Manchester	circa WWI	National Shell Factory, 4.5in shell

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped





2.1 Historical industrial land uses

Records within 500m	128

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on page 22

ID	Location	Land Use	Date	Group ID
A	On site	Drill Shed	1915	979855
A	On site	Unspecified Depot	1978	818418
A	On site	Drill Shed	1923	979855

ID	Location	Land Use	Date	Group ID
1	35m N	Unspecified Works	1978	830420
B	78m SE	Unspecified Warehouse	1991	807188
C	86m E	Cemetery	1851	851050
D	87m N	Unspecified Works	1915	873002
D	95m N	Unspecified Works	1985	980514
D	95m N	Unspecified Works	1991	980514
D	99m N	Unspecified Commercial/Industrial	1970	796807
D	99m N	Unspecified Works	1968	977680
C	103m E	Cemetery	1888	554544
C	103m E	Cemetery	1934	554544
C	103m E	Cemetery	1915	554544
C	103m E	Cemetery	1923	554544
C	103m E	Cemetery	1905	554544
C	111m E	Cemetery	1890	525381
C	116m E	Cemetery	1955	554544
E	116m SW	Cooperage	1915	911687
E	119m SW	Cooperage	1923	980784
E	120m SW	Cooperage	1938	986972
E	120m SW	Cooperage	1934	986972
4	155m N	Industrial School	1890	833220
G	165m N	Unspecified Works	1970	979806
G	165m N	Unspecified Works	1968	979806
E	187m SW	Sawmills	1923	851136
J	188m SW	Stores	1915	632276
J	189m SW	Unspecified Stores	1923	642032
E	189m SW	Sawmills	1915	851136
J	198m SW	Electric Substation	1915	923333
J	198m SW	Electric Substation	1923	923333

ID	Location	Land Use	Date	Group ID
K	213m SE	Unspecified Works	1578	923157
K	222m SE	Unspecified Works	1968	965469
L	230m E	Hospital	1938	908307
L	230m E	Hospital	1934	908307
L	230m E	Hospital	1915	945904
L	230m E	Hospital	1890	932220
L	237m E	Hospital	1956	910970
L	237m E	Hospital	1923	942296
K	246m SE	Unspecified Works	1965	887509
P	276m SE	Unspecified Works	1968	830419
Q	311m E	Tramways and Bus Depot	1936	940066
Q	311m E	Tramways and Bus Depot	1934	940066
Q	311m E	Tramway Depot	1915	977495
Q	313m E	Tramway Depot	1905	977495
S	316m E	Goods and Mineral Yard	1905	901913
S	316m E	Goods and Mineral Yard	1923	848119
T	315m E	Railway Sidings	1905	955460
T	315m E	Railway Sidings	1923	952334
Q	317m E	Sawmills	1890	813170
Q	317m E	Tramway Depot	1923	880951
T	317m E	Railway Sidings	1890	887070
Q	321m E	Unspecified Commercial/Industrial	1978	796806
Q	322m E	Bus Depot	1956	832358
S	322m E	Goods and Mineral Yard	1938	901883
S	322m E	Goods and Mineral Yard	1934	880979
T	322m E	Railway Sidings	1938	940411
T	322m E	Railway Sidings	1934	940411
T	323m E	Railway Sidings	1915	940411

ID	Location	Land Use	Date	Group ID
Q	323m E	Unspecified Works	1968	830422
S	336m E	Goods and Mineral Yard	1959	883825
T	336m E	Railway Sidings	1959	853106
T	336m E	Railway Sidings	1970	875920
T	336m E	Railway Sidings	1968	853106
Q	340m E	Unspecified Depot	1951	926898
Q	345m E	Unspecified Depot	1985	926898
T	355m NE	Goods Depot and Mineral Yard	1938	917696
S	370m E	Goods Shed	1923	980550
S	372m E	Goods Shed	1938	981628
S	372m E	Goods Shed	1934	981628
S	372m E	Goods Shed	1915	929274
AE	395m NE	Railway Sidings	1956	950163
AC	397m SW	Bakery	1923	968962
S	399m NE	Railway Sidings	1851	923729
AC	400m SW	Bakery	1915	968962
Ab	400m NW	Tyre Works	1923	957255
Ab	404m NW	Tyre Works	1915	957255
6	407m NE	Railway Sidings	1934	690601
T	412m NE	Goods Yard	1905	881345
T	412m NE	Goods Yard	1923	844969
T	415m NE	Goods Depot and Mineral Yard	1934	979341
T	415m NE	Goods Yard	1915	888562
Q	419m E	Timber Yard	1950	796315
T	419m NE	Railway Sidings	1985	981601
T	422m NE	Railway Station	1938	881537
T	422m NE	Railway Station	1934	881537
T	423m NE	Railway Station	1915	940078

ID	Location	Land Use	Date	Group ID
T	423m NE	Railway Station	1968	978085
T	426m NE	Railway Station	1905	930292
T	426m NE	Railway Station	1923	928955
AE	427m N	Railway Sidings	1934	889923
AE	428m N	Railway Sidings	1923	879517
T	428m NE	Railway Station	1853	936931
T	429m NE	Railway Station	1956	978085
T	429m NE	Railway Station	1890	891220
Q	430m E	Car Works	1955	886277
Q	435m E	Car Works	1938	952875
Q	435m E	Car Works	1934	952875
Q	435m E	Car Building and Repairing Shed	1915	976073
Q	440m E	Bus Depot	1968	932320
T	442m NE	Goods Depot and Mineral Yard	1896	971120
Q	442m E	Car Building and Repairing Shed	1923	976073
AF	444m NE	Unspecified Works	1978	877779
AF	445m NE	Unspecified Works	1985	987558
AF	445m NE	Unspecified Works	1991	987558
AE	464m N	Railway Sidings	1938	899923
AE	464m N	Railway Sidings	1915	849007
T	465m NE	Railway Building	1978	820162
B	465m NW	Unspecified Commercial/Industrial	1923	847885
AE	468m N	Railway Sidings	1965	932616
AE	468m N	Railway Sidings	1970	930007
AE	468m N	Railway Sidings	1991	932616
B	469m NW	Unspecified Commercial/Industrial	1955	930471
T	476m NE	Engine Shed	1915	903672
T	476m NE	Railway Station	1965	853358

ID	Location	Land Use	Date	Group ID
T	475m NE	Railway Station	1891	653358
T	476m NE	Engine Shed	1923	903872
T	479m NE	Goods Shed	1938	935532
T	481m NE	Goods Shed	1934	935532
D	482m E	Unspecified Depot	1978	869613
AK	482m NW	Unspecified Works	1965	854217
AK	482m NW	Unspecified Works	1991	854217
AE	484m N	Railway Sidings	1968	889807
AK	493m NW	Unspecified Works	1923	967647
T	494m NE	Railway Building	1965	820283
AM	495m SE	Fire Station	1936	910749
AM	495m SE	Fire Engine Station	1934	876535
AM	495m SE	Fire Engine Station	1915	957910

This data is sourced from Ordnance Survey / Groundsure

2.2 Historical tanks

Records within 500m	48

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on page 22

ID	Location	Land Use	Date	Group ID
3	111m NW	Unspecified Tank	1908	115786
B	153m SE	Unspecified Tank	1995	132986
B	153m SE	Unspecified Tank	1997	132986
B	158m SE	Unspecified Tank	1997	132986
B	158m SE	Unspecified Tank	1993	132986
B	158m SE	Unspecified Tank	1993	132986
B	158m SE	Unspecified Tank	1993	132986

ID	Location	Land Use	Date	Group ID
I	175m N	Unspecified Tank	1977	115785
I	197m N	Tanks	1948	129745
I	198m N	Tanks	1954	149268
I	198m N	Tanks	1948	149268
G	215m NE	Unspecified Tank	1994	137510
G	215m NE	Unspecified Tank	1993	137510
G	215m NE	Unspecified Tank	1993	137510
G	215m NE	Unspecified Tank	1994	137510
G	218m NE	Unspecified Tank	1989	148246
G	218m NE	Unspecified Tank	1991	148246
M	222m NW	Unspecified Tank	1988	143310
M	222m NW	Unspecified Tank	1988	143310
K	314m SE	Unspecified Tank	1976	115759
U	325m N	Unspecified Tank	1965	133818
U	325m N	Unspecified Tank	1968	133818
U	325m N	Unspecified Tank	1965	133818
U	325m N	Unspecified Tank	1964	115784
W	345m NW	Unspecified Tank	1889	141568
W	345m NW	Unspecified Tank	1908	141568
W	345m NW	Unspecified Tank	1932	141568
W	345m NW	Unspecified Tank	1889	141568
W	350m NW	Unspecified Tank	1932	146824
X	355m S	Unspecified Tank	1958	115787
X	359m S	Unspecified Tank	1961	115788
7	429m NW	Unspecified Tank	1995	115783
AH	447m W	Unspecified Tank	1992	128178
AH	447m W	Unspecified Tank	1989	128537
AH	448m W	Unspecified Tank	1987	128178

ID	Location	Land Use	Date	Group ID
A	460m W	Unspecified Tank	1970	125664
A	460m W	Unspecified Tank	1970	125664
A	460m W	Unspecified Tank	1970	125664
A	460m W	Unspecified Tank	1968	125664
A	461m W	Tanks	1984	107104
A	467m W	Unspecified Tank	1970	125809
A	467m W	Unspecified Tank	1970	125809
A	467m W	Unspecified Tank	1970	125809
A	468m W	Unspecified Tank	1968	126029
G	471m E	Unspecified Tank	1932	115838
AL	483m NW	Unspecified Tank	1986	129197
AL	483m NW	Unspecified Tank	1995	129197
AL	483m NW	Unspecified Tank	1996	129197

This data is sourced from Ordnance Survey / Groundsure

2.3 Historical energy features

Records within 500m	58

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on page 22

ID	Location	Land Use	Date	Group ID
2	121m E	Electricity Substation	1995	62179
H	175m E	Electricity Substation	1995	64889
H	175m E	Electricity Substation	1997	64889
H	175m E	Electricity Substation	1997	64889
H	175m E	Electricity Substation	1992	64889
H	175m E	Electricity Substation	1993	64889
H	175m E	Electricity Substation	1993	64889

ID	Location	Land Use	Date	Group ID
J	185m SW	Electricity Stores	1900	71153
J	185m SW	Electricity Stores	1922	71133
J	238m SW	Electricity Substation	1970	78775
J	238m SW	Electricity Substation	1949	78775
J	238m SW	Electricity Substation	1949	81396
N	242m S	Electricity Substation	1983	81221
N	242m S	Electricity Substation	1991	81221
N	243m S	Electricity Substation	1976	81221
N	243m S	Electricity Substation	1964	81221
J	246m SW	Electricity Substation	1908	67994
J	246m SW	Electricity Substation	1922	67994
L	295m E	Electricity Substation	1955	70267
L	295m E	Electricity Substation	1997	70267
L	295m E	Electricity Substation	1997	70267
L	295m E	Electricity Substation	1992	70267
L	295m E	Electricity Substation	1993	70267
L	295m E	Electricity Substation	1993	70267
L	300m E	Electricity Substation	1976	73365
R	314m N	Electricity Substation	1966	78617
R	315m N	Electricity Substation	1949	80908
R	315m N	Electricity Substation	1908	78617
R	315m N	Electricity Substation	1995	66586
R	315m N	Electricity Substation	1998	66586
Q	328m E	Electricity Substation	1989	72367
Q	328m E	Electricity Substation	1991	72367
Q	329m E	Electricity Substation	1994	72367
Q	329m E	Electricity Substation	1993	72367
Q	329m E	Electricity Substation	1993	72367

ID	Location	Land Use	Date	Group ID
Q	323m E	Electricity Substation	1954	72367
Q	323m E	Electricity Substation	1977	72367
Y	366m W	Electricity Substation	1970	68007
Y	366m W	Electricity Substation	1976	68007
Y	366m W	Electricity Substation	1984	68007
Y	367m W	Electricity Substation	1983	68007
Y	367m W	Electricity Substation	1991	68007
Z	376m W	Electricity Substation	1995	75649
Z	376m W	Electricity Substation	1998	75649
Z	376m W	Electricity Substation	1986	61105
Z	376m W	Electricity Transformer	1968	74844
Z	377m W	Electricity Transformer	1969	74844
AA	380m SW	Electricity Substation	1976	61090
AA	380m SW	Electricity Substation	1984	61090
AA	380m SW	Electricity Substation	1983	61090
AA	380m SW	Electricity Substation	1991	61090
AB	447m N	Electricity Substation	1995	69390
AB	447m N	Electricity Substation	1998	69390
AB	447m N	Electricity Substation	1986	69390
AJ	482m SE	Electricity Substation	1985	72533
AJ	482m SE	Electricity Substation	1997	72533
AJ	482m SE	Electricity Substation	1997	72533
AO	498m NW	Electricity Substation	1948	62177

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure

2.5 Historical garages

Records within 500m	31

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on page 22

ID	Location	Land Use	Date	Group ID
F	147m NW	Garage	1965	25866
F	147m NW	Garage	1965	25866
F	147m NW	Garage	1968	25652
F	148m NW	Garage	1965	25652
F	149m NW	Garage	1963	22692
F	149m NW	Garage	1960	23311
O	272m N	Garages	1968	23858
O	275m N	Garages	1965	26779
O	275m N	Garages	1965	26779
O	310m N	Garages	1948	26091
O	310m N	Garages	1964	26091
F	324m SE	Garage	1961	25142
F	324m SE	Garage	1953	25142
V	336m NW	Garage	1965	25849
V	336m NW	Garage	1965	25849
V	337m NW	Garage	1960	21337

ID	Location	Land Use	Date	Group ID
V	343m NW	Garage	1953	21434
Q	432m E	Car Building and Repairing Shed	1922	22961
Q	435m E	Car Building and Repairing Shed	1908	20944
AG	444m NE	Garage	1965	25108
AG	444m NE	Garage	1965	25108
AG	444m NE	Garage	1963	25108
AG	446m NE	Garage	1954	25108
AG	446m NE	Garage	1948	25108
T	474m NE	Carriage Shed	1932	22502
T	487m NE	Carriage Shed	1954	23550
T	487m NE	Carriage Shed	1948	21355
T	487m NE	Carriage Shed	1948	24310
T	487m NE	Carriage Shed	1965	24310
T	487m NE	Carriage Shed	1965	24310
T	487m NE	Carriage Shed	1968	24310

This data is sourced from Ordnance Survey / Groundsure

3 Waste and landfill



Site Outline
Search buffers in metres (m)
Historical waste sites
Licensed waste sites
Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	1

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 34**

ID	Location	Address	Further Details	Date
3	343m SE	Site Address: Universal House, Devonshire Street, Manchester, Greater Manchester, M60 6EL	Type of Site: Recovery/Treatment Centre Planning application reference: 106637/FO/2014/N2 Description: Scheme comprises construction of part single storey part two storey building to form [class C2] 24 bedroom recovery and treatment centre with associated car parking, sustainable urban drainage system (suds), natural ventilation, landscaping and vehicular access from Devonshire Street. Sustainable information: This development has been designed to achieve BREEAM Very Good rating with 59%. The associated works include sewer systems, infrastructure and enabling works. Data source: Historic Planning Application Data Type: Point	22/12/2014

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	1

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on page 34

ID	Location	Details		
7	439m N	Site Name: Pye Metals Ltd Site Address: Temperance Street, Ardwick, Manchester, M12 6HS Correspondence Address: -	Type of Site: Metal Recycling Site (Inland MRS's) Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PM1001 EPR reference: EA/EPR/AP3397CK/A001 Operator: Pye Metals Ltd Waste Management Licence No: 53583 Annual Tonnage: 1733	Issue Date: 11/10/1996 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	47

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on page 34

ID	Location	Site	Reference	Category	Sub-Category	Description
A	58m N	18a Dolphin Street MANCHESTER M12 6BQ	EPR/EP3208VL/A001	Treating waste exemption	Agricultural Waste Only	Treatment of waste food
A	58m N	18a Dolphin Street MANCHESTER M12 6BQ	EPR/EP3208VL/A001	Storing waste exemption	Both agricultural and non-agricultural waste	Storage of waste in secure containers
A	58m N	18a Dolphin Street MANCHESTER M12 6BQ	EPR/EP3208VL/A001	Treating waste exemption	Both agricultural and non-agricultural waste	Preparatory treatments (baling, sorting, shredding etc)

ID	Location	Site	Reference	Category	Sub-Category	Description
A	58m N	18a Dolphin Street MANCHESTER M12 6BG	EPR/EP0208VL/A001	Treating waste exemption	Both agricultural and non-agricultural waste	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
A	58m N	18a Dolphin Street MANCHESTER M12 6BG	EPR/EP0208VL/A001	Treating waste exemption	Both agricultural and non-agricultural waste	Recovery of scrap metal
A	58m N	18a Dolphin Street MANCHESTER M12 6BG	EPR/EP0208VL/A001	Using waste exemption	Both agricultural and non-agricultural waste	Use of waste in construction
A	58m N	16 Dolphin Street Manchester Manchester M12 6BG	EPR/EP0608VF/A001	Treating waste exemption	Non-Agricultural Waste Only	Screening and blending of waste
A	58m N	16 Dolphin Street Manchester Manchester M12 6BG	EPR/EP0608VF/A001	Using waste exemption	Non-Agricultural Waste Only	Incorporation of ash into soil
B	144m NE	33, Harkness Street, Hardwick, Manchester, M12 6BT	WEX126614	Storing waste exemption	Not on a farm	Storage of waste in secure containers
B	144m NE	33, Harkness Street, Hardwick, Manchester, M12 6BT	WEX126614	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	144m NE	33, Harkness Street, Hardwick, Manchester, M12 6BT	WEX126614	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
B	144m NE	33, Harkness Street, Hardwick, Manchester, M12 6BT	WEX126614	Treating waste exemption	Not on a farm	Screening and blending of waste
B	144m NE	33, Harkness Street, Hardwick, Manchester, M12 6BT	WEX126614	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
B	144m NE	33, Harkness Street, Hardwick, Manchester, M12 6BT	WEX126614	Treating waste exemption	Not on a farm	Recovery of scrap metal

ID	Location	Site	Reference	Category	Sub-Category	Description
B	144m NE	33, Harkness Street, Hardwick, Manchester, M12 6BT	WEX136514	Using waste exemption	Not on a farm	Use of waste in construction
C	166m N	-	WEX260967	Treating waste exemption	Not on a farm	Manual treatment of waste
C	166m N	Scott Pallets, Higher Ardwick, Manchester, M12 6DB	WEX243369	Using waste exemption	Not on a farm	Use of waste for a specified purpose
C	166m N	Scott Pallets, Higher Ardwick, Manchester, M12 6DB	WEX243369	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods
D	201m NE	33 Harkness Street MANCHESTER M12 6BT	EPR/TP3700XN/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in secure containers
D	201m NE	33 Harkness Street MANCHESTER M12 6BT	EPR/TP3700XN/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
D	201m NE	33 Harkness Street MANCHESTER M12 6BT	EPR/TP3700XN/A001	Treating waste exemption	Non-Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
D	201m NE	33 Harkness Street MANCHESTER M12 6BT	EPR/TP3700XN/A001	Treating waste exemption	Non-Agricultural Waste Only	Screening and blending of waste
D	201m NE	33 Harkness Street MANCHESTER M12 6BT	EPR/TP3700XN/A001	Treating waste exemption	Non-Agricultural Waste Only	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
D	201m NE	33 Harkness Street MANCHESTER M12 6BT	EPR/TP3700XN/A001	Treating waste exemption	Non-Agricultural Waste Only	Recovery of scrap metal
D	201m NE	33 Harkness Street MANCHESTER M12 6BT	EPR/TP3700XN/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste in construction
E	206m N	1 Higher Ardwick, Higher Ardwick, Manchester, M126DB	WEX119938	Treating waste exemption	Not on a farm	Manual treatment of waste
E	207m N	1 Higher Ardwick Manchester Lancashire M12 6DB	EPR/RP0133SJ/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste for a specified purpose

ID	Location	Site	Reference	Category	Sub-Category	Description
E	207m N	1 Higher Ardwick Manchester Lancashire M12 6DB	EPR/KP3533EJ/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste to manufacture finished goods
D	212m NE	33, HARKNESS STREET, MANCHESTER, M12 6BT	WEX274802	Using waste exemption	Not on a farm	Use of waste in construction
D	212m NE	33, HARKNESS STREET, MANCHESTER, M12 6BT	WEX274502	Storing waste exemption	Not on a farm	Storage of waste in a secure place
D	212m NE	33, HARKNESS STREET, MANCHESTER, M12 6BT	WEX274902	Storing waste exemption	Not on a farm	Storage of waste in secure containers
D	212m NE	33, HARKNESS STREET, MANCHESTER, M12 6BT	WEX274903	Treating waste exemption	Not on a farm	Recovery of scrap metal
D	212m NE	33, HARKNESS STREET, MANCHESTER, M12 6BT	WEX274800	Treating waste exemption	Not on a farm	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising
D	212m NE	33, HARKNESS STREET, MANCHESTER, M12 6BT	WEX274901	Treating waste exemption	Not on a farm	Screening and blending of waste
I	231m E	Unit 57, Carlocca Complex 2 Halldon Close Manchester Lancashire M12 4AH	EPR/JT0508BS/A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting and denaturing of controlled drugs for disposal
F	281m SE	Saddon Construction Ltd, Devonshire Street, Ardwick, M12 4AB	WEX017919	Treating waste exemption	Not on a farm	Screening and blending of waste
F	281m SE	Saddon Construction Ltd, Devonshire Street, Ardwick, M12 4AB	WEX017919	Using waste exemption	Not on a farm	Use of waste in construction
F	281m SE	Independent Hospital, Devonshire Street, Ardwick, Manchester, M12 4AB	WEX006572	Treating waste exemption	Not on a farm	Screening and blending of waste
F	281m SE	Independent Hospital, Devonshire Street, Ardwick, Manchester, M12 4AB	WEX006573	Using waste exemption	Not on a farm	Use of waste in construction
G	319m W	Staverton Close Brunswick M13 9TS	EPR/WE3346BX/A001	Treating waste exemption	Non-Agricultural Waste Only	Screening and blending of waste
G	319m W	Staverton Close Brunswick M13 9TS	EPR/WE3346BX/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste in construction

ID	Location	Site	Reference	Category	Sub-Category	Description
2	333m NE	Universal Building 37/45 Devonshire Street North Manchester M12 6JR	EPR/TP3104KY/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
H	365m NE	HIGHER ARDWICK, MANCHESTER, M12 6DB	WEX080086	Using waste exemption	Not on a farm	Use of waste for a specified purpose
H	365m NE	HIGHER ARDWICK, MANCHESTER, M12 6DB	WEX080085	Using waste exemption	Not on a farm	Use of waste to manufacture finished goods
4	430m NE	Corner of Cranbury Street North Western Street Ardwick Lancashire M12 6DA	EPR/WP3137AQ/A001	Treating waste exemption	Non-Agricultural Waste Only	Manual treatment of waste
5	435m N	-	WEX239223	Treating waste exemption	Not on a farm	Screening and blending of waste
6	477m N	Corner of Cranbury Street North Western Street Ardwick Lancashire M12 6DA	EPR/CE5252RW/A001	Treating waste exemption	Non-Agricultural Waste Only	Treatment of waste wood and waste plant matter by chipping, shredding, cutting or pulverising

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



Site Outline
Search buffers in metres (m)
Recent industrial land uses
Current or recent petrol stations
Licensed pollutant release (Part A(1)/B)
Licensed Discharges to controlled waters
Pollution incidents (EA/NRA)

4.1 Recent industrial land uses

Records within 250m	40

Current potentially contaminative industrial sites

Features are displayed on the Current industrial land use map on **page 41**

ID	Location	Company	Address	Activity	Category
A	On site	Imperial Knitwear Ltd	16-18, Hyde Road, Manchester, Greater Manchester, M12 6BW	Textiles, Fabrics, Silk and Machinery	Industrial Products
A	0m E	Electricity Sub Station	Greater Manchester, M12	Electrical Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
A	10m E	Business Centre	Greater Manchester, M12	Business Parks and Industrial Estates	Industrial Features
A	17m W	Panache Autocentre	14, Hyde Road, Manchester, Greater Manchester, M12 6BW	Vehicle Repair, Testing and Servicing	Repair and Servicing
A	38m E	Shah Knit Ltd	Second Floor Unit 4 Apollo Business Park, Apsley Grove, Manchester, Greater Manchester, M12 6AW	Textiles, Fabrics, Silk and Machinery	Industrial Products
B	55m N	N C S M Group	3-5, Hyde Road, Manchester, Greater Manchester, M12 6BQ	Secondhand Vehicles	Motoring
B	56m N	J T Fleet Management Services	23, Hyde Road, Manchester, Greater Manchester, M12 6BQ	Vehicle Hire and Rental	Hire Services
B	73m N	Allied Knitwear Ltd	16, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Clothing, Components and Accessories	Consumer Products
B	73m N	Alexia Knitwear Ltd	15, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Textiles, Fabrics, Silk and Machinery	Industrial Products
B	75m N	Goldenknit M C R Ltd	16, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Textiles, Fabrics, Silk and Machinery	Industrial Products
B	82m N	Apollo Self Storage	3-5, Hyde Road, Manchester, Greater Manchester, M12 6BQ	Container and Storage	Transport, Storage and Delivery
B	84m N	Zam Zam Knitwear	13, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Clothing, Components and Accessories	Consumer Products
B	94m N	Fashion Craft	9-11, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Clothing, Components and Accessories	Consumer Products
B	94m N	T & A	9-11, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Textiles, Fabrics, Silk and Machinery	Industrial Products
C	99m NE	Fast Car Glass	8, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Vehicle Repair, Testing and Servicing	Repair and Servicing
C	102m NE	Velvet Sofa	8, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Furniture	Consumer Products
C	113m NE	Super Knit Ltd	19-21, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Clothing, Components and Accessories	Consumer Products
C	115m NE	Classic Knitwear	19-21, Dolphin Street, Manchester, Greater Manchester, M12 6BG	Textiles, Fabrics, Silk and Machinery	Industrial Products
D	118m E	Real Lancashire Eccles Cakes	57, Hyde Road, Manchester, Greater Manchester, M12 6BH	Baking and Confectionery	Foodstuffs

ID	Location	Company	Address	Activity	Category
C	150m NE	A & N Knitwear	Dalberg House, Dalberg Street, Manchester, Greater Manchester, M12 6BG	Clothing, Components and Accessories	Consumer Products
D	155m E	Manchester Motorbodie s	71-73, Hyde Road, Manchester, Greater Manchester, M12 6BH	Vehicle Repair, Testing and Servicing	Repair and Servicing
F	160m SE	Electricity Sub Station	Greater Manchester, M12	Electrical Features	Infrastructure and Facilities
F	163m SE	Tank	Greater Manchester, M12	Tanks (Generic)	Industrial Features
F	178m E	Electricity Sub Station	Greater Manchester, M12	Electrical Features	Infrastructure and Facilities
G	185m N	Lucky Beds & Furniture Ltd	Horizon House, Harkness Street, Manchester, Greater Manchester, M12 6BT	Beds and Bedding	Consumer Products
G	185m NE	Shipping to China	25-27, Harkness Street, Manchester, Greater Manchester, M12 6BT	Distribution and Haulage	Transport, Storage and Delivery
F	187m E	Infinite Zone Ltd	Unit 18 Carlocca Enterprises 2, Helldon Close, Manchester, Greater Manchester, M12 4AH	Radar and Telecommunications Equipment	Industrial Products
E	190m W	Tesco Petrol Station	Aqueduct Street South, Manchester, Greater Manchester, M13 9XF	Petrol and Fuel Stations	Road and Rail
F	191m SE	H D Secure	Unit 9, Carlocca Enterprises, 2, Helldon Close, Manchester, Greater Manchester, M12 4AH	Electronic Equipment	Industrial Products
F	193m E	Jaymac Mechanical Engineers	Unit 101 Carlocca Enterprises 2, Helldon Close, Manchester, Greater Manchester, M12 4AH	Mechanical Engineers	Engineering Services
F	194m E	S & S Power Transmissio n	Unit 102 Carlocca Enterprises 2, Helldon Close, Manchester, Greater Manchester, M12 4AH	Vehicle Repair, Testing and Servicing	Repair and Servicing
F	196m E	Boose Manchester	Unit 96 Carlocca Enterprises 2, Helldon Close, Manchester, Greater Manchester, M12 4AH	Distribution and Haulage	Transport, Storage and Delivery
F	198m SE	Ship 4 U	Unit 5 Carlocca Enterprises 2, Helldon Close, Manchester, Greater Manchester, M12 4AH	Distribution and Haulage	Transport, Storage and Delivery
F	202m E	Tech Regen E	Unit 94 Carlocca Enterprises 2, Helldon Close, Manchester, Greater Manchester, M12 4AH	Electrical Equipment Repair and Servicing	Repair and Servicing
G	213m N	Works	Greater Manchester, M12	Unspecified Works Or Factories	Industrial Features

ID	Location	Company	Address	Activity	Category
G	215m N	Dolphin Knitwear Co Ltd	53, Higher Ardwick, Manchester, Greater Manchester, M12 6DA	Clothing, Components and Accessories	Consumer Products
G	217m NE	Tank	Greater Manchester, M12	Tanks (General)	Industrial Features
F	233m E	Metcom UK Ltd	Unit B3 Cariocca Enterprises 2, Pelldon Close, Manchester, Greater Manchester, M12 4AH	Electrical Equipment Repair and Servicing	Repair and Servicing
G	236m NE	T N S Knitwear Ltd	58-60, Higher Ardwick, Manchester, Greater Manchester, M12 6DA	Clothing, Components and Accessories	Consumer Products
F	243m E	Complete Plumbing & Drainage Services Ltd	Unit 67 Cariocca Enterprises 2, Pelldon Close, Manchester, Greater Manchester, M12 4AH	Civil Engineers	Engineering Services

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	1

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current Industrial land use map on **page 41**

ID	Location	Company	Address	LPG	Status
E	172m W	ESSO	Ardwick Green South, Manchester, Greater Manchester, M13 9XF	No	Open

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	4

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current Industrial land use map on **page 41**

ID	Location	Address	Details	
E	135m NW	Ardwick Green Serv Stn, Ardwick Green, M13 9XF	Process: Petrol Vapour Recovery Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
G	179m N	Chemrange Ltd, 33 Harkness Street, Ardwick, M12 6BT	Process: Other Mineral Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
E	161m NW	Tesco Express Ardwick, Ardwick Green South, Ardwick, Manchester, M13 9XF	Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified
J	476m N	Ardwick Scrap, 2 Hyde Street, Ardwick, M12 6HS	Process: Non-Ferrous Metal Foundry Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of enforcement: No Enforcement Notified Comment: No Enforcement Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	1

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 41**.

ID	Location	Address	Details	
7	174m E	CARLOCCA DEVELOPMENT SWD, HYDE ROAD/DEVONSHIRE STREET, ARDWICK, GREATER MANCHESTER.	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 016991353 Permit Version: 1 Receiving Water: CORNBROOK CULVERT	Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01/11/1994 Revocation Date: 01/11/1994

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	4

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current Industrial land use map on **page 41**

ID	Location	Details	
H	465m NE	Incident Date: 11/09/2001 Incident Identification: 30107 Pollutant: Specific Waste Materials Specific Waste Materials Specific Waste Materials Pollutant Description: Commercial Waste Containers Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
H	465m NE	Incident Date: 11/09/2001 Incident Identification: 30107 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
H	466m NE	Incident Date: 11/09/2001 Incident Identification: 30107 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
H	466m NE	Incident Date: 11/09/2001 Incident Identification: 30107 Pollutant: Specific Waste Materials Pollutant Description: Containers	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	2

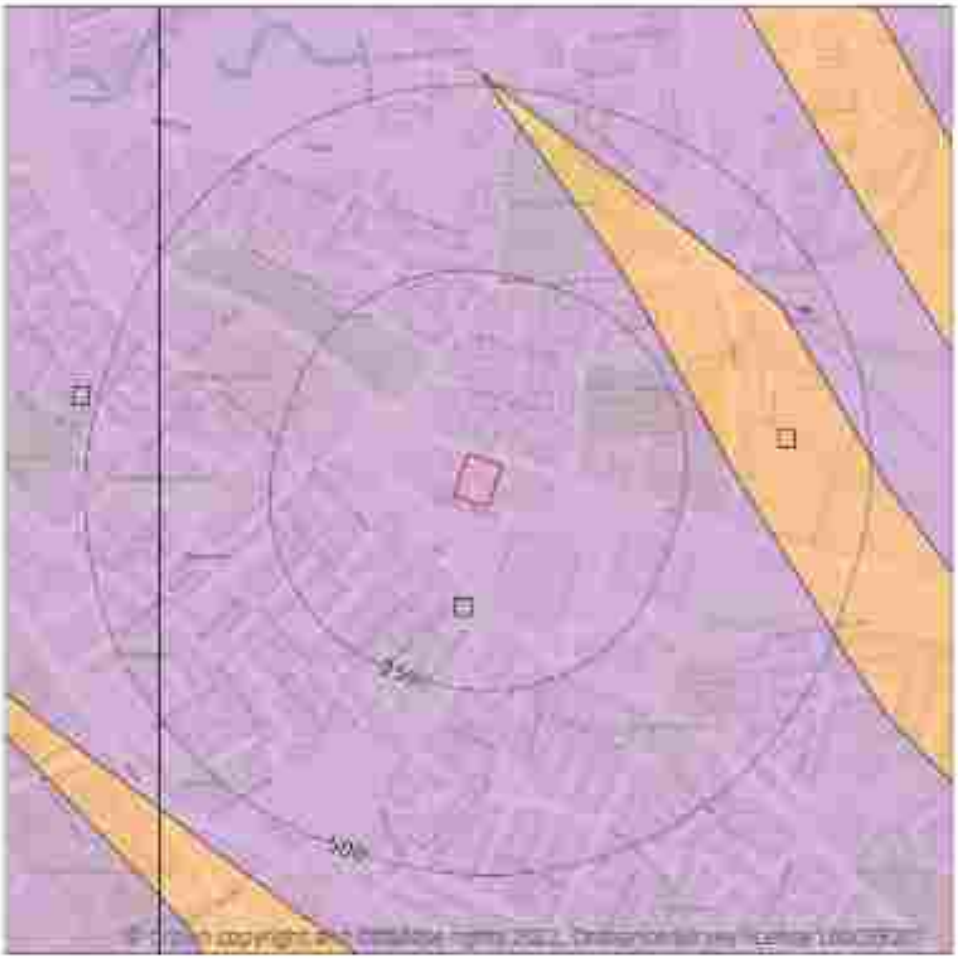
Aquifer status of groundwater held within superficial geology

Features are displayed on the Hydrogeology map on page 50

ID	Location	Designation	Description
1	On site	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
2	338m W	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	3

Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on page 52

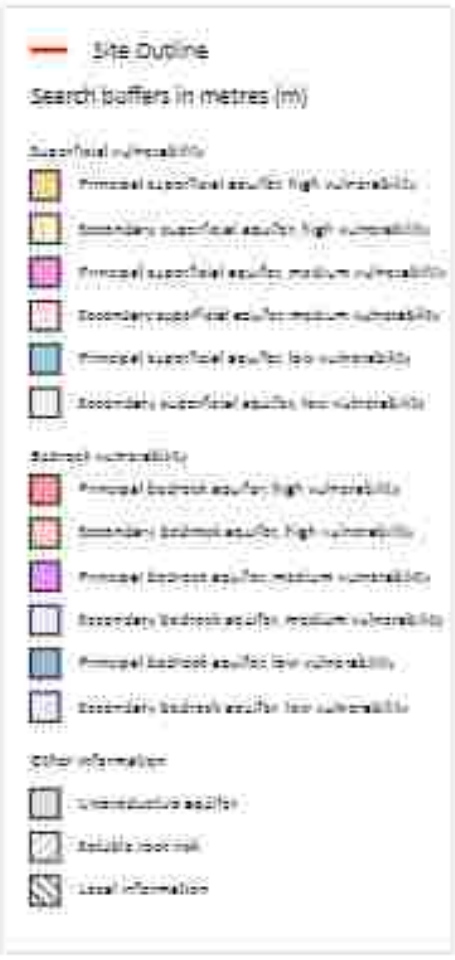
ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	271m NE	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers

ID	Location	Designation	Description
3	295m W	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability





5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on page 54

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures
2	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

5.5 Groundwater vulnerability- local information

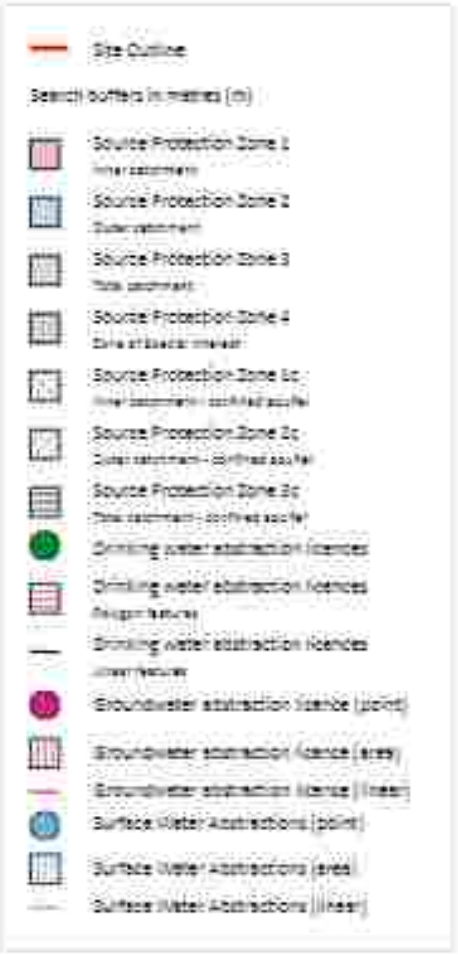
Records on site	0

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03708 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones





5.6 Groundwater abstractions

Records within 2000m	19

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on page 56

ID	Location	Details	
1	334m SE	Status: Historical Licence No: NW/069/0004/005 Details: Heat Pump Direct Source: Ground Water - North West Region Point: AREA OF ABSTRACTION - LOWER CARBONIFEROUS LIMESTONE Data Type: Poly4 Name: G T Energy UK Limited Easting: 385729 Northing: 396778	Annual Volume (m^3): 2,049,840 Max Daily Volume (m^3): 9840 Original Application No. - Original Start Date: 17/01/2013 Expiry Date: 16/01/2037 Issue No: 2 Version Start Date: 11/06/2013 Version End Date: -
A	544m N	Status: Historical Licence No: 2569006001 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, BROADIE ST, ARDWICK, MANCHESTER" Data Type: Point Name: MOSELEY RUBBER CO LTD Easting: 385240 Northing: 397540	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 00/00/1966 Expiry Date: - Issue No: 100 Version Start Date: 08/02/1966 Version End Date: -
A	544m N	Status: Historical Licence No: 2569006001 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, BROADIE ST, ARDWICK, MANCHESTER Data Type: Point Name: MOSELEY RUBBER CO LTD Easting: 385240 Northing: 397540	Annual Volume (m^3): 331858 Max Daily Volume (m^3): 909.2 Original Application No: - Original Start Date: 08/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 08/02/1966 Version End Date: -
-	1225m W	Status: Active Licence No: NW/069/0005/002 Details: Heat Pump Direct Source: Ground Water - North West Region Point: BOREHOLE 1 AT LOWER CHATHAM STREET Data Type: Point Name: Manchester Metropolitan University Easting: 384150 Northing: 397051	Annual Volume (m^3): 282,240 Max Daily Volume (m^3): 1,532 Original Application No: NPS/WR/015264 Original Start Date: 04/04/2014 Expiry Date: 31/03/2037 Issue No: 2 Version Start Date: 04/04/2014 Version End Date: -

ID	Location	Details	
-	1225m W	Status: Active Licence No: NW/069/0006/003 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE 1 AT LOWER CHATHAM STREET Data Type: Point Name: Manchester Metropolitan University Easting: 384180 Northing: 397051	Annual Volume (m³): 283,240 Max Daily Volume (m³): 1,532 Original Application No: NPS/WR/015254 Original Start Date: 04/04/2014 Expiry Date: 31/03/2027 Issue No: 2 Version Start Date: 04/04/2014 Version End Date: -
-	1232m NW	Status: Historical Licence No: NW/069/0006/001 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: BOREHOLES AT ORIGIN DEVELOPMENTS, MANCHESTER Data Type: Point Name: West Contracting Easting: 384376 Northing: 397739	Annual Volume (m³): 338128 Max Daily Volume (m³): 1010 Original Application No: - Original Start Date: 19/01/2009 Expiry Date: 31/03/2015 Issue No: 1 Version Start Date: 19/01/2009 Version End Date: -
-	1257m NW	Status: Historical Licence No: NW/069/0006/001 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: BOREHOLES AT ORIGIN DEVELOPMENTS, MANCHESTER Data Type: Point Name: West Contracting Easting: 384376 Northing: 397739	Annual Volume (m³): 338128 Max Daily Volume (m³): 1010 Original Application No: - Original Start Date: 19/01/2009 Expiry Date: 31/03/2015 Issue No: 1 Version Start Date: 19/01/2009 Version End Date: -
-	1639m NW	Status: Historical Licence No: 2569007069 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "BOREHOLE AT GEORGE ST, MANCHESTER" Data Type: Point Name: BRITISH TELECOM Easting: 384100 Northing: 398000	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 27/01/1971 Expiry Date: - Issue No: 100 Version Start Date: 27/01/1971 Version End Date: -

ID	Location	Details	
-	1625m NW	Status: Historical Licence No: 2569007059 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT GEORGE ST, MANCHESTER Data Type: Point Name: BRITISH TELECOMMUNICATIONS PLC Easting: 384100 Northing: 398000	Annual Volume (m³): 1100 Max Daily Volume (m³): 360 Original Application No. - Original Start Date: 01/04/1984 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2007 Version End Date: -
-	1638m W	Status: Active Licence No: NW/069/0004/003 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT MANCHESTER METROPOLITAN UNIVERSITY Data Type: Point Name: Manchester Metropolitan University Easting: 383715 Northing: 396746	Annual Volume (m³): 274,115 Max Daily Volume (m³): 751 Original Application No: NPS/WR/008077 Original Start Date: 20/09/2013 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 01/01/2015 Version End Date: -
-	1698m W	Status: Active Licence No: NW/069/0004/005 Details: Heat Pump Direct Source: Ground Water - North West Region Point: BOREHOLE AT MANCHESTER METROPOLITAN UNIVERSITY Data Type: Point Name: Manchester Metropolitan University Easting: 383715 Northing: 396746	Annual Volume (m³): 274,115 Max Daily Volume (m³): 751 Original Application No: NPS/WR/008077 Original Start Date: 20/09/2013 Expiry Date: 31/03/2027 Issue No: 1 Version Start Date: 01/01/2015 Version End Date: -
-	1840m SW	Status: Historical Licence No: 2569007007 Details: Process water Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER" Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383300 Northing: 395900	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 15/08/1995 Version End Date: -

ID	Location	Details	
-	1840m SW	Status: Historical Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER" Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383900 Northing: 395900	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No.: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 15/08/1855 Version End Date: -
-	1840m SW	Status: Historical Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383900 Northing: 395900	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No.: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/12/2003 Version End Date: -
-	1840m SW	Status: Historical Licence No: 2569007007 Details: Process water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, MOSS SIDE, MANCHESTER Data Type: Point Name: SCOTTISH COURAGE BREWING LTD Easting: 383900 Northing: 395900	Annual Volume (m³): - Max Daily Volume (m³): - Original Application No.: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 31/12/2003 Version End Date: -
-	1840m SW	Status: Historical Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383900 Northing: 395900	Annual Volume (m³): 227000 Max Daily Volume (m³): 900 Original Application No.: - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 102 Version Start Date: 23/11/2009 Version End Date: -

ID	Location	Details	
-	1640m SW	Status: Historical Licence No: 2569007007 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383900 Northing: 399500	Annual Volume (m³): 227000 Max Daily Volume (m³): 900 Original Application No. - Original Start Date: 15/02/1966 Expiry Date: - Issue No: 102 Version Start Date: 23/11/2009 Version End Date: -
-	1694m SW	Status: Active Licence No: 2569007007 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383665 Northing: 399909	Annual Volume (m³): 227,000 Max Daily Volume (m³): 900 Original Application No: NPS/WR/015793 Original Start Date: 15/02/1966 Expiry Date: - Issue No: 103 Version Start Date: 08/05/2014 Version End Date: -
-	1694m SW	Status: Active Licence No: 2569007007 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES MOSS SIDE MANCHESTER Data Type: Point Name: Heineken UK Ltd Easting: 383665 Northing: 399909	Annual Volume (m³): 227,000 Max Daily Volume (m³): 900 Original Application No: NPS/WR/015793 Original Start Date: 15/02/1966 Expiry Date: - Issue No: 103 Version Start Date: 08/05/2014 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	0

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline
Search buffers in metres (m)
Water Network (OS MasterMap)
Surface water features (wider than 5m)
Surface water features (narrower than 5m)
WFD River, canal and surface water transfer water bodies
WFD Lake water bodies
WFD transitional and coastal water bodies
WFD Surface water body catchments boundaries
WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	1

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on page 63

ID	Location	Type of water feature	Ground level	Permanence	Name
A	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Corn Brook

This data is sourced from the Ordnance Survey

6.2 Surface water features

Records within 250m	0

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

This data is sourced from the Ordnance Survey

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on page 63

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	River	Irwell / Manchester Ship Canal (Irk to confluence with Upper Mers	GB112069061452	Croal Irwell	Irwell

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on page 63

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	335m NW	River	Irwell / Manchester Ship Canal (Irk to confluence with Upper Mers	GB112069061452	Moderate	Fail	Moderate	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on page 63

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	On site	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	GB41201G101100	Poor	Poor	Poor	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



Site Outline
Search buffers in metres (m)
River and coastal flooding
High
Medium
Low
Very Low
Historical Flood Events
Areas Used for Flood Storage
Areas Benefiting from Flood Defences
Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	2

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 66**

Distance	Flood risk category
On site	Low
0 - 50m	Low

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



Site Outline
Search buffers in metres (m)
Flood zone 2
Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 66**

Location	Type
On site	Zone 2 - (Fluvial /Tidal Models)

This data is sourced from the Environment Agency and Natural Resources Wales

7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 70**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiental Risk Analytics

9 Groundwater flooding



Site Outline
Search buffers in metres (m)
High
Moderate - High
Moderate
Low
Negligible

9.1 Groundwater flooding

Highest risk on site	High
Highest risk within 50m	High

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 72**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive. SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	0

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	1

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
1607m N	River Irk (Nuttall Brook to River mouth) NVZ	Surface Water	636	Existing

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



Site Outline
Search buffers in metres (m)
SSSI Impact Risk Zones
SSSI Units
Not recorded
Favourable
Unfavourable - Recovering
Unfavourable - No change
Unfavourable - Declining
Partially destroyed
Destroyed

10.17 SSSI Impact Risk Zones

Records on site	1

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 77**

ID	Location	Type of developments requiring consultation
1	On site	Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons & digestate stores > 4000m². Combustion - General combustion processes >50mw energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



Site Outline

Search buffers in metres (m)

- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	4

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on page 79

ID	Location	Name	Grade	Reference Number	Listed date
1	39m W	Apollo Theatre, Ardwick, Manchester, M12	II	1254683	06/06/1994
2	140m N	Fenton House, Ardwick, Manchester, M12	II	1218585	06/06/1994
3	193m N	2 and 4, Palfrey Place, Ardwick, Manchester, M12	II	1346659	15/03/1989
4	213m NW	Railings of Ardwick Green, Ardwick, Manchester, M13	II	1307603	03/10/1974

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

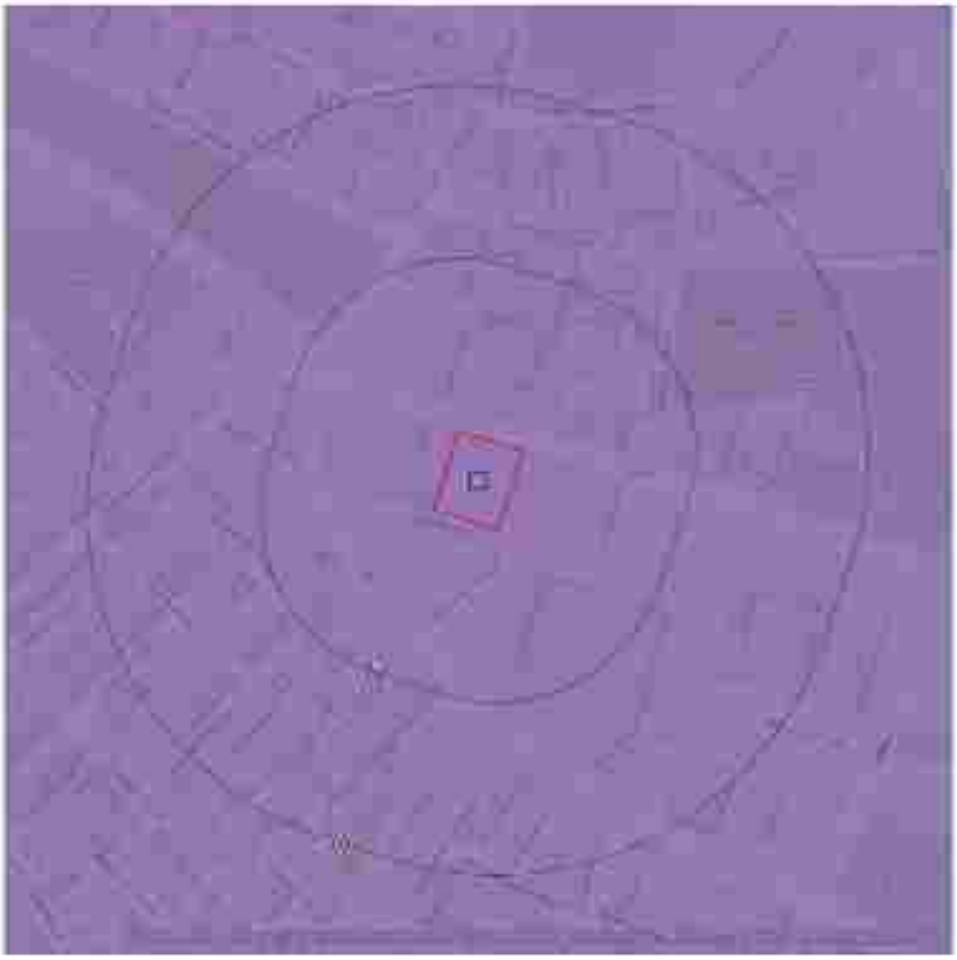
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline
Search buffers in metres (m)
Grade 1 - excellent quality
Grade 2 - very good quality
Grade 3 - good to moderate quality
Grade 3a - good quality
Grade 3b - moderate quality
Grade 4 - poor quality
Grade 5 - very poor quality
Non-agricultural land
Urban land
Exclusion land
Tree felling licences
Open Access land

12.1 Agricultural Land Classification

Records within 250m	1

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on page 82

ID	Location	Classification	Description
1	On site	Urban	-

This data is sourced from Natural England

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



Site Outline
Search buffers in metres (m)

Priority Habitat Inventory
Open Mosaic Habitat
Limestone Pavement Orders

Habitat Networks
Primary Habitat
Restorable Habitat
Associated Habitats
Habitat Restoration-Creation
Network Enhancement Zone 1
Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	6

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 84**

ID	Location	Main Habitat	Other habitats
A	113m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
1	125m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	150m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
B	155m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
2	154m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
8	183m NW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline
Search buffers in metres (m)

Full coverage
Partial coverage
No coverage

14.1 10k Availability

Records within 500m	2

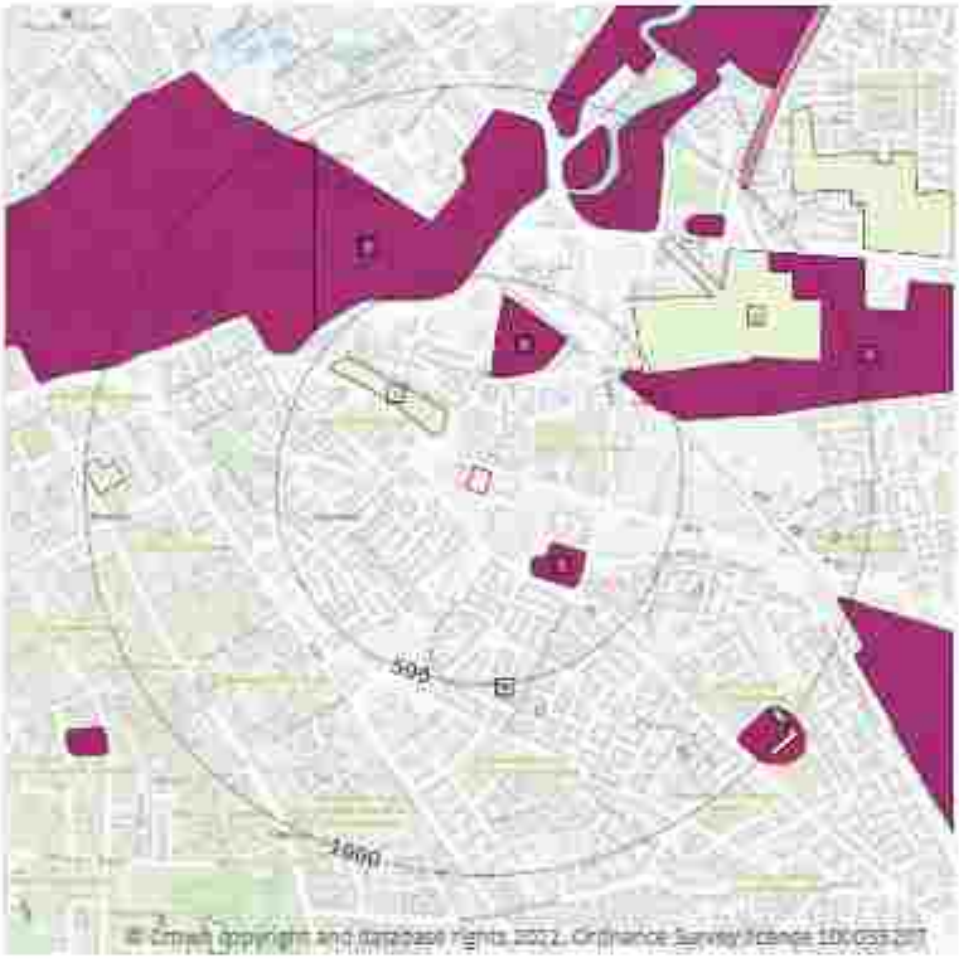
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 86**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	SJ89NE
2	339m W	Full	Full	Full	No coverage	SJ89NW

This data is sourced from the British Geological Survey

Geology 1:10,000 scale - Artificial and made ground



Site Outline

Search buffers in metres (m)

- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m	7

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

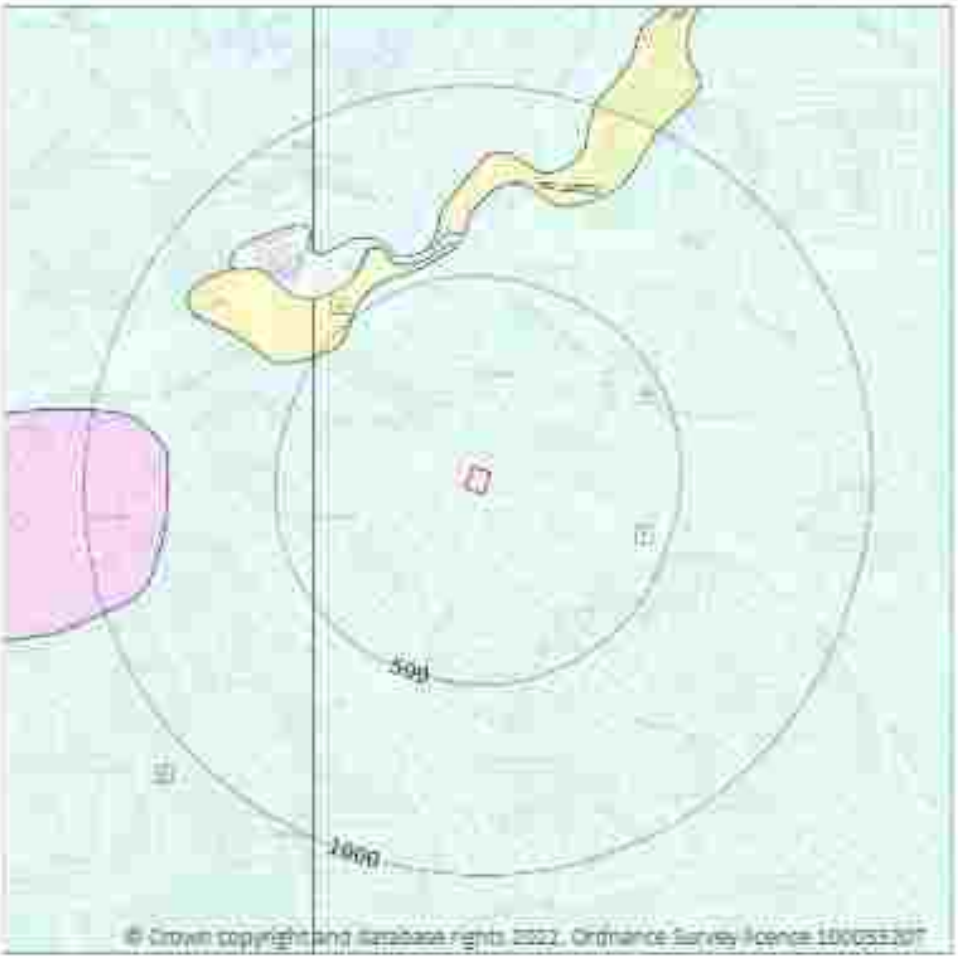
Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on page 87

ID	Location	LEX Code	Description	Rock description
1	125m NW	WMGR-ARTDP	Infilled Ground	Artificial Deposit
2	213m SE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	242m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
4	415m NE	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

ID	Location	LEX Code	Description	Rock description
5	465m N	MGR-ARTDP	Made Ground (Undifferentiated)	Artificial Deposit
6	471m NE	WMGR-ARTDP	Infilled Ground	Artificial Deposit
A	495m S	WMGR-ARTDP	Infilled Ground	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline
Search buffers in metres (m)
Landslip (10k)
Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m	3

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on page 89

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
2	395m W	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
3	476m NW	ALSA-NCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

This data is sourced from the British Geological Survey.

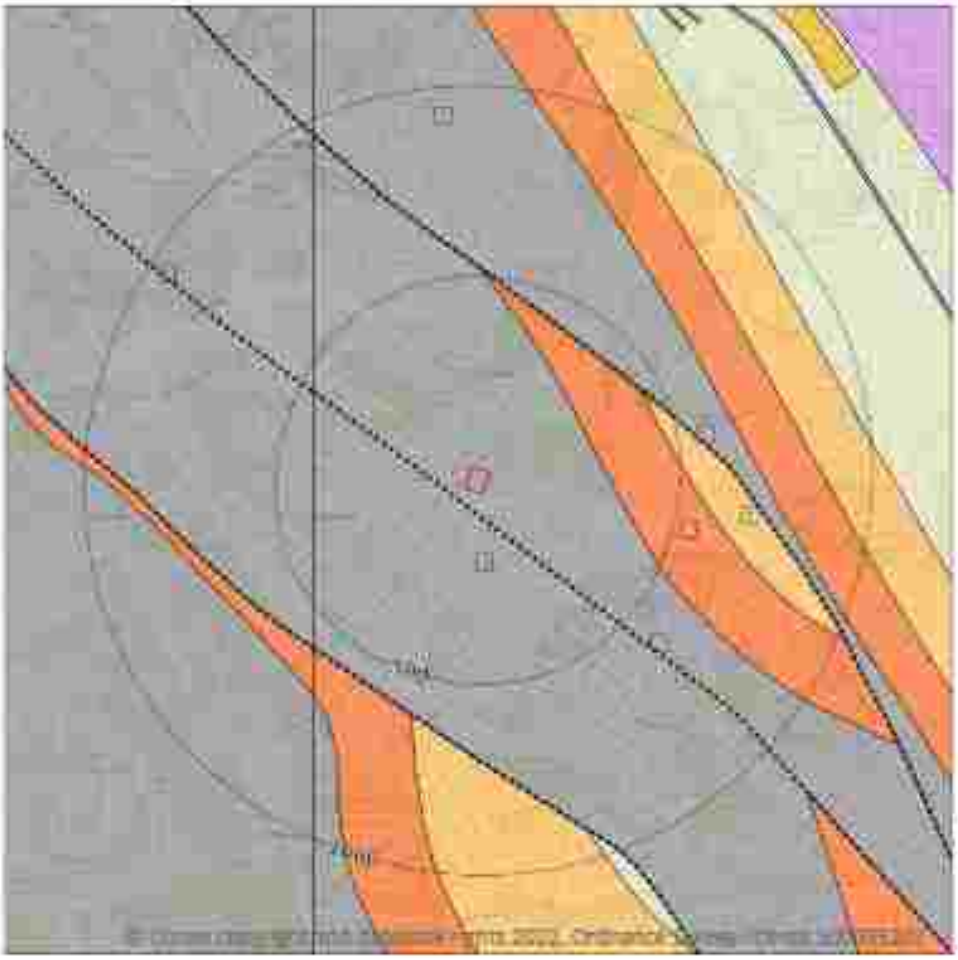
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	5

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 91**

ID	Location	LEX Code	Description	Rock age
1	On site	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch
3	358m NE	MMI-MDST	Manchester Marls Formation - Mudstone	Late Permian Epoch [Obsolete name]
4	399m W	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch

ID	Location	LEX Code	Description	Rock age
5	414m NE	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch
7	448m NE	CS-SDST	Collyhurst Sandstone Formation - Sandstone	Cisuralian Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m	3

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on page 91

ID	Location	Category	Description
2	35m SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
6	414m NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
8	462m NW	FAULT	Normal fault, inferred; crossmarks on downthrow side

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

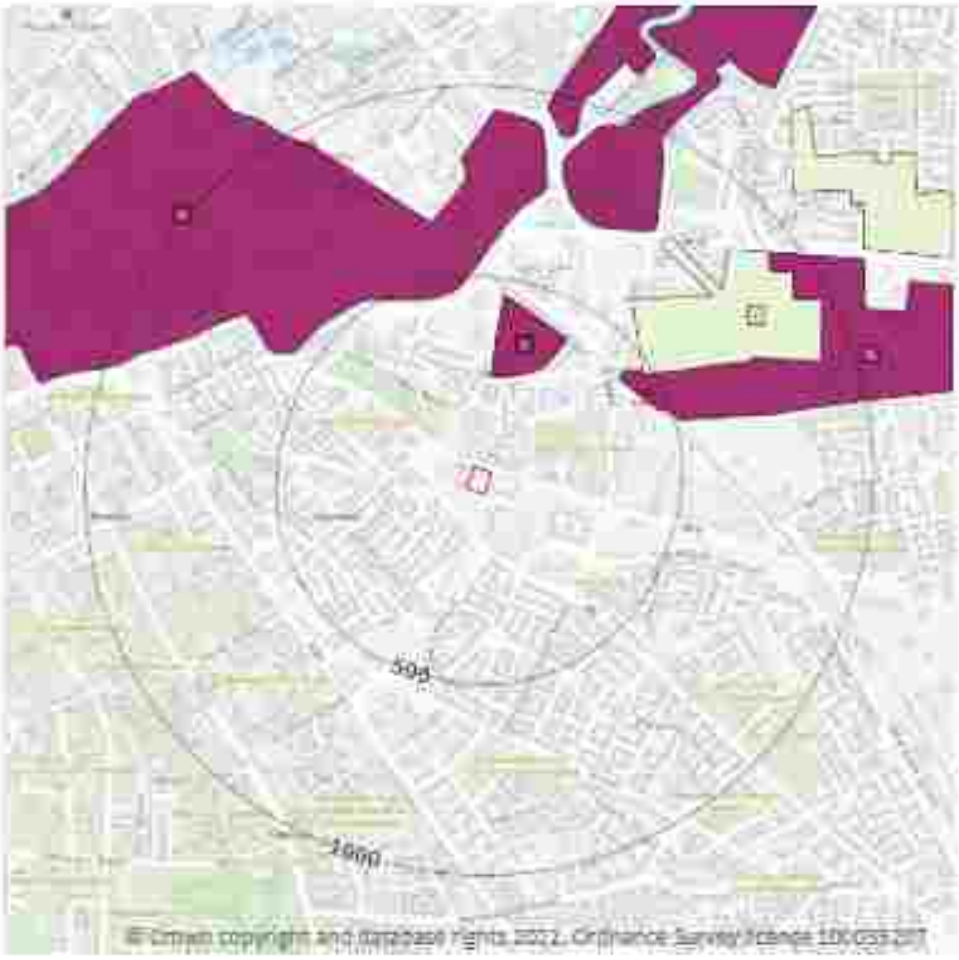
An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on page 93

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	EW085_manchester_v4

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground



Site Outline
Search buffers in metres (m)
Made ground
Worked ground
Infilled ground
Disturbed ground
Landscaped ground

15.2 Artificial and made ground (50k)

Records within 500m	4

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on page 94

ID	Location	LEX Code	Description	Rock description
1	242m N	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	415m NE	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	455m N	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
4	471m NE	WMGR-ARTDP	INFILLED GROUND	ARTIFICIAL DEPOSIT

This data is sourced from the British Geological Survey.

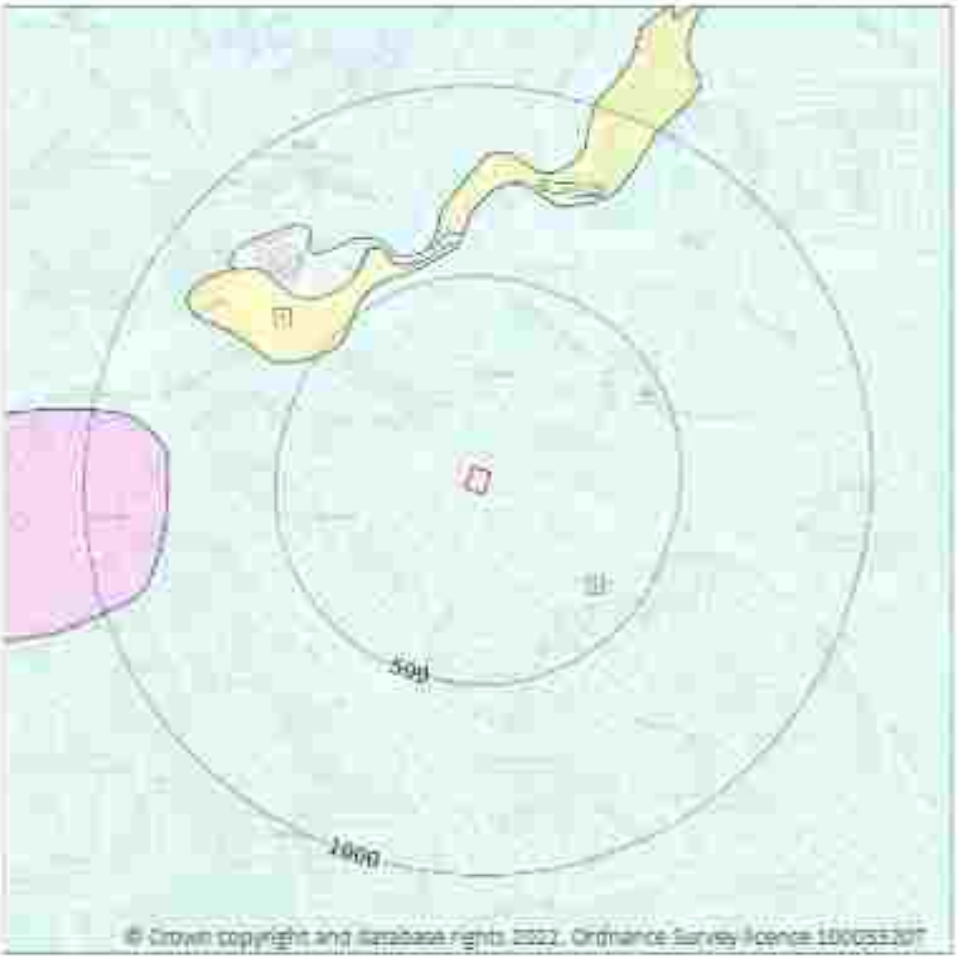
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m	2

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on page 96

ID	Location	LEX Code	Description	Rock description
1	On site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	476m NW	ALSA-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Low

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

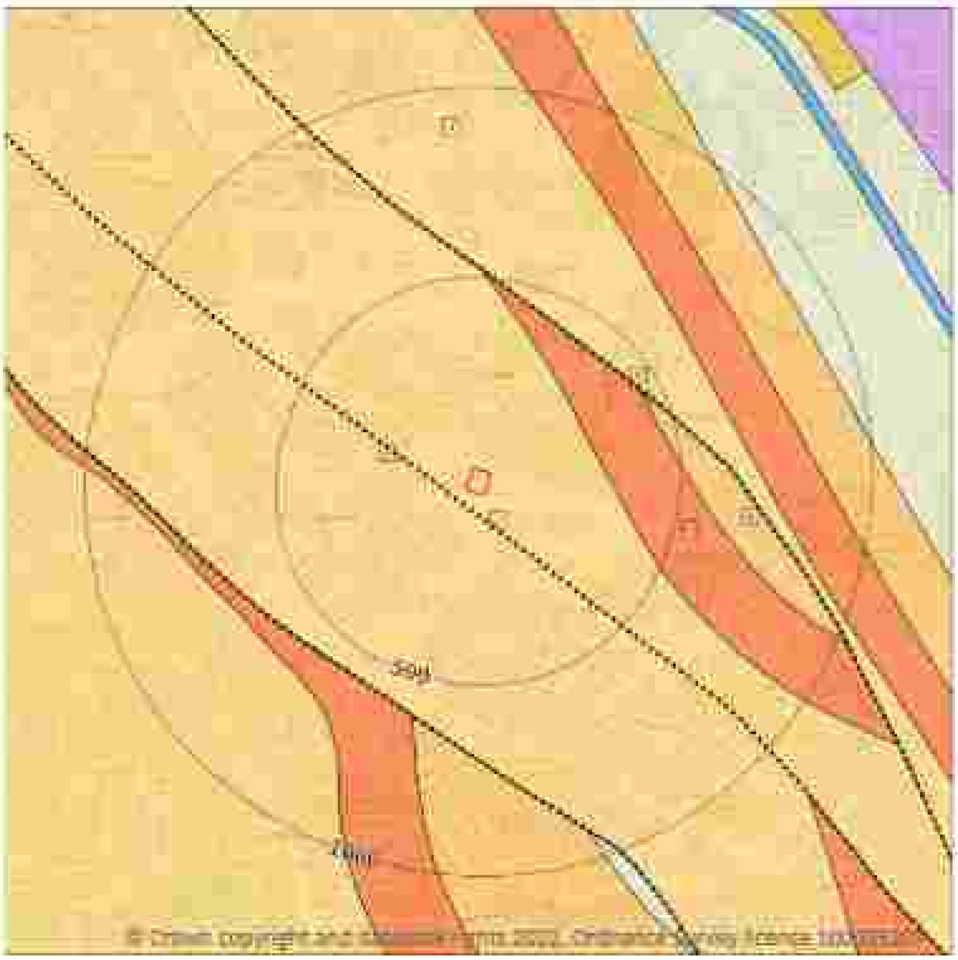
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline
Search buffers in metres (m)
Bedrock faults and other linear features (50k)
Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	4

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 98**

ID	Location	LEX Code	Description	Rock age
1	On site	CHES-SDST	CHESTER FORMATION - SANDSTONE	OLENEKIAN
3	358m NE	MM-MDST	MANCHESTER MARLS FORMATION - MUDSTONE	-
4	414m NE	CHES-SDST	CHESTER FORMATION - SANDSTONE	OLENEKIAN
6	447m NE	CS-SDST	COLLYHURST SANDSTONE FORMATION - SANDSTONE	-

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Moderate

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m	2

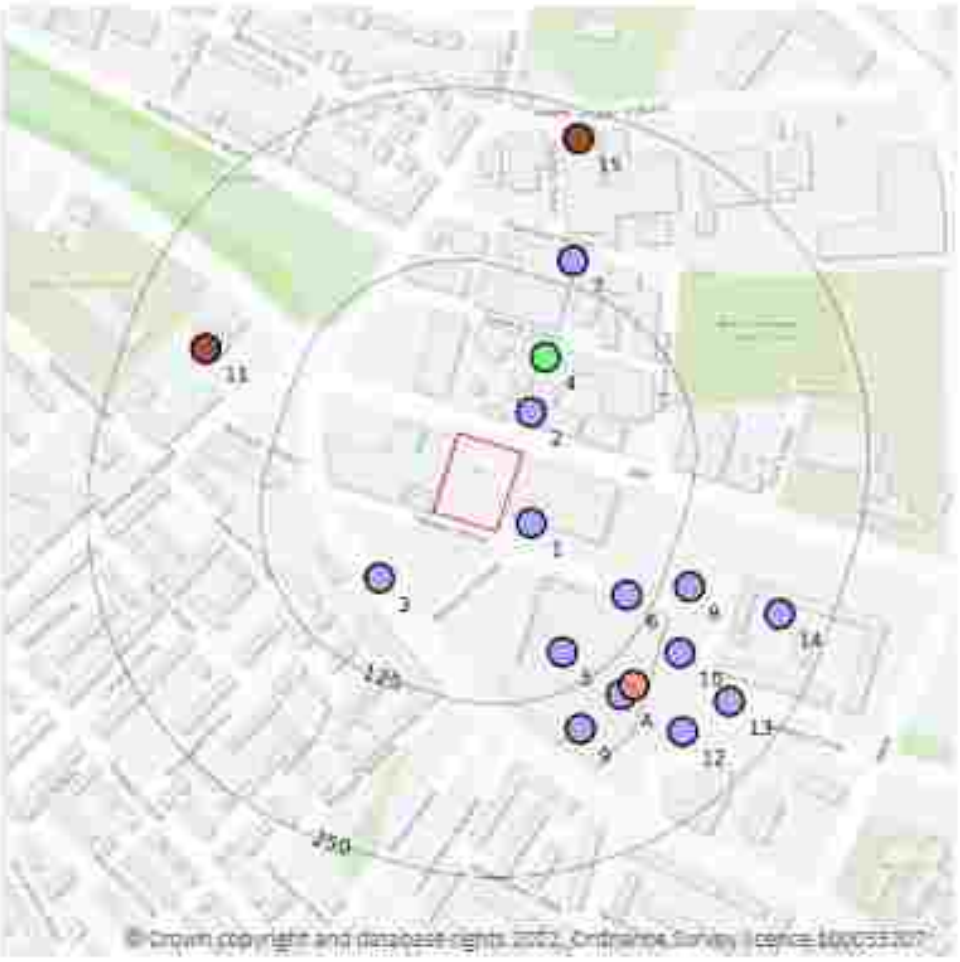
Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on page 98

ID	Location	Category	Description
2	35m SW	FAULT	Fault, Inferred
5	414m NE	FAULT	Fault, Inferred

This data is sourced from the British Geological Survey.

16 Boreholes



Site Outline
Search buffers in metres (m)

Confidential
0 - 10m
10 - 30m
30m+
Unknown

16.1 BGS Boreholes

Records within 250m 17

The Single Onshore Boreholes Index (SOBI), an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

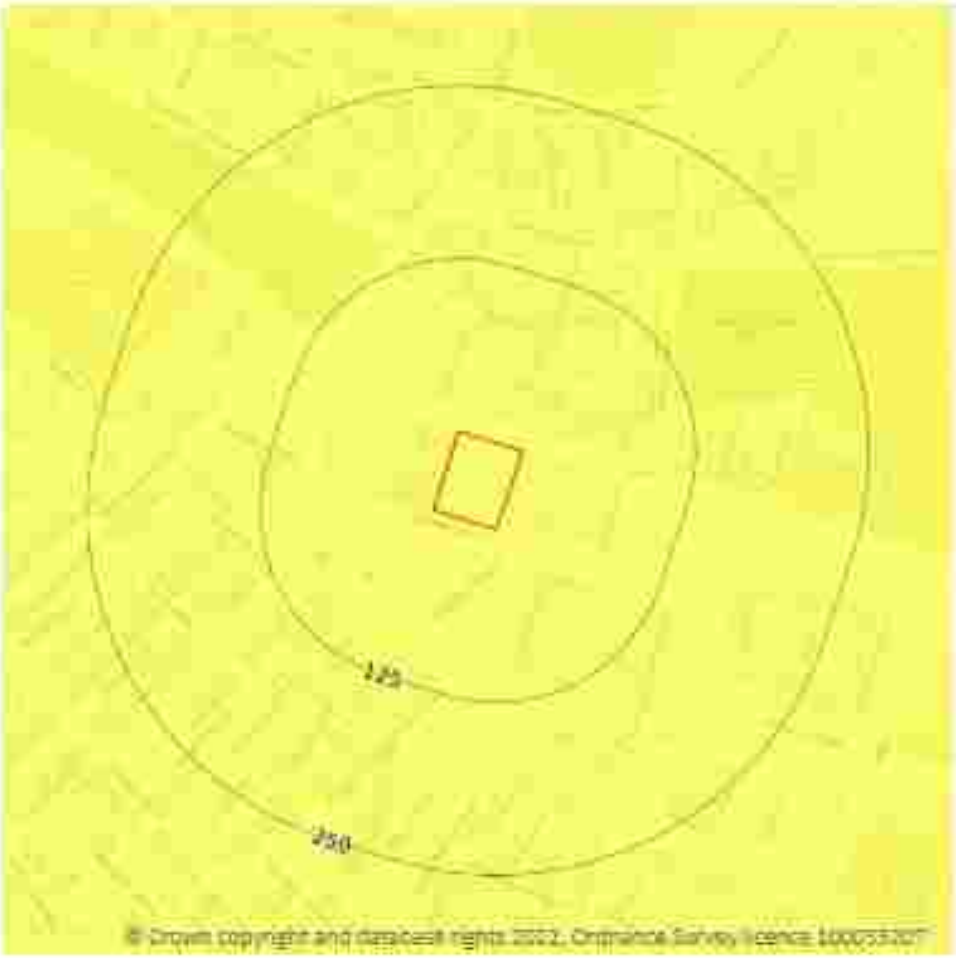
Features are displayed on the Boreholes map on **page 100**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	22m E	385470 396960	MANCHESTER 24	6.85	N	18435203
2	38m N	385470 397040	MANCHESTER 21	4.64	N	18435200
3	62m SW	385360 396900	MANCHESTER 25	3.51	N	18435204

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	71m N	385400 397000	MANCHESTER 20	15.31	N	19425198
5	99m SE	385492 396867	MANCHESTER APOLLO 5	3.5	N	936680
6	105m SE	385539 396908	MANCHESTER APOLLO 1	5.0	N	936676
7	144m N	385500 397150	MANCHESTER 19	3.81	N	19425197
8	145m E	385584 396914	MANCHESTER APOLLO 2	6.25	N	936677
A	145m SE	385595 396836	MANCHESTER APOLLO 7	4.0	N	936682
A	149m SE	385544 396843	BORING NEAR SYNDALL STREET	55.47	N	936640
9	155m SE	385505 396811	MANCHESTER APOLLO 11	3.5	N	936689
10	159m SE	385577 396844	MANCHESTER APOLLO 6	4.0	N	936681
11	192m W	385135 397086	BORE NEAR MAWSON STREET, ANDWICH	-1.0	N	936634
12	198m SE	385579 396809	MANCHESTER APOLLO 12	4.0	N	936687
13	205m SE	385613 396831	MANCHESTER APOLLO 8	5.0	N	936683
14	213m E	385649 396894	MANCHESTER APOLLO 3	3.75	N	936678
15	229m N	385504 397238	MANCHESTER DAIRY CO PARK PLACE	-1.0	N	936624

This data is sourced from the British Geological Survey

17 Natural ground subsidence - Shrink swell clays



Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	1

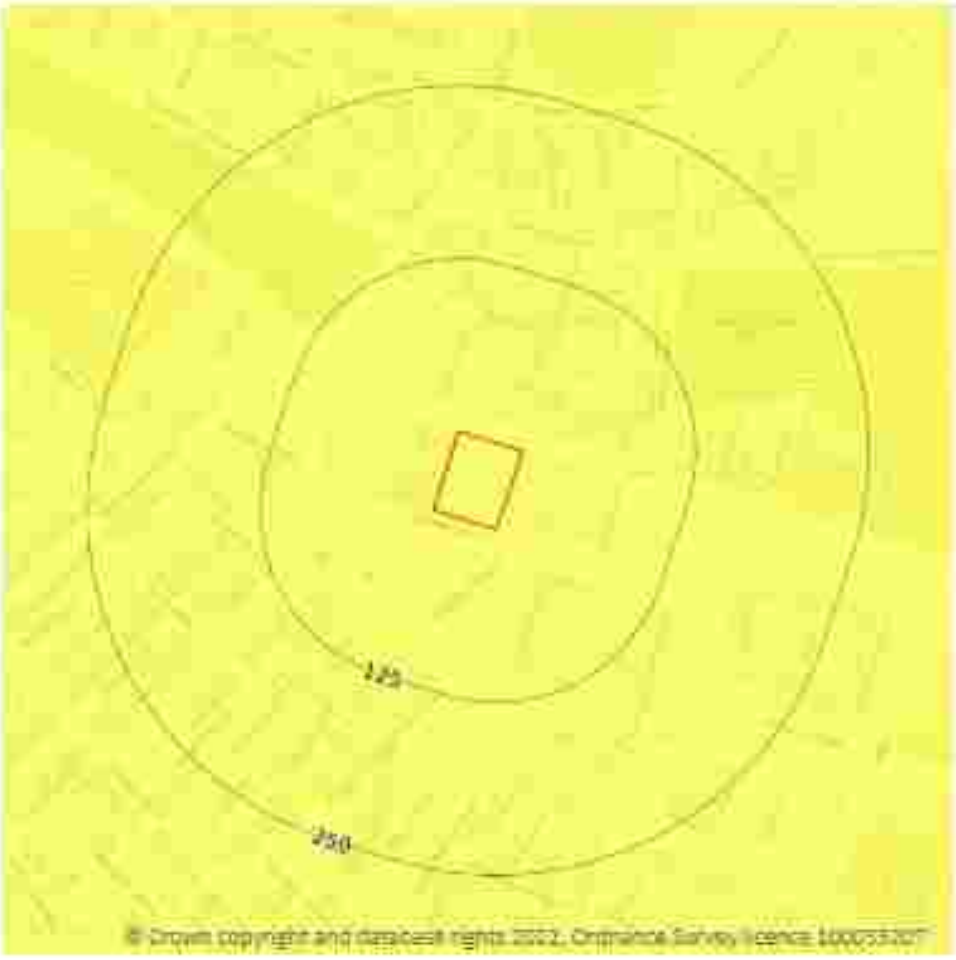
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 102**

Location	Hazard rating	Details
On site	Very low	Ground conditions predominantly low plasticity.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	1

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 103**

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	1

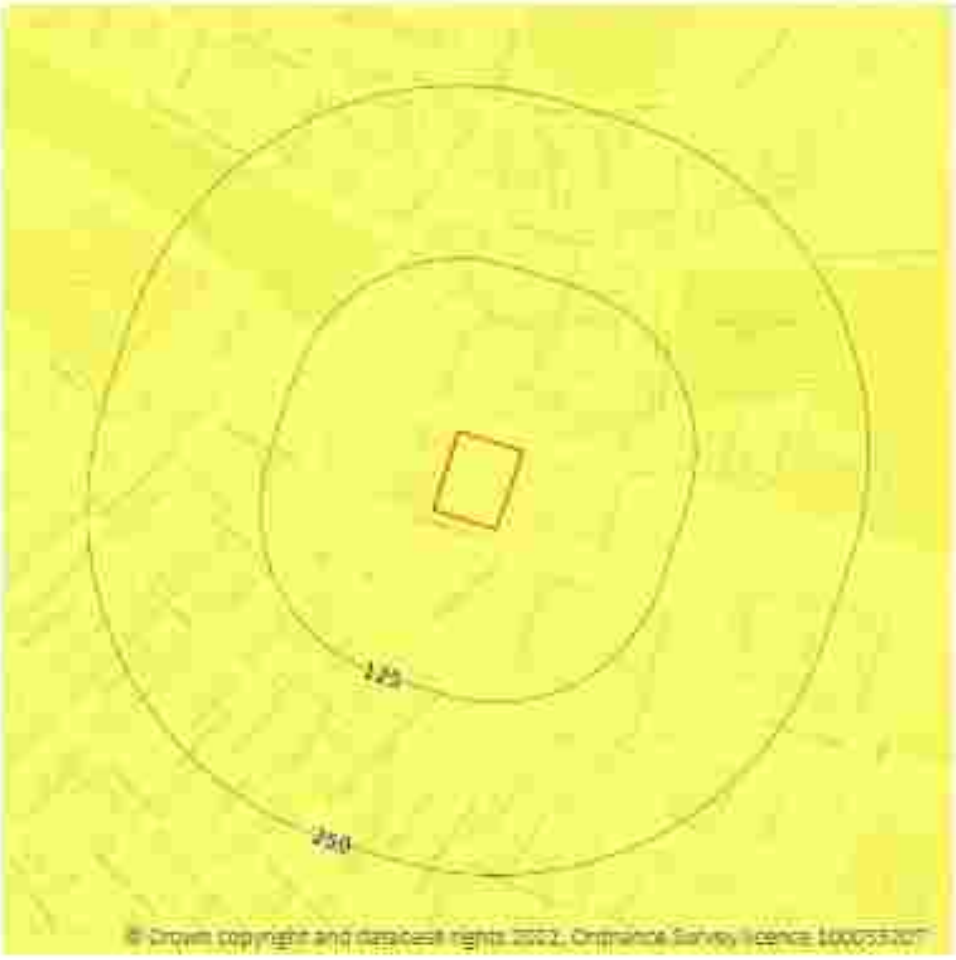
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 104**.

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

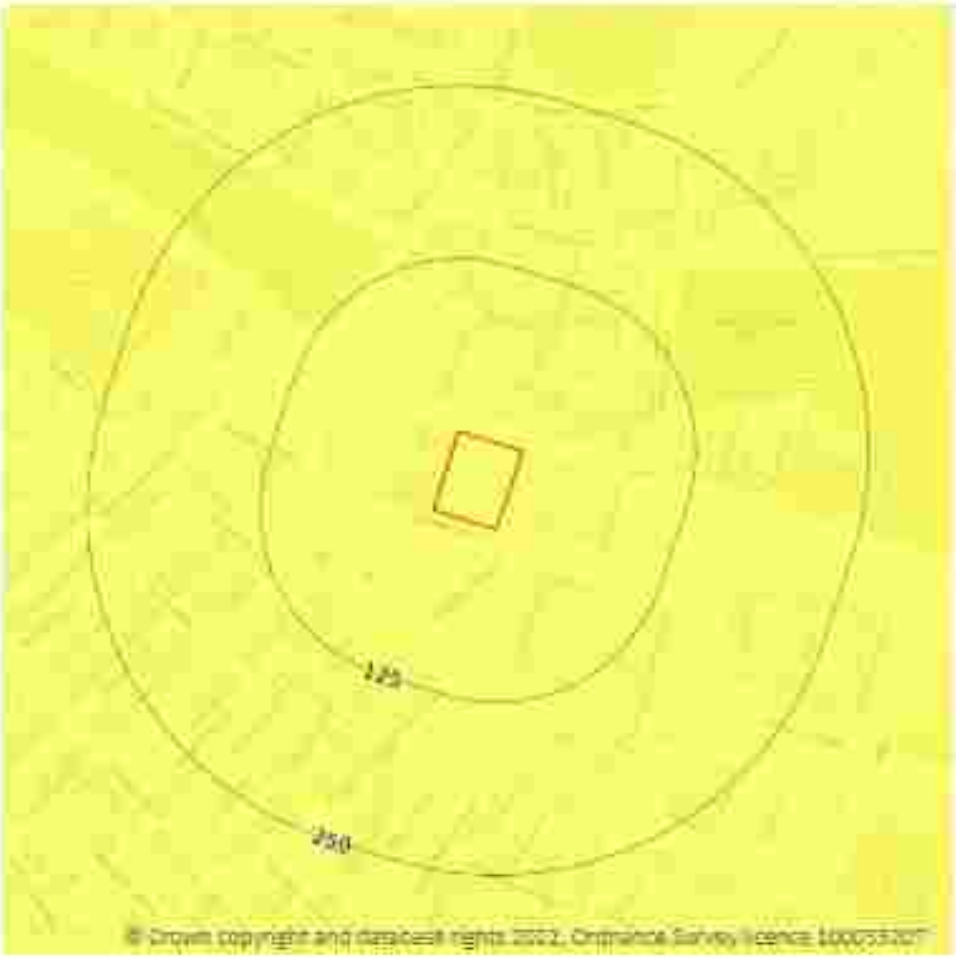
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 105**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 106**

Location	Hazard rating	Details
On site	Very low	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline
Search buffers in metres (m)
No data
Negligible
Very low
Low
Moderate
High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on page 107

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline
Search buffers in metres (m)
Natural cavities (Area)
Natural cavities (Point)
BritPits
Surface ground workings
Underground workings
Historical Mineral Planning Areas
Mining Cavities
Non Coal Mining
Sporadic underground mining of restricted extent possible
Localised small scale underground mining possible
Small scale mining possible
Underground mining known or likely within or in close proximity
Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	9

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on page 109

ID	Location	Land Use	Year of mapping	Mapping scale
A	86m E	Cemetery	1851	1:10560
A	103m E	Cemetery	1938	1:10560
A	103m E	Cemetery	1934	1:10560
A	103m E	Cemetery	1915	1:10560
A	103m E	Cemetery	1905	1:10560
A	103m E	Cemetery	1923	1:10560
A	111m E	Cemetery	1890	1:10560
A	115m E	Cemetery	1956	1:10560
1	120m NW	Pond	1851	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	1

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories – vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 109**.

ID	Location	Name	Commodity	Class	Likelihood
-	906m NE	Ardwick	Limestone - Ardwick	D	Underground mining is known or considered likely to have occurred within or close to the area. Potential for difficult ground conditions are at a level where they should be considered.

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	1

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

Features are displayed on the Mining, ground workings and natural cavities map on **page 109**.

ID	Location	Mine Address	Mineral	Data source	Publisher
2	515m W	Manchester, Greater Manchester	Freestone, Freestone, Roadstone Hornstone, Kaolinite, Sandstone, Scythestone, Silver Sand, Wheatstone	'Underground Manchester - Secrets of the city revealed'	Willow Publishing

This data is sourced from Stanley UK Ltd

18.8 JPB mining areas

Records on site	1

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

Location	Details
On site	In addition to being located inside an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) have information such as mining plans and maps held within their archive of mining activities that have occurred within 1km of this property which may supplement this information. Please note, the plans held by JPB may also relate to non-mining records. Further details and a quote for services (if appropriate) can be obtained by emailing this report to enquiries.gs@jpb.co.uk.

This data is sourced from Johnson Poole and Bloomer

18.9 Coal mining

Records on site	1

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.

This data is sourced from the Coal Authority

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

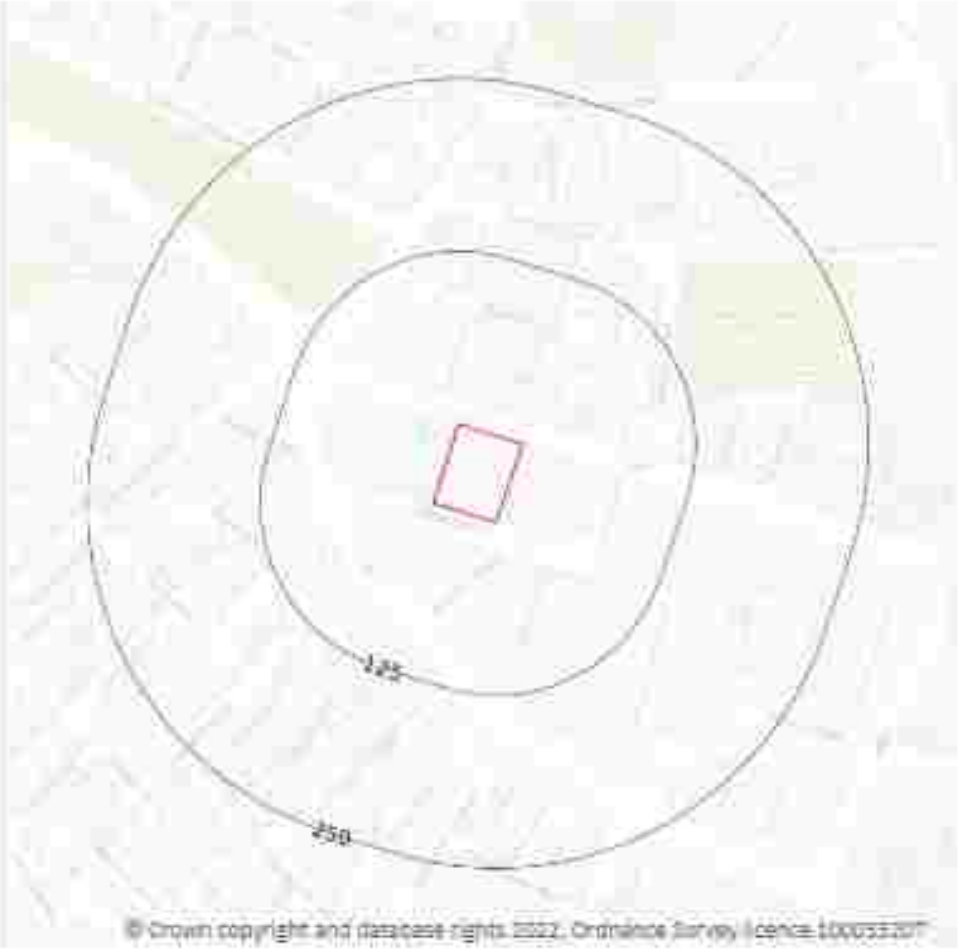
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



Site Outline
Search buffers in metres (m)

Greater than 30%
Between 10% and 30%
Between 5% and 10%
Between 3% and 5%
Between 1% and 3%
Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 114**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	7

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km², this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
On site	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
36m NE	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
38m E	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
38m SE	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
48m SW	15 - 25 mg/kg	No data	100 - 200 mg/kg	60 - 120 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	6

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

Location	Arsenic (mg/kg)	Bioaccessible Arsenic (mg/kg)	Lead (mg/kg)	Bioaccessible Lead (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Nickel (mg/kg)	Tin (mg/kg)
On site	22	3.8	115	79	1.9	80	25	34	3
On site	22	3.8	52	36	0.4	73	24	32	4
On site	25	4.4	121	83	1.9	82	25	34	3
9m NW	27	4.7	46	32	0.4	79	25	31	4
36m NE	22	3.8	147	101	0.5	64	190	34	24
38m E	20	3.5	141	97	0.8	61	203	35	24

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/

APPENDIX 6 - Coal Authority Report

The Coal Authority

CON29M
coal mining report

14 HYDE ROAD, MANCHESTER, M12 6BW

Known or potential coal mining risks

Future underground coal mining — Page 3

Further action

No further reports from the Coal Authority are required. Further information on any next steps can be found in our Professional opinion.

For more information on our reports please visit www.groundstability.com

Professional opinion

According to the official mining information records held by the Coal Authority at the time of this search, evidence of, or the potential for, coal mining related features have been identified. It is unlikely that these features will impact on the stability of the enquiry boundary.

Your reference: [illegible]
Our reference: [illegible]
Date: 10 October 2022

Client name: James Doyle

If you require any further assistance please contact our experts on:
0345 762 6848
groundstability@coal.gov.uk

The Law Society

Enquiry boundary

Key

Approximate position of enquiry boundary shown



We can confirm that the location is **on the coalfield**

Map data

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This report is prepared in accordance with the latest Law Society's Guidance Notes 2018, the User Guide 2018 and the Coal Authority's Terms and Conditions applicable at the time the report was produced.

Accessibility

If you would like this information in an alternative format, please contact our communications team on **0345 762 6848** or email **communications@coal.gov.uk**

Detailed findings

Information provided by the Coal Authority in this report is compiled in response to the Law Society's CON29M Coal Mining enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL.

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1 Past underground coal mining

The property is not within a surface area that could be affected by any past recorded underground coal mining.

2 Present underground coal mining

The property is not within a surface area that could be affected by present underground mining.

3 Future underground coal mining

The property is not in an area where the Coal Authority has received an application for, and is currently considering whether to grant a licence to remove or work coal by underground methods.

The property is not in an area where a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area likely to be affected from any planned future underground coal mining.

However, reserves of coal exist in the local area which could be worked at some time in the future.

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

4 Mine entries

There are no recorded coal mine entries known to the Coal Authority within, or within 20 metres of, the boundary of the property.

5 Coal mining geology

The Coal Authority is not aware of any damage due to geological faults or other lines of weakness that have been affected by coal mining.

6 Past opencast coal mining

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

7 Present opencast coal mining

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

8 Future opencast coal mining

There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

9 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 preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

10 Mine gas

The Coal Authority has no record of a mine gas emission requiring action.

11 Hazards related to coal mining

The property has not been subject to remedial works by or on behalf of the Coal Authority, under its Emergency Surface Hazard Call Out procedures.

12 Withdrawal of support

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.

13 Working facilities order

The property is not in an area where an order has been made, under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

14 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.

Statutory cover



Coal mining subsidence

In the unlikely event of any coal mining related subsidence damage, the Coal Authority or the mine operator has a duty to take remedial action in respect of subsidence caused by the withdrawal of support from land or property in connection with lawful coal mining operations.

When the works are the responsibility of the Coal Authority, our dedicated public safety and subsidence team will manage the claim. The house or land owner ("the owner") is covered for these works under the terms of the Coal Mining Subsidence Act 1991 (as amended by the Coal Industry Act 1994). Please note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

If you believe your land or property is suffering from coal mining subsidence damage and you need more information on what to do next, please use the following link to our website which sets out what your rights are and what you need to consider before making a claim.
www.gov.uk/government/publications/coal-mining-subsidence-damage-notice-form



Coal mining hazards

Our public safety and subsidence team provide a 24 hour a day, 7 days a week hazard reporting service, to help protect the public from hazards caused by past coal workings, such as a mine shaft or shallow working collapse. To report any hazards please call **0800 288 4242**. Further information can be found on our website: www.gov.uk/coalauthority

Glossary

Key terms

adit - horizontal or sloped entrance to a mine

coal mining subsidence - ground movement caused by the removal of coal by underground mining

Coal Mining Subsidence Act 1991 - the Act setting out the duties of the Coal Authority to repair damage caused by coal mining subsidence

coal mining subsidence damage - damage to land, buildings or structures caused by the removal of coal by underground mining

coal seams - bed of coal of varying thickness

future opencast coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal from the surface

future underground coal mining - a licence granted, or licence application received, by the Coal Authority to excavate coal underground. Although it is unlikely, remaining coal reserves could create a possibility for future mining which would be licensed by the Coal Authority

mine entries - collective name for shafts and adits

payments to owners of former copyhold land - historically, copyhold land gave rights to coal to the copyholder. Legislation was set up to allow others to work this coal, but they had to issue a notice and pay compensation if a copyholder came forward

shaft - vertical entry into a mine

site investigation - investigations of coal mining risks carried out with the Coal Authority's permission

stop notice - a delay to repairs because further coal mining subsidence damage may occur and it would be unwise to carry out permanent repairs

subsidence claim - a formal notice of subsidence damage to the Coal Authority since it was established on 31 October 1994

withdrawal of support - a historic notice informing landowners that the coal beneath their property was going to be worked

working facilities orders - a court order which gave permission, restricted or prevented coal mine workings

APPENDIX 7 – Preliminary UXO Risk Assessment

EOD CONTRACTS LTD

Unexploded Ordnance Risk Mitigation

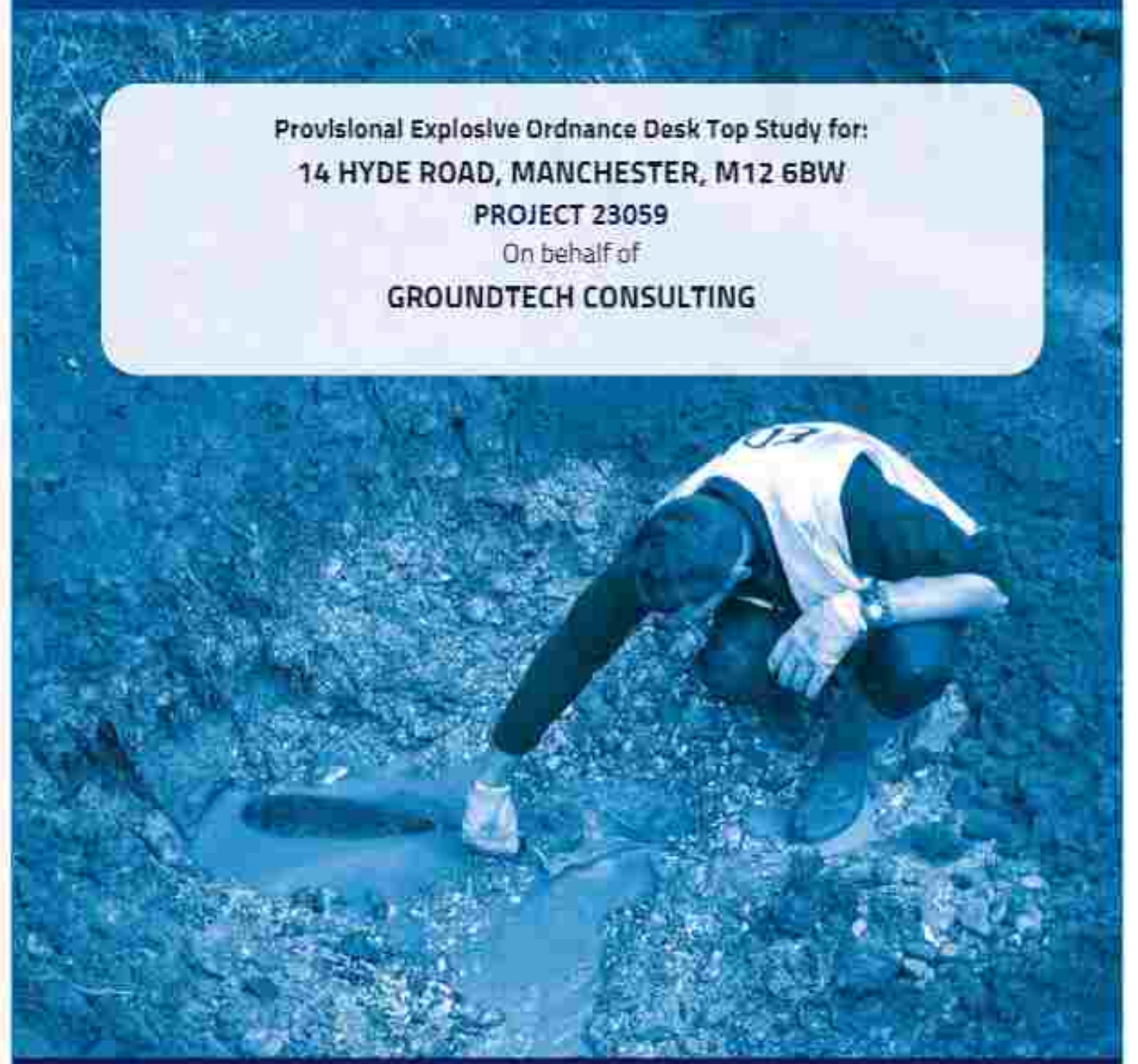
Provisional Explosive Ordnance Desk Top Study for:

14 HYDE ROAD, MANCHESTER, M12 6BW

PROJECT 23059

On behalf of

GROUNDTECH CONSULTING



www.eodcontractsltd.com

Tel: 01386 578 405

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Company Registration Number 4483560

Institute of Explosives Engineers

PROVISIONAL EXPLOSIVE ORDNANCE DESKTOP STUDY

For

14 HYDE ROAD, MANCHESTER, M12 6BW

Conducted by **EOD Contracts Limited**

On behalf of **ASL**

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CONTENTS

Title	Pages
Front Cover	I
Document Control & Enquiries	I
Contents Page	II-III
Terms and Definitions	IV-V
Executive Summary	VI-X

EXECUTIVE SUMMARY

INSTRUCTION

EOD Contracts Ltd, have been commissioned by Groundtech Consulting to undertake a desktop study for potential historic Unexploded Ordnance (UXO) contamination for the future works at 14 Hyde Road, Manchester, M12 6BW (The Site).

SCOPE OF WORK

The scope of this EO Risk Assessment/Provisional Desk Study is to assess the likelihood of buried EO/UXO within the environs of The Site (See Figure 1.1), in view of further development. A further aim was to evaluate the implication from UXO contamination during any future intrusive land use.

Figure 1.1: Clients Supplied Site Diagram, This DTS will be covering all areas shown within the Red Boundary.



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LOCATION

The site is located in Ardwick (Manchester). Access can be gained via Hyde Road. Should the need be required the Client will provide an exact meeting point.

Table 3.1 Site Location (red boundary).



Title	Description (Centre of Site)
Address	14 Hyde Road, Manchester
Post Code	M12 6BW
Grid Reference	SJ 854969 (eastings) – SJ 8543096994 (northings)
what3words	taker.lamps.visa

SOURCES OF UXO CONTAMINATION

The main sources of UXO contamination that have been researched for the site are:

- Anti-Aircraft Ammunition (AA)
- Air delivered ordnance bombs and sub-munitions/incendiaries

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KEY FINDINGS

Based on the information researched by EOD Contracts Ltd for the proposed scope of works being carried out within the given site area, the following conclusions have been reached:

Historical UXO Contamination

The indicators for UXO contamination are:

Bomb Strikes	There are no recorded incidents of the site being the subject of bombardment throughout WW1. Manchester was the subject of several attacks throughout WW2, the most devastating being the Christmas raids over 2 nights (22nd – 24th December 1940). Both the Site and its surrounding area was the subject of heavy bombing throughout this period. The site area may have been utilised by military personnel.
Military Usage	The site area may have been utilised by military personnel as a Drill Hall
Explosive/Munition Factory	No obvious signs

RECOMMENDATIONS

It is recommended that the following risk mitigation strategy be executed prior to any intrusive works:

Full UXO DTS be carried out for the Site prior to intrusive works. OR A UXO Risk Mitigation Engineer be on Site for all ground works.

EOD Contracts Ltd can supply a turnkey solution to your UXO requirements. Therefore, the following mitigation strategies can be supplied for land or water-based operations:

Intrusive survey using CPT *(Cone Pressure Testing)* or borehole equipment, *supplying risk mitigation to all Borehole and Pile locations down to a maximum bomb penetration depth determined within this document.*

Non-Intrusive Survey using multiple array system with DGPS *(Differential Global Positioning System).*

Offshore, near-shore, estuarine and freshwater water environments magnetic, side scan and bathymetric supported by state-of-the-art DGPS.

The aforementioned surveys are supported with post processing of data and intrusive investigations if required.

EOD Engineer over watch using Suitably Qualified and Experienced Personnel, normally former British Army, Navy, or RAF Bomb Disposal specialists.

Explosive Ordnance Safety Presentations.

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APPENDIX B - CIRIA Risk Assessment Methodology

Contaminated Land Risk Assessment

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ⇨ Hazard Assessment ⇨ Risk Estimation ⇨ Risk Evaluation

LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process.

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

- High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
- Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.
- Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term.
- Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

- Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000).
  Examples—High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse.

- Medium: Chronic damage to human health ("significant harm" as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in "Draft Circular on Contaminated Land", DETR 2000).
  Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve.

- Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in "Draft Circular on Contaminated Land", DETR 2000). Damage to sensitive buildings, structures, services or the environment.
  Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

- Minor: Harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.
  Examples – Presence of contaminants at such concentrations PPE is required during site work; loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very low	Very low

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

- Very High: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required;

- High: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term;

- Moderate: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;

- Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild;

- Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

APPENDIX 9 - Relevant Legislative Background

Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act;
- The Contaminated Land (England) Regulations 2000;
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

1) Significant harm is being caused or there is a significant possibility of such harm being caused;
2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

- Source - substances that are potential contaminants or pollutants that may cause harm;
- Pathway - a potential route by which contaminants can move from the source to the receptor;
- Receptor - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists; site contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below however the list is not exhaustive:

- LQM – Model Procedures;
- Contamination and Environmental Matters - Their Implications for Property Professionals (2nd Edition RICS Nov 2009);
- Brownfields – Managing the development of previously developed land – A client's guide. CIRIA 2002;
- DEFRA and Environment Agency publications CLR7 – 10, supported by the TOX guides and SGV guides dated March 2002;
- DETR Circular 02/2000. Contaminated Land: Implementation of Part IIA of the Environmental Protection Act 1990;
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990. May 2002.

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environment Act (1995);
- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012);
- The Environment Protection Act (1990);
- The Contaminated Land (England) Act (2000);
- Contaminated Land (England) Regulations (2012);
- The Water Resources Act (1991);
- The Pollution Prevention and Control (England and Wales) Regulations (2000);
- The Landfill Regulations (England and Wales) Regulations (2002);
- The Landfill (England and Wales) (Amendment) Regulations (2004);
- Health and Safety at Work Act;

APPENDIX 10 - Limitations

Limitations

This report (Report) forms part of the Services and if applicable Additional Services undertaken by Groundtech Consulting Ltd pursuant to a written contract (Agreement) which contains detailed provisions including express limitations of the liability of Groundtech Consulting Ltd.

This Report was prepared using reasonable skill and care as stated in the Agreement for the purpose including intended end use stated by the Client (Purpose) and the liability of Groundtech Consulting Ltd in respect of the form and content of this Report is no greater than its liability under the Agreement. All records, measurements, notes, or any other data (Data) obtained by or for the benefit of the Consultant were obtained at a specific point in time and it may not be assumed by the Client or any person relying on this Report that the Data will remain unaffected by the passage of time, the seasons, weather conditions, changes in the water table or the carrying out and completion of works at the Site.

Unless otherwise agreed this Report has been prepared exclusively for the use and reliance of the Client and may not be relied upon, by any other party except as provided for in the Agreement. A third party who relies on this Report, does so at their own and sole risk and Groundtech Consulting Ltd has no liability to such parties.

Groundtech Consulting Ltd that this Report is to be used for the Purpose. The Purpose was instrumental in determining the scope and of the Services provided. If the Purpose should change, the Client may not be able to rely on the Report without the separate agreement of Groundtech Consulting Ltd.

Since the Report was written, later changes in legislation, statutory requirements and industry best practices have not been considered and this should be allowed for. Ground conditions can also change (see below) and should be investigated if there is any significant delay in acting on the findings of this Report. The period of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions in this Report should not be relied upon in the future without written confirmation from Groundtech Consulting Ltd that it is safe to do so.

The observations and conclusions outlined in this Report are based exclusively on the services that were provided as set out in the agreement between the client and Groundtech Consulting Ltd.

Groundtech Consulting Ltd is not liable for the existence of any condition, the discovery of which would require additional investigation outside the agreed scope of works or core competency. The Report is based upon Groundtech Consulting Ltd's observations of existing physical conditions at the Site gained from site reconnaissance together with interpretation of information including documentation, obtained from third parties and from the Client on the history and usage of the Site. The findings and recommendations contained in this Report are based in part upon information provided by third parties, and Groundtech Consulting Ltd have relied upon such information assuming it to be correct.

Groundtech Consulting Ltd accepts no responsibility for errors or inaccuracies in third party information presented in this Report. Groundtech Consulting Ltd was not authorised to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services or Additional Services. Groundtech Consulting Ltd is not liable for any inaccurate information, misrepresentation of data or conclusions, which may inform the scope of investigation undertaken by Groundtech Consulting Ltd and forms the contract with the client.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions may also vary due to the ground's heterogeneous properties

and because investigation exploratory locations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this Report, particularly between exploratory holes. The extent of the limited area depends on the soil and groundwater conditions, together with other constraints such as the position of any existing structures and underground utilities. If so stipulated in the Agreement, geo-environmental testing was carried out for a limited number of parameters based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

Any groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The groundwater level often has not had time to reach equilibrium and a monitoring period is required. Furthermore, groundwater levels are subject to seasonal variation or changes in local drainage conditions and groundwater levels may occur at other times of the year which are higher than were recorded during this investigation.

Any site drawings provided in this Report are preliminary and used to present the general relative locations of features on, and surrounding, the Site.



APPENDIX 4 – BGS Records

SUB SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE No. 22

EXPLORATORY BORING RECORD

Site Manchester Ref.: 70/73

Boring Method Shell Ground Level 139.7 O.D.

DATE	DIA. OF CASING & DEPTH BELOW G.L.	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW G.L.	STRATA APPROX. SCALE 5 FT. TO ONE INCH	NO. OF SAMP.	TYPE OF SAMP.	PENETRATION OF SAMPLER OR CORE BARREL FROM	PENETRATION OF SAMPLER OR CORE BARREL TO	NO. OF BLOWS	CORE RECOVERY
1.10.70	8"	NIL		Soft clay, brick pieces, tonsoil, etc Fill Material	1	X	4'0	5'0	10	
					2	U	5'6	8'0	20	
			6'6		3	U	8'0			
				Soft brown sandy clay with grey fissures and strps / nods.	4	X	12'6	13'6	77	
3.10.70	5'0				5	X	25'0	15'3	50	
1.10.70			10'6							
				Sewer Pipe						
			12'0							
				Soft to firm dark red fine grained sandstone with thin bands of red silty clay (marl). (Sand in upper zone)						
2.10.70	15'0		15'3							

Samples shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WHEN BORING (W.B. = WAT STRUCK)	ESTIMATED SWEPTAGE	WATER RISES AT FOLLOWING DEPTHS TO ABOUT BOREHOLE	WATER LEVEL IN OBSERVATION BOREHOLE OR CAVITIES		
				DATE	WATER LEVEL	DEPTH OF CASING
1. NONE						
2.						
3.						
4.						
5.						
6.						

REMARKS:

1) No initial penetration for S.P.T. samples Nos 4, 5.
Sewerage pipe struck at 10'6"

SUB SOIL SURVEYS LTD.
MANCHESTER.

BOREHOLE No. 24

EXPLORATORY BORING RECORD

Site Manchester Ref.: 70/73

Boring Method Shell Ground Level 137.24 O.D.

DATE	DIA. OF CASING & DEPTH BELOW G.L.	WATER LEVEL STRUCK & RISE	DEPTH OF STRATA BELOW G.L.	STRATA (APPROX. SCALE 5 FT. TO ONE INCH)	NO. OF SAMPLE	TYPE OF SAMPLE	PENETRATION OF SAMPLER OR CORE BARREL FROM	PENETRATION OF SAMPLER OR CORE BARREL TO	NO. OF BLOWS	CORE RECOVERY
25.9.70	8"	NIL		Black organic clay, topsoil, bricks and ashes etc., (Fill Material)	1	X	3'6	4'6	4	
					2	X	7'6	8'6	9	
			8'6		3	B	8'6	9'6		
				Dark brown sandy clay.	4	X	10'0	11'0	75	
					5	X	14'6	15'6	83	
			9'6		6	X	18'6	18'9	25	
				Soft red fine grained sandstone.	7	X	22'0	22'6	50	
26.9.70	8'0	NIL								
28.9.70		NIL								
28.9.70	15'0	NIL	22'6							

Samples shown thus: Disturbed D. Undisturbed U. Standard Pen. Test X. Water W. Bulk B.

WATER STRUCK AT THE FOLLOWING DEPTHS	DEPTH OF CASING WITH DRILLER (R.S. = REST RESULTS)	ESTIMATED SUPPLY	WATER ROSE AT FOLLOWING DEPTHS IN ABOVE HOLES	WATER LEVEL IN OBSERVATION STANDPIPE OR COMPLETION		
				DATE	WATER LEVEL	DEPTH OF CASING
1. NONE						
2.						
3.						
4.						
5.						
6.						

REMARKS:

EOD CONTRACTS LTD

Unexploded Ordnance Risk Mitigation

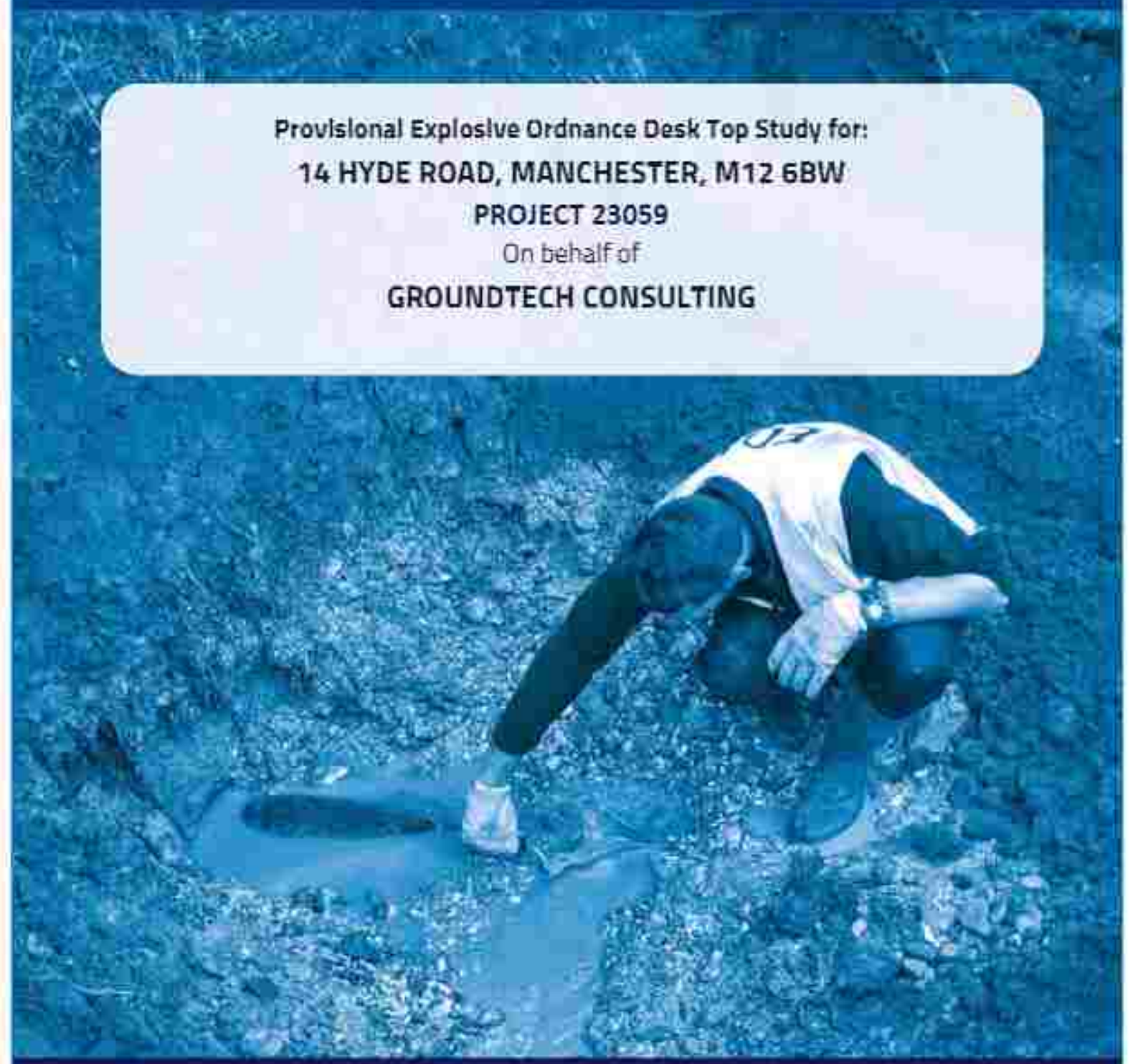
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PROJECT 23059

On behalf of

GROUNDTECH CONSULTING



www.eodcontractsltd.com

Tel: 01386 578 405

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Company Registration Number 4483560

Institute of Explosives Engineers

PROVISIONAL EXPLOSIVE ORDNANCE DESKTOP STUDY

For

14 HYDE ROAD, MANCHESTER, M12 6BW

Conducted by **EOD Contracts Limited**

On behalf of **ASL**

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CONTENTS

Title	Pages
Front Cover	I
Document Control & Enquiries	I
Contents Page	II-III
Terms and Definitions	IV-V
Executive Summary	VI-X

EXECUTIVE SUMMARY

INSTRUCTION

EOD Contracts Ltd, have been commissioned by Groundtech Consulting to undertake a desktop study for potential historic Unexploded Ordnance (UXO) contamination for the future works at 14 Hyde Road, Manchester, M12 6BW (The Site).

SCOPE OF WORK

The scope of this EO Risk Assessment/Provisional Desk Study is to assess the likelihood of buried EO/UXO within the environs of The Site (See Figure 1.1), in view of further development. A further aim was to evaluate the implication from UXO contamination during any future intrusive land use.

Figure 1.1: Clients Supplied Site Diagram, This DTS will be covering all areas shown within the Red Boundary.



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LOCATION

The site is located in Ardwick (Manchester). Access can be gained via Hyde Road. Should the need be required the Client will provide an exact meeting point.

Table 3.1 Site Location (red boundary).



Title	Description (Centre of Site)
Address	14 Hyde Road, Manchester
Post Code	M12 6BW
Grid Reference	SJ 854969 (eastings) – SJ 8543096994 (northings)
what3words	taker.lamps.visa

SOURCES OF UXO CONTAMINATION

The main sources of UXO contamination that have been researched for the site are:

- Anti-Aircraft Ammunition (AA)
- Air delivered ordnance bombs and sub-munitions/incendiaries

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KEY FINDINGS

Based on the information researched by EOD Contracts Ltd for the proposed scope of works being carried out within the given site area, the following conclusions have been reached:

Historical UXO Contamination

The indicators for UXO contamination are:

Bomb Strikes	There are no recorded incidents of the site being the subject of bombardment throughout WW1. Manchester was the subject of several attacks throughout WW2, the most devastating being the Christmas raids over 2 nights (22nd – 24th December 1940). Both the Site and its surrounding area was the subject of heavy bombing throughout this period. The site area may have been utilised by military personnel.
Military Usage	The site area may have been utilised by military personnel as a Drill Hall
Explosive/Munition Factory	No obvious signs

RECOMMENDATIONS

It is recommended that the following risk mitigation strategy be executed prior to any intrusive works:

Full UXO DTS be carried out for the Site prior to intrusive works. OR A UXO Risk Mitigation Engineer be on Site for all ground works.

EOD Contracts Ltd can supply a turnkey solution to your UXO requirements. Therefore, the following mitigation strategies can be supplied for land or water-based operations:

Intrusive survey using CPT *(Cone Pressure Testing)* or borehole equipment, *supplying risk mitigation to all Borehole and Pile locations down to a maximum bomb penetration depth determined within this document.*

Non-Intrusive Survey using multiple array system with DGPS *(Differential Global Positioning System).*

Offshore, near-shore, estuarine and freshwater water environments magnetic, side scan and bathymetric supported by state-of-the-art DGPS.

The aforementioned surveys are supported with post processing of data and intrusive investigations if required.

EOD Engineer over watch using Suitably Qualified and Experienced Personnel, normally former British Army, Navy, or RAF Bomb Disposal specialists.

Explosive Ordnance Safety Presentations.

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Detailed
Unexploded Ordnance (UXO)
Risk Assessment

Project Name	14 Hyde Road, Manchester
Client	Murray Rix (Northern) Ltd
Site Address	14 Hyde Road, Manchester, M12 6BW
Report Reference	DA811646-00
Date	31st January 2024
Author	HJ
Quality Assurance	AB
Final Check	AT

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1ST LINE DEFENCE

Executive Summary

Site Location and Description

The site is located in Ardwick, Manchester, in the north-west of England.

According to recent aerial imagery, the site is currently occupied by hardstanding ground, in use as a car park. Bordering the north and south of the site are Hyde Road and Apsley Grove respectively. East and west of the site are large warehouse/industrial structures.

The site is approximately centred on the OS grid reference **SJ 85431 96996**.

Proposed Works

The proposed development is for commercial end use comprising of a self-storage building, bin store and car park. The scope of works proposed for the site are understood to include ground investigation including boreholes and trial pits.

Geology and Bomb Penetration Depth

The British Geological Survey (BGS) map shows the site to be underlain by the Chester Formation, comprised primarily of sandstone. Superficial deposits across the site are recorded as part of Till, Devensian, containing diamicton.

Site-specific geotechnical information was not available to 1st Line Defence at the time of the production of this report. An assessment of maximum bomb penetration depth can be made once such data becomes available, or by a UXO specialist during on-site support.

It should be noted that the maximum depth that a bomb could reach may vary across a site and will be largely dependent on the specific underlying geological strata and its density.

UXO Risk Assessment

1st Line Defence has assessed that there is an overall **Medium Risk** in the north of the site and **Low Risk** in the south of the site from German and post-war UK unexploded ordnance on the site of proposed works. There is an assessed **Low Risk** from Allied anti-aircraft ordnance.

The Risk from German Air-Delivered UXO

- During WWII, the site was situated in the County Borough of Manchester, which sustained an overall low density of bombing, with an average of 27.1 bombs recorded per 1000 acres according to official Home Office bombing statistics.
- At the outbreak of WWII, the site was occupied by a large drill hall, a separate slightly smaller drill hall, and a war memorial facing Hyde Road to the north.
- The Manchester Bomb and Damage Map recorded one HE bomb strike on the northern portion of the site on the 11th/12th March 1941, in addition to two 'fire bombs' within the northern section of the site in October 1940. The northern portion of the drill hall on site, where the HE incident is plotted, is shaded red, indicating that it was demolished. A number of additional bombing incidents were recorded within close proximity to the site boundary, including two unexploded HE bomb strikes plotted approximately 50 – 65m east of the site, an additional HE approximately 50m west of the site, and several additional 'fire bombs' in the area.
- Numerous additional sources appear to corroborate that the northern portion of the site was bombed, destroyed and subsequently cleared, whilst the southern portion of the site suffered no additional incidents and remained largely intact. One anecdotal source states that "the Victorian building was bombed on the 12th March 1941 and destroyed, as was the R.A. Memorial in front of it [...] The Drill Hall at the rear of the HQ was repaired and remained in use until the 1990s".
- WWII-era aerial imagery dating from 1944 – 1948 further supports this, showing that the northern portion of the site had been cleared of any structures by 1944, but the southern portion of the site remained structurally intact, occupied by the apparently undamaged remainder of the drill hall. Similarly, when comparing pre- and post-WWII OS mapping, the war memorial depicted within the north of the site on pre-war mapping was no longer present post-war, and the Drill Hall on site does not extend as far north on the post-WWII OS mapping as in the pre-WWII OS mapping.

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- As the site was occupied by a Drill Hall and a Royal Artillery Officer's HQ at the outbreak of WWII, it is anticipated to have been subject to a relatively frequent level of access, with ground cover considered conducive towards the detection of UXO. any incidents would likely have resulted in a visible trail of rubble or debris. However, following the recorded bombing and extensive damage / destruction within the northern section of the site, access to this area is presumed to have significantly decreased, and conditions were likely far less favourable to the detection of UXO. Areas of damage, rubble and debris could easily obscure evidence of UXO, such as bomb entry holes (which could be as small as 30cm in diameter), and infrequent access can increase the likelihood that an item of UXO would go unnoticed and unreported.
- In summary, the northern section of the site is recorded as having sustained several fire bombs, as well as a ME bomb strike which reportedly destroyed the war memorial and drill hall situated within the area. However, numerous sources appear to suggest that the southern section remained structurally intact post-war, with no evidence that this area was subject to any additional incidents of bombing. Taking the above mentioned into consideration, the risk from German UXO contamination across the site is not considered to be homogenous, with the northern section of the site deemed to hold an overall **Medium Risk**, and the south of the site designated as **Low Risk**. Risk Map shown in **Annex O**.

The Risk from Allied UXO

- Evidence suggests that the site was occupied by a Drill Hall and Royal Artillery Officer's HQ. Drill Halls are generally considered to have had a limited capability to store and utilise live ordnance, due to their small size and urban location, and were instead often used for tasks such as physical exercise, administration and accommodation. No evidence has been found to suggest that the Drill Hall recorded on site contained facilities that could result in UXO contamination. Therefore, the risk from Allied UXO is not considered significant enough to warrant proactive risk mitigation measures, although the possibility cannot be wholly discounted given the military history of the site. UXO Safety awareness findings are recommended as a sensible minimum precaution.
- The conditions in which HAA or LAA projectiles may have fallen unnoticed within the site boundary are however analogous to those regarding air delivered ordnance.

Post-WWII Redevelopment

- According to recent aerial imagery, the drill hall which previously occupied the site has been removed and the site is now occupied by hardstanding ground, in use as a car park.

Recommended Risk Mitigation Measures

The following risk mitigation measures are recommended to support the proposed works at the M Hyde Road, Manchester site:

Activity	Recommended Risk Mitigation Measure
All Works	• UXO Risk Management Plan • Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.
Open Excavations (trial pits, service pits, bulk excavations, strip foundations etc.) **in Medium Risk Area**	• UXO Specialist On-site Support
Boreholes and Piled Foundations **in Medium Risk Area**	• Intrusive Magnetometer Survey of all borehole and pile locations/footprints down to maximum bomb penetration depth.

Note – proactive on-site UXO support/survey should not be necessary for any works taking place at the footprint of and down to the depths of significantly worked post-war made ground/post-war fill.

UXO Risk Map and Recommended Risk Mitigation Measures



For indicative purposes - not to scale.
Please note that this assessment has not taken account of any sub-surface obstructions present on site.

Risk Zone	Activity	Recommended Risk Mitigation Measures
Low	All Works	• UXO Risk Management Plan • Site Specific UXO Awareness Briefings to all personnel conducting intrusive works
Medium	Open Excavations (shaft pits, service pits, bulk excavations, strip foundations etc.)	• UXO Specialist On-site Support
	Boreholes and Pilot Foundations	• Intrusive Magnetometer Survey of all borehole and pile locations/clusters down to maximum bore penetration depth.

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Glossary

Abbreviation	Definition
AA	Anti-Aircraft
AFS	Auxiliary Fire Service
AP	Anti-Personnel
ARP	Air Raid Precautions
DA	Delay-action
EOC	Explosive Ordnance Clearance
EOD	Explosive Ordnance Disposal
FP	Fire Pot
GM	G Mine (Parachute mine)
HAA	Heavy Anti-Aircraft
HE	High Explosive
IB	Incendiary Bomb
JSEODOC	Joint Services Explosive Ordnance Disposal Operation Centre
LAA	Light Anti-Aircraft
LCC	London County Council
LRRB	Long Range Rocket Bomb ("V 2")
LSA	Land Service Ammunition
NFF	National Filling Factory
OB	Oil Bomb
PAC	Pilotless Aircraft (V-1)
PB	Phosphorous Bomb
PM	Parachute Mine
POW	Prisoner Of War
RAF	Royal Air Force
RCAF	Royal Canadian Air Force
RFC	Royal Flying Corps
RNAS	Royal Naval Air Service
ROF	Royal Ordnance Factory
SA	Small Arms
SAA	Small Arms Ammunition
SD2	Anti-personnel "Butterfly Bomb"
SIP	Self-Igniting Phosphorous
UC	Unclassified bomb
UP	Unrotated Projectile (rocket)
USAAF	United States Army Air Force
UX	Unexploded
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V-1	Flying Bomb (Doodlebug)
V-2	Long Range Rocket
WAAF	Women's Auxiliary Air Force
X	Exploded

Contents

Executive Summary ii
Glossary v
Contents vi
Annexes viii
Appendices viii
1 Introduction 1
1.1 Background 1
2 Method Statement 2
2.1 Report Objectives 2
2.2 Risk Assessment Process 2
2.3 Sources of Information 2
3 Background to Bombing Records 3
3.1 General Considerations of Historical Research 3
3.2 German Bombing Records 3
3.3 Allied Records 3
4 UK Regulatory Environment and Guidelines 4
4.1 General 4
4.2 CDM Regulations 2015 4
4.3 The 1974 Health and Safety at Work etc. Act 4
4.4 CIRIA C681 4
4.5 Additional Legislation 4
5 The Role of Commercial UXO Contractors and The Authorities 5
5.1 Commercial UXO Specialists 5
5.2 The Authorities 5
6 The Site 6
6.1 Site Location 6
6.2 Site Description 6
7 Scope of the Proposed Works 6
7.1 General 6
8 Ground Conditions 6
8.1 General Geology 6
8.2 Site-Specific Geology 6
9 Site History 7
9.1 Introduction 7
9.2 Summary of the Historical Background of the Site 7
9.3 Ordnance Survey Historical Maps 7
10 Introduction to German Air Delivered Ordnance 9
10.1 General 9
10.2 Generic Types of WWII German Air Delivered Ordnance 9
10.3 Failure Rate of German Air Delivered Ordnance 10
10.4 UXB Ground Penetration 10
10.4.1 The J-Curve Principle 10
10.4.2 WWII UXB Ground Penetration Studies 10

10.4.3 Site Specific Bomb Penetration Considerations 11
10.5 V-Weapons 11
11. The Likelihood of Contamination from German Air Delivered UXBs 12
11.1 World War I 12
11.2 World War II Bombing of County Borough of Manchester 12
11.3 WWII Home Office Bombing Statistics 13
11.4 Manchester Air Raid Precautions Bomb Census and Damage Map 13
11.5 Interactive Manchester Blitz Christmas Map 14
11.6 Manchester Damage Cards 14
11.7 WWII-Era Aerial Photography 16
11.8 Abandoned Bombs 16
11.9 Bomb Disposal Tasks 16
11.10 Evaluation of German Air Delivered UXO Records 17
12. Introduction to Allied Ordnance 19
12.1 General 19
12.2 Defending the UK from Aerial Attack 19
12.3 Anti-Aircraft Artillery (AAA) 19
13. The Likelihood of Contamination from Allied Ordnance 22
13.1 Introduction 22
13.2 Military History of the Site of Proposed Works 22
13.3 Evaluation of Contamination Risk from Allied UXO 22
14. The Likelihood of UXO Contamination Summary 24
15. The Likelihood that UXO Remains 25
15.1 Introduction 25
15.2 UXO Clearance 25
15.3 Post-War Redevelopment 25
16. The Likelihood of UXO Encounter 26
16.1 Introduction 26
16.2 Encountering Air Delivered Ordnance 26
17. The Likelihood of UXO Initiation 27
17.1 Introduction 27
17.2 Initiating Air Delivered Ordnance 27
18. Consequences of Initiation/Encounter 28
18.1 Introduction 28
18.2 Consequences of Detonation 28
19. 1st Line Defence Risk Assessment 28
19.1 Risk Assessment Stages 28
19.2 Assessed Risk Level 29
20. Proposed Risk Mitigation Methodology 30
20.1 General 30
Bibliography 31

Annexes

List of Report Annexes	
Annex A	Site Location Maps
Annex B	Recent Aerial Photography
Annex C	Client Provided Site Plan
Annex D	Pre and Post-WWII Historical Maps
Annex E	Pre-WWII Oblique Photography of the Site
Annex F	Example of UXO Entry Hole / The 'J-curve' Effect Principle
Annex G	Examples of UXO Incidents
Annex H	WWI Map of Air Raids and Naval Bombardments
Annex I	Luftwaffe Target / Reconnaissance Photography
Annex J	Manchester Air Raid Precautions Bomb Census and Damage Map
Annex K	Interactive Manchester Blitz Christmas Map
Annex L	Manchester Damage Cards
Annex M	Ministry of Home Security Intelligence Summaries
Annex N	WWII-era RAF Aerial Photography of the Site
Annex O	Risk Mapping of the Site Area

Appendices

List of Report Appendices	
Appendix i-iii	Examples of German Air-Delivered Ordnance
Appendix iv	Examples of Anti-Aircraft Projectiles
Appendix v-vii	Examples of Land Service Ammunition
Appendix viii	Examples of Small Arms Ammunition

1st Line Defence Limited®
Detailed Unexploded Ordnance (UXO) Risk Assessment

Site: 14 Hyde Road, Manchester
Client: Murray Rix (Northern) Ltd

1. Introduction

1.1. Background

1st Line Defence has been commissioned by Murray Rix (Northern) Ltd to conduct a Detailed Unexploded Ordnance (UXO) Risk Assessment for the works proposed at 14 Hyde Road, Manchester.

Buried UXO can present a significant risk to construction works and development projects. The discovery of a suspect device during works can cause considerable disruption to operations as well as cause unwanted delays and expense.

UXO in the UK can originate from three principal sources:

1. Munitions resulting from wartime activities including German bombing in WWI and WWII, long range shelling, and defensive activities.
2. Munitions deposited as a result of military training and exercises.
3. Munitions lost, burnt, buried or otherwise discarded either deliberately, accidentally, or ineffectively.

This report will assess the potential factors that may contribute to the risk of UXO contamination. If an elevated risk is identified at the site, this report will recommend appropriate mitigation measures, in order to reduce the risk to as low as is reasonably practicable. Detailed analysis and evidence will be provided to ensure an understanding of the basis for the assessed risk level and any recommendations.

This report complies with the guidelines outlined in CIRIA C681, 'Unexploded Ordnance (UXO) A Guide for the Construction Industry.'

2. Method Statement

2.1 Report Objectives

The aim of this report is to conduct a comprehensive assessment of the potential risk from UXO at M Hyde Road, Manchester. The report will also recommend appropriate site and work-specific risk mitigation measures to reduce the risk from explosive ordnance during the envisaged works to a level that is as low as reasonably practicable.

2.2 Risk Assessment Process

1st Line Defence has undertaken a five-step process for assessing the risk of UXO contamination:

1. The likelihood that the site was contaminated with UXO.
2. The likelihood that UXO remains on the site.
3. The likelihood that UXO may be encountered during the proposed works.
4. The likelihood that UXO may be initiated.
5. The consequences of initiating or encountering UXO.

In order to address the above, 1st Line Defence has taken into consideration the following factors:

- Evidence of WWI and WWII German air delivered bombing as well as the legacy of Allied occupation.
- The nature and conditions of the site during WWII.
- The extent of post-war development and UXO clearance operations on site.
- The scope and nature of the proposed works and the maximum assessed bomb penetration depth.
- The nature of ordnance that may have contaminated the proposed site area.

2.3 Sources of Information

Every reasonable effort has been made to ensure that relevant evidence has been consulted and presented in order to produce a thorough and comprehensible report for the client. To achieve this the following, which includes military records and archive material held in the public domain, have been accessed:

- The National Archives and Manchester Central Library.
- Historical mapping datasets.
- Historic England National Monuments Record.
- Relevant information supplied by Murray Rix (Northern) Ltd.
- Available material from 33 Engineer Regiment (EOD) Archive (part of 29 Explosive Ordnance and Disposal and Search Group).
- 1st Line Defence's extensive historical archives, library and UXO geo-datasets.
- Open sources such as published books and Internet resources.

5. Background to Bombing Records

5.1 General Considerations of Historical Research

This desktop assessment is based largely upon analysis of historical evidence. Every reasonable effort has been made to locate and present significant and pertinent information. 1st Line Defence cannot be held accountable for any changes to the assessed risk level or risk mitigation measures, based on documentation or other data that may come to light at a later date, or which was not available to 1st Line Defence during the production of this report.

It is often problematic and sometimes impossible to verify the completeness and accuracy of WWII-era records. As a consequence, conclusions as to the exact location and nature of a UXO risk can rarely be quantified and are, to a degree, subjective. To counter this, a range of sources have been consulted, presented and analysed. The same methodology is applied to each report during the risk assessment process. 1st Line Defence cannot be held responsible for any inaccuracies or the incompleteness in available historical information.

5.2 German Bombing Records

During WWII, bombing records were generally gathered locally by the police, Air Raid Precaution (ARP) wardens and military personnel. These records typically contained information such as the date, the location, the amount of damage caused and the types of bombs that had fallen during an air raid. This information was made either through direct observation or post-raid surveys. The Ministry of Home Security Bomb Census Organisation would then receive this information, which was plotted onto maps, charts, and tracing sheets by regional technical officers. The collective record set (regional bomb census mapping and locally gathered incidents records) would then be processed and summarised into reports by the Ministry of Home Security Research and Experiments Branch. The latter were tasked with providing the government "a complete picture of air raid patterns, types of weapons used and damage caused- in particular to strategic services and installations such as railways, shipyards, factories and public utilities."

The quality, detail and nature of record keeping could vary considerably between provincial towns, boroughs and cities. No two areas identically collated or recorded data. While some local authorities maintained records with a methodical approach, sources in certain areas can be considerably more vague, dispersed, and narrower in scope. In addition, the immediate priority was mostly focused on assisting casualties and minimising damage at the time. As a result, some records can be incomplete and contradictory. Furthermore, many records were even damaged or destroyed in subsequent air raids. Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are therefore not always reliable. Whereas records of attacks on military or strategic targets were often maintained separately and have not always survived.

5.3 Allied Records

During WWII, considerable areas of land were requisitioned by the War Office for the purpose of defence, training, munitions production and the construction of airfields. Records relating to military features vary and some may remain censored. Within urban environments datasets will be consulted detailing the location of munition production as well as wartime air and land defences. In rural locations it may be possible to obtain plans of military establishments, such as airfields, as well as training logs, record books, plans and personal memoirs. As with bombing records, every reasonable effort will be made to access records of, and ascertain any evidence of, military land use. However, there are occasions where such evidence is not available, as records may not be accessible, have been lost/destroyed, or simply were not kept in the first place.

4. UK Regulatory Environment and Guidelines

4.1 General

There is no formal obligation requiring a UXO risk assessment to be undertaken for construction projects in the UK, nor is there any specific legislation stipulating the management or mitigation of UXO risk. However, it is implicit in the legislation outlined below that those responsible for intrusive works (archaeology, site investigation, drilling, piling, excavation etc.) should undertake a comprehensive and robust assessment of the potential risks to employees and that mitigation measures are implemented to address any identified hazards.

4.2 CDM Regulations 2015

The Construction (Design and Management) Regulations 2015 (CDM 2015) define the responsibilities of parties involved in the construction of temporary or permanent structures.

The CDM 2015 establishes a duty of care extending from clients, principle designers, and contractors to those working on, or affected by, a project. Those responsible for construction projects may therefore be accountable for the personal or proprietary loss of third parties, if correct health and safety procedure has not been applied.

Although the CDM does not specifically reference UXO, the risk presented by such items is both within the scope and purpose of the legislation. It is therefore implied that there is an obligation for parties to:

- Provide an appropriate assessment of potential UXO risks at the site (or ensure such an assessment is completed by others).
- Put in place appropriate risk mitigation measures if necessary.
- Supply all parties with information relevant to the risks presented by the project.
- Ensure the preparation of a suitably robust emergency response plan.

4.3 The 1974 Health and Safety at Work etc. Act

All employers have a responsibility under the Health and Safety at Work etc. Act 1974 and the Management of Health and Safety at Work Regulations 1999, to ensure the health and safety of their employees and third parties, so far as is reasonably practicable and conduct suitable and sufficient risk assessments.

4.4 CIRIA C681

In 2009, the Construction Industry Research and Information Association (CIRIA) produced a guide to the risk posed by UXO to the UK construction industry (CIRIA C681). CIRIA is a neutral, independent and not-for-profit body, linking organisations with common interests and facilitating a range of collaborative activities that help improve the industry.

The publication provides the UK construction industry with a defined process for the management of risks associated with UXO from WWI and WWII air bombardment. It is also broadly applicable to the risks from other forms of UXO that might be encountered. It focuses on construction professionals' needs, particularly if there is a suspected item of UXO on site, and covers issues such as what to expect from a UXO specialist. The guidance also helps clients to fulfil their legal duty under CDM 2015 to provide designers and contractors with project specific health and safety information needed to identify hazards and risks associated with the design and construction work. This report conforms to the CIRIA guidance and to the various recommendations for good practice referenced therein. It is recommended that this document is acquired and studied where possible to allow a better understanding of the background to both the risk assessment process and the UXO issue in the UK in general.

4.5 Additional Legislation

In the event of a casualty resulting from the failure of an employer/client to address the risks relating to UXO, the organisation may be criminally liable under the Corporate Manslaughter and Corporate Homicide Act 2007.

5. The Role of Commercial UXO Contractors and The Authorities

5.1. Commercial UXO Specialists

The role of a UXO Specialist (often referred to as UXO Consultant or UXO Contractor) such as 1st Line Defence, is defined in CIRIA C681 as the provision of expert knowledge and guidance to the client on the most appropriate and cost-effective approach to UXO risk management at a site.

The principal role of UXO Specialists is to provide the client with an appropriate assessment of the risk posed by UXO for a specific project, and identify and carry out suitable methodology for the mitigation of any identified risks to reduce them to an acceptable level.

The requirement for a UXO Specialist should ideally be identified in the initial stages of a project, and it is recommended that this occur prior to the start of any detailed design. This will enable the client to budget for expenditure that may be required to address the risks from UXO, and may enable the project team to identify appropriate techniques to eliminate or reduce potential risks through considered design, without the need for UXO specific mitigation measures. The UXO Specialist should have suitable qualifications, levels of competency and insurances.

Please note: 1st Line Defence has the capability to provide a complete range of required UXO risk mitigation services, in order to reduce a risk to as low as reasonably practicable. This can involve the provision of both ground investigation, and where appropriate, UXO clearance services.

5.2. The Authorities

The police have a responsibility to co-ordinate the emergency services in the event of an ordnance-related incident at a construction site. Upon inspection they may impose a safety cordon, order an evacuation, and call the military authorities Joint Services Explosive Ordnance Disposal Operation Centre (JSEODOC) to arrange for investigation and/or disposal. Within the Metropolitan Police Operational Area, SO15 EOD will be tasked to any discovery of suspected UXO. The request for Explosive Officer (Explo) support is well understood and practiced by all Metropolitan Boroughs. The requirement for any additional assets will then be coordinated by the Explo if required.

In the absence of a UXO specialist, police officers will usually employ such precautionary safety measures, thereby causing works to cease, and possibly requiring the evacuation of neighbouring businesses and properties.

The priority given to the police request will depend on the EOD teams' judgement of the nature of the UXO risk, the location, people and assets at risk, as well as the availability of resources. The speed of response varies; authorities may respond immediately or in some cases it may take several days for the item of ordnance to be dealt with. Depending on the on-site risk assessment the item of ordnance may be removed from the site and/or destroyed by a controlled explosion.

Following the removal of an item of UXO, the military authorities will only undertake further investigations or clearances in high-risk situations. If there are regular UXO finds on a site the JSEODOC may not treat each occurrence as an emergency and will recommend the construction company puts in place alternative procedures, such as the appointment of a commercial contractor to manage the situation.

6. The Site

6.1 Site Location

The site is located in Ardwick, Manchester, in the north-west of England.

Bordering the north and south of the site are Hyde Road and Apsley Grove respectively. East and west of the site are large warehouse/industrial structures.

The site is approximately centred on the OS grid reference: **SJ 85431 96996.**

Site location maps are presented in **Annex A**.

6.2 Site Description

According to recent aerial imagery, the site is currently occupied by hardstanding ground, in use as a car park.

A recent aerial photograph and site plan are presented in **Annex B** and **Annex C** respectively.

7. Scope of the Proposed Works

7.1 General

The proposed development is for commercial end use comprising of a self-storage building, bin store and car park. The scope of works proposed for the site are understood to include ground investigation including boreholes and trial pits.

8. Ground Conditions

8.1 General Geology

The British Geological Survey (BGS) map shows the site to be underlain by the Chester Formation, composed primarily of sandstone. Superficial deposits across the site are recorded as part of Till, Devensian, containing diamicton.

8.2 Site-Specific Geology

Site-specific geotechnical data was not provided by the client during the production of this report.

9. Site History

9.1 Introduction

The purpose of this section is to identify the composition of the site pre and post-WWII. It is important to establish the historical use of the site, as this may indicate the site's relation to potential sources of UXO as well as help with determining factors such as the land use, ground cover, likely frequency of access and signs of bomb damage.

9.2 Summary of the Historical Background of the Site

The site was previously occupied by a Drill Hall, indicated to have been the location of the Royal Artillery Officer's HQ in Manchester and used as a military billet for a short period. A 6 metre high stone obelisk memorial was constructed outside the Drill Hall to commemorate lost soldiers from the Manchester region during WWI; photography of the war memorial can be seen in **Annex E**. The HQ and war memorial were destroyed during a bombing incident during WWII, though the Drill Hall at the rear of the HQ was repaired and remained in use until the 1990s.[1]

9.5 Ordnance Survey Historical Maps

Relevant historical maps were obtained for this report and are presented in **Annex D**. See below for a summary of the site history shown on acquired mapping.

Pre-WWII		
Date	Scale	Description
1852	1:2500	This mapping indicates that the site was primarily occupied by a large *Drill Hall*, with a smaller adjacent structure within the western portion of the site and a small *War Memorial* shown to the north of the site. Bordering the north and south of the site were *Hyde Road* and *Apsley Grove*, respectively. Residential structures and *Sandall Avenue* border the east of the site and to the west of the site is a large structure, believed to have been industrial.

Post-WWII		
Date	Scale	Description
1948-1949	1:1250	This mapping shows the southern section of the site to be occupied by the *Drill Hall*; the building is smaller than depicted on the pre-war mapping, with the northern portion of the drill hall and the war memorial having been removed by the date. The smaller building is also labelled as an additional *Drill Hall*. An area of *Ruins* depicted to the east of the site, east of *Sandall Avenue*, which immediately borders the site. The sites immediate surroundings to the north, south and west otherwise appear largely unchanged. The buildings bordering the site to the west are now labelled as a *Steelworks* and is *RM*.

[1] https://www.greatermanchesterwarmemorials.co.uk/index.php/memorials/1914-1918/second_id=62

9.4. Pre-WWII Photography of the Site:

Pre-WWII aerial photography has been obtained from the Aerofilms collection available from Britain From Above. This imagery provides a view of the site in the 1930s (see **Annex E**). See below for a description:

Pre-WWII Photography of the Site	
Date	**Description**
June 1933	This pre-war imagery shows the northern site boundary facing Hyde Road. The section of the site visible in this image is occupied by large structures, presumably the drill hall labelled by OS mapping, and is bordered by roadway to the north, residential properties to the west, with additional structures visible to the west. Ardwick Hall is notable further north of the site. The southern section of the site is not visible in this photo.
1920s / 1930s	These pre-war ground level images show the Ardwick Royal Artillery WWI war memorial erected outside the drill hall which occupied the site.

10. Introduction to German Air Delivered Ordnance

10.1 General

During WWI and WWII, the UK was subjected to bombing which often resulted in extensive damage to city centres, docks, rail infrastructure and industrial areas. The poor accuracy of WWII targeting technology and the nature of bombing techniques often resulted in neighbouring areas to targets sustaining collateral damage.

In addition to raids which concentrated on specific targets, indiscriminate bombing of large areas also took place. This occurred most prominently in the London 'Blitz', though affected many other towns and cities. As discussed in the following sections, a proportion of the bombs dropped on the UK did not detonate as designed. Although extensive efforts were made to locate and deal with these UXBs at the time, many still remain buried and can present a potential risk to construction projects.

The main focus of research for this section of the report will concern German air delivered ordnance dropped during WWII, although WWI bombing will also be considered.

10.2 Generic Types of WWII German Air Delivered Ordnance

To provide an informed assessment of the hazards posed by any items of unexploded ordnance that may remain in situ on site, the table below provides information on the types of German air delivered ordnance most commonly used by the Luftwaffe during WWII. Images and brief summaries of the characteristics of these items of ordnance are listed in **Appendices I-III**

Generic Types of WWII German Air Delivered Ordnance		
Type	**Frequency**	**Likelihood of Detection**
High Explosive (HE) bombs	In terms of weight of ordnance dropped, HE bombs were the most frequently deployed by the Luftwaffe during WWII.	Although efforts were made to identify the presence of unexploded ordnance following an air raid, often the damage and destruction caused by detonated bombs made observation of UXB entry holes impossible. The entry hole of an unexploded bomb can be as little as 20cm in diameter and was easily overlooked in certain ground conditions (see **Annex F**). Furthermore, ARP documents describe the danger of assuming that damage, actually caused by a large UXB, was due to an exploded smaller bomb. UXBs therefore present the greatest risk to present-day intrusive works.
1kg Incendiary bombs (IB)	In terms of the number of weapons dropped, small IBs were the most numerous. Millions of these were dropped throughout WWII.	IBs had very limited penetration capability and in urban areas would often have been located in post raid surveys. If they failed to ignite and fell in water, on soft vegetated ground, or trapped in rubble, they could easily go undetected.
Large Incendiary bombs (IB)	These were not as common as the 1kg IBs, although they were more frequently deployed than PMs and AP bomblets.	If large IBs did penetrate the ground, complete combustion did not always occur and in such cases they could remain a risk to intrusive works.
Aerial or Parachute mines (PM)	These were deployed less frequently than HE and IBs due to size, cost and the difficulty of deployment.	If functioning correctly, PMs would generally have had a slow rate of descent and were very unlikely to have penetrated the ground. Where the parachute failed, mines would have simply shattered on impact if the main charge failed to explode. There have been extreme cases when these items have been found unexploded. However, in these scenarios, the ground was either extremely soft or the munition fell into water.
Anti-personnel (AP) bomblets	These were not commonly used and are generally considered to pose a low risk to most works in the UK.	500 bomblets were packed into containers holding between 6 and 108 submunitions. They had little ground penetration ability and should have been located by the post raid survey unless they fell into water, dense vegetation or bomb rubble.

10.3 Failure Rate of German Air Delivered Ordnance

It has been estimated that 10% of WWII German air delivered HE bombs failed to explode as designed. Reasons for why such weapons might have failed to function as designed include:

- Malfunction of the fuze or gain mechanism (manufacturing fault, sabotage by forced labour or faulty installation).
- Many were fitted with a clockwork mechanism that could become immobilised on impact.
- Failure of the bomber aircraft to arm the bombs due to human error or an equipment defect.
- Jettisoning the bomb before it was armed or from a very low altitude. This most likely occurred if the bomber aircraft was under attack or crashing.

From 1940 to 1945, bomb disposal teams reportedly dealt with a total of 50,000 explosive items of 50kg, over 7,000 anti-aircraft projectiles and 300,000 beach mines. Unexploded ordnance is still regularly encountered across the UK, see press articles in **Annex G**.

10.4 UXB Ground Penetration

An important consideration when assessing the risk from a UXB is the likely maximum depth of burial. There are several factors which determine the depth that an unexploded bomb will penetrate:

- Mass and shape of bomb.
- Height of release.
- Velocity and angle of bomb.
- Nature of the ground cover.
- Underlying geology.

Geology is perhaps the most important variable. If the ground is soft, there is a greater potential of deeper penetration. For example, peat and alluvium are easier to penetrate than gravel and sand, whereas layers of hard strata will significantly retard and may stop the trajectory of a UXB.

10.4.1 The J-Curve Principle

J-curve is the term used to describe the characteristic curve commonly followed by an air delivered bomb dropped from height after it penetrates the ground. Typically, as the bomb is slowed by its passage through underlying soils, its trajectory curves towards the surface. Many UXBs are found with their nose cone pointing upwards as a result of this effect. More importantly, however, is the resulting horizontal offset from the point of entry. This is typically a distance of about one third of the bomb's penetration depth, but can be higher in certain conditions (see **Annex F**).

10.4.2 WWII UXB Ground Penetration Studies

During WWII the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by bomb disposal (BD) teams. Conclusions were drawn predicting the likely average and maximum depths of penetration of different sized bombs in different geological strata.

For example, the largest common German bomb (500kg) had a likely concluded penetration depth of 6m in sand or gravel but 11m in clay. The maximum observed depth for a 500kg bomb was 11.4m and for a 1,000kg bomb 12.8m. Theoretical calculations suggested that significantly greater penetration depths were probable.

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10.4.3. Site Specific Bomb Penetration Considerations

When considering an assessment of the bomb penetration at the site of proposed works the following parameters should be used:

- WWII geology – Chester Formation
- Impact angle and velocity – 10-15° from vertical and 270 metres per second
- Bomb mass and configuration – The 500kg SC HE bomb, without retarder units or armour piercing nose (this was the largest of the common bombs used against Britain)

It has not been possible to determine maximum bomb penetration capabilities at this stage due to the limitations of site-specific geotechnical information provided for the purpose of this report. An assessment can be made once further information becomes available or by an UXO Specialist on-site.

10.5 V-Weapons

Hitler's "V-weapon" campaign began from mid-1944. It used newly developed unmanned cruise missiles and rockets. The V-1, known as the flying bomb or pilotless aircraft, and the V-2, a long range rocket, were launched from bases in Germany and occupied Europe. A total of 9,251 V-1s and 1,115 V-2s were recorded in the United Kingdom.

Although these weapons caused considerable damage, their range was limited by their position of deployment across Europe and as a result the vast majority of V-weapon strikes were directed against targets in the south-east of England, predominantly in the London Boroughs and Home Counties. This limitation of capability meant targets in Manchester were generally too far to be considered for V-weapon strikes by the Luftwaffe. The risk from V-weapons is therefore considered negligible and will not be further addressed in this report.

11. The Likelihood of Contamination from German Air Delivered UXBs

11.1 World War I

During WWI Britain was targeted and bombed by Zeppelin Airships as well as Gotha and Giant fixed-wing aircraft. The objective of these raids was to unnerve the British public, to destroy strategic targets and to ultimately attempt to coerce Britain's capitulation from the war. A WWI map of air raids and naval bombardments across the UK was consulted, see **Annex H**. This source shows no WWI air raids or naval bombardments within the city of Manchester.

WWI bombs were generally smaller and dropped from a lower altitude than those used in WWII. This resulted in limited UXB penetration depths. Aerial bombing was often such a novelty at the time that it attracted public interest and even spectators to watch the raids in progress. For these reasons there is a limited risk that UXBs passed undiscovered in the urban environment. When combined with the relative infrequency of attacks and an overall low bombing density, the risk from WWI UXBs is considered low and will not be further addressed in this report.

11.2 World War II Bombing of County Borough of Manchester

The Luftwaffe's main objective for the attacks on Britain was to inhibit the country's economic and military capability. To achieve this they targeted airfields, depots, docks, warehouses, wharves, railway lines, factories, and power stations. As the war progressed the Luftwaffe bombing campaign expanded to include the indiscriminate bombing of civilian areas in an attempt to subvert public morale.

During WWII the site was located within the County Borough of Manchester, which sustained an overall low density of bombing, as represented by bomb density data figures below. Manchester and the wider area were not targeted to the same extent as cities such as London and Birmingham, however it was subject to several major raids. The first raid on the city was in September 1940, but the worst came in December 1940, often referred to as the 'Christmas Blitz', whereby the city was raided for two consecutive nights which resulted in an estimated 684 people losing their lives, and more than 2,000 being injured.[1]

The city was home to a significant number of important targets, such as the Bradford Road Gas works, which was situated approximately 2km north-east of the site (see **Annex I**). This shows that, even though the site was located some distance from the major targets like the port or city centre, the Luftwaffe did have bombing targets further out in the city.

Records of bombing incidents in the civilian areas of the district were typically collected by Air Raid Precautions wardens and collated by Civil Defence personnel. Some other organisations, such as port and railway authorities, maintained separate records. Records would be in the form of typed or hand written incident notes, maps and statistics. Bombing data was carefully analysed, not only due to the requirement to identify those parts of the country most needing assistance, but also in an attempt to find patterns in the Germans' bombing strategy in order to predict where future raids might take place.

Records of bombing incidents are presented in the following sections.

[1] https://www.iwm.org.uk/history/the-manchester-blitz

11.3 WWII Home Office Bombing Statistics

The following table summarises the quantity of German air delivered bombs (excluding 1kg incendiaries and anti-personnel bombs) dropped on the County Borough of Manchester between 1940 and 1945.

Record of German Ordnance Dropped on the County Borough of Manchester		
Area Acreage		27,255
Weapons	High Explosive bombs (all types)	710
	Parachute mines	18
	Oil bombs	7
	Phosphorus bombs	0
	Flare pots	0
	Pilotless aircraft (V-1)	1
	Long range rocket bombs (V-2)	0
Total		736
Number of Bombs per 1,000 acres		27.1
Source: Home Office Statistics This table does not include UXO found during or after WWII		

Detailed records of the quantity and locations of the 1kg incendiary and anti-personnel bombs were not routinely maintained by the authorities as they were frequently too numerous to record. Although the risk relating to 1lbs is lesser than that relating to larger HE bombs, they were similarly designed to inflict damage and injury. Anti-personnel bombs were used in much smaller quantities and are rarely found today but are potentially more dangerous. Although Home Office statistics did not record these types of ordnance, both should not be overlooked when assessing the general risk to personnel and equipment.

11.4 Manchester Bomb and Damage Map

A local bomb map, compiled by Manchester City Council, showing HE and incendiary bomb strikes on the borough, as well as demolished or damaged buildings, was obtained from Manchester University Library. The section showing the area of the site is described in the table below and presented in **Annex I**.

Manchester Bomb and Damage Map	
Data Range	Comments
Consolidated bomb plot and damage map: 1940-1941	Several bombs are plotted in the northern portion of the site, including two 'fire bombs' on the 1st October 1940 and one HE bomb on the 11/12th March 1941. The northern portion of the site hall on site, where the HE bomb is recorded, is shaded red, indicating it was demolished. No bombs or damage are recorded within the southern section of the site. Additional 'fire bombs' are plotted across the structures adjacent to the western boundary of the site. Several additional HE bomb strikes are recorded within proximity to the site area further along Hyde Road including two unexploded bombs plotted approximately 30m and 45m east of the site, and a HE recorded in the vicinity of the Picture Theatre 50m west of the site. These incidents are recorded on 1/10/40 and 11-12/3/41.

9.5. Interactive Manchester Blitz Christmas Map

A local bomb map, compiled by Manchester Evening News, demonstrates the recorded bomb strikes during the 'Christmas Blitz' that resulted in fatalities. The section of this map showing the area of the site is described in the table below and presented in **Annex K**.

Interactive Manchester Blitz Christmas Map	
Date Range	Comments
December 1940	No bomb strike fatalities are recorded on site or within close proximity to the site boundary. The closest recorded bombing incident is plotted approximately 280m north-west of the site, along Ardwick Green S.

9.6. Manchester Damage Cards

Manchester Damage Cards were obtained from Manchester Central Library. These reports recorded any damage caused to specific streets across Manchester, including assigning a letter grade to the damage caused to structures, the date on which the structures were damaged and the general extent of damage. The damage cards found referring to roadways which surrounded the site are transcribed in the table below, with example imagery presented in **Annex L**.

Manchester Damage Cards		
Date	Location	Comments
15.5.41	Apsley Grove, Ardwick *Roadway adjacent to southern boundary of the site*	Nearby properties recorded no visible damage, or "glazing" damage to windows.
	Brampton Street, Ardwick *Junction of Brampton Street and Apsley Grove was located 5m south of the site*	The properties closest to the site, Nos. 18, 16, & 11, were noted as having "Glazing" damage to Windows.
	Hyde Road, Ardwick *Roadway adjacent to the northern boundary of the site*	Damage is recorded to properties No. 32 & 34, immediately adjacent to the site boundary to the east.
	Lilian Square, Ardwick *Approximately 45m east of the site*	"No obvious damage, evacuated by police"
	Marshall Street, Ardwick *Junction of Marshall Street and Apsley Grove was located 30m south-east of the site*	The closest property to the site, No 16 Marshall Street (No. 28 Apsley Grove) (Public House), was noted as having "Glazing" damage to Windows.
	Pleasant View, Ardwick *Approximately 30m east of the site*	"Remains evacuated because of Time Bomb in Hyde Road"

11.7 Ministry of Home Security Intelligence Summaries

Regional Home Security Intelligence Summaries compiled by the Ministry of Home Security were consulted for the purpose of this report. These records discuss incidents in the north-west region, damage, and responses from the emergency services. Locations are not often specific, mostly referring to the general district in which incidents occurred. Those records found describing incidents in the general area of Ardwick or in proximity to the site are presented below and in **Annex M**.

Ministry of Home Security Intelligence Summaries – Annex M	
Date Range	**Transcription**
1st September 1940	In MANCHESTER and HE. fell mainly in the ARDWICK district.
11th October 1940	MANCHESTER Was raided on 2200 hours 10/10/40 Most of the bombs fell in the South Central part of the City which is largely residential. 29 HE., 67 IB. and 2 oil IB. caused widespread damage to dwelling houses. At least 9 houses have been demolished. A considerable number of fires were caused, all of which have been dealt with. There was much damage to gas mains. Casualties so far reported: 3 dead, 9 seriously injured, 17 slightly injured.
23rd December 1940	MANCHESTER AREA ARDWICK – Major damage: Wilson Street, Stockport Road district. *[Wilson Street was situated approximately 130m south of the site]*
8th March 1941	MANCHESTER. – 18. in Chorlton (fires extinguished or under control); H.E. in Whalley Range and Ardwick Districts.
11/12th March 1941	MANCHESTER – 33 H.E. and many I.B. in Hulme, Ardwick, Chorlton and Whalley Range Districts. Damage to houses, a cinema, and public utilities. Casualties: 15 dead, 28 seriously and 29 slightly injured; about 300 homeless.

11.8 Anecdotal References

Numerous online and anecdotal sources were consulted for any reference to damage to the site and its immediate surroundings. A relevant passage relating to the bombing of the war memorial and drill hall located within the northern section of the site has been transcribed below:

> *"The memorial started out as a 6 metre high stone obelisk memorial erected outside the Royal Artillery Officer's HQ aka the Drill Hall, Hyde Road, Ardwick. This Victorian building was bombed on the 13th March 1941 and destroyed, as was the R.A. Memorial in front of it. 12 Royal Engineers were killed in the incident when they were using the building as a billet.[3] The Drill Hall at the rear of the HQ was repaired and remained in use until the 1990s"*[4]

One online source also noted bombing at the Ardwick Picture Theatre, at the junction of Hyde Road and Stockport Road, approximately 50m west of the site:

> *"On the night of 13th March 1941 the cinema received a direct hit by German Luftwaffe bombs and the building was set on fire. The film playing that week was Gary Cooper in "The Westerner". The bombing also did some damage to the dance hall of the adjacent Apollo Theatre. Damage to the Ardwick Picture Theatre was so bad that that it had to be demolished"*[5]

[3] https://www.grosvenor-beswick-bunches.com/index.php?memorials=Tyne&memorial_id=62
[4] https://www.manchesterhistory.net/theatres/ardwick.html

11.9 WWII-Era Aerial Photography

WWII-era aerial photography for the site area was obtained from the National Monuments Record Office (Historic England). This photography provides a record of the potential composition of the site during the war, as well as its condition immediately following the War (see **Annex N**).

WWII-Era Aerial Photography	
Date/Title	Description
30th May 1944	This wartime aerial imagery shows the condition of the site in the later stages of WWII, in May 1944. The southern portion of the site appears to have remained structurally intact whilst the northern portion of the site is shown as open ground, which appears to have been cleared of its pre-war structures, and the war memorial. There are no other obvious signs of bomb damage shown in the sites immediate surroundings, such as cleared or damaged structures, roof holes, cratering or rubble.
7th May 1946	The higher quality post-war imagery dating from 1946 confirms that the northern portion of the site appears to have been cleared of pre-war structures and features. The remainder of the site appears to have survived the war structurally intact, with the large drill hall and the adjacent smaller hall to its west appearing to show no obvious signs of damage. There are no further indications of bomb damage identified in the surrounding area of the site, such as roof holes, damaged structures or discolouration.
16th May 1948	The later post-war image again shows that the southern portion of the site remains intact whilst the northern portion of the site is vacant of any structures.

11.10 Abandoned Bombs

A post air-raid survey of buildings, facilities, and installations would have included a search for evidence of bomb entry holes. If evidence of an entry hole was encountered, Bomb Disposal Officer Teams would normally have been requested to attempt to locate, render safe, and dispose of the bomb. Occasionally, evidence of UXBs was discovered but due to a relatively benign position, access problems, or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an 'abandoned bomb'.

Given the inaccuracy of WWII records, and the fact that these bombs were 'abandoned', their locations cannot be considered definitive or the lists exhaustive. The MoD states that 'action to make the devices safe would be taken only if it was thought they were unstable'. It should be noted that other than the 'officially' abandoned bombs, there will inevitably be UXBs that were never recorded.

1st Line Defence holds no records of officially registered abandoned bombs at or near the site of the proposed works.

11.11 Bomb Disposal Tasks

The information service from the Explosive Ordnance Disposal (EOD) Archive Information Office at 33 Engineer Regiment (now part of 29 EOD & Search Group) no longer processes commercial requests for information. It has therefore not been possible to include any updated official information regarding bomb disposal/clearance tasks with regards to this site. A database of known disposal/clearance tasks has been referred to which does not make reference to such instances occurring within the site of proposed works. If any relevant information is received at a later date, Murray Fox (Northern) Ltd will be advised.

11.2 Evaluation of German Air Delivered UXO Records

German Air Delivered UXO Records Summary	
Factors	Considerations
Density of Bombing *It is important to consider the bombing density when assessing the possibility that UXBs remain in an area. High bombing density could allow for areas to record bursting due to removal damage caused to the area.*	During WWII, the site was situated in the County Borough of Manchester, which sustained an overall low density of bombing, with an average of 27.1 bombs recorded per 1,000 acres according to official Home Office bombing statistics. The Manchester Bomb and Damage Map recorded two HE bomb strike within the northern portion of the site on the 11th/12th March 1941, as well as two 'fire bombs' in this northern section in October 1940. A number of additional bombing incidents are recorded within close proximity to the site boundary, including two unexploded HE bomb strikes along Hyde Road, plotted approximately 30 – 45m east of the site, another HE approximately 50m west of the site at the Picture Theatre, and several additional 'fire bombs'. An online anecdotal source states that the drill hall and war memorial which occupied the northern portion of the site was bombed and destroyed on the 12th March 1941.
Damage *If buildings or structures in a site sustained more or less damage, any resulting rubble and debris could have obscured the entry holes of unexploded bombs dropped during the same air raid. Similarly, a high explosive bomb strike in an area of open agricultural land will have caused little disturbance, increasing the risk that a UXB entry hole would be overlooked.*	Numerous sources appear to suggest that the northern portion of the site was destroyed and subsequently cleared, whilst the southern portion of the site remained largely intact. One anecdotal source states that "the Victorian building was bombed on the 12th March 1941 and destroyed, as was the R.A. Memorial in front of it [...] The Drill Hall at the rear of the HQ was repaired and remained in use until the 1990s." Within the Manchester Bomb and Damage Map, the northern portion of the drill hall on site (where a HE bomb is plotted) is shaded red, indicating that it was demolished. WWII-era aerial imagery, dating from 1944 – 1945, appears to corroborate this, showing that the northern portion of the site had been cleared by 1944, but the southern portion of the site remained structurally intact, occupied by the apparently undamaged remainder of the drill hall. These images record no additional indications of bombing in the area surrounding the site, such as scars, discolouration or disturbance. Similarly, when comparing pre- and post-WWII OS mapping, the war memorial depicted within the north of the site on pre-war mapping was no longer present post-war, and the Drill Hall on site does not extend as far north in the post-WWII OS mapping as in the pre-WWII OS mapping.
Ground Cover *The nature of the ground cover present during WWII would have a substantial influence on any visual indication that may indicate UXO being present.*	At the outbreak of WWII, the site is considered to have had ground cover conducive to the detection of UXO as it was predominantly occupied by a Drill Hall. It is thought likely that evidence of UXO, such as bomb entry holes, are more likely to have been noted and reported under these conditions. Any accidents would have likely resulted in a visible trail of rubble and debris. Following the bombing within the northern section of the site, ground conditions within the area likely became significantly less conducive to the detection of UXO. Areas of damage, rubble and debris could easily obscure evidence of UXO, such as bomb entry holes which could have been as small as 30cm in diameter.

Access Frequency *UXO in locations where access was irregular would have a greater chance of passing undetected than on sites that were regularly occupied. The importance of a site to the war effort is also an important consideration as such sites are likely to have been both frequently visited and subject to post-raid checks for evidence of UXO.*	As the site was occupied by a Drill Hall and a Royal Artillery Officer's HQ, the site is considered to have been subject to frequent access and observation during the war. However, following the recorded bombing and extensive damage within the northern section of the site, the frequency of access to the site is presumed to have significantly decreased. Infrequent access can increase the likelihood that an item of UXO could go unnoticed.
Bomb Failure Rate	There is no evidence to suggest that the bomb failure rate in the locality of the site would have been dissimilar to the 10% normally used.
Abandoned Bombs	1st Line Defence holds no records of abandoned bombs at or within the site vicinity.
Bombing Decoy sites	1st Line Defence could find no evidence of bombing decoy sites within the site vicinity.
Bomb Disposal Tasks	1st Line Defence could find no evidence of bomb disposal tasks within the site boundary and immediate area.

12. Introduction to Allied Ordnance

12.1 General

Many areas across the UK may be at risk from Allied UXO because of both wartime and peacetime military use. Typical military activities and uses that may have led to a legacy of military UXO at a site include former minefields, home guard positions, anti-aircraft emplacements, training and firing ranges, military camps, as well as weapons manufacture and storage areas.

Although land formerly used by the military was usually subject to clearance before returned to civilian use, items of UXO are sometimes discovered and can present a potential risk to construction projects.

It should be highlighted that there is no evidence that the site formerly had any military occupation or usage that could have led to contamination with such items of Allied ordnance. Despite this, urban areas, such as the location of the site, can be at risk from buried unexploded anti-aircraft projectiles fired during WWII – as addressed below.

12.2 Defending the UK From Aerial Attack

During WWII the War Office employed a number of defence tactics against the Luftwaffe from bombing major towns, cities, manufacturing areas, ports and airfields. These can be divided into passive and active defences (examples are provided in the table below).

Active Defences	Passive Defences
• Anti-aircraft gun emplacements to engage enemy aircraft. • Fighter aircraft to act as interceptors. • Rockets and missiles were used later during WWII.	• Blackouts and camouflaging to hinder the identification of Luftwaffe targets. • Decoy sites were located away from targets and used dummy buildings and lighting to replicate urban, military, or industrial areas. • Barrage balloons forced enemy aircraft to greater altitudes. • Searchlights were often used to track and divert adversary bomber crews during night raids.

Active defences such as anti-aircraft artillery present a greater risk of UXO contamination than passive defences. Unexploded ordnance resulting from dogfights and fighter interceptors is rarely encountered and difficult to accurately qualify.

12.3 Anti-Aircraft Artillery (AAA)

During WWII three main types of gun sites existed: heavy anti-aircraft (HAA), light anti-aircraft (LAA) and 'Z' batteries (ZAA). If the projectiles and rockets fired from these guns failed to explode or strike an aircraft they would descend back to land. The table below provides further information on the operation and ordnance associated with these type of weapons.

Anti-Aircraft Artillery				
Term	Description			
HAA	These large calibre guns such as the 3.7" QF (Quick Firing) were used to engage high flying enemy bombers. They often fired large HE projectiles, which were usually initiated by mongst fuses, triggered by impact, time, time delay or a combination of aforementioned mechanisms.			
LAA	These mobile guns were intended to engage fast, low flying aircraft. They were typically related between locations on the perimeters of towns and strategically important industrial works. As they could be moved to new positions with relative ease, when required, records of their locations are limited. The most numerous of these were the 40mm Bofors gun which could fire up to 120 x 40mm HE projectiles per minute to over 1,900m.			
Variations in HAA and LAA Ammunition	Gun type	Calibre	Shell Weight	Shell Dimensions
	3.0 Inch	76mm	7.3kg	76mm x 356mm
	3.7 Inch	94mm	12.3kg	94mm x 452mm
	4.5 Inch	114mm	24.7kg	114mm x 578mm
	40mm	40mm	0.9kg	40mm x 311mm
Z-AA	Rockets were commonly designed to destroy heavily armoured military vehicles (anti-tank weapon). The device contains an explosive head (warhead) that can be accelerated using internal propellants to an intended target. Anti-aircraft rocket batteries were also utilised as part of air defence measures.			

The conditions in which anti-aircraft projectiles may have fallen unnoticed within a site area are analogous to those regarding air delivered ordnance. Unexploded anti-aircraft projectiles could essentially have fallen indiscriminately anywhere within range of the guns. The chance of such items being observed, reported and removed during the war depends on factors such as land use, ground cover, damage and frequency of access – the same factors that govern whether evidence of a UXB is likely to have been noted. More information about these factors with regards to this particular site can be found in the German Air Delivered Ordnance section of this report.

Illustrations of Anti-Aircraft artillery, projectiles and rockets are presented at **Appendix iv**

12.4 Land Service Ammunition

The term LSA covers items of ordnance that are propelled, placed, or thrown during land warfare. These items may be filled or charged with explosives, smoke, incendiary, or pyrotechnics and can be divided into five main groups:

Land Service Ammunition (LSA)	
Item	Description
Mortar Rounds	A mortar round is normally muzzle-fused and fitted with its own propelling charge. Its flight is stabilised by the use of a fin. They are usually tear-drop shaped (though older variants are parallel sided), with a finned "spigot tube" screwed or welded to the rear end of the body which houses the propellant charge. Mortars are either High Explosive or Carrier (i.e. smoke, incendiary, or pyrotechnic).
Grenades	A grenade is a short range weapon designed to kill or injure people. It can be hand thrown or fired from a rifle or a grenade launcher. Grenades either contain high explosive or smoke producing pyrotechnic compounds. The common variants have a classic "pineapple" shape.
Projectiles	A projectile (or shell) is propelled by force, normally from a gun, and continues in motion using its kinetic energy. The gun a projectile is fired from usually determines its size. A projectile contains a fuzing mechanism and a filling. Projectiles can be high explosive, carrier or Shot (a solid projectile).
Rockets	Rockets were commonly designed to destroy heavily armoured military vehicles (anti-tank weapon). The device contains an explosive head (warhead) that can be accelerated using internal propellants to an intended target. Anti-aircraft rocket batteries were also utilised as part of air defence measures.
Landmines	A landmine is designed to be laid on or just below the ground to be exploded by the proximity or contact of a person or vehicle. Landmines were often placed in defensive areas of the UK to obstruct potential invading adversaries.

In the UK unexploded or partially exploded mortars and grenades are the most common items of LSA encountered, as they could be transported and utilised anywhere. They are mostly encountered in areas used for military training and are often found discarded on or near historical military bases.

Images of the most commonly found items of LSA are presented in **Appendices v - vii**.

12.5 Small Arms Ammunition

The most common type of ordnance encountered on land used by the military are items of Small Arms Ammunition (SAA). SAA refers to the complete round or cartridge designed to be discharged from varying sized hand-held weapons such as rifles, machine guns and pistols. SAA can include bullets, cartridge cases and primers/caps. Example images of the most SAA are presented in **Appendix viii.**

13. The Likelihood of Contamination from Allied Ordnance

13.1 Introduction

There are several factors that may serve to either affirm, increase, or decrease the level of risk within a site with a history of military usage. Such factors are typically dependent upon the proximity of the proposed area of works to training activities, munition productions and storage, as well as its function across the years.

This section will examine the history of the proposed site and assess to what degrees, if any, the site could have become contaminated as a result of the military use of the surrounding area.

13.2 Military History of the Site of Proposed Works

Historical OS maps show that the site was occupied by a Drill Hall which is indicated to have been present on site from as early as the 1890s. The drill hall was the location of the Royal Artillery Officer's HQ in Manchester, and was used as a military billet for a short period in WWII.

The Manchester Artillery was formed as part of the Volunteer Force, first raised in the City of Manchester in 1860. In 1881 its full title became 7th Lancashire (The Manchester Artillery) AVC, with its headquarters on site at Hyde Road. It later became a brigade of the Royal Field Artillery in the Territorial Force in 1908: the 15th, 16th and 17th Lancashire Batteries, along with their Ammunition Column made up the 2nd East Lancashire Brigade[1]. In 1921, the TF was reorganised into the Territorial Army, and in 1938 the brigade were redesignated as 52nd (Manchester) Field Regiment.

The HQ and adjacent WWI war memorial facing Hyde Road were destroyed during a bombing incident during WWII, though the Drill Hall at the rear of the HQ was repaired and remained in use until the 1990s[2].

13.3 Evaluation of Contamination Risk from Allied UXO

1st Line Defence has considered the following potential sources of Allied ordnance contamination:

Allied UXO Records Summary	
Sources of Allied UXO Contamination	**Comments**
Military Camps *Military camps present an elevated risk that ordnance might due to the large military presence and likelihood of accidental live ordnance training.*	1st Line Defence could find no evidence of a military camp within the site.
Anti-Aircraft Defences *Anti-Aircraft defences were employed across the country, primarily to protect industrial complexes and centres of manufacturing. AA projectiles.*	1st Line Defence could find no evidence of Anti-Aircraft defences such as a HAA or LAA gun emplacement occupying or bordering the site. The closest HAA was located approximately 2.2km south of the site. Despite this distance the maximum effective range of an AA projectile can be up to 15km. The conditions in which HAA or LAA projectiles may have fallen unexploded within a site footprint are generally analogous to those regarding German air delivered ordnance.

[1] https://www.[illegible].org.uk/...

[2] https://www.[illegible].com/...

Home Guard Activity *The Home Guard regularly undertook training and ordnance practice in open areas as well as forging ordnance as part of anti-invasion defences*	Evidence suggests that the site was occupied by a Drill Hall and Royal Artillery Officer's HQ. Drill Halls are generally considered to have had a limited capability to store and utilise live ordnance, due to their small size and urban location and were instead often used for tasks such as physical exercise, administration and accommodation. No evidence has been found to suggest that the Drill Hall recorded on site contained facilities that could result in UXO contamination.
Defensive Positions *Extended positions support the presence of military activity, which is often indicative of ordnance storage, usage or disposal.*	There is no evidence of any pillbox, emplacement or other defensive features formerly located on or bordering the site footprint.
Training or firing ranges *Areas of ordnance training can historical ordnance usage on large numbers often with inadequate disposal of expended and live items. The presence of these ranges significantly impact on the risk of encountering items of ordnance in close vicinity.*	No evidence of training or firing ranges could be found within the site or surrounding area.
Defensive Minefields *Minefields were placed in strategic areas to defend the country in the event of a German invasion. Minefields were not always cleared with an appropriate level of vigilance.*	There is no evidence of defensive minefields affecting the site.
Ordnance Manufacture *Ordnance manufacture indicates an increased chance that items of ordnance were stored or disposed of within a location.*	No information of ordnance being stored, produced, or disposed of within the proposed site could be found.
Military Related Airfields *Military airfields present an elevated risk from ordnance, simply due to the large military presence and likelihood of ordnance and live ordnance training or bombing practice.*	The site was not situated within the perimeters or vicinity of a military airfield.

14. The Likelihood of UXO Contamination Summary

The following table assesses the likelihood that the site was contaminated by items of German air delivered and Allied ordnance. Factors such as the risk of UXO initiation, remaining, and encountering will be discussed later in the report.

UXO Contamination Summary	
Quality of the Historical Record	The research has evaluated pre- and post-WWII Ordnance Survey maps, Luftwaffe reconnaissance imagery, official Home Office bombing statistics, air raid damage files, Manchester Bomb and Damage Maps, Manchester Evening News Blitz Christmas Map, Manchester Street Damage Cards, Home Security Intelligence Summaries, written and anecdotal information, and WWII era aerial photography. The record set is of generally good quality with a fair number of records available to consult, including written records, bomb mapping and high resolution photography of the site.
German Air-Delivered Ordnance	• During WWII, the site was situated in the County Borough of Manchester, which sustained an overall low density of bombing, with an average of 27.1 bombs recorded per 1,000 acres according to official Home Office bombing statistics. • At the outbreak of WWII, the site was occupied by a large drill hall, a separate slightly smaller drill hall, and a war memorial facing Hyde Road to the north. • The Manchester Bomb and Damage Map recorded one HE bomb strike in the northern portion of the site on the 19/20th March 1941, in addition to two 'fire bombs' within the northern section of the site in October 1940. The northern portion of the drill hall on site, where the HE incident is plotted, is shaded red, indicating that it was demolished. A number of additional bombing incidents were recorded within close proximity to the site boundary, including two unexploded HE bomb strikes plotted approximately 30 – 45m east of the site, an additional HE approximately 50m west of the site, and several additional 'fire bombs' in the area. • Numerous additional sources appear to corroborate that the northern portion of the site was bombed, destroyed and subsequently cleared, whilst the southern portion of the site suffered no additional incidents and remained largely intact. One anecdotal source states that "the Victorian building was bombed on the 12th March 1941 and destroyed, as was the R.A. Memorial in front of it [...] The Drill Hall at the rear of the HQ was repaired and remained in use until the 1990s." • WWII-era aerial imagery dating from 1944 – 1948 further supports this, showing that the northern portion of the site had been cleared of any structures by 1944, but the southern portion of the site remained structurally intact, occupied by the apparently undamaged remainder of the drill hall. Similarly, when comparing pre- and post-WWII OS mapping, the war memorial depicted within the north of the site on pre-war mapping was no longer present post-war, and the Drill Hall on site does not extend as far north in the post-WWII OS mapping as in the pre-WWII OS mapping. • As the site was occupied by a Drill Hall and a Royal Artillery Officer's HQ at the outbreak of WWII, it is anticipated to have been subject to a relatively frequent level of access, with ground cover considered conducive towards the detection of UXO. any incidents would likely have resulted in a visible trail of rubble or debris. However, following the recorded bombing and extensive damage / destruction within the northern section of the site, access to this area is presumed to have significantly decreased, and conditions were likely far less favourable to the detection of UXO. Areas of damage, rubble and debris could easily obscure evidence of UXO, such as bomb entry holes (which could be as small as 20cm in diameter), and subsequent access can increase the likelihood that an item of UXO would go unnoticed and unreported. • In summary, the northern section of the site is recorded as having sustained several fire bombs, as well as a HE bomb strike which reportedly destroyed the war memorial and drill hall situated within this area. However, numerous sources appear to suggest that the southern section remained structurally intact post-war, with no evidence that this area was subject to any additional incidents of bombing. Taking the aforementioned into consideration, the risk from German UXO contamination across the site is not considered to be homogenous, with the northern section of the site deemed to hold an overall **Medium Risk**, and the south of the site designated as **Low Risk**. Risk Map shown in **Annex O**.

Allied Ordnance	• Evidence suggests that the site was occupied by a Drill Hall and Royal Artillery Officer's HQ. Drill Halls are generally considered to have had a limited capability to store and utilise live ordnance, due to their small size and urban location, and were instead often used for tasks such as physical exercise, administration and accommodation. No evidence has been found to suggest that the Drill Hall recorded on site contained facilities that could result in UXO contamination. Therefore, the risk from Allied UXO is not considered significant enough to warrant proactive risk mitigation measures, although the possibility cannot be wholly discounted given the military history of the site. UXO Safety awareness briefings are recommended as a sensible minimum precaution. • The conditions in which HAA or LAA projectiles may have fallen unexploded within the site boundary are however analogous to those regarding air delivered ordnance.

5. The Likelihood that UXO Remains

5.1 Introduction

It is important to consider the extent to which any explosive ordnance clearance (EOC) activities or extensive ground works have occurred on site. This may indicate previous ordnance contamination or reduce the risk that ordnance remains undiscovered.

5.2 UXO Clearance

1st Line Defence has found no evidence in the public domain or within internal records that any official ordnance clearance operations have taken place on site. Note however that we have not received confirmation of this fact from the 33 EOD Regiment Archive (now part of 29 EOD & Search Group). It should also be noted that in addition to 29 EOD & Search Group archival information, 1st Line Defence also do not currently have access to data that may be relevant including 5151(BD)SQN Archive, SO Training Technical Advisory Section (TAS) and MACA Records (bomb disposal callouts).

If such information is available at a later date, it is recommended that it be reviewed as it will assist with understanding both levels and types of contamination likely to be present, and may indicate risk reduction in certain areas.

5.3 Post-War Redevelopment

According to recent aerial imagery, the drill hall which previously occupied the site has been removed and the site is now occupied by hardstanding ground, in use as a car park.

The risk of UXO remaining is considered to be mitigated at the location of and down to the depth of any post-war redevelopment on site. For example, the risk from deep buried UXO will only have been mitigated within the volumes of any post-war pile foundations or deep excavations for basement levels. The risk will however remain within virgin geology below and amongst these post-war works, down to the maximum bomb penetration depth.

16. The Likelihood of UXO Encounter

16.1 Introduction

For UXO to pose a risk at a site, there should be a means by which any potential UXO might be encountered on that site.

The likelihood of encountering UXO on the site of proposed works would depend on various factors, such as the type of UXO that might be present and the intrusive works planned on site. In most cases, UXO is more likely to be present below surface (buried) than on surface.

In general, the greater the extent and depth of intrusive works, the greater the risk of encountering. The most likely scenarios under which items of UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations.

Generally speaking, the risk of encountering any type of UXO will be minimal for any works planned within the footprint and down to the depth of post-war foundations and excavations.

16.2 Encountering Air Delivered Ordnance

Since an air delivered bomb may come to rest at any depth between just below ground level and its maximum penetration depth, there is a chance that such an item (if present) could be encountered during shallow excavations (for services or site investigations) into the original WWII ground level as well as at depth.

16.3 Land Service/Small Arms Ammunition Encounter

Items of LSA and SAA are mostly encountered in areas previously used for military training. Such items could have been lost, burnt, buried or discarded during being in use by the military. Due to this, LSA are most likely to be encountered at relatively shallow depths – generally in the top 1m below ground level. Therefore, such items are most likely to be encountered during open excavation works. In some cases, there is the potential that LSA or SAA may be present on the surface of the ground – especially in areas with active military use or were recently in use by the MoD.

17. The Likelihood of UXO Initiation

17.1 Introduction

UXO does not spontaneously explode. Older UXO devices will require an external event/energy to create the conditions for detonation to occur. The likelihood that a device will function can depend on a number of factors, including the type of weaponry, its age and the amount of energy it is struck with.

17.2 Initiating Air Delivered Ordnance

Unexploded bombs do not spontaneously explode. All high explosive filling requires significant energy to create the conditions for detonation to occur.

In recent decades, there have been a number of incidents in Europe where Allied UXBs have detonated, and incidents where fatalities have resulted. There have been several hypotheses as to the reason why the issue is more prevalent in mainland Europe – reasons could include the significantly greater number of bombs dropped by the Allied forces on occupied Europe, the preferred use by the Allies of mechanical rather than electrical fuzes, and perhaps just good fortune. The risk from UXO in the UK is also being treated very seriously in many sectors of the construction industry, and proactive risk mitigation efforts will also have affected the lack of detonations in the UK.

There are certain construction activities which make initiation more likely, and several potential initiation mechanisms must be considered:

UXB Initiation	
Direct Impact	Unless the fuze or fuze pocket is struck, there needs to be a significant impact e.g. from piling or large and violent mechanical excavation, onto the main body of the weapon to initiate a bored iron bomb. Such violent action can cause the bomb to detonate.
Re- starting the Clock	A small proportion of German WWII bombs employed clockwork fuzes. It is probable that significant corrosion would have taken place within the fuze mechanism over the last 70+ years that would prevent clockwork mechanisms from functioning. Nevertheless, it was reported that the clockwork fuze in a UXB dealt with by 33 EOD Regiment in Surrey in 2002 did re-start.
Friction Impact	The most likely scenario resulting in the detonation of a UXB is friction impact initiating the shock-sensitive fuze explosive. The combined effects of occasional changes in temperature and general degradation over time can cause explosive compounds to crystallise and extrude out from the main body of the bomb. It may only require a limited amount of energy to initiate the extruded explosive which could detonate the main charge.

17.3 Land Service /Small Arms Ammunition Initiation

Items of LSA generally do not become inert or lose their effectiveness with age. Time can cause items to become more sensitive and less stable. This applies equally to items submerged in water or embedded in silts, clays, or similar materials. The greatest risk occurs when an item of ordnance is struck or interfered with. This is likely to occur when mechanical equipment is used or when unqualified personnel pick up munitions.

If left alone, an item of LSA will pose little/no risk of initiation. Therefore, if it is not planned to undertake construction/intrusive works at the site, the risk of initiation of any LSA that may be present would be negligible. Similarly, those accessing a contaminated area would be at minimal risk if they do not interfere with any UXO present on the ground. Clearly for many end uses, however, the presence of UXO anywhere on a site would not be acceptable as it could not be guaranteed that the items will not be handled, struck or otherwise affected, increasing the likelihood of initiation.

Items of SAA are much less likely to detonate than LSA or UXBs, but can be accidentally initiated by striking the casing, coming into contact with fire, or being tampered with/dismantled. It is likely that the detonation of an item of SAA would result in a small explosion, as the pressure would not be contained within a barrel. Detonation would only result in local overpressure and very minor fragmentation from the cartridge case.

18. Consequences of Initiation/Encounter

18.1 Introduction

The repercussions of the inadvertent detonation of UXO during intrusive ground works, or if an item or ordnance is interfered with or disturbed, are potentially profound, both in terms of human and financial cost. A serious risk to life and limb, damage to plant and total site shutdown during follow-up investigations are potential outcomes. However, if appropriate risk mitigation measures are put in place, the chances of initiating an item of UXO during ground works is comparatively low.

The consequences of encountering UXO can be particularly notable in the case of high-profile sites (such as airports and train stations) where it is necessary to evacuate the public from the surrounding area. A site may be closed for anything from a few hours to a week with potentially significant cost in lost time. It should be noted that even the discovery of suspected or possible item of UXO during intrusive works (if handled solely through the authorities), may also involve significant loss of production.

18.2 Consequences of Detonation

When considering the potential consequences of a detonation, it is necessary to identify the significant receptors that may be affected. The receptors that may potentially be at risk from a UXO detonation on a construction site will vary depending on the site specific conditions but can be summarised as follows:

- People – site workers, local residents and general public.
- Plant and equipment – construction plant on site.
- Services – subsurface gas, electricity, telecommunications.
- Structures – not only visible damage to above ground buildings, but potentially damage to foundations and the weakening of support structures.
- Environment – introduction of potentially contaminating materials.

19. 1st Line Defence Risk Assessment

19.1 Risk Assessment Stages

Taking into account the quality of the historical evidence, the assessment of the overall risk from unexploded ordnance is based on the following five considerations:

1. That the site was contaminated with unexploded ordnance.
2. That unexploded ordnance remains on site.
3. That such items will be encountered during the proposed works.
4. That ordnance may be initiated by the works operations.
5. The consequences of encountering or initiating ordnance.

10.2 Assessed Risk Level

Northern Area:

1st Line Defence has assessed that there is an overall **Medium Risk** from German and anti-aircraft unexploded ordnance within the northern portion of the site. There is an assessed **Low Risk** from Allied unexploded ordnance.

Ordnance Type:	Risk Level			
	Negligible	Low	Medium	High
German Unexploded HE Bombs			✓	
German Big Incendiary Bombs			✓	
Anti-Aircraft Artillery Projectiles			✓	
Allied Land Service and Small Arms Ammunition		✓		

Southern Area:

1st Line Defence has assessed that there is an overall **Low Risk** from German and anti-aircraft unexploded ordnance within the remaining southern section of the site. There is an assessed **Low Risk** from Allied unexploded ordnance.

Ordnance Type:	Risk Level			
	Negligible	Low	Medium	High
German Unexploded HE Bombs		✓		
German Big Incendiary Bombs		✓		
Anti-Aircraft Artillery Projectiles		✓		
Allied Land Service and Small Arms Ammunition		✓		

Please note – although the risk from unexploded ordnance within the southern section of this site has been assessed as 'Low', this does not mean there is 'no' risk of encountering UXO. This report has been undertaken with due diligence, and all reasonable care has been taken to access and analyse relevant historical information. By necessity, when dealing historical evidence, and when making assessments of UXO risk, various assumptions have to be made which we have discussed and justified throughout this report. Our reports take a common-sense and practical approach to the assessment of risk, and we strive to be reasonable and pragmatic in our conclusions.

It should however be stressed that if any suspect items are encountered during the proposed works, 1st Line Defence should be contacted for advice/assistance, and to re-assess the risk where necessary. The mitigation measures outlined in the next section are recommended as a minimum precaution to alert ground personnel to the history of the site, what to look out for, and what measures to take in the event that a suspect item is encountered. It should also be noted that the conclusions of this report are based on the scope of works outlined in the 'Proposed Works' section of this report. Should the scope of works change or additional works be proposed, 1st Line Defence should be contacted to re-evaluate the risk.

20 Proposed Risk Mitigation Methodology

20.1 General

The following risk mitigation measures are recommended to support the proposed works at 14 Hyde Road, Manchester.

Recommended Risk Mitigation Measures	
Activity	**Recommended Risk Mitigation Measure**
All Works	• **UXO Risk Management Plan** It is recommended that a site-specific plan for the management of UXO risk be written for this site. This plan should be kept on site and be referred to in the event that a suspect item of UXO is encountered at any stage of the project. It should detail the steps to be taken in the event of such a discovery, considering elements such as communication, raising the alarm, nominated responsible persons etc. Contact 1st Line Defence for help/more information. • **Site Specific UXO Awareness Briefings to all personnel conducting intrusive works** As a minimum precaution, all personnel working on the site should be briefed on the basic identification of UXO and what to do in the event of encountering a suspect item. This should in the first instance be undertaken by a UXO Specialist. Posters and information on the risk of UXO can be held in the site office for reference.
Open Excavations (trial pits, service pits, bulk excavations, strip foundations etc.) **Medium Risk Area Only**	• **Unexploded Ordnance (UXO) Specialist Presence on Site to support open excavations** When on site the role of the UXO Specialist would include: • Monitoring works using visual recognition and instrument aided, including immediate response to reports of suspicious objects or suspected items of ordnance that have been recovered by the ground workers on site. • Providing UXO awareness briefings to any uninformed staff and advise staff of the need to modify working practices to take account of the ordnance risk. • To aid incident management which would involve liaison with the local authorities and police should ordnance be identified and present an explosive hazard.
Boreholes and Piled Foundations **Medium Risk Area Only**	• **Intrusive Magnetometer Survey of all borehole and pile locations down to a maximum bomb penetration depth** 1st Line Defence can deploy a range of intrusive magnetometer techniques to clear pile locations. The 'appropriate' technique is influenced by a number of factors, but most importantly the site's ground conditions. The appropriate survey methodology would be confirmed once the piling works have been completed.

In making this assessment and recommending these risk mitigation measures, if known, the works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, 1st Line Defence should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

1st Line Defence Limited **31st January 2024**

This Report has been produced in compliance with the Construction Industry Research and Information Association (CIRIA) C681 guidelines for the writing of Detailed UXO Risk Assessments.

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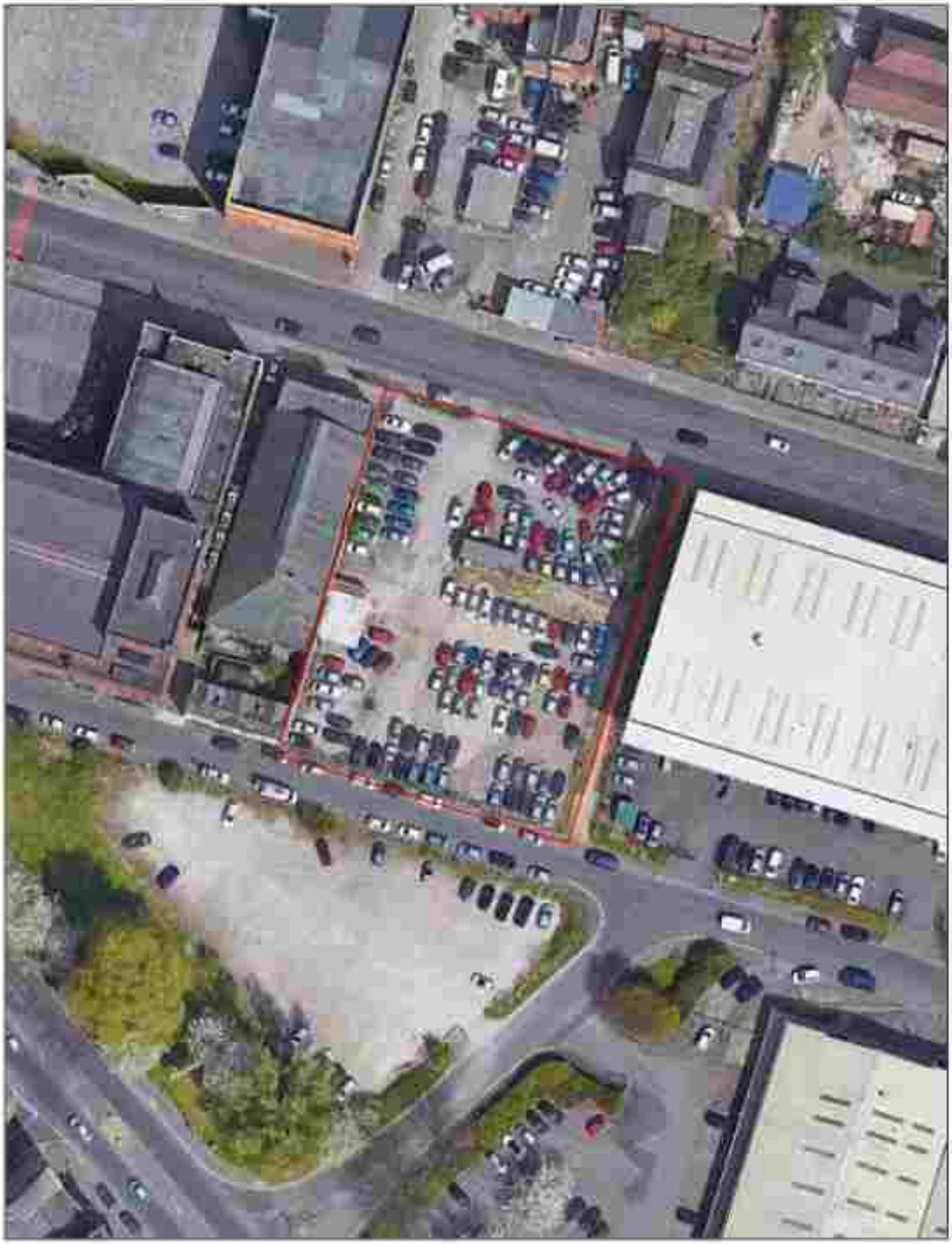




Client	Murray Rix (Northern) Ltd	Approximate site boundary	N
Project	14 Hyde Road, Manchester		
Ref	DA18646-00	Source Google Maps	

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Project: 14 Hyde Road, Manchester

Ref: DA18646-00

Source: Google earth

Approximate site boundary

N

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Project: 14 Hyde Road, Manchester

Ref: DA18646-00

Source: Murray Rix (Northern) Ltd

Approximate site boundary

N

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Client	Murray Rix (Northern) Ltd	Approximate site boundary	N
Project	14 Hyde Road, Manchester		
Ref	DA18646-00	Scale: NTS	

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Approximate site boundary

N

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Client: Murray Rix (Northern) Ltd

Project: 14 Hyde Road, Manchester

Ref: DA18646-00

Source: Unspecified

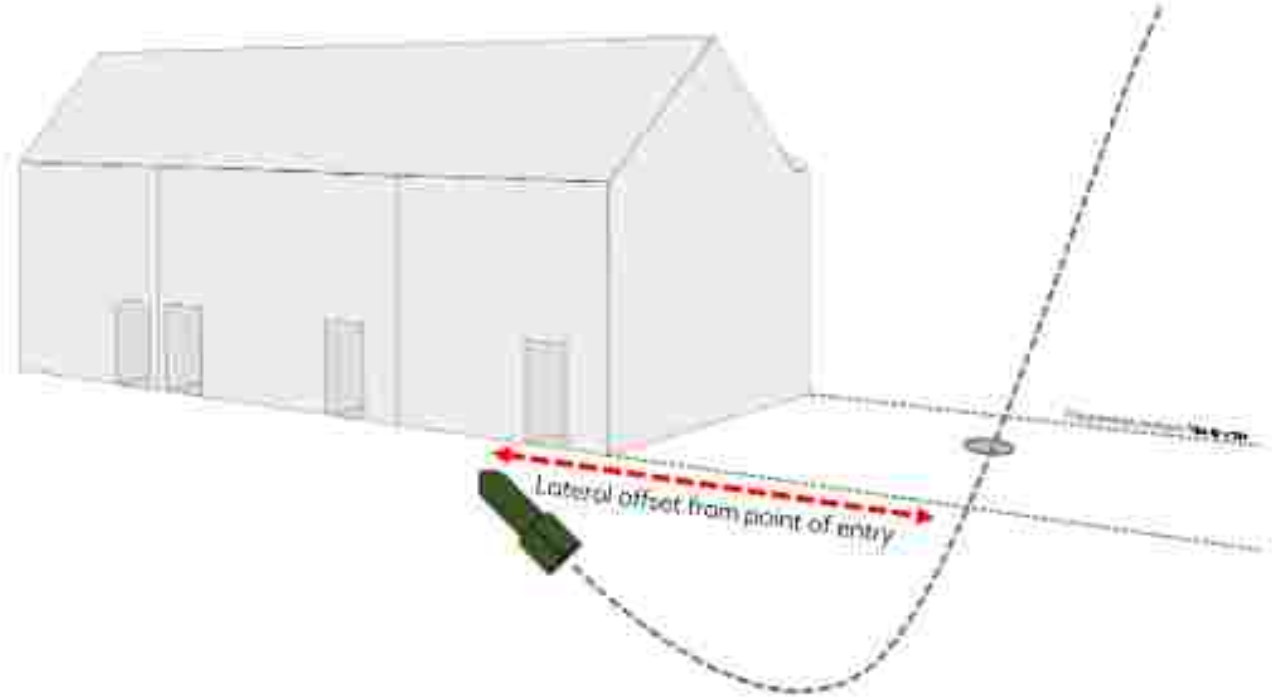
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Top: J-curve Effect - Due to angle of entry, unexploded bombs would often end their trajectory at a lateral offset from point of entry, often ending up beneath adjacent extant structures/sites.

The photograph **above** shows a 250kg unexploded bomb found in Bermondsey in 2015, pointing upwards, demonstrating 'J-curve'.

One of the most common scenarios for UXO going unnoticed was when a UXB fell into a 'bomb site' (such as the area shown **Top Left**), the entry hole of the bomb obscured by any debris and rubble present. Note that the entry hole of a 50kg UXB could be as little as 20cm in diameter (**Left**).

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BBC NEWS

Bermondsey bomb: World War Two device safely removed



An unexploded World War Two bomb found in south London has been driven away safely under police and Army escort.

The 1000lb (250kg) device was found on a building site in George Walk, Bermondsey on Monday.

Two primary schools were closed and hundreds of homes were evacuated as a precaution.

A London Underground (LUL) exclusion zone was lifted at about 14:15 GMT as the bomb was removed to a quarry in Kent to be detonated, police said.

The Metropolitan Police have said the device was a "UK 250kg WWII German air-dropped bomb, known to the Army's Royal Logistic Corps bomb disposal experts.

250kg German HE Bomb, March 2015

BBC NEWS

WW2 bomb found near London City Airport blown up



An unexploded World War Two bomb found near London City Airport has been detonated.

The 500kg device was discovered at the King George V Dock on Sunday during planned work at the airport.

It was closed and all flights were cancelled on Monday after an exclusion zone was put in place.

The detonation, which took place at Shoeburyness, Essex, was postponed on Tuesday because of high winds and dangerous conditions for divers.

The 1.5m-long German bomb – which was found in a pen of silt, 13m underwater – was carefully recovered from the Thames and placed in a secure location a mile away from the coast at Essex.

500kg German HE Bomb, February 2018

BBC NEWS



Exeter WW2 bomb is detonated after homes evacuated

More than 2,500 households and 12 university halls of residence were cleared before the 2,700lb (1,000kg) device **was destroyed** on Saturday.

Police said the blast left a crater about the size of a double-decker bus.

Police have reported large pieces of [illegible] hitting buildings and said some properties in the [illegible] area were left with [illegible] damage.



1000kg German HE bomb, February 2021

BBC NEWS



Great Yarmouth: Huge blast after unplanned WW2 bomb detonation

A World War Two bomb found in Great Yarmouth has detonated while work was being done to defuse it, causing a huge blast that was heard for miles.

Army specialists were attempting to disarm it when there was an unplanned detonation at about 17:00 GMT.

People on social media said they heard a loud bang and felt buildings shake 15 miles (24km) away.

There have been no reports of injuries among the Army, emergency services or the public, Norfolk Police said.

Cordons were put in place when the bomb was first discovered close to Vauxhall Holiday Park on Tuesday, and work began to make it safe.

250kg German HE Bomb, February 2023

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BASF has confirmed that an explosive device, most likely a World War II-era bomb, caused the blast that left one person injured Tuesday at a plant construction site in Germany.

The explosion was reported at BASF's Ludwigshafen toluene diisocyanate (TDI) plant, which recently broke ground for a 300,000 metric tons per year TDI production plant and other construction to expand its facilities.



BASF Provides Some Details

Responding to a request from ICIS pricing for more information on Wednesday (1 st. 27), BASF's manager of media relations and corporate communications Europe, Ursula von Stetten, wrote in an email: "So there [are] the facts: The detonation took place at 12:30 a.m. One person was injured, the injury is not serious. He will be kept in the hospital for some days.

"Cause of the detonation was an explosive device, presumably a bomb dating from the Second World War. The device detonated when grounding work was done. No details on [a] delay [are] available. At the moment, the exact circumstances of the incident are [being] examined."

1st March 2013

WWII bomb injures 17 at Hattingen construction site



Seventeen people were injured on Friday when a construction crew unwittingly detonated a buried World War II-era bomb in Hattingen.

An excavator apparently drove over a 250 kilogramme (550 pound) American bomb, damaging surrounding buildings. Most of the injured suffered auditory trauma from the blast, and the excavator operator suffered injuries to his hands, police in the German state of North Rhine-Westphalia said.

"The hole was astoundingly small for such a large bomb full of so many explosives," Armin Gebhard, head of the Arnsberg department for military ordnance removal, told The Local. "But of course it damaged all the surrounding buildings too. We are really happy it wasn't worse."

9th September 2015

SPIEGEL ONLINE

Blast kills one

World War II Bomb Explodes on German Motorway

A highway construction worker in Germany accidentally struck an unexploded World War II bomb, causing an explosion which killed him and smashed several passing cars.



A World War II bomb has exploded during construction work on a German highway, killing one worker and injuring several motorists who were driving past, police said.

"The workers had been drilling a hole for a road sign when the bomb exploded," police said. "The explosion created a crater two metres deep and 5 metres wide. Police said they weren't sure yet what type of bomb it was. "The explosion seems to have been very small for it to have been an unexploded bomb," a police spokesman said.

25th October 2006

BBC NEWS

World War II bomb kills three in Germany



A special commission is investigating the cause of the explosion, while prosecutors are considering whether the man could face charges of manslaughter through negligence, the DDP news agency reports from Trier.

"We have happened on many bombs this year and dealt with each one in turn," Trier police chief Jurgen Weber told the agency.

Officials said the three men who died were experienced explosives experts in charge of clearing unexploded bombs from the area. Around 2,000 people were evacuated ahead of the blast.

More than 7,000 people were killed during World War II when 1,800kg bombs were dropped on Trier, a university town and local transport hub, the agency reports.

2nd June 2010



June 2006

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BBC

NEWS

Unexploded WW1 artillery shell found in Newark



Kirby residents react after grenade is detonated on housing estate



YORKSHIRE POST

Army called after unexploded WW2 shell found in village near Ilkley



Police warning after discovery of unexploded mortar shell in Glensup moorland



Express & Star

Dozens more mortar shells found during work on Burntwood housing estate



Unexploded WW2 bomb found at Kenfig Pool, Bridgend



SwindonAdvertiser

Worker on old school site in Swindon finds buried explosives



deadline.

Locals on Isle of Wight find 1ft long unexploded WW2 bomb



SuffolkNews

Icklingham mortar bomb is blown up by Army



Bomb squad descend on industrial estate with cordon in place after 'war shell' found

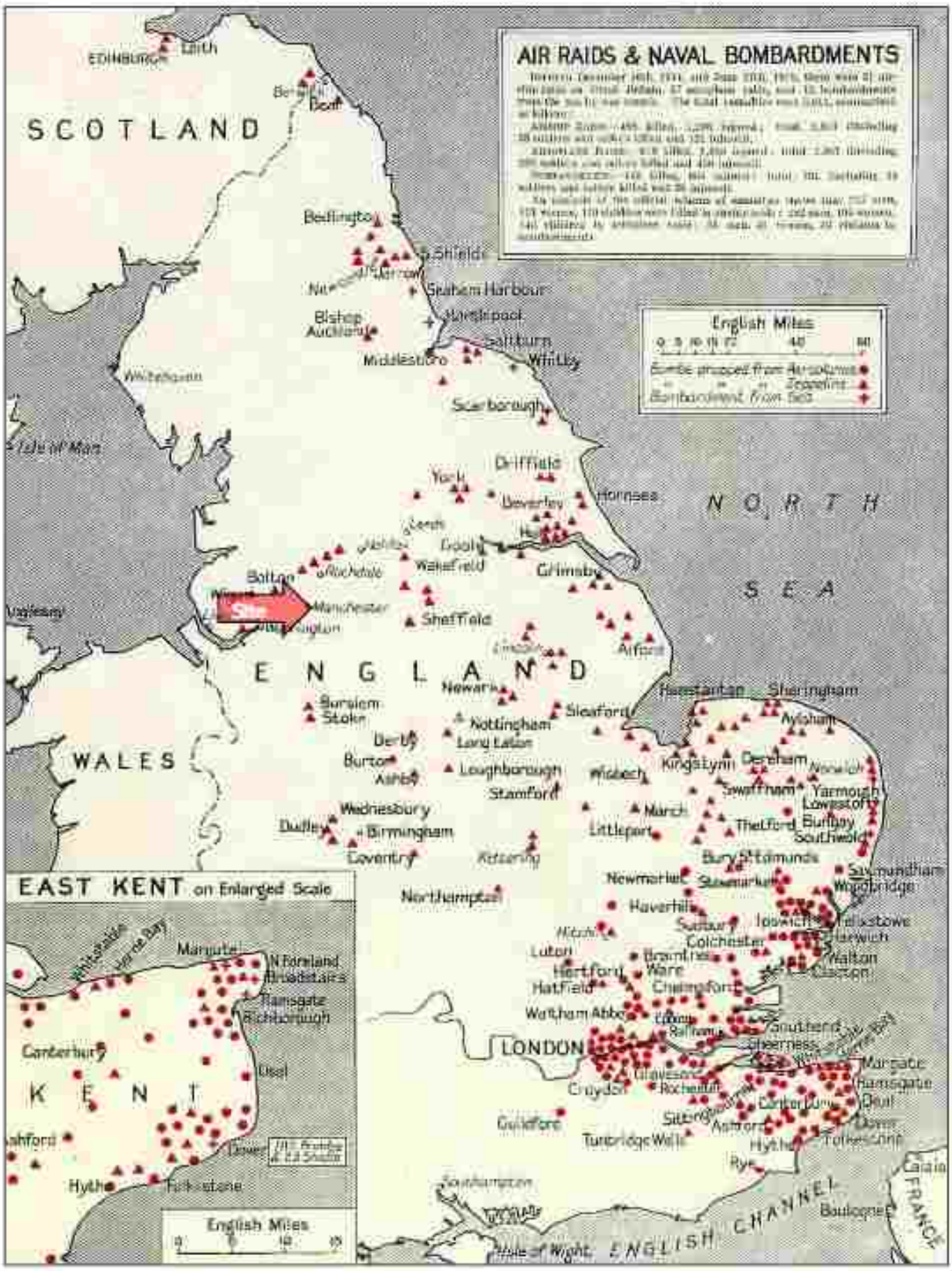
By **Ashlie Blakey** Live and breaking news reporter & **Imogen Clyde-Smith** UPDATED 13:31, 19 SEP 2023



Bomb disposal experts are on the scene of an industrial estate in Salford after a 'war shell' was discovered.

A cordon is currently in place on Lester Road in Little Hulton. Greater Manchester Police said officers were called to the scene to a report of a World War Two shell being found.

The bomb squad is currently on the scene assessing the item. Police said there is not believed to be any risk to the wider community.



ISELINE DEFENCE	Client: Murray Rix (Northern) Ltd	N
Unit 2, Maple Park, Essex Road, Huddersfield, Hertfordshire, SG13 8EX. Email: iain@iselinedefence.co.uk Tel: +44 (0)1992 245 000	Project: 14 Hyde Road, Manchester	
	Ref: DA18646-00	Source: 1 Metres, German Air Raids on Britain

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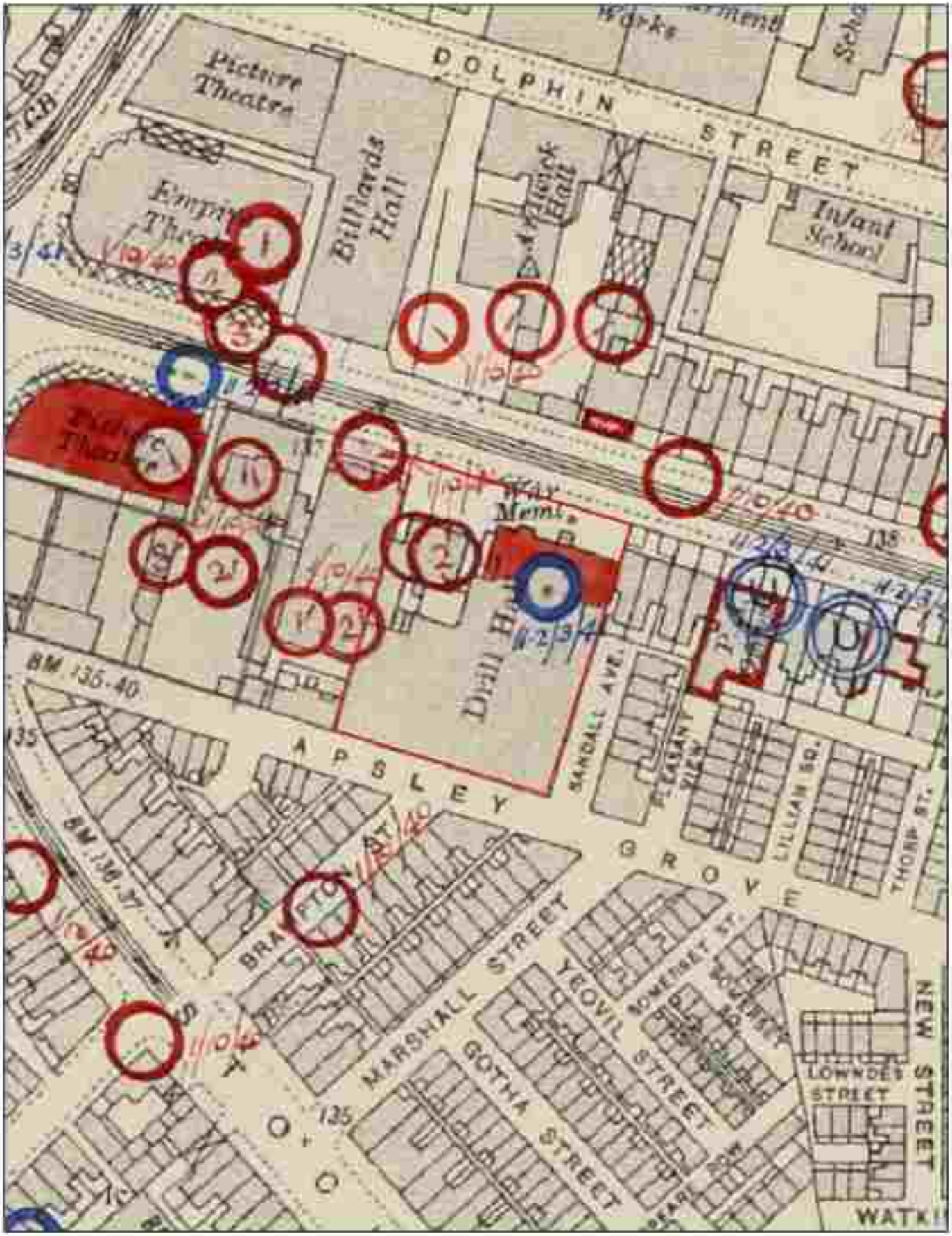


Manchester- Clayton
Bradford Road Gas works

The site was located approximately 2km south west of the Bradford Road Gas works.

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Fire Bomb | High Explosive Bomb | Demolished Building | Partially Damaged Structure

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Project: 14 Hyde Road, Manchester

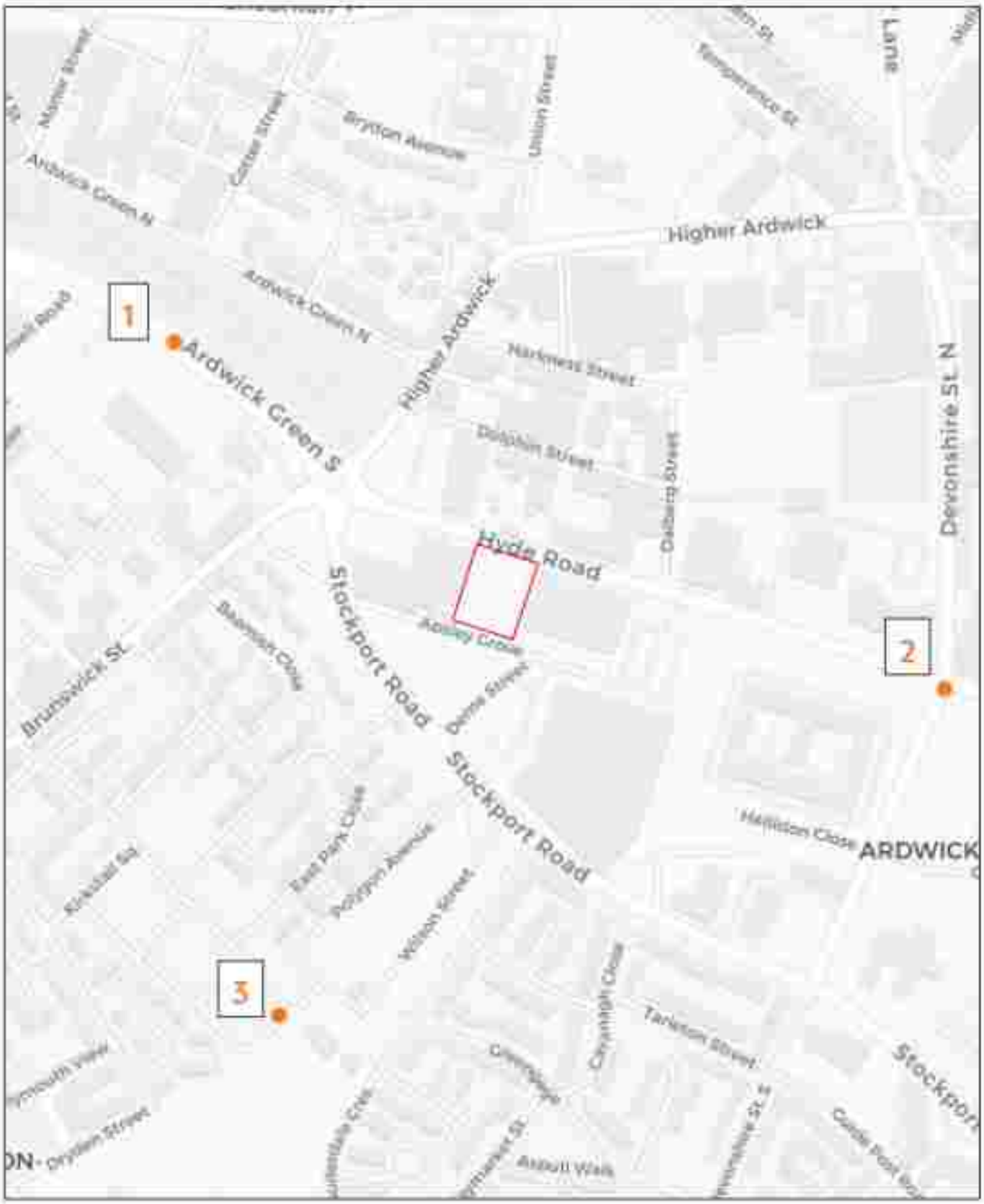
Ref: DA18646-00

Source: The National Archives, Kew

Approximate site boundary

N

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1 23 Carver Street, Chorlton-Upon-Medlock, Manchester
Fatalities: 1

2 Devonshire Street, Manchester
Fatalities: 1

3 4 Livingstone Street, Manchester
Fatalities: 3

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Ref: DA18646-00

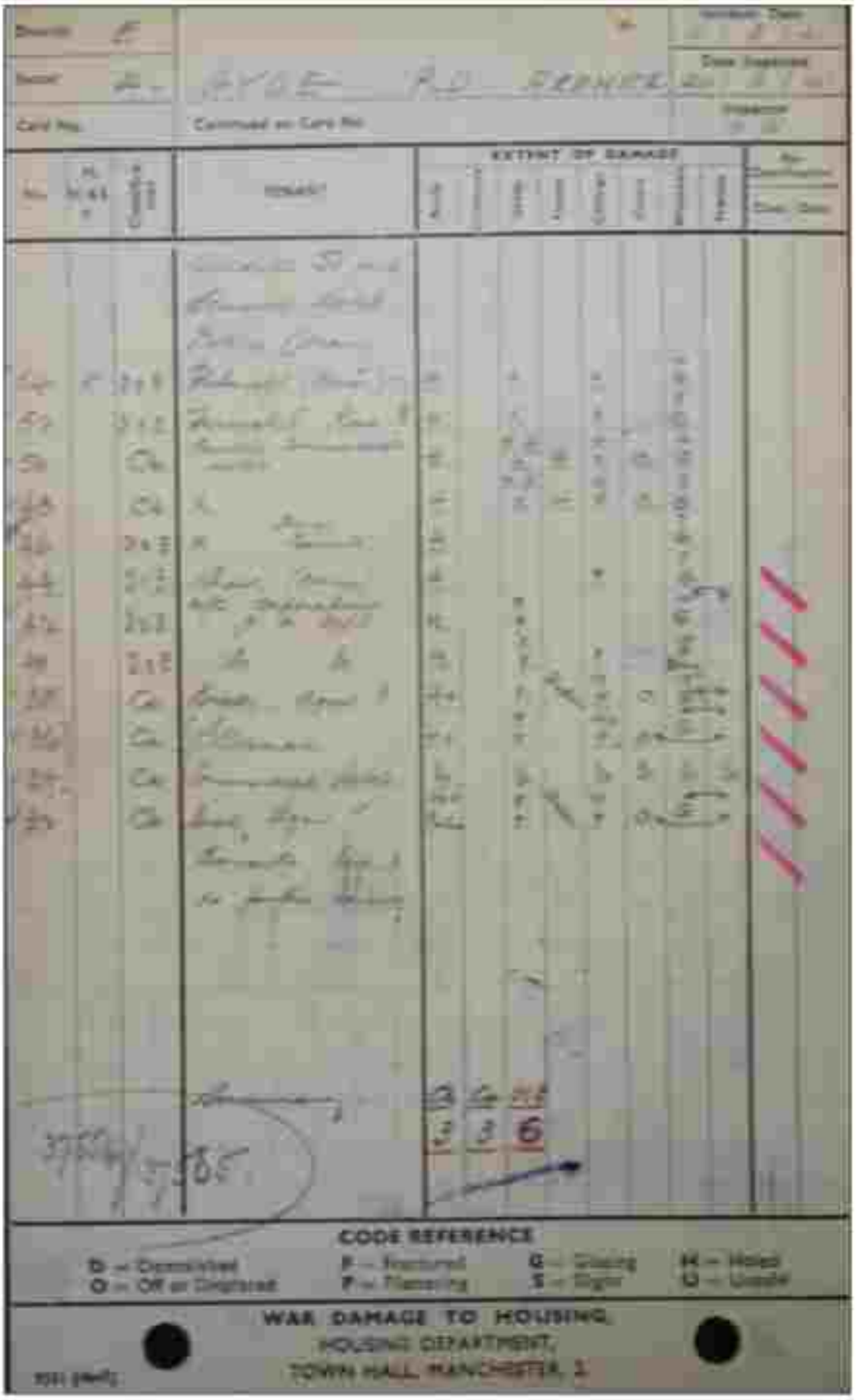
Source: The National Archives, Kew

Approximate site boundary

N

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In MANCHESTER itself H.E. fell mainly in the ARDWICK district. H.E. also hit BRIDGEWATER House, Whitworth Street. About 15 casualties so far reported. Probably more to come.

MANCHESTER.

Was raided at 8200 hours 11/12/40.
Most of the bombs fell in the South Central part of the City which is largely residential. 28 H.E., 67 I.B. and 2 oil I.B. caused wide spread damage to dwelling houses. At least 9 houses have been demolished. A considerable number of fires were caused, all of which have been dealt with. There was much damage to gas mains. Casualties so far reported: 3 Dead, 9 seriously injured, 17 slightly injured.
The more serious ones are:-

3rd December, 1940. H.E.I.S. 24.

MANCHESTER AREA.

MANCHESTER. H.E. or I.B. Rushton Street, Ashton Ave nood, High Street (CHORLTON ON MEDLOCK) (many trapped).

Major damage Woolley's Chemical Works and Rochdale Road Gas Works.

DEANSGATE blocked by debris and crater between South Mill and Chester Road.

ARDWICK. Major damage Wilson Street, Stockport Road el.and.

SECRET 11 MAR 44 156

MANCHESTER.

1.B. IN CHORLTON C FIRES EXTINGUISHED OR UNDER CONTROL.
H.E. IN WHALLEY RANGE AND ARDWICK DISTRICTS. CASUALTIES 7 SERIOUSLY SLIGHTLY INJURED.

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Project: 14 Hyde Road, Manchester
Ref: DA18646-00
Source: Manchester Central Library

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www.lidefence.co.uk



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Northumberland, HX1 1XA
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Client: Murray Rix (Northern) Ltd

Approximate site boundary

Project: 14 Hyde Road, Manchester

N

Ref: DA18646-00

Source: National Monuments Record Office (Historic England)

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Project: 14 Hyde Road, Manchester

Ref: DA18646-00

Source: National Monuments Record Office (Historic England)

— Approximate site boundary

N

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Client: Murray Rix (Northern) Ltd

Project: 14 Hyde Road, Manchester

Ref: DA18646-00

Source: National Monuments Record Office (Historic England)

— Approximate site boundary

N

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Risk Zone	Activity	Recommended Risk Mitigation Measures
Low	All Works	• UXO Risk Management Plan • Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.
Medium	Open Excavations. (trial pits, service pits, bulk excavations, strip foundations etc.)	• UXO Specialist On-site Support
	Borehole and Piled Foundations	• Intrusive Magnetometer Survey of all borehole and pile locations/clusters down to maximum bomb penetration depth.

1st LINE DEFENCE

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— Approximate site boundary

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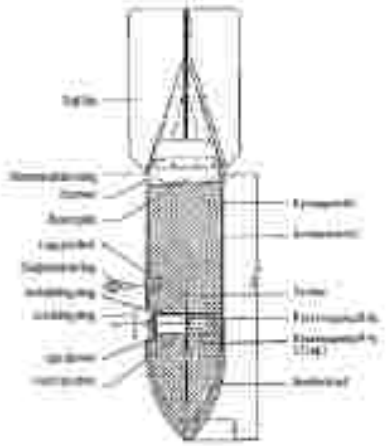


Risk Zone	Activity	Recommended Risk Mitigation Measures
Low	All Works	• UXO Risk Management Plan • Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.
Medium	Open Excavations. (trial pits, service pits, bulk excavations, strip foundations etc.)	• UXO Specialist On-site Support
	Borehole and Piled Foundations	• Intrusive Magnetometer Survey of all borehole and pile locations/clusters down to maximum bomb penetration depth.

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SC 50kg High Explosive Bomb

Bomb Weight	49.5kg (108.9lb)
Explosive Weight	25kg (55lb)
Fuze Type	Impact Rheinmetall mechanical time delay fuze
Bomb Dimensions	1,000 x 240mm (39.4 x 9.5in)
Body Diameter	240mm (9.5in)
Use	Against lightly constructed industrial, transport, railway rolling stock, ammunition depot, light bridges and buildings up to three storeys.
Remarks	The smallest and most common conventional German bomb. Nearly 70% of bombs dropped on the UK were 50kg.

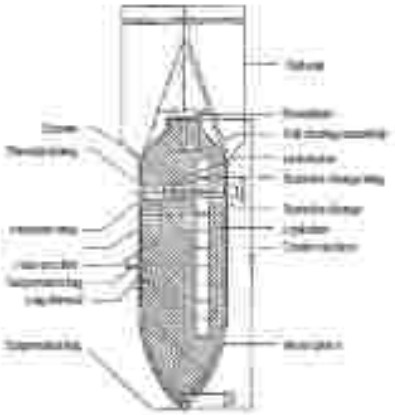






SC 250kg High Explosive Bomb

Bomb Weight	245-251kg (540-554lb)
Explosive Weight	125-131kg (276-287lb)
Fuze Type	Electrical impact/mechanical time delay fuze
Bomb Dimensions	1,640 x 510mm (64.57 x 20.08in)
Body Diameter	510mm (20.1in)
Use	Against railway installations, warehouses, flyovers, underpasses, large buildings and below-ground installations.
Remarks	It could be carried by almost all German bomber aircraft and was used to considerable effect by the Allies in All Wars. (Thunderstruck/Fighting at 30th Edition)

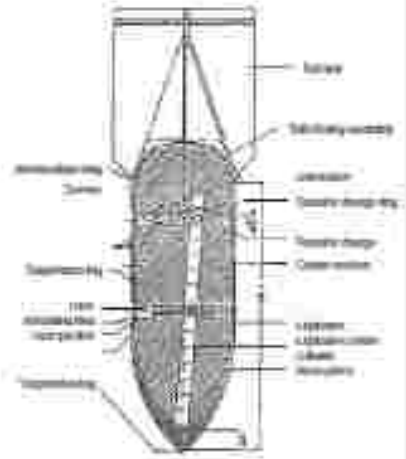






SC 500kg High Explosive Bomb

Bomb Weight	480-510kg (1,058-1,124lb)
Explosive Weight	250-260kg (551-573lb)
Fuze Type	Electrical impact/mechanical or time delay fuze
Bomb Dimensions	1,970 x 640mm (77.6 x 25.2in)
Body Diameter	470mm (18.5in)
Use	Against fixed airfield installations, hangars, assembly halls, flyovers, underpasses, high-rise buildings and below-ground installations.
Remarks	40,000 of 54,000 Aircraft Bombs, Training, Bombs were fitted with Trotter fillers, have cylindrical paper wrapped plates, 1,970mm in length and diameter.

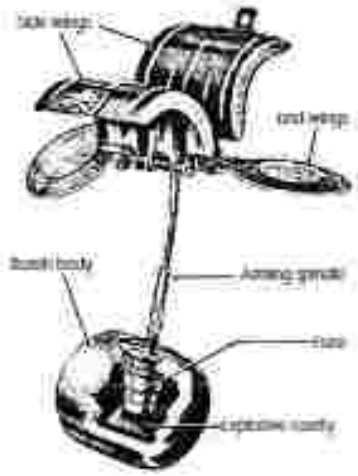






SD2 Anti-Personnel 'Butterfly Bomb'

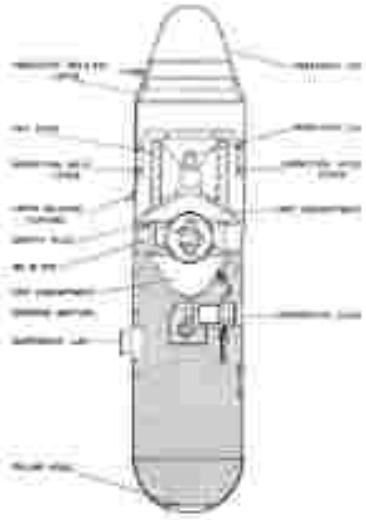
Bomb Weight	Approx 2kg (4.4lb)
Explosive Weight	Approx 75oz (235 grams) of Amatol surrounded by sleeve of fabricated composition
Fuze Type	4 fuze clamps, 4/7 fuze (clockwork time delay) or 70 fuze (anti-handling device)
Body Diameter	9in (7.47 cm) diameter, 13in (33.74) long
Use	Designed as an anti-personnel/psychological weapon. They were delivered by air, being dropped in containers of 33 SD2 sub-munitions that opened at a predetermined height, thus scattering the bombs
Remarks	Quite rare. First used against Ipswich in 1940, but were also dropped on Kingston upon Hull, Grimsby and Cleethorpes in late 1941, amongst various other targets in UK. As the bombs fell the outer case flicked open via springs which caused five light metal drogues with a protruding 3 inch lead cable to deploy in the form of a parachute & wind vane, which caused the device to spin.





Parachute Mine (Luftmine B / LMB)

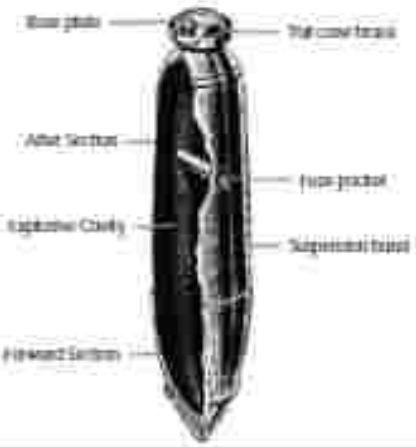
Bomb Weight	Approx 1000kg (2200lb)
Explosive Weight	Approx 500kg (1100lb)
Fuze Type	Impact/Mine delay/hydrostatic pressure fuze
Dimensions	2.45m x 0.45m (8'0in with parachute housing)
Use	Against civilian, military and industrial targets. Used as blast bombs and designed to detonate above ground level to maximise damage to a wider area.
Remarks	Deployed by parachute when dropped in order to control its descent. Had the potential to cause extensive damage within a 700m radius.





SC 1000kg High Explosive Bomb

Bomb Weight	Approx 999.5kg (2,203.2 lb)
Explosive Weight	Approx 500-630kg (1102-1389lb)
Fuze Type	Electrical impact time/hydrostatic time delay fuze
Filling	Mixture of 40% amatol and 60% TNT, but when used as an anti-shipping bomb it was filled with Trialen 105, a mixture of 55% RDX, 20% TNT and 25% aluminium powder
Bomb dimensions	3600 x 1.14mm (10' x 3'-6in)
Body Diameter	454mm (18 1/2in)
Use	SC-type bombs were General Purpose Bombs used primarily for general demolition work. Constructed of parallel walls with comparatively heavy noses, they are usually of three piece welded construction.



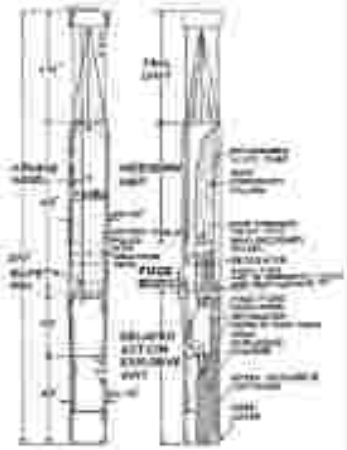


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1kg Incendiary Bomb

Bomb Weight	Approx 1kg (2.2 lbs)
Explosive Weight	Approx. 440g (15lb) Thermite & Flight Explosive Pellargonite
Fuze Type	Impact fuze
Bomb Dimensions	150 x 50mm (5.9 x 2.0"in)
Body Diameter	50mm (2.0"in)
Use	Air Incendiary - dropped in clusters on towns and industrial complexes.
Remarks	Magnesium alloy case, tubular fitted with high explosive charge. The body is a cylindrical alloy casting threaded internally at the nose to receive the fuze holder and fuze.

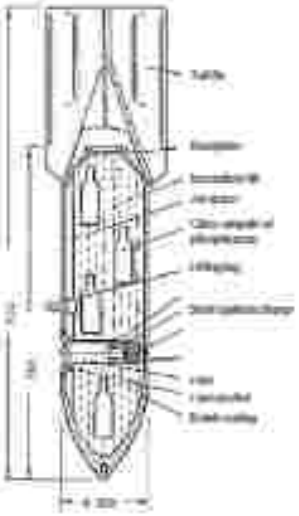


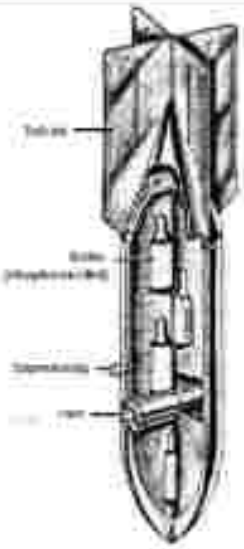




C50 A Incendiary Bomb

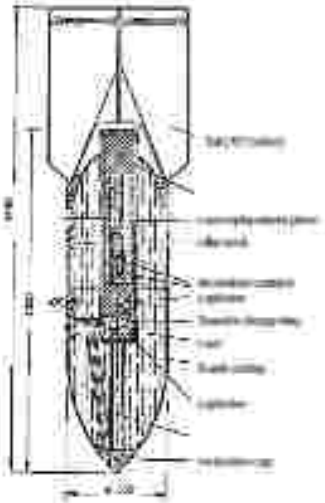
Bomb Weight	Approx. 4lbs (90-4lb)
Explosive Weight	Approx. 0.03kg (0.06lb)
Incendiary Filling	1.5kg (3.3lb) liquid filling with phosphor igniters in glass phials. Benzine 81%, Phosphorus 4%, Rape Rubber 15%
Fuze Type	Electrical impact fuze.
Bomb Dimensions	1300 x .76cm/ins (45.7 x 3in)
Use	Against any targets where an incendiary effect is required.
Remarks	Early fill was a phosphorus and carbon disulphide incendiary mixture.





Flam C-250 Oil Bomb

Bomb Weight	450-520kg (1,058-1,146lb)
Explosive Weight	250-260kg (551-573lb)
Fuze Type	Electrical impact/time fuze in tail. Delay fuze
Bomb Dimensions	1902 x 640mm (77 x 21.0in)
Body Diameter	420mm (16.5in)
Use	Against fixed utilised installations, hangars, assembly halls, flyovers, underpasses, high rise buildings and below ground installations.
Remarks	400mm or 500Kg Amatol TNT, Trialene. Bombs encased with Trialen filling have cylindrical paper wrapped pellets, 115Mm in length and diameter.





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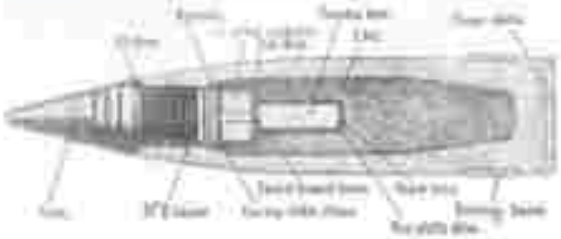
www.firstlinedefence.co.uk

3.7 Inch QF Anti-Aircraft Projectile

Projectile Weight	28lb (12.6kg)
Explosive weight	2.5lbs
Fuze Type	Mechanical Time Fuze
Dimensions	3.7in x 14.3in (94mm x 364mm)
Rate of fire	10 to 20 rounds per minute
Use	The 3.7in AA Mk I-3 were the standard Heavy Anti-Aircraft guns of the British Army and were commonly used on the Home front.
Ceiling	30,000ft to 31,000ft







40mm Bofors Projectile

Projectile Weight	1.9lb (0.9kg)
Explosive Weight	100g (3.4lb)
Fuze Type	Impact Fuze
Rate of fire	120 rounds per minute
Projectile Dimensions	40 x 160mm
Ceiling	23,000ft (7000m)
Remarks	Light quick fire high explosive anti aircraft projectile. Each projectile filled with small tracer element. If no target hit, shell would explode when tracer burnt out. Designed to engage aircraft flying below 2,000ft



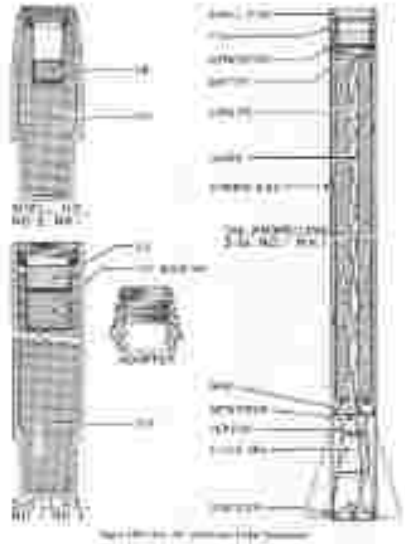




3in Unrotated Projectile (UP) Anti-Aircraft Rocket ("Z" Battery)

Mk Projectile Weight	3.4kg (7.5lb)
Explosive weight	0.54kg (1.2lb)
Filling	High Explosive - TNT filled with aerial burst fusing
Dimensions of projectile	230 x 69mm (9.2in x 2.8in)
Remarks	As a short range rocket array anti aircraft weapon developed for the Royal Navy. It was used extensively by British ships during the early days of World War II. The UP was also used in ground based single and 10 round launchers known as "Z" Batteries. Shell consists of a steel cylinder reduced in diameter at the base and threaded externally to screw into the shell ring of the rocket motor.

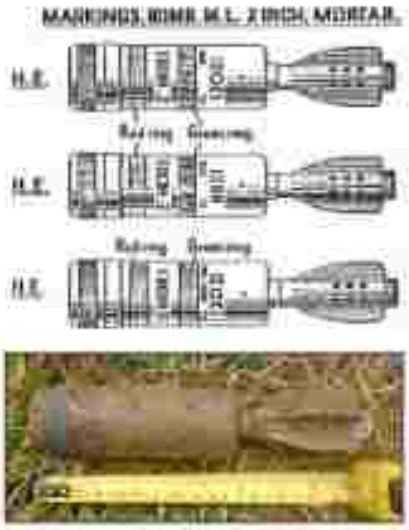




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2 inch Mortar High Explosive

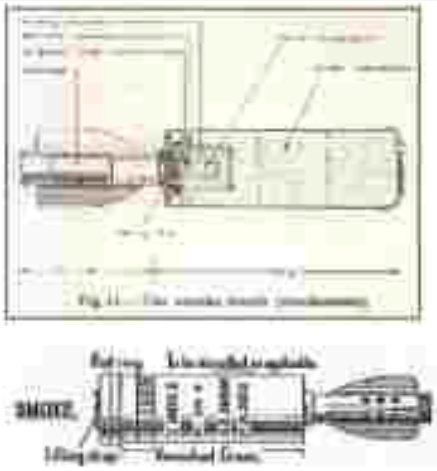
Weight	Approx 1.00kg (2.25lb)
Maximum Range	460m (500yards)
Filling	200g (0.5LYDIT
Dimensions	51 x 210mm (2in x 8.4 in.)
Fuze Type	An impact fuze which detonates the fuze booster charge and in turn the high explosive charge
Use	It had greater range and firepower over hand and rifle grenades, and was used to attack targets behind cover with high explosive effects.
Identification	Hit had a rounded edge to it But back. Can either be a black body colour with red and yellow band or dark green with yellow band. Brass cap on top. Practice will have hole all the way through the top.





2 inch Mortar Smoke

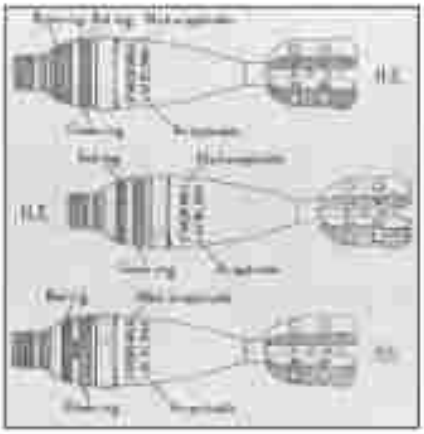
Weight	Approx. 910g (2lb)
Maximum Range	460m (500yards)
Filling	White phosphorus and smoke 88
Dimensions	51 x 210mm (2in x 8.4 in.)
Fuze Type	An impact fuze which initiates a bursting charge. This ruptures the mortar bomb's body and disperses the phosphorus filler.
Identification	Smoke mortars have a cross and chequer bands. May still be light green body paint. Look for stained ground around warhead.
Use	As a screening device for unit movement or to impair enemy field of vision.





3 inch Mortar High Explosive

Weight	Approx. 4.5kg (10lb)
Maximum Range	1,600 (1mile) – 2,560m (1mile) (1,600 – 2,800yds)
Dimensions	76mm (3in)
Filling	Amatol
Firing Mechanism	Drop, Recoil striker
Remarks	Hit stabilised bomb fired by means of a charge consisting of a primary cartridge in the tail and four secondary cartridges.
Identification	An old style mortar. Often no way of telling if hit or practice, so treat as hit.



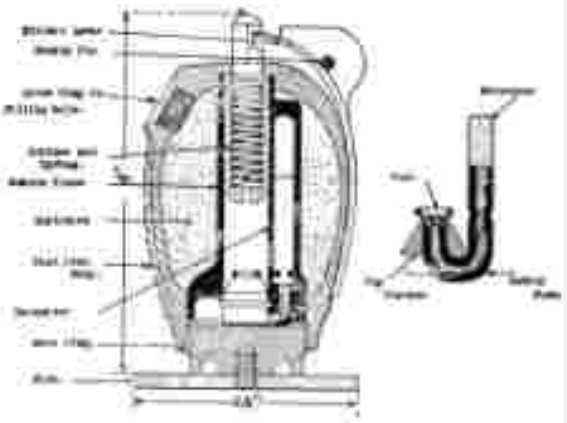




No. 36 'Mills' Grenade

Weight	Approx. ½kg filled (lb ½oz)
Explosive weight	76g (2oz) filling
Fuze Type	4.7 second delay-burn throwing fuze no.4 (obsolete)
Dimensions	95 x 58mm (3.8 x 2.4in)
Use	Fragmentation explosive at approx. 30m range. 90m range of damage
Remarks	First introduced in 1915, its classic grooved, cast iron 'pineapple' design was designed to provide uniform fragmentation. The obturator is inserted behind the striker before the fuse plug

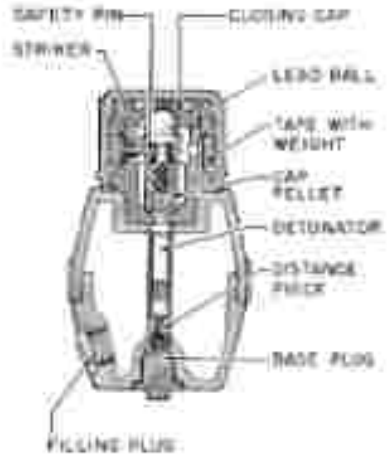




No. 69 Grenade

Weight	Approx. 567g (1.1/4oz)
Fill Weight	113g (3.75 oz) of either Amatol, Baratol or Cyclotol
Fuze Type	"All-ways" fuze. Comprised of a safety cap, a weighted detonator attached to a steel ball bearing and a safety bolt designed to detonate from any point of impact
Dimensions	111 x 53mm (4.5 x 2.4 in)
Use	A blast grenade for use as an offensive weapon. Detonator was inserted before use
Remarks	Introduced December 1940 and made from the plastic Bakelite as opposed to conventional metal, detection is difficult due to the low metal content

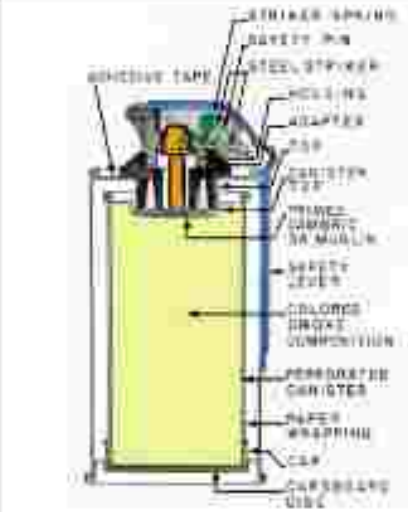




No. 83 Smoke Grenade

Weight	Approx. 640g (1.5lb)
Explosive Weight	Approx. 510-300g (18.7 oz)
Fuze Type	Originally used a friction system using a match head composition, later developed to a chemical time ignition system
Dimensions	Approx. 82 x 54mm (3.44 x 5.5 in)
Use	Use as a target or landing zone marking device and as a concealing method for troop / unit movement
Remarks	The basic design stayed relatively unchanged up to the 1980's. The letters CCC were often etched into the body of the grenade in the colour of the smoke



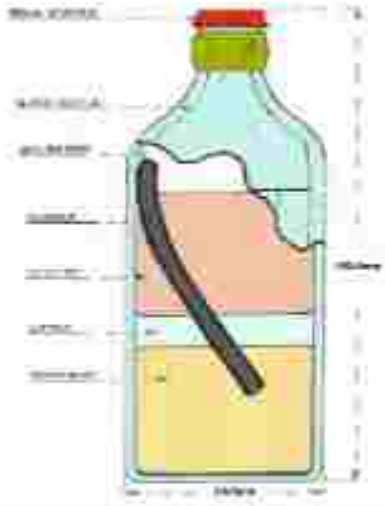


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No. 76 Self Igniting Phosphorous (SIP) Grenade

Weight	Approx 1lb 4oz
Filling	White phosphorous and thickener
Design	The filling was contained in a ½ pint sized glass bottle with water and a strip of rubber. Over time the rubber dissolved to create a sticky which would self ignite when the bottle broke.
Use	Originally intended as an anti tank incendiary weapon deployed by hand. Designed to be produced cheaply without consuming materials needed to produce armaments on the front line.
Remarks	The Home Guard had caches of these grenades during the war, not all locations were officially recorded and some caches were lost and contaminated post war. In all cases, the grenades are still found to be dangerous.



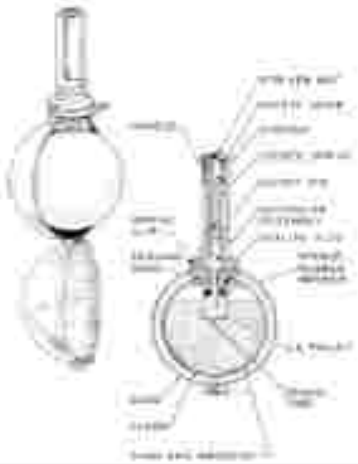


No. 74 Grenade ("Sticky Bomb") Mk1

Weight	Approx 1lbs (0.45kg)
Filling	Approx 4oz(0.1kg) nobel's no.808 (nitro glycerine) (0.2kg)
Design	A glass ball on the end of a Bakelite (plastic) handle. The inside of the ball would contain the explosive filling and the outside is very sticky adhesive coating.
Use	An anti tank grenade, primarily issued to the home guard. It required the user to come in very close proximity of the target and smash the glass explosive container against it.
Remarks	Three fuze were located in the handle. The would explode after 3-5 secs.





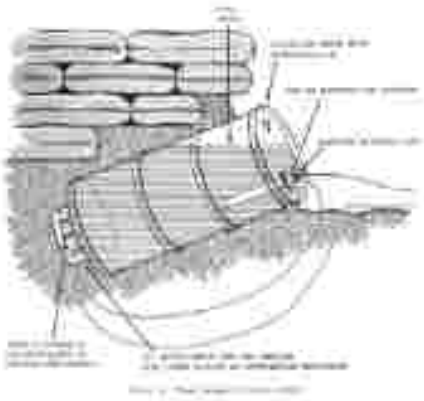


Flame Fougasse Bomb

Weight	Various
Filling	Initially a mixture of 40% petrol and 60% gas oil/diesel provided the propellant charge.
Design	Usually constructed from a 40 gallon drum, dug into a roadside and camouflaged.
Use	As an improvised anti tank bomb. When triggered the container could project a sheet of burning sticky fluid in a fixed direction from up to 3m (10ft) wide and 27m (30yards) long.
Remarks	A highly unorthodox weapon designed by the Petroleum Warfare Department to address a critical lack of weapons in 1940. 50,000 are estimated to have been distributed around the UK.



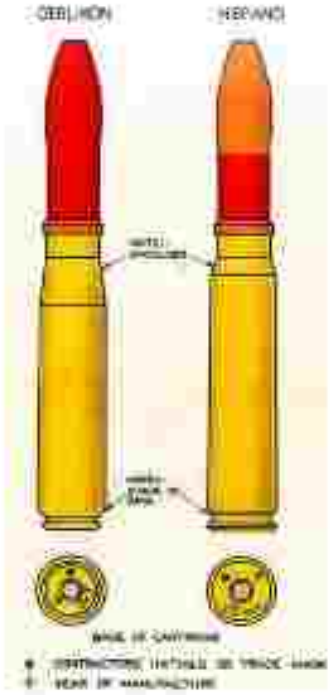




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Common WWII-era Aircraft Mounted Gun Ammunition





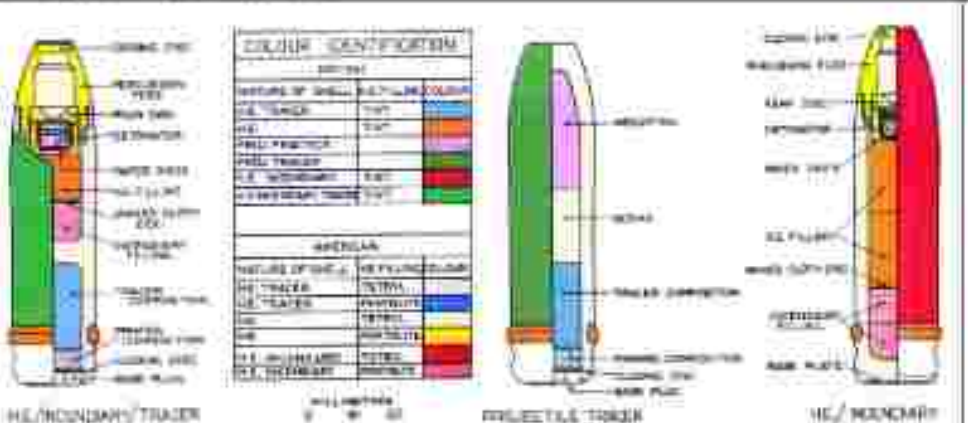
.303 British Rifle Ammunition

Bullet diameter	7.7mm
Case length	54.48mm
Overall length	78.59mm
Type	Rifle Ammunition
Propellant	Originally black powder. Later Cordite followed by Nitrocellulose.
Remarks	First produced in 1889 and still in use today, the .303inch cartridge has progressed through two 'marks' which eventually extended to a total of seventeen (+ variations





20mm Oerlikon Cannon Rounds





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1ST LINE DEFENCE

Front cover image credit: London Bomb Census Mapping, The National Archives (HO 193)

Groundsure
LOCATION INTELLIGENCE

Radon Check

APSLEY GROVE, MANCHESTER, M12 6AW

Professional opinion

PASS

Site plan



Search results

Not in a radon affected area

Local levels of radon are considered normal.

However, if an underground room makes up part of the accommodation, the property should be tested regardless of radon Affected Area status.

Useful contacts

UK Health Security Agency (UKHSA) / UKRadon
Radon Survey
Chemical, Radiation and Environmental Hazards
Chilton, Didcot
Oxon
OX11 0RQ
https://www.ukradon.org/

UK Radon Association
http://www.radonassociation.co.uk/

Overview of findings and recommendations

Radon

No further action is recommended based on the identified local levels of radon.

However, all basement and cellar areas are considered at additional risk from high radon levels. If an underground room such as a cellar or basement makes up part of the living or working accommodation, the property should be tested regardless of radon Affected Area status.

It should be noted that although this report uses the best available data this assessment is an estimation and is not based upon measurements. It is possible to find high radon levels in properties anywhere in the country, even in lower risk areas, as radon is everywhere in varying concentrations.

Conveyancing Information Executive and our terms & conditions

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- acknowledge it within 5 working days of receipt
- normally deal with it fully and provide a final response, in writing, within 20 working days of receipt
- liaise, at your request, with anyone acting formally on your behalf

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APPENDIX D
DRAWINGS

HYDE ROAD

Vehicle access
IN / OUT

CAR PARK
4No. Spaces
including
2No. DDA
2No. Staff Car Park

6875

STORAGE UNIT

PV Panels No.20

10No. Bike Spaces

bin store

TOTAL CAR PARK
20No. Spaces
including
2No. DDA
2No. Staff Car Park

APSLEY GROVE

0 2 4 6 8m
1:200

RIBA
Chartered Practice

General notes
The Architect does have no responsibility for any use made of this document other than for the which it was prepared and issued.
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LEGEND

Site Boundary

Rv	Initials	Ch	Dt	Description
P1	HAMAN	CM	24	Amended Issue Revision
P2	HAMAN	CM	24	Amended Drawing on Client Comments
P3	HAMAN	MB	24	Amended Drawing & TCM Issue
P4	HAMAN	CM	24	Amended Car Park Layout & Red Height
P5	HAMAN	CM	24	Amended Site Layout
P6	HAMAN	CM	24	Amended Drawings
P7	HAMAN	CM	24	Initial Issue
No.	Date	Drn	Ch'd	Revision or Issued To/Date

Client
Crown Advisory

createit studios
Architecture & Development

Project Title
16-18, Hyde Road, Manchester M12 6AW

Scale Paper Size
1 : 200

Drawing Title
Proposed Site Plan

Drawing Number
A-0414-02-001

Revision
P7

Drawing Status
Preliminary

HYDE ROAD

Vehicle access
IN / OUT

CAR PARK
4No. Spaces
including
2No. DDA
2No. Staff Car Park

6875

X BH 1

X BH 2

X BH 3

X BH 9

STORAGE UNIT

X BH 10

X BH 5

X BH 4

PV Panels No.20

10No. Bike Spaces

bin store

X BH 8

TOTAL CAR PARK
20No. Spaces
including
2No. DDA
2No. Staff Car Park

X BH 6

X BH 7

APSLEY GROVE

0 2 4 6 8m
1:200

RIBA
Chartered Practice

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LEGEND

Site Boundary

Rv	Initials	Ch	Dt	Amendment Issued for
P6	mmartin	DB	22.11.21	Amended Drawing per Client Comments
P5	mmartin	MB	15.11.21	Amended Drawing to TEN Design
P4	mmartin	DB	08.11.21	Amended Car Park Layout & Red Height
P3	mmartin	DB	04.11.21	Amended Site Levels
P2	mmartin	DB	01.11.21	Reissued Drawings
P1	mmartin	DB	25.10.21	Initial Issue

Client
Crouch Advisory

createit studios
Architecture & Development

Project Title
161-163, Hyde Road, Manchester M12 6AW

Scale Paper Size
1 : 200

Drawing Title
Proposed Site Plan

Drawing Number
A1214102.001

Revision
P7

Drawing Status
Preliminary

APPENDIX E
EXPLORATORY HOLE LOGS

APPENDIX F
CHEMICAL TEST RESULTS

envirolab
Hattersley Science & Technology Park
Stockport Road, Hattersley, SK14 3QU

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 24/02650
Issue Number: 1 **Date:** 25 March, 2024

Client:
Murray Rix (Northern) Ltd
Andrew House
Hadfield Street
Dukinfield
Dukinfield
SK16 4QX

Project Manager: Enquires/Matt/Owain Davies
Project Name: 16-18 Hyde Road, Manchester M12 6BW
Project Ref: No
Order No: 24/110
Date Samples Received: 14/03/24
Date Instructions Received: 14/03/24
Date Analysis Completed: 23/03/24

Approved by:



Richard Wong
Client Manager

Envirolab Job Number: 24/02690

Client Project Name: 16-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID										
Client Sample No	425401	425402	425403	425407	425410	425411	425412			
Client Sample ID	BH1	BH1	BH2	BH2	BH3	BH3	BH4			
Depth to Top	0.20	0.40	0.15	0.50	0.15	1.20	0.10			
Depth To Bottom	0.50	0.50	0.50	0.80	0.50	1.70	0.60			
Date Sampled	08-Mar-24	08-Mar-24	08-Mar-24	08-Mar-24	08-Mar-24	08-Mar-24	08-Mar-24			
Sample Type	SOIL - 2	SOIL - 2	SOIL - 2	SOIL - 2	SOIL - 2	SOIL - 2	SOIL - 2			
Sample Matrix Code	446	84	846	846	84	84	84			
% Stones >10mm	<0.1	7.1	8.2	<0.1	7.1	<0.1	2.8	% w/w	0.1	
pH[M]	8.48	8.02	8.16	7.99	8.05	8.47	7.93	pH	0.01	
Organic Matter[M]	5.6	7.6	5.9	1.1	5.4	4.2	4.7	% w/w	0.1	
Arsenic[M]	9	10	9	4	11	8	8	mg/kg	1	
Barium	402	127	194	55	82	97	78	mg/kg	1	
Beryllium	0.9	<0.5	1.0	0.6	1.0	1.2	0.9	mg/kg	0.5	
Boron (Water soluble)[M]	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	1	
Cadmium[M]	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	mg/kg	0.5	
Copper[M]	95	79	120	33	44	82	45	mg/kg	1	
Chromium[M]	24	13	21	22	19	18	19	mg/kg	1	
Chromium (hexavalent)	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	
Chromium (trivalent)	24	13	21	22	19	18	19	mg/kg	1	
Lead[M]	333	133	134	33	221	99	222	mg/kg	1	
Mercury	<0.17	<0.17	0.21	<0.17	0.72	<0.17	<0.17	mg/kg	0.17	
Nickel[M]	18	13	22	17	19	19	18	mg/kg	1	
Selenium[M]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	
Vanadium[M]	34	23	27	21	33	31	34	mg/kg	1	
Zinc[M]	113	68	103	42	58	68	42	mg/kg	5	

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID								Units	Limit of Detection	Method ref
Client Sample No	435401	435405	435406	435407	435410	435411	435412			
Client Sample ID	BH1	BH1	BH2	BH2	BH3	BH3	BH4			
Depth to Top	0.20	0.40	0.15	0.50	0.15	1.20	0.10			
Depth To Bottom	0.30	0.50	0.30	0.60	0.50	1.70	0.60			
Date Sampled	05-Mar-24	05-Mar-24	05-Mar-24	05-Mar-24	05-Mar-24	05-Mar-24	05-Mar-24			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code	ARS	SA	SAS	SAS	SA	SA	SA			
Asbestos in Soil (Inc. matrix)										
Asbestos in soil*	Chrysotile	NAD	NAD	Chrysotile	NAD	NAD	NAD			In house method
Asbestos Matrix (Visual)*	-	-	-	-	-	-	-			In house method
Asbestos Matrix (Microscopic)*	Loose Fibres	-	-	Loose Fibres	-	-	-			In house method
Asbestos ACM / Suitable for Water Absorption Test*	N/A	N/A	N/A	N/A	N/A	N/A	N/A			In house method
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (Hand picking and weighing)*	0.003	-	-	<0.001	-	-	-	% w/w	0.001	In house method

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID								Units	Limit of Detection	Method ref
Client Sample No	435401	435405	435406	435407	435410	435411	435412			
Client Sample ID	BH1	BH1	BH2	BH2	BH3	BH3	BH4			
Depth to Top	0.20	0.40	0.15	0.50	0.15	1.20	0.10			
Depth To Bottom	0.50	0.50	0.30	0.80	0.50	1.70	0.50			
Date Sampled	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code	ES	SA	SAS	SAS	SA	SA	SA			
PAH-16MS										
Acenaphthene,[M]	0.18	0.27	0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM5
Acenaphthylene,[M]	0.08	0.07	0.02	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM5
Anthracene,[M]	0.39	0.33	0.05	<0.02	<0.02	<0.02	<0.02	mg/kg	0.02	TM5
Benzo(a)anthracene,[M]	2.73	1.19	0.21	0.09	<0.04	<0.04	<0.04	mg/kg	0.04	TM5
Benzo(a)pyrene,[M]	2.93	1.07	0.25	0.09	<0.04	<0.04	<0.04	mg/kg	0.04	TM5
Benzo(b)fluoranthene,[M]	3.69	1.66	0.27	0.09	<0.05	<0.05	<0.05	mg/kg	0.05	TM5
Benzo(ghi)perylene,[M]	1.81	0.73	0.13	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	TM5
Benzo(k)fluoranthene,[M]	1.33	0.48	0.13	<0.07	<0.07	<0.07	<0.07	mg/kg	0.07	TM5
Chrysene,[M]	2.83	1.46	0.23	0.08	<0.06	<0.06	<0.06	mg/kg	0.06	TM5
Dibenz(a,h)anthracene	0.53	0.20	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	0.04	TM5
Fluoranthene,[M]	5.69	2.62	0.50	0.14	<0.05	<0.05	<0.05	mg/kg	0.05	TM5
Fluorene,[M]	0.11	0.19	0.02	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM5
Indeno(123-cd)pyrene,[M]	1.24	0.68	0.13	0.05	<0.03	<0.03	<0.03	mg/kg	0.03	TM5
Naphthalene,[M]	<0.03	0.09	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	0.03	TM5
Phenanthrene,[M]	0.89	0.10	0.27	0.07	0.03	<0.02	0.02	mg/kg	0.02	TM5
Pyrene,[M]	5.71	2.73	0.47	0.14	<0.07	<0.07	<0.07	mg/kg	0.07	TM5
Total PAH-16MS	32.3	15.1	2.94	0.73	<0.05	<0.05	<0.05	mg/kg	0.01	TM5

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID								Units	Limit of Detection	Method ref
Client Sample No	415401	415405	415406	415407	415410	415411	415412			
Client Sample ID	BH1	BH1	BH2	BH2	BH3	BH3	BH4			
Depth to Top	0.20	0.40	0.15	0.50	0.15	1.20	0.10			
Depth To Bottom	0.50	0.50	0.30	0.80	0.50	1.70	0.60			
Date Sampled	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24	26-Mar-24			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code	ARS	SA	SAS	SAS	SA	SA	SA			
TPH CWG with Clean Up										
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Ali >C8-C10	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	TM36
Ali >C10-C12 [N]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	TM36
Ali >C12-C16 [N]	2	1	<1	<1	<1	<1	<1	mg/kg	1	TM36
Ali >C16-C21 [N]	5	3	<1	<1	<1	<1	<1	mg/kg	1	TM36
Ali >C21-C35 [N]	11	141	6	2	2	<1	3	mg/kg	1	TM36
Total Aliphatics	18	151	6	2	2	<1	3	mg/kg	1	Calculation
Aro >C5-C7 [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Aro >C7-C8 [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Aro >C8-C10	2	2	<1	<1	<1	<1	<1	mg/kg	1	TM36
Aro >C10-C12	1	1	<1	<1	<1	<1	<1	mg/kg	1	TM36
Aro >C12-C16	11	7	2	<1	1	<1	1	mg/kg	1	TM36
Aro >C16-C21 [N]	42	22	8	<1	2	<1	2	mg/kg	1	TM36
Aro >C21-C35 [N]	199	88	15	5	4	<1	5	mg/kg	1	TM36
Total Aromatics	327	130	23	5	5	<1	9	mg/kg	1	Calculation
(TPH (Ali & Aro >5-C35))	344	281	29	7	10	<1	12	mg/kg	1	Calculation
Ali/Aro - Benzene [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Ali/Aro - Toluene [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Ali/Aro - Ethyl Benzene [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Ali/Aro - m & p Xylene [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
Ali/Aro - o Xylene [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36
MTBE [N]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM36

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID								Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID										
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type										
Sample Matrix Code										
% Stones >10mm										
pH										
Organic Matter										
Arsenic										
Barium										
Beryllium										
Boron (water soluble)										
Cadmium										
Copper										
Chromium										
Chromium (hexavalent)										
Chromium (trivalent)										
Lead										
Mercury										
Nickel										
Selenium										
Vanadium										
Zinc										

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID										
Client Sample No	435431	435432	435433	435434	435435	435436	435437			
Client Sample ID	BH4	BH5	BH6	BH8	BH8	BH7	BH7			
Depth to Top	1.00	0.10	0.80	0.10	2.50	0.80	1.10			
Depth To Bottom	1.50	0.80	1.20	0.60	2.80	0.90	1.60			
Date Sampled	26-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code	SA	SA	SAS	SA	SA	SA	SAS			
Asbestos in Soil (inc. matrix)										
Asbestos in soil*	NAD	NAD	NAD	NAD	NAD	NAD	NAD			
Asbestos Matrix (mass)	-	-	-	-	-	-	-			
Asbestos Matrix (microscope)	-	-	-	-	-	-	-			
Asbestos ACM / Suitable for Water Absorption Test**	N/A	N/A	N/A	N/A	N/A	N/A	N/A			

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID								Units	Limit of Detection	Method ref
Client Sample No	435451	435452	435453	435454	435455	435456	435457			
Client Sample ID	BH4	BH5	BH6	BH8	BH8	BH7	BH7			
Depth to Top	1.00	0.10	0.80	0.10	2.50	0.00	1.10			
Depth To Bottom	1.50	0.50	1.20	0.50	2.50	0.50	1.50			
Date Sampled	05-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code	SA	SA	SAS	SA	SA	SA	SAS			
PAH-16MS										
Acenaphthene,[M]	0.01	0.05	0.09	<0.01	<0.01	0.09	0.23	mg/kg	0.01	TM5
Acenaphthylene,[M]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	TM5
Anthracene,[M]	<0.02	0.04	0.06	<0.02	<0.02	0.07	0.15	mg/kg	0.02	TM5
Benzo[a]anthracene,[M]	0.05	0.03	0.12	<0.04	<0.04	0.22	0.29	mg/kg	0.04	TM5
Benzo[a]pyrene,[M]	0.05	0.11	0.12	<0.04	<0.04	0.19	0.32	mg/kg	0.04	TM5
Benzo[b]fluoranthene,[M]	0.07	0.11	0.15	<0.05	<0.05	0.23	0.33	mg/kg	0.05	TM5
Benzo[ghi]perylene,[M]	<0.05	<0.05	0.07	<0.05	<0.05	0.09	0.11	mg/kg	0.05	TM5
Benzo[k]fluoranthene,[M]	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.11	mg/kg	0.07	TM5
Chrysene,[M]	<0.09	0.12	0.15	<0.09	<0.09	0.22	0.30	mg/kg	0.09	TM5
Dibenz(ah)anthracene,	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	0.04	TM5
Fluoranthene,[M]	0.11	0.23	0.31	<0.09	<0.09	0.39	0.71	mg/kg	0.09	TM5
Fluorene,[M]	<0.01	0.01	0.02	<0.01	<0.01	0.03	0.13	mg/kg	0.01	TM5
Indeno(123-cd)pyrene,[M]	0.03	0.08	0.07	<0.03	<0.03	0.05	0.14	mg/kg	0.03	TM5
Naphthalene,[M]	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	mg/kg	0.03	TM5
Phenanthrene,[M]	0.09	0.13	0.25	0.03	0.04	0.44	0.84	mg/kg	0.03	TM5
Pyrene,[M]	0.11	0.28	0.31	<0.07	<0.07	0.37	0.66	mg/kg	0.07	TM5
Total PAH-16MS	0.54	1.29	1.95	<0.25	<0.25	2.25	4.23	mg/kg	0.21	TM5

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID								Units	Limit of Detection	Method ref
Client Sample No	435431	435432	435433	435434	435435	435436	435437			
Client Sample ID	BH4	BH5	BH6	BH8	BH9	BH7	BH7			
Depth to Top	1.00	0.10	0.80	0.10	0.30	0.00	1.10			
Depth To Bottom	1.50	0.50	1.20	0.50	0.50	0.50	1.50			
Date Sampled	26-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24	27-Mar-24			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code	SA	SA	SAE	SA	SA	SA	SAE			
TPH CWG with Clean Up										
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
Ali >C8-C10	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	
Ali >C10-C12	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	
Ali >C12-C16	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	
Ali >C16-C21	<1	<1	<1	<1	<1	2	1	mg/kg	1	
Ali >C21-C35	2	2	<1	1	2	8	4	mg/kg	1	
Total Aliphatics	2	2	<1	1	2	9	5	mg/kg	1	
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
Aro >C8-C10	<1	<1	<1	<1	<1	<1	1	mg/kg	1	
Aro >C10-C12	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	
Aro >C12-C16	<1	3	<1	<1	<1	3	6	mg/kg	1	
Aro >C16-C21	<1	5	<1	1	<1	8	13	mg/kg	1	
Aro >C21-C35	3	12	3	3	3	15	26	mg/kg	1	
Total Aromatics	3	20	3	3	3	34	46	mg/kg	1	
TPH (Ali & Aro >5-C35)	4	22	3	4	4	43	50	mg/kg	1	
BTEX - Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
BTEX - Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
BTEX - Ethyl Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
BTEX - m & p Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
BTEX - o Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	
MTBE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID								Units	Limit of Detection	Method ref
Client Sample No	435478	435480	435501	435502	435513	435518				
Client Sample ID	BH3	BH5	BH9	BH9	BH10	BH10				
Depth to Top	0.15	0.50	0.15	0.50	0.10	1.50				
Depth To Bottom	0.70	3.00	0.70	1.40	0.50	2.10				
Date Sampled	05-Mar-24	05-Mar-24	05-Mar-24	05-Mar-24	05-Mar-24	05-Mar-24				
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL				
Sample Matrix Code	S	S	S	S	S	S				
% Stones >10mm	1.6	2.8	<0.1	<0.1	1.5	2.5		% w/w	0.1	
pH	8.08	7.79	8.04	7.93	7.89	7.81		pH	4.01	
Organic Matter	12.2	5.5	7.9	2.8	6.8	1.7		% w/w	0.1	
Arsenic	9	11	9	5	15	6		mg/kg	1	
Barium	91	49	139	108	182	74		mg/kg	1	
Beryllium	1.2	<0.9	1.2	1.1	1.1	0.7		mg/kg	0.9	
Boron (water soluble)	<1.0	<1.0	1.1	1.0	<1.0	<1.0		mg/kg	1	
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		mg/kg	0.5	
Copper	54	7	99	40	88	28		mg/kg	1	
Chromium	19	10	22	27	22	18		mg/kg	1	
Chromium (hexavalent)	<1	<1	<1	<1	<1	<1		mg/kg	1	
Chromium (trivalent)	19	10	22	27	22	18		mg/kg	1	
Lead	118	9	139	52	529	142		mg/kg	1	
Mercury	0.21	<0.17	<0.17	<0.17	<0.17	<0.17		mg/kg	0.17	
Nickel	24	9	30	21	22	19		mg/kg	1	
Selenium	<1	<1	<1	<1	<1	<1		mg/kg	1	
Vanadium	28	9	28	31	28	21		mg/kg	1	
Zinc	40	16	97	58	83	46		mg/kg	5	

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID									
Client Sample No									
Client Sample ID									
Depth to Top									
Depth To Bottom									
Date Sampled									
Sample Type									
Sample Matrix Code									
Asbestos in Soil (Inc. matrix)									

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID										
Client Sample No										
Client Sample ID										
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type										
Sample Matrix Code										
PAH-16MS										
Acenaphthene,[M]										
Acenaphthylene,[M]										
Anthracene,[M]										
Benzo(a)anthracene,[M]										
Benzo(a)pyrene,[M]										
Benzo(b)fluoranthene,[M]										
Benzo(ghi)perylene,[M]										
Benzo(k)fluoranthene,[M]										
Chrysene,[M]										
Dibenz(a,h)anthracene										
Fluoranthene,[M]										
Fluorene,[M]										
Indeno(123-cd)pyrene,[M]										
Naphthalene,[M]										
Phenanthrene,[M]										
Pyrene,[M]										
Total PAH (16MS)										

Envirolab Job Number: 24/02650

Client Project Name: 18-18 Hyde Road, Manchester M12 6BW

Client Project Ref: No

Lab Sample ID										
Client Sample No										
Client Sample ID										
Depth to Top										
Depth To Bottom										
Date Sampled										
Sample Type										
Sample Matrix Code										
TPH CWG with Clean Up										
Ali >C5-C6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
Ali >C6-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
Ali >C8-C10	<1	<1	<1	<1	<1	<1		mg/kg	1	
Ali >C10-C12	<1	<1	<1	<1	<1	<1		mg/kg	1	
Ali >C12-C16	1	<1	<1	<1	<1	<1		mg/kg	1	
Ali >C16-C21	1	<1	<1	<1	<1	<1		mg/kg	1	
Ali >C21-C35	2	<1	1	1	3	2		mg/kg	1	
Total Aliphatics	4	<1	1	1	3	2		mg/kg	1	
Aro >C5-C7	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
Aro >C7-C8	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
Aro >C8-C10	<1	<1	<1	<1	<1	<1		mg/kg	1	
Aro >C10-C12	<1	<1	<1	<1	<1	<1		mg/kg	1	
Aro >C12-C16	2	<1	<1	2	<1	<1		mg/kg	1	
Aro >C16-C21	3	<1	1	7	1	<1		mg/kg	1	
Aro >C21-C35	12	<1	4	19	5	<1		mg/kg	1	
Total Aromatics	18	<1	5	28	6	<1		mg/kg	1	
TPH (Ali & Aro >5-C35)	24	<1	6	27	10	2		mg/kg	1	
Benzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
Toluene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
Ethylbenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
m & p Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
o Xylene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	
MTBE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		mg/kg	0.01	

Report Notes

General

This report shall not be reproduced, except in full, without written approval from Envirolab.
The results reported herein relate only to the material supplied to the laboratory.
The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside our scope of accreditation.
The Client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client.
A damaging sample report is appended and are invalid if samples or tests have been found to be damaging. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Key

Subscript "#"	Accredited to ISO 17025
Subscript "M"	Accredited to MCerts
Subscript "I"	Individual result not accredited
None of the above samples	Analysis unaccredited
Subscript "A"	Analysis performed on as-received Sample
Subscript "D"	Analysis performed on the dried sample, crushed to pass 2mm sieve
Subscript "#"	Asterisk has represented ignore asbestos results. Details appear in the comments or your Sample Report
ns	Insufficient Sample for accuracy
US	Unsuitable Sample for analysis
NDP	No Determinable Possible
N/D	No Asbestos Detected
N/A	Not applicable

Asbestos

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.
Stones etc. are not removed from the sample prior to analysis.
Quantitation of asbestos is a 3 stage process including visual identification, hand picking and weighing, and this counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as fine fibres) quantification by gravimetrically is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed on a percentage of the dried soil sample aliquot used.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Debris
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals unspecified)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCerts accreditation, unless stated above.

Soil Chemical Analysis:

All results are reported on dry weight (+40°C).
For samples with Matrix Codes 1 – 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as "% stones >10mm"
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" suffix.
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" suffix.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.
Results "with Clean up" indicates samples cleaned up with Silica during extraction

EPH CWG (method A-T-008) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.
Where these humic substances have been identified in any GCs from "TPH CWG with clean up" please note that the concentration is NOT included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-007:

Results greater than 12500µS/cm @ 25°C / 11500uS/cm @ 20°C fall outside the accreditation range and as such are uncorrected.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel: 0161 368 4921 email: ask@envlab.co.uk

Client: Murray Rix (Northern) Ltd, Andrew House , Hadfield Street, Dukinfield , Dukinfield, SK16 4QX

Project: 16-18 Hyde Road, Manchester M12 6BW

Project No: 24/02650

Date Received: 14/03/2024 (am)

Cool Box Temperatures (°C): 14.7, 12.3, 10.1, 12.4, 13.2

Clients Project No: No

NO DEVIATIONS IDENTIFIED
If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	24/02850/1	24/02850/2	24/02850/3	24/02850/4	24/02850/5	24/02850/6	24/02850/7	24/02850/8	24/02850/9	24/02850/10	24/02850/11	24/02850/12
Client Sample No	435401	435405	435406	435407	435418	435420	435430	435432	435442	435443	435454	435456
Client Sample ID/Depth	BH1 0.20-0.50m	BH1 2.40-2.99m	BH2 0.15-0.30m	BH2 0.30-0.50m	BH3 0.15-0.50m	BH3 1.20-1.70m	BH4 0.10-0.50m	BH4 1.00-1.50m	BH5 0.12-0.50m	BH5 0.80-1.30m	BH6 0.10-0.50m	BH6 2.30-2.80m
Date Sampled	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24	06/03/24	07/03/24	07/03/24	07/03/24	07/03/24
A-T-019s	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024
A-T-023s	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024
A-T-024s	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
A-T-027s	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
A-T-031s	23/03/2024	21/03/2024	21/03/2024	23/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
A-T-032s	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024
A-T-040s	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
A-T-044	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024
A-T-045	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024
A-T-064	21/03/2024			21/03/2024								
A-T-055s	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024
Calc	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
Calc-As Recd	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024

Lab Sample ID	24/02650/13	24/02650/14	24/02650/15	24/02650/16	24/02650/17	24/02650/18	24/02650/19	24/02650/20
Client Sample No.	435468	435469	435479	435483	435501	435502	435513	435516
Client Sample ID/Depth	BH7 0.08-0.60m	BH7 1.10-1.60m	BH8 0.15-0.70m	BH8 2.80-3.30m	BH9 0.15-0.70m	BH9 0.90-1.40m	BH10 0.12-0.80m	BH10 1.60-2.10m
Date Sampled	07/03/24	07/03/24	08/03/24	08/03/24	08/03/24	08/03/24	08/03/24	08/03/24
A-T-019s	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024
A-T-022s	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024
A-T-024s	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	22/03/2024
A-T-027s	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
A-T-031s	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
A-T-032s	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024	20/03/2024
A-T-040s	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024
A-T-044	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024
A-T-045	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024	18/03/2024
A-T-054								
A-T-056s	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024
Calc	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	21/03/2024	22/03/2024
Calc-As Recd	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024	19/03/2024

The above dates are the analysis completion dates, please note that these are not necessarily the date that the analysis was weighed/extracted.

End of Report

APPENDIX G
ORIGIN OF TIER 1 GENERIC ASSESSMENT CRITERIA

CONSTITUENT	ORIGIN OF RISK ASSESSMENT VALUE
Arsenic	2014 LQM/CIEH S4ULs
Cadmium	2014 LQM/CIEH S4ULs
Chromium	2014 LQM/CIEH S4ULs
Lead	2014 LQM/CIEH S4ULs
Mercury	2014 LQM/CIEH S4ULs
Nickel	2014 LQM/CIEH S4ULs
Selenium	2014 LQM/CIEH S4ULs
Copper	2014 LQM/CIEH S4ULs
Zinc	2014 LQM/CIEH S4ULs
Cyanide – Total	2014 LQM/CIEH S4ULs
Phenols – Total	2014 LQM/CIEH S4ULs
Naphthalene	General assessment criteria (GAC) developed by CIEH/LQM Suitable 4 Use Levels with supporting data from SR3, SR7 and existing Tox report where applicable. 1% SOM
Acenaphthene	
Acenaphthene	
Fluorene	
Phenanthrene	
Anthracene	
Fluoranthene	
Pyrene	
Benzo(a)Anthracene	
Chrysene	
Benzo(b/k)Fluoranthene	
Benzo(a)Pyrene	
Indeno(123-cd)Pyrene	
Dibenzo(a,h)Anthracene	
Benzo(ghi)Perylene	
TPH $C_5 - C_{35}$ Aliphatic	
TPH $C_5 - C_{35}$ Aromatic	

APPENDIX H
GEOTECHNICAL TEST RESULTS

MURRAY RIX
CONSULTANCY, SITE INVESTIGATION
CONSTRUCTION MATERIALS TESTING

TEST REPORT

Client	Crown Advisory Ltd
Address	11 Virgil Street Manchester M15 4ED

Contract 16-18 Hyde Road, Manchester M12 6AW

Job Number MRN 24210
Date of Issue 22 March 2024
Pages 1 of 11

Approved Signatories

S J Hutchings, O P Davies

Notes

1 All remaining samples and remnants from this contract will be disposed 28 days from the date of this report unless you notify us to the contrary.

2 Result certificates, in this report, not bearing a UKAS mark, are not included in our UKAS accreditation schedule.

3 Opinions and interpretations expressed herein are outside the scope of our UKAS accreditation.

4 Certified that the samples have been examined and tested in accordance with the terms of the contract order and unless otherwise stated conform to the standards/specifications quoted.

5 The results included within the report are representative of the samples submitted for analysis.

6 This certificate should not be reproduced, except in full, without the express permission of the laboratory.

Andrew House, Hadfield Street, Dukinfield, Cheshire SK16 4QX Tel: 0161 473 0870
Email: enquiries@murrayrix.com Website: www.murrayrix.com

Also at: London: 020 8503 1999

Murray Rix is the trading name of Murray Rix Holdings Limited. Registered in England 2878561.

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

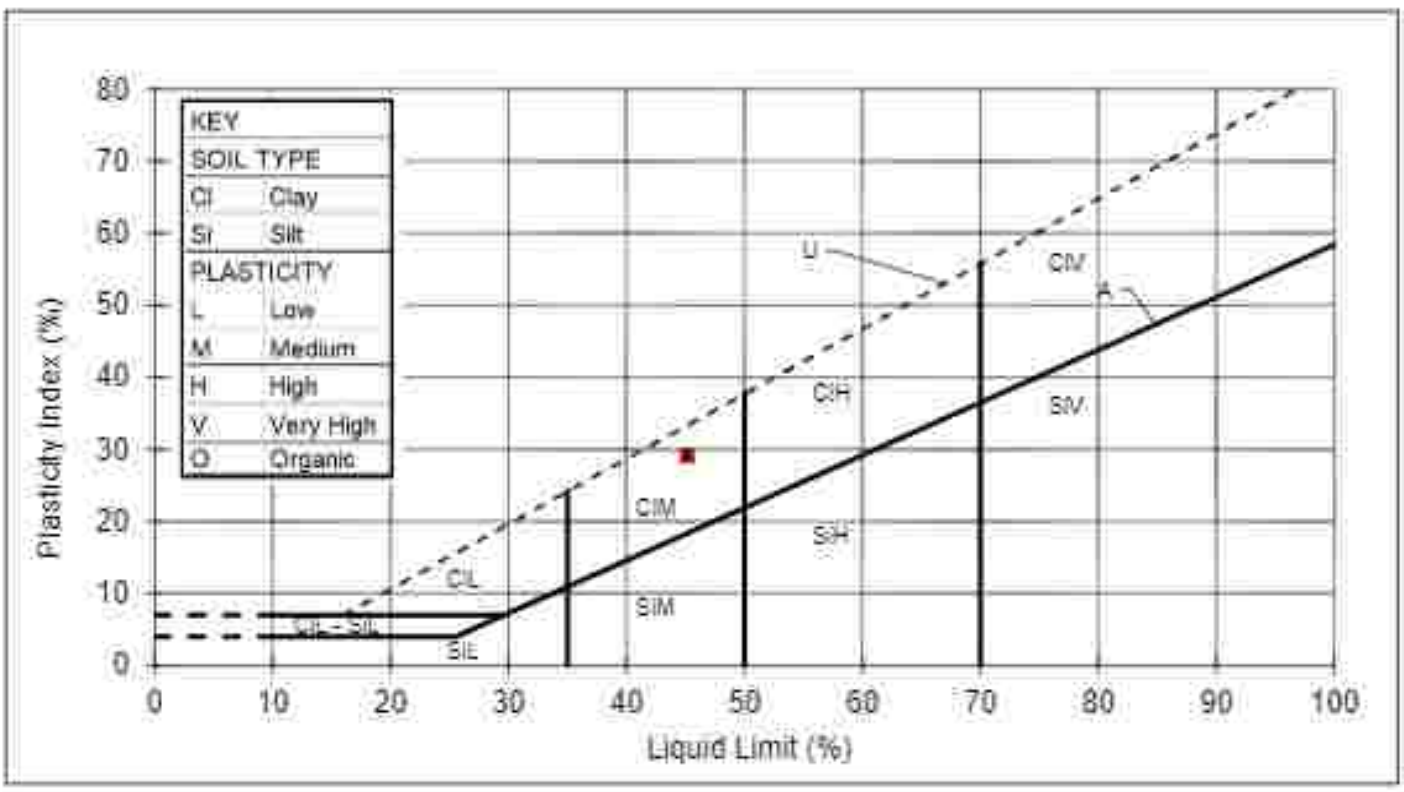
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 2 1.50m	DATE SAMPLED	04-Mar-24
SAMPLE No.	435408	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Firm orange brown mottled silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.4	45.5	0.994	
Determination 2 (avg)	20.4	45.4		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.9	45	16	29	88



REMARKS

SIGNED

NAME S.J. Hutchings (Director) DATE 22-Mar-24

MURRAY RIX

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WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

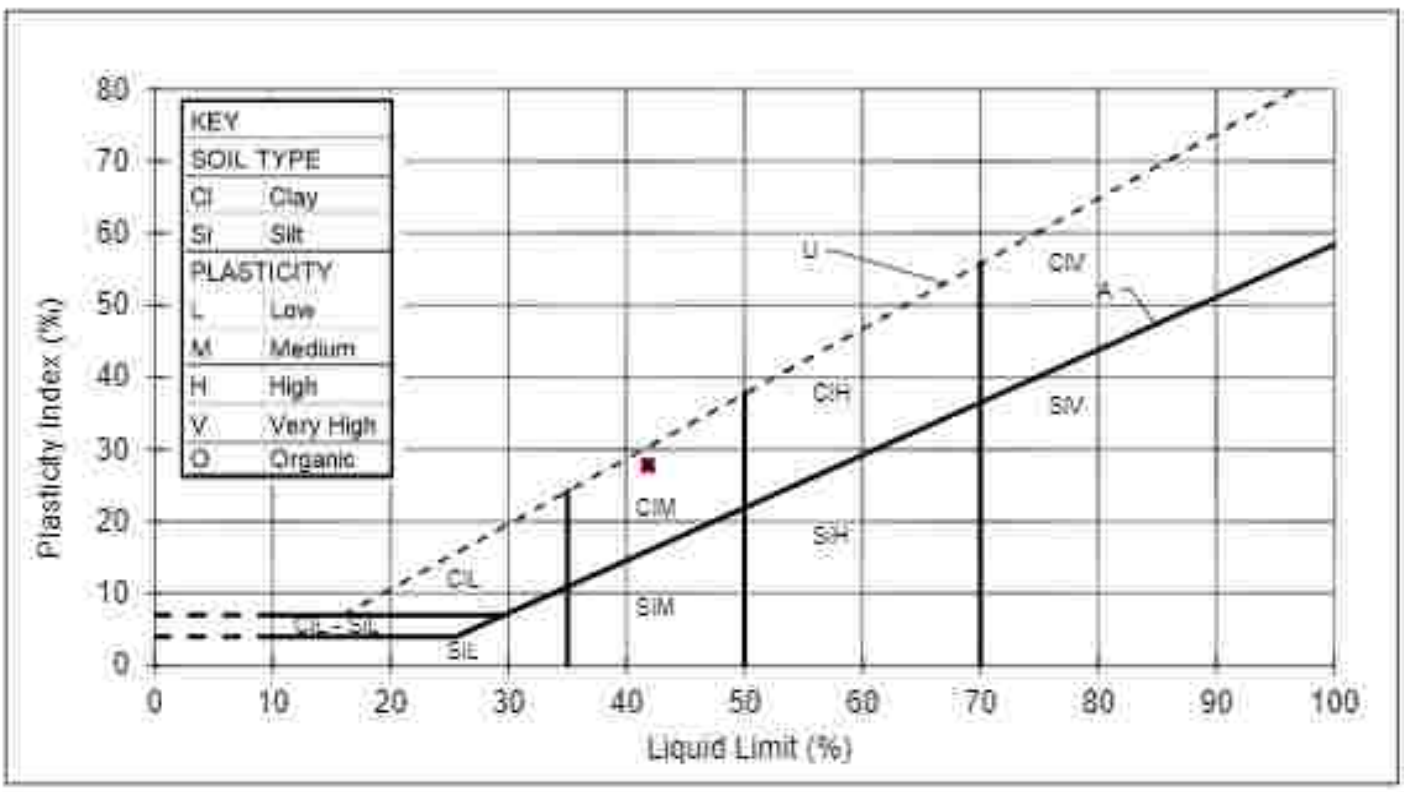
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 3 2.00m	DATE SAMPLED	04-Mar-24
SAMPLE No.	435421	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Firm dark brown silty CLAY		
ADVISED SOURCE	Site investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	22.2	43.2	0.967	
Determination 2 (avg)	22.2	43.3		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
23.1	42	14	28	100



REMARKS

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NAME S.J. Hutchings (Director) DATE 22-Mar-24

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

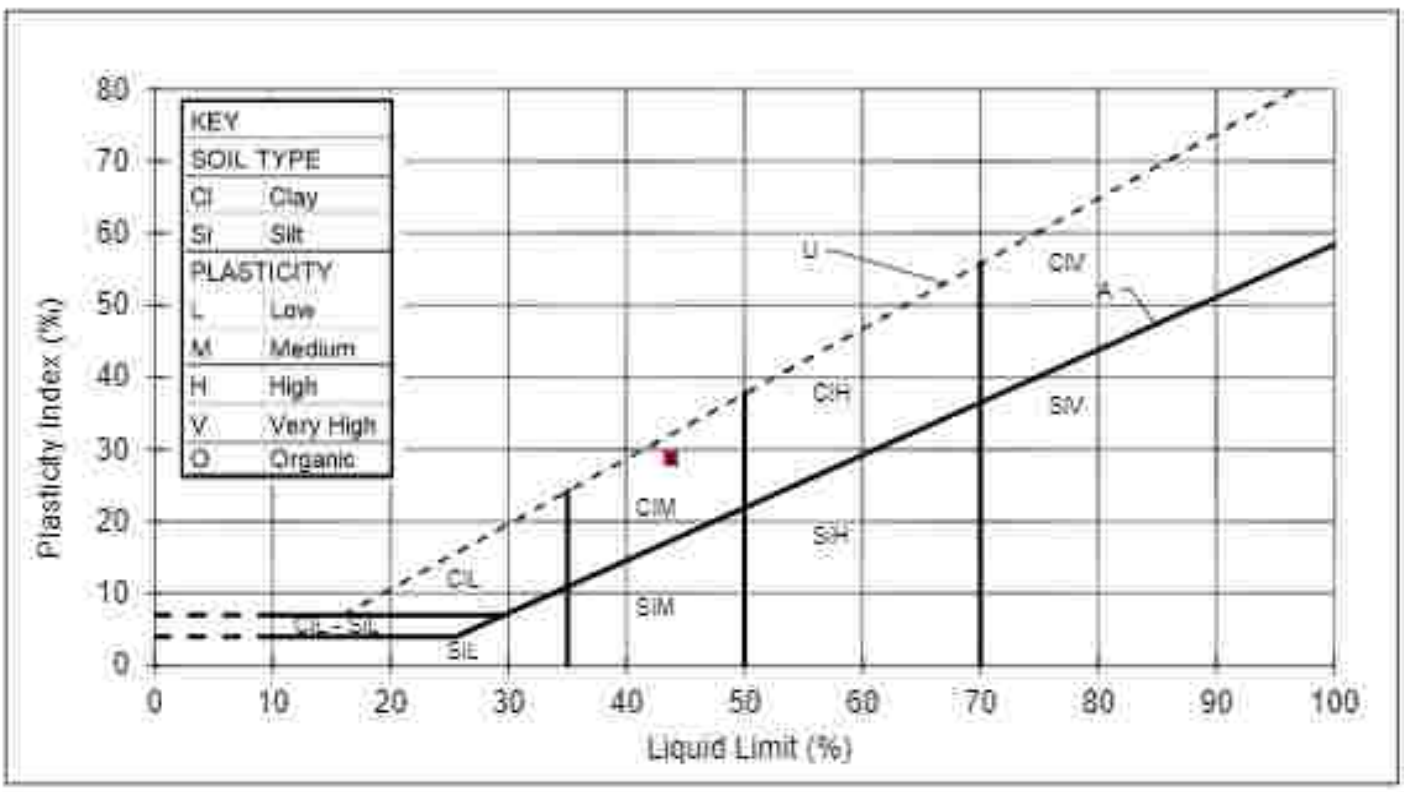
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 4 2.00m	DATE SAMPLED	04-Mar-24
SAMPLE No.	435433	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Firm orange brown silty sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.4	43.2	1.012	
Determination 2 (avg)	19.4	43.3		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.5	44	15	29	83



REMARKS

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NAME S.J. Hutchings (Director) DATE 22-Mar-24

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

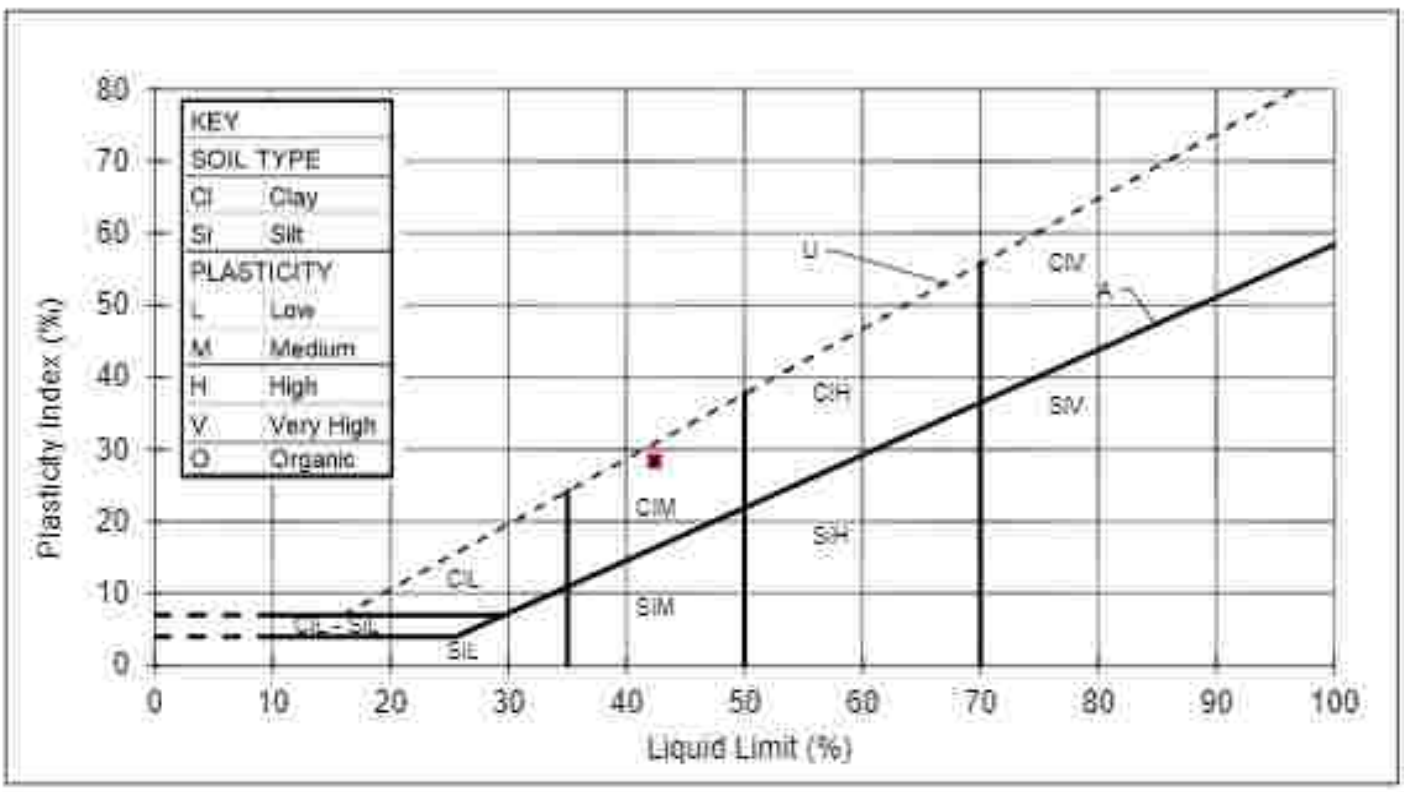
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 5 1.00m	DATE SAMPLED	05-Mar-24
SAMPLE No.	435443	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Firm orange brown silty CLAY		
ADVISED SOURCE	Site investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.5	41.2	1.026	
Determination 2 (avg)	18.6	41.4		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
22.4	42	14	28	100



REMARKS

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NAME S.J. Hutchings (Director) DATE 22-Mar-24

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

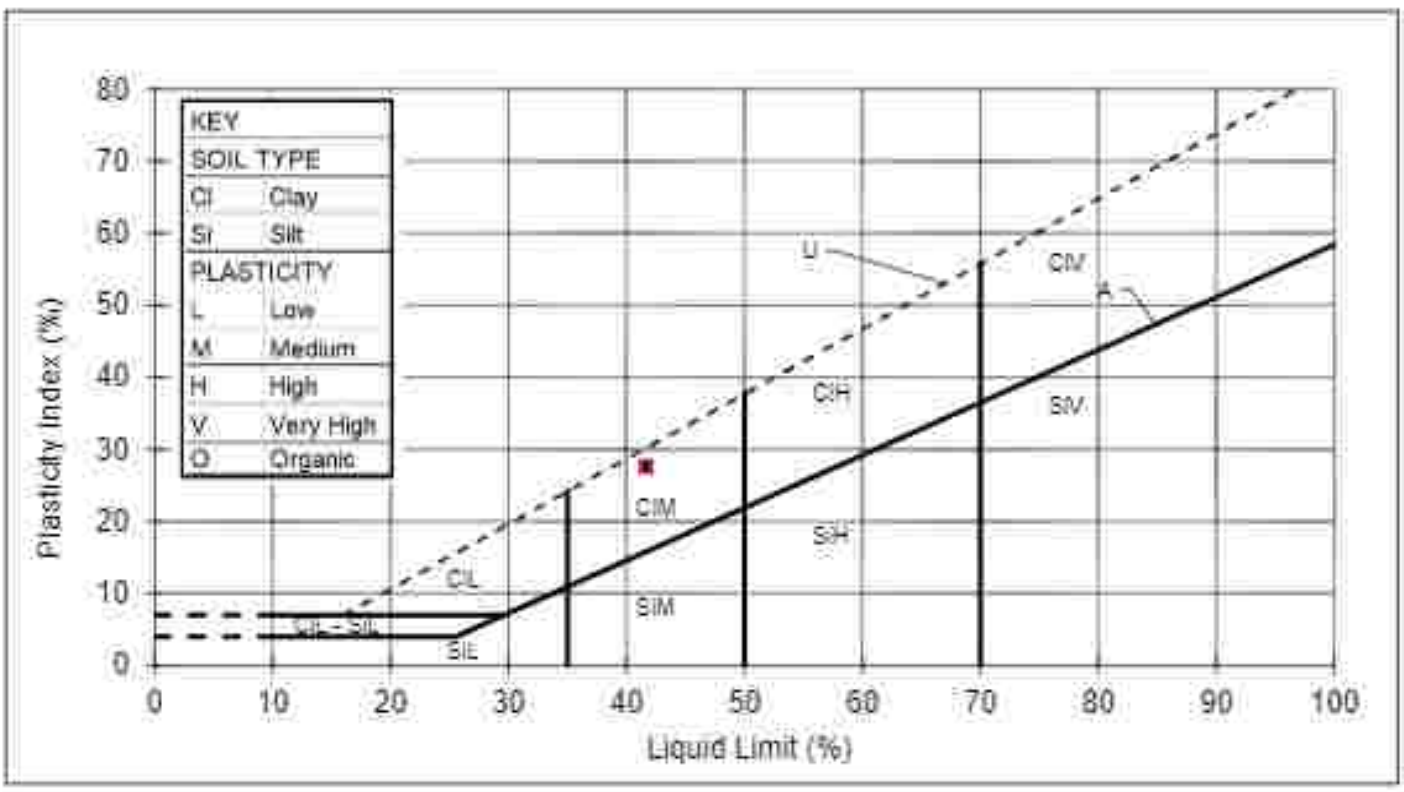
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 6 2.00m	DATE SAMPLED	05-Mar-24
SAMPLE No.	435457	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Soft orange brown silty CLAY		
ADVISED SOURCE	Site investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.1	41.7	0.997	
Determination 2 (avg)	20.3	41.9		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.5	42	14	28	100



REMARKS

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NAME S.J. Hutchings (Director) DATE 22-Mar-24

MURRAY RIX

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TEST CERTIFICATE

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

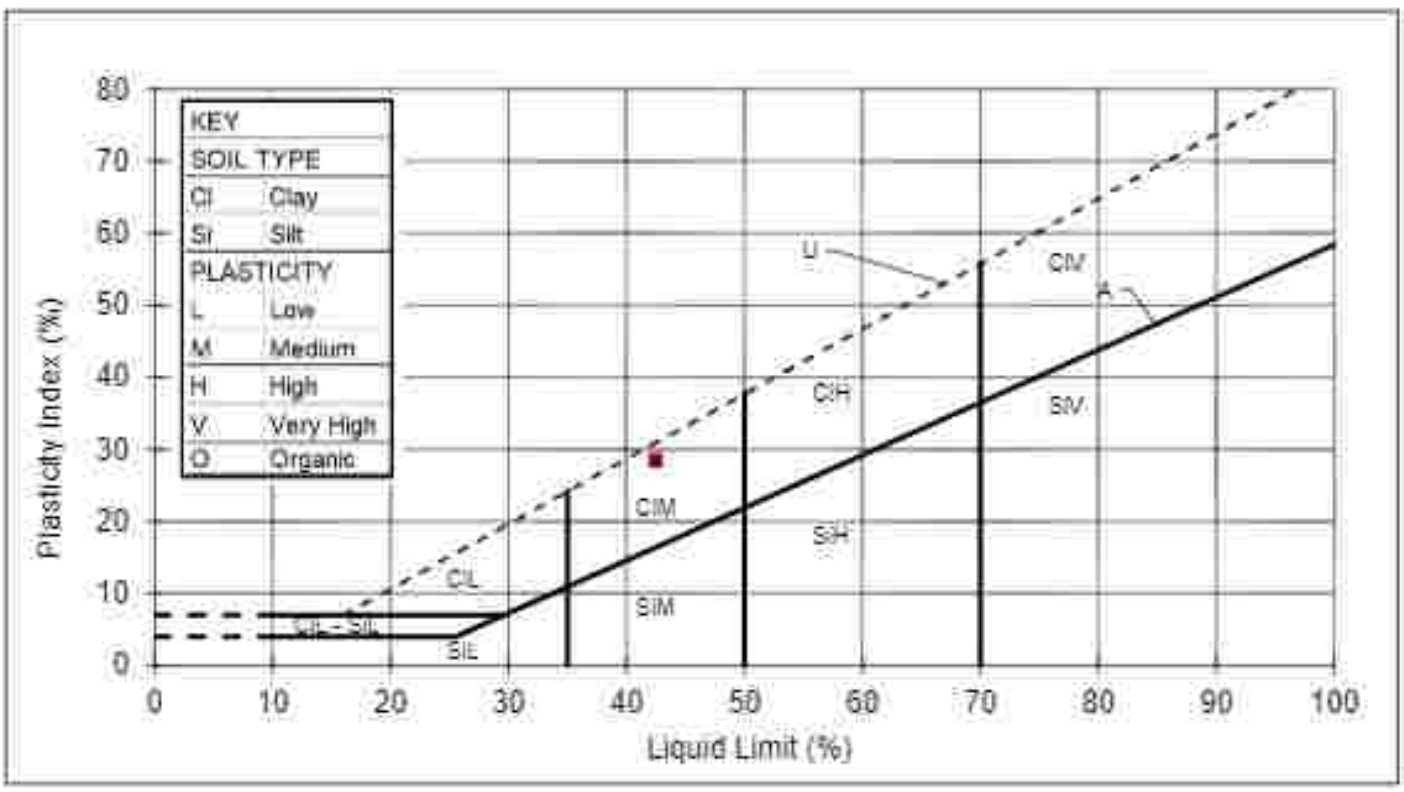
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 7 1.50m	DATE SAMPLED	06-Mar-24
SAMPLE No.	435468	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Soft dark brown silty CLAY		
ADVISED SOURCE	Site investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.8	43.0	0.986	
Determination 2 (avg)	21.0	43.2		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
27.8	42	14	28	100



REMARKS

SIGNED

NAME S.J. Hutchings (Director) DATE 22-Mar-24

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

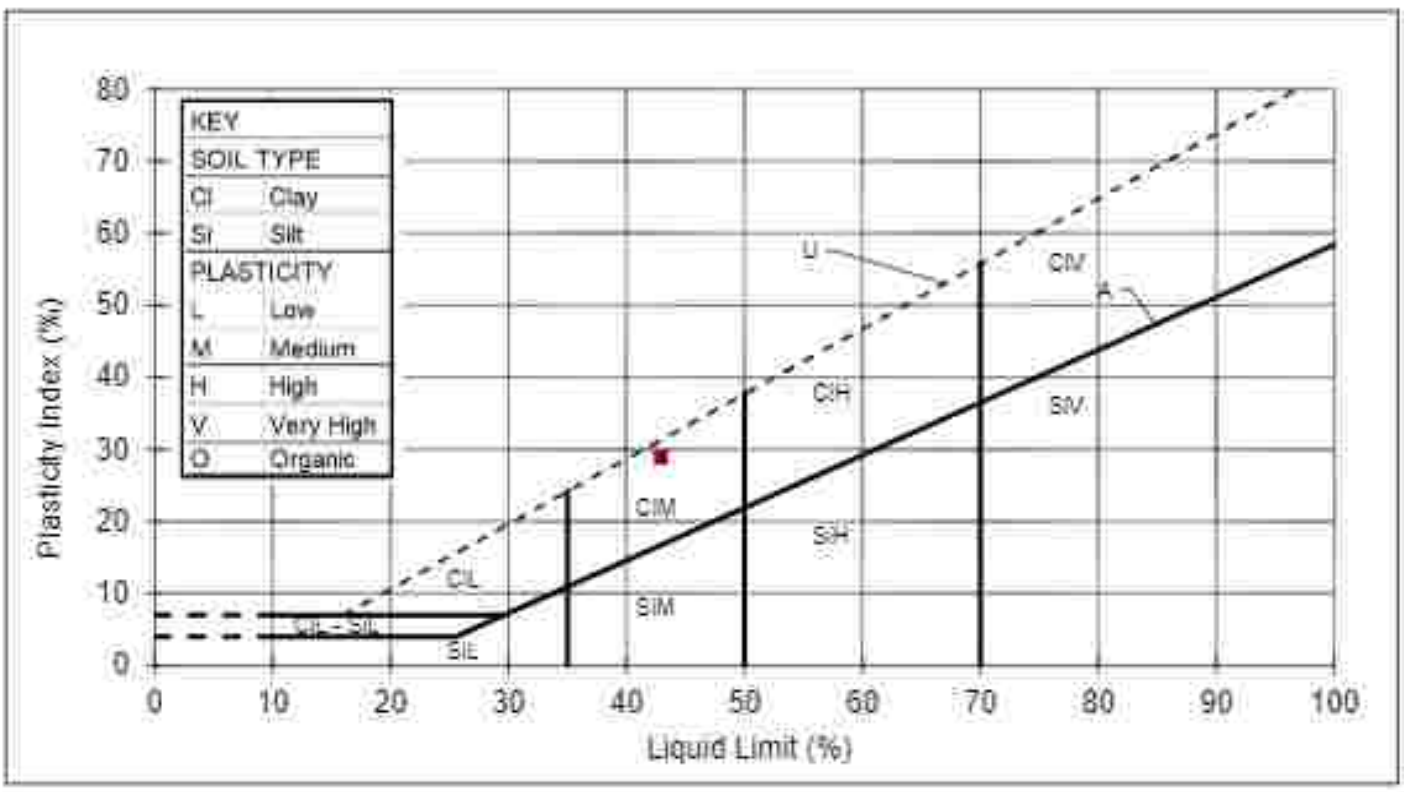
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 8 2.00m	DATE SAMPLED	05-Mar-24
SAMPLE No.	435481	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Firm orange brown silty slightly sandy CLAY		
ADVISED SOURCE	Site investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.7	42.0	1.022	
Determination 2 (avg)	18.7	42.0		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
24.0	43	14	29	94



REMARKS

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NAME S.J. Hutchings (Director) DATE 22-Mar-24

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TEST CERTIFICATE

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PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

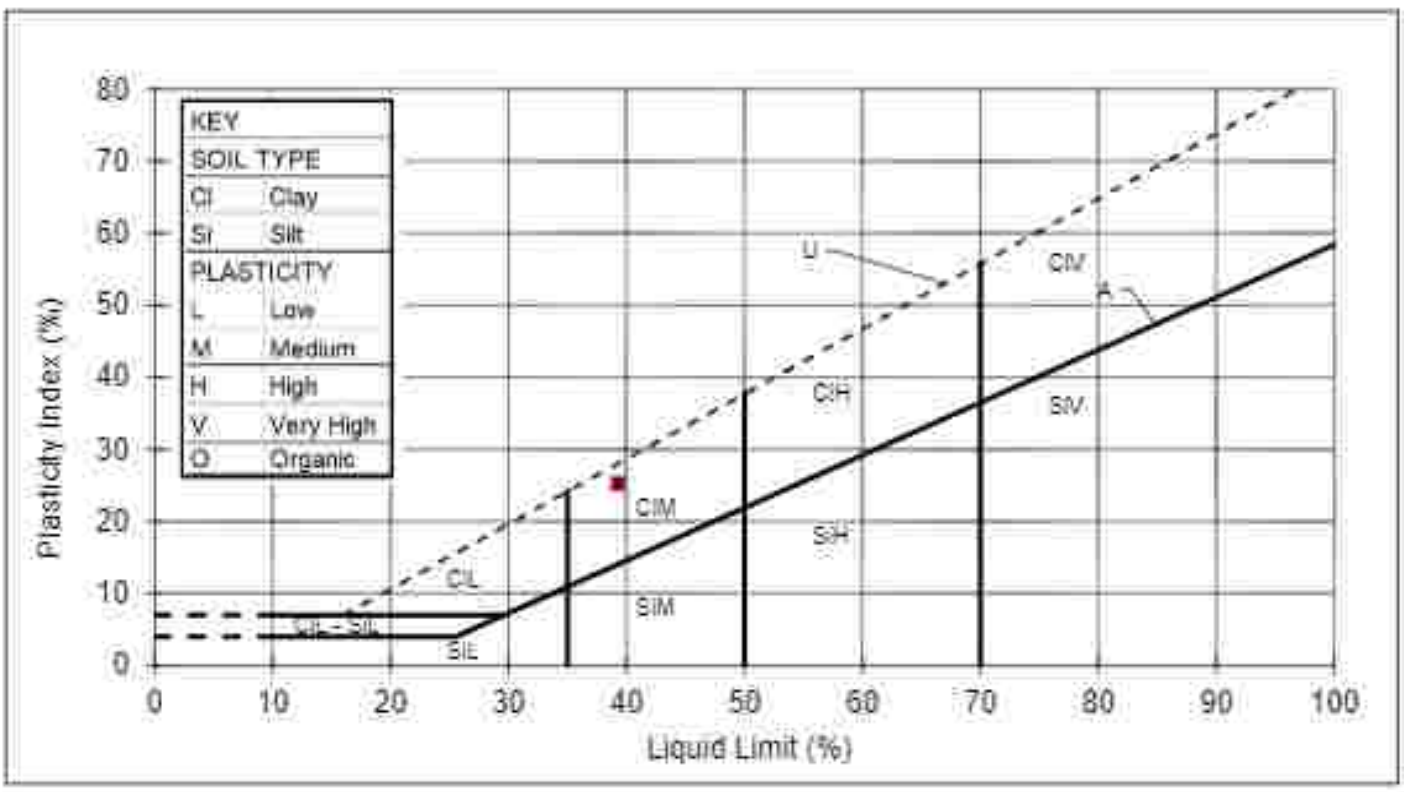
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 9 2.00m	DATE SAMPLED	06-Mar-24
SAMPLE No.	435504	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Firm orange brown silty sandy CLAY		
ADVISED SOURCE	Site investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	21.2	40.0	0.951	
Determination 2 (avg)	21.2	40.0		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
21.3	39	14	25	82



REMARKS

SIGNED

NAME S.J. Hutchings (Director) DATE 22-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

LIQUID LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.3 (30° FALL CONE) 1 POINT METHOD
PLASTIC LIMIT BS EN ISO 17892-12:2018+A2:2022 Clause 5.5
WATER CONTENT METHOD BS EN ISO 17892-1:2014+A1:2022

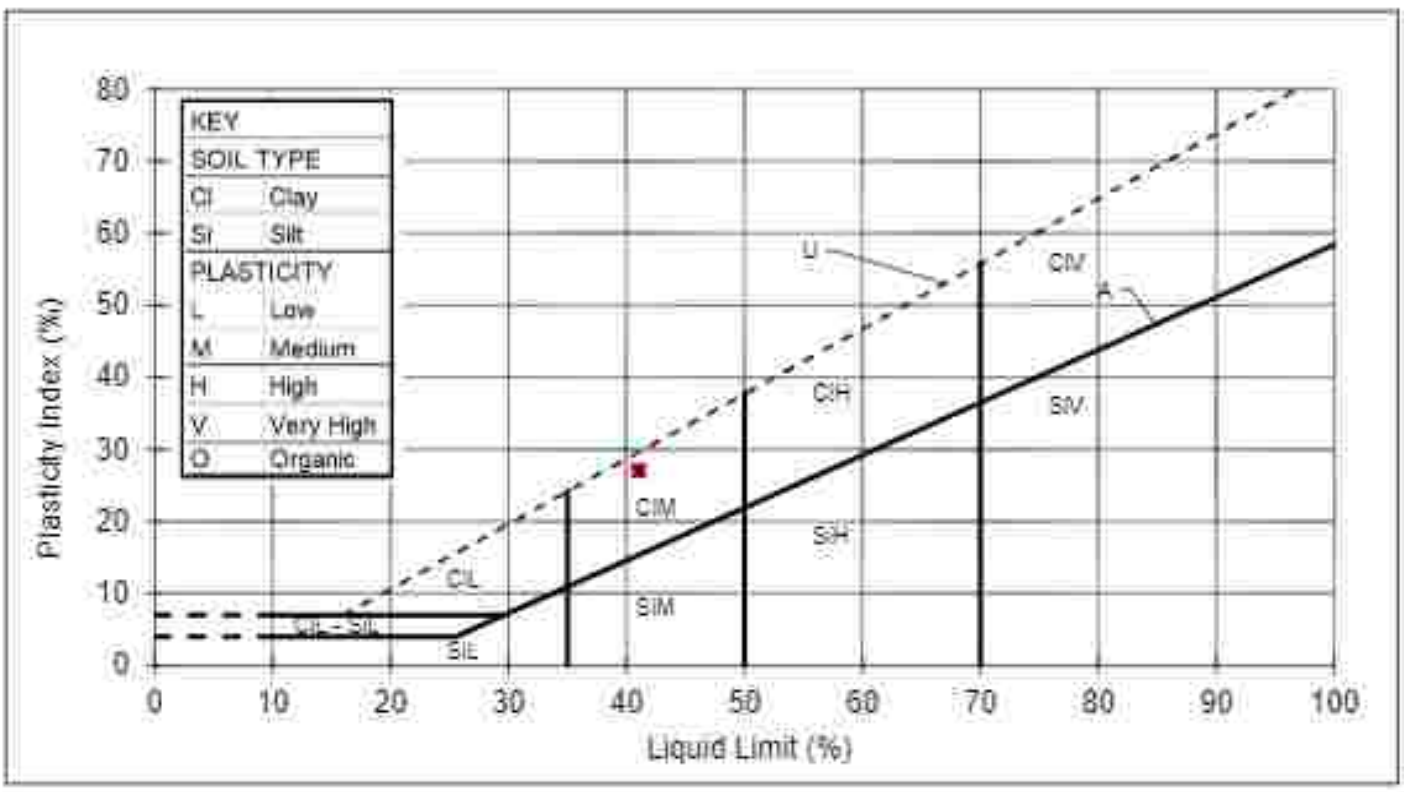
CLIENT	Crown Advisory Ltd
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

SAMPLE LABEL	BH 10 2.00m	DATE SAMPLED	06-Mar-24
SAMPLE No.	435516	DATE RECEIVED	07-Mar-24
DATE TESTED	12-Mar-24	SAMPLED BY	Murray Rix

MATERIAL	Soft orange brown silty slightly sandy CLAY		
ADVISED SOURCE	Site investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Wet Sieved

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	20.4	41.3	0.994	
Determination 2 (avg)	20.4	41.3		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
27.1	41	14	27	91



REMARKS

SIGNED

NAME S.J. Hutchings (Director) DATE 22-Mar-24

MURRAY RIX

ANDREW HOUSE, HADFIELD STREET,
DUKINFIELD, CHESHIRE SK16 4QX
TEL 0161 475 0870

TEST CERTIFICATE

DETERMINATION OF WATER-SOLUBLE SULPHATE IN SOIL
& DETERMINATION OF THE pH VALUE
BS 1377-3:2018+A1:2021, Cl. 7.3 & Cl. 12

CLIENT	Crown Advisory
SITE	16-18 Hyde Road, Manchester M12 6AW
JOB NUMBER	MRN 24210

DATE TESTED	12-Mar-24	DATE SAMPLED	04 - 06-Mar-24
SAMPLED BY	Murray Rix	DATE RECEIVED	07-Mar-24
PRE-TREATMENT	Air Dried	ADVISED SOURCE	Site Investigation Samples

Sample Number	Sample Label	Material	% Ret. 2mm	pH Value	Water Soluble Sulphate as SO_4 (mg/l)
435408	BH 2 1.50m	Firm orange brown mottled silty sandy CLAY	0	7.4	370
435411	BH 2 3.00m	Dense orange fine tpo medium SAND	0	7.2	120
435421	BH 3 2.00m	Firm dark brown silty CLAY	0	6.8	320
435433	BH 4 2.00m	Firm orange silty sandy CLAY	0	7.5	410
435443	BH 5 1.00m	Firm orange brown silty CLAY	0	6.6	400
435457	BH 6 2.00m	Soft orange brown silty CLAY	0	6.9	350
435468	BH 7 1.50m	Soft dark brown silty CLAY	0	6.7	310
435481	BH 8 2.00m	Firm orange brown silty slightly sandy CLAY	0	7.5	370
435504	BH 9 2.00m	Firm orange brown silty sandy CLAY	0	7.8	380
435516	BH 10 2.00m	Soft orange brown silty slightly sandy CLAY	0	6.8	290
435518	BH 10 3.00m	Dense orange fine to medium SAND	0	7.2	100

REMARKS

SIGNED

NAME S.J. Hutchings (Director) DATE 22-Mar-24