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PROPOSED DEVELOPMENT AT PLOTS 2, 3, 4 & 5, ANGEL MEADOW, MANCHESTER

PHASE 1 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT



May 2017

WSP | PARSONS BRINCKERHOFF

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Far East Consortium International Limited & Co-operative Group Ltd

Report no: 70020194-EV2/10687(4)
Date: May 2017

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EXECUTIVE SUMMARY

Introduction	WSP | Parsons Brinckerhoff was instructed by Far East Consortium International Limited and the Co-operative Group Limited (henceforth referred to as the Client) to undertake a Phase 1 Preliminary Environmental Risk Assessment of land at Angel Meadows, Manchester. The purpose of this report is to provide information in support of a Planning Application for redevelopment of the site with residential apartments. The planning application relates to the development of 756 residential units across the four plots (Plot 2, 3, 5 and 5) and includes public realm and landscape proposals to the edge of Angel Meadow park which partially sits within the application site boundary, as well as changes to the surrounding highways network including the alterations to parts of Aspin Lane, Mincing Street, Irk Street and Old Mount Street to create new public realm and shared surfaces. The total development area is 1.4015 hectares (ha).
Current land uses	The Plot 2, Plot 3 and Plot 5 parcels of land are currently used for car parking and include Mincing Street, a section of Aspin Lane, a section of Old Mount Street and portions of Angel Meadow park. Plot 4 currently comprises MJT Motors garage with associated car park and land utilised by a microbrewery named Blackjack Beers. Land towards the southwest of Plot 4 comprises Angel Meadow Park.
History	The Site is located within an area of Manchester with a long history of industrial and residential development. Available Ordnance Survey mapping dating from 1850 indicates that Plot 2, Plot 3 and Plot 5 have generally been developed as residential housing with localised commercial use. Land uses at Plot 4 have included a mill, breakers yard and works prior to development as a garage. Pertinent off-site land uses include a gas works to the north of Plot 4 along with numerous heavy industrial and commercial developments in the vicinity of the site. Angel Meadow park includes an historic burial ground. As outlined in Section 3.13 a detailed UXO desk study has been undertaken and determined that the site has a low UXO risk with respect of UXO.
Anticipated Ground Conditions	The available information indicates that the plots are underlain by Made Ground of varying thickness and composition. Infilled basements and relict structures associated with the demolition of previous structures should be anticipated. Natural strata are shown as both cohesive and granular Glacial Till (Secondary Aquifer) overlying bedrock (sandstone) of the Chester Pebble Beds (Principal Aquifer). The Glacial Till is unconformable over the sandstone bedrock which is variable in elevation and locally highly weathered and fractured. The sandstone overlies Coal Measures strata at depth.
Hydrogeology	The site is not within a groundwater Source Protection Zone, as defined by the Environment Agency. There are 3 recorded Water Abstractions within ~500m of the site boundary, all of which are for Potable Water Abstractions
Hydrology	The River Irk is the closest surface water feature, approximately 60m northwest of Plot 3. It flows north to south, before flowing northeast to southwest as it passes closest to Plots 2 and 3, before being culverted beneath Victoria Station and joining the River Irwell approximately 500m southwest of Plot 2. The Groundsure Report identifies the northwestern most part of Plot 4 and the north-easternmost corner of Plot 3 as within Zone 2 floodplains and Aspin Lane as being in Zone 3.
Mining	The site is not considered to be within an area susceptible to effects of coal mining.

Radon	The Groundsure Report indicates the site is not in a Radon Affected Area as less than 1% of homes are above the action level; radon protection measures are not necessary.
Potential for Soil and Groundwater Contamination	The potential for deep Made Ground and the former industrial use of some parts of the site and neighbouring land gives rise to the potential for soil and groundwater contamination. Made Ground materials may also contain asbestos containing materials or asbestos fibres and produce hazardous ground gases. As a result, a number of potentially complete pollutant linkages have been identified. It should be noted that the available historical mapping dates from 1850, previous land use may have included additional areas used for burials and historic buildings and structures of archaeological interest. It is recommended that archaeological constraints to excavations are established before breaking ground. The presence of chemical or asbestos contamination within soils will have implications for material reuse or off-site disposal to landfill. Soil and groundwater quality should be assessed during any intrusive investigation.
Geotechnical Considerations	Given the likely shallow ground conditions, it would seem likely that bored or continuous flight auger plies would represent the most suitable foundation solution for Plots 2, 3 and 5. If competent rock is encountered within the basement excavations, then an option may be to found the structure on a raft foundation. If sufficiently competent ground is not encountered then piled foundations may be required. A basement retention system will be required to control deflections and ground movement on the site boundaries. This is likely to be in the form of a contiguous or secant bored pile wall. Given the proximity of the Plot 4 basement excavation to the adjacent railway viaduct, it is considered that a detailed assessment of likely ground movements will be required together with appropriate liaison with and approval from Network Rail. Below ground obstructions should be anticipated across all the sites and may present a significant risk to the installation of foundations, basement retention system and basement excavation. If rock is encountered in the basement excavation, then hard digging, possibly with the use of hydraulic breakers and ripping techniques may be required. Significant groundwater ingress would not be anticipated on Plot 5, although inflows of perched water within the Made Ground may be encountered. Groundwater may be encountered within the basement excavations on Plots 2, 3 and 4 and the need for specialist dewatering techniques and/or secant retaining walls cannot be ruled out. For the purposes of preliminary budget costings a CBR of <2% is considered appropriate. It is considered unlikely that the ground conditions will require a concrete class in excess of DS4/AC4.
Recommendations	Based on the data presented within this report it is recommended that an intrusive investigation is completed to confirm the presence/absence of risks associated with contamination prior to the construction of each plot and to provide sufficient geotechnical information to allow the cost effective design of the substructures. It should be noted that the available historical mapping dates from 1850. On-site land uses prior to 1850 may have included additional areas used for burials, historic buildings or structures of archaeological interest. It is recommended that archaeological constraints to excavations are established before breaking ground, including any site investigation.

1 INTRODUCTION

1.1 AUTHORISATION

WSP | Parsons Brinckerhoff was instructed by Far East Consortium International Limited and Co-operative Group Limited to undertake a Phase 1 Preliminary Environmental Risk Assessment of land at Plot 2, 3, 4 and 5 Angel Meadow, Manchester. A site location plan is provided as Figure 1 in **Appendix A**.

1.2 AIMS AND OBJECTIVES

The purpose of this report is to provide information in support of a Planning Application for redevelopment of the site with residential apartments. The applications boundary includes four distinct parcels of land, adjacent to Angel Meadow Park in Manchester, referred to as Plot 2, Plot 3, Plot 4 and Plot 5. The application boundary (the site) is shown on the 5plus Architects drawing ref **05498 MP_00_1001** within **Appendix A**. The objectives of this report are to establish the site history, environmental setting and anticipated ground conditions of each plot to identify potential geo-environmental and geotechnical constraints on the proposed development. The report includes a ground models, assessment of the potential risks associated with contamination due to current and historical uses and presents a preliminary conceptual site model in accordance with Model Procedures for the Management of Land Contamination (CLR11).

1.3 SOURCES OF INFORMATION

This report has been prepared using the information sources listed below:

- Site walkover completed by WSP | Parsons Brinckerhoff on 07 December 2016 (photographs in **Appendix B**).
- Groundsure Report dated 8th December 2016 and containing Enviro Insight report Reference GS-3512618, and Groundsure Geo Insight Plus report Reference GS-3512621 (**Appendix C**) and Historical Ordnance Survey maps (GS-3512619), town plans and detailed historical building plans (**Appendix D**).
- Coal Authority Non-Residential Mining Report Reference GS-3512620 (**Appendix C**).
- Zetica Unexploded Ordnance (UXO) Desk Study and Risk Assessment (**Appendix E**).
- British Geological Survey (BGS) geology viewer and borehole logs (SJ89NW56, SJ89NW2903, and SJ89NW1339) available online (**Appendix C**).
- BGS 1:50,000 Geological Maps, Sheet 85 (Manchester), Bedrock and Superficial edition. 2011.
- Online environmental data available on the Environment Agency (EA) website.

It should be noted that the site boundary indicated on the Groundsure plans and within the Groundsure report encompasses all four plot areas, as well as the central area of St. Michael's Flags and Angel Meadow public space (herein referred to as "the park"). In addition to Aspin Lane and a section of Old Mount Street, the eastern and western areas of the park lie within the application boundary of the proposed development; the central area of the park does not form part the the site proposed for development.

1.4 LIMITATIONS

General limitations of this assessment and information on the approach used are outlined in **Appendix F**.

2 SITE INFORMATION

Site Address	Angel Meadow, Manchester
National Grid Reference Coordinates	Plot 2 – SJ 84352 99160 (approximate centre) Plot 3 – SJ 84389 99208 (approximate centre) Plot 4 – SJ 84503 99262 (approximate centre) Plot 5 – SJ 84519 99156 (approximate centre)
Approximate Developable Area	The development area coveres approximately 1.4015 ha.
Site Location and Boundaries	The site is located to the north of Manchester City centre adjacent to the Green Quarter area of the city, approximately 250m east of Manchester Victoria Railway Station. The site is proposed for development is split into four parcels of land around the park. · Plot 2 is bounded by: Mincing Street to the north, with Plot 3 beyond; Aspin Lane to the east with the park beyond; Angel Street to the south with 1 Angel Square beyond; Dantzic Street to the west with residential student accommodation and a car park beyond. · Plot 3 is bounded by: Little Nelson Street to the north, with the King of Kings School beyond; Aspin Lane to the east with the park beyond; Mincing Street to the south with Plot 2 beyond; Dantzic Street to the west with a railway viaduct beyond. · Plot 4 is bounded by: A railway viaduct to the northwest, with the River Irk and commercial units beyond; Gould Street to the northeast with an electrical substation and car park beyond; the park to the southeast and southwest. · Plot 5 is bounded by: Old Mount Street to the northwest, with the park beyond; residential apartments immediately to the southwest, and to the northeast beyond Ludgate Hill; Naples Street to the southeast with the former CWS Tobacco factory now converted to apartments, beyond. A site layout plan is presented as drawing ref **05498 MP_00_1001** in **Appendix A.**
Current Site Use	The Plot 2, Plot 3 and Plot 5 parcels of land are currently used for car parking, roads and portions of Angel Meadow park. Plot 4 currently comprises MJT Motors garage with associated car park, part of the Blackjack Beers site and a portion of the Angel Meadow park.
Site Description	Plot 2 comprises a fenced asphalt surfaced ground level car park in addition to a portion of Mincing Street, Aspin Lane and the southwestern area of the park. It slopes down gently to the north, with a change in elevation of approximately 2.5m across the site. Plot 3 comprises a fenced asphalt surfaced ground level car park in addition to a portion of Mincing Street and Aspin Lane. It slopes down gently to the north, with a change in elevation of approximately 2m across the site. Plot 4 comprises two garage buildings and part of the Blackjack Beers site

	with access from Irk Street, off Gould Street. A portion of the north and northeastern area of the park is also included within the site. The area is relatively flat, but approximately 3m below the level of Gould Street to the northeast, as shown in Photo 5 in **Appendix B**. Plot 5 is generally rectangular in shape and comprises a fenced asphalt surfaced ground level car park, a portion of Old Mount Street and a section of Angel Meadow park which is proposed for development as pedestrian access to the park. The majority of the plot slopes down gently to the north from an elevation of approximately 44.7m AOD to 43.7m AOD, the area of the proposed steps slopes down through the park to approximately 38m AOD.
Proposed Development	The planning application relates to the development of 756 residential units across the four plots and includes public realm and landscape proposals to the edge of Angel Meadow park which sits within the application site boundary, as well as changes to the surrounding highways network including the alterations to parts of Aspin Lane, Mincing Street, Irk Street and Old Mount Street to create new public realm and shared surfaces. A summary of the development proposals for each plot is as follows: · Plot 2: a 22 storey residential development plus one basement level with commercial uses and residential amenity uses at ground level. · Plot 3: a 17 storey residential development plus one basement level with commercial uses and residential amenity uses at ground level. · Plot 4: a 40 storey landmark residential development with commercial uses and residential amenity uses plus one lower ground level and one basement level. · Plot 5: a part 9 storey and part 12 storey residential development with residential amenity uses at ground level. The proposed re-development is understood to comprise four apartment buildings for residential use with associated commercial use, amenity and public realm use.

3 SITE SETTING & HISTORY

3.1 PUBLISHED GEOLOGY

British Geological Survey (BGS) geological map Sheet 85, Manchester, scale 1:50,000, Bedrock and Superficial edition (2011), shows the site to be underlain by the following:

Table 3.1 Summary of Mapped Geology

GEOLOGICAL UNIT	DESCRIPTION	AQUIFER DESIGNATION*	SITE AREAS
Artificially Modified Ground: Made ground	Artificially raised ground which can include spoil tips and landfills	n/a	Plot 4
Superficial Deposits: Glacial Till	Variable lithology, usually sandy, gravelly clay.	Secondary Aquifer (undifferentiated)	All plots
Bedrock: Chester Pebble Beds	Sandstone, fine- to coarse-grained, commonly pebbly, with conglomerates and sporadic siltstones; cross-stratified	Principal	All plots

Available online borehole logs from the British Geological Survey (BGS) for borehole referenced SJ89NW56, located approximately 20m south of Plot 2, indicates the presence of Made Ground comprising fill material to depths of approximately 6 feet (1.83m) bgl, over Boulder Clay (Glacial Till) to 7 feet (2.13m) bgl, over gravel to 38 feet (11.58m) bgl, over gravelly and loamy clay to 51 feet (15.55m) bgl, over soft red 'roach' to 54 feet (16.46m) bgl, over red sandstone to 62 feet (18.90m) bgl at the base of the borehole. Borehole SJ89NW2903, approximately 60m northwest of Plot 4 and 95m northeast of Plot 3, indicates tarmacadam surfacing over Made Ground fill material down to 3.5m bgl over dense reddish brown partially cemented sand (Bunter Sandstone) to 7.75m where the hole terminates. The only record present for Borehole SJ89NW1339, located on the southern part of Plot 2, shows that the log is missing.

BGS borehole logs are presented in **Appendix C.**

The Groundsure report records a normal fault bisecting Plot 5, though this is not identified on BGS mapping. The British Geological map (Sheet 85, Manchester, scale 1:50,000, Bedrock and Superficial) records a northwest to southeast trending fault downthrown to the northeast located 335m southwest of Plot 2 and a northwest to southeast trending fault downthrown to the southwest to be located approximately 345m to the northeast of the Plot 4.

3.2 HYDROGEOLOGY

The Glacial Till is classified by the Environment Agency as a Secondary Aquifer, whilst the underlying Chester Pebble Beds is classified as a Principal Aquifer.

The site is not within a groundwater Source Protection Zone, as defined by the Environment Agency. There are 3 recorded Water Abstractions within ~500m of the site boundary, all of which are for Potable Water Abstractions; boreholes No 1, No 2 and No 3 at Interbrew UK Ltd. are located 488m, 502m, and 507m west of site respectively. The most recent versions of the abstraction licences have start dates of 1/1/2004.

BGS borehole log SJ89NW56 did not record any information regarding groundwater depths. Borehole log SJ89NW2903 records that groundwater was encountered during drilling at a depth of 2.7m bgl; however, the borehole location is closer to the River Irk than the site.

3.3 HYDROLOGY

The River Irk is the closest surface water feature, approximately 60m northwest of Plot 3. It flows north to south, before flowing northeast to southwest as it passes closest to Plots 2 and 3, before being culverted beneath Victoria Station and joining the River Irwell approximately 500m southwest of Plot 2.

The Groundsure Report identifies the northwestern most part of Plot 4 and the north-easternmost corner of Plot 3 as within Zone 2 floodplains meaning the Environment Agency estimates that the annual Probability of flooding from rivers as between 1 in 1000 and 1 in 100. In addition, Aspin Lane (which links Plot 3 and Plot 4), and is included within the site, is within a Zone 3 floodplain. The Risk of Flooding from Rivers and the Sea (RoFRaS) rating on site is Low, however there are areas of medium and high risk within 50m of site to the northwest.

3.4 GROUND STABILITY

The Groundsure Report classes all on site potential for ground stability hazards as either Very Low or Negligible. This includes collapsible ground, compressible ground, ground dissolution, landslide, running sand and shrinking or swelling clay. The Groundsure Report indicates that this includes a 50m buffer zone in all directions.

3.5 MINING AND MINERAL SITES

Geological maps show the site is underlain by bedrock comprising Chester Pebble Beds, which are not coal bearing strata. Reference to the Coal Authority's Interactive Map Viewer indicates the site is not located with a Development High Risk Area. Notwithstanding this, the site is within a Coal Mining Affected Area due to the presence of coal subcrops within 1km of the site. A Coal Authority Non-Residential Mining Report has been acquired and states the following:

- The property is in a surface area that could be affected by underground mining in two seams of coal at 440m to 810m depth, and last worked in 1965. Any movement in the ground due to coal mining activity should have stopped and the property is not within a surface area that could be affected by present underground mining.
- The property is not within a surface area that could be affected by present underground mining and the property is not in an area where the Coal Authority has granted or plans to grant a licence 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.
- There are no known coal mine entries within, or within 20 metres of, the boundary of the property and 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.
- There are no past, present or future concerns regarding opencast mining on or near to the site.
- The Coal Authority has no record of a mine gas emission requiring action and the property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.
- The property lies outside the Cheshire Brine Compensation District.

With the exception of a mineral vein 864m east which may have been sporadically mined, there are no other current or historical records within 1km of mining activities, non-coal mining activities, natural cavities, brine extraction, gypsum extraction, tin mining or clay mining. .

3.6 LANDFILLS AND WASTE

Whilst there are no recorded landfill sites within 250m of the site (the closest being 433m north) the BGS identifies Artificial Ground beneath the park and beneath Plot 4. Borehole logs recovered from the vicinity of the development indicate the presence of Made Ground beneath the site.

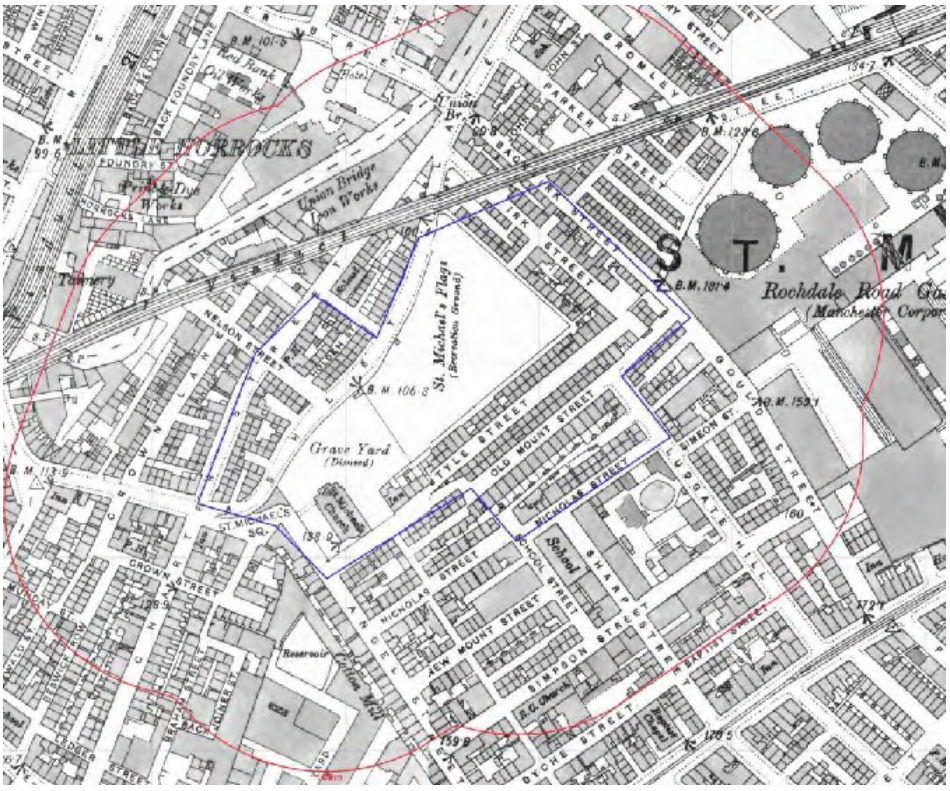
Within 250m of the site, there are 12 records of waste transfer, waste treatment or disposal sites. Two are related to a Breakers Yard on site in Plot B from 1984 and 1990. A Scrap Metal Works was 82 m northeast in 1969. A Waste transfer station is 101m north and a Waste Recycling shed 128 m northeast.

Within 250m of site there are 9 licensed waste site records. The closest is a Household, Commercial and Industrial Waste transfer station 139m northwest.

3.7 GRAVE YARDS AND INFILLED GROUND

The Groundsure report lists a Grave Yard and Disused Grave Yard from 1851 and 1978 respectively, covering much of the current Angel Meadow park. The historical land uses map shows that part of the 1851 Grave Yard is located within the northern part of the site. Information collected from signage within the park during the site walkover and readily available on-line searches suggests that this grave yard area contains up to 40,000 bodies, including cholera victims, buried in a mass grave. The indicated location of the grave yards is shown in Box 1 below.

Box 1: Extract of 1892-1893 mapping (Groundsure Report, Appendix D)



3.8 ARCHAEOLOGY

It should be noted that the available historical mapping dates from 1850. On-site land uses prior to 1850 may have included additional areas used for burials, historic buildings or structures of archaeological interest. It is recommended that archaeological constraints to excavations are established before breaking ground.

3.9 RADON

The Groundsure Report indicates the site is not in a Radon Affected Area as less than 1% of homes are above the action level and that radon protection measures are not necessary in the construction of new dwellings or extensions.

3.10 SENSITIVE LAND USES

The Groundsure Report has identified the site as being within a Nitrate Vulnerable Zone as identified by DEFRA.

3.11 SITE HISTORY

The Groundsure historical maps are presented in **Appendix D** (note the site boundary indicated on the maps relates to Plot 2, 3, 4 and 5 and the park which is only partially included within the development site). The maps have been reviewed and a summary of the pertinent details of the onsite and offsite history for each of the development plots is provided below.

ONSITE

The tables below summarise the relatively simple onsite history for Plots 2 and 3 and the more complex onsite history of Plots 4 and 5 between 1850 and 1995.

Table 3.9.1. Onsite history of Plots 2 and 3

MAP DATE	PLOT 2	PLOT 3
1850 (earliest mapping)	Housing around four "courts" – No. 1, No. 2, No. 3 and Nelson Court.	Two plots of housing either side of Holden Street which runs between Little Nelson Street and Nelson Street (now Mincing Street). Derbyshire Arms Public House present on the western corner.
1938	Featureless ground with the exception of one building on the northern extent of the plot.	No significant changes.
1949	Featureless ground	Featureless ground
2014 (most recent)	Featureless ground	Featureless ground

Table 3.9.2. Onsite history of Plots 4 and 5

MAP DATE	PLOT 4	PLOT 5
1850	The plot comprises housing around the crossroads of Williamson Street and Irk Street, between the St. Michael's Place adjacent to the Parochial Burial Ground (park) and Back Irk Street (now Gould Street). The development boundary includes an area shown as a Parochial Burial Ground.	A row of terraced housing between Old Mount Street and Back Old Mount Street. A row of flats and or houses between Back Old Mount Street and Nicholas Street. The area of the proposed steps into Angel Meadow park is shown as terraced housing.
1891	More housing developed, particularly in the southeast of the plot.	No significant changes.
1922	No significant changes.	Residential buildings towards the north of Old Mount Street have been demolished
1938	No significant changes.	No significant changes.
1949	All housing appears to have been demolished, with the exception of a small block in the north of the plot. A building labelled St. Michael's Mill present on the northeast boundary and one unlabelled building on the southwest boundary adjacent to the park.	Mostly featureless ground. Large unlabelled building in the north of site, with three smaller buildings adjacent and one on the southeast boundary.
1951-1952	No significant changes.	Another unlabelled building developed on the northeast boundary.
1953-1958	The mill is relabelled a Works.	No significant changes.
1958-1959	The building in the west of site is redeveloped into and specified Works and unlabelled building.	Another unlabelled building developed on the southeast boundary.
1970	No significant changes.	Buildings on the southeast boundary demolished.
1978-1980	The former mill Works building is not present and there is only one residential building left of the housing previously in the north. The western half of the map is not available.	Large building in north of plot demolished, only the building on the northeast boundary remains.
1984-1988	The Works in the west of the plot now a garage and the southern area of site shown as a Breakers yard.	Featureless ground
1989-1992	The breakers yard is not labelled.	Mostly featureless ground. Building developed in the east corner of site.
1994-1995	A large building is developed on the northeastern boundary, adjacent to Gould Street, next to the remaining house.	No significant changes.
2002	No significant changes.	Featureless ground
2014 (most recent)	No significant changes.	No significant changes.

ST. MICHAEL'S FLAGS AND ANGEL MEADOW PARK

The following information regarding the Angel Meadow park is a summary of information included on historical maps included within the Groundsure report, as well as text found on signposts describing the history of the park during the site walkover. A map featured on one of these signs can be seen in photo 9 in **Appendix B**.

The ground was been consecrated as a cemetery in 1787, with St. Michael's and All Angels Church built in 1788, approximately 25m southeast of Plot 2, 45m south of Plot 3, 130m southwest of Plot 4 and 60m west-southwest of the main development area of Plot 5. It had its own grave yard, but the adjacent ground was subsequently used as a burial ground for people who couldn't afford a proper burial, with an estimated 40,000 bodies or more buried up until 1816 when it was closed down. It was left as open ground but was flagged over in the mid 1800's. The earliest mapping from 1848-1850 shows St Michael's Church within a Church Yard and the Parochial Burial Ground to the northeast. The church graveyard was closed to burials in 1854. In subsequent mapping in 1892 the burial ground is labelled St. Michael's Flags and the church grave yard labelled disused. In 1922 terraced housing along Style Street and Old Mount Street is no longer present, except for a small group of properties close to the church. The church was demolished by 1935. Mapping from 1980 shows the remaining housing along Style Street demolished, with a section of the road and the area up to Old Mount Street incorporated into the park. In January 2001 regeneration began of the area of wasteland into a green space.

OFFSITE

The Groundsure report lists 346 records of sites with potentially contaminative past land uses, 183 records of historical tanks, 128 records of historical energy features, 96 records of historical garage and motor vehicle repair sites, and 55 potentially infilled features derived from historical mapping within 500m of site. For brevity and relevance the following offsite historical summary focusses on features identified within 250m of the site boundaries.

The earliest available historical maps (1848 and 1850) show the site area surrounded by a mixture of housing and industrial land uses. There are two Timber Yards, one with an associated saw pit, present immediately across the road north of Plot 3. A Factory yard is shown 50m southeast of Plot 2. A large Timber Yard (containing a pond) and adjacent Machine Manufactory, as well as a school and two Smithy buildings are shown immediately southeast of Plot 5 across Nicholas Street. A Gasworks is shown immediately east with three Gasometers aligned in a row north-south to the northeast of Plot 4, 10m 30m and 50m from site. The railway viaduct runs northeast to southwest to the north of the area, passing closest at 25m north of Plot 4 and 30m north of Plot 3. The River Irk is seen flowing northeast to southwest approximately 50m and 75m northwest of Plots 3 and 4 respectively. A chemical works is shown on the opposite bank. Residential housing is shown between Old Mount Street and the Parochial Burial Ground further to the north.

Mapping from 1891-1893 shows Union Bridge Ironworks developed in the place of housing on the bank of the River Irk closer to site, approximately 35m north of Plot 3 and 60m northwest of Plot 4. The timber yard and smithies adjacent to Plot 5 are not labelled but a chimney is shown. The Gasworks adjacent to Plot 4 have been developed with the three Gasometers to the northeast being replaced by four larger gasometers between 30m and 150m northeast of site (the closet also being 100m northeast of Plot 5), with several large buildings and a rail link up to 200m east of Plot 4 and 50m northeast of Plot 5. A Cotton Mill is shown between 40m and 100m southeast of Plot 2 and Plot 5 respectively. Another Chemical Works and a dye works are shown on the river, 100m and 130m north respectively of Plot 4. Two more gasometers are shown 160 m and 180 m north of Plot 4. An industrial area showing a Tannery, Print and Dye works, Spring and Axel works and Oil Works between 100m and 200m north and northeast of Plots 2 and 3.

Mapping from 1905-1908 shows the Iron Works has expanded to incorporate the former Chemical works, Oil Works and Print and Dye works north of the River Irk. The railway viaduct has been widened and now comes within 15m northwest of Plot 4 and 20m northwest of Plot 3. The dye works to the north are labelled disused and a Rubber Works is shown 100m north of Plot 4. Adjacent to Plot 5 the former Timber Yard is developed into a Tobacco Works, with a second building across Ludgate Hill, immediately east of Plot 5. A Printing Works has been developed 20 m south across Nicholas Street and a small Ironworks is present 120 m south of Plot 5. Several Tanks are shown around the Gasometers to the northeast of Plot 4.

Mapping from 1922-1923 shows the Rubber Works to the north expands to within 90m of Plot 4 and a Bolt Works is also shown 140m northeast of Plot 4. The Ironworks south of Plot 5 is shown as disused and the residential housing to the north of Old Mount Street has been demolished. The chemical works to the north across the River Irk have been redeveloped into a Glue Works and Metal Foundry, 100m and 120m northwest of Plot 4 respectively.

Mapping from 1931-1933 shows the area is relatively unchanged since the last maps.

Mapping from 1949-1952 identifies more Tanks and a Coke feeder around the railway link into the Gasworks, approximately 100 m east of Plots 4 and 5. Several wells are also noted next to the Gasometers. An electrical substation is seen 130m northwest of Plot 4 next to the ironworks. A garage is shown approximately 80m southeast and 80m southwest of Plots 2 and 5 respectively.

Mapping from 1953-1958 relabelled all industry to “Works” and a garage is shown 125m southeast of Plot 5.

Mapping from 1970 shows two electrical substations across Gould Street, approximately 10 m north and 25m east of Plot 4. A scrap metal works is shown 90 m north and an Asphalt works shown 160m northeast of Plot 4. The western half of the map is missing on the 1970 and 1978-1980 1:1,250 scale maps. In 1980 the Gasholders to the northeast of Plot 5 appear to have been demolished, as does a large area of housing to the southwest which is then labelled a car park.

Mapping from 1984-1988 shows a saw mill approximately 50m southwest of Plot 5 and 70m southeast of Plot 2. A garage is also shown 110m northwest of Plots 2 and 3. The Gas Works have been partially demolished, with a Depot now labelled instead, and the electrical substation to the east of Plot 4 now moved to ~60m southeast of Plot 4 and northeast of Plot 5. The electrical substation across Gould Street from Plot 4 has expanded to cover a larger area.

By 1991-1992 the large ironworks northwest had been demolished and was used as a car park.

Mapping from 1993-1995 shows the garage to the northwest was no longer present, and the large block of industrial works 150m northwest of Plots 2 and 3 also not present, later redeveloped into apartments between 2002 and 2010. The land to the north of Old Mount Street, formerly occupied by residential properties and Style Street, has been incorporated into the park.

Mapping from 2010 shows the works 180m north of Plot 4 were redeveloped. No further major changes were noted on the latest mapping, dated 2014.

There are 12 records of potentially infilled land relating to ponds within 250m of site, all dated pre-1945, the closest being 20m south of site which can be seen on the earliest mapping. Two records from 1933 and 1938 relate to a Refuse Heap 133 m north. Six further records within 250m identify Unspecified Ground Workings between 1851 and 1994.

3.12 REGULATORY INFORMATION

Other regulatory information contained within the Groundsure Report for the site is summarised in **Table 2**, below.

Table 2 – Regulatory Information

ISSUE	DETAILS
Pollution Incidents	There are no recorded Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of site. There have been 29 Environment Agency Recorded Pollution Events (Nation Incidents Recording System, List 2) within 500m of the site, 17 of which have been recorded as Category 2 (significant incidents) in either Water, Land, or Air impact. The closest incident - in December 2012, 188m northwest of site - related to Tyres, Asbestos, Household and Commercial Waste.
Discharge Consents (DC)	There are 34 current discharge consents within 500m of the site, all of which relate to sewer storm overflow discharges into the River Irk.
Integrated Pollution Prevention and Control (IPPC)	No IPPCs have been identified within 500m of the site boundary.
Part A(2) and Part B Activities	There are 8 permits, 7 of which are historical. The closest, 86 m northeast of site, relates to animal and vegetable matter processes. Another relates to metal foundry processes, three relate to cement and lime processes, one relates to respraying vehicles, and one relates to petrol vapour recovery. The only current permit relates to unloading petrol at Redbank Service Station 181m northwest of site. There have been no enforcements notified on any of these records.
Fuel Station Entries	There are 4 fuel stations within 500m of the site, the closest of which is an obsolete entry 275m east. The closest open fuel station is Texaco 287m northwest, with the remaining two both obsolete entries 309m southeast and 315m northwest of site.
Current Industrial Data	There are 49 entries of potentially contaminative industrial sites within 250m of site, one of which - MJT Motors, a Vehicle Repair, Testing and Servicing garage – is on site in Plot 4. Eight more of these entries are within 100 m of the site, 4 of which are electricity sub-stations, the closest being 8m southeast adjacent to Plot 5. Another, 20m northeast of Plot 4, was noted by the WSP | Parsons Brinckerhoff engineer during the walkover and is shown on photo 13 (**Appendix B**).

Within 500m of the site there are no records of Sites Determined as Contaminated Land under Part 2A EPA 1990, Control of major accident hazards (COMAH) or Notification of Installations Handling Hazardous Substances (NIHHS) sites,

There is a record of a revoked/cancelled Radioactive Substance Authorisation for Disposal of Radioactive Waste 119m south of site at Brooke Edgley Specialist Technical Service Ltd. The licence was active between August 2000 and January 2015.

The Groundsure report notes that the site is within 5km of the proposed route of the High Speed 2 large scale railway project.

3.13 UNEXPLODED ORDNANCE (UXO)

A UXO desk study and risk assessment in relation to potential unexploded ordnance at the site was produced by Zetica for WSP | Parsons Brinckerhoff, Zetica Ref P6594-17-R1, Revision A, dated 18 January 2017 and is presented as **Appendix E**. The study concluded that:

- No records have been found indicating that High Explosive (HE) bombs fell on the site.
- One Incendiary Bomb (IB) is recorded falling on the northern boundary of the site during World War Two. There is no evidence that this caused any extensive damage likely to mask the impact of an Unexploded Bomb (UB).
- No other significant military activity is recorded on the site.
- It is considered that the site has a low UXB hazard level.

Zetica recommends that: Where a low risk of UXB encounter is anticipated, industry good practice is simply to raise the awareness of those individuals in excavations so that in the unliklely event that a suspect item is discovered, appropriate action is taken. This can be achieved through UXO awareness briefings to site staff. Further controls such as specific clearance at each pile or borehole location is considered prudent only if a zero tolerance to risk is adopted, such as at safety critical infrastructure such as nuclear power stations and oil refineries.

4 PRELIMINARY CONCEPTUAL SITE MODEL (CSM)

4.1 PRELIMINARY GROUND MODEL

The preliminary conceptual site model considers the potential contamination sources and the context of the environmental setting along with the proposed site use. It provides an assessment of the potential complete pollutant linkages between contamination sources and sensitive environmental or human receptors.

The preliminary ground model has been developed using published data and observations made during a site walkover. It is not supported by site specific intrusive investigation.

The site is expected to be underlain by Made Ground associated with previous development. Made Ground thickness is expected to be greatest in areas of former foundations. The depth indicated by BGS borehole logs close to Plot 2 is 1.83m of fill.

Superficial deposits are indicated to be present as Glacial Till, consisting predominately of clay and gravel, with sand content also likely. The depth to base of these superficial deposits is indicated to be approximately 15.55m by the closest BGS borehole log overlying weathered sandstone. Mapping indicates that the underlying bedrock is sandstone of the Chester Pebble Beds (Principal Aquifer).

The site is in close proximity to the River Irk and as such groundwater is expected to be in continuity with the River. BGS borehole log SJ89NW2903 (**Appendix C**) records that standing water level was at a depth of 2.67m bgl approximately a metre above the top of the weathered sandstone. It should be noted that this borehole is approximately 50m from site, much closer to the river.

4.2 POLLUTANT LINKAGE ASSESSMENT

The potential contaminants (sources), receptors that could be impacted and pathways, via which sources and receptors may be connected, are described below. These pollutant linkages assume redevelopment of the site as predominantly residential uses (apartments), without private gardens and publically accessible areas. .

Potential Contaminant Sources

Given the historical use of the site the following potential contaminative sources are considered to be limited to:

- Potential contamination (including asbestos containing materials and asbestos fibres in soil) within Made Ground / historical demolition/fill materials;
- Generation of hazardous ground gases from areas of Made Ground or organic soils (if present);
- Potential contamination associated with spills/leakages from the Garage, Breakers Yard and other industrial uses (including car parking) previously present on site (especially Plot 4);
- Potential contamination sourced from cooling oil spills/leakages from the substations currently present in the immediate vicinity of site (possibly containing polychlorinated biphenyls).

Potential Receptors

Relevant potential receptors are considered to include:

- Construction workers during redevelopment.
- Neighbouring site users during redevelopment.
- Future site users.
- Future maintenance workers.
- Future building infrastructure (such as potable water pipes).
- Surface waters (River Irk).
- Groundwater (Primary Aquifer – Bedrock).

Potential Contaminant Pathways

Relevant potential pathways are considered to include:

- Direct contact, ingestion or inhalation of soil bound contaminants / dust.
- Inhalation of vapours associated with soil / groundwater contamination.
- Migration of leachable/mobile contamination.
- Migration of potential ground gas into on-site or neighbouring buildings, causing asphyxiation or risk of explosion.

Potentially Complete Pollutant Linkages

There are a number of previous uses identified at the site and in the immediate surrounding area, some of which is industrial in the case of Plot 4, and as such there is potential for contamination to be present. The potentially complete pollutant linkages are considered to be:

1. Direct contact, ingestion or inhalation of soil-bound contamination during redevelopment by construction workers.
2. Inhalation of ground gases by construction workers and future site users following redevelopment.
3. Inhalation of vapours associated with ground contamination by construction workers, future site users and neighbouring site users during redevelopment.
4. Direct contact, ingestion or inhalation of soil-bound contamination by future site users and maintenance workers, following redevelopment.
5. Migration of leachable/mobile contamination to surface waters (River Irk) and the wider groundwater environment.
6. Direct contact between contamination in soil/groundwater and future below ground structures/infrastructure.

4.3 POTENTIAL MITIGATION MEASURES

Based on the preliminary CSM and subject to the findings of forthcoming investigation and assessment, examples of risk management measures that could be required during redevelopment to mitigate the risks associated with the complete pollutant linkages are provided below

- à Detailed intrusive site investigation, including soil sampling, risk assessment and monitoring of bulk ground gas.
- à Development of a Remediation Strategy and Verification Plan, as required. Mitigation measures may include provision of barrier pipework, incorporation of a clean cover system and incorporation of gas protection measures.
- à Adoption of best practice during construction and development (e.g. Construction Environmental Management Plan, provision of appropriate PPE).

4.4 WASTE CLASSIFICATION

Consideration should be given to the future waste classification of any excess material and associated disposal costs, particularly if significant volumes of spoil are expected to be generated in the course of basement and/or foundation construction.

Potential contamination within groundwater should also be considered in relation to de-watering options.

5 POTENTIAL GEOTECHNICAL CONSTRAINTS

5.1 GROUND CONDITIONS, FOUNDATIONS AND BASEMENT CONSTRUCTION

Published geological mapping indicates that the site is underlain by a sequence of Made Ground, Glacial Till, and Chester Pebble Beds Formation sandstone of the Sherwood Sandstone Group. An inferred normal fault, down throwing to the northeast, is indicated to traverse the site trending northwest to southeast.

Current proposals comprise the construction of four structures, one on each of the four plots, ranging in height from 12 storeys (Plot 5) to 40 storeys (Plot 4). A plan of the development is presented below.

Plot 4 will contain a basement and a lower ground floor utilised for car parking and service areas; Plot 2 and Plot 3 will each include a basement comprising a lift pit/stairwell and plant room. No basement areas are currently proposed for Plot 5.

Proposed Site Extent



Given the likely shallow ground conditions (Made Ground & Glacial Till), it would seem likely that bored or continuous flight auger plies would represent the most suitable foundation solution for Plots 2, 3 and 5.

In order to ensure adequate bearing resistances can be achieved it is likely that piled foundations will have to bear into the sandstone bedrock.

If competent rock is encountered within the basement excavation for Plot 4, then an option may be to found the structure on a raft foundation. If sufficiently competent ground is not encountered then piled foundations may be required.

Basement retention systems will be required to control deflections and ground movement on the site boundaries. This is likely to be in the form of a contiguous or secant bored pile wall. On Plot 4, given the proximity of the basement excavation to the adjacent railway viaduct, it is considered that a detailed assessment of likely ground movements will be required together with appropriate liaison with and approval from Network Rail.

Suspended ground floor construction should be assumed for Plots 2, 3 and 5 at this stage. Subject to confirmation of the ground conditions and consultation with specialist contractors, consideration could be given to the use of ground improvement techniques (e.g. vibro stone columns), to improve the performance of the Made Ground and allow the use of ground bearing floor slabs.

The above is subject to confirmation of the ground conditions through ground investigations works and confirmation of the development proposals, structural and floor slab loadings.

5.2 OBSTRUCTIONS, EXCAVATABILITY & GROUNDWATER

Below ground obstructions associated with previous phases of development should be anticipated across all the plots. Such obstructions could present a significant risk to the installation of foundations, basement retention system and basement excavation. Careful consideration should be given to appropriate mitigation measures to deal with any obstructions to ensure that abnormal costs are appropriately managed.

The Made Ground may be unstable in open excavations and, in order to maintain safe working conditions, the use of ground support or cutting batters to safe angles is likely to be required.

Based on the available data, no significant problems would be anticipated with the basement excavations for Plots 2, 3 and 4. The majority of the excavations would be anticipated to be through Made Ground and Glacial Till. If rock is encountered, then hard digging, possibly with the use of hydraulic breakers and ripping techniques may be required to reach formation level.

Rock coring and laboratory strength testing will be required to assess the excavation methodology required.

Significant groundwater ingress would not be anticipated on Plot 5, although inflows of perched water within the Made Ground may be a problem, particularly during period of wet weather. If bedrock proves to be shallow then groundwater may be encountered within the basement excavations on Plots 2, 3 and 4 and the need for specialist dewatering techniques and/or secant retaining walls cannot be ruled out.

A detailed ground investigation will be required prior to construction commencing to establish groundwater levels and allow the design of any specialist dewatering measures that may be required.

5.3 UXO

As outlined in Section 3.13 a desk study assessment undertaken by Zetica UXO concluded that the site is low risk with respect to UXO.

It is the responsibility of the Principal Contractor to ensure that the UXO risk is appropriately addressed and mitigated during the groundworks. In planning mitigation measures, reference should be made to CIRIA 681 '*Unexploded Ordnance (UXO) – A Guide for the Construction Industry*' 2009.

5.4 PAVEMENTS AND HARDSTANDING

The formation level will be dependent on any earthworks undertaken to achieve desired site levels and such information is not available at the time of writing. Given the previously developed nature of the site, formation soils could be highly variable and significant disturbance could be experienced through the removal of below ground structures. As such, the achievable CBR for the design of pavements and hardstandings will be dependent on the formation soils and the degree of preparation (e.g. rolling and removal of soft spots).

For the purposes of preliminary budget costings a CBR of <2% is considered appropriate.

5.5 BELOW GROUND CONCRETE

Whilst specialist testing will be required to determine the requirements for below ground concrete, it is considered unlikely that the ground conditions will require a concrete class in excess of DS4/AC4, as defined by BRE Special Digest 1, "*Concrete in Aggressive Ground Guidance*" 2005.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Contamination

The potential for deep Made Ground and the former industrial use of some parts of the site and neighbouring land gives rise to the potential for soil and groundwater contamination. Made Ground materials may also contain asbestos containing materials or asbestos fibres and produce hazardous ground gases. As a result, a number of potentially complete pollutant linkages have been identified.

It should be noted that the available historical mapping dates from 1850. On-site land uses prior to 1850 may have included additional areas used for burials, historic buildings or structures of archaeological interest. It is recommended that archaeological constraints to excavations are established before breaking ground, including any site investigation.

The presence of chemical or asbestos contamination within excess excavated soils will have implications for material reuse or off-site disposal to landfill and, along with groundwater quality, should be considered and assessed during any intrusive investigation.

Geotechnical

Given the likely shallow ground conditions, it would seem likely that bored or continuous flight auger plies would represent the most suitable foundation solution for Plots 2, 3 and 5.

If competent rock is encountered within the basement excavations for Plots 2, 3 and 4, then an option may be to found the structure on a raft foundation. If sufficiently competent ground is not encountered then piled foundations may be required.

A basement retention system will be required to control deflections and ground movement on the site boundaries. This is likely to be in the form of a contiguous or secant bored pile wall.

Given the proximity of the Plot 4 basement excavation to the adjacent railway viaduct, it is considered that a detailed assessment of likely ground movements will be required together with appropriate liaison with and approval from Network Rail.

Below ground obstructions should be anticipated across all the sites and may present a significant risk to the installation of foundations, basement retention system and basement excavation. If rock is encountered in the basement excavation, then hard digging, possibly with the use of hydraulic breakers and ripping techniques may be required.

Significant groundwater ingress would not be anticipated on Plot 5, although inflows of perched water within the Made Ground may be encountered.

Groundwater may be encountered within the basement excavation on Plots 2, 3 and 4 and the need for specialist dewatering techniques and a secant retaining wall cannot be ruled out.

For the purposes of preliminary budget costings a CBR of <2% is considered appropriate.

It is considered unlikely that the ground conditions will require a concrete class in excess of DS4/AC4,

6.2 RECOMMENDATIONS

It is recommended that an intrusive investigation is completed to confirm the presence/absence of risks associated with contamination and to provide sufficient geotechnical information to allow the cost effective design of the substructures. A number of potentially complete pollutant linkages have been identified in the preliminary CSM. Following confirmation through site investigation, a remediation strategy will be developed and implemented, mitigation measure may include but are not limited to:

- à Provision of barrier pipework;
- à Inclusion of a clean cover system in areas of soft landscaping; and,
- à Inclusion of ground gas protection measures.

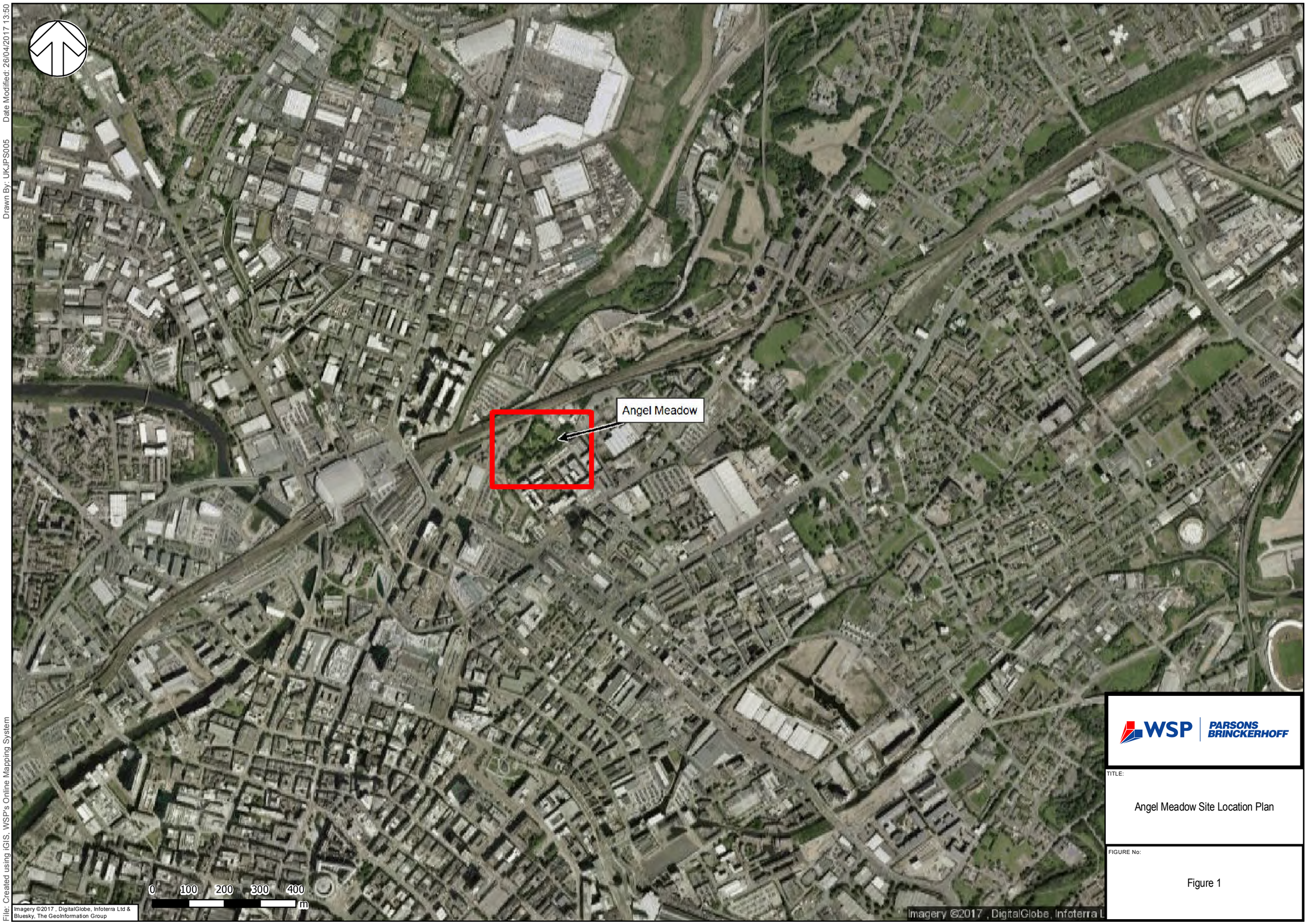
The production of an intrusive investigation report and remediation strategy (if required) is likely to be a condition of the planning permission. The groundwater level and the permeability of the bedrock will need to be confirmed as part of any future ground investigation.

It is recommended that archaeological constraints to excavations are established before breaking ground.

Appendix A

FIGURES AND DRAWINGS

Drawn By: UKJPS005 Date Modified: 26/04/2017 13:50



WSP | PARSONS BRINCKERHOFF

TITLE:

Angel Meadow Site Location Plan

FIGURE No:

Figure 1

File: Created using iGIS, WSP's Online Mapping System

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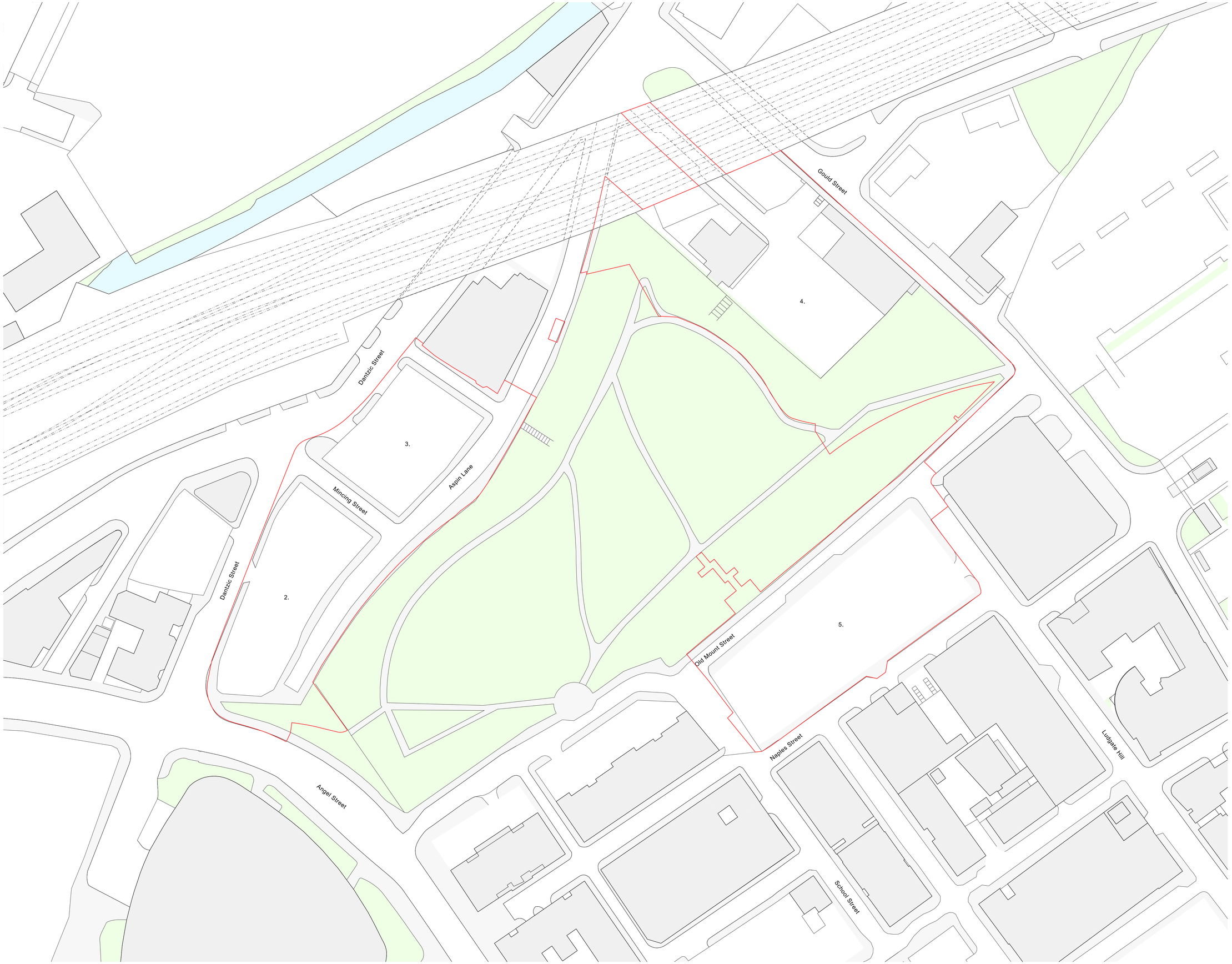
All dimensions and levels should be 'read only' from those values stated in text, on the drawings

⚠ CONSTRUCTION - It is considered that the proposed works are within the scope of a competent Contractor and as such no unusual hazards have been identified, refer to relevant Hayr Scheduler Designers Risk Assessment

KEY PLAN:



Application Boundary



REV:	DATE:	DETAILS:
F	05/05/17	Planning Issue
E	24/04/17	Planning Issue
D	05/04/17	Planning Issue
C	03/04/17	Updated Boundary
B	23/03/17	Design Freeze Issue
A	25/01/17	50% Stage 2 Issue

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PROJECT:
Angel Meadow
Manchester

TITLE:
Existing Site Plan

SCALE:	ORIGIN DATE:	DRAWN:	CHECKED:
1:500@A1	12/01/17	AAB	JC

STATUS:
Planning

PROJECT	DRAWING NO:	REV:
05498	MP_00_1001	F

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⚠ CONSTRUCTION - It is considered that the proposed works are within the scope of a competent Contractor and as such no unusual hazards have been identified, refer to relevant Key/ Scheduled Designers Risk Assessment

KEY PLAN:



Application Boundary

REV:	DATE:	DETAILS:
H	05/05/17	Planning Issue
G	24/04/17	Planning Issue
F	13/04/17	Draft Planning Issue
E	11/04/17	Draft Planning Issue
D	05/04/17	Draft Planning Issue
C	23/03/17	Design Freeze Issue.
B	17/02/17	Updated ground floor plans
A	02/02/17	Amended ground floor plans

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PROJECT:
Angel Meadow
Manchester

TITLE:
Proposed Ground Floor Masterplan

SCALE:	ORIGIN DATE:	DRAWN:	CHECKED:
1:500@A1	18/01/17	AAB	JC

STATUS:
Planning

PROJECT	DRAWING NO:	REV:
05498	_MP_00_1200	H

Architecture | Masterplanning | Interiors | Graphics | Branding

Appendix B

WALKOVER PHOTOGRAPHS



Photo 1: Plot 2, viewed from the southern boundary along Angel Street, looking north.



Photo 2: Plot 2, viewed from the northern boundary along Mincing Street, looking south.



Photo 3: Plot 3 viewed from the southwest corner, at the junction of Mincing Street and Datzic Street, facing northeast.



Photo 4: The railway viaduct, viewed from the northwest boundary of Plot 3 on Daztic Street, facing northeast.



Photo 5: Plot 4, as viewed from the park, facing northeast.



Photo 6: A view of Plot 4 from the northeastern boundary on Gould Street, facing southwest.



Photo 7: Plot 5 viewed from Ludgate Hill, facing southwest.



Photo 8: Plot 5 viewed from Old Mout Street, facing east.



Photo 9: One of the several information signs in Angel Meadows Public Space.



Photo 10: Map with key of Angel Meadows Public Space, from an information sign.



Photo 11: View of Angel Meadows facing north from the site of the old church. Plot 3 is visible on the left of the photo.



Photo 12: A view of Angel Meadows facing west northwest, with Plot 4 visible in the right of the photo and Plots 2 and 3 visible in the background on the left.



Photo 13: A view of the substation across Gould Street from Plot 4, facing east.



Photo 14: A view across Angel Meadows from Old Mount Street, facing north. Plot 4 can be seen in the background.

Appendix C

GROUNDSURE REPORT,
COAL AUTHORITY REPORT
BGS BOREHOLE LOGS

Groundsure
LOCATION INTELLIGENCE

WSP UK Ltd

PARSONS BRINCKERHOFF LTD,OXFORD HOUSE, OXFORD ROAD, MANCHESTER, M1 7ED

Groundsure Reference:	GS-3512621
Your Reference:	PO20037664
Report Date	8 Dec 2016
Report Delivery Method:	Email - pdf

Groundsure Geo Insight Plus

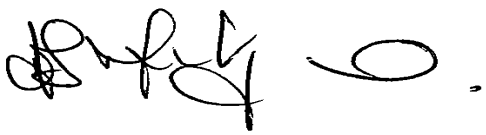
Address: Angel Meadow,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geo Insight Plus** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
Groundsure Geoinsight Plus

Groundsure Geo Insight Plus

Address:	**Angel Meadow,**
Date:	**8 Dec 2016**
Reference:	**GS-3512621**
Client:	**WSP UK Ltd**

NW N NE



W E

SW S SE

Aerial Photograph Capture date:	11-Jun-2015
Grid Reference:	384374,399201
Site Size:	2.94ha

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Overview of Findings

The Groundsure Geo Insight Plus provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 and 1:10,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Non-coal mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Geology 1:10,000 Scale		
1.1 Artificial Ground	1.1 Is there any Artificial Ground/ Made Ground present beneath the study site at 1:10,000 scale?	Yes
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site at 1:10,000 scale?*	Yes
	1.2.2 Are there any records of landslip within 500m of the study site boundary at 1:10,000 scale?	No
1.3 Bedrock, Solid Geology and Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records of faults within 500m of the study site boundary at 1:10,000 scale?	Yes

Section 2: Geology 1:50,000 Scale		
2.1 Artificial Ground	2.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	Yes
	2.1.2 Are there any records relating to permeability of artificial ground within the study site*boundary?	Yes
2.2 Superficial Geology and Landslips	2.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?*	Yes
	2.2.2 Are there any records of permeability of superficial ground within 500m of the study site?	Yes
	2.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	2.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No

Section 2: Geology 1:50,000 Scale

2.3 Bedrock, Solid Geology and Faults	2.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	2.3.2 Are there any records relating to permeability of bedrock ground within the study site boundary?	Yes
	2.3.3 Are there any records of faults within 500m of the study site boundary?	Yes

Section 3: Radon

3. Radon	3.1Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
	3.2Radon Protection	No radon protective measures are necessary.

Section 4: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
4.1 Historical Surface Ground Working Features from Small Scale Mapping	1	0	17	Not Searched	Not Searched
4.2 Historical Underground Workings from Small Scale Mapping	0	0	0	5	5
4.3 Current Ground Workings	0	0	0	0	9

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.1 Historical Mining	0	0	0	0	0
5.2 Coal Mining	1	0	0	0	0
5.3 Johnson Poole and Bloomer Mining Area	1	0	1	4	0
5.4 Non-Coal Mining*	0	0	0	0	1
5.5 Non–Coal Mining Cavities	0	0	0	0	0
5.5 Natural Cavities	0	0	0	0	0

Section 5: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
5.6 Brine Extraction	0	0	0	0	0
5.7 Gypsum Extraction	0	0	0	0	0
5.8 Tin Mining	0	0	0	0	0
5.9 Clay Mining	0	0	0	0	0

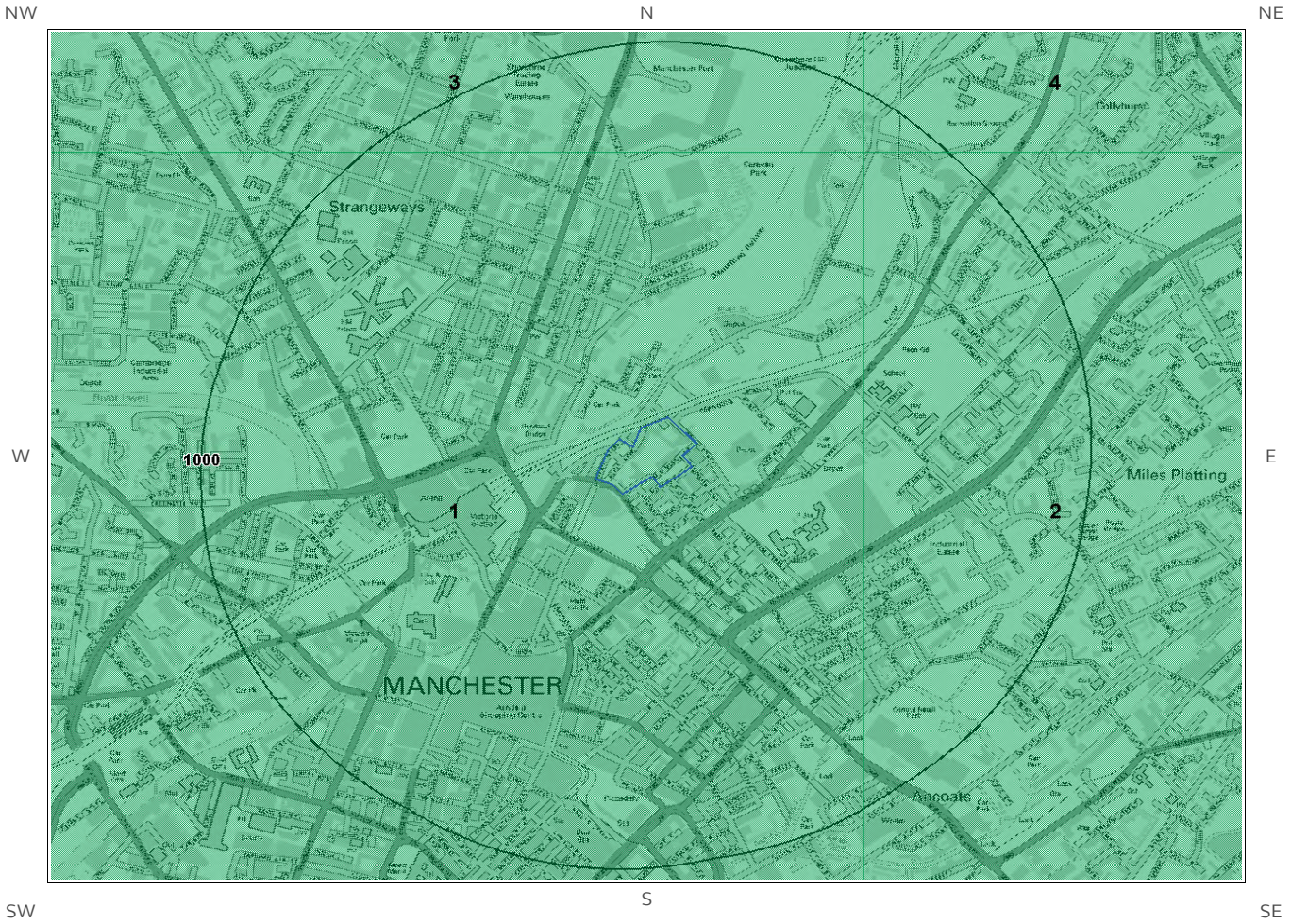
Section 6: Natural Ground Subsidence	On-site
6.1 Shrink-Swell Clay	Very Low
6.2 Landslides	Very Low
6.3 Ground Dissolution of Soluble Rocks	Negligible
6.4 Compressible Deposits	Very Low
6.5 Collapsible Deposits	Very Low
6.5 Running Sand	Very Low

Section 7: Borehole Records	On-site	0-50m	51-250
7 BGS Recorded Boreholes	1	4	83

Section 8: Estimated Background Soil Chemistry	On-site	0-50m	51-250
8 Records of Background Soil Chemistry	2	2	0

Section 9: Railways and Tunnels	On-site	0-50m	51-250	250-500
9.1 Tunnels	0	0	0	Not Searched
9.2 Historical Railway and Tunnel Features	9	18	97	Not Searched
9.3 Historical Railways	0	0	5	Not Searched
9.4 Active Railways	0	22	24	Not Searched
9.5 Railway Projects	0	0	0	0

1:10,000 Scale Availability



1_10,000 Availability Legend

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Site Outline

Full Coverage

Partial Coverage

No Coverage

50
250
Search Buffers (m)

Availability of 1:10,000 Scale Geology Mapping

The following information represents the availability of the key components of the 1:10,000 scale geological data.

ID	Distance	Artificial Coverage	Superficial Coverage	Bedrock Coverage	Mass Movement Coverage
1	0.0	Some deposits are mapped	Full	Full	No coverage
2	422.0	Some deposits are mapped	Full	Full	Some deposits are mapped
3	706.0	Some deposits are mapped	Full	Full	Some deposits are mapped
4	862.0	Some deposits are mapped	Full	Full	Some deposits are mapped

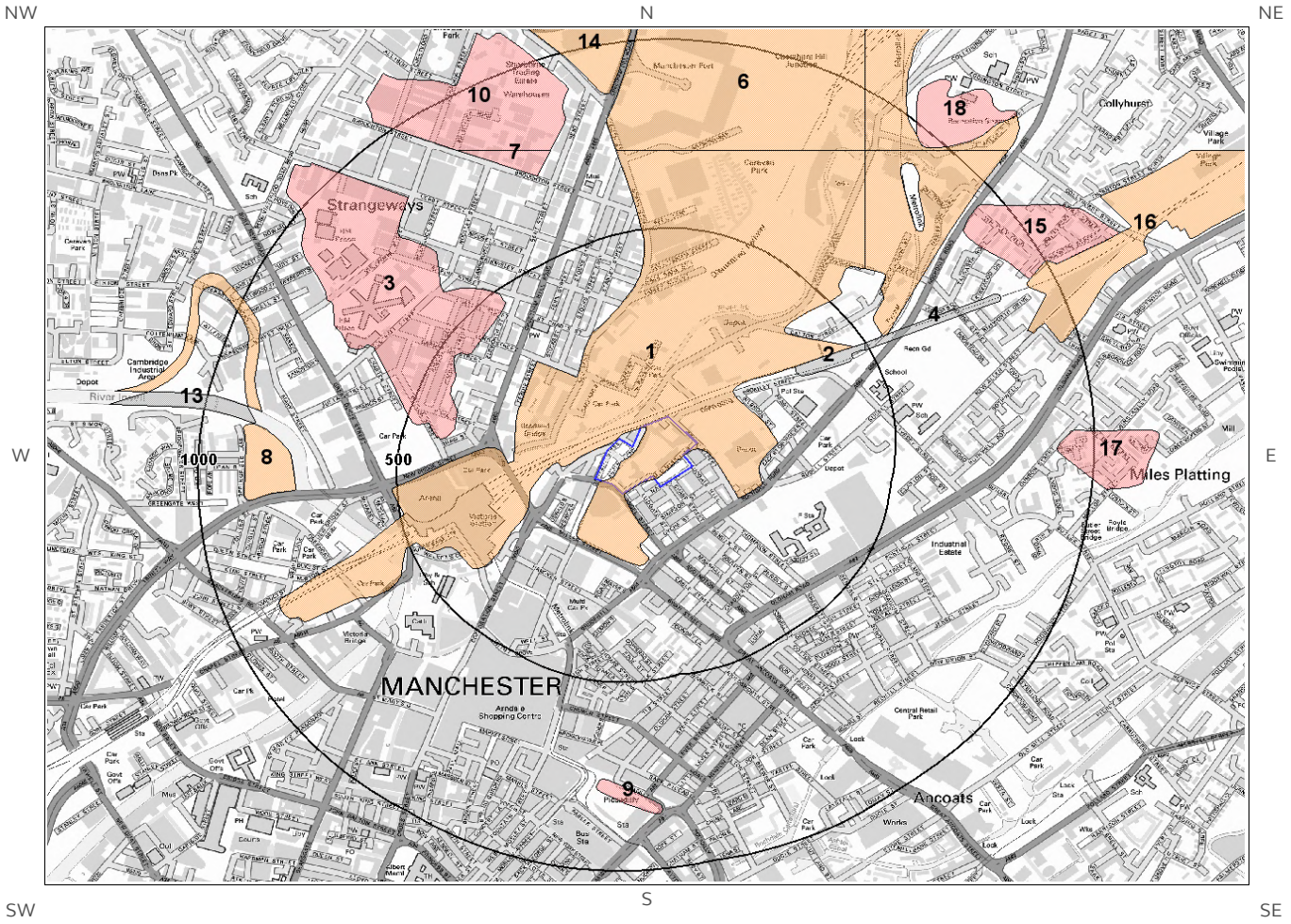
Guidance: The 1:10,000 scale geological interpretation is the most detailed generally available from BGS and is the scale at which most geological surveying is carried out in the field. The database is presented as four types of geology (artificial, mass movement, superficial and bedrock), although not all themes are mapped or available on every map sheet. Therefore a coverage layer showing the availability of the four themes is presented above.

The definitions of coverage are as follows:

Geology	Full Coverage	Partial Coverage	No Coverage
Bedrock	The whole tile has been mapped	Some but not all the tile has been mapped	No coverage
Superficial	The whole tile has been mapped	Some but not all of the tile has been mapped	No coverage
Artificial	Some deposits are mapped on this tile	-	No deposits are mapped
Mass Movement	Some deposits are mapped on this tile	-	No coverage

1 Geology (1:10,000 scale).

1.1 Artificial Ground Map (1:10,000 scale)



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

1. Geology 1:10,000 scale

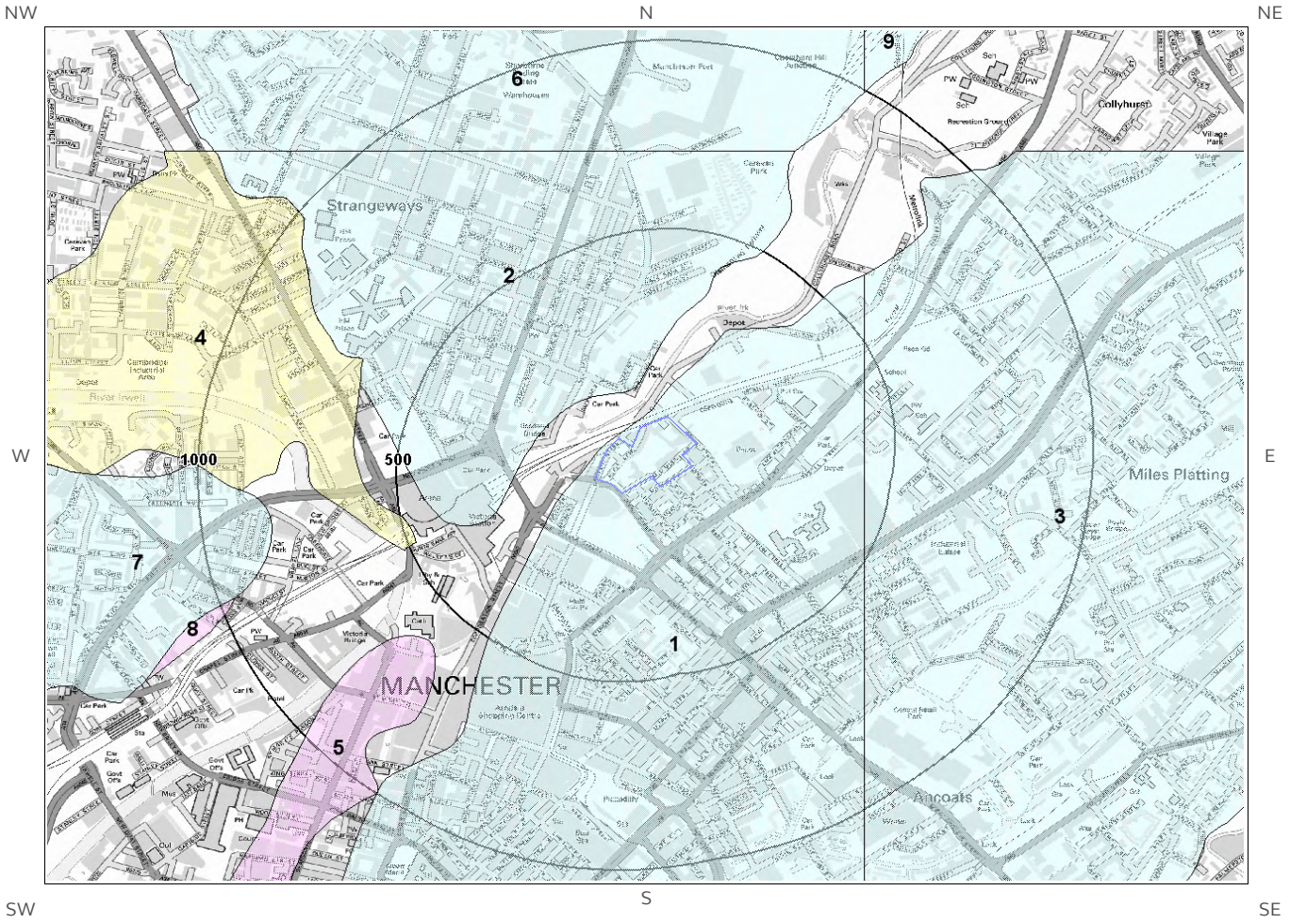
1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

Are there any records of Artificial/ Made Ground within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	311.0	NE	WGR-VOID	Worked Ground (Undivided)	Void
3	379.0	W	WMGR-ARTDP	Infilled Ground	Artificial Deposit
4	489.0	NE	WGR-VOID	Worked Ground (Undivided)	Void

1.2 Superficial Deposits and Landslips Map (1:10,000 scale)



Artificial Ground Legend

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Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary at 1:10,000 scale? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
2	102.0	NW	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
3	422.0	E	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
4	481.0	W	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

1.2.2 Landslip

Are there any records of Landslip within 500m of the study site boundary at 1:10,000 scale?

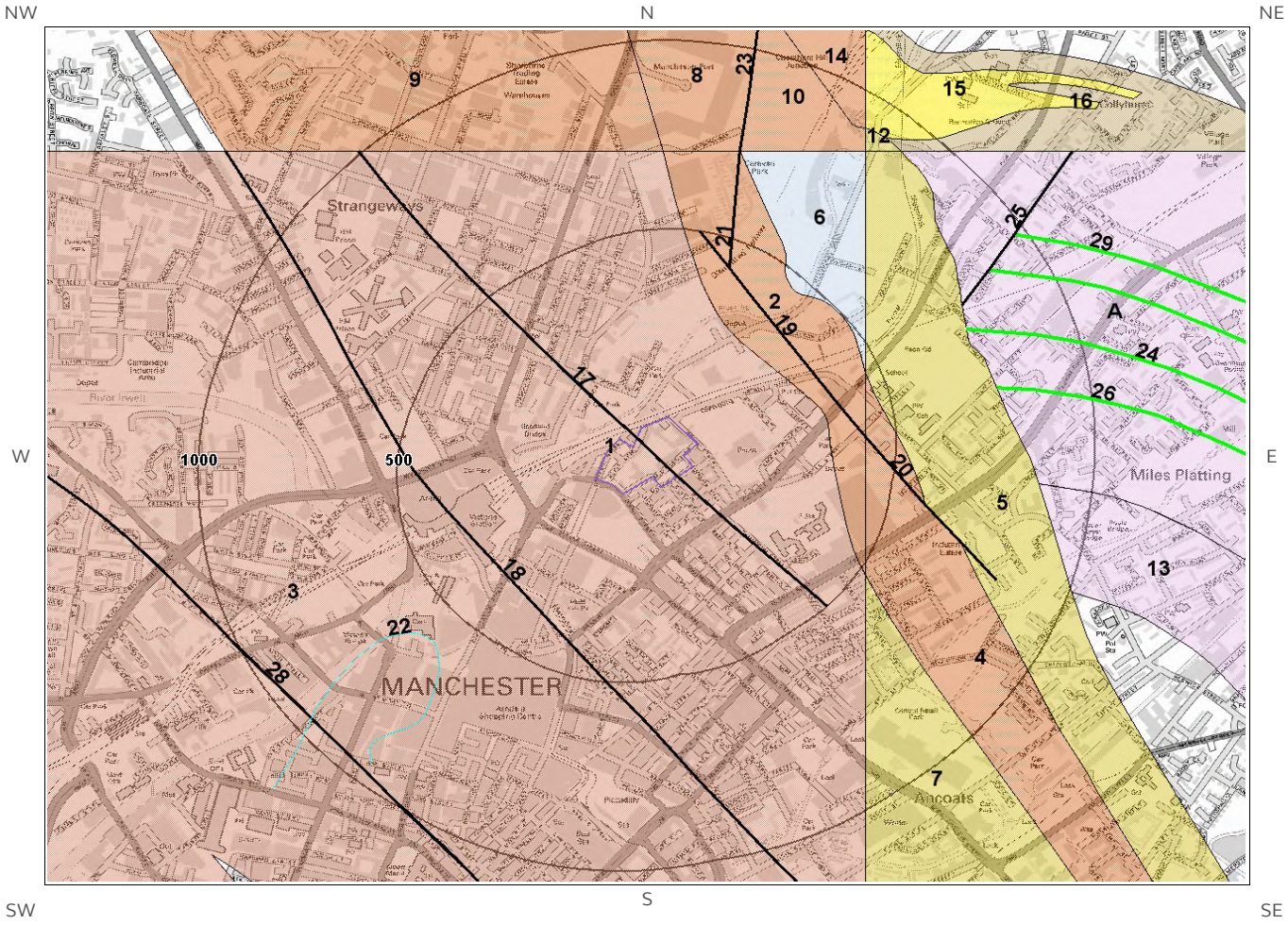
No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:10,000 scale

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3 Bedrock and Faults Map (1:10,000 scale)



Bedrock and Faults Legend

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Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock and Faults

The following geological information represented on the mapping is derived from 1:10,000 scale BGS Geological mapping.

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary at 1:10,000 scale.

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch
2	270.0	NE	MM-MDST	Manchester Marls Formation - Mudstone	Late Permian Epoch [Obsolete name]
3	335.0	SW	CPB-SDST	Chester Pebble Beds Formation - Sandstone	Early Triassic Epoch
4	422.0	E	MM-MDST	Manchester Marls Formation - Mudstone	Late Permian Epoch [Obsolete name]
5	461.0	E	CS-SDST	Collyhurst Sandstone Formation - Sandstone	Cisuralian Epoch
6	462.0	NE	CS-SDST	Collyhurst Sandstone Formation - Sandstone	Cisuralian Epoch

1.3.2 Faults

Are there any records of Faults within 500m of the study site boundary at 1:10,000 scale? Yes

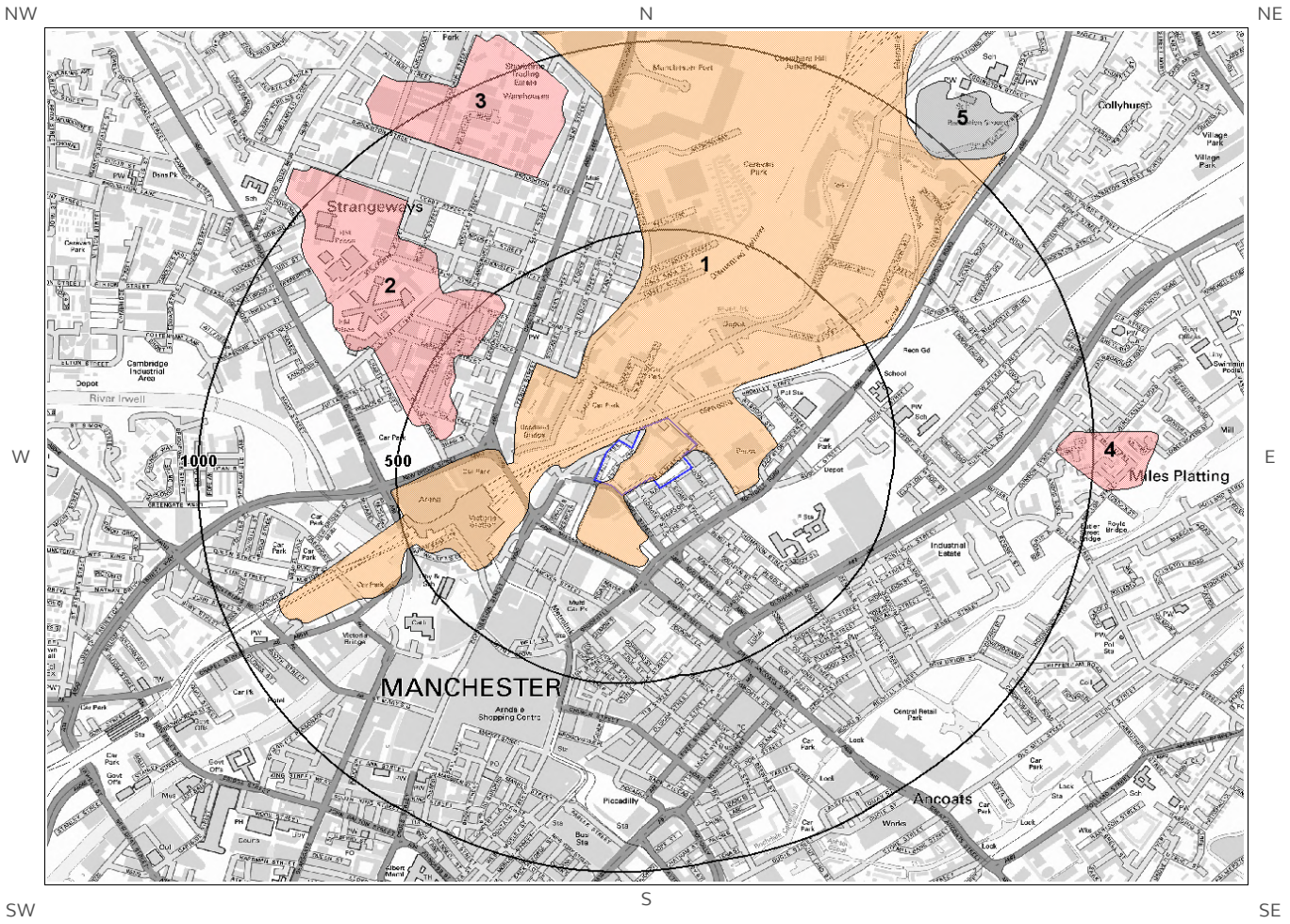
ID	Distance (m)	Direction	Category Description	Feature Description
17	0.0	On Site	FAULT	Normal fault, inferred; crossmarks on downthrow side
18	335.0	SW	FAULT	Normal fault, inferred; crossmarks on downthrow side
19	345.0	NE	FAULT	Normal fault, inferred; crossmarks on downthrow side
20	422.0	E	FAULT	Normal fault, inferred; crossmarks on downthrow side
21	424.0	N	FAULT	Normal fault, inferred; crossmarks on downthrow side

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of great Britain at 1:10,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2 Geology 1:50,000 Scale

2.1 Artificial Ground Map



Ground Workings Legend

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Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Disturbed Ground (undivided)

Worked Ground (undivided)

Landscaped Ground (undivided)

Infilled Ground

Reclaimed Ground

2. Geology 1:50,000 scale

2.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 085

2.1.1 Artificial/ Made Ground

Are there any records of Artificial/ Made Ground within 500m of the study site boundary? Yes

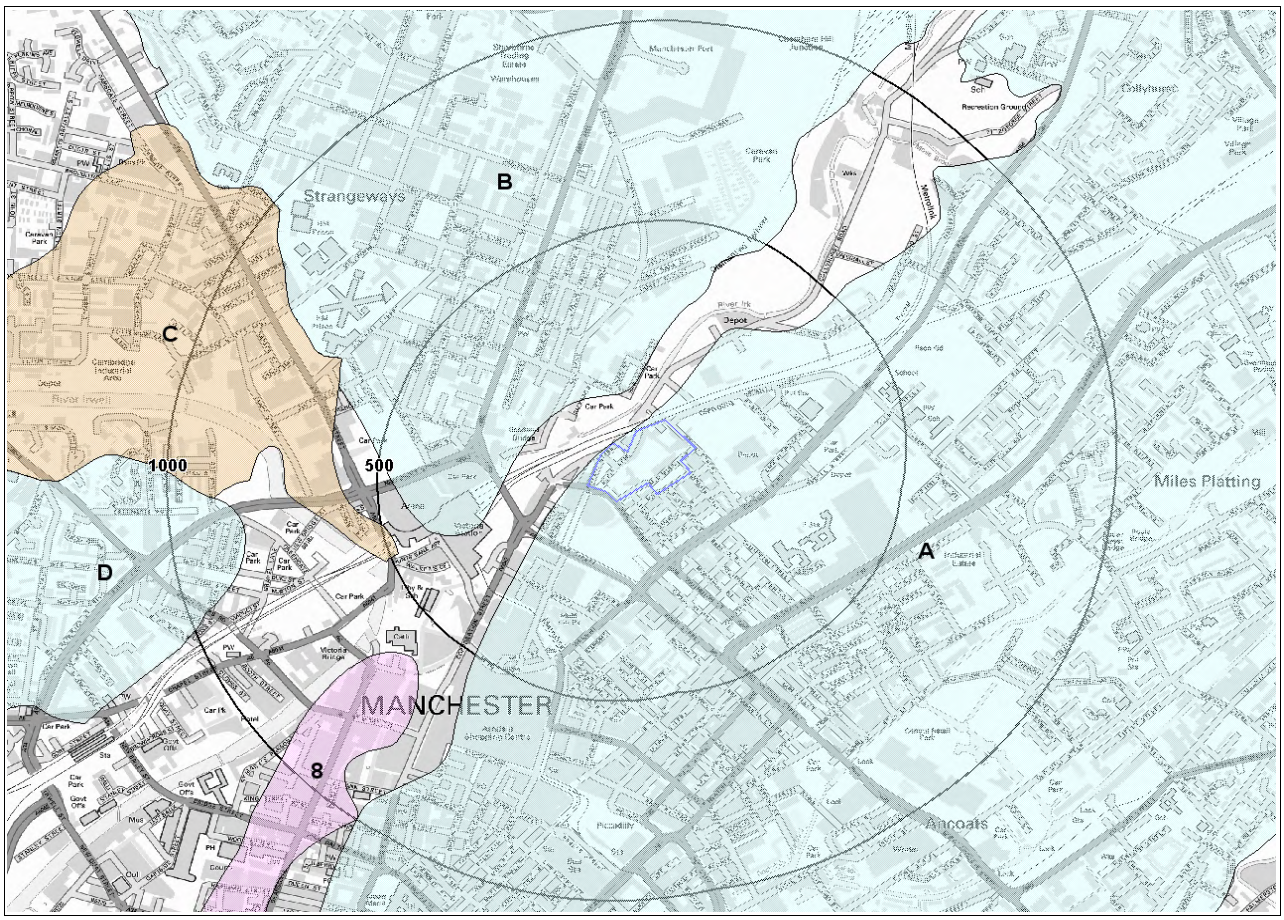
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	379.0	W	WMGR-MGRD	INFILLED GROUND	ARTIFICIAL DEPOSIT

2.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	Very High	Low

2.2 Superficial Deposits and Landslips Map (1:50,000 scale)



Ground Workings Legend

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Site Outline

500
1000
Search Buffers (m)

2.2 Superficial Deposits and Landslips

2.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance	Direction	LEX Code	Description	Rock Description
1A	0.0	On Site	TILLD	TILL, DEVENSIAN	DIAMICTON
2B	103.0	NW	TILLD	TILL, DEVENSIAN	DIAMICTON
3C	480.0	W	ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]
5A	0.0	On Site	TILLD	TILL, DEVENSIAN	DIAMICTON
6B	103.0	NW	TILLD	TILL, DEVENSIAN	DIAMICTON
7C	480.0	W	ALV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL [UNLITHIFIED DEPOSITS CODING SCHEME]

2.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Low

2.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

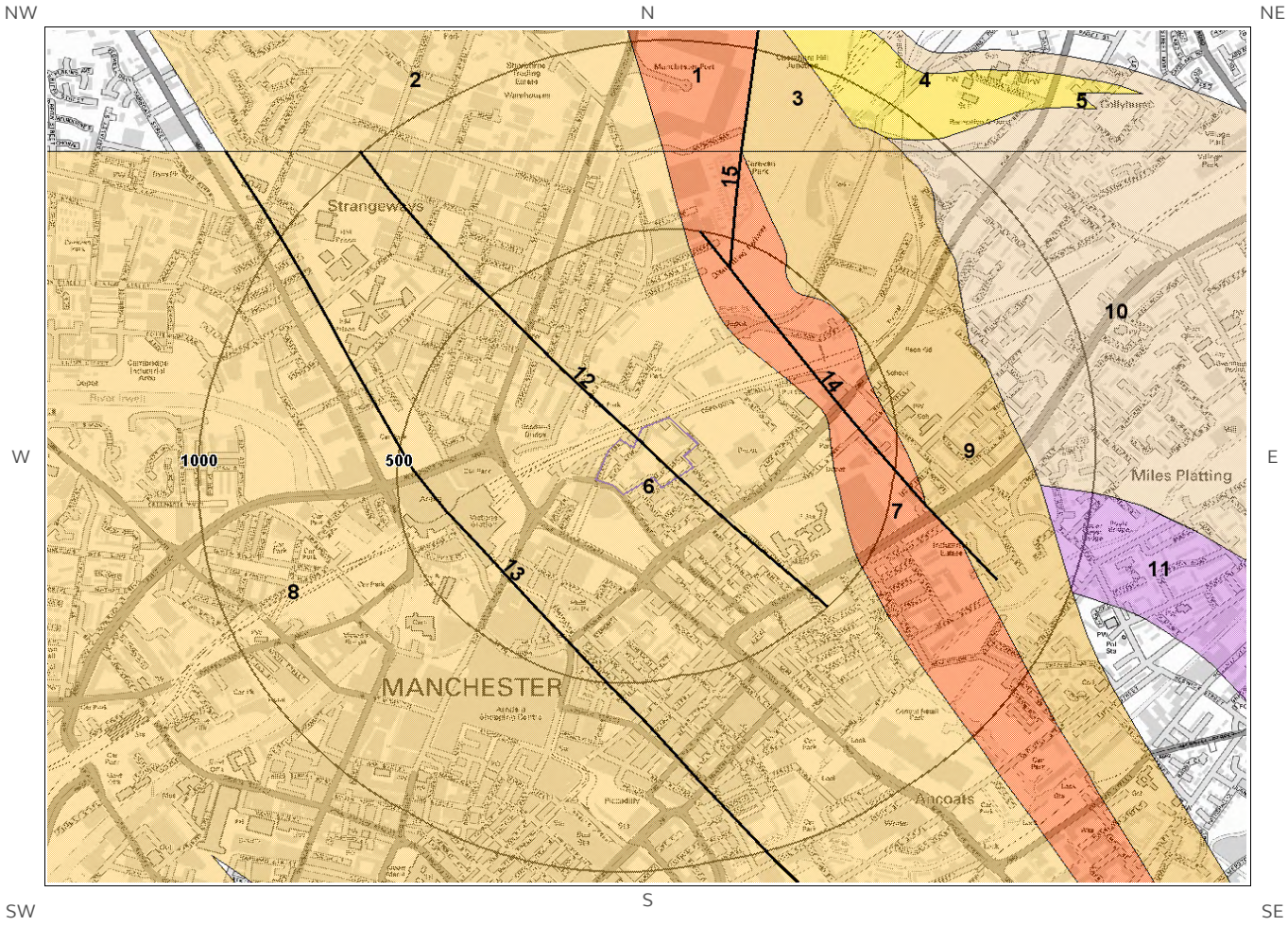
This Geology shows the main components as discrete layers, there are: Artificial/ Made Ground, Superficial/ Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

2.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site boundary? No

Database searched and no data found.

2.3 Bedrock and Faults Map (1:50,000 scale)



Ground Workings Legend

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Site Outline

500
1000
Search Buffers (m)

2.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No: 085

2.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance	Direction	LEX Code	Rock Description	Rock Age
6	0.0	On Site	CPB-SDST	Chester Pebble Beds Formation - Sandstone	No Details
7	270.0	NE	MM-MDST	Manchester Marls Formation - Mudstone	No Details
8	336.0	SW	CPB-SDST	Chester Pebble Beds Formation - Sandstone	No Details
9	461.0	E	CS-SDST	Collyhurst Sandstone Formation - Sandstone	No Details

2.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Moderate

2.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? Yes

ID	Distance	Direction	Category Description	Feature Description
12	0.0	On Site	FAULT	Fault, inferred, crossmark on downthrow side, throw in metres
13	336.0	SW	FAULT	Fault, inferred, crossmark on downthrow side, throw in metres
14	345.0	NE	FAULT	Fault, inferred, crossmark on downthrow side, throw in metres
15	424.0	N	FAULT	Fault, inferred, crossmark on downthrow side, throw in metres

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nation wide coverage.

3 Radon Data

3.1 Radon Affected Areas

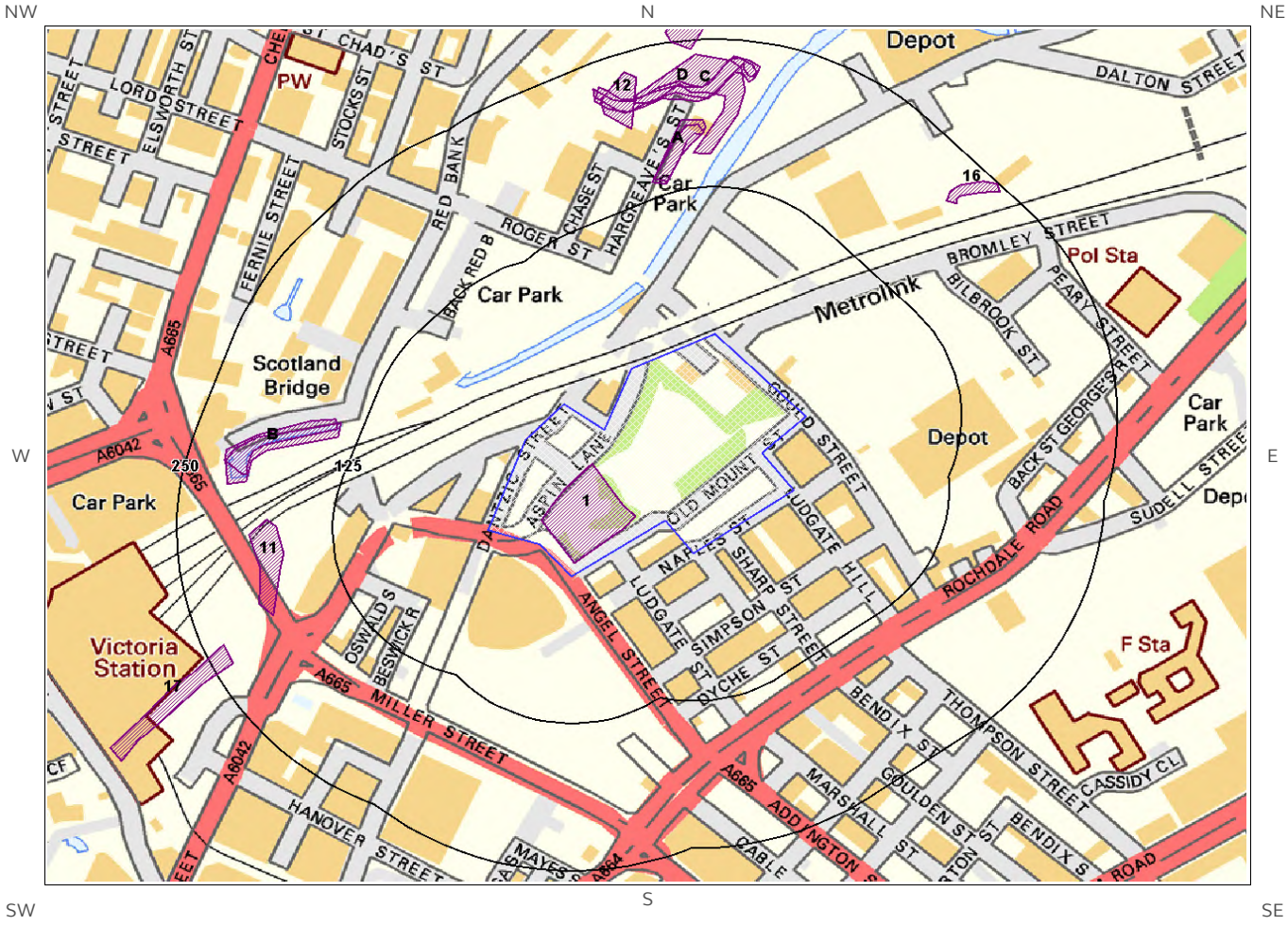
Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

3.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

---

4 Ground Workings Map



Ground Workings Legend

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Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

4 Ground Workings

4.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Use	Date
1	0.0	On Site	384403 399142	Disused Grave Yard	1978
2A	133.0	N	384475 399447	Refuse Heap	1938
3A	135.0	N	384477 399450	Refuse Heap	1933
4B	141.0	W	384129 399193	Pond	1889
5B	144.0	W	384129 399199	Pond	1906
6B	144.0	W	384129 399199	Pond	1916
7B	144.0	W	384129 399199	Pond	1938
8B	144.0	W	384129 399199	Pond	1931
9B	144.0	W	384129 399199	Pond	1923
10C	153.0	N	384519 399489	Unspecified Ground Workings	1921
11	166.0	W	384145 399096	Pond	1889
12	186.0	N	384428 399492	Pond	1889
13C	198.0	N	384503 399505	Unspecified Ground Workings	1988
14D	198.0	N	384503 399505	Unspecified Ground Workings	1994
15D	200.0	N	384475 399506	Unspecified Ground Workings	1956
16	210.0	NE	384712 399414	Unspecified Ground Workings	1956
17	234.0	SW	384066 398981	Pond	1889
18	242.0	N	384486 399557	Pond	1891

4.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	478.0	NE	385116 399612	Tunnel	1968
Not shown	478.0	NE	385116 399612	Tunnel	1956
Not shown	478.0	NE	385116 399612	Tunnel	1978
Not shown	494.0	NE	385125 399609	Tunnel	1985
Not shown	494.0	NE	385125 399609	Tunnel	1991
Not shown	550.0	NE	385122 399641	Tunnel	1923
Not shown	550.0	NE	385122 399641	Tunnel	1938
Not shown	550.0	NE	385122 399641	Tunnel	1933
Not shown	550.0	NE	385122 399641	Tunnel	1921
Not shown	550.0	NE	385122 399641	Tunnel	1906

4.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

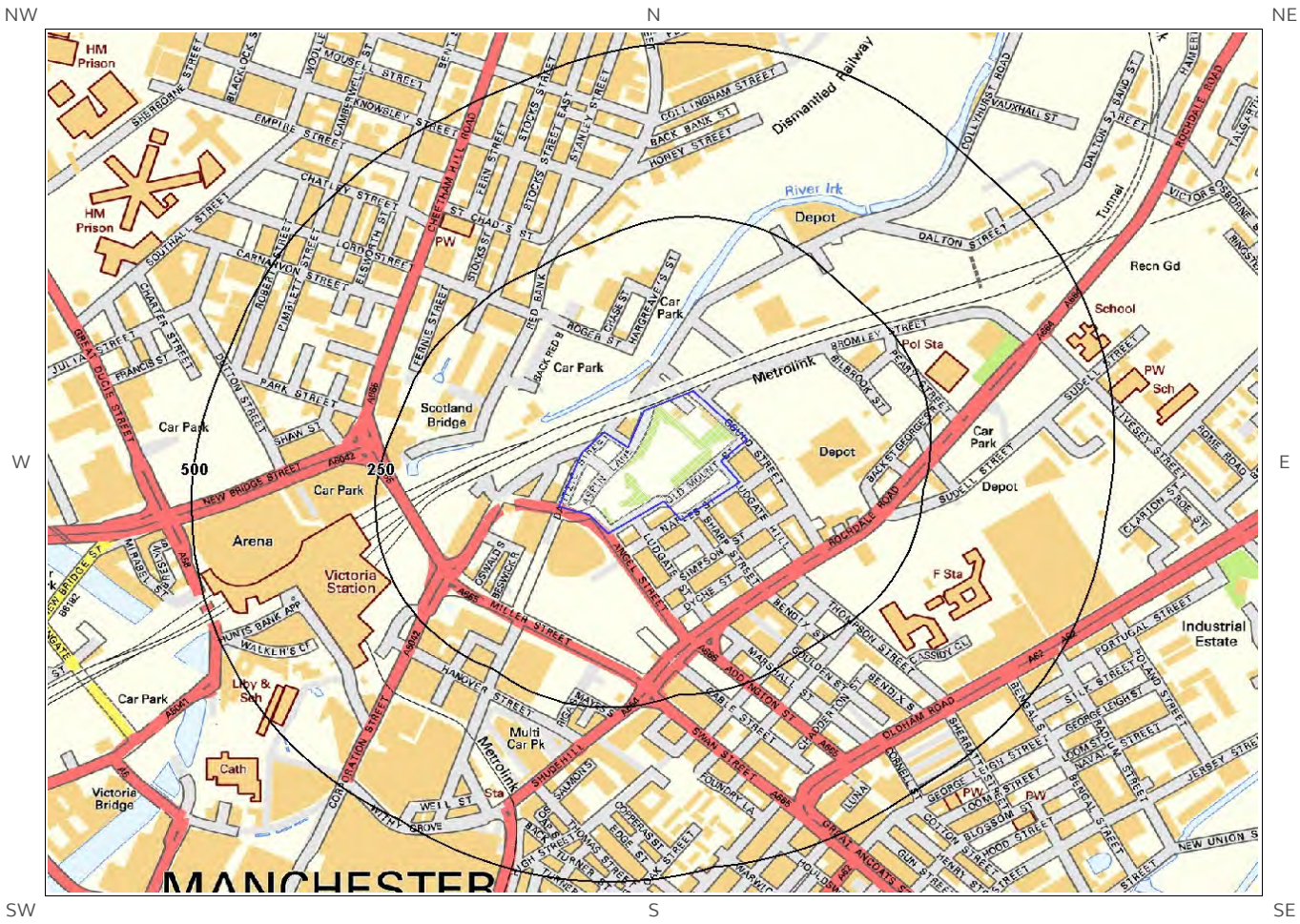
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	539.0	NW	383894 399487	Clay & Shale	Strangeways Brick Field	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	687.0	N	384675 399960	Clay & Shale	North Street Brickworks	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	744.0	NE	385005 399845	Sandstone	Collyhurst	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	841.0	NE	385300 399655	Coal, Deep	St George's Colliery	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	841.0	NW	383700 399735	Clay & Shale	Sherborne Street Brickworks	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	852.0	NE	385290 399692	Coal, Deep	St Georges Colliery	Working is wholly underground, access by shaft, adit or drift. Working may be termed Colliery, Mine, Drift Mine, Slant, Level, Adit or Ingoing Eye (Ingaun Ee - Scots)	Ceased
Not shown	856.0	NE	385100 399910	Sand	Red Sand Delph	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	909.0	NW	384125 400120	Clay & Shale	Broughton Street Brickworks	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	915.0	N	384800 400160	Clay & Shale	Ellison's Brickworks	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

5 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

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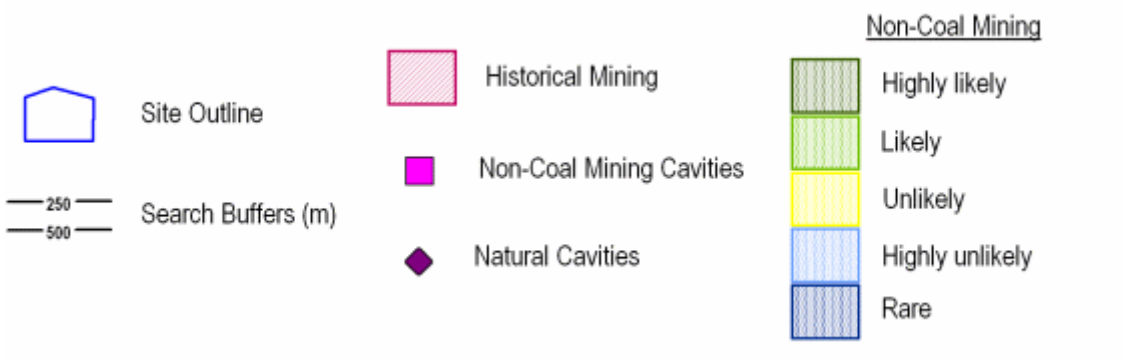


5 Mining, Extraction & Natural Cavities

5.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

5.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? Yes

The following information provided by JPB is not represented on mapping: 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. Further details and a quote for services can be obtained by emailing this report to enquiries.gs@jpb.co.uk.

5.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
Not shown	864.0	E	Not available	Vein Mineral	Sporadic underground mining of restricted extent may have occurred. Potential for difficult ground conditions are unlikely and localised and are at a level where they need not be considered

5.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

5.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

5.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level..

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

5.10 Clay Mining

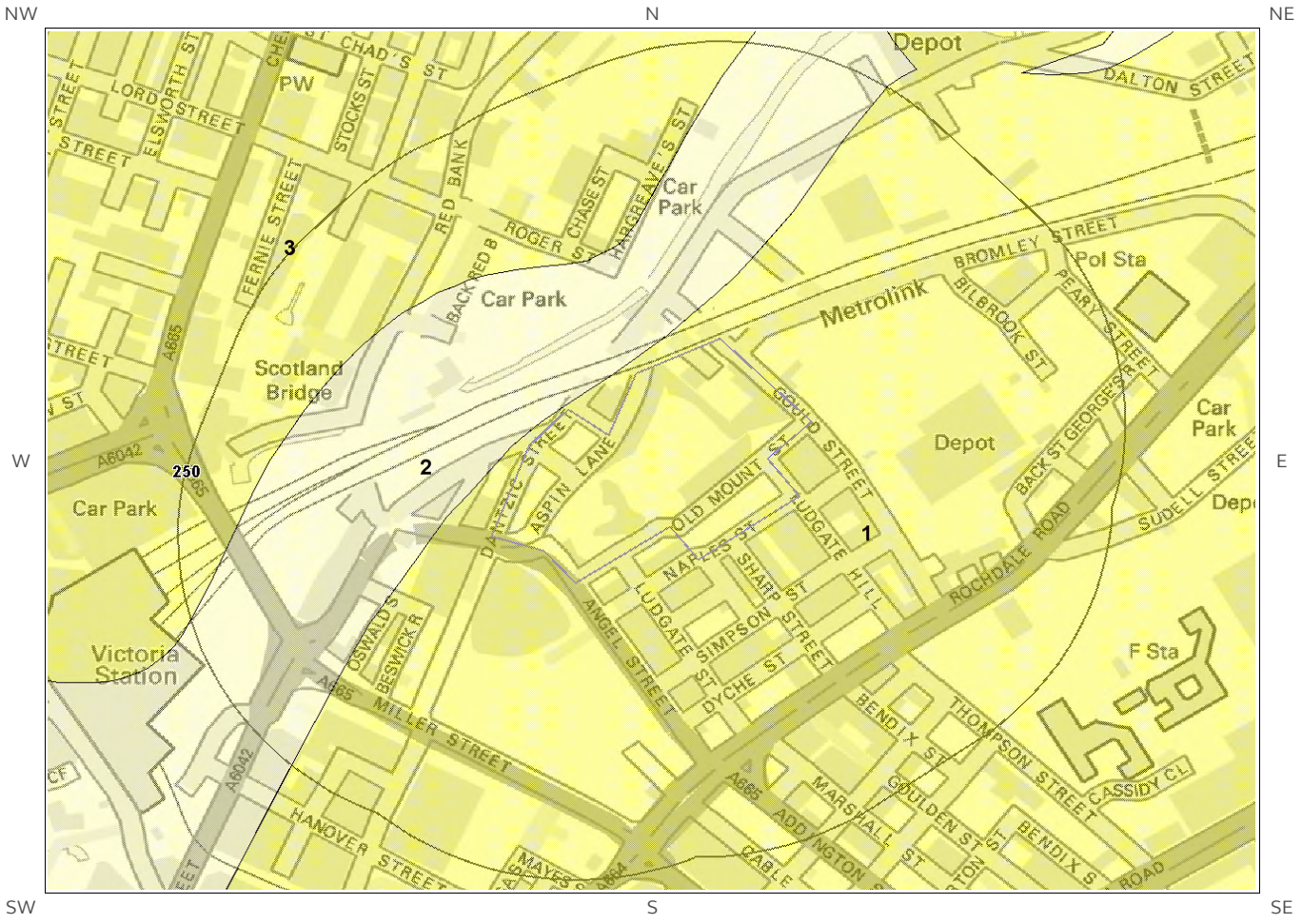
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

6 Natural Ground Subsidence

6.1 Shrink-Swell Clay Map



Shrink Swell Clay Legend

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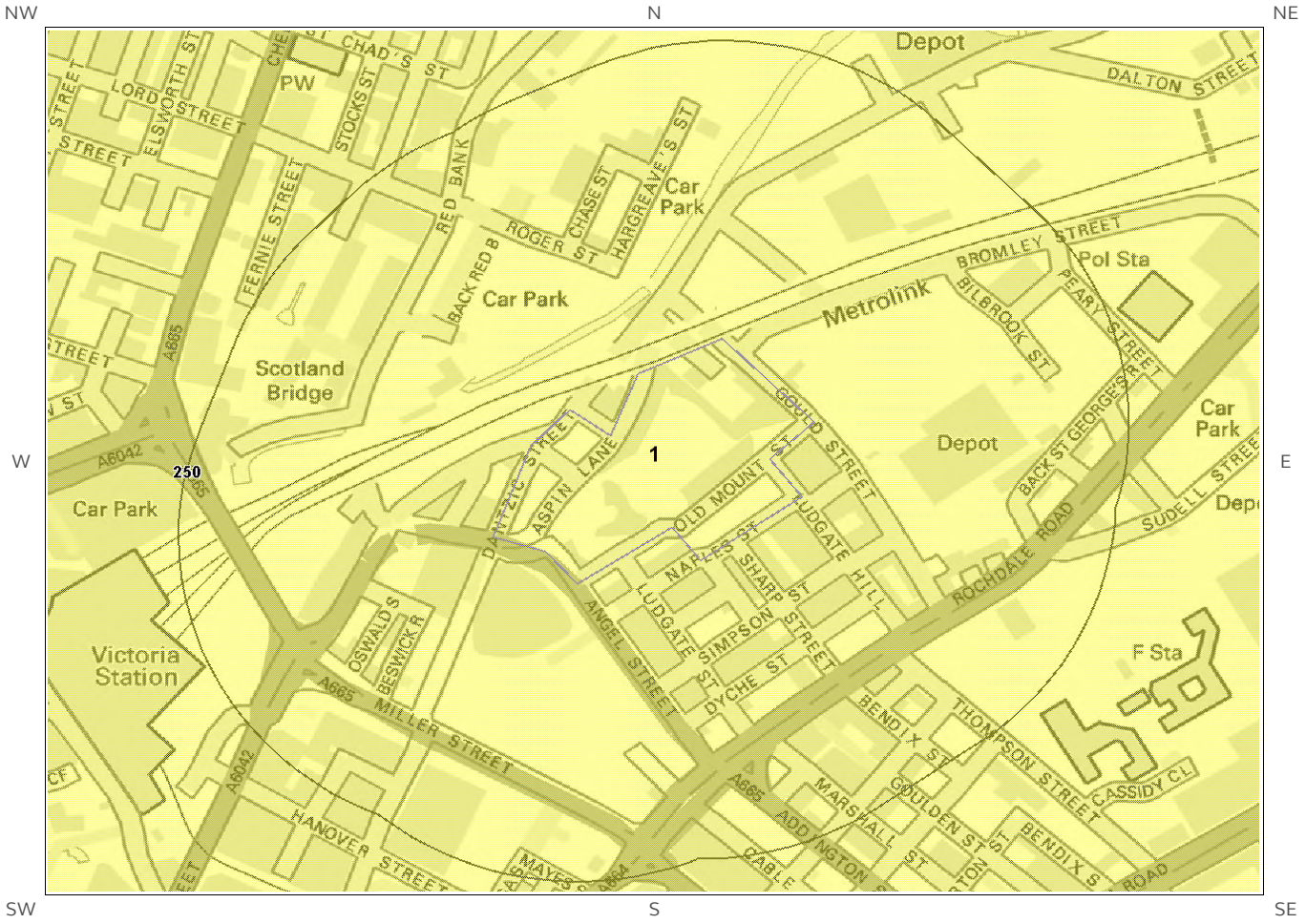
6.2 Landslides Map



Landslides Legend

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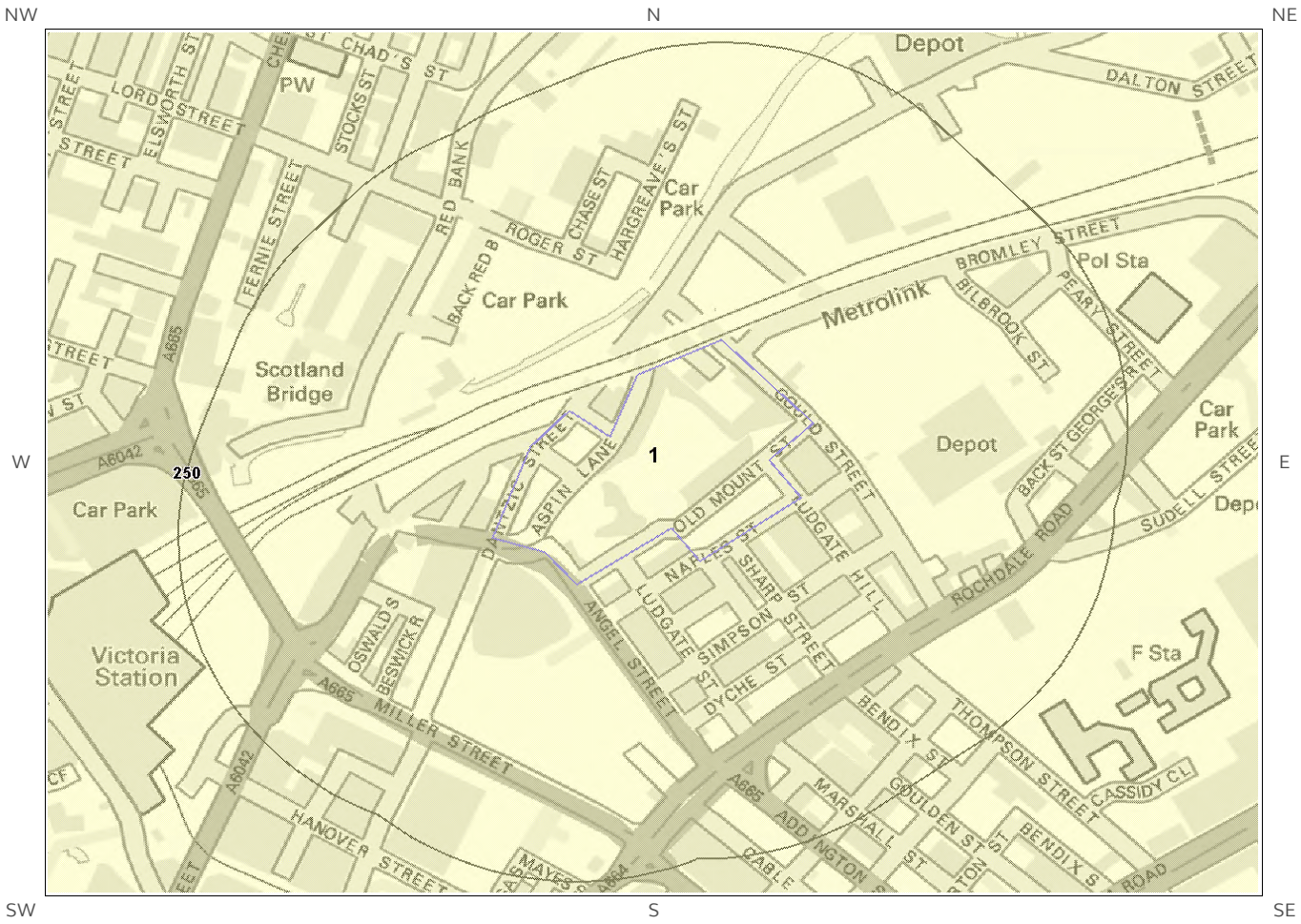
6.3 Ground Dissolution of Soluble Rocks Map



Ground Dissolution Soluble Rocks Legend

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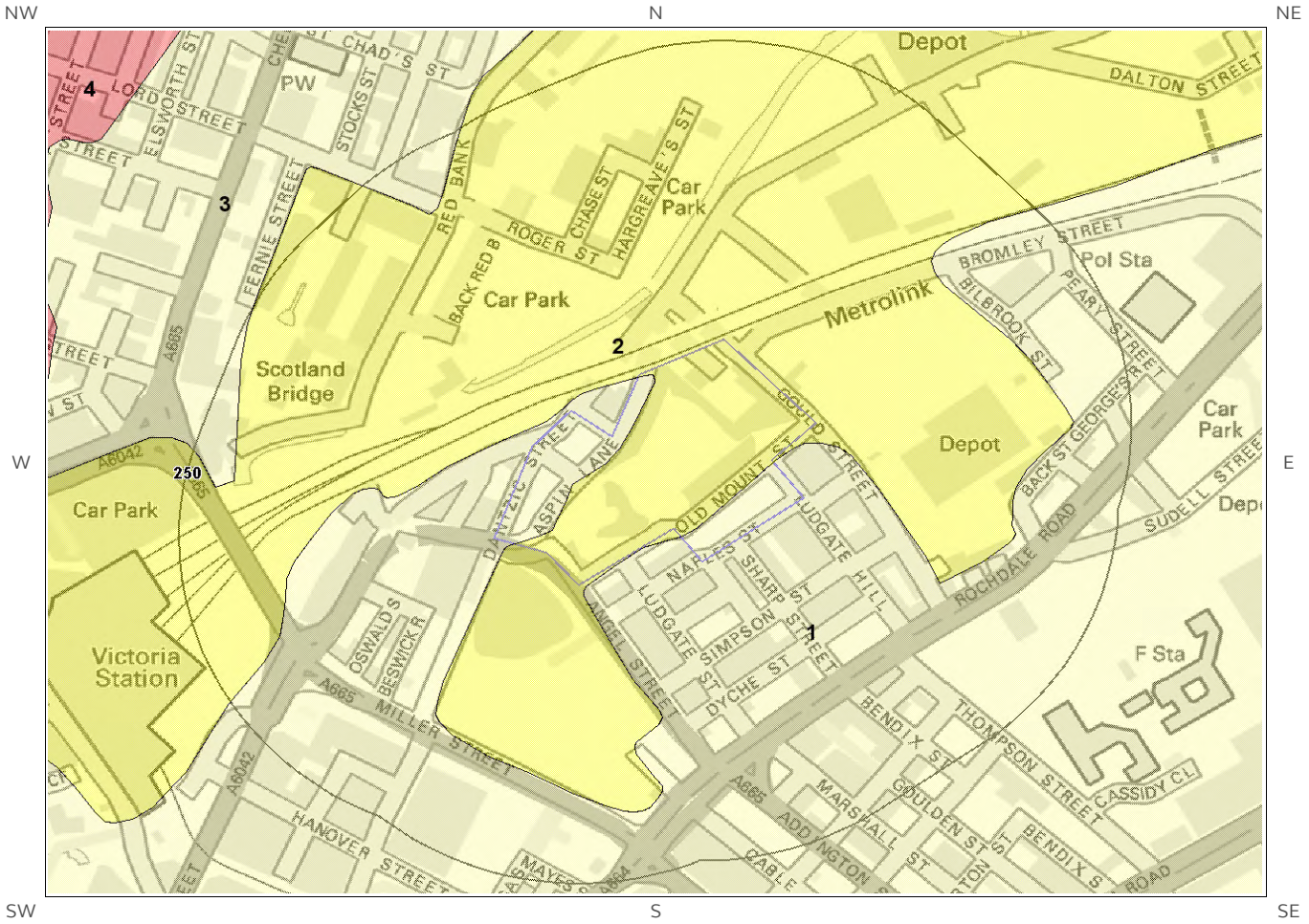
6.4 Compressible Deposits Map



Compressible Deposits Legend

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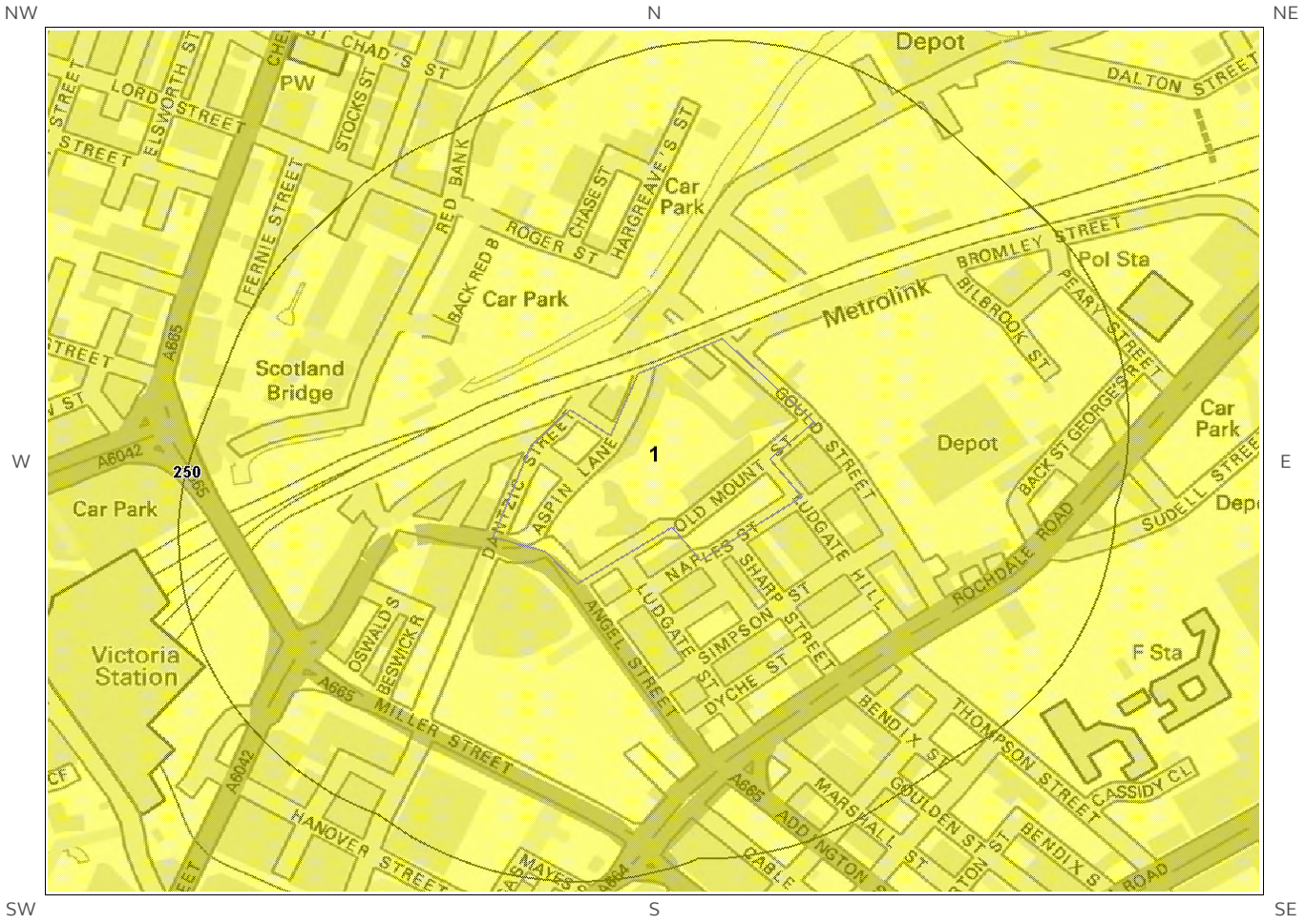
6.5 Collapsible Deposits Map



Collapsible Deposits Legend

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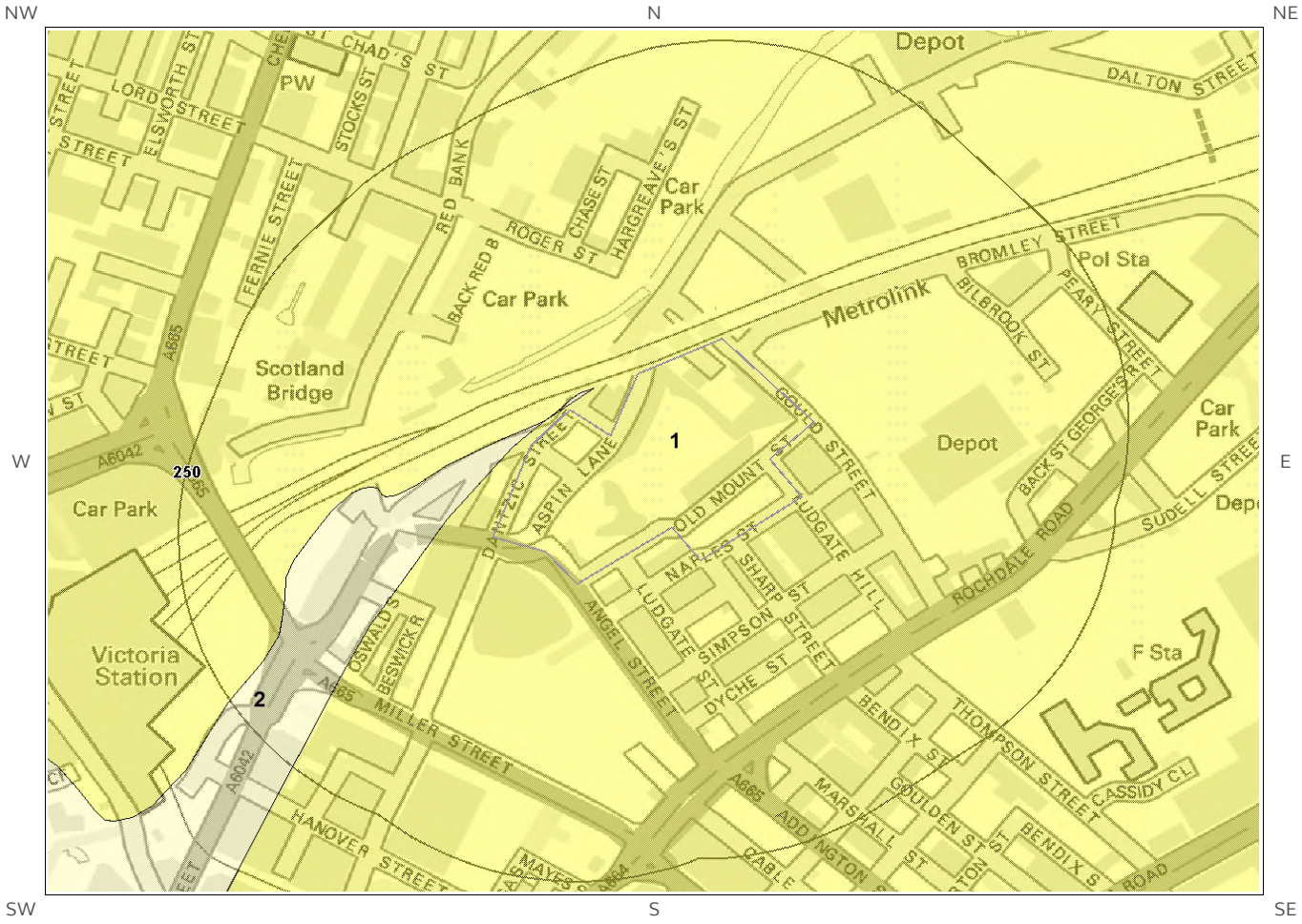
6.6 Running Sand Map



Running Sand Legend

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6 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site*[*] boundary? Very Low

6.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
2	4.0	NW	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely likely due to potential problems with shrink-swell clays.

6.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This includes an automatically generated 50m buffer zone around the site

6.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

6.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
2	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

6.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

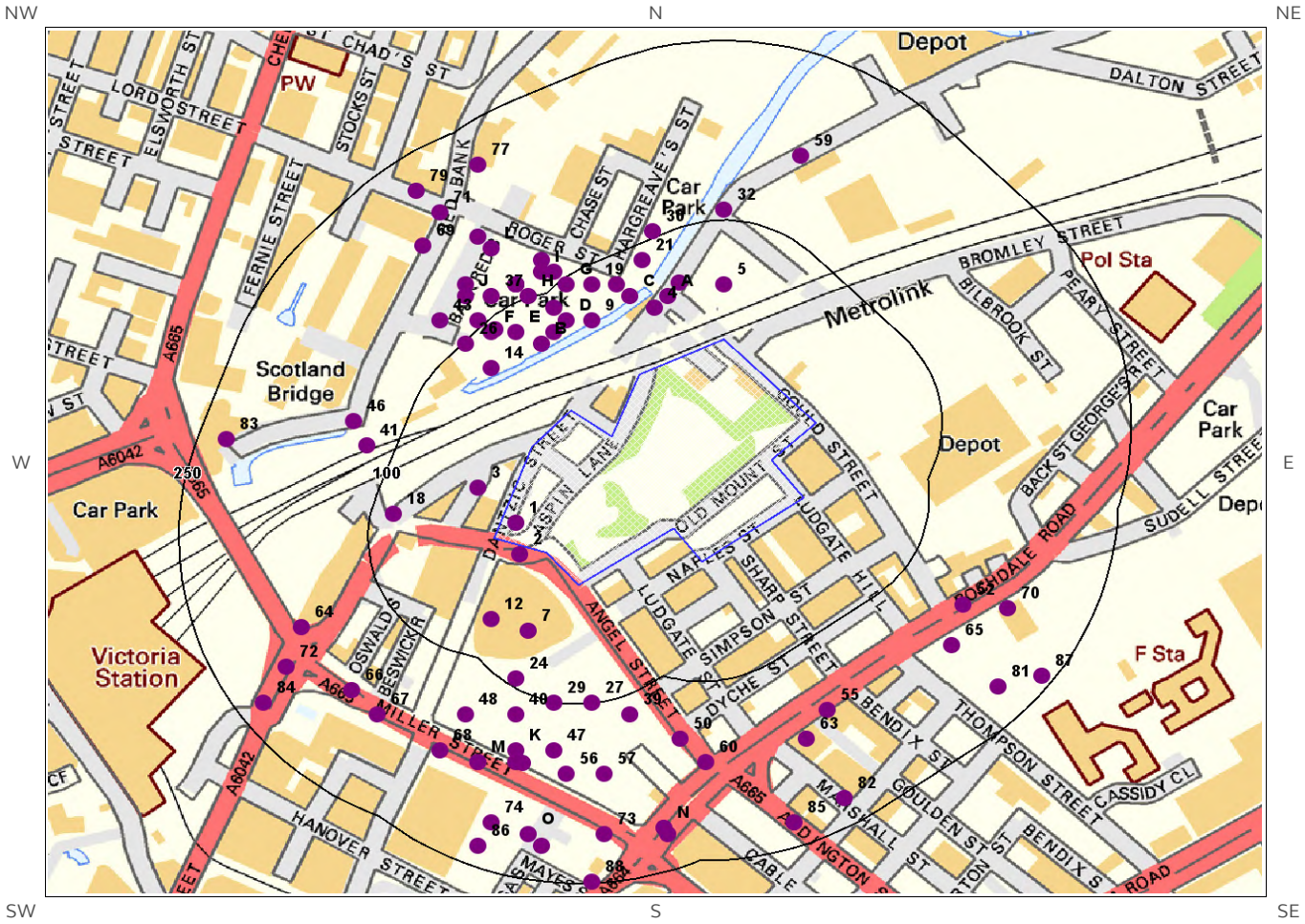
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

6.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	4.0	NW	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

7 Borehole Records Map



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7 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 88

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	0.0	On Site	384340 399140	SJ89NW1339	4.11	CITY CENTRE - PHASE 2 35
2	8.0	S	384343 399114	SJ89NW56	18.9	MANCHESTER CORP. VICTORIA STATION
3	27.0	W	384310 399170	SJ89NW3277	-1.0	CROWN LANE MANCHESTER OB
4	46.0	NW	384450 399320	SJ89NW2903	7.75	NEW ROGER STREET BRIDGE 4
5	46.0	N	384505 399340	SJ89NW32	5.03	MANCHESTER CORP. NEWTOWN
6A	51.0	NW	384460 399330	SJ89NW2902	6.55	NEW ROGER STREET BRIDGE 3
7	56.0	SW	384350 399050	SJ89NW3655	30.94	IRO SCHEDULE CENTRE O
8A	57.0	NW	384469 399341	SJ89NW33	5.18	MANCHESTER CORP. B.SEWER
9	59.0	NW	384400 399310	SJ89NW1644	-1.0	ROGER STREET MANCHESTER TP 9
10B	60.0	NW	384360 399290	SJ89NW1652	-1.0	ROGER STREET MANCHESTER TP 17
11C	63.0	NW	384430 399330	SJ89NW2901	6.3	NEW ROGER STREET BRIDGE 2
12	66.0	S	384320 399060	SJ89NW3654	5.48	IRO SCHEDULE CENTRE N
13B	66.0	N	384370 399300	SJ89NW1634	-1.0	ROGER STREET MANCHESTER 6
14	70.0	NW	384320 399270	SJ89NW1638	-1.0	ROGER STREET MANCHESTER TP 3
15D	73.0	NW	384380 399310	SJ89NW1636	-1.0	ROGER STREET MANCHESTER TP 1
16C	76.0	NW	384420 399340	SJ89NW1635	-1.0	ROGER STREET MANCHESTER 7
17E	78.0	NW	384340 399300	SJ89NW1643	-1.0	ROGER STREET MANCHESTER TP 8
18	82.0	W	384243 399148	SJ89NW55	7.92	MANCHESTER CORP. H.SEWER
19	84.0	NW	384400 399340	SJ89NW1637	-1.0	ROGER STREET MANCHESTER TP 2
20D	86.0	N	384370 399320	SJ89NW1651	-1.0	ROGER STREET MANCHESTER TP 16
21	86.0	NW	384440 399360	SJ89NW2900	7.54	NEW ROGER STREET BRIDGE 1
22E	91.0	NW	384323 399302	SJ89NW202	106.68	CLEMSON & CO. BACK FOUNDRY STREET RED BANK

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
23F	91.0	NW	384320 399300	SJ89NW1632	-1.0	ROGER STREET MANCHESTER 4
24	93.0	SW	384340 399010	SJ89NW3651	6.55	IRO SCHEDULE CENTRE K
25G	95.0	NW	384380 399340	SJ89NW1633	-1.0	ROGER STREET MANCHESTER 5
26	98.0	NW	384300 399290	SJ89NW1650	-1.0	ROGER STREET MANCHESTER TP 15
27	100.0	S	384400 398990	SJ89NW3652	8.68	IRO SCHEDULE CENTRE L
28H	101.0	N	384350 399330	SJ89NW1647	-1.0	ROGER STREET MANCHESTER TP 12
29	101.0	S	384370 398990	SJ89NW3650	6.09	IRO SCHEDULE CENTRE H
30	105.0	NW	384448 399384	SJ89NW203	28.35	CLARLES SMITH RED BANK
31F	105.0	NW	384310 399310	SJ89NW1649	-1.0	ROGER STREET MANCHESTER TP 14
32	108.0	N	384505 399402	SJ89NW34	4.88	MANCHESTER CORP. B.SEWER
33G	109.0	NW	384370 399350	SJ89NW1645	-1.0	ROGER STREET MANCHESTER TP 10
34H	114.0	NW	384340 399340	SJ89NW1631	-1.0	ROGER STREET MANCHESTER 3
35H	114.0	NW	384340 399340	SJ89NW3267	115.37	W CLEMSON & CO RED BANK HORROCKS
36H	114.0	NW	384340 399340	SJ89NW3268	82.3	W CLEMSON & CO RED BANK HORROCKS
37	115.0	NW	384320 399330	SJ89NW1648	-1.0	ROGER STREET MANCHESTER TP 13
38I	115.0	NW	384360 399350	SJ89NW1646	-1.0	ROGER STREET MANCHESTER TP 11
39	116.0	S	384430 398980	SJ89NW3653	30.5	IRO SCHEDULE CENTRE M
40	120.0	SW	384340 398980	SJ89NW3648	11.73	IRO SCHEDULE CENTRE F
41	122.0	W	384222 399205	SJ89NW54	5.79	MANCHESTER CORP. H.SEWER
42I	123.0	NW	384360 399360	SJ89NW1642	-1.0	ROGER STREET MANCHESTER TP 7
43	126.0	NW	384280 399310	SJ89NW1639	-1.0	ROGER STREET MANCHESTER TP 4
44J	127.0	NW	384300 399330	SJ89NW1630	-1.0	ROGER STREET MANCHESTER 2
45J	134.0	NW	384300 399340	SJ89NW1640	-1.0	ROGER STREET MANCHESTER TP 5
46	140.0	W	384211 399225	SJ89NW53	5.79	MANCHESTER CORP. H.SEWER
47	140.0	S	384370 398950	SJ89NW3647	14.02	IRO SCHEDULE CENTRE E
48	141.0	SW	384300 398980	SJ89NW3649	30.33	IRO SCHEDULE CENTRE G
49K	148.0	S	384340 398950	SJ89NW3646	13.71	IRO SCHEDULE CENTRE C
50	149.0	S	384470 398960	SJ89NW1355	25.55	INNER RING ROAD SECTION 2 PHASE 1 MANCHESTER 21
51L	149.0	NW	384320 399370	SJ89NW1629	-1.0	ROGER STREET MANCHESTER 1

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
52	155.0	SE	384694 399072	SJ89NW26	21.95	MANCHESTER CORP. ROCHDALE ROAD SEWER
53K	157.0	S	384345 398939	SJ89NW204	82.3	CHADWICK & TAYLOR, OLD MILL PAPER WORKS, MILLER ST
54K	157.0	S	384340 398940	SJ89NW3300	155.45	OLD MILL PAPER WORKS MANCHESTER
55	158.0	SE	384587 398984	SJ89NW27	23.16	MANCHESTER CORP. NEWTOWN
56	159.0	S	384380 398930	SJ89NW3645	13.56	IRO SCHEDULE CENTRE B
57	160.0	S	384410 398930	SJ89NW3644	29.26	IRO SCHEDULE CENTRE A
58L	163.0	NW	384310 399380	SJ89NW1641	-1.0	ROGER STREET MANCHESTER TP 6
59	165.0	N	384566 399447	SJ89NW35	6.1	MANCHESTER CORP. B.SEWER
60	168.0	S	384490 398940	SJ89NW3603	-1.0	ADDINGTON STREET IMPROVEMENT 2
61M	169.0	SW	384310 398940	SJ89NW1343	-1.0	MILLER STREET 2
62M	169.0	SW	384310 398940	SJ89NW1345	-1.0	MILLER STREET 5
63	169.0	SE	384570 398960	SJ89NW1354	11.12	INNER RING ROAD SECTION 2 PHASE 1 MANCHESTER 20
64	170.0	SW	384170 399053	SJ89NW57	12.34	MANCHESTER CORP. VICTORIA STATION
65	170.0	SE	384685 399038	SJ89NW372	-1.0	THOMPSON ST MANCHESTER 1
66	171.0	SW	384210 399000	SJ89NW1342	-1.0	MILLER STREET 1
67	175.0	SW	384230 398980	SJ89NW1346	-1.0	MILLER STREET 4
68	177.0	SW	384280 398950	SJ89NW1347	-1.0	MILLER STREET 6
69	181.0	NW	384266 399372	SJ89NW52	5.18	MANCHESTER CORP. H.SEWER
70	187.0	SE	384730 399069	SJ89NW373	-1.0	THOMPSON ST MANCHESTER 2
71	195.0	NW	384280 399400	SJ89NW1544	-1.0	RED BANK CATCHMENT 14
72	197.0	SW	384158 399020	SJ89NW58	12.19	MANCHESTER CORP. B.SEWER
73	210.0	S	384410 398880	SJ89NW1344	-1.0	MILLER STREET 3
74	211.0	S	384320 398890	SJ89NW3615	-1.0	HANOVER STREET / MILLER STREET 3
75O	213.0	S	384350 398880	SJ89NW3617	-1.0	HANOVER STREET / MILLER STREET 5
76N	215.0	S	384457 398885	SJ89NW28	25.91	MANCHESTER CORP. ROCHDALE ROAD SEWER
77	217.0	NW	384310 399440	SJ89NW3278	-1.0	RED BANK MANCHESTER OB
78N	220.0	S	384460 398880	SJ89NW3602	-1.0	ADDINGTON STREET IMPROVEMENT 1
79	220.0	NW	384261 399418	SJ89NW51	6.71	MANCHESTER CORP. H.SEWER

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
80O	221.0	S	384360 398870	SJ89NW3614	-1.0	HANOVER STREET / MILLER STREET 2
81	221.0	SE	384722 399003	SJ89NW374	-1.0	THOMPSON ST MANCHESTER 3
82	227.0	SE	384600 398910	SJ89NW1353	11.12	INNER RING ROAD SECTION 2 PHASE 1 MANCHESTER 19
83	228.0	W	384110 399210	SJ89NW500	3.5	MANCHESTER INN. RELIEF ROAD 6
84	229.0	SW	384140 398990	SJ89NW1437	-1.0	VICTORIA STATION AREA SEWERS 14
85	230.0	S	384560 398890	SJ89NW3604	-1.0	ADDINGTON STREET IMPROVEMENT 3
86	233.0	S	384310 398870	SJ89NW3613	-1.0	HANOVER STREET / MILLER STREET 1
87	241.0	SE	384757 399012	SJ89NW375	-1.0	THOMPSON ST MANCHESTER 4
88	249.0	S	384400 398840	SJ89NW2007	-1.0	SHUDE HILL WITHY GROVE SEWER REPLACEMENT 7

The borehole records are available using the hyperlinks below: Please note that if the donor of the borehole record has requested the information be held as commercial-in-confidence, the additional data will be held separately by the BGS and a formal request must be made for its release.

#1: scans.bgs.ac.uk/sobi_scans/boreholes/1043533
#2: scans.bgs.ac.uk/sobi_scans/boreholes/1042198
#3: scans.bgs.ac.uk/sobi_scans/boreholes/1045471
#4: scans.bgs.ac.uk/sobi_scans/boreholes/1045097
#5: scans.bgs.ac.uk/sobi_scans/boreholes/1042174
#6A: scans.bgs.ac.uk/sobi_scans/boreholes/1045096
#7: scans.bgs.ac.uk/sobi_scans/boreholes/1045849
#8A: scans.bgs.ac.uk/sobi_scans/boreholes/1042175
#11C: scans.bgs.ac.uk/sobi_scans/boreholes/1045095
#12: scans.bgs.ac.uk/sobi_scans/boreholes/1045848
#18: scans.bgs.ac.uk/sobi_scans/boreholes/1042197
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#24: scans.bgs.ac.uk/sobi_scans/boreholes/1045845
#27: scans.bgs.ac.uk/sobi_scans/boreholes/1045846
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#32: scans.bgs.ac.uk/sobi_scans/boreholes/1042176
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#39: scans.bgs.ac.uk/sobi_scans/boreholes/1045847
#40: scans.bgs.ac.uk/sobi_scans/boreholes/1045842
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#52: scans.bgs.ac.uk/sobi_scans/boreholes/1042168
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#69: scans.bgs.ac.uk/sobi_scans/boreholes/1042194
#72: scans.bgs.ac.uk/sobi_scans/boreholes/1042200
#76N: scans.bgs.ac.uk/sobi_scans/boreholes/1042170
#77: scans.bgs.ac.uk/sobi_scans/boreholes/1045472
#79: scans.bgs.ac.uk/sobi_scans/boreholes/1042193
#82: scans.bgs.ac.uk/sobi_scans/boreholes/1043547
#83: scans.bgs.ac.uk/sobi_scans/boreholes/1042694

8 Estimated Background Soil Chemistry

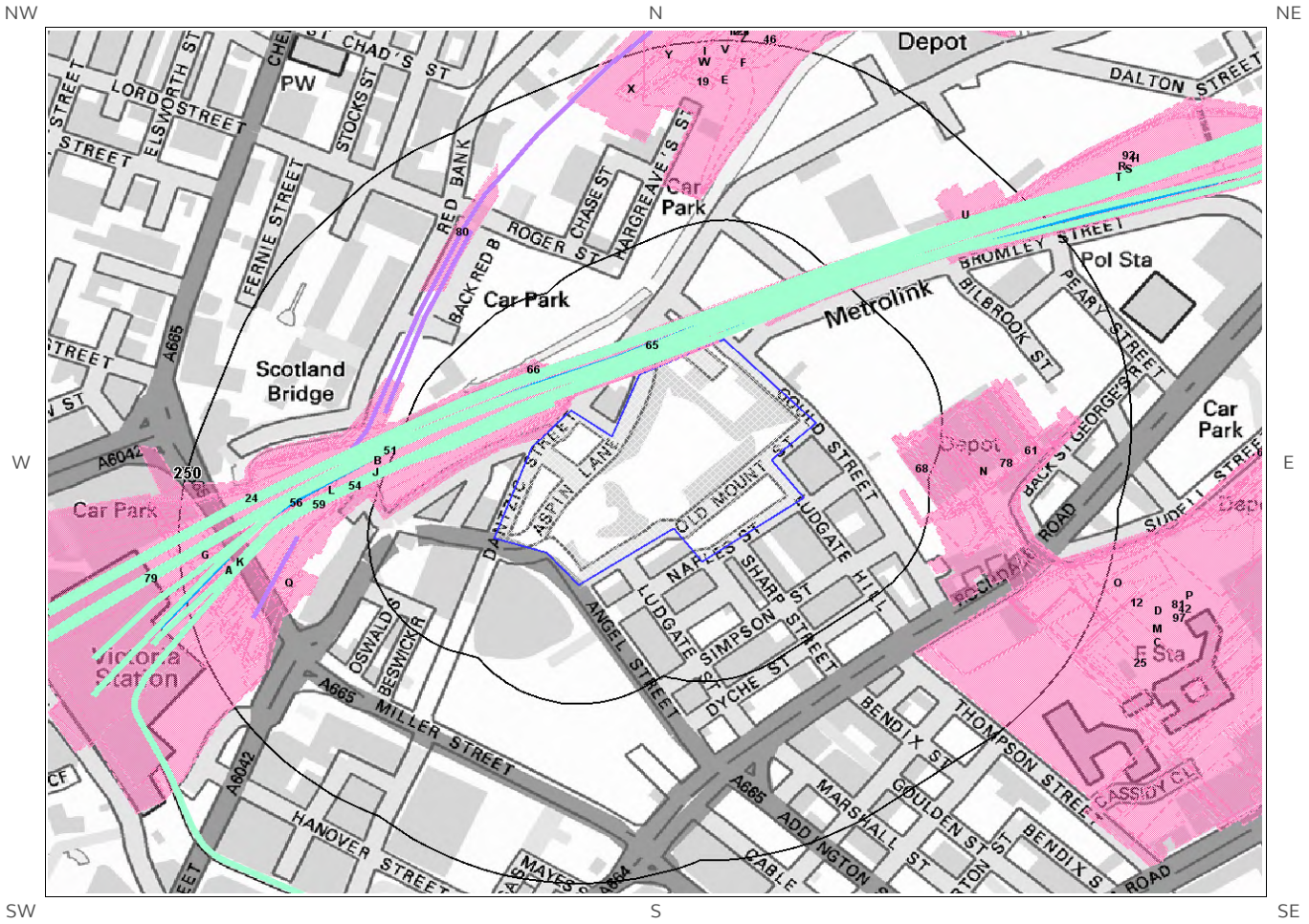
Records of background estimated soil chemistry within 250m of the study site boundary: 4

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geo Insight Plus User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	200 - 300 mg/kg
0.0	On Site	RuralSoil	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	100 - 200 mg/kg
16.0	NW	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	200 - 300 mg/kg
23.0	N	RuralSoil	25 - 35 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	<15 mg/kg	100 - 200 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

9 Railways and Tunnels Map



Railways and Tunnels Legend

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- Site Outline
- Search Buffers (m) — 250 / 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- High Speed 2 Revised Proposed Route
- Crossrail 1
- Railway and/or Tunnel Feature from Historical Mapping

9 Railways and Tunnels

9.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

9.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? Yes

Have any historical railway or tunnel features been identified within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1J	0	NW	384236 399170	Railway Sidings	1923
51	0	On Site	384193 399180	Railway Sidings	1995
52J	0	On Site	384250 399172	Railway Sidings	1952
53J	0	On Site	384250 399172	Railway Sidings	1949
54	0	On Site	384262 399173	Railway Sidings	1963
55J	0	NW	384172 399171	Railway Sidings	1990

ID	Distance (m)	Direction	NGR	Details	Date
56	0	NW	383765 398937	Railway Sidings	1933
57K	0	NW	383765 398937	Railway Sidings	1922
58K	0	NW	383765 398937	Railway Sidings	1908
2A	3	NW	383915 399018	Railway Sidings	1978
3A	3	NW	383915 399018	Railway Sidings	1971
4A	3	NW	383915 399018	Railway Sidings	1994
5A	3	NW	383915 399018	Railway Sidings	1956
6A	3	NW	383915 399018	Railway Sidings	1985
7A	3	NW	383915 399018	Railway Sidings	1988
59	3	NW	384124 399149	Railway Sidings	1964
60	3	N	n/a	Railway	1922
61	4	N	384784 399412	Railway Sidings	1908
62L	4	NW	384125 399149	Railway Sidings	1949
63L	4	NW	384125 399149	Railway Sidings	1958
64L	4	NW	384125 399149	Railway Sidings	1952
8B	6	NW	384236 399170	Railway Sidings	1931
9B	6	NW	384236 399170	Railway Sidings	1938
10B	6	NW	384236 399170	Railway Sidings	1916
11B	6	NW	384236 399170	Railway Sidings	1906
65	13	NW	384449 399286	Railway Sidings	1931
66	40	NW	384354 399266	Railway Sidings	1891
67D	61	E	384641 399213	Railway Sidings	1893
68	63	E	384663 399184	Railway Sidings	1891
69M	70	E	384913 399073	Railway Sidings	1931
70D	70	E	384965 399136	Railway Sidings	1922
12	72	E	384910 399075	Railway Sidings	1891
71N	74	E	384720 399171	Railway Sidings	1964
13N	76	E	384719 399180	Railway Sidings	1956
72O	77	E	384707 399130	Railway Sidings	1958

ID	Distance (m)	Direction	NGR	Details	Date
73O	77	E	384707 399130	Railway Sidings	1949
74O	77	E	384707 399130	Railway Sidings	1952
75O	78	E	384707 399130	Railway Sidings	1952
76O	78	E	384707 399130	Railway Sidings	1949
77O	78	E	384707 399130	Railway Sidings	1958
14C	88	E	384894 399054	Railway Sidings	1933
15C	88	E	384894 399054	Railway Sidings	1938
16D	89	E	384898 399072	Railway Sidings	1906
17D	89	E	384898 399072	Railway Sidings	1921
78	93	E	384697 399186	Railway Sidings	1891
18M	112	E	384898 399072	Railway Sidings	1923
19	118	N	384866 400008	Railway Sidings	1923
20E	121	N	384866 400008	Railway Sidings	1933
21E	121	N	384866 400008	Railway Sidings	1938
22F	124	N	384866 400008	Railway Sidings	1906
23F	124	N	384866 400008	Railway Sidings	1921
79	125	W	383826 398971	Railway Sidings	1892
24	127	W	384146 399165	Railway Sidings	1894
80	142	NW	n/a	Railway	1885
25	156	SE	384829 399046	Railway Sidings	1956
81	156	SE	384894 399108	Railway Sidings	1970
82P	157	SE	384899 399109	Railway Sidings	1964
83Q	159	W	384161 399087	Railway Sidings	1949
84Q	159	W	384161 399087	Railway Sidings	1952
85R	161	NE	384806 399425	Railway Sidings	1893
86R	163	NE	384796 399424	Railway Sidings	1891
87S	163	NE	384845 399446	Railway Sidings	1931
88T	166	NE	384880 399444	Railway Sidings	1922
26S	170	NE	384825 399426	Railway Sidings	1891

ID	Distance (m)	Direction	NGR	Details	Date
89S	183	NE	384839 399441	Railway Sidings	1952
90S	183	NE	384839 399441	Railway Sidings	1949
91S	183	NE	384839 399441	Railway Sidings	1958
92	185	NE	384823 399435	Railway Sidings	1964
27T	187	NE	384866 399443	Railway Sidings	1923
93U	191	NE	384696 399396	Railway Sidings	1949
94U	191	NE	384696 399396	Railway Sidings	1952
95U	191	NE	384696 399396	Railway Sidings	1958
96U	191	NE	384696 399396	Railway Sidings	1970
28G	197	W	384100 399113	Railway Sidings	1938
29G	197	W	384100 399113	Railway Sidings	1916
30G	197	W	384100 399113	Railway Sidings	1906
31G	197	W	384100 399113	Railway Sidings	1931
32	198	SW	384091 399079	Railway Sidings	1923
33H	201	NE	384870 399454	Railway Sidings	1906
34H	201	NE	384870 399454	Railway Sidings	1933
35H	201	NE	384870 399454	Railway Sidings	1921
36H	201	NE	384870 399454	Railway Sidings	1938
97	208	E	384844 399056	Railway Sidings	1891
98V	209	N	384721 399713	Railway Sidings	1931
37I	210	N	384731 399748	Railway Sidings	1956
38I	210	N	384731 399748	Railway Sidings	1985
39I	210	N	384731 399748	Railway Sidings	1971
40I	210	N	384731 399748	Railway Sidings	1978
41I	210	N	384677 399753	Railway Sidings	1988
99V	212	N	384738 399748	Railway Sidings	1964
100V	212	N	384738 399748	Railway Sidings	1952
101V	212	N	384738 399748	Railway Sidings	1958
102V	212	N	384738 399748	Railway Sidings	1949

ID	Distance (m)	Direction	NGR	Details	Date
103V	213	N	384721 399713	Railway Sidings	1922
104W	213	N	384485 399526	Railway Sidings	1952
105W	213	N	384485 399526	Railway Sidings	1968
106W	213	N	384485 399526	Railway Sidings	1989
107W	213	N	384485 399526	Railway Sidings	1949
108W	213	N	384485 399526	Railway Sidings	1958
109W	215	N	384485 399528	Railway Sidings	1978
110X	215	N	384431 399501	Railway Sidings	1922
111X	215	N	384431 399501	Railway Sidings	1933
42	217	E	385374 399476	Railway Sidings	1851
112Y	217	N	384462 399534	Railway Sidings	1958
113Y	217	N	384462 399534	Railway Sidings	1968
114Y	217	N	384462 399534	Railway Sidings	1952
115Y	218	N	384462 399533	Railway Sidings	1949
116Y	218	N	384461 399534	Railway Sidings	1978
117Z	219	N	384744 399742	Railway Sidings	1990
118Z	220	N	n/a	Railway	1922
119V	220	N	384749 399742	Railway Sidings	1952
120V	220	N	384749 399742	Railway Sidings	1958
121V	220	N	384749 399742	Railway Sidings	1970
43P	223	E	384887 399094	Railway Sidings	1985
44C	223	E	384886 399059	Railway Sidings	1978
45C	223	E	384886 399059	Railway Sidings	1971
46	226	N	384701 399754	Railway Sidings	1891
47H	232	NE	384868 399449	Railway Sidings	1971
48H	232	NE	384868 399449	Railway Sidings	1956
49H	232	NE	384868 399449	Railway Sidings	1978
50H	232	NE	384868 399449	Railway Sidings	1985
122V	232	N	384721 399713	Railway Sidings	1908

ID	Distance (m)	Direction	NGR	Details	Date
123	245	N	384726 399719	Railway Sidings	1893
124	247	N	384526 399560	Railway Sidings	1891

Any records that have been identified are represented on the Railways and Tunnels Map.

9.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Status
119	W	Abandoned
126	NW	Abandoned
156	W	Abandoned
175	NW	Abandoned
193	N	Abandoned

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? No

Have any active railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Name	Type
4	N	Not given	Tram
4	N	Not given	Tram
5	NW	Not given	Multi Track
5	NW	Not given	Multi Track
10	N	Not given	Tram
10	N	Not given	Tram
13	N	Not given	Rail
13	N	Not given	Rail
14	NW	Not given	Tram
14	NW	Not given	Tram
17	N	Not given	Rail
17	N	Not given	Rail
19	NW	Not given	Multi Track
19	NW	Not given	Multi Track

Distance (m)	Direction	Name	Type
22	N	Caldervale Line	Rail
22	N	Caldervale Line	Rail
26	N	Not given	Rail
26	NW	Not given	Tram
26	N	Not given	Rail
26	NW	Not given	Tram
40	NW	Not given	Rail
40	NW	Not given	Rail
74	W	Not given	Multi Track
74	W	Not given	Multi Track
74	W	Not given	Multi Track
74	W	Not given	Multi Track
92	NE	Not given	Rail
92	NE	Not given	Rail
93	NE	Not given	Rail
93	NE	Not given	Rail
125	W	Not given	Multi Track
125	W	Not given	Multi Track
125	W	Not given	Multi Track
125	W	Not given	Multi Track
162	W	Not given	Rail
162	W	Not given	Rail
183	W	Not given	Rail
183	W	Not given	Rail
207	W	Not given	Multi Track
207	W	Not given	Multi Track
211	W	Not given	Multi Track
211	W	Not given	Multi Track
220	W	Not given	Multi Track
220	W	Not given	Multi Track
229	W	Not given	Multi Track
229	W	Not given	Multi Track

Multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

9.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project? Yes

Is the study site within 500m of the route of the Crossrail 1 rail project? No

*Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a **Groundsure HS2 and Crossrail 1 Report**.*

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Please note that this assessment takes account of both the original Phase 2b proposed route and the amended route proposed in 2016. As the Phase 2b route is still under consultation, Groundsure are providing information on both options until the final route is formally confirmed. Practitioners should take account of this uncertainty when advising clients.

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WSP UK Ltd

PARSONS BRINCKERHOFF LTD,OXFORD HOUSE, OXFORD ROAD, MANCHESTER, M1 7ED

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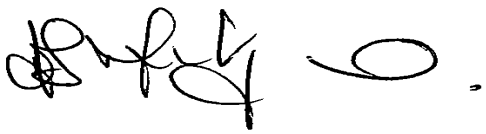

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

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Address:	**Angel Meadow,**
Date:	**8 Dec 2016**
Reference:	**GS-3512618**
Client:	**WSP UK Ltd**

NW N NE

W E



SW S SE

Aerial Photograph Capture date:	11-Jun-2015
Grid Reference:	384374,399201
Site Size:	2.94ha

Report Reference: GS-3512618
Client Reference: PO20037664

Groundsure
LOCATION INTELLIGENCE

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Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	9	38	143	156
1.2 Additional Information – Historical Tank Database	0	19	129	35
1.3 Additional Information – Historical Energy Features Database	4	22	61	41
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	3	3	36	54
1.6 Potentially Infilled Land	2	1	20	32

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	6	2
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	1	0
2.1.8 Records of Licensed Discharge Consents	0	0	20	14
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	5	24
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	0	0	0	1	4	1
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	1
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	1
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	2	0	10	5	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	0	0	9	5	0	5

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	1	5	43	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	4
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology	0-500m
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	6	27	7
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	3	9	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	0	0	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

	0-500m					
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site?	No	No	Yes	No	Yes	Yes
6.10 Detailed River Network entries within 500m of the site	0	0	4	0	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	Yes
7.2 Are there any Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	Yes
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	0
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	1	0	0	1	2	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Very Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Very Low
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	Yes
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	No
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

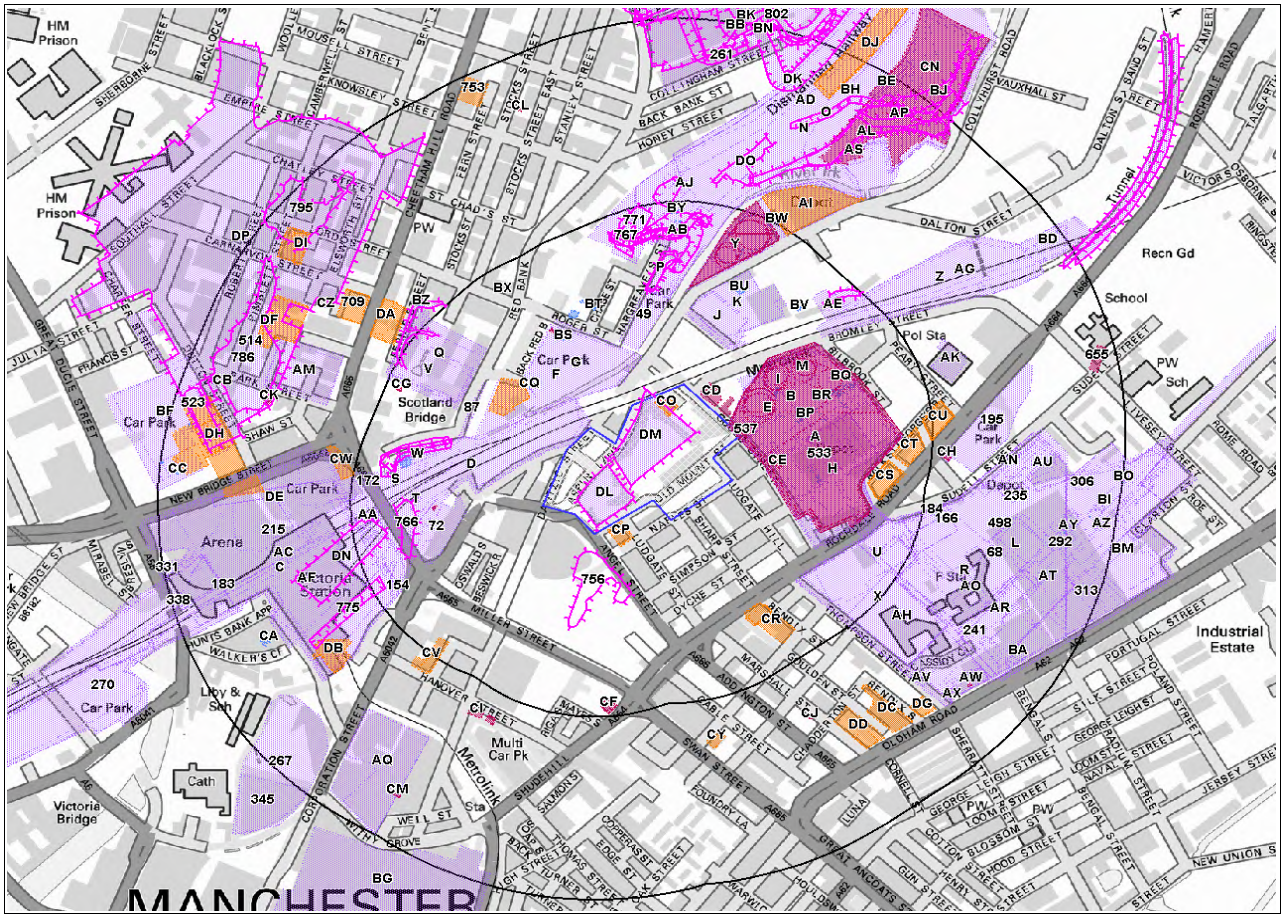
All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use

NW N NE

W E

SW S SE



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Site Outline

250
500
Search Buffers (m)

Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 346

ID	Distance [m]	Direction	Use	Date
1A	0	On Site	Unspecified Commercial/Industrial	1938
2A	0	On Site	Unspecified Commercial/Industrial	1933
3A	0	On Site	Unspecified Commercial/Industrial	1891
4B	0	On Site	Gas Works	1921
5B	0	On Site	Gas Works	1906
6B	0	On Site	Gas Works	1923
7DL	0	On Site	Disused Grave Yard	1978
8DM	0	On Site	Grave Yard	1851
9D	0	NW	Railway Sidings	1923
10C	3	NW	Railway Sidings	1971
11C	3	NW	Railway Sidings	1978
12C	3	NW	Railway Sidings	1956
13C	3	NW	Railway Sidings	1988
14C	3	NW	Railway Sidings	1985
15C	3	NW	Railway Sidings	1994
16B	5	NE	Unspecified Commercial/Industrial	1956
17D	6	NW	Railway Sidings	1931
18D	6	NW	Railway Sidings	1938
19D	6	NW	Railway Sidings	1916
20D	6	NW	Railway Sidings	1906
21B	7	NE	Gas Works	1985
22B	7	NE	Gas Works	1971
23B	7	NE	Gas Works	1978
24A	12	E	Unspecified Depot	1988
25A	12	E	Unspecified Depot	1994
26E	14	NE	Gas Works	1851
27E	17	NE	Gasometer	1851
28E	22	NE	Gasometer	1921
29E	22	NE	Gasometer	1906
30E	22	NE	Unspecified Tank	1933
31E	22	NE	Unspecified Tanks	1891
32E	22	NE	Unspecified Tanks	1938

33E	22	NE	Gasometer	1923
34E	28	NE	Gasometer	1978
35E	28	NE	Gasometer	1971
36I	30	NE	Unspecified Tanks	1956
37F	32	NW	Iron Works	1931
38F	32	NW	Iron Works	1938
39F	32	NW	Iron Works	1916
40F	32	NW	Iron Works	1906
41F	32	NW	Iron Works	1923
42G	33	NW	Unspecified Works	1971
43G	33	NW	Iron Works	1956
44G	33	NW	Unspecified Works	1985
45G	33	NW	Unspecified Works	1978
46H	46	E	Unspecified Commercial/Industrial	1923
47H	48	E	Unspecified Commercial/Industrial	1921
48H	54	SE	Unspecified Commercial/Industrial	1956
49	66	NW	Unspecified Commercial/Industrial	1923
50I	69	NE	Unspecified Tanks	1978
51I	69	NE	Unspecified Tanks	1971
52I	72	NE	Gasometer	1921
53I	72	NE	Gasometer	1906
54I	72	NE	Unspecified Tank	1938
55I	72	NE	Unspecified Tank	1891
56I	72	NE	Unspecified Tank	1933
57I	72	NE	Gasometer	1923
58L	72	E	Railway Sidings	1891
59J	74	NE	Rubber Works	1923
60J	75	NE	Rubber Works	1933
61J	75	NE	Rubber Works	1938
62H	76	E	Railway Sidings	1956
63K	80	NE	Unspecified Works	1988
64K	80	NE	Unspecified Works	1994
65K	80	NE	Unspecified Works	1978
66K	80	NE	Unspecified Works	1985
67L	88	E	Railway Sidings	1938
68	88	E	Railway Sidings	1933
69L	89	E	Unspecified Commercial/Industrial	1921
70L	89	E	Railway Sidings	1906
71L	89	E	Railway Sidings	1921
72	100	W	Unspecified Commercial/Industrial	1923
73M	105	NE	Unspecified Tank	1938
74M	105	NE	Gasometer	1906

75M	105	NE	Unspecified Tank	1933
76M	105	NE	Gasometer	1921
77M	105	NE	Unspecified Tank	1891
78M	105	NE	Gasometer	1923
79L	112	E	Railway Sidings	1923
80N	118	N	Railway Sidings	1923
81N	121	N	Railway Sidings	1938
82N	121	N	Railway Sidings	1933
83O	124	N	Railway Sidings	1921
84O	124	N	Railway Sidings	1906
85S	127	W	Railway Sidings	1894
86Y	128	N	Unspecified Commercial/Industrial	1923
87	129	W	Railway Building	1894
88P	133	N	Refuse Heap	1938
89BW	134	N	Unspecified Commercial/Industrial	1956
90P	135	N	Refuse Heap	1933
91BQ	136	NE	Unspecified Tank	1891
92Q	152	NW	Unspecified Works	1985
93Q	152	NW	Unspecified Works	1978
94Q	152	NW	Unspecified Works	1971
95Q	152	NW	Unspecified Works	1988
96V	153	NW	Unspecified Commercial/Industrial	1923
97AB	153	N	Unspecified Ground Workings	1921
98Q	155	NW	Unspecified Commercial/Industrial	1931
99R	155	SE	Unspecified Depot	1985
100W	156	W	Railway Building	1985
101R	156	SE	Railway Sidings	1956
102Q	157	NW	Unspecified Commercial/Industrial	1916
103S	157	W	Railway Building	1923
104T	158	W	Railway Building	1931
105T	158	W	Railway Building	1916
106U	158	SE	Railway Building	1978
107U	158	SE	Railway Building	1971
108U	158	SE	Railway Building	1985
109V	158	NW	Unspecified Commercial/Industrial	1938
110W	158	W	Railway Building	1971
111X	158	SE	Goods Shed	1921
112W	159	W	Railway Building	1931
113W	159	W	Railway Building	1916
114X	160	SE	Goods Shed	1923
115X	160	SE	Goods Station	1938

116X	160	SE	Goods Station	1933
117Y	165	N	Unspecified Tank	1891
118Y	165	N	Unspecified Tank	1921
119Y	165	N	Unspecified Tank	1933
120Y	165	N	Unspecified Tank	1938
121Y	165	N	Unspecified Tank	1906
122Y	165	N	Unspecified Tank	1923
123Z	170	NE	Railway Sidings	1891
124Y	176	N	Unspecified Tanks	1956
125W	180	W	Railway Building	1923
126W	182	W	Railway Building	1931
127L	184	SE	Unspecified Commercial/Industrial	1906
128Z	187	NE	Railway Sidings	1923
129Y	194	NE	Unspecified Tanks	1921
130Y	194	NE	Unspecified Tank	1906
131Y	194	NE	Unspecified Tanks	1933
132Y	194	NE	Unspecified Tank	1938
133Y	194	NE	Unspecified Tank	1891
134Y	194	NE	Unspecified Tank	1923
135AA	197	W	Railway Sidings	1931
136AA	197	W	Railway Sidings	1938
137AA	197	W	Railway Sidings	1916
138AA	197	W	Railway Sidings	1906
139AB	198	N	Unspecified Ground Workings	1994
140AB	198	N	Unspecified Ground Workings	1988
141	198	SW	Railway Sidings	1923
142AB	200	N	Unspecified Ground Workings	1956
143AE	201	NE	Railway Building	1923
144Z	201	NE	Railway Sidings	1933
145Z	201	NE	Railway Sidings	1938
146Z	201	NE	Railway Sidings	1906
147Z	201	NE	Railway Sidings	1921
148AC	202	SW	Railway Station	1931
149AC	202	SW	Railway Station	1938
150AC	202	SW	Railway Station	1916
151AC	202	SW	Railway Station	1906
152AC	205	W	Railway Station	1923
153DN	206	W	Gravel Yard	1851
154	208	SW	Railway Building	1923
155AD	210	N	Railway Sidings	1988
156AD	210	N	Railway Sidings	1971
157AD	210	N	Railway Sidings	1956
158AD	210	N	Railway Sidings	1985

159AD	210	N	Railway Sidings	1978
160AE	210	NE	Unspecified Ground Workings	1956
161AF	214	W	Railway Station	1971
162AF	214	W	Railway Station	1978
163AF	214	W	Railway Station	1985
164AF	214	W	Railway Station	1988
165AF	215	W	Railway Station	1956
166	217	E	Railway Sidings	1851
167AE	217	NE	Railway Building	1923
168AT	218	SE	Unspecified Commercial/Industrial	1891
169L	223	E	Railway Sidings	1978
170L	223	E	Railway Sidings	1985
171L	223	E	Railway Sidings	1971
172	224	W	Railway Building	1894
173BH	226	N	Railway Sidings	1891
174CX	231	NW	Unspecified Ground Workings	1851
175AG	232	NE	Railway Sidings	1978
176AG	232	NE	Railway Sidings	1956
177AG	232	NE	Railway Sidings	1971
178AG	232	NE	Railway Sidings	1985
179AH	234	SE	Goods Station	1971
180AH	234	SE	Goods Station	1956
181AH	234	SE	Railway Building	1985
182AH	234	SE	Goods Station	1978
183	234	W	Railway Stations	1894
184	239	E	Railway Building	1938
185DE	241	W	Workhouse	1851
186AI	242	NE	Unspecified Depot	1978
187AI	242	NE	Unspecified Depot	1994
188AI	242	NE	Unspecified Depot	1988
189AI	242	NE	Unspecified Depot	1985
190R	243	E	Railway Building	1851
191AF	252	SW	Railway Station	1994
192AJ	262	N	Railway Building	1906
193AJ	262	N	Railway Building	1938
194AJ	262	N	Railway Building	1923
195	262	E	Bus Depot	1978
196AK	264	E	Police Station	1985
197AK	264	E	Police Station	1988
198AK	264	E	Police Station	1994
199C	275	W	Railway Station	1851
200AJ	276	N	Railway Building	1923
201DO	278	N	Unspecified Ground Workings	1891

202AL	285	N	Unspecified Ground Workings	1988
203AL	285	N	Unspecified Ground Workings	1994
204DK	289	N	Railway Sidings	1994
205AM	312	W	Hospital	1923
206AM	313	W	Hospital	1931
207AM	313	W	Hospital	1916
208AS	314	NE	Unspecified Mill	1938
209AN	315	E	Railway Building	1956
210AN	316	E	Railway Buildings	1971
211AN	316	E	Railway Buildings	1985
212AN	316	E	Railway Buildings	1978
213AO	316	E	Fire Station	1994
214AO	316	E	Fire Station	1988
215	341	W	Railway Building	1985
216AP	342	NE	Unspecified Ground Workings	1971
217AP	342	NE	Unspecified Ground Workings	1978
218AP	342	NE	Unspecified Ground Workings	1956
219AP	342	NE	Unspecified Ground Workings	1985
220AN	343	E	Railway Building	1923
221L	345	E	Goods Shed	1938
222L	345	E	Goods Station	1906
223L	345	E	Goods Shed	1933
224L	345	E	Goods Shed	1923
225L	346	E	Goods Shed	1921
226AU	348	E	Railway Building	1956
227L	350	E	Railway Building	1956
228L	350	E	Railway Building	1971
229L	350	E	Railway Building	1985
230L	350	E	Railway Building	1978
231AQ	350	SW	Unspecified Commercial/Industrial	1931
232AQ	350	SW	Unspecified Commercial/Industrial	1916
233AQ	351	SW	Unspecified Commercial/Industrial	1938
234AR	357	SE	Railway Station	1851
235	360	E	Railway Building	1923
236AR	360	SE	Railway Building	1956
237AR	360	SE	Railway Building	1978
238AR	360	SE	Railway Building	1971
239AV	360	SE	Railway Building	1938
240DP	360	NW	Brick Field	1851
241	363	SE	Railway Building	1985

242AS	364	NE	Unspecified Mill	1906
243AS	364	NE	Unspecified Mill	1921
244AS	364	NE	Unspecified Mill	1933
245AS	364	NE	Unspecified Mill	1923
246AT	365	SE	Unspecified Commercial/Industrial	1923
247AR	367	SE	Railway Building	1938
248AG	368	NE	Railway Building	1923
249AU	376	E	Railway Building	1971
250AU	376	E	Railway Building	1978
251AS	376	NE	Unspecified Mill	1891
252DQ	377	N	Unspecified Ground Workings	1891
253AU	382	E	Railway Building	1923
254AT	388	E	Railway Building	1985
255AS	388	NE	Corn Mill	1851
256AV	391	SE	Railway Building	1956
257AW	396	SE	Railway Building	1985
258AW	396	SE	Railway Building	1971
259AW	396	SE	Railway Building	1978
260AW	397	SE	Railway Building	1956
261	399	N	Brewery	1891
262AW	400	SE	Railway Building	1985
263AW	400	SE	Railway Building	1978
264AW	400	SE	Railway Building	1971
265AX	406	SE	Railway Building	1956
266AX	408	SE	Railway Building	1938
267	409	SW	Unspecified Commercial/Industrial	1938
268BF	413	W	Unspecified Commercial/Industrial	1923
269AY	416	E	Railway Buildings	1891
270	421	W	Exchange Station	1923
271BN	421	N	Brick Works	1956
272AY	423	E	Railway Building	1923
273AZ	425	E	Railway Sidings	1968
274AZ	425	E	Railway Sidings	1956
275AY	426	E	Railway Building	1938
276BA	426	SE	Railway Building	1985
277BA	426	SE	Railway Building	1978
278BA	426	SE	Railway Building	1971
279BI	426	E	Railway Sidings	1978
280AY	429	E	Goods Station	1923
281BB	429	N	Brick Works	1906
282BB	429	N	Brick Works	1921
283BB	429	N	Brick Works	1933

284BB	429	N	Unspecified Ground Workings	1906
285BB	429	N	Unspecified Ground Workings	1933
286BB	429	N	Unspecified Ground Workings	1921
287AP	429	NE	Unspecified Ground Workings	1891
288AY	430	E	Railway Building	1938
289AY	430	E	Railway Building	1933
290AY	430	E	Good Station	1921
291BC	430	W	Railway Sidings	1894
292	431	E	Railway Building	1923
293AD	431	NE	Carriage Shed	1938
294AD	431	NE	Carriage Shed	1906
295AD	431	NE	Carriage Shed	1933
296AD	431	NE	Carriage Shed	1921
297AD	431	NE	Carriage Shed	1923
298BC	432	W	Railway Sidings	1931
299BC	432	W	Railway Sidings	1906
300BC	432	W	Railway Sidings	1916
301BC	432	W	Railway Sidings	1938
302BC	432	W	Railway Sidings	1923
303BA	433	SE	Railway Building	1956
304AY	436	E	Railway Building	1956
305AY	436	E	Railway Building	1968
306	440	E	Railway Building	1956
307BB	440	N	Brick Works	1938
308DJ	444	NE	Railway Building	1891
309BD	446	NE	Railway Sidings	1994
310BD	446	NE	Railway Sidings	1988
311BK	448	N	Clay Pit	1923
312BM	449	E	Unspecified Commercial/Industrial	1956
313	456	E	Police Station	1851
314BE	456	NE	Railway Buildings	1921
315BE	456	NE	Railway Buildings	1933
316BE	456	NE	Railway Buildings	1906
317BE	456	NE	Railway Buildings	1938
318BE	456	NE	Railway Buildings	1923
319BF	459	W	Brewery	1978
320BG	460	S	Bus Station	1988
321BG	460	S	Bus Station	1985
322BG	460	S	Bus Station	1994
323BH	462	NE	Railway Building	1971
324BE	462	NE	Railway Building	1978
325BI	465	E	Railway Building	1923

326BI	465	E	Railway Building	1938
327BE	466	NE	Railway Buildings	1956
328BE	467	NE	Railway Buildings	1891
329BJ	469	NE	Unspecified Ground Workings	1933
330BJ	469	NE	Unspecified Heap	1938
331	475	W	Railway Building	1923
332BK	476	N	Unspecified Pit	1933
333BI	476	E	Railway Building	1891
334BL	478	NE	Tunnel	1956
335BL	478	NE	Tunnel	1978
336BL	478	NE	Tunnel	1968
337BM	480	E	Potato Shed	1968
338	488	W	Railway Building	1931
339BL	494	NE	Tunnel	1985
340BL	494	NE	Tunnel	1991
341BN	494	N	Unspecified Ground Workings	1956
342BO	495	E	Railway Building	1923
343BD	496	NE	Railway Building	1923
344BO	496	E	Railway Building	1938
345	496	SW	Unspecified Commercial/Industrial	1931
346BO	498	E	Railway Building	1956

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 183

ID	Distance (m)	Direction	Use	Date
347A	4	NE	Gas Works	1949
348A	4	NE	Gas Works	1952
349B	4	NE	Gas Works	1970
350A	4	NE	Gas Works	1949
351A	4	NE	Gas Works	1952
352E	22	NE	Gasometer	1908
353E	22	NE	Gasometer	1922
354E	22	NE	Gasometer	1893
355E	22	NE	Unspecified Tank	1931
356E	25	NE	Gasometer	1891
357E	28	NE	Gasometer	1891
358E	31	NE	Unspecified Tank	1958

359E	31	NE	Gasometer	1952
360E	31	NE	Gasometer	1970
361E	31	NE	Gasometer	1949
362E	31	NE	Gasometer	1949
363E	31	NE	Unspecified Tank	1964
364E	31	NE	Gasometer	1952
365E	31	NE	Unspecified Tank	1958
366E	53	NE	Unspecified Tank	1931
367E	60	NE	Unspecified Tank	1958
368E	60	NE	Unspecified Tank	1964
369E	60	NE	Unspecified Tank	1958
370B	71	NE	Unspecified Tank	1908
371M	71	NE	Gasometers	1893
372B	71	NE	Unspecified Tank	1931
373B	71	NE	Unspecified Tank	1891
374I	72	NE	Gasometers	1922
375I	72	NE	Gasometers	1908
376I	72	NE	Tanks	1931
377I	73	NE	Gasometer	1891
378BP	74	E	Tanks	1893
379BP	76	E	Tanks	1891
380I	77	NE	Unspecified Tank	1964
381I	77	NE	Unspecified Tank	1958
382I	77	NE	Unspecified Tank	1958
383I	79	NE	Unspecified Tank	1958
384I	79	NE	Gasometer	1949
385I	79	NE	Unspecified Tank	1964
386I	79	NE	Gasometer	1952
387I	80	NE	Gasometer	1952
388I	80	NE	Gasometer	1949
389I	80	NE	Gasometer	1970
390I	80	NE	Unspecified Tank	1958
391CQ	93	NW	Unspecified Tank	1891
392H	98	E	Tanks	1952
393H	98	E	Tanks	1949
394BP	100	E	Unspecified Tank	1891
395BP	103	NE	Unspecified Tank	1891
396BP	104	E	Unspecified Tank	1891
397BP	105	E	Unspecified Tank	1891
398H	105	E	Tanks	1949
399H	105	E	Tanks	1952
400H	105	E	Tanks	1949
401H	105	E	Tanks	1952
402M	106	NE	Gasometer	1891
403H	109	E	Tanks	1952
404H	109	E	Tanks	1949

405H	110	E	Tanks	1949
406H	111	E	Tanks	1952
407BQ	112	NE	Tanks	1949
408BR	112	NE	Tanks	1952
409BR	112	NE	Tanks	1949
410BR	112	NE	Tanks	1952
411M	114	NE	Gasometer	1949
412M	114	NE	Unspecified Tank	1958
413M	114	NE	Unspecified Tank	1964
414M	114	NE	Gasometer	1952
415M	114	NE	Gasometer	1952
416M	114	NE	Gasometer	1949
417M	114	NE	Unspecified Tank	1958
418M	114	NE	Gasometer	1970
419BQ	123	NE	Gasometer	1891
420BQ	124	NE	Tanks	1949
421BQ	124	NE	Tanks	1952
422BS	124	N	Unspecified Tank	1922
423BS	124	N	Unspecified Tank	1908
424BS	127	NW	Unspecified Tank	1958
425BQ	130	NE	Tanks	1952
426Y	131	N	Gas Works	1949
427Y	131	N	Gas Works	1952
428Y	132	N	Gas Works	1952
429Y	132	N	Gas Works	1949
430BR	136	E	Unspecified Tank	1891
431BQ	137	NE	Tanks	1893
432BQ	137	NE	Unspecified Tank	1958
433BQ	138	NE	Unspecified Tank	1958
434BQ	138	NE	Unspecified Tank	1964
435BT	139	NW	Tanks	1952
436BQ	139	NE	Tanks	1891
437BT	140	NW	Tanks	1952
438BT	140	NW	Tanks	1990
439BT	141	NW	Tanks	1963
440BT	141	NW	Tanks	1964
441BU	143	NE	Tanks	1949
442BU	143	NE	Tanks	1952
443BU	143	NE	Tanks	1952
444BU	143	NE	Tanks	1949
445BT	151	NW	Tanks	1990
446BQ	157	NE	Unspecified Tank	1891
447Y	167	N	Tanks	1931
448Y	167	N	Gasometers	1908
449Y	167	N	Gasometers	1922
450Y	169	N	Gasometer	1891

451Y	169	N	Gasometer	1893
452T	169	W	Unspecified Tank	1949
453T	169	W	Unspecified Tank	1952
454T	169	W	Unspecified Tank	1963
455T	170	W	Unspecified Tank	1952
456T	170	W	Unspecified Tank	1949
457T	170	W	Unspecified Tank	1964
458T	170	W	Unspecified Tank	1958
459Y	174	N	Gasometer	1952
460Y	174	N	Unspecified Tank	1958
461Y	174	N	Gasometer	1949
462BV	175	NE	Unspecified Tank	1958
463Y	175	N	Tanks	1958
464BV	175	NE	Unspecified Tank	1958
465Y	175	N	Gasometer	1952
466Y	175	N	Gasometer	1949
467Y	175	N	Unspecified Tank	1964
468W	182	W	Unspecified Tank	1949
469Y	191	NE	Unspecified Tank	1891
470Y	196	NE	Unspecified Tank	1958
471BW	196	NE	Gasometer	1893
472BW	196	NE	Gasometer	1891
473Y	197	NE	Unspecified Tank	1964
474Y	203	NE	Gasometer	1949
475Y	203	NE	Gasometer	1952
476Y	203	NE	Unspecified Tank	1958
477BW	204	NE	Gasometer	1952
478BW	204	NE	Unspecified Tank	1964
479BW	204	NE	Gasometer	1949
480Y	208	N	Unspecified Tank	1891
481BW	213	N	Gas Works	1952
482Y	215	N	Unspecified Tank	1958
483Y	215	N	Unspecified Tank	1964
484BW	217	N	Unspecified Tank	1958
485BW	217	N	Gasometer	1952
486BX	217	NW	Unspecified Tank	1952
487BX	218	NW	Unspecified Tank	1952
488AB	219	N	Unspecified Tank	1891
489BX	220	NW	Unspecified Tank	1963
490BX	221	NW	Unspecified Tank	1964
491AB	223	N	Unspecified Tank	1891
492BY	233	N	Tanks	1891
493BY	234	N	Unspecified Tank	1891
494BY	237	N	Unspecified Tank	1891
495BZ	271	NW	Unspecified Tank	1952
496BZ	271	NW	Unspecified Tank	1958

497BZ	271	NW	Unspecified Tank	1952
498	353	E	Unspecified Tank	1891
499BJ	355	NE	Gas Works	1952
500BJ	355	NE	Gas Works	1949
501CZ	368	NW	Unspecified Tank	1891
502CA	400	SW	Unspecified Tank	1949
503CA	400	SW	Unspecified Tank	1970
504CA	400	SW	Unspecified Tank	1955
505CA	400	SW	Unspecified Tank	1963
506CA	400	SW	Unspecified Tank	1970
507CA	400	SW	Unspecified Tank	1958
508CA	400	SW	Unspecified Tank	1957
509CA	405	SW	Unspecified Tank	1891
510CA	407	SW	Unspecified Tank	1933
511CA	407	SW	Unspecified Tank	1922
512CA	407	SW	Unspecified Tank	1908
513DF	421	NW	Tanks	1891
514	433	W	Unspecified Tank	1891
515CN	435	NE	Gas Works	1952
516AY	436	E	Unspecified Tank	1908
517CB	447	W	Tanks	1951
518CB	447	W	Tanks	1950
519CB	458	W	Tanks	1950
520BI	465	E	Unspecified Tank	1891
521BF	468	W	Unspecified Tank	1996
522BF	469	W	Unspecified Tank	1987
523	469	W	Tanks	1996
524CC	475	W	Unspecified Tank	1922
525CC	475	W	Unspecified Tank	1908
526CC	475	W	Unspecified Tank	1933
527CC	496	W	Unspecified Tank	1996
528CC	497	W	Unspecified Tank	1987
529BO	500	E	Unspecified Tank	1891

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 128

ID	Distance (m)	Direction	Use	Date
530A	0	On Site	Gas Work	1908
531A	0	On Site	Gas Work	1893

532A	0	On Site	Gas Work	1922
533	0	On Site	Corporation Gas Works	1891
534A	4	NE	Gas Works	1949
535A	4	NE	Gas Works	1952
536CD	4	NE	Electricity Substation	1984
537	4	NE	Electricity Substation	1970
538B	4	NE	Gas Works	1970
539A	4	NE	Gas Works	1949
540A	4	NE	Gas Works	1952
541CD	8	NE	Electricity Substation	1989
542CD	8	NE	Electricity Substation	1970
543CD	9	NE	Electricity Substation	1994
544CD	9	NE	Electricity Substation	1993
545B	20	NE	Corporation Gas Works	1891
546E	22	NE	Gasometer	1908
547E	22	NE	Gasometer	1922
548E	22	NE	Gasometer	1893
549E	25	NE	Gasometer	1891
550E	28	NE	Gasometer	1891
551E	31	NE	Gasometer	1949
552E	31	NE	Gasometer	1952
553E	31	NE	Gasometer	1970
554E	31	NE	Gasometer	1949
555E	31	NE	Gasometer	1952
556CE	58	SE	Electricity Substation	1993
557CE	58	SE	Electricity Substation	1994
558CE	58	SE	Electricity Substation	1989
559CE	59	SE	Electricity Substation	1984
560M	71	NE	Gasometers	1893
561M	72	NE	Gasometers	1922
562M	72	NE	Gasometers	1908
563I	73	NE	Gasometer	1891
564I	79	NE	Gasometer	1952
565I	79	NE	Gasometer	1949
566I	80	NE	Gasometer	1949
567I	80	NE	Gasometer	1952
568I	80	NE	Gasometer	1970
569M	106	NE	Gasometer	1891
570M	114	NE	Gasometer	1952
571M	114	NE	Gasometer	1949
572M	114	NE	Gasometer	1949
573M	114	NE	Gasometer	1952
574M	114	NE	Gasometer	1970
575BQ	123	NE	Gasometer	1891
576Y	131	N	Gas Works	1949
577Y	131	N	Gas Works	1952

578BS	132	N	Electricity Substation	1949
579BS	132	N	Electricity Substation	1949
580BS	132	N	Electricity Substation	1952
581Y	132	N	Gas Works	1952
582Y	132	N	Gas Works	1949
583T	138	W	Electricity Substation	1990
584T	139	W	Electricity Substation	1990
585BS	139	N	Electricity Substation	1952
586T	139	W	Electricity Substation	1995
587Y	167	N	Gasometers	1908
588Y	167	N	Gasometers	1922
589Y	169	N	Gasometer	1891
590Y	169	N	Gasometer	1893
591Y	174	N	Gasometer	1949
592Y	174	N	Gasometer	1952
593Y	175	N	Gasometer	1949
594Y	175	N	Gasometer	1952
595Y	196	NE	Gasometer	1893
596Y	196	NE	Gasometer	1891
597Y	203	NE	Gasometer	1952
598Y	203	NE	Gasometer	1949
599Y	204	NE	Gasometer	1949
600Y	204	NE	Gasometer	1952
601BW	213	N	Gas Works	1952
602BW	217	N	Gasometer	1952
603CF	223	S	Electricity Substation	1953
604CF	224	S	Electricity Substation	1980
605CF	225	S	Electricity Substation	1951
606CF	225	S	Electricity Substation	1948
607CG	225	W	Electricity Substation	1990
608CF	226	S	Electricity Substation	1992
609CF	227	S	Electricity Substation	1986
610CF	227	S	Electricity Substation	1953
611CG	229	W	Electricity Substation	1952
612CG	229	W	Electricity Substation	1949
613CG	229	W	Electricity Substation	1949
614CG	229	W	Electricity Substation	1952
615CG	229	W	Electricity Substation	1990
616CG	229	W	Electricity Substation	1995
617CH	263	E	Electricity Substation	1993
618CH	263	E	Electricity Substation	1994
619CH	263	E	Electricity Substation	1952
620CH	263	E	Electricity Substation	1984
621CH	263	E	Electricity Substation	1952
622CH	263	E	Electricity Substation	1989
623CI	283	SW	Electricity Substation	1953

624CI	283	SW	Electricity Substation	1948
625CI	283	SW	Electricity Substation	1951
626CI	283	SW	Electricity Substation	1953
627CI	283	SW	Electricity Substation	1986
628CI	283	SW	Electricity Substation	1992
629CI	284	SW	Electricity Substation	1980
630CJ	321	SE	Electricity Substation	1984
631CJ	321	SE	Electricity Substation	1988
632CJ	322	SE	Electricity Substation	1995
633BJ	355	NE	Gas Works	1952
634BJ	355	NE	Gas Works	1949
635CK	379	W	Electricity Substation	1950
636CK	379	W	Electricity Substation	1986
637CK	379	W	Electricity Substation	1951
638CK	379	W	Electricity Substation	1950
639CK	379	W	Electricity Substation	1984
640CK	379	W	Electricity Substation	1987
641CK	379	W	Electricity Substation	1987
642CK	380	W	Electricity Substation	1996
643AX	413	SE	Electricity Substation	1988
644AX	413	SE	Electricity Substation	1995
645CL	426	NW	Electricity Substation	1993
646CL	426	NW	Electricity Substation	1992
647CL	426	NW	Electricity Substation	1993
648CL	429	NW	Electricity Substation	1968
649CL	429	NW	Electricity Substation	1989
650CM	433	SW	Electricity Substation	1953
651CM	433	SW	Electricity Substation	1948
652CM	433	SW	Electricity Substation	1951
653CM	434	SW	Electricity Substation	1953
654CN	435	NE	Gas Works	1952
655	461	E	Electricity Substation	1996
656AP	464	NE	Electricity Substation	1993
657AP	467	NE	Electricity Substation	1990

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 96

ID	Distance (m)	Direction	Use	Date
658CO	0	On Site	Garage	1990
659CO	0	On Site	Garage	1995
660CO	0	On Site	Garage	1990
661CP	3	SE	Garage	1952
662CP	3	SE	Garage	1958
663CP	3	SE	Garage	1952
664CQ	84	NW	Garage	1990
665CQ	84	NW	Garage	1990
666CR	158	SE	Garage	1995
667CR	158	SE	Garage	1953
668CR	158	SE	Garage	1965
669CR	158	SE	Garage	1967
670CR	158	SE	Garage	1963
671CR	158	SE	Garage	1953
672CR	158	SE	Garage	1988
673CR	164	SE	Garage	1984
674CS	175	E	Garage	1989
675CS	175	E	Garage	1994
676CS	175	E	Garage	1993
677CS	176	E	Garage	1970
678CS	176	E	Garage	1984
679CT	199	E	Garage	1993
680CT	199	E	Garage	1994
681CT	199	E	Garage	1989
682CV	224	SW	Garage	1953
683CU	237	E	Garage	1958
684CU	237	E	Garage	1994
685CU	237	E	Garage	1993
686CU	237	E	Garage	1970
687CU	237	E	Garage	1989
688CU	237	E	Garage	1964
689CU	238	E	Garage	1958
690CU	238	E	Garage	1984
691CV	243	SW	Garage	1948
692CV	243	SW	Garage	1951
693AI	243	NE	Garage	1964
694AI	243	NE	Garage	1952

695AI	243	NE	Garage	1958
696AI	245	NE	Garage	1952
697AI	245	NE	Garage	1958
698CW	248	W	Garage	1964
699CW	248	W	Garage	1963
700CX	266	NW	Garage	1990
701CX	268	NW	Garage	1995
702DA	276	NW	Garage	1990
703CY	292	S	Garage	1963
704CY	292	S	Garage	1988
705CY	293	S	Garage	1995
706DB	310	SW	Carriage Works	1891
707CZ	318	NW	Garage	1990
708DA	318	NW	Garage	1995
709	319	NW	Garage	1990
710DB	324	SW	Carriage Works	1892
711DB	324	SW	Carriage Works	1892
712DC	327	SE	Garage	1967
713DC	327	SE	Garage	1965
714DC	327	SE	Garage	1953
715DC	327	SE	Garage	1963
716DC	327	SE	Garage	1953
717DD	338	SE	Garage	1965
718DD	338	SE	Garage	1967
719DE	363	W	Garage	1951
720DD	375	SE	Garage	1953
721DD	375	SE	Garage	1963
722DD	376	SE	Garage	1953
723DF	381	NW	Carriage Works	1891
724DF	381	NW	Carriage Works	1908
725DF	381	NW	Carriage Works	1922
726DF	382	NW	Carriage Works	1892
727DG	384	SE	Garage	1953
728DG	384	SE	Garage	1963
729DG	384	SE	Garage	1953
730DG	384	SE	Garage	1967
731DG	384	SE	Garage	1965
732DG	384	SE	Garage	1984
733DH	388	W	Garage	1984
734DH	407	W	Garage	1975
735DH	407	W	Garage	1950
736DH	420	W	Garage	1958
737DF	420	W	Carriage Works	1891
738DH	421	W	Garage	1958
739DH	423	W	Carriage Works	1908
740DI	428	NW	Garage	1963

741DI	430	NW	Garage	1958
742DI	430	NW	Garage	1964
743DJ	432	NE	Carriage Shed	1922
744DJ	432	NE	Carriage Shed	1908
745DJ	432	NE	Carriage Shed	1931
746DJ	432	NE	Carriage Shed	1893
747DJ	433	NE	Carriage Shed	1891
748DI	436	NW	Garage	1958
749DI	437	NW	Garage	1958
750CC	438	W	Motor Repair Works	1975
751DK	439	NE	Carriage Shed	1949
752DI	445	NW	Garage	1968
753	454	NW	Carriage Works	1908

1.6 Potentially Infilled Land

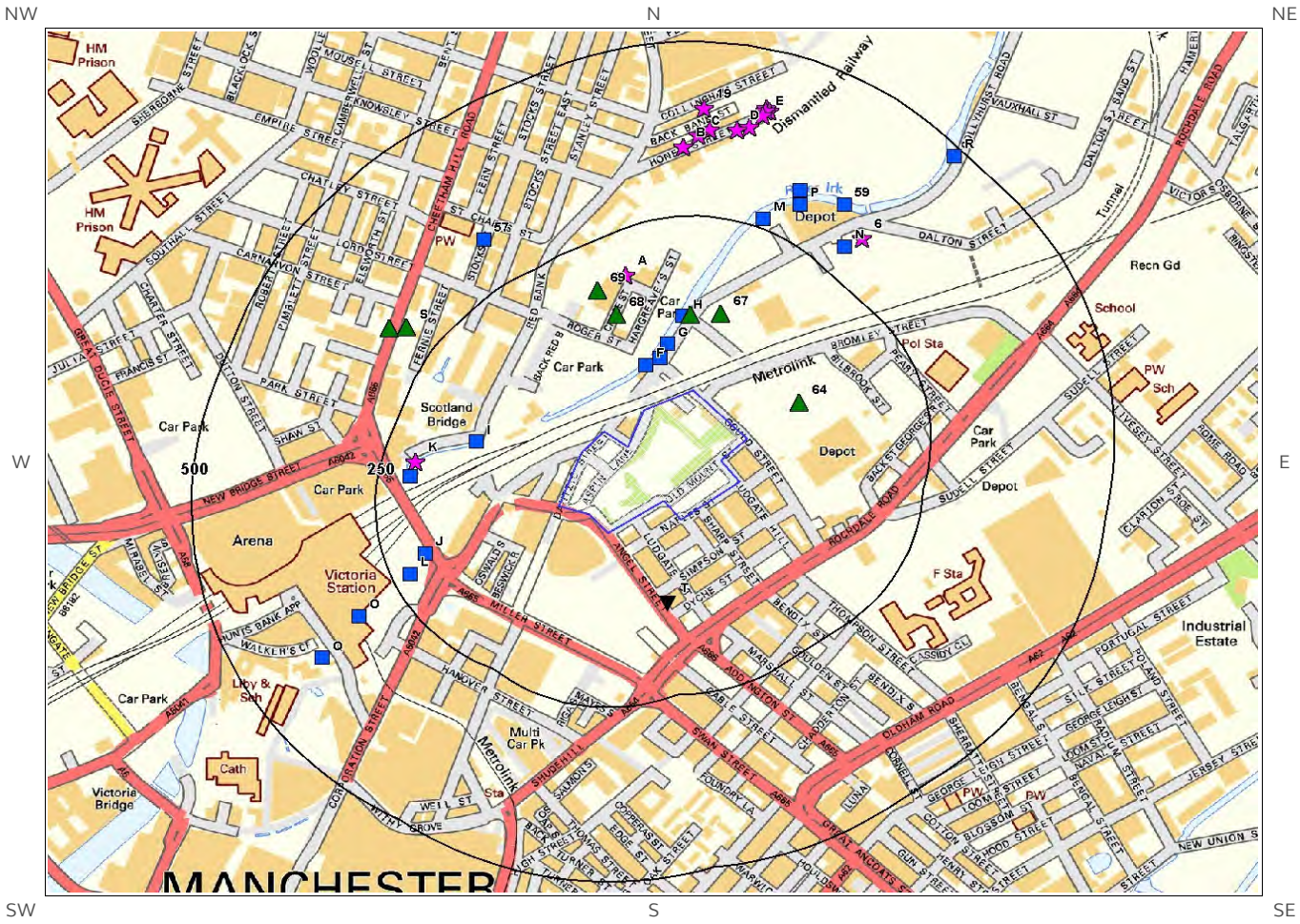
Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 55

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
754DL	0	On Site	Disused Grave Yard	1978
755DM	0	On Site	Grave Yard	1851
756	25	S	Pond	1851
757P	133	N	Refuse Heap	1938
758P	135	N	Refuse Heap	1933
759W	141	W	Pond	1894
760W	144	W	Pond	1923
761W	144	W	Pond	1938
762W	144	W	Pond	1931
763W	144	W	Pond	1916
764W	144	W	Pond	1906
765AB	153	N	Unspecified Ground Workings	1921
766	166	W	Pond	1894
767	186	N	Pond	1894
768AB	198	N	Unspecified Ground Workings	1994
769AB	198	N	Unspecified Ground Workings	1988
770AB	200	N	Unspecified Ground Workings	1956
771	204	N	Pond	1851
772DN	206	W	Gravel Yard	1851
773AE	210	NE	Unspecified Ground Workings	1956
774CX	231	NW	Unspecified Ground Workings	1851

775	234	SW	Pond	1894
776AJ	242	N	Pond	1891
777DO	278	N	Unspecified Ground Workings	1891
778AL	285	N	Unspecified Ground Workings	1994
779AL	285	N	Unspecified Ground Workings	1988
780AP	342	NE	Unspecified Ground Workings	1971
781AP	342	NE	Unspecified Ground Workings	1956
782AP	342	NE	Unspecified Ground Workings	1985
783AP	342	NE	Unspecified Ground Workings	1978
784DP	360	NW	Brick Field	1851
785DQ	377	N	Unspecified Ground Workings	1891
786	386	W	Ponds	1851
787BN	421	N	Brick Works	1956
788BB	429	N	Unspecified Ground Workings	1933
789BB	429	N	Brick Works	1921
790BB	429	N	Brick Works	1933
791BB	429	N	Brick Works	1906
792BB	429	N	Unspecified Ground Workings	1921
793BB	429	N	Unspecified Ground Workings	1906
794AP	429	NE	Unspecified Ground Workings	1891
795	439	NW	Ponds	1851
796BB	440	N	Brick Works	1938
797BK	448	N	Clay Pit	1923
798BJ	469	NE	Unspecified Ground Workings	1933
799BJ	469	NE	Unspecified Heap	1938
800BK	476	N	Unspecified Pit	1933
801BK	476	N	Pond	1938
802	476	N	Pond	1933
803BL	478	NE	Tunnel	1968
804BL	478	NE	Tunnel	1978
805BL	478	NE	Tunnel	1956
806BL	494	NE	Tunnel	1991
807BL	494	NE	Tunnel	1985
808BN	494	N	Unspecified Ground Workings	1956

2. Environmental Permits, Incidents and Registers Map



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- Site Outline
- Search Buffers (m) — 250 — 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

8

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
64	86	NE	384648 399274	Address: Manchester Tabacco Ltd, Ludgate Hill, Manchester, M4 4DA Process: Animal and vegetable matter Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
65H	106	N	384500 399400	Address: Tan Yard Metal Ltd, Hargreaves St, M4 4EJ 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
66H	106	N	384500 399400	Address: Place Mix Ltd, Hargreave St, M4 4EJ Process: cement/lime/mortar process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
67	113	N	384542 399401	Address: Concret Barrowing Company Ltd, Hargreaves Street, Cheetham, M4 4EJ Process: Cement processes. Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
68	139	NW	384400 399400	Address: New Mix Concrete, Roger St, M4 4EN Process: cement/lime/mortar process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
69	181	NW	384374 399435	Address: Avis Rent A Car Ltd, Avis Bodyshop, Chase Street, Redbank, Cheetham, Hill, M4 4FL Process: Respraying of Road Vehicles Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified
70S	297	NW	384115 399382	Address: Redbank Service Station, 57 Cheetham Hill Road, Cheetham Hill, M4 4EX 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
71S	315	NW	384091 399380	Address: Cheetham Hill Serv Stn, Cheetham Hill Rd, M4 4FT Process: Petrol Vapour Recovery Process Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

1

The following RAS Licence (3 or 4) records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Address	Operator	Type	Permission Number	Dates	Status
73T	119	S	384470 398990	Brooke Edgley Specialist Technical Services Ltd, Unit 4, Angel Industrial Estate, Angel Street, Manchester, M4 4BQ	Brooke Edgley Specialist Technical Services Ltd	Disposal Of Radioactive Waste (was Rsa60 Section 6).	BI9880	Date of Approval:7/8/2000 Effective from:7/8/2000 Last date of update:2015-01-01	Revoked/cancelled

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

34

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
30F	59	NW	384440 399330	Address: LORD ST & RED BANK, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0062 Permit Version: 1	Receiving Water: RIVER IRK Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 25/10/1995
31F	59	NW	384440 399330	Address: ROGER ST/HARGREAVES ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0059 Permit Version: 3	Receiving Water: RIVER IRK Status: VARIED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: -
32F	59	NW	384440 399330	Address: ROGER ST/HARGREAVES ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0059 Permit Version: 2	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 14/04/2009 Effective Date: 14-Apr-2009 Revocation Date: 02/09/2010
33F	59	NW	384440 399330	Address: ROGER ST/HARGREAVES ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0059 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 13/04/2009

ID	Distance (m)	Direction	NGR	Details	
34F	60	NW	384460 399340	Address: GOULD ST/JASON ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0047 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 13/04/2009
35F	60	NW	384460 399340	Address: GOULD ST/JASON ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0047 Permit Version: 3	Receiving Water: RIVER IRK Status: SURRENDERED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: 03/12/2014
36F	60	NW	384460 399340	Address: GOULD ST/JASON ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0047 Permit Version: 2	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 14/04/2009 Effective Date: 14-Apr-2009 Revocation Date: 02/09/2010
37G	74	NW	384470 399360	Address: BROMLEY ST/DANTZIC ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0046 Permit Version: 2	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 14/04/2009 Effective Date: 14-Apr-2009 Revocation Date: -
38G	74	NW	384470 399360	Address: PARLANE ST/DANTZIC ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0061 Permit Version: 1	Receiving Water: RIVER IRK Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 25/10/1995
39G	74	NW	384470 399360	Address: BROMLEY ST/DANTZIC ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0046 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 13/04/2009
40H	107	N	384490 399400	Address: BROMLEY ST SSO, BROMLEY ST, NEAR RAILWAY ARCH, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982627 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 30-Sep-1994 Revocation Date: -
41H	107	N	384490 399400	Address: BROMLEY ST SSO, BROMLEY ST, NEAR RAILWAY ARCH, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0310 Permit Version: 1	Receiving Water: RIVER IRK Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 01/01/1995

ID	Distance (m)	Direction	NGR	Details	
42I	139	W	384210 399220	Address: ASPIN LANE, ANCOATS, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0031 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 02/09/2010
43I	139	W	384210 399220	Address: ASPIN LANE, ANCOATS, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0031 Permit Version: 2	Receiving Water: RIVER IRK Status: VARIED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: -
44J	195	W	384140 399060	Address: MILLER/CORPORATION ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0161 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 02/09/2010
45J	195	W	384140 399060	Address: MILLER/CORPORATION ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0161 Permit Version: 2	Receiving Water: RIVER IRK Status: VARIED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: -
46K	207	W	384120 399170	Address: VERDON ST, NEAR SCOTLAND STREET, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0265 Permit Version: 1	Receiving Water: RIVER IRK Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 01/01/1995
47K	207	W	384120 399170	Address: VERDON ST, NEAR SCOTLAND STREET, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982715 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 30-Sep-1994 Revocation Date: -
48L	225	SW	384120 399030	Address: CORPORATION STREET, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0159 Permit Version: 2	Receiving Water: RIVER IRK Status: VARIED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: -
49L	225	SW	384120 399030	Address: CORPORATION STREET, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0159 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 02/09/2010

ID	Distance (m)	Direction	NGR	Details	
50M	264	N	384600 399540	Address: DANTZIC ST/WARFORD ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0039 Permit Version: 2	Receiving Water: RIVER IRK Status: VARIED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: -
51M	264	N	384600 399540	Address: DANTZIC ST/WARFORD ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0039 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 02/09/2010
52N	291	NE	384710 399500	Address: DALTON ST/DANTZIC STREET SSO, DALTON ST/DANTZIC STREET, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0264 Permit Version: 1	Receiving Water: RIVER IRK Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 01/01/1995
53N	291	NE	384710 399500	Address: DALTON ST/DANTZIC STREET SSO, DALTON ST/DANTZIC STREET, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982623 Permit Version: 1	Receiving Water: RIVER IRK Status: SURRENDERED UNDER EPR 2010 Issue date: - Effective Date: 30-Sep-1994 Revocation Date: 03/12/2014
54P	303	NE	384650 399560	Address: DANTZIC STREET CSO, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982951 Permit Version: 2	Receiving Water: RIVER IRK Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: - Effective Date: 07-Dec-2004 Revocation Date: -
55O	315	SW	384050 398970	Address: HANOVER STREET, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0158 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 02/09/2010
56O	315	SW	384050 398970	Address: HANOVER STREET, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0158 Permit Version: 2	Receiving Water: RIVER IRK Status: VARIED UNDER EPR 2010 Issue date: 03/09/2010 Effective Date: 03-Sep-2010 Revocation Date: -
57	320	NW	384220 399510	Address: CHEETHAM HILL RD, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0369 Permit Version: 1	Receiving Water: - Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: -

ID	Distance (m)	Direction	NGR	Details	
58P	321	NE	384650 399580	Address: DANTZIC STREET CSO, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982951 Permit Version: 1	Receiving Water: RIVER IRK Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 23-Jun-1995 Revocation Date: 06/12/2004
59	336	NE	384710 399560	Address: DUCAL ST/DANTZIC ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0057 Permit Version: 1	Receiving Water: RIVER IRK Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 25/10/1995
60Q	390	SW	384000 398910	Address: LONG MILLGATE -TODD ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0160 Permit Version: 1	Receiving Water: RIVER IRK Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: 01/01/1995 Effective Date: 01-Jan-1995 Revocation Date: 31/05/2005
61Q	390	SW	384000 398910	Address: LONG MILLGATE -TODD ST, MANCHESTER, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016993741 Permit Version: 1	Receiving Water: RIVER IRK Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 01/06/2005 Effective Date: 01-Jun-2005 Revocation Date: -
62R	488	NE	384860 399630	Address: BURTON ST SSO, NR DALTON ST, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01MAN0263 Permit Version: 1	Receiving Water: RIVER IRK Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 01-Jan-1995 Revocation Date: 01/01/1995
63R	488	NE	384860 399630	Address: BURTON ST SSO, NR DALTON ST, GREATER MANCHESTER Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982622 Permit Version: 1	Receiving Water: RIVER IRK Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 30-Sep-1994 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

29

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1A	188	NW	384412 399459	Incident Date: 10-Dec-2012 Incident Identification: 1066931 Pollutant: Specific Waste Materials Pollutant Description: Tyres	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
2A	188	NW	384412 399459	Incident Date: 10-Dec-2012 Incident Identification: 1066931 Pollutant: Specific Waste Materials Pollutant Description: Asbestos	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
3A	188	NW	384412 399459	Incident Date: 10-Dec-2012 Incident Identification: 1066931 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
4A	188	NW	384412 399459	Incident Date: 10-Dec-2012 Incident Identification: 1066931 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
5K	207	W	384126 399191	Incident Date: 10-Jan-2002 Incident Identification: 51724 Pollutant: Oils and Fuel Pollutant Description: Mixed/Waste Oils	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6	315	NE	384733 399512	Incident Date: 04-Sep-2001 Incident Identification: 28889 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
7B	349	N	384490 399643	Incident Date: 12-Sep-2008 Incident Identification: 620850 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 2 (Significant)

ID	Distance (m)	Direction	NGR	Details	
8B	349	N	384490 399643	Incident Date: 12-Sep-2008 Incident Identification: 620850 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Effects on Humans	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 2 (Significant)
9B	349	N	384490 399643	Incident Date: 12-Sep-2008 Incident Identification: 620850 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 2 (Significant)
10C	366	N	384511 399660	Incident Date: 24-Jun-2002 Incident Identification: 86928 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)
11C	375	N	384526 399668	Incident Date: 15-Apr-2002 Incident Identification: 71723 Pollutant: Inert Materials and Wastes:Specific Waste Materials Pollutant Description: Construction and Demolition Materials and Wastes:Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
12C	375	N	384526 399668	Incident Date: 15-Apr-2002 Incident Identification: 71723 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)
13C	375	N	384526 399668	Incident Date: 15-Apr-2002 Incident Identification: 71723 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
14D	378	N	384564 399667	Incident Date: 24-Apr-2002 Incident Identification: 74406 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)
15D	385	N	384581 399671	Incident Date: 13-May-2012 Incident Identification: 990313 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
16D	385	N	384581 399671	Incident Date: 13-May-2012 Incident Identification: 990313 Pollutant: Specific Waste Materials Pollutant Description: Commercial Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
17D	385	N	384581 399671	Incident Date: 13-May-2012 Incident Identification: 990313 Pollutant: Specific Waste Materials Pollutant Description: Tyres	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
18D	385	N	384581 399671	Incident Date: 13-May-2012 Incident Identification: 990313 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
19	404	N	384519 399698	Incident Date: 27-Sep-2001 Incident Identification: 33323 Pollutant: Organic Chemicals/Products Pollutant Description: Solvents	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
20E	405	N	384599 399688	Incident Date: 04-Oct-2002 Incident Identification: 70537 Pollutant: Inert Materials and Wastes : Specific Waste Materials Pollutant Description: Construction and Demolition Materials and Wastes :Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
21E	405	N	384599 399688	Incident Date: 10-Apr-2002 Incident Identification: 70537 Pollutant: Specific Waste Materials Pollutant Description: Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
22E	405	N	384599 399688	Incident Date: 10-Apr-2002 Incident Identification: 70537 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
23E	405	N	384599 399688	Incident Date: 04-Oct-2002 Incident Identification: 70537 Pollutant: Specific Waste Materials Pollutant Description: Construction and Demolition Materials and Wastes Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
24E	405	N	384599 399688	Incident Date: 10-Apr-2002 Incident Identification: 70537 Pollutant: Inert Materials and Wastes:Specific Waste Materials Pollutant Description: Construction and Demolition Materials and Wastes:Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
25E	413	N	384602 399695	Incident Date: 22-Mar-2002 Incident Identification: 65939 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
26E	413	N	384608 399694	Incident Date: 18-Feb-2002 Incident Identification: 59103 Pollutant: Inert Materials and Wastes:Specific Waste Materials Pollutant Description: Construction and Demolition Materials and Wastes:Household Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
27E	413	N	384608 399694	Incident Date: 18-Feb-2002 Incident Identification: 59103 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)
28E	413	N	384608 399694	Incident Date: 18-Feb-2002 Incident Identification: 59103 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
29E	416	N	384603 399698	Incident Date: 05-Feb-2002 Incident Identification: 57584 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

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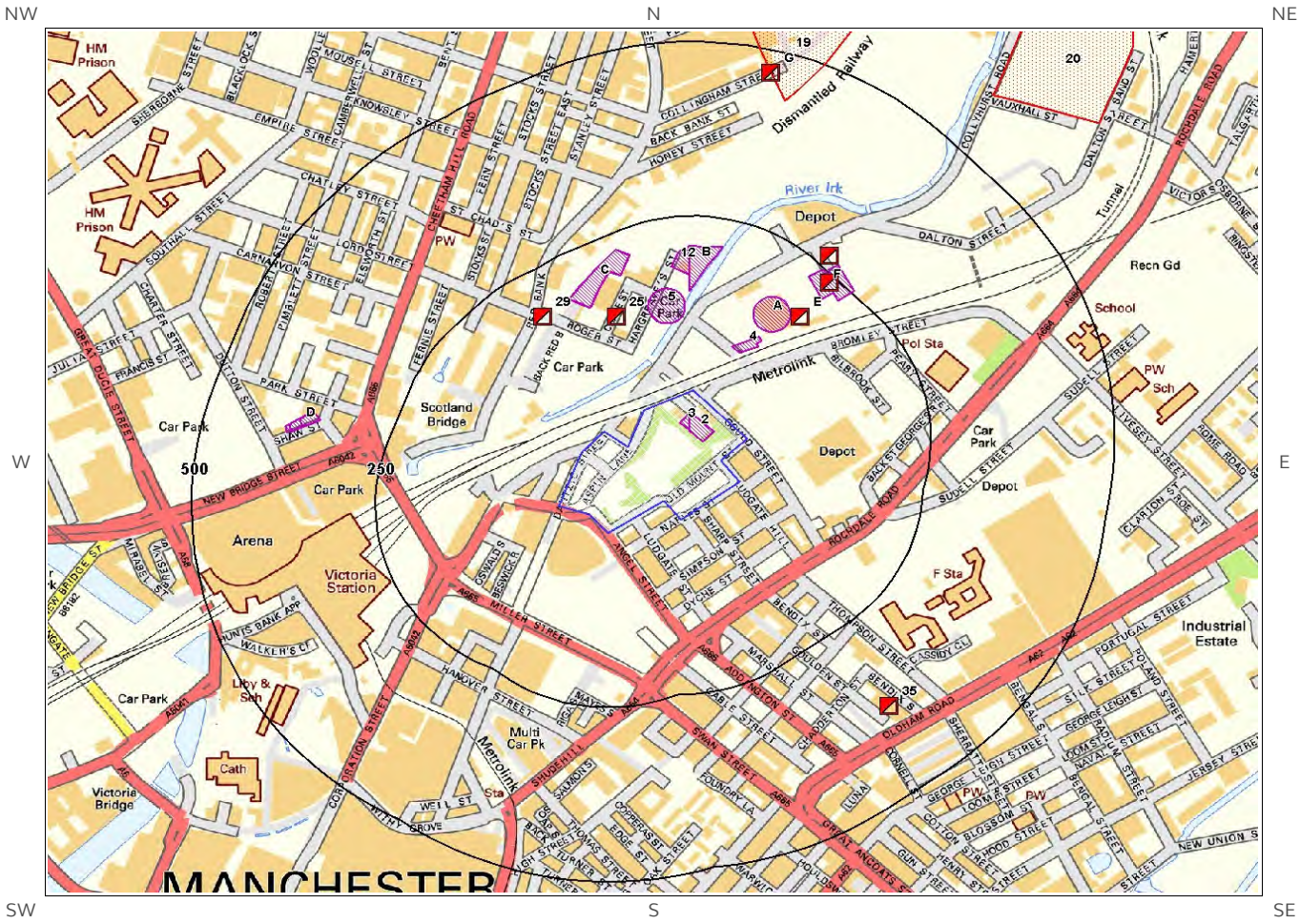
3. Landfill and Other Waste Sites Map



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Site Outline

250 / 500 Search Buffers (m)

EA/NRW Active Landfill

EA/NRW Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

EA/NRW Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

6

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
19	433	N	384700 400100	Site Address: Queens Road Tip - Land to South of Queens Road and North of Collingham Street, Cheetham, Manchester, Greater Manchester Waste Licence: Yes Site Reference: F005,RD/LIC/241/82 Waste Type: Inert, Industrial, Commercial, Household, Special, Liquid sludge Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 01-Jan-1974 Licence Surrendered: Licence Holder Address: - Operator: H Evers Limited Licence Holder: Manchester City Council First Recorded: 31-Dec-1955 Last Recorded: 31-Dec-1970
20	588	NE	385000 399800	Site Address: Sand Street, Collyhurst, Greater Manchester Waste Licence: - Site Reference: F027 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	714	NW	384100 400000	Site Address: Elizabeth Street, Cheetham, Greater Manchester Waste Licence: - Site Reference: F030 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	861	W	383300 399400	Site Address: Overbridge Road, Salford, Greater Manchester Waste Licence: - Site Reference: E090 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -

ID	Distance (m)	Direction	NGR	Details	
Not shown	868	NE	385200 400000	Site Address: Land at Fitzgeorge Street, Collyhurst, Manchester, Greater Manchester Waste Licence: - Site Reference: F031 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1307	NW	383400 400400	Site Address: Land at Fairy Lane, Cheetham Hill, Manchester, Greater Manchester Waste Licence: - Site Reference: F015 Waste Type: Commercial, Household Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1048	N	384800.0 400300.0	Address: H Evans Ltd, Queens Rd Tip, Cheetham, Manchester BGS Number: 848.0	Risk: No risk to aquifer Waste Type: N/A

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

1

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	1127	NW	383302 399677	Pricewise, 1 Overbridge Road, Salford	Manchester city council	Point

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

17

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details		
2	0	On Site	384516 399239	Type of Site: Breakers Yard Site Address: N/A	Planning Application Reference: N/A Date: 1984	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
3	0	On Site	384493 399247	Type of Site: Breakers Yard Site Address: N/A	Planning Application Reference: N/A Date: 1990	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
4	82	NE	384577 399359	Type of Site: Scrap Metal Works Site Address: N/A	Planning Application Reference: N/A Date: 1969	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
5	101	N	384469 399414	Type of Site: Waste Transfer Station Site Address: Hargreaves Street, Hargreaves Street, MANCHESTER, Greater Manchester, M4 4EJ	Planning Application Reference: 54626 Date: -	Further Details: Building to be used as a waste transfer station. Use of the land for storage of re-cycled materials for existing concrete business. Garage/workshop buildings and portable buildings relocated. An application (ref: 54626) for Detailed Planning permissn was submitted to Manchester C.C. on 12th June 1998. Data Source: Historic Planning Application Data Type: Point
6A	128	NE	384612 399402	Type of Site: Waste Recycling Shed (Conversion) Site Address: 204 Dantzic Street, MANCHESTER, Greater Manchester, M4 4DD	Planning Application Reference: 077598/FO/2005/N1 Date: -	Further Details: Scheme comprises change of use of shed from warehouse to sorting shed for skip waste recycling. An application (ref: 077598/FO/2005/N1) for detailed planning permission was granted by Manchester C.C. Planning decision obtained Data Source: Historic Planning Application Data Type: Point
7A	128	NE	384612 399402	Type of Site: Waste Recycling Shed (Conversion) Site Address: 204 Dantzic Street, MANCHESTER, Greater Manchester, M4 4DD	Planning Application Reference: 077598/FO/2005/N1 Date: -	Further Details: Scheme comprises change of use of shed from warehouse to sorting shed for skip waste recycling. An application (ref: 077598/FO/2005/N1) for detailed planning permission was granted by Manchester C.C. Planning decision obtained Data Source: Historic Planning Application Data Type: Point

ID	Distance (m)	Direction	NGR	Details		
8B	142	N	384510 399468	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1993	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
9B	142	N	384510 399468	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1994	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
10C	164	NW	384376 399453	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1995	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
11C	164	NW	384377 399453	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1989	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
12	166	N	384487 399478	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1995	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
13F	216	NE	384693 399448	Type of Site: Scrap Metal Works Site Address: N/A	Planning Application Reference: N/A Date: 1969	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
14D	347	W	383977 399248	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1985	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
15D	348	W	383983 399251	Type of Site: Scrap Metal Yard Site Address: N/A	Planning Application Reference: N/A Date: 1974	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
16D	348	W	383974 399248	Type of Site: Scrap Metal Yard Site Address: N/A	Planning Application Reference: N/A Date: 1984	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
17D	348	W	383974 399248	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1985	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon
18D	348	W	383974 399248	Type of Site: Scrap Yard Site Address: N/A	Planning Application Reference: N/A Date: 1985	Further Details: N/A Data Source: Historic Mapping Data Type: Polygon

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

19

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

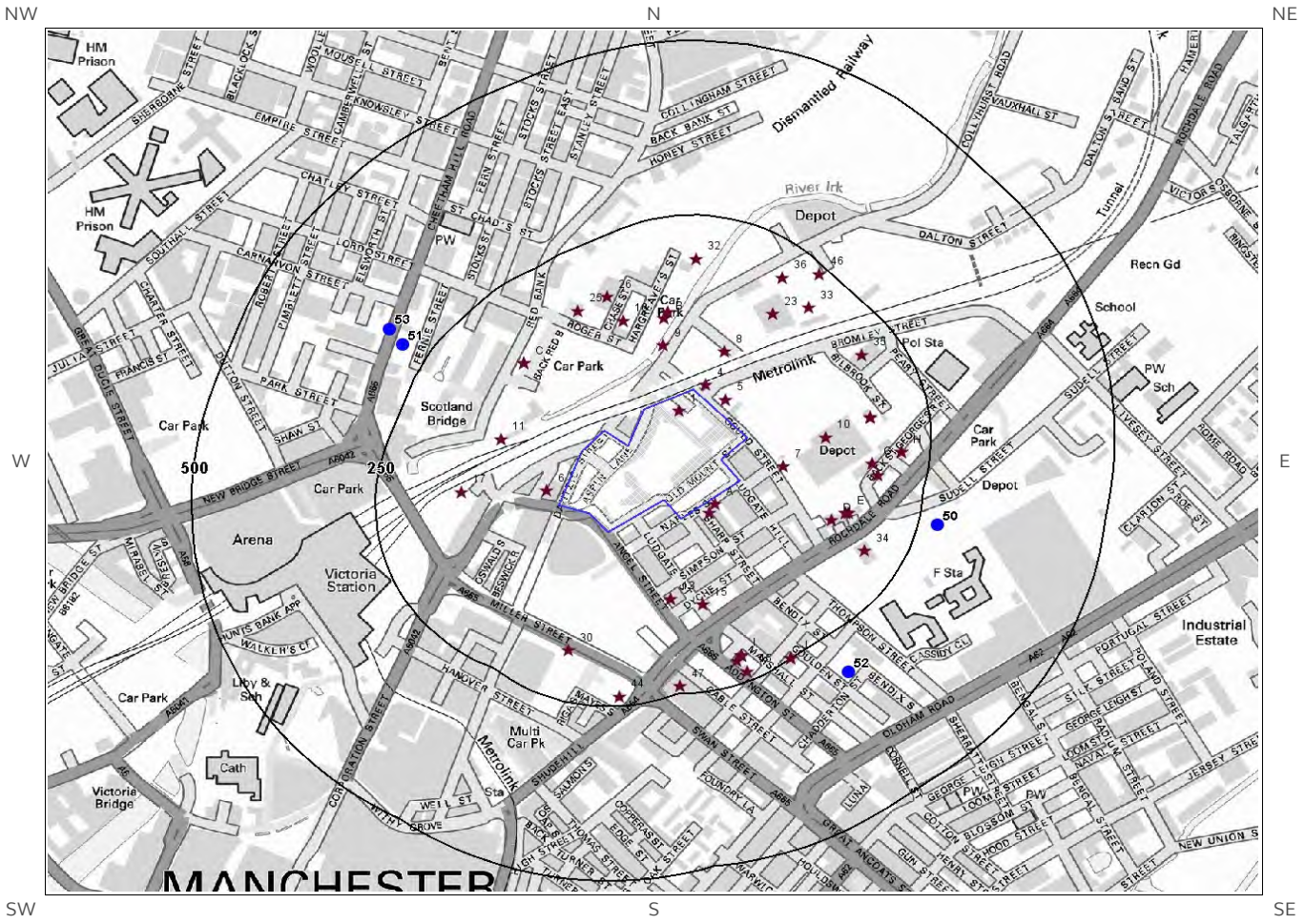
ID	Distance (m)	Direction	NGR	Details	
25	139	NW	384400 399400	Site Address: - Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PLT001 EPR reference: EA/EPR/CP3998CM/A001 Operator: Placemix Ltd Waste Management licence No: 50017 Annual Tonnage: 24900.0	Issue Date: 31/03/2000 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Placemix Ltd Transfer Station Correspondence Address: -
26E	177	NE	384650 399400	Site Address: Land/premises At, Warford Street, Collyhurst, Manchester, M4 4DD Type: Household, Commercial & Industrial Waste T Stn Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FAR008 EPR reference: EA/EPR/YP3594CH/V002 Operator: Farlam Waste Management Ltd Waste Management licence No: 50461 Annual Tonnage: 74999.0	Issue Date: 20/02/2007 Effective Date: - Modified: 12/11/2010 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Farlam Waste Management Ltd Correspondence Address: -
27E	177	NE	384650 399400	Site Address: Warford Street, Collyhurst, Manchester, M4 4JJ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FPL001 EPR reference: EA/EPR/DP3098CF/A001 Operator: Farlam Properties Ltd Waste Management licence No: 50118 Annual Tonnage: 24999.0	Issue Date: 27/08/2002 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Farlam Properties Ltd Correspondence Address: -
28E	177	NE	384650 399400	Site Address: Warford Street, Collyhurst, Manchester, M4 4DD Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FAR008 EPR reference: - Operator: Farlam Waste Management Ltd Waste Management licence No: 50461 Annual Tonnage: 0.0	Issue Date: 20/02/2007 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Farlam Waste Management Ltd Correspondence Address: Warford Street, Off Dantzic Street, Collyhurst, Manchester, M4 4DD
29	185	NW	384300 399400	Site Address: Red Bank, Cheetham Hill, Manchester, M8 Type: Mobile Plant Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MEL002 EPR reference: EA/EPR/LP3292ZH/S002 Operator: Mel Ltd Waste Management licence No: 65243 Annual Tonnage: 75000.0	Issue Date: 17/04/2002 Effective Date: - Modified: - Surrendered Date: 06/02/2007 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Mobile Plant Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details	
30F	240	NE	384690 399449	Site Address: Dulwich Street, Collyhurst, Manchester, M4 4JJ Type: Household, Commercial & Industrial Waste T Stn Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: JR001 EPR reference: - Operator: J Ryan & Co Ltd Waste Management licence No: 50084 Annual Tonnage: 0.0	Issue Date: 15/03/2002 Effective Date: - Modified: 26/07/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: J Ryan & Co Ltd Correspondence Address: Brian Cook, Pearl Environmental Services, 13, Middleton Road, Reddish, Stockport, Cheshire, SK5 6SG
31F	240	NE	384690 399449	Site Address: Dulwich Street, Collyhurst, Manchester, M4 4JJ Type: Household, Commercial & Industrial Waste T Stn Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: JR001 EPR reference: - Operator: J Ryan & Co Ltd Waste Management licence No: 50084 Annual Tonnage: 0.0	Issue Date: 15/03/2002 Effective Date: - Modified: 26/07/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: J Ryan & Co Ltd Correspondence Address: Pearl Environmental Services, 13, Middleton Road, Reddish, Stockport, Cheshire, SK5 6SG
32F	240	NE	384690 399449	Site Address: Dulwich Street, Collyhurst, Manchester, M4 4JJ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: JR001 EPR reference: - Operator: J Ryan & Co Ltd Waste Management licence No: 50084 Annual Tonnage: 0.0	Issue Date: 15/03/2002 Effective Date: - Modified: 26/07/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: J Ryan & Co Ltd Correspondence Address: Pearl Environmental Services, 13, Middleton Road, Reddish, Stockport, Cheshire, SK5 6SG
33F	240	NE	384690 399449	Site Address: Land/premises At, Dulwich Street, Collyhurst, Manchester, M4 4JJ Type: Household, Commercial & Industrial Waste T Stn Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: JRC001 EPR reference: EA/EPR/WP3898CJ/T003 Operator: Ryan John Waste Management licence No: 50084 Annual Tonnage: 75000.0	Issue Date: 15/03/2002 Effective Date: 04/07/2007 Modified: 26/07/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: J Ryan Correspondence Address: -
34F	267	NE	384690 399487	Site Address: Dulwich Street, Collyhurst, Manchester, M4 4JJ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: JR001 EPR reference: - Operator: J Ryan & Co Ltd Waste Management licence No: 50084 Annual Tonnage: 25000.0	Issue Date: 15/03/2002 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: J Ryan & Co Correspondence Address: Pearl Environmental Services, 13, Middleton Road, Reddish, Stockport, Cheshire, SK5 6SG

ID	Distance (m)	Direction	NGR	Details	
35	379	SE	384771 398842	Site Address: - Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: KER003 EPR reference: EA/EPR/TP3494CL/S002 Operator: Brendan J Kershaw & Winston Brown Waste Management licence No: 50328 Annual Tonnage: 0.0	Issue Date: 10/08/2004 Effective Date: - Modified: - Surrendered Date: 06/07/2010 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: French Parts Uk Correspondence Address: -
36G	468	N	384610 399750	Site Address: 23, Honey Street, Collyhurst, Manchester, M8 8RG Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MBS001 EPR reference: - Operator: Manchester And Bury Skip Hire Ltd Waste Management licence No: 50136 Annual Tonnage: 0.0	Issue Date: 02/01/2003 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Honey Street Transfer Station Correspondence Address: 28, Alnwick Drive, Bury, Lancashire, BL9 8BZ
37G	468	N	384610 399750	Site Address: 23, Honey Street, Collyhurst, Manchester, M8 8RG Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: UKS001 EPR reference: - Operator: Uk Skip Hire Ltd Waste Management licence No: 50136 Annual Tonnage: 0.0	Issue Date: 02/01/2003 Effective Date: 14/05/2005 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Honey Street Transfer Station Correspondence Address: 23, Honey Street, Collyhurst, Manchester, M8 8RG
38G	468	N	384610 399750	Site Address: 21-23, Honey Street, Collyhurst, Manchester, M8 8RG Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: UKS001 EPR reference: EA/EPR/YP3498CV/T002 Operator: U K Skip Hire Ltd Waste Management licence No: 50136 Annual Tonnage: 24999.0	Issue Date: 02/01/2003 Effective Date: 14/05/2005 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred Site Name: Honey Street Transfer Station Correspondence Address: -
Not shown	1035	W	383354 399493	Site Address: 23, Cottenham Lane, Salford, Manchester, M7 1TH Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MOT002 EPR reference: EA/EPR/SP3694CX/A001 Operator: Motor Body Services (Salford) Ltd Waste Management licence No: 50240 Annual Tonnage: 2500.0	Issue Date: 13/07/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: M B S & Partfirst Correspondence Address: -
Not shown	1035	W	383354 399493	Site Address: 23, Cottenham Lane, Salford, Manchester, M7 1TH Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MOT002 EPR reference: EA/EPR/SP3694CX/A001 Operator: Motor Body Services (salford) Ltd Waste Management licence No: 50240 Annual Tonnage: 2500.0	Issue Date: 13/07/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: M B S & Partfirst Correspondence Address: -

ID	Distance (m)	Direction	NGR	Details	
Not shown	1090	NW	383690 400076	Site Address: - Type: Material Recycling Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: KSD001 EPR reference: EA/EPR/KP3592CV/S002 Operator: Kains Steel Drums Waste Management licence No: 53472 Annual Tonnage: 75000.0	Issue Date: 17/11/1998 Effective Date: - Modified: - Surrendered Date: 22/08/2001 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Kains Steel Drums Correspondence Address: -
Not shown	1205	W	383200 399566	Site Address: Cambridge Industrial Area, Cottenham Lane, Salford, Lancashire, M7 1GS Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: GSC001 EPR reference: EA/EPR/UP3692CM/S002 Operator: Granyte Surface Coatings Plc Waste Management licence No: 53446 Annual Tonnage: 50000.0	Issue Date: 21/09/1999 Effective Date: - Modified: - Surrendered Date: 03/07/2002 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Granyte Surface Coatings Plc Correspondence Address: -
Not shown	1275	NW	383201 399751	Site Address: Unit 26, Caroline Street, Salford, Manchester, M7 1SS Type: Material Recycling Treatment Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: EGR001 EPR reference: EA/EPR/YP3492CM/A001 Operator: Gregson Ernest Waste Management licence No: 53620 Annual Tonnage: 2083.33	Issue Date: 15/03/1996 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Expired Site Name: Star Drums Correspondence Address: -

4. Current Land Use Map



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Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 49

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	M J T Motors	384485 399263	Irk Street, Manchester, M4 4JT	Vehicle Repair, Testing and Servicing	Repair and Servicing
2A	8	SE	Electricity Sub Station	384534 399130	M4	Electrical Features	Infrastructure and Facilities
3A	14	SE	Works	384527 399118	M4	Unspecified Works Or Factories	Industrial Features
4	17	NE	Church Lane Garage	384521 399301	39, Bromley Street, Manchester, M4 4JS	Vehicle Repair, Testing and Servicing	Repair and Servicing
5	20	NE	Electricity Sub Station	384548 399280	M4	Electrical Features	Infrastructure and Facilities
6	24	W	Electricity Sub Station	384305 399149	M4	Electrical Features	Infrastructure and Facilities
7	63	E	Electricity Sub Station	384627 399184	M4	Electrical Features	Infrastructure and Facilities
8	69	NE	Marble Brewery	384547 399348	41, Bromley Street, Manchester, M4 4JS	Alcoholic Drinks	Foodstuffs
9	75	NW	The Runaway Brewery	384463 399357	Unit 4 Millgate, Dantzic Street, Manchester, M4 4JW	Alcoholic Drinks	Foodstuffs
10	106	E	Depot	384684 399226	M4	Container and Storage	Transport, Storage and Delivery
11	109	W	Gantry	384243 399223	M4	Travelling Cranes and Gantries	Industrial Features
12B	110	N	Chimney	384464 399396	M4	Chimneys	Industrial Features
13	115	S	Warehouse	384474 398994	M4	Container and Storage	Transport, Storage and Delivery
14B	117	N	Vale Works	384470 399406	M4	Unspecified Works Or Factories	Industrial Features
15	126	S	River Park Estate Ltd	384517 398985	25, Rochdale Road, Manchester, M4 4HT	Business Parks and Industrial Estates	Industrial Features
16	129	NW	Works	384409 399393	M4	Unspecified Works Or Factories	Industrial Features
17	135	W	A-Plant Hire Co Ltd	384189 399147	Unit 4, Millow Street, Manchester, M4 4DR	Construction and Tool Hire	Hire Services
18D	136	SE	Depot	384692 399107	M4	Container and Storage	Transport, Storage and Delivery
19C	146	NW	Belle Design & Print	384274 399332	19, Red Bank, Manchester, M4 4HF	Published Goods	Industrial Products

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
20C	146	NW	Prontaprint Ltd	384274 399332	19, Red Bank, Manchester, M4 4HF	Published Goods	Industrial Products
21D	150	E	A1 Tyres M C R	384711 399116	87, Rochdale Road, Manchester, M4 4HY	Vehicle Parts and Accessories	Motoring
22E	150	E	Nationwide Vehicle Deliveries Ltd	384711 399116	87a, Rochdale Road, Manchester, M4 4HY	Distribution and Haulage	Transport, Storage and Delivery
23	153	NE	Astra Signs	384612 399402	204, Dantzic Street, Manchester, M4 4DD	Signs	Industrial Products
24E	154	E	Depot	384715 399117	M4	Container and Storage	Transport, Storage and Delivery
25	169	NW	Transporter	384347 399407	5, Roger Street, Manchester, M4 4EN	Vehicle Repair, Testing and Servicing	Repair and Servicing
26	169	NW	Dekbed UK Ltd	384387 399427	3, Roger Street, Manchester, M4 4EN	Textiles, Fabrics, Silk and Machinery	Industrial Products
27F	169	E	Mast	384744 399254	M4	Telecommunications Features	Infrastructure and Facilities
28F	170	E	Pylon	384745 399254	M4	Electrical Features	Infrastructure and Facilities
29G	173	E	Depot	384747 399188	M4	Container and Storage	Transport, Storage and Delivery
30	178	S	Electricity Sub Station	384335 398920	M60	Electrical Features	Infrastructure and Facilities
31G	185	E	Great American Car Wash	384755 399171	1, Back St. Georges Road, Manchester, M4 4JD	Vehicle Cleaning Services	Personal, Consumer and Other Services
32	188	N	Scrap Yard	384508 399482	M4	Scrap Metal Merchants	Recycling Services
33	194	NE	Depot	384662 399412	M4	Container and Storage	Transport, Storage and Delivery
34	196	SE	Warehouse	384737 399063	M4	Container and Storage	Transport, Storage and Delivery
35	197	NE	Works	384734 399344	M4	Unspecified Works Or Factories	Industrial Features
36	201	NE	Depot	384625 399455	M4	Container and Storage	Transport, Storage and Delivery
37H	210	E	Northern Auto Ltd	384787 399204	117-119, Rochdale Road, Manchester, M4 4HZ	Vehicle Repair, Testing and Servicing	Repair and Servicing
38H	210	E	Nothern Auto Electrical Services	384787 399204	117-119, Rochdale Road, Manchester, M4 4HZ	Vehicle Repair, Testing and Servicing	Repair and Servicing
39I	211	SE	Royal Tablecloths	384569 398913	53, Marshall Street, Manchester, M4 5FU	Catering and Non Specific Food Products	Foodstuffs
40I	211	SE	Indigo Denim Yarn Ltd	384569 398913	53, Marshall Street, Manchester, M4 5FU	Textiles, Fabrics, Silk and Machinery	Industrial Products
41I	211	SE	Global Star Ltd	384569 398913	53, Marshall Street, Manchester, M4 5FU	Clothing, Components and Accessories	Consumer Products
42I	211	SE	Signteck UK	384569 398913	53, Marshall Street, Manchester, M4 5FU	Signs	Industrial Products
43I	216	S	International Trimmings	384563 398905	44, Addington Street, Manchester, M4 5EU	Ropes, Nets and Cordage	Industrial Products
44	235	S	Electricity Sub Station	384404 398854	M60	Electrical Features	Infrastructure and Facilities

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
45	236	S	Westbeach	384577 398889	John Swift Building 19, Mason Street, Manchester, M4 5FT	Hobby, Sports and Pastime Products	Consumer Products
46	238	NE	Depot	384676 399460	M4	Container and Storage	Transport, Storage and Delivery
47	239	S	Barkat Knitwear Manufacturing Co Ltd	384487 398868	2, Rochdale Road, Manchester, M4 4JR	Textiles, Fabrics, Silk and Machinery	Industrial Products
48J	248	SE	Customised Clothing Co	384636 398909	32, Mason Street, Manchester, M4 5EY	Textiles, Fabrics, Silk and Machinery	Industrial Products
49J	248	SE	Usman Fashions M C R Ltd	384636 398909	32, Mason Street, Manchester, M4 5EY	Clothing, Components and Accessories	Consumer Products

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 4

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
50	275	E	384836 399099	Obsolete	Rochdale Road Service Station, Rochdale Road, Manchester, Lancashire, M4 4HZ	Not Applicable	Obsolete
51	287	NW	384110 399358	Texaco	Redbank Service Station, Cheetham Hill Road, Manchester, Lancashire, M4 4EX	No	Open
52	309	SE	384715 398888	Unbranded	Smithfield Service Station, 12, Rochdale Road, Bendix Street, Collyhurst, Manchester, Lancashire, M24 6DP	Not Applicable	Obsolete
53	315	NW	384091 399380	Obsolete	Cheetham Hill Service Station, Cheetham Hill Road, Manchester, Lancashire, M4 4FT	Not Applicable	Obsolete

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

---

5. Geology

5.1 Artificial Ground and Made Ground

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TILLD	TILL, DEVENSIAN	DIAMICTON
TILLD	TILL, DEVENSIAN	DIAMICTON

5.3 Bedrock and Solid Geology

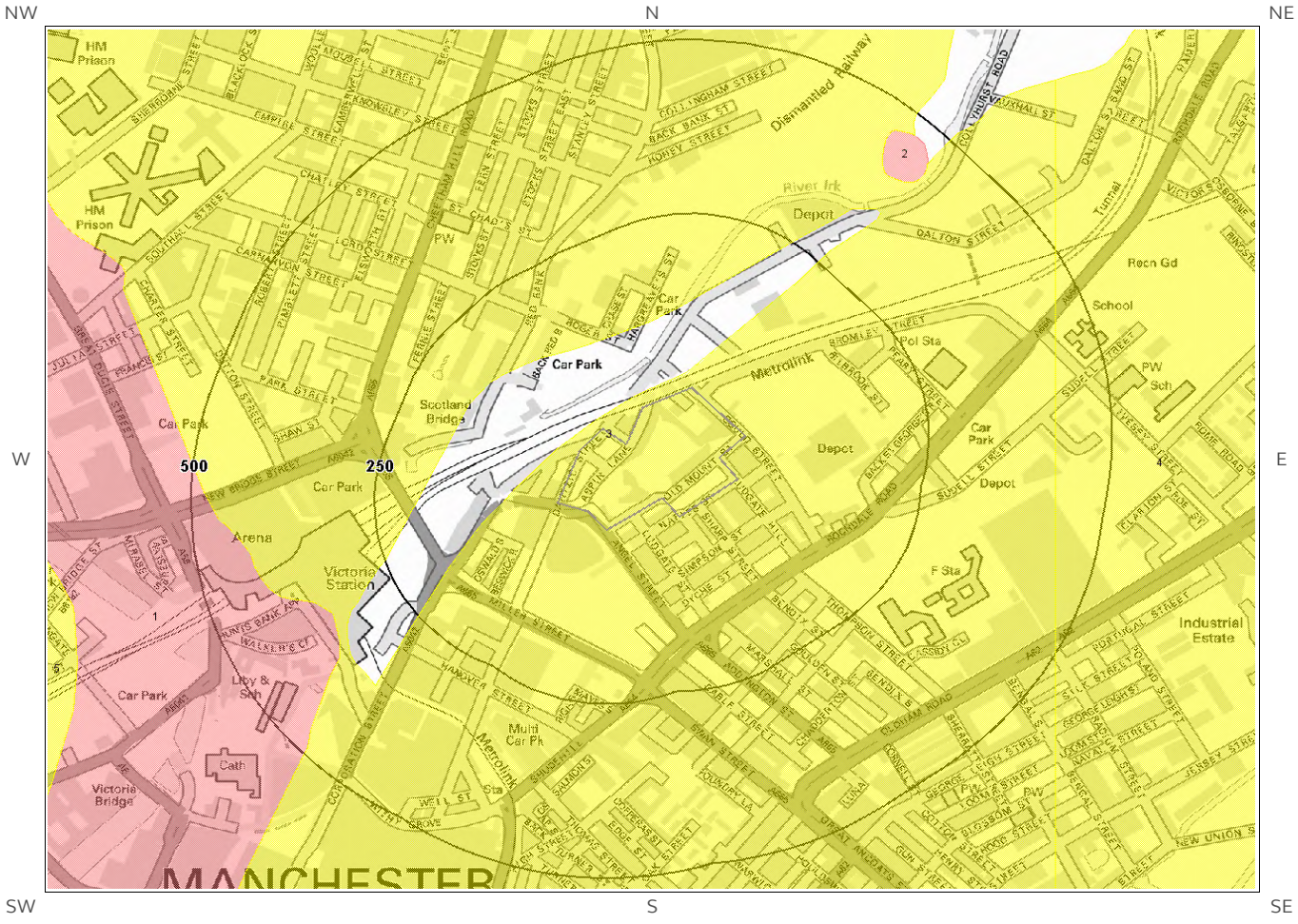
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
CPB-SDST	CHESTER PEBBLE BEDS FORMATION	SANDSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology



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Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

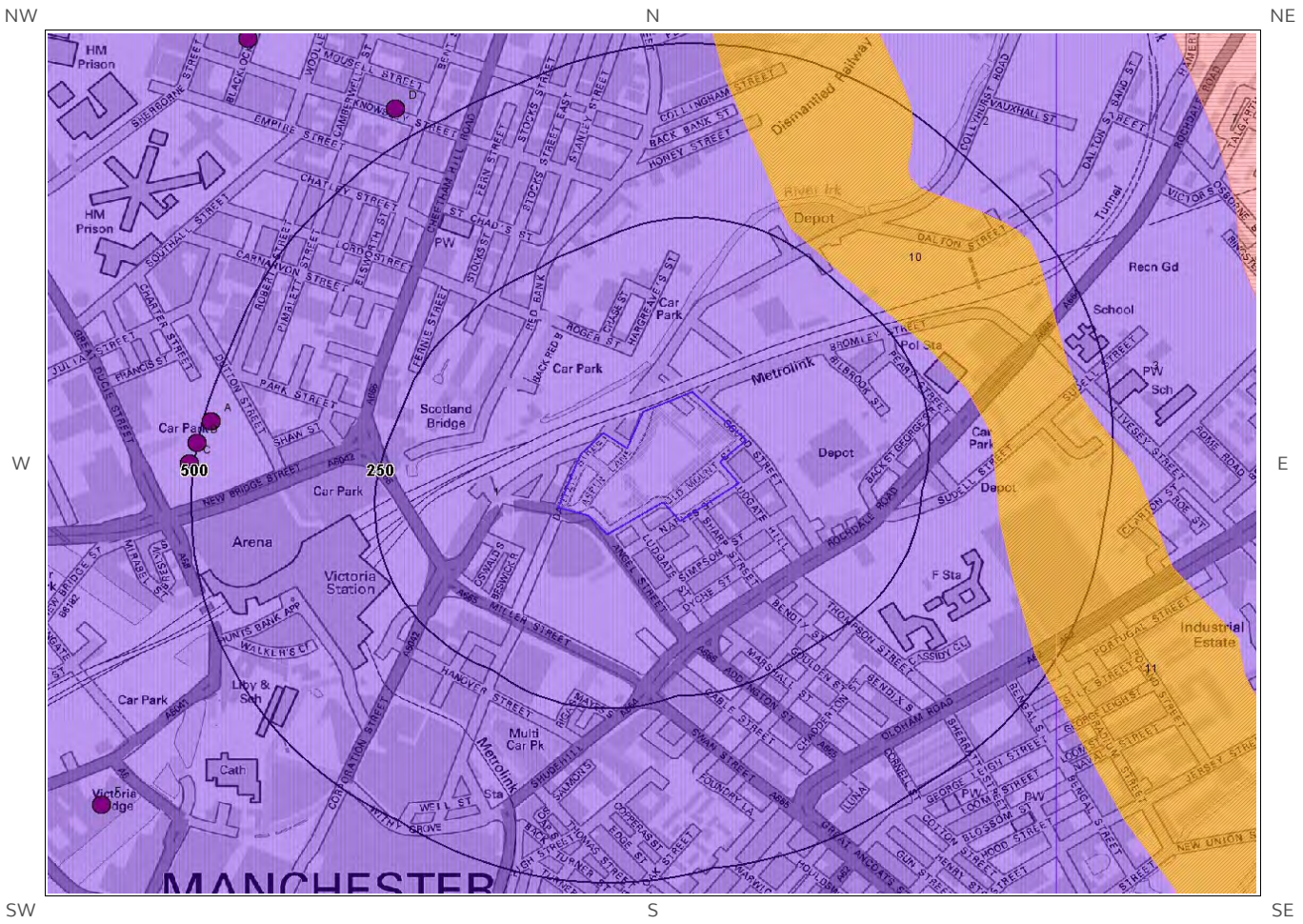
Secondary (B) Aquifer - Lower Permeability Layers

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

6b. Aquifer Within Bedrock Geology and Abstraction Licenses



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Site Outline

250

500

Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



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6d. Hydrogeology – Source Protection Zones within confined aquifer



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Site Outline

250 Search Buffers (m)
500

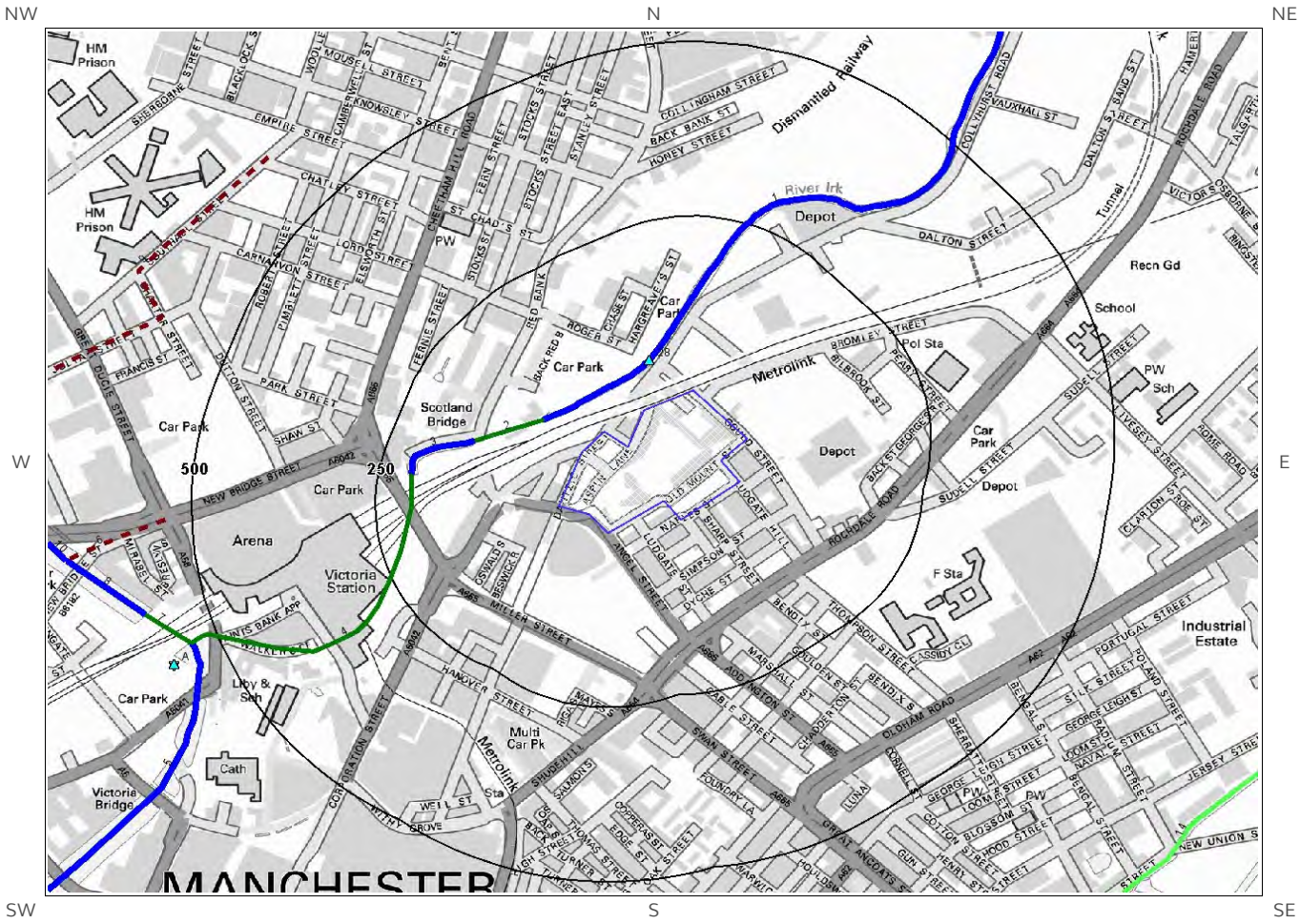
Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

6e. Hydrology – Detailed River Network and River Quality



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Site Outline

250
500
Search Buffers (m)

Primary River
Secondary River
Tertiary River
Lake/Reservoir
Underground River (inferred)
General Quality Assessment: Biology
General Quality Assessment: Chemistry

Canal
Canal Tunnel
Culvert
Multiple Channel Culvert
Underground River (Potential Sewer)
Underground River (local knowledge)

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
3	0	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
1	346	SW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	405	NE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
4	422	E	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

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	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
10	263	NE	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
11	422	E	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers
2	425	NE	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

ID	Distance (m)	Direction	Designation	Description
3	451	E	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

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
13A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: Borehole (no 1) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
14A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole (no 1) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
15A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: "borehole (no 1) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 9/8/2000 Version End Date:
16A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole (no 1) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 9/8/2000 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
17A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 1 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
18A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: Process Water Direct Source: Ground Water - North West Region Point: Borehole Number 1 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
19B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: Borehole Number 3 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
20B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 3 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
21B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: Borehole (no 3) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
22B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole (no 3) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
23B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Process Water Direct Source: Ground Water - North West Region Point: Borehole Number 3 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
24B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole (no 3) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 9/8/2000 Version End Date:
25B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: "borehole (no 3) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 9/8/2000 Version End Date:
26B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 3 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
27C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: Borehole Number 2 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
28C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 2 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
29C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: Borehole (no 2) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
30C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole (no 2) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
31C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole (no 2) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 9/8/2000 Version End Date:
32C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Process water Direct Source: Ground Water - North West Region Point: "borehole (no 2) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 9/8/2000 Version End Date:
33C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 2 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:
34C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Process Water Direct Source: Ground Water - North West Region Point: Borehole Number 2 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 1/1/2004 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
35D	545	NW	384100 399700	Status: Historical Licence No: 2569004011 Details: Process Water Direct Source: Ground Water - North West Region Point: Borehole At Derby Brewery, Cheetham, Manchester 3 Data Type: Point Name: JOSEPH HOLT LTD	Annual Volume (m^3): 45460 Max Daily Volume (m^3): 181.84 Original Application No: 0423 Original Start Date: 17/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/2/1966 Version End Date:
36D	545	NW	384100 399700	Status: Historical Licence No: 2569004011 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "borehole At Derby Brewery, Cheetham, Manchester 3" Data Type: Point Name: JOSEPH HOLT LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 423 Original Start Date: 17/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/2/1966 Version End Date:
37D	545	NW	384100 399700	Status: Historical Licence No: 2569004011 Details: Process water Direct Source: Ground Water - North West Region Point: "borehole At Derby Brewery, Cheetham, Manchester 3" Data Type: Point Name: JOSEPH HOLT LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 423 Original Start Date: 17/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/2/1966 Version End Date:
38D	545	NW	384100 399700	Status: Historical Licence No: 2569004011 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: Borehole At Derby Brewery, Cheetham, Manchester 3 Data Type: Point Name: JOSEPH HOLT LTD	Annual Volume (m^3): 45460 Max Daily Volume (m^3): 181.84 Original Application No: 0423 Original Start Date: 17/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/2/1966 Version End Date:
39E	744	NW	383900 399800	Status: Historical Licence No: 2569004021 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole At Premises, Derby Street, Cheetham, Manchester Data Type: Point Name: LANCASHIRE DAIRIES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 1749 Original Start Date: 17/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/4/1993 Version End Date:
40E	744	NW	383900 399800	Status: Historical Licence No: 2569004021 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: Borehole At Premises, Derby Street, Cheetham, Manchester Data Type: Point Name: LANCASHIRE DAIRIES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 1749 Original Start Date: 17/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 1/4/1993 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
41F	756	SW	383700 398700	Status: Historical Licence No: 2569007070 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: Borehole At Dial House, Chapel St, Salford Data Type: Point Name: BRITISH TELECOMMUNICATIONS PLC	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 2333 Original Start Date: 27/1/1971 Expiry Date: - Issue No: 101 Version Start Date: 1/4/1984 Version End Date:
42F	756	SW	383700 398700	Status: Historical Licence No: 2569007070 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: "borehole At Dial House, Chapel St, Salford" Data Type: Point Name: BRITISH TELECOM	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 2333 Original Start Date: 27/1/1971 Expiry Date: - Issue No: 100 Version Start Date: 27/1/1971 Version End Date:
43F	756	SW	383700 398700	Status: Historical Licence No: 2569007070 Details: General Cooling (Existing Licences Only) (High Loss) Direct Source: Ground Water - North West Region Point: Borehole At Dial House Chapel Street Salford Data Type: Point Name: BRITISH TELECOMMUNICATIONS PLC	Annual Volume (m^3): 45 Max Daily Volume (m^3): 30 Original Application No: 2333 Original Start Date: 27/1/1971 Expiry Date: - Issue No: 101 Version Start Date: 1/4/2007 Version End Date:
Not shown	946	NE	385000 400100	Status: Historical Licence No: 2569005015 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "b/hole, Little Green Works, Collyhurst Rd, Manchester 10" Data Type: Point Name: PACKAGING PRODUCTS LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 689 Original Start Date: 16/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 21/2/1995 Version End Date:
Not shown	946	NE	385000 400100	Status: Historical Licence No: 2569005015 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: B/hole, Little Green Works, Collyhurst Rd, Manchester 10 Data Type: Point Name: Packaging Products (Coatings) Ltd	Annual Volume (m^3): 438689 Max Daily Volume (m^3): 1636.56 Original Application No: NPS/WR/006003 Original Start Date: 16/2/1966 Expiry Date: - Issue No: 102 Version Start Date: 9/2/2011 Version End Date:
Not shown	1127	S	384100 398000	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	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 2332 Original Start Date: 27/1/1971 Expiry Date: - Issue No: 100 Version Start Date: 27/1/1971 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1127	S	384100 398000	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 TELECOMMUNICATIONS PLC	Annual Volume (m^3): 1100 Max Daily Volume (m^3): 860 Original Application No: 2332 Original Start Date: 1/4/1984 Expiry Date: - Issue No: 100 Version Start Date: 1/4/2007 Version End Date:
Not shown	1283	SW	383335 398310	Status: Historical Licence No: 2569007089 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: 2 Boreholes At Gartside Street Manchester Data Type: Line Name: HER MAJESTY'S COURT SERVICE	Annual Volume (m^3): 200000 Max Daily Volume (m^3): 1179 Original Application No: 7546 Original Start Date: 26/1/2005 Expiry Date: 31/3/2011 Issue No: 2 Version Start Date: 10/7/2008 Version End Date:
Not shown	1356	S	384378 397733	Status: Historical Licence No: NW0690006001 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: Boreholes At Origin Developments, Manchester Data Type: Point Name: West Contracting	Annual Volume (m^3): 139128 Max Daily Volume (m^3): 1010 Original Application No: 7623 Original Start Date: 19/1/2009 Expiry Date: 31/3/2015 Issue No: 1 Version Start Date: 19/1/2009 Version End Date:
Not shown	1356	S	384378 397733	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	Annual Volume (m^3): 139128 Max Daily Volume (m^3): 1010 Original Application No: 7623 Original Start Date: 19/1/2009 Expiry Date: 31/3/2015 Issue No: 1 Version Start Date: 19/1/2009 Version End Date:
Not shown	1739	SE	385240 397540	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	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 6 Original Start Date: 8/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 8/2/1966 Version End Date:
Not shown	1739	SE	385240 397540	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	Annual Volume (m^3): 331858 Max Daily Volume (m^3): 909.2 Original Application No: 0006 Original Start Date: 8/2/1966 Expiry Date: - Issue No: 100 Version Start Date: 8/2/1966 Version End Date:

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details	
1A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole (no 1) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
2A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole (no 1) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
3A	488	W	383850 399250	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 1 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
4B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 3 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:

ID	Distance (m)	Direction	NGR	Details	
5B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 3 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
6B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole (no 3) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
7B	502	W	383830 399220	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole (no 3) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
8C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 2 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
9C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole Number 2 At Premises Strangeways Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): 500000 Max Daily Volume (m^3): 2500 Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
10C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: "Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services" Direct Source: Ground Water - North West Region Point: "borehole (no 2) At Premises, Strangeways, Manchester" Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023 Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:

ID	Distance (m)	Direction	NGR	Details	
11C	507	W	383820 399190	Status: Historical Licence No: 2569004023 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole (no 2) At Premises, Strangeways, Manchester Data Type: Point Name: INTERBREW UK LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: CW0023R Original Start Date: 18/2/1966 Expiry Date: - Issue No: 102 Version Start Date: Version End Date:
12	744	NW	383900 399800	Status: Historical Licence No: 2569004021 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: Borehole At Premises, Derby Street, Cheetham, Manchester Data Type: Point Name: LANCASHIRE DAIRIES LTD	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: 1749 Original Start Date: 17/2/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Is there any Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site? Yes

6.9.1 Biological Quality:

Biological Quality data describes water quality in terms of 83 groups of macroinvertebrates, some of which are pollution sensitive. The results are graded from A ('Very Good') to F ('Bad').

The following Biological Quality records are shown on the Hydrology Map (6e):

ID	Distance (m)	Direction	NGR	River Quality Grade	Biological Quality Grade				
					2005	2006	2007	2008	2009
24A	571	SW	383800 398900	River Name: Irk Reach: Moston Bk. To Irwell End/Start of Stretch: End of Stretch NGR	E	E	E	E	E
Not shown	732	NE	384900 399910	River Name: Irk Reach: Moston Bk. To Irwell End/Start of Stretch: Start of Stretch NGR	E	E	E	E	E
Not shown	732	NE	384900 399910	River Name: Moston Bk Reach: Qsl At Hale Lane Failsworth To Irk End/Start of Stretch: End of Stretch NGR	F	F	F	F	E
Not shown	732	NE	384900 399910	River Name: Irk Reach: Wince Brook To Moston Bk. End/Start of Stretch: End of Stretch NGR	E	E	E	E	E

6.9.2 Chemical Quality:

Chemical quality data is based on the General Quality Assessment Headline Indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. In Wales, the samples are measured for biological oxygen demand (BOD), ammonia and dissolved oxygen. The results are graded from A ('Very Good') to F ('Bad').

The following Chemical Quality records are shown on the Hydrology Map (6e):

					Chemical Quality Grade				
ID	Distance (m)	Direction	NGR	River Quality Grade	2005	2006	2007	2008	2009
28	61	NW	384445 399335	River Name: Irk Reach: Moston Bk. To Irwell End/Start of Stretch: Sample Point NGR	C	C	C	C	D
29A	571	SW	383800 398900	River Name: Irk Reach: Moston Bk. To Irwell End/Start of Stretch: End of Stretch NGR	C	C	C	C	D
Not shown	732	NE	384900 399910	River Name: Irk Reach: Moston Bk. To Irwell End/Start of Stretch: Start of Stretch NGR	C	C	C	C	D
Not shown	732	NE	384900 399910	River Name: Irk Reach: Wince Brook To Moston Bk. End/Start of Stretch: End of Stretch NGR	C	C	C	C	C
Not shown	804	SE	384950 398450	River Name: Rochdale Canal Reach: Empress Processing To Ashton Canal End/Start of Stretch: Start of Stretch NGR	A	A	A	A	A
Not shown	804	SE	384950 398450	River Name: Rochdale Canal Reach: Qsl At Summit To Empress Processing End/Start of Stretch: End of Stretch NGR	A	A	A	A	A
Not shown	978	S	384850 398200	River Name: Rochdale Canal Reach: Empress Processing To Ashton Canal End/Start of Stretch: End of Stretch NGR	A	A	A	A	A
Not shown	1027	S	384830 398140	River Name: Rochdale Canal Reach: Ashton Canal To Knott Mill End/Start of Stretch: Start of Stretch NGR	A	A	A	A	A

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	52	NW	River Name: River Irk Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
2	69	NW	River Name: River Irk Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
3	141	W	River Name: River Irk Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
4	201	W	River Name: River Irk Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined

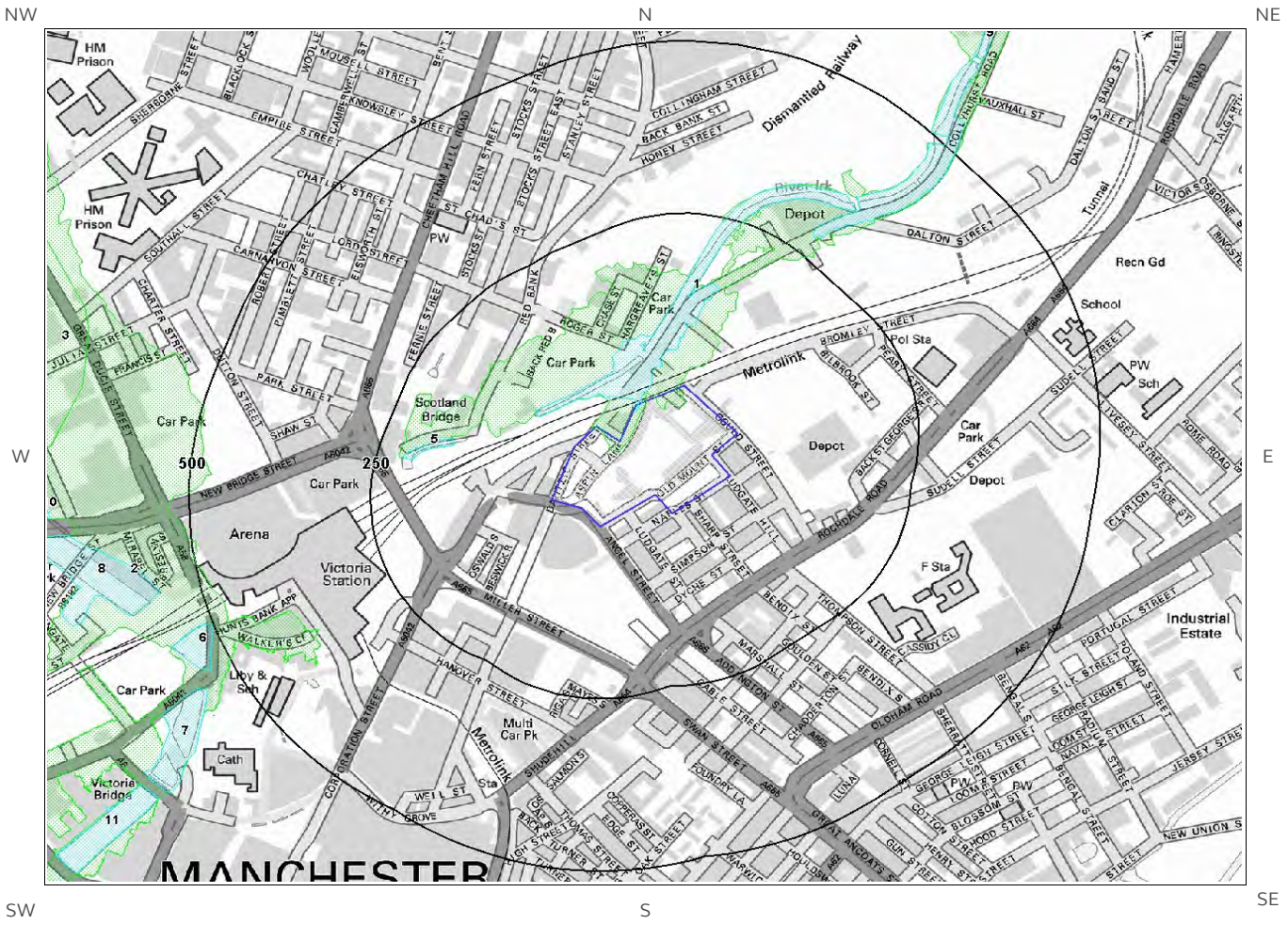
6.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
49	NW
61	NW
141	W

7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



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Site Outline

Search Buffers (m)

Zone 2 Floodplain

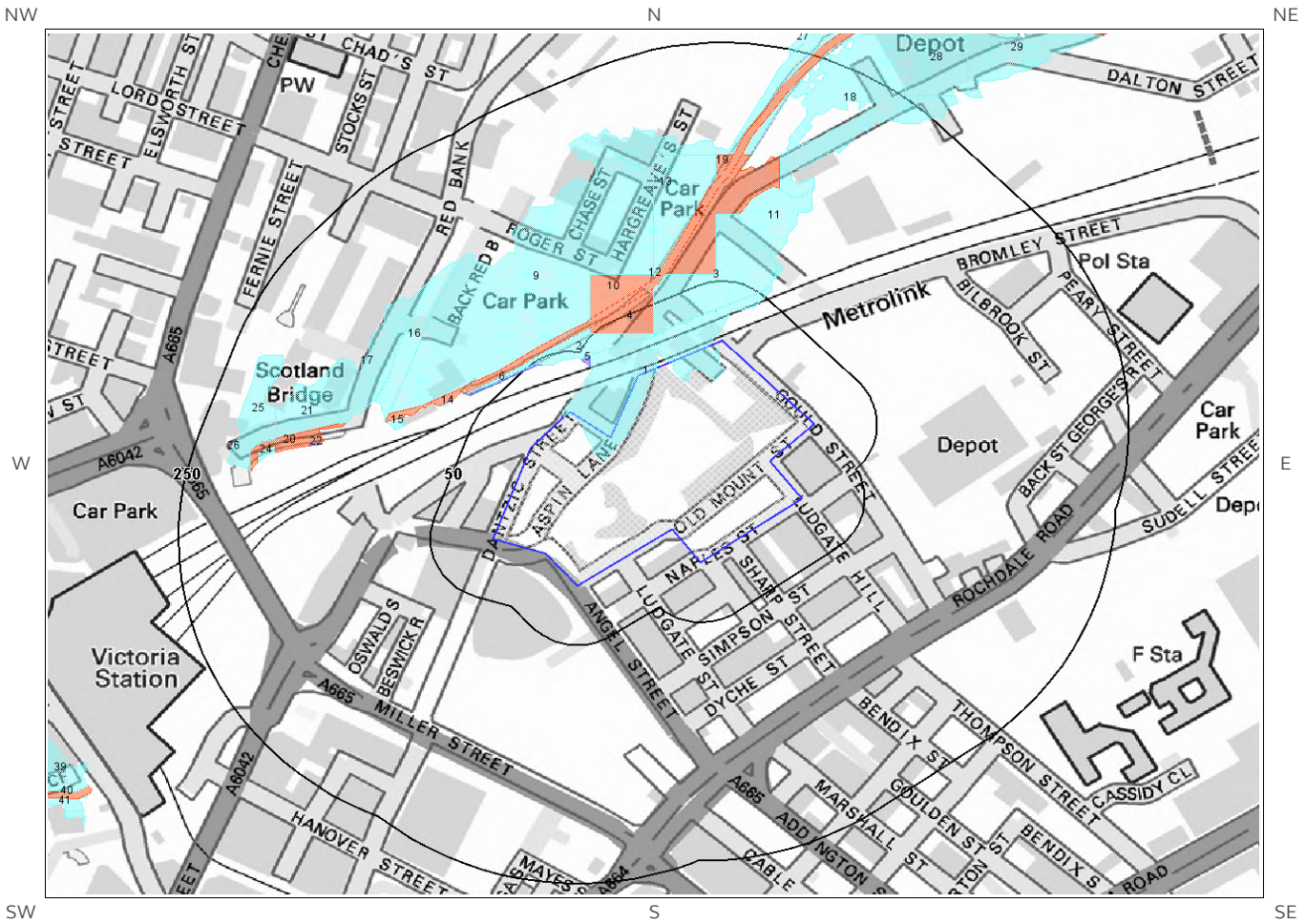
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

- Very Low
- Low
- Medium
- High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 2 floodplain? Yes

Environment Agency/Natural Resources Wales Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

ID	Distance (m)	Direction	Update	Type
1	0	On Site	09-Sep-2016	Zone 2 - (Fluvial/Tidal Models)

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency/Natural Resources Wales Zone 3 floodplain? Yes

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

ID	Distance (m)	Direction	Update	Type
1	0	On Site	09-Sep-2016	Zone 3 - (Fluvial Models)
	156	W	09-Sep-2016	Zone 3 - (Fluvial Models)

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Low (greater than 1 in 1000 but less than 1 in 100) chance of flooding in any given year.

Any relevant data within 250m is represented on the RoFRaS Flood map. Data to 50m is reported in the table below.

ID	Distance (m)	Direction	RoFRas flood Risk

1	0.0	On Site	Low
2	26.0	NW	Low
3	26.0	NW	Low
4	27.0	NW	High
5	38.0	NW	Medium
6	45.0	NW	Medium

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

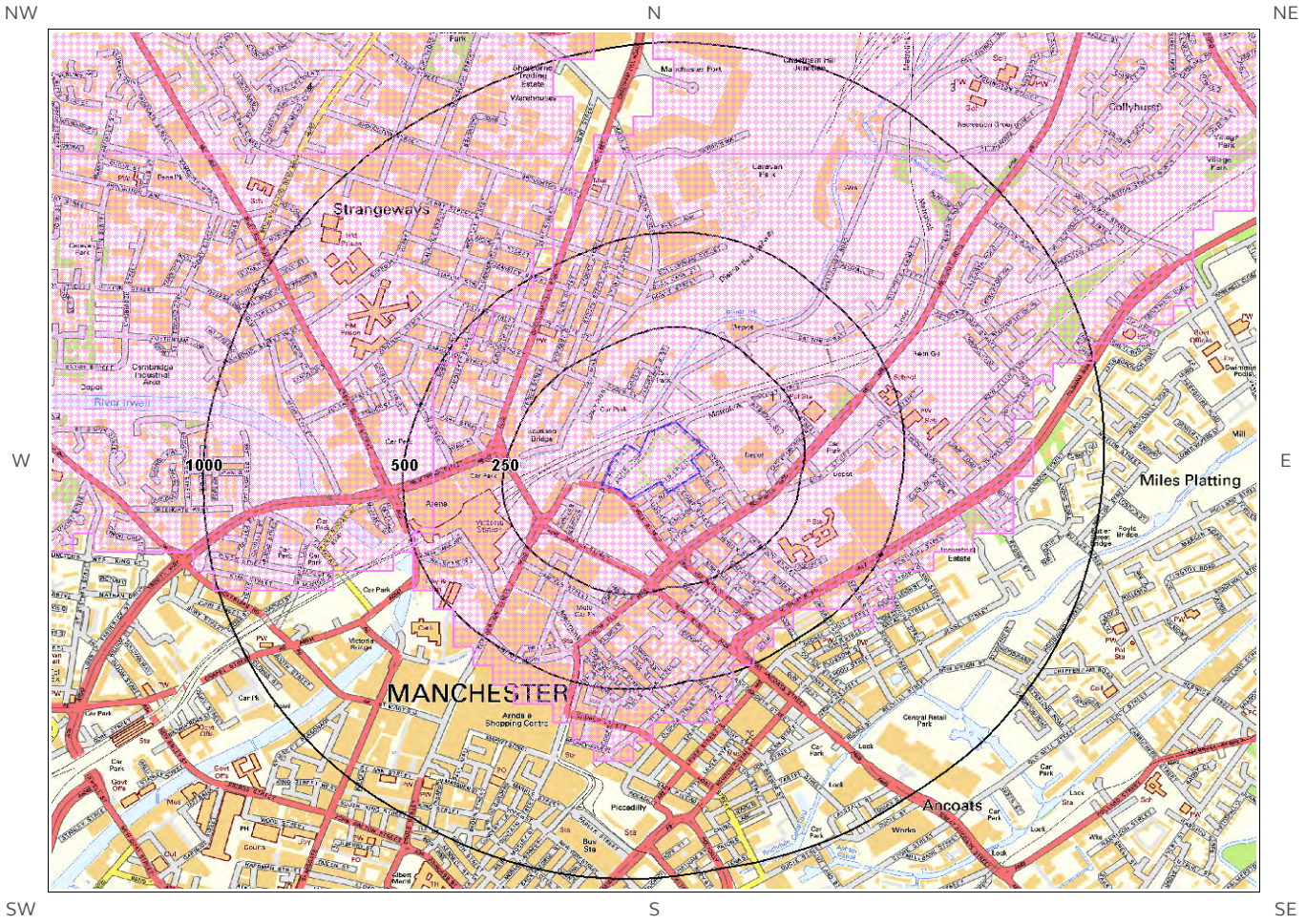
7.8 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?	Low

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



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Site Outline

100
250
Search Buffers (m)

AONB

National Park

SSSI

Special Protection Areas

Nitrate Vulnerable Zones

Green Belt

Environmentally Sensitive Areas

Special Areas of Conservation

World Heritage Sites

Nitrate Sensitive Areas

Ancient Woodland

National Nature Reserve

Local Nature Reserves

Ramsar Sites

8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site?	Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

0

Database searched and no data found.

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

0

Database searched and no data found.

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

4

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
1	0	On Site	Existing	DEFRA
2	423	W	Existing	DEFRA
3	706	N	Existing	DEFRA
4	751	N	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure Geo Insight, available from our website. The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell*[*] hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? No

Database searched and no data found.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No
Guidance: No Guidance Required.

Contact Details

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

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

Environment Agency
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Tel: 03708 506 506
Web: **www.environment-agency.gov.uk**
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Main switchboard**: 020 7654 8000**

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Ordnance Survey
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SO16 0AS
Tel: 08456 050505

Local Authority
Authority: Manchester City Council
Phone: 0161 234 5000
Web: http://www.manchester.gov.uk/
Address: Town Hall, Albert Square, Manchester, M60 2LA

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.
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The Coal Authority

Resolving the impacts of mining

CON29M Non-Residential Mining Report





ANGEL MEADOW
CARMARTHENSHIRE



Date of enquiry:	08 December 2016
Date enquiry received:	08 December 2016
Issue date:	08 December 2016
Our reference:	51001306957001
Your reference:	GS-3512620

CON29M Non-Residential Mining Report

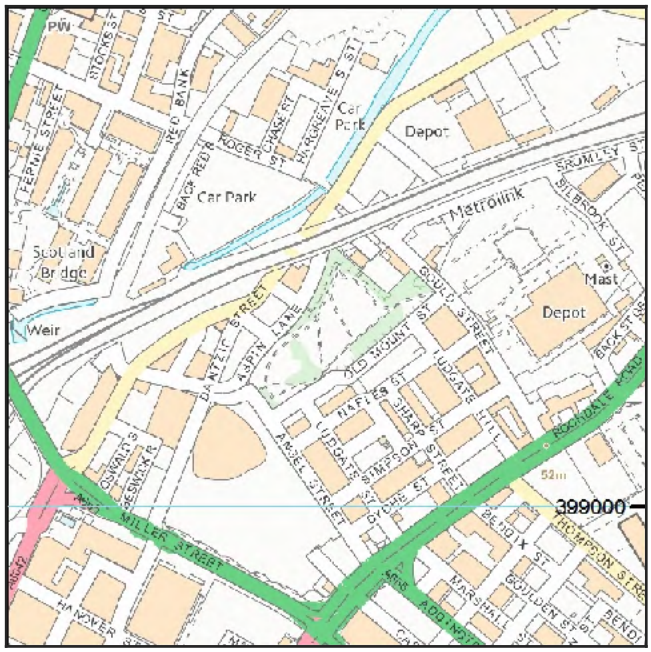
This report is based on, and limited to, the records held by the Coal Authority and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Client name

GROUNDSURE LIMITED

Enquiry address

ANGEL MEADOW, CARMARTHENSHIRE



Approximate position of property

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NG18 4RG

www.groundstability.com

/company/the-coal-authority
/thecoalauthority
/coalauthority

Summary

Has the search report highlighted evidence or potential of		
1	Past underground coal mining	Yes
2	Present underground coal mining	No
3	Future underground coal mining	Yes
4	Mine entries	No
5	Coal mining geology	No
6	Past opencast coal mining	No
7	Present opencast coal mining	No
8	Future opencast coal mining	No
9	Coal mining subsidence	No
10	Mine gas	No
11	Hazards related to coal mining	No
12	Withdrawal of support	No
13	Working facilities order	No
14	Payments to owners of former copyhold land	No
15	Information from the Cheshire Brine Subsidence Compensation Board	No

For detailed findings, please go to page 4.

Detailed findings

1. Past underground coal mining

The property is in a surface area that could be affected by underground mining in 2 seams of coal at 440m to 810m depth, and last worked in 1965.

Any movement in the ground due to coal mining activity should have stopped.

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 plans to grant a licence to remove coal using 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 known coal mine entries 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, 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.

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 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.

15. Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional remarks

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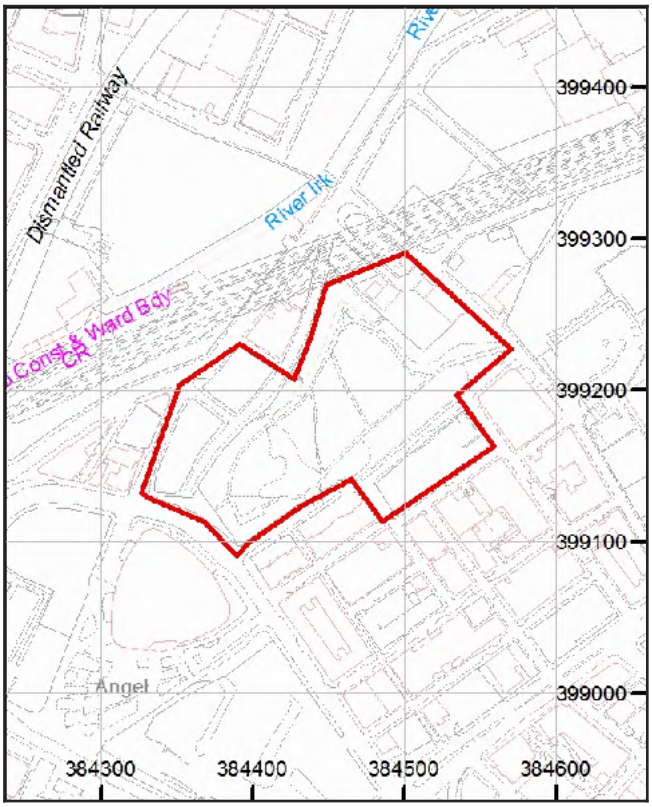
Enquiry boundary

Key

Approximate position of enquiry boundary shown



Map data

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200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

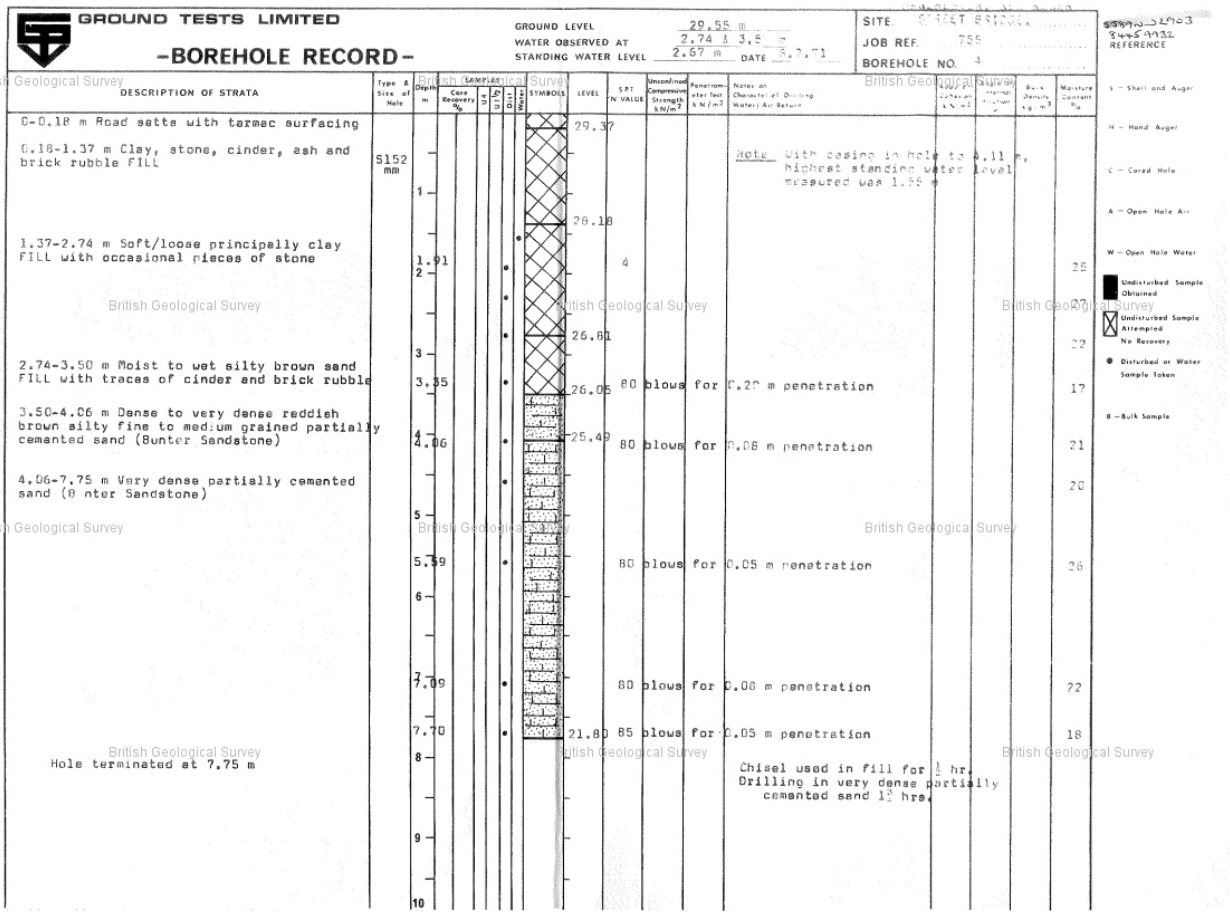
www.groundstability.com

/company/the-coal-authority
/thecoalauthority
/coalauthority

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 1045097 : BGS Reference: SJ89NW2903
British National Grid (27700) : 384450,399320
Report an issue with this borehole

<< < Prev Page 1 of 1 Next > >>



GROUND TESTS LIMITED

-BOREHOLE RECORD-

GROUND LEVEL 29.55 m
WATER OBSERVED AT 2.74 & 3.5 m
STANDING WATER LEVEL 2.67 m DATE 8.7.71

SITE. STREET ESTATE
JOB REF. 755
BOREHOLE NO. 4

SJ89NW 2903
8445 9932
REFERENCE

DESCRIPTION OF STRATA	Depth m	Core Recovery %	SPT 'N' VALUE	Unconfined Compressive Strength kN/m²	Penetrometer Test kN/m²	Notes on Character of Drilling Water/Air Return	Moisture Content %
0-0.18 m Road setts with tarmac surfacing							
0.18-1.37 m Clay, stone, cinder, ash and brick rubble FILL	S152 mm					Note: With casing in hole to 3.11 m, highest standing water level measured was 1.55 m	
1.37-2.74 m Soft/loose principally clay FILL with occasional pieces of stone	1.91		4				25
							27
							22
2.74-3.50 m Moist to wet silty brown sand FILL with traces of cinder and brick rubble	3.35					80 blows for 0.20 m penetration	17
3.50-4.06 m Dense to very dense reddish brown silty fine to medium grained partially cemented sand (Bunter Sandstone)	4.06					80 blows for 0.08 m penetration	21
4.06-7.75 m Very dense partially cemented sand (Bunter Sandstone)							20
	5.59					80 blows for 0.05 m penetration	26
	7.09					80 blows for 0.08 m penetration	22
	7.70					85 blows for 0.05 m penetration	18
Hole terminated at 7.75 m						Chisel used in fill for 1 hr. Drilling in very dense partially cemented sand 1½ hrs.	

Level: 29.37; 28.18; 26.81; 26.05; 25.49; 21.80

Key: S - Shell and Auger; H - Hand Auger; C - Cored Hole; A - Open Hole Air; W - Open Hole Water; Undisturbed Sample Obtained; Undisturbed Sample Attempted No Recovery; Disturbed or Water Sample Taken; B - Bulk Sample

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 1042198 : BGS Reference: SJ89NW56
British National Grid (27700) : 384343,399114
Report an issue with this borehole

SJ89NW 56, 57

GEOLOGICAL SURVEY AND MUSEUM. BOREHOLE AND SHAFTS.

BORES ~~or SHAFT~~ Nr. Victoria Station

Manchester

County Lancs.

6-in. Map 104NW. 4

GSM 43-44

Surface level ____ O.D. ____ One-inch Map 85

Communicated Manchester Corporation

Date of sinking ____ Borer ____

Specimens

Description.	THICKNESS. Feet.	Inches.	DEPTH. Feet.	Inches.
	Metres		Metres	
57 Corner of Miller St. & Corporation St.				
Made ground, marl & sand	3.51 11	6	3.51 11	6
Sandstone	8.84 29	–	12.34 40	6
No. 44 No. 25. 130.86 ft. O.D. Corner of Ashley Lane & Angel St. off Rochdale Road. NEWTOWN.				
56	Metres		Metres	
Filling	1.83	6 –	1.83	6 –
Boulder clay	0.31	1 –	2.13	7 –
Coarse gravel	6.40	21 –	8.53	28 –
Fine gravel	3.05	10 –	11.58	38 –
Gravelly clay	2.74	9 –	14.33	47 –
Loamy clay	1.22	4 –	15.55	51 –
Soft red rock.	0.91	3 –	16.46	54 –
Red sandstone.	2.44	8 –	18.90	62 –
L 104 N.W.E.				

British Geological Survey British Geological Survey British Geological Survey

(B12268) Wt. 18119—0014 5000 9/27 Gp. 160 O.A.

British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

BGS ID: 1043533 : BGS Reference: SJ89NW1339
British National Grid (27700) : 384340,399140
Report an issue with this borehole

NGRC BOREHOLE RECORDS ADJUSTMENT FORM

British Geological Survey

QUARTER SHEET SJ 89 NW

BH REGISTRATION NUMBER 1333 – 1341

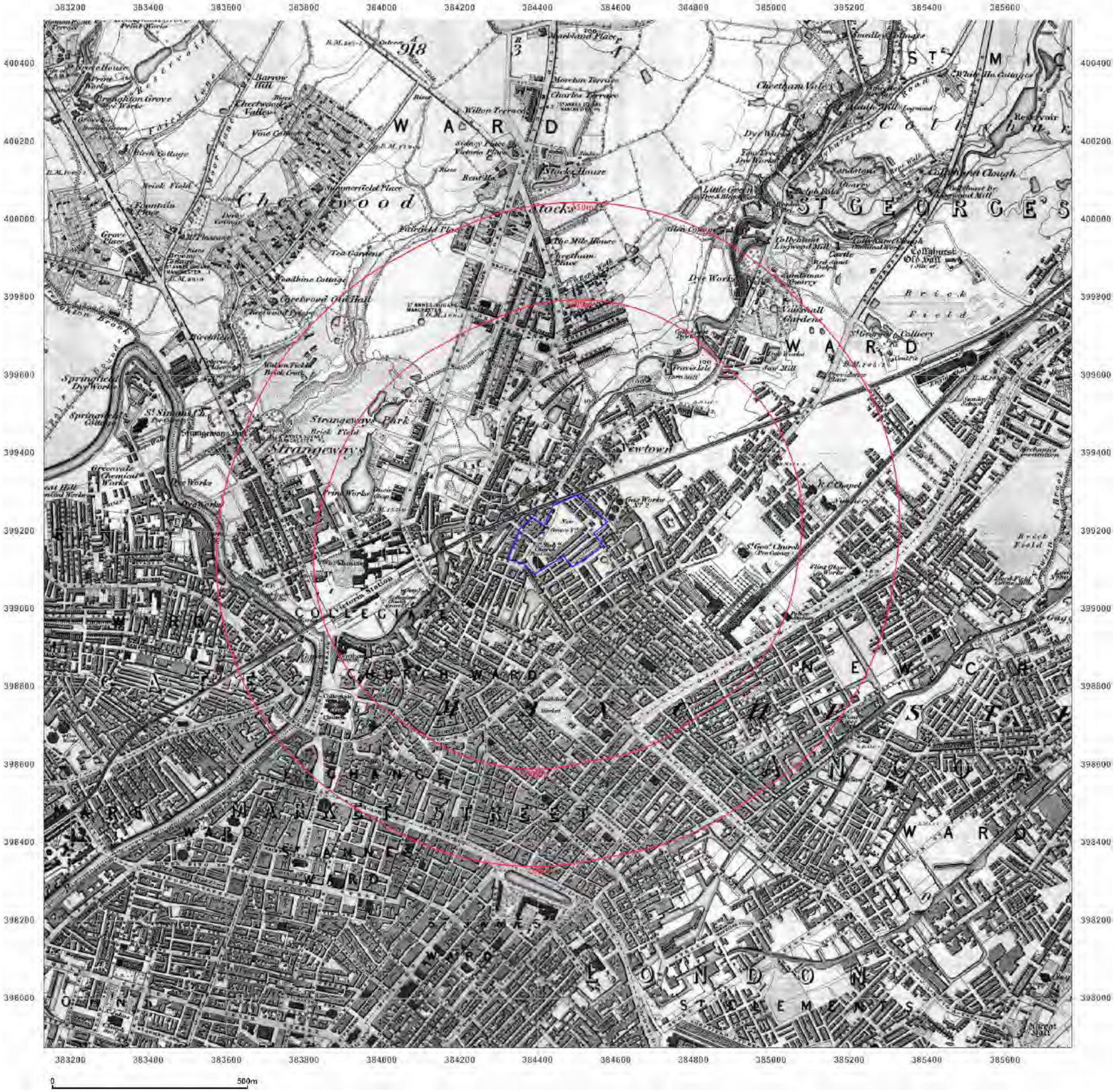
NUMBER NOT USED / ! LOG MISSING !

(Delete as appropriate)

(NGRC FORM 2)

Appendix D

HISTORICAL MAPS



Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1848**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

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

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Production date: 08 December 2016

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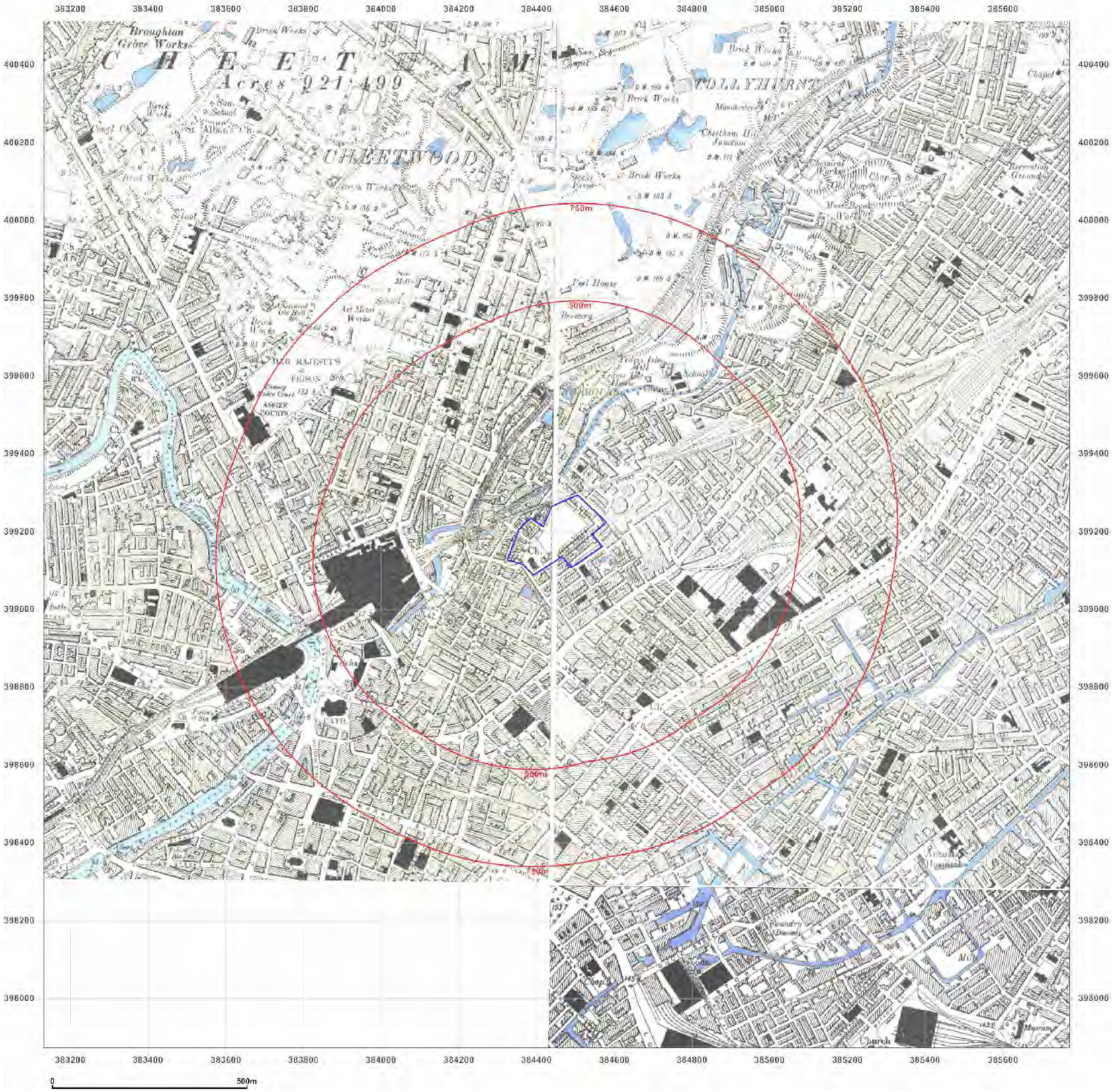

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1890-1894**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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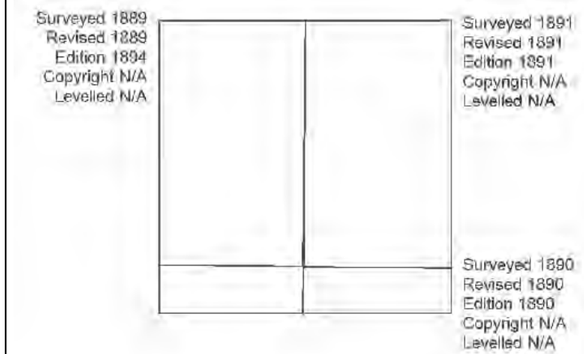

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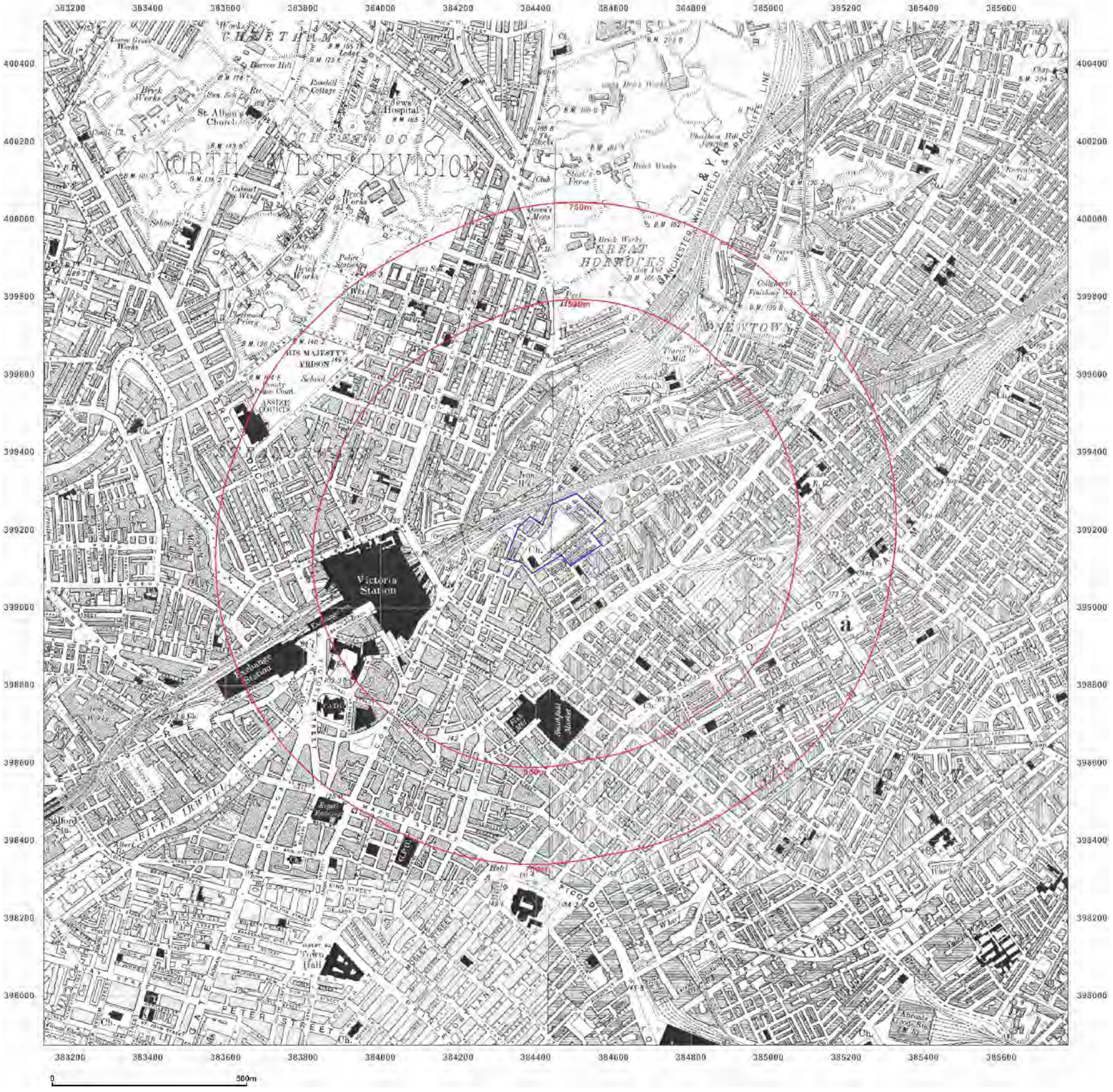

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1905-1906**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
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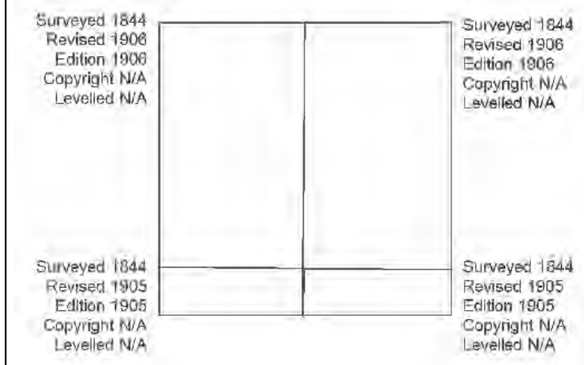

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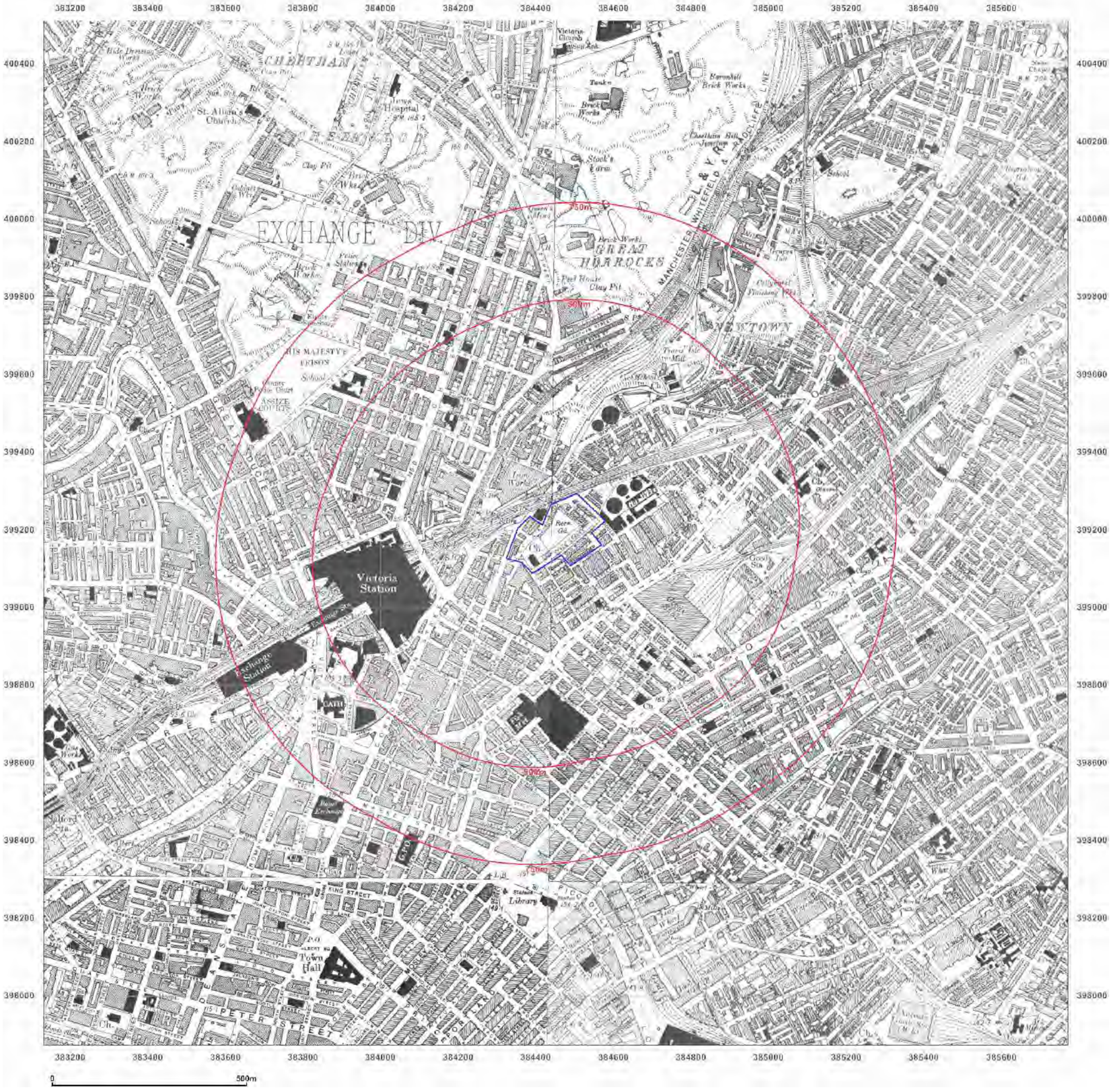

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

N
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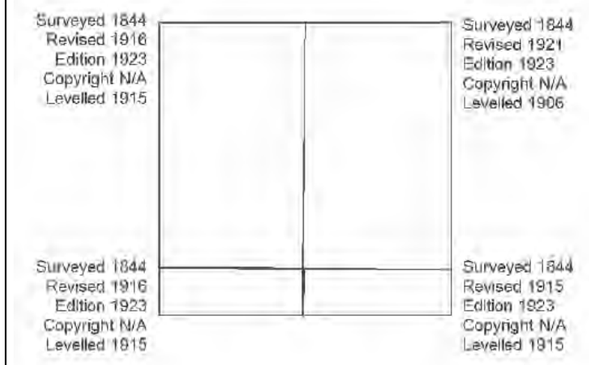

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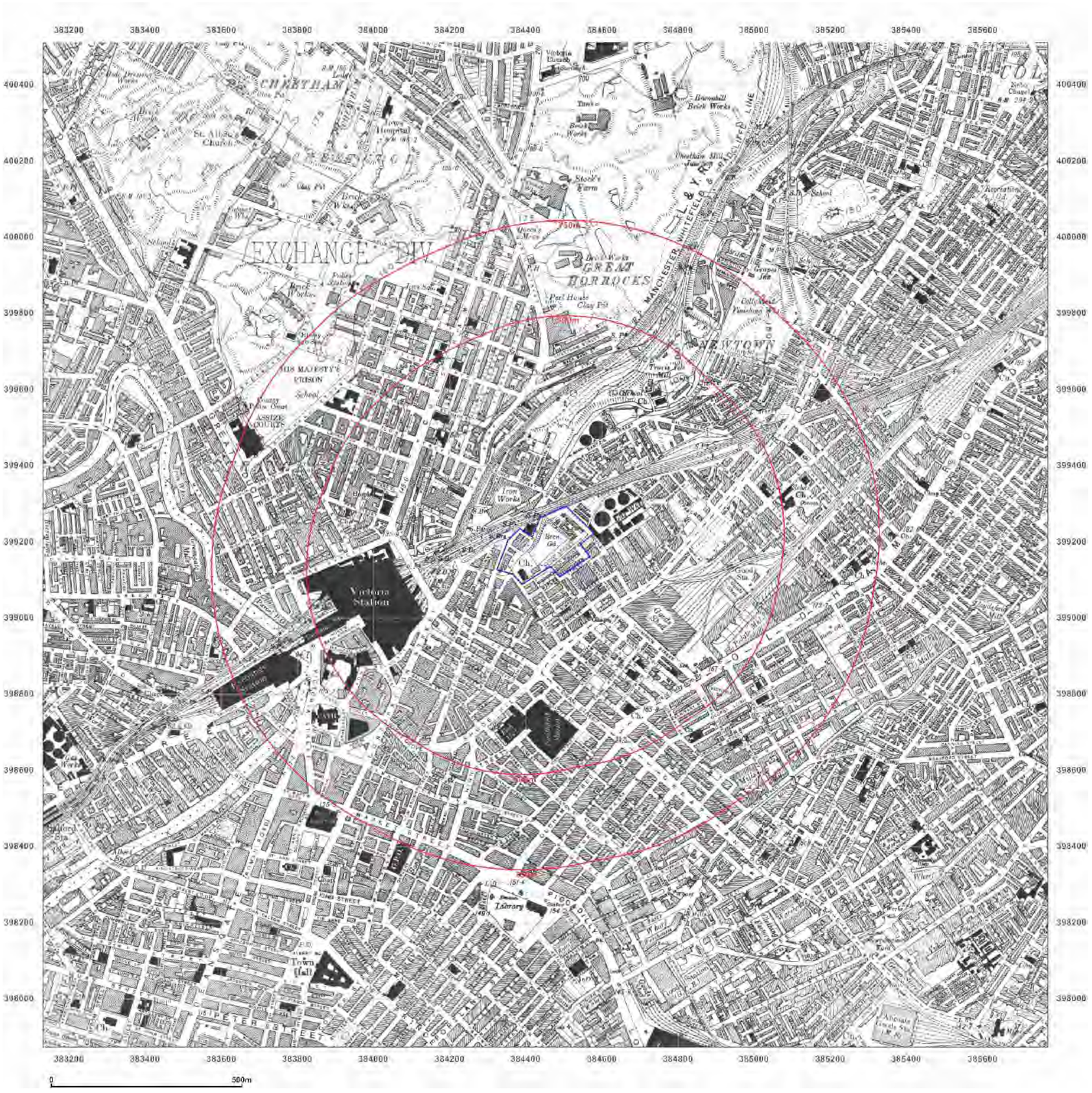

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1923**

Scale: 1:10,560

Printed at: 1:10,560

N
W E
S

Surveyed 1844
Revised 1918
Edition 1923
Copyright N/A
Levelled 1915

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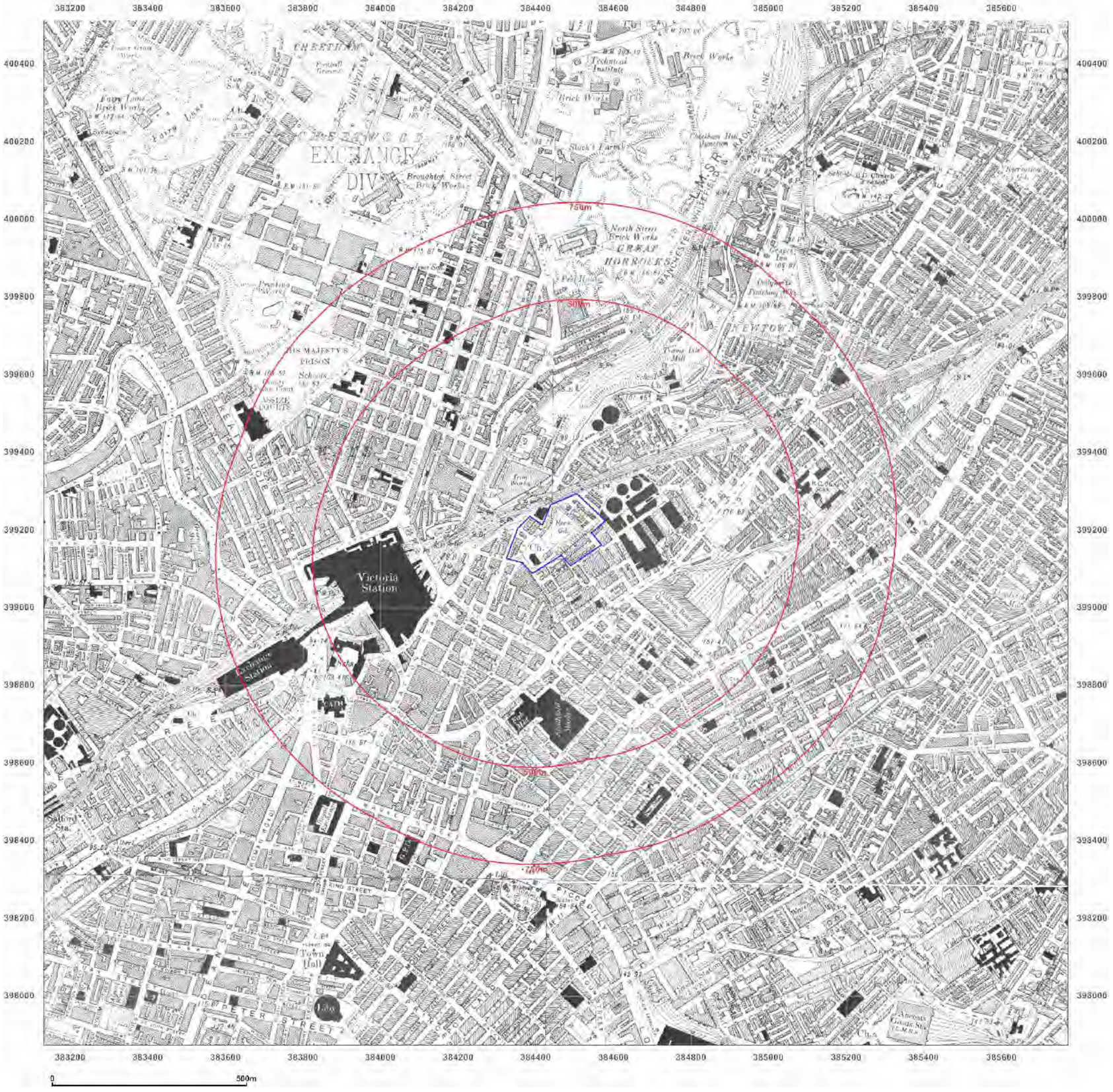

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1931-1934**

Scale: 1:10,560

Printed at: 1:10,560

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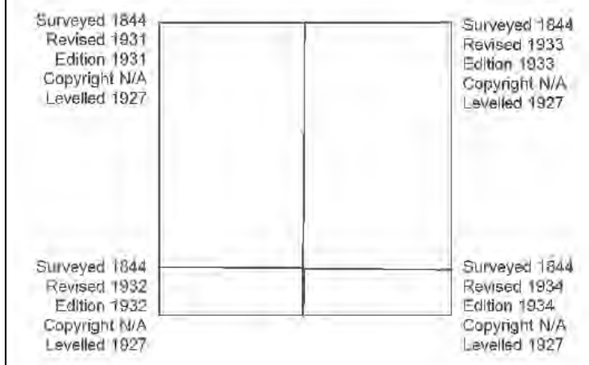

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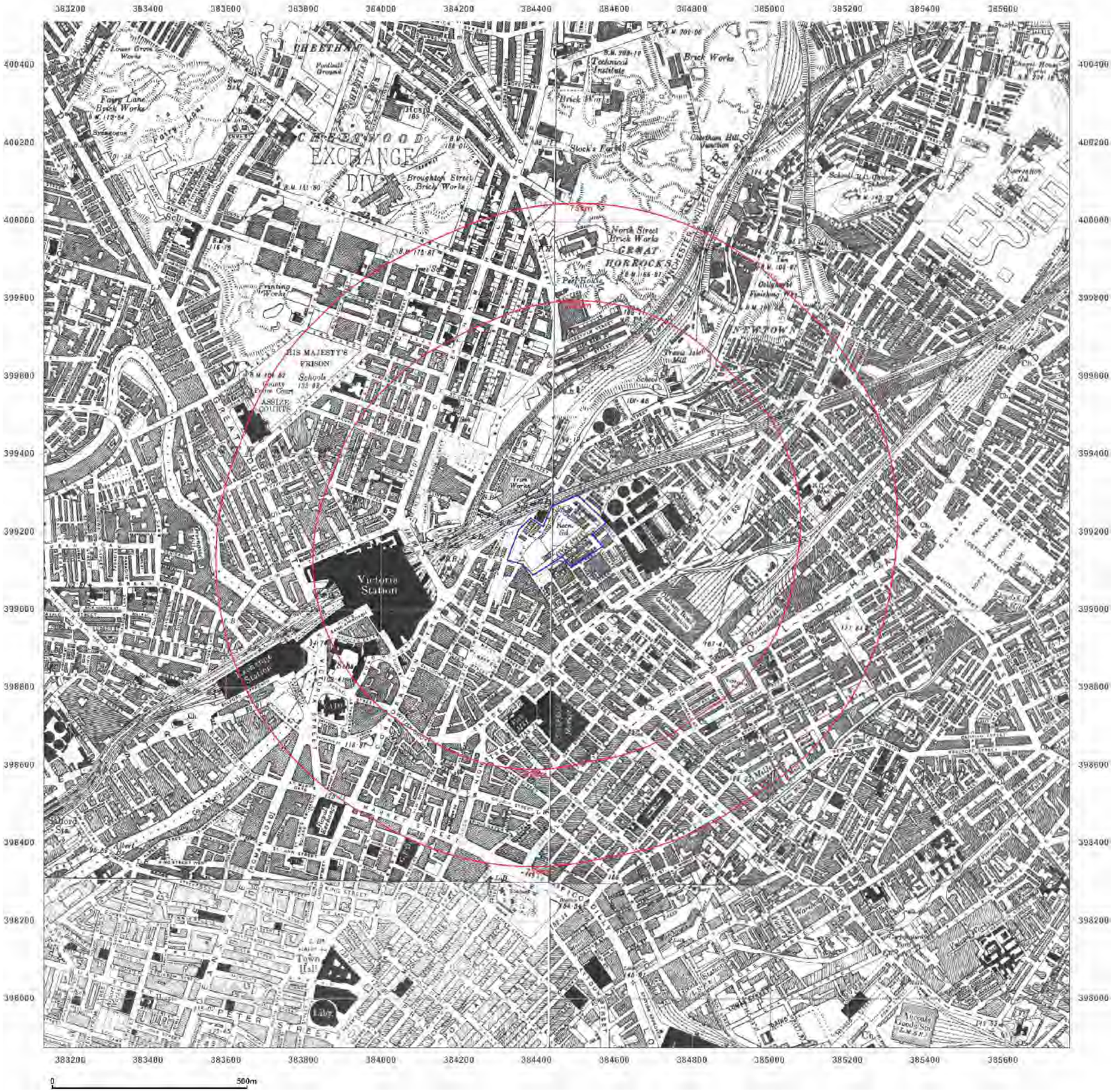

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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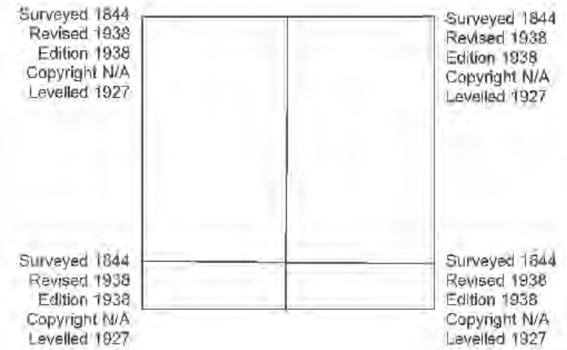

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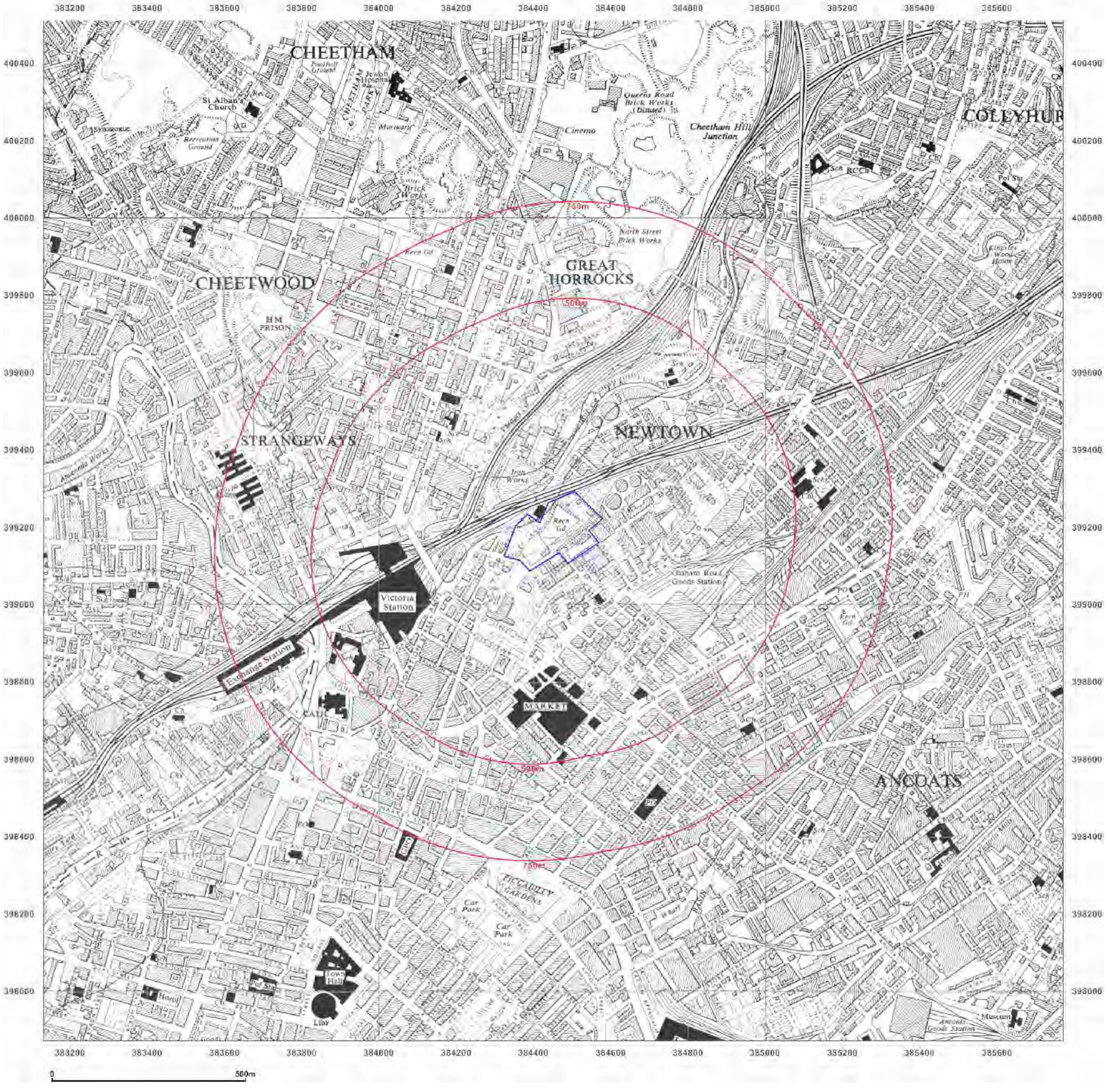

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: Provisional

Map date: **1956**

Scale: 1:10,560

Printed at: 1:10,560

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

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

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

Surveyed 1956
Revised 1956
Edition N/A
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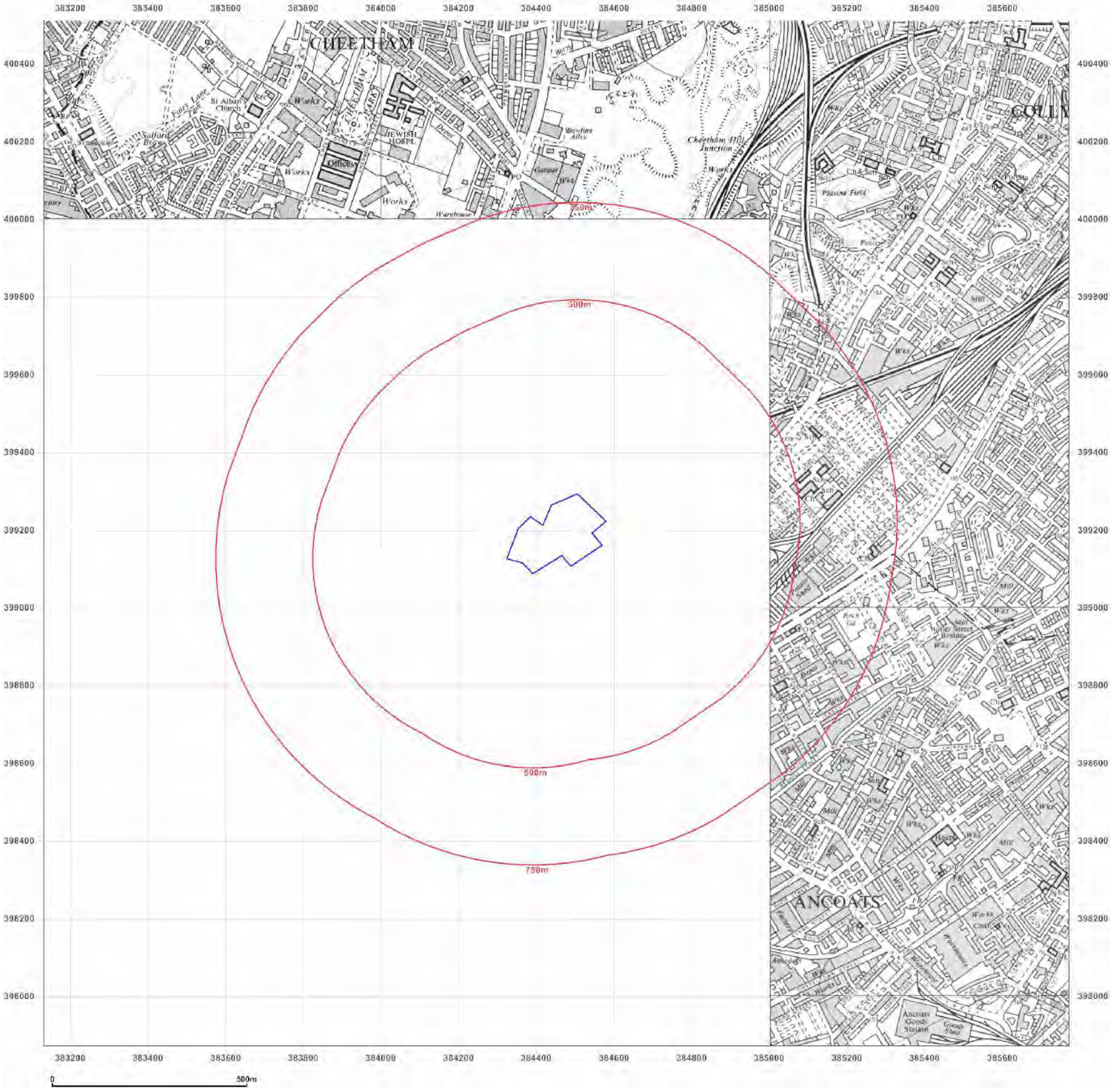

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: Provisional
Map date: **1966-1968**
Scale: 1:10,560
Printed at: 1:10,560

N
W E
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Surveyed 1968
Revised 1968
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1966
Revised 1966
Edition N/A
Copyright N/A
Levelled N/A

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

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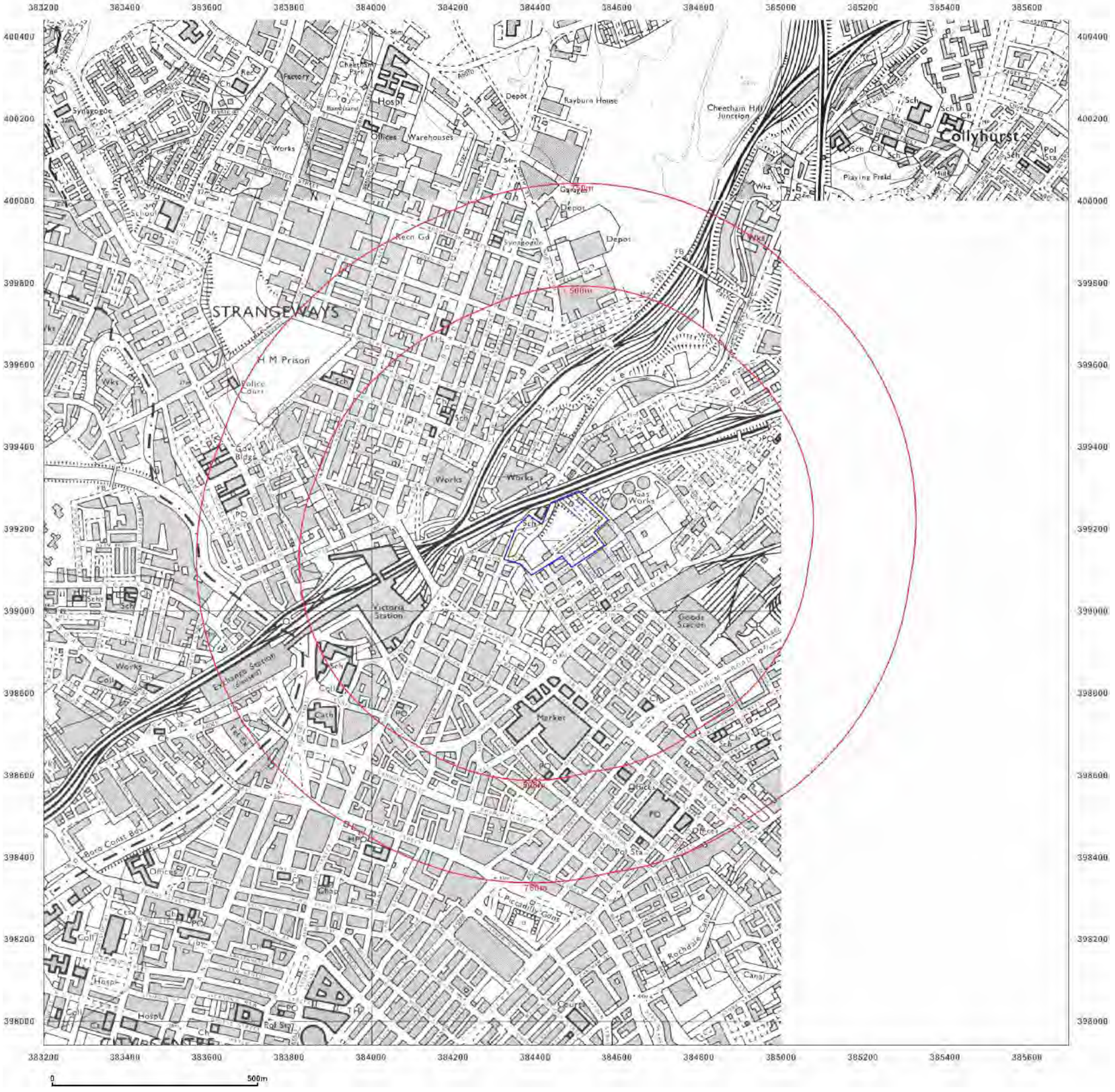


Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1972-1977**

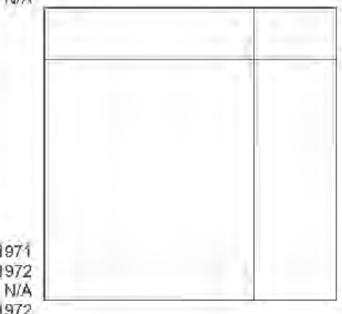
Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

Surveyed 1975
Revised 1977
Edition N/A
Copyright N/A
Levelled N/A

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



Surveyed 1971
Revised 1972
Edition N/A
Copyright 1972
Levelled 1972

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Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1980-1985**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1985
Revised 1985
Edition N/A
Copyright N/A
Levelled N/A

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

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

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

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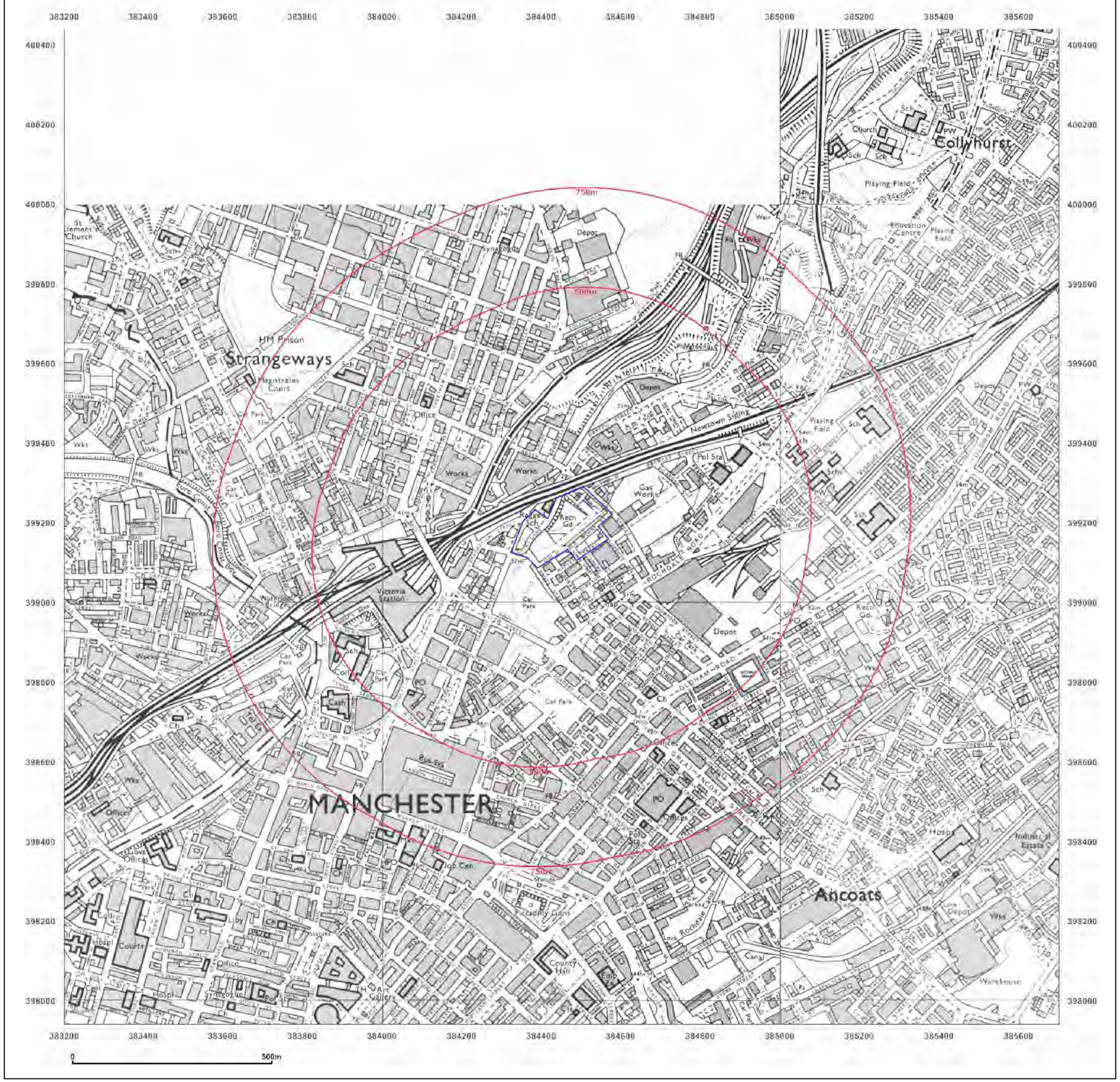

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1985-1988**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
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Surveyed 1987
Revised 1988
Edition N/A
Copyright N/A
Levelled N/A

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

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

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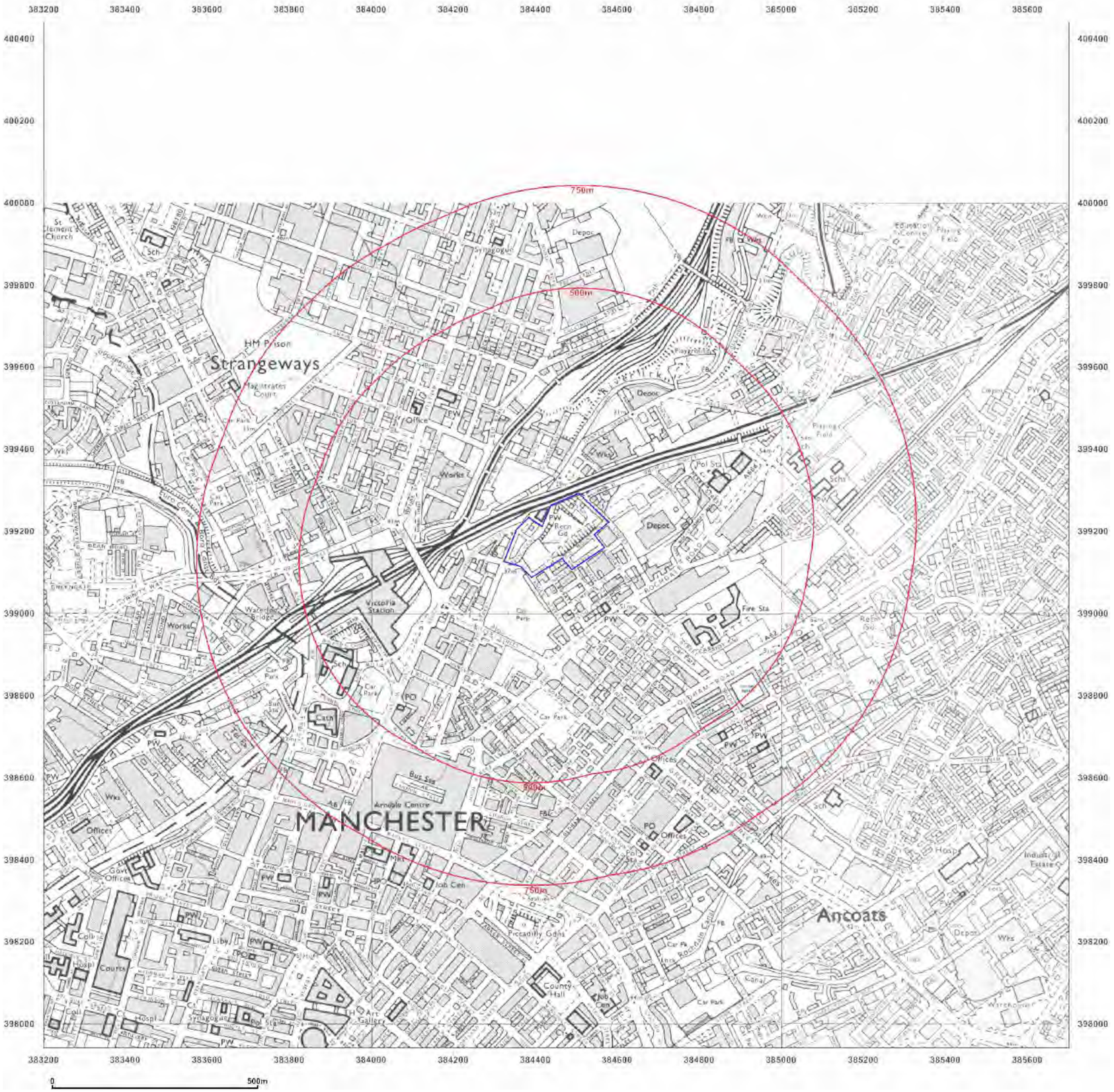

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1988-1991**

Scale: 1:10,000

Printed at: 1:10,000

N
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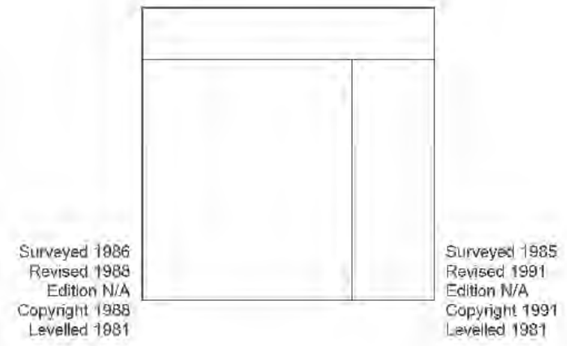

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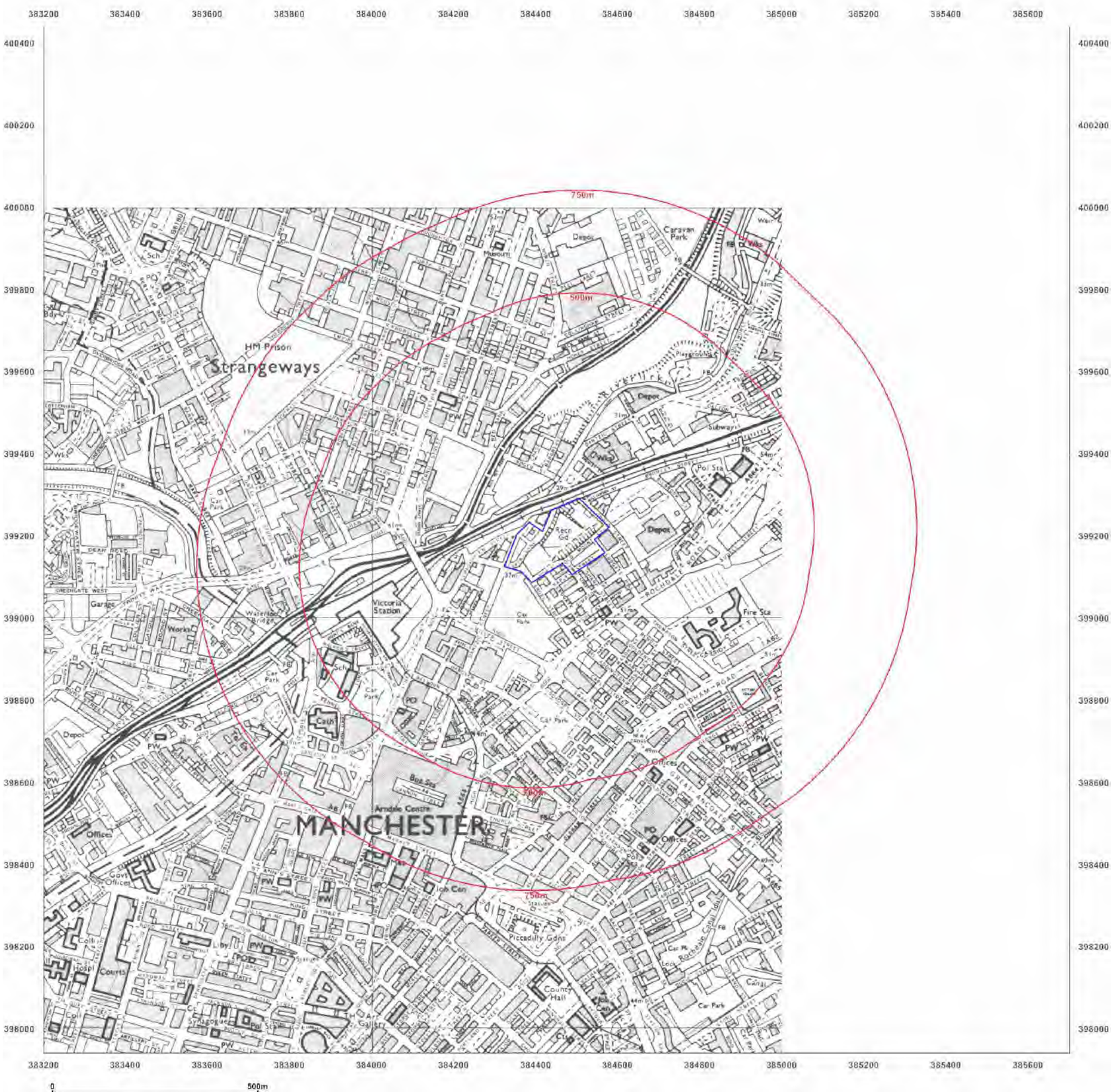


Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

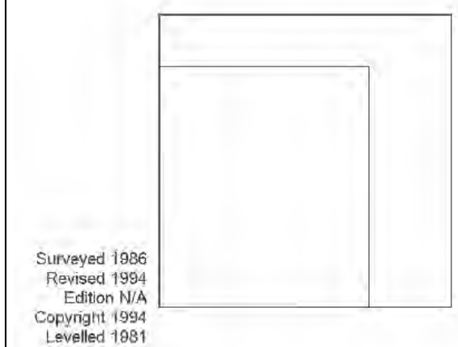
Map Name: National Grid

Map date: **1994**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S



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To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

Printed at: 1:10,000

N
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2002

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Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2010

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Production date: 08 December 2016

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Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

Printed at: 1:10,000

N
W E
S

2014

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Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: 1056 Scale Town Plan

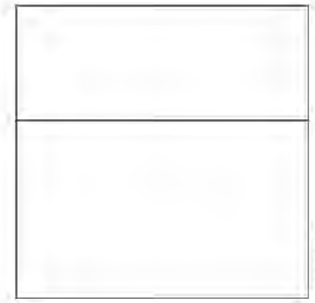
Map date: **1850**

Scale: 1:1,056

Printed at: 1:1,056

N
W E
S

Surveyed 1848
Revised N/A
Edition 1850
Copyright N/A
Levelled N/A



Surveyed 1848
Revised N/A
Edition 1850
Copyright N/A
Levelled N/A

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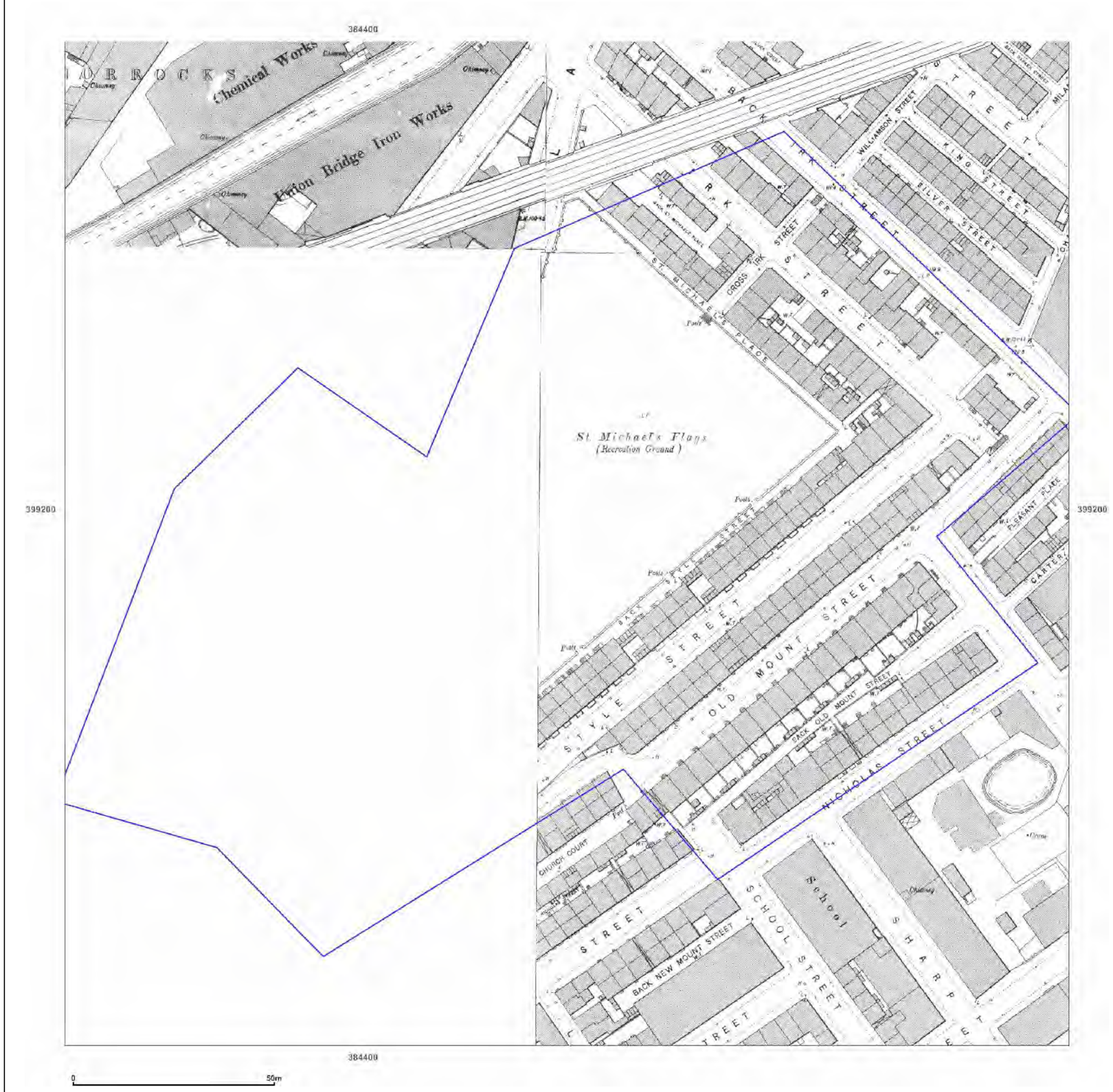

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series Town Plan
Map date: **1891**
Scale: 1:500
Printed at: 1:1,000

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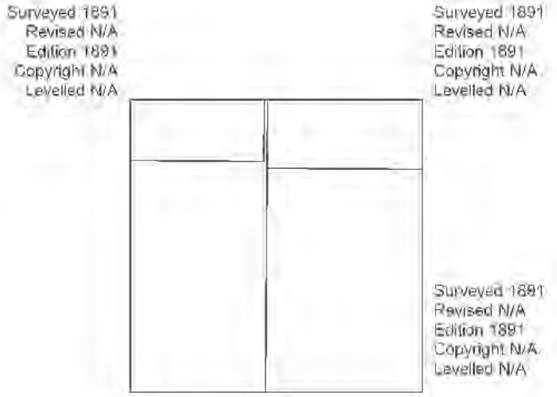

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Production date: 08 December 2016

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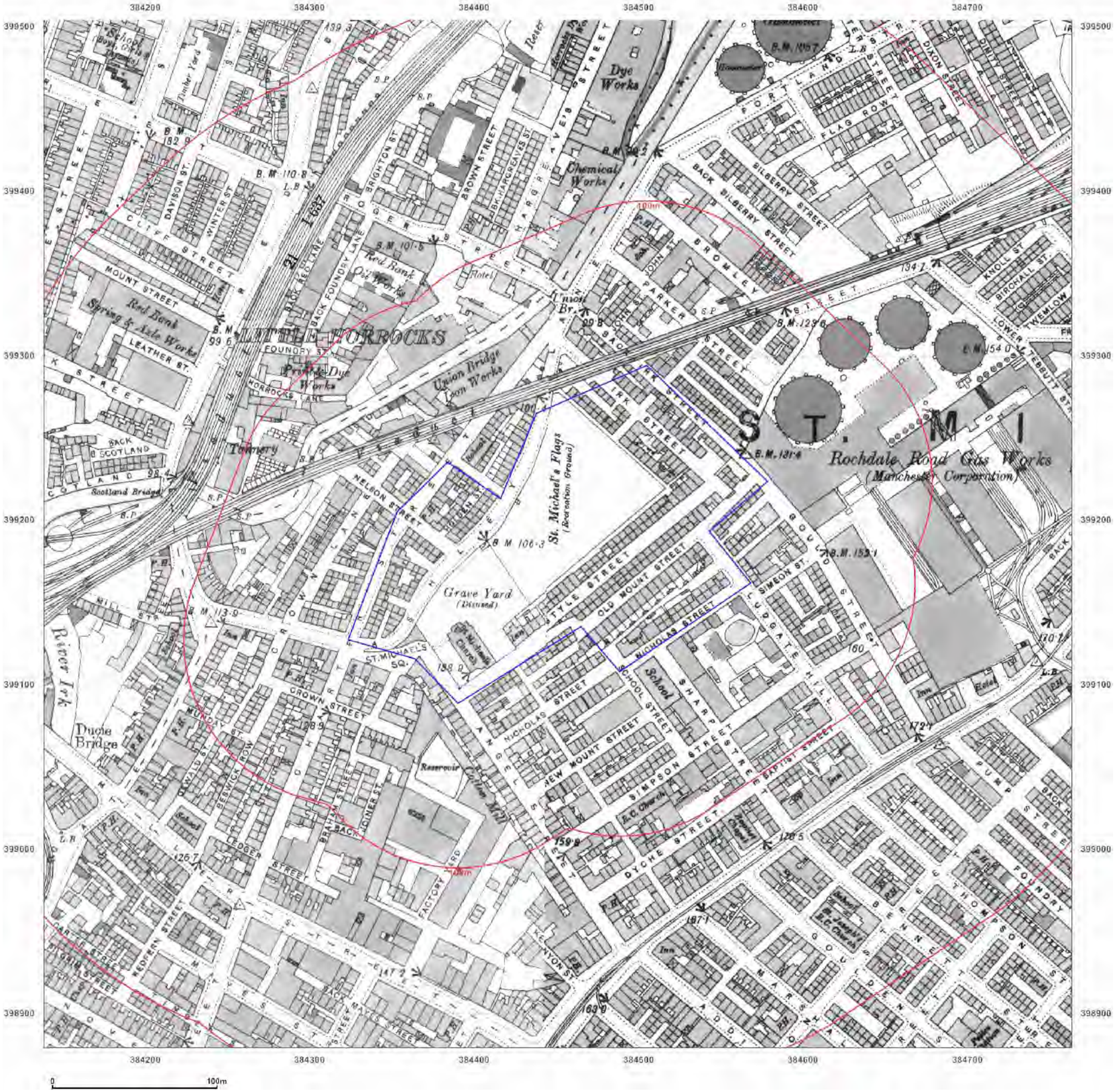

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1892-1893**

Scale: 1:2,500

Printed at: 1:2,500

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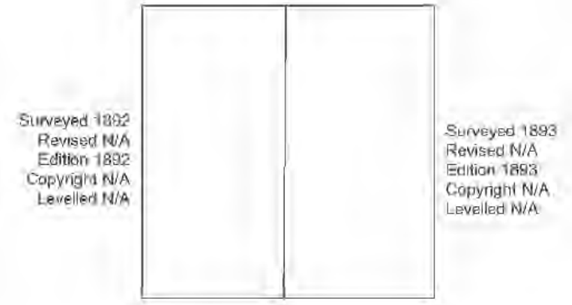

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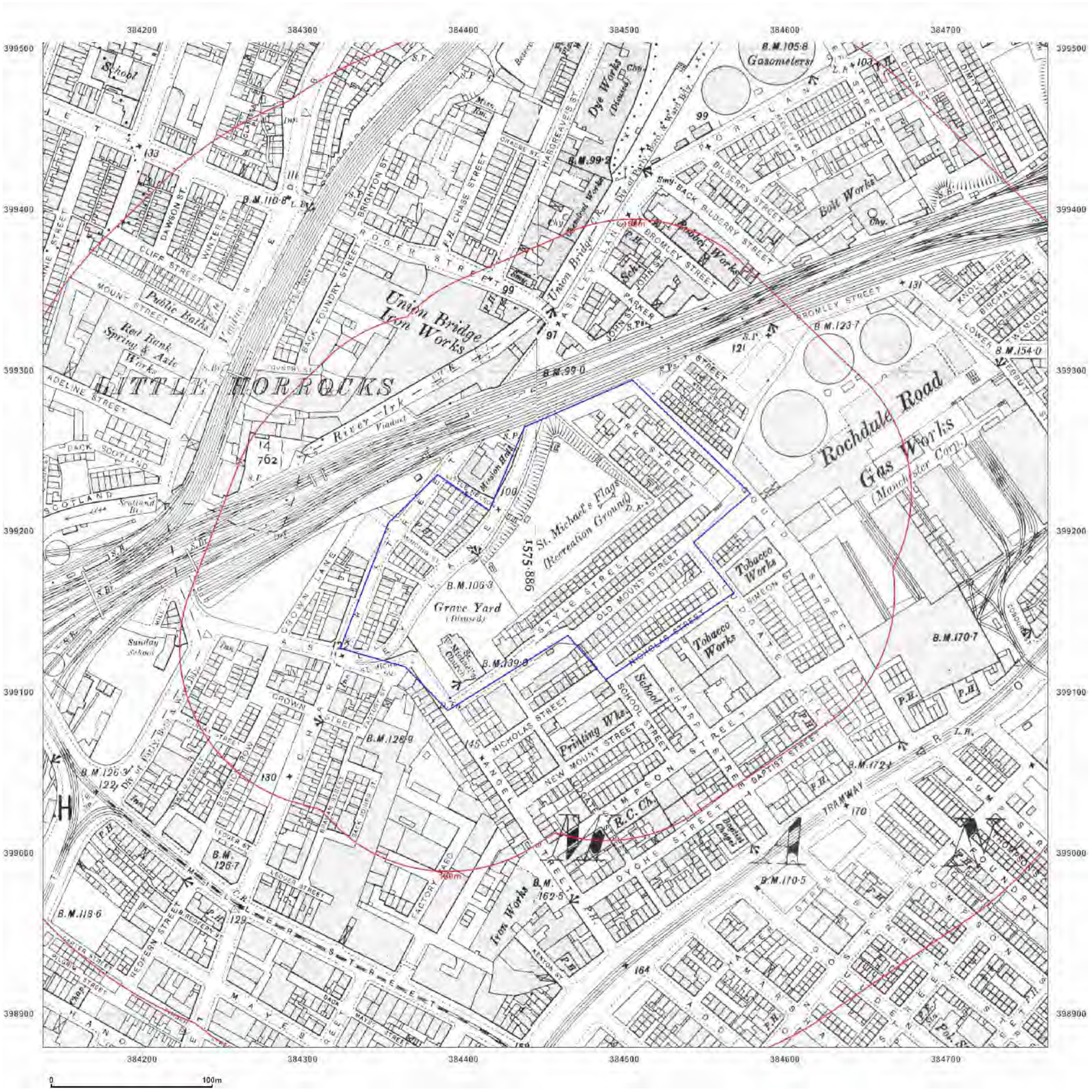

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1908**

Scale: 1:2,500

Printed at: 1:2,500

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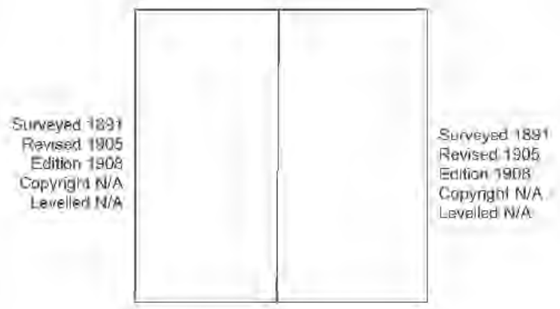

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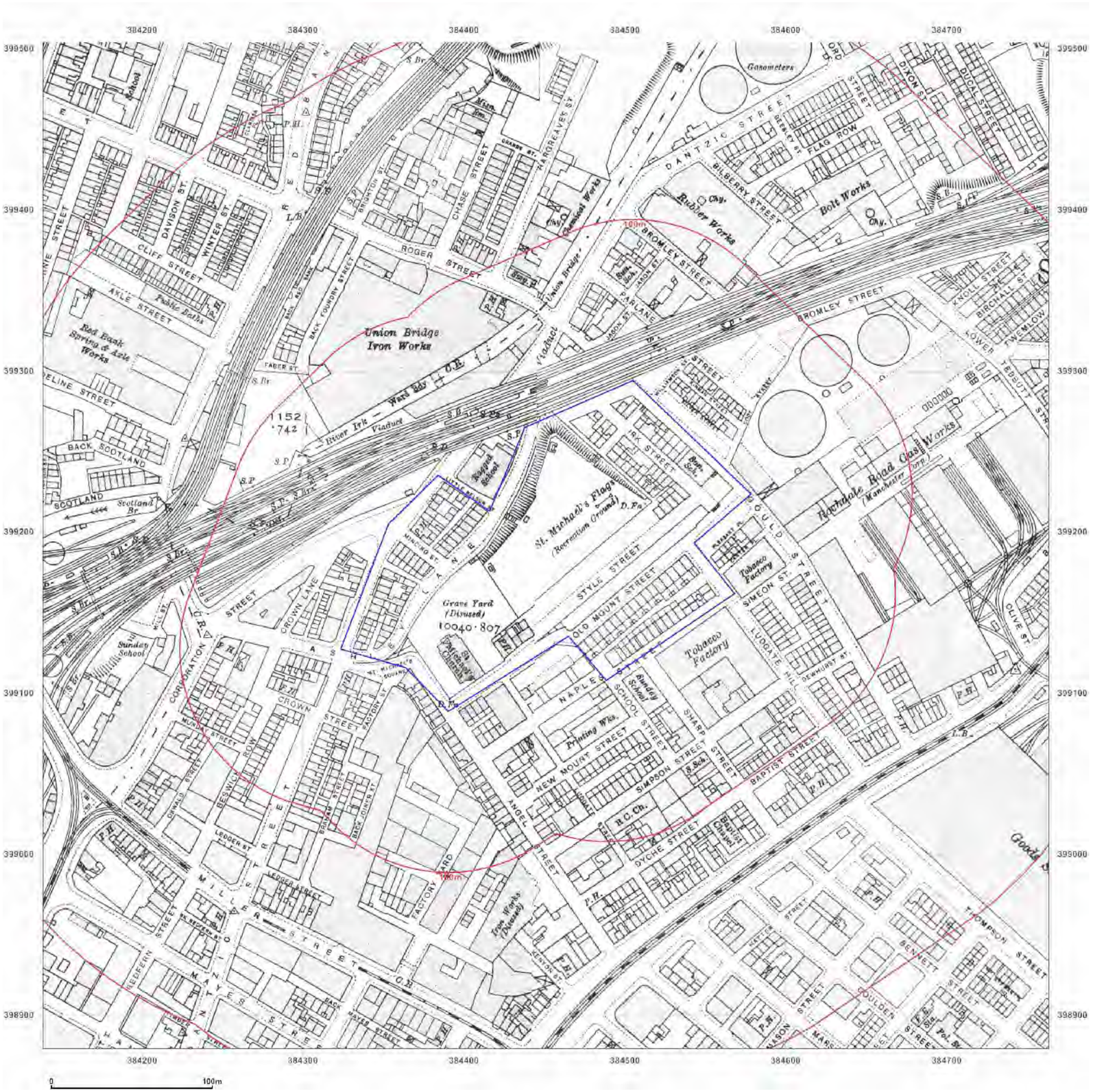

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1922**

Scale: 1:2,500

Printed at: 1:2,500

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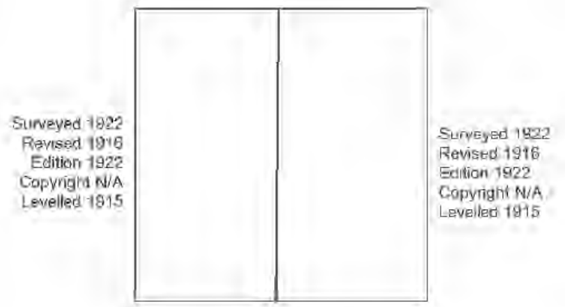

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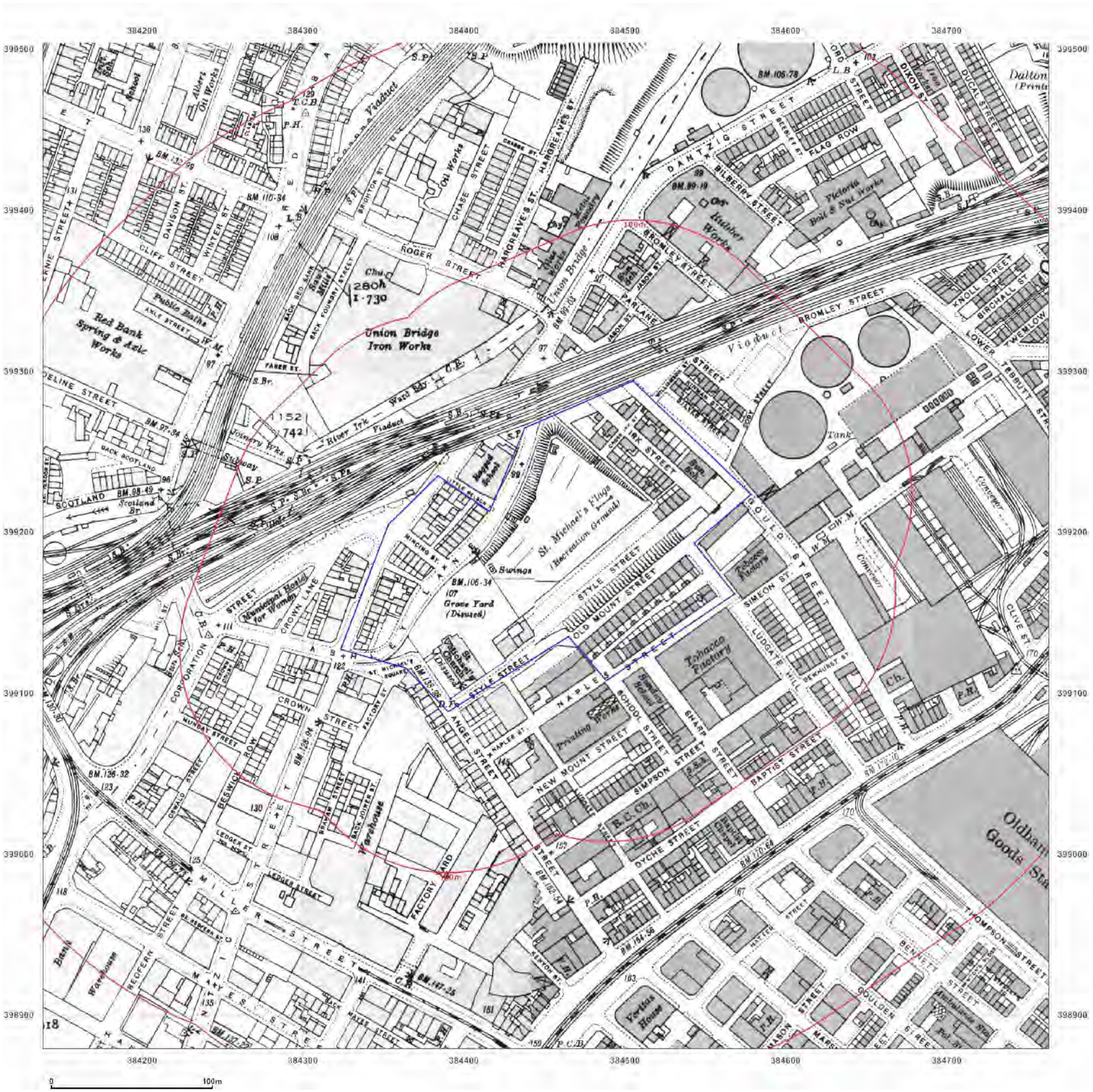

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: County Series

Map date: **1931-1933**

Scale: 1:2,500

Printed at: 1:2,500

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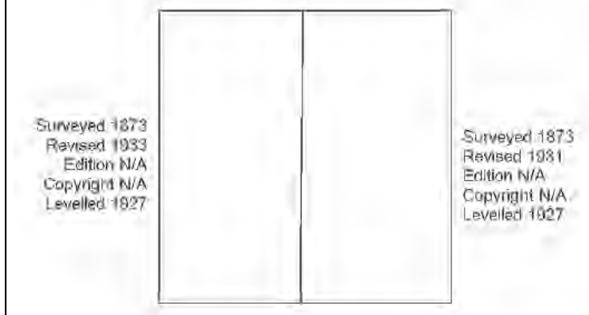

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Production date: 08 December 2016

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1949**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1949
Revised 1949
Edition N/A
Copyright 1950
Levelled 1929

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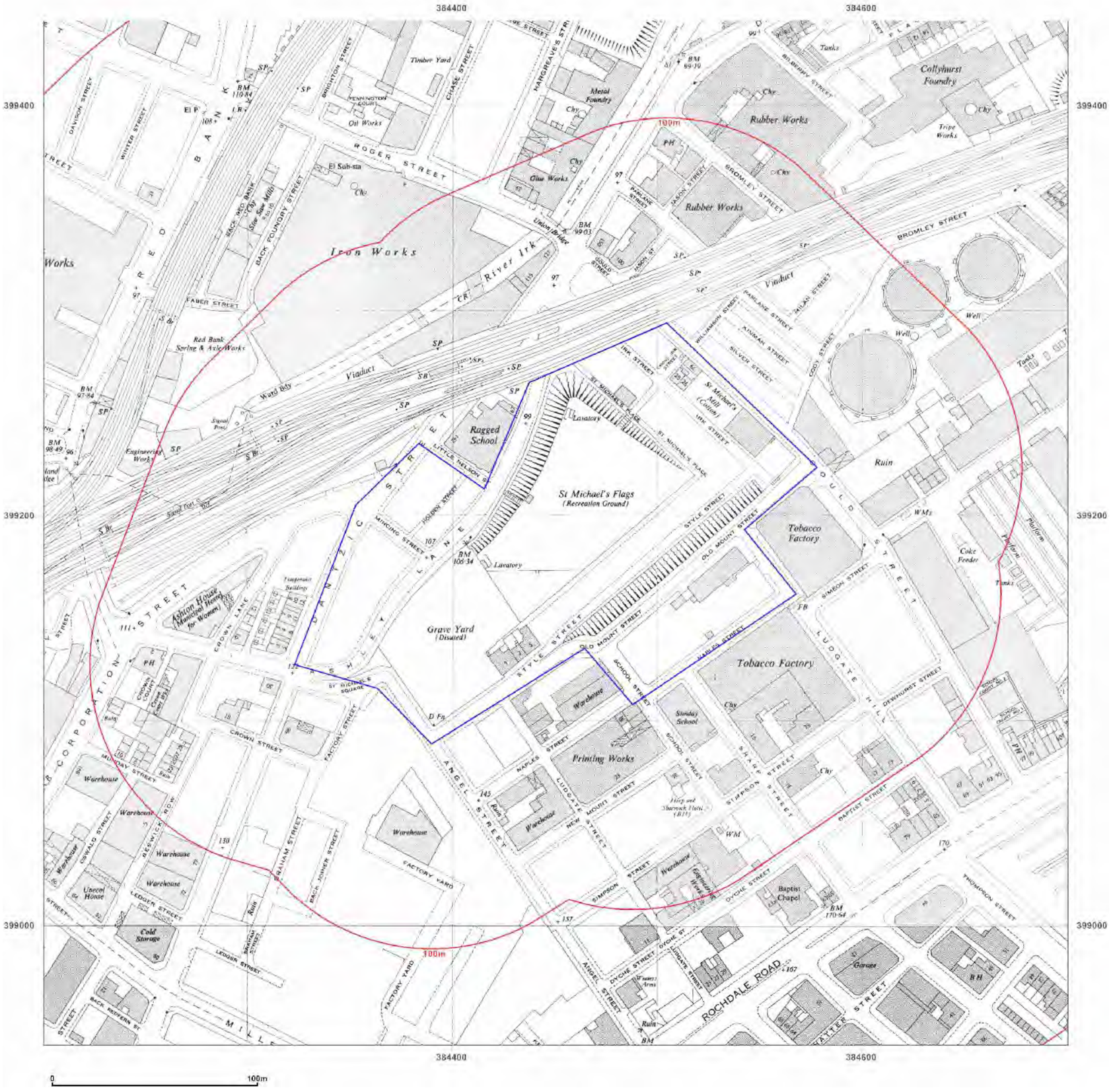
Production date: 08 December 2016

To view map legend click here *Legend*


384400
384600
399400
399200
399000
Iron Works
River Irk
Rubber Works
Rubber Works
Metal Foundry
Glue Works
Oil Works
Timber Yard
Red Bank Spring & Axle Works
Engineering Works
Ragged School
St Michael's Flags (Recreation Ground)
Grave Yard (Disused)
Tobacco Factory
Tobacco Factory
Printing Works
Warehouse
Warehouse
Warehouse
Warehouse
Warehouse
Warehouse
Warehouse
Spring & Axle Works
Baptist Chapel
Sunday School
Garage
Cold Storage
Unicol House
Ashton House (Hostel for Women)
Collyhurst Foundry (Disused)
Tripe Works
Viaduct
Union Bridge
Gas Sub-sta
El Sub-sta
Tanks
Well
Lavatory
Temperance Building
Rubber Works
Paper Works
Coke Feeder
Platform
Tanks
Works
Ruins
Ruins
Ruins



Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1948-1953**

Scale: 1:1,250

Printed at: 1:2,000

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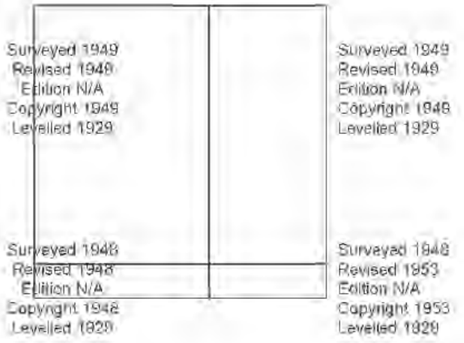

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Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1952-1953**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1952
Revised 1952
Edition N/A
Copyright 1953
Levelled 1929

Surveyed 1948
Revised 1948
Edition N/A
Copyright 1954
Levelled 1929

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Production date: 08 December 2016

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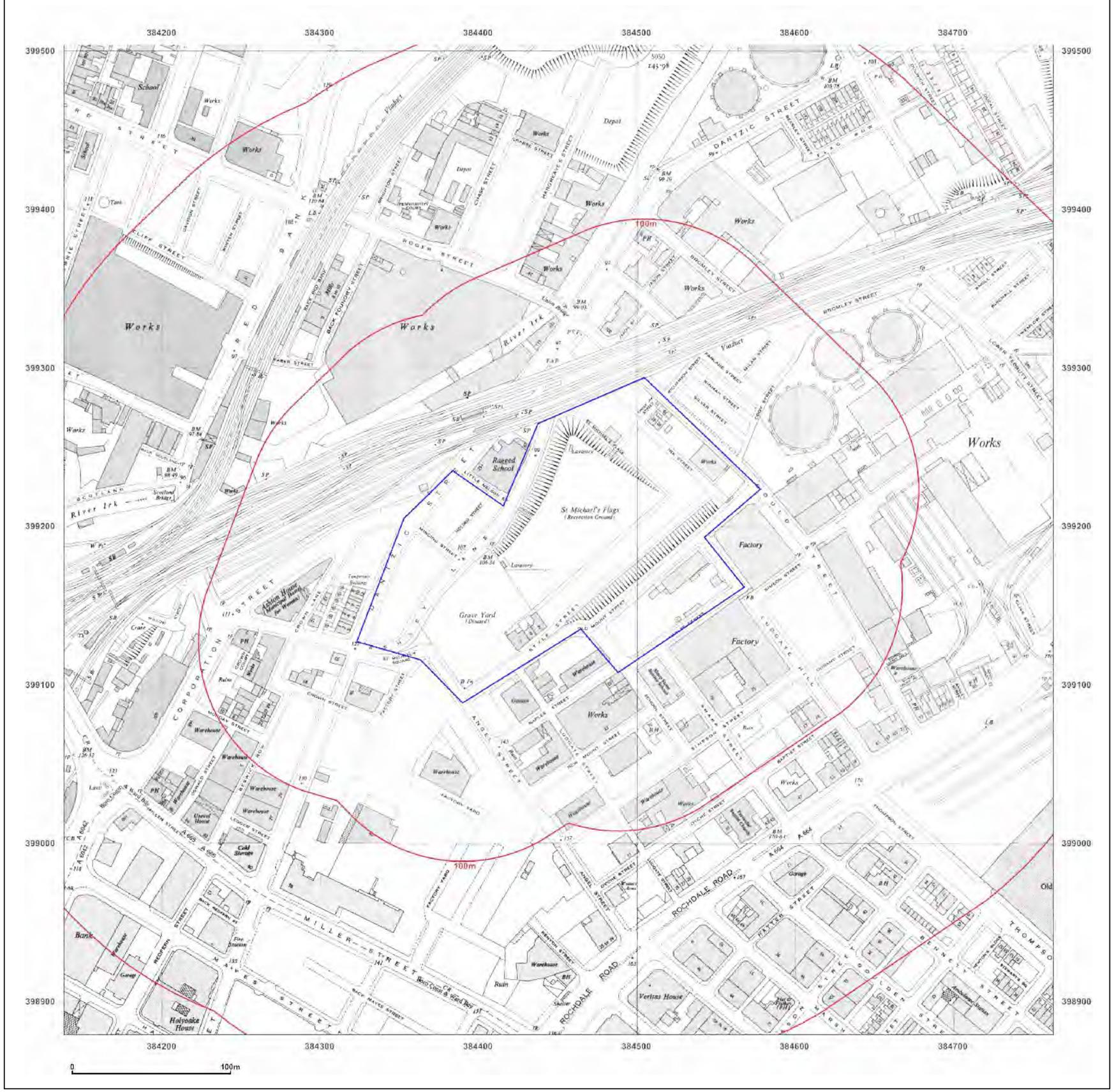

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1953-1958**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed 1958
Revised 1958
Edition N/A
Copyright 1959
Levelled 1929

Surveyed 1953
Revised 1953
Edition N/A
Copyright 1954
Levelled 1929

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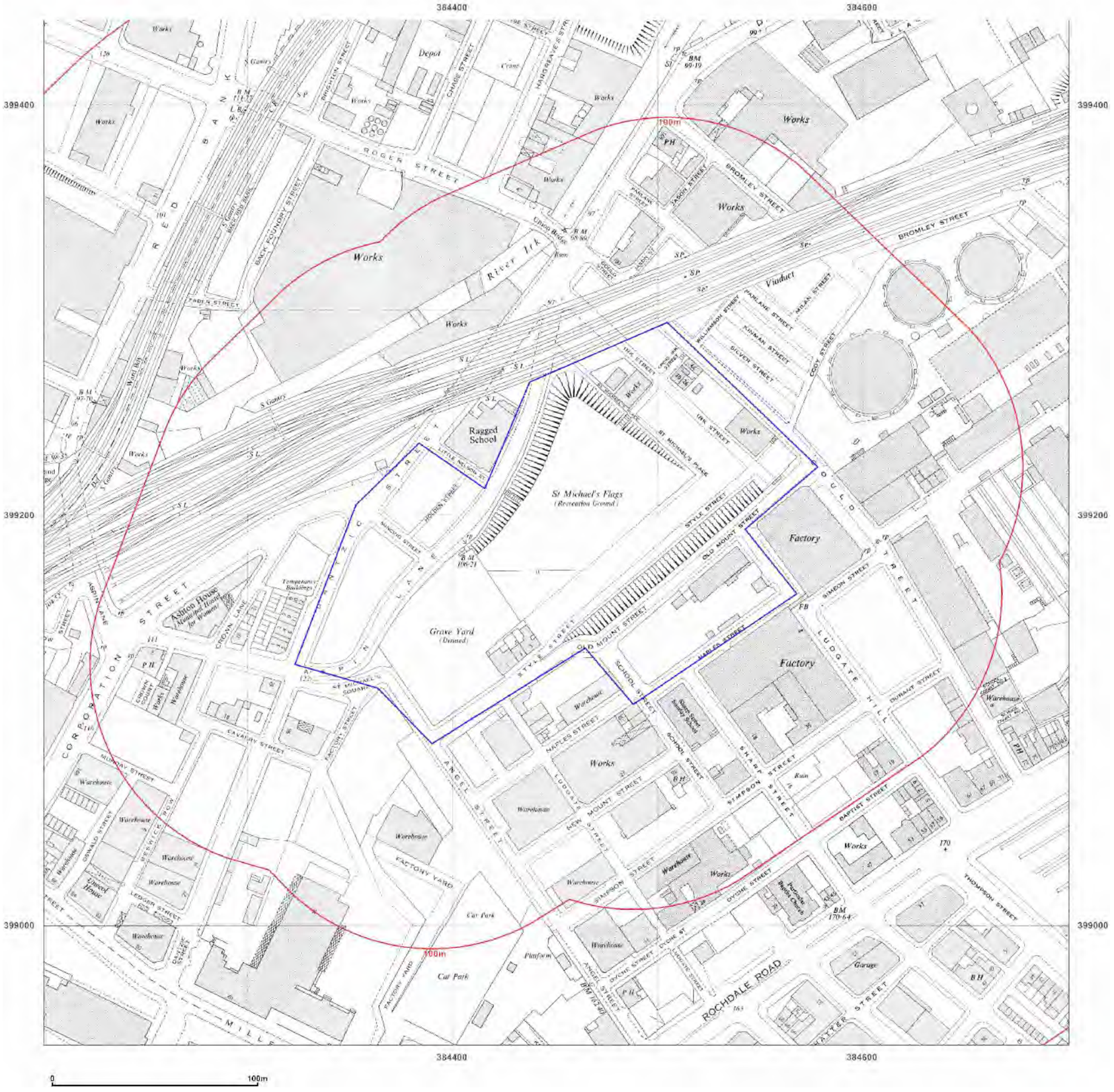

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1958-1963**

Scale: 1:1,250

Printed at: 1:2,000

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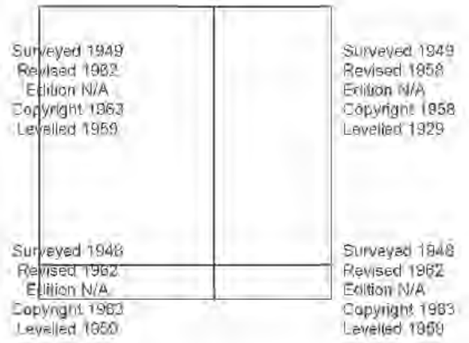

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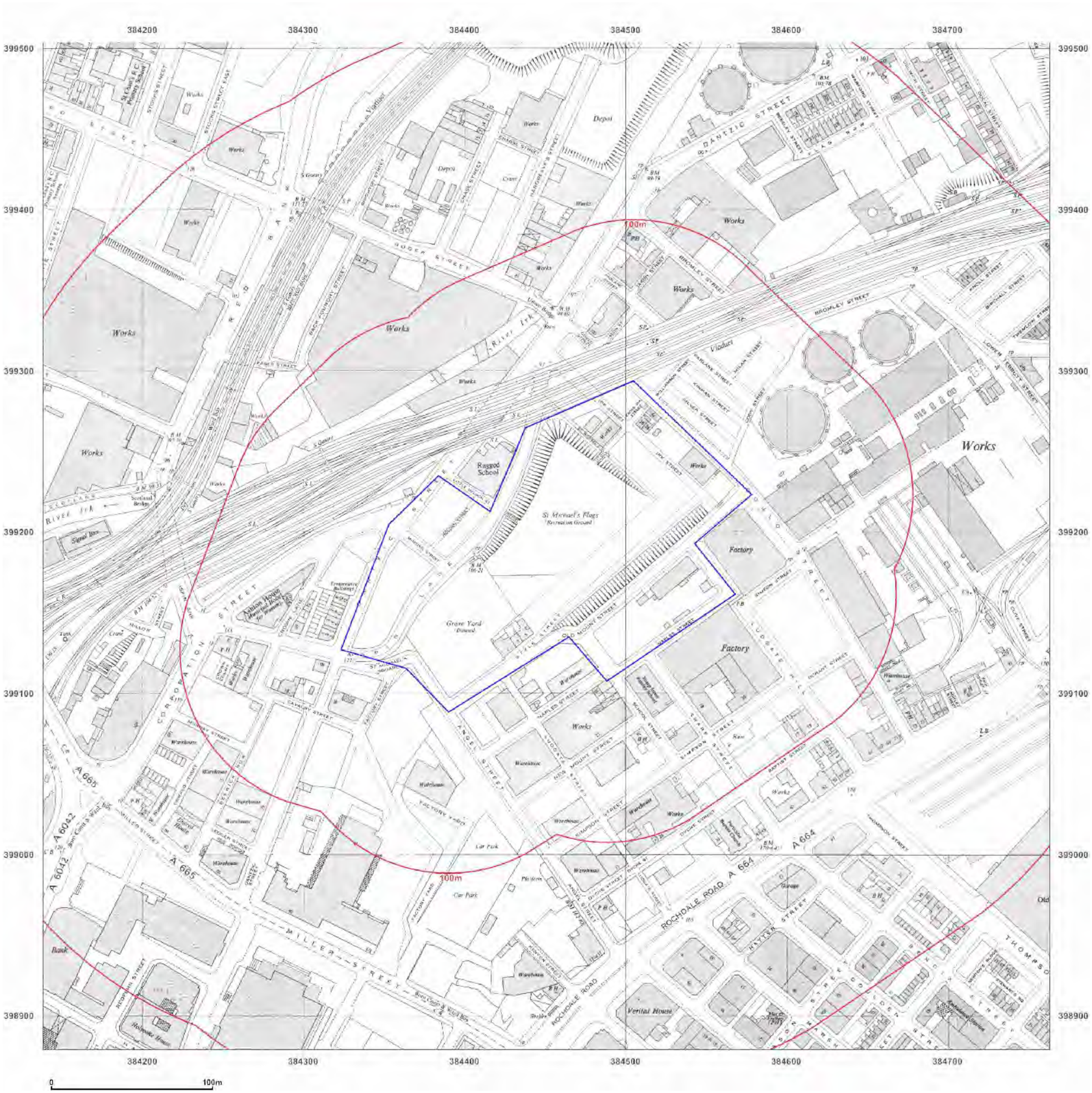

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1964-1965**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1964
Revised 1984
Edition N/A
Copyright 1966
Levelled 1964

Surveyed N/A
Revised 1964
Edition N/A
Copyright 1965
Levelled 1959

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Production date: 08 December 2016

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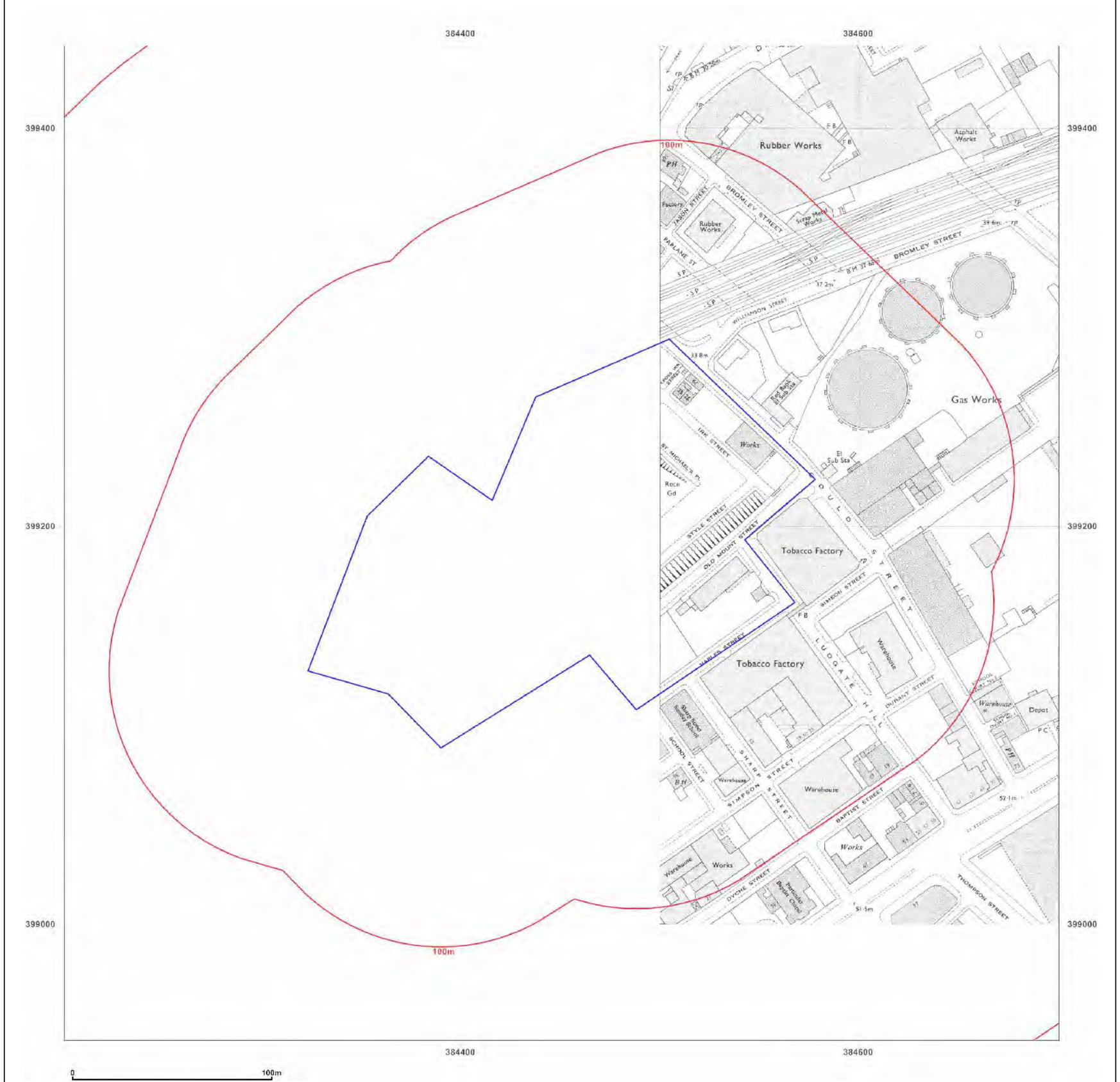

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1970**

Scale: 1:1,250

Printed at: 1:2,000

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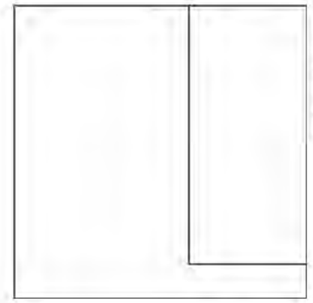

Surveyed 1949
Revised 1969
Edition N/A
Copyright 1970
Levelled 1964

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Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1978-1980**

Scale: 1:1,250

Printed at: 1:2,000

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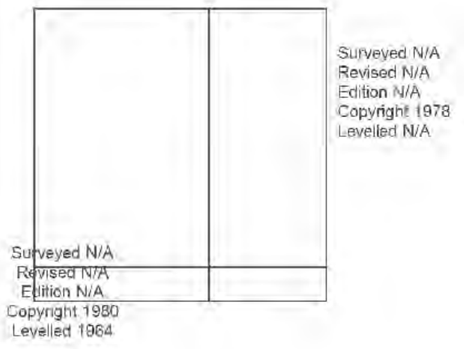

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Production date: 08 December 2016

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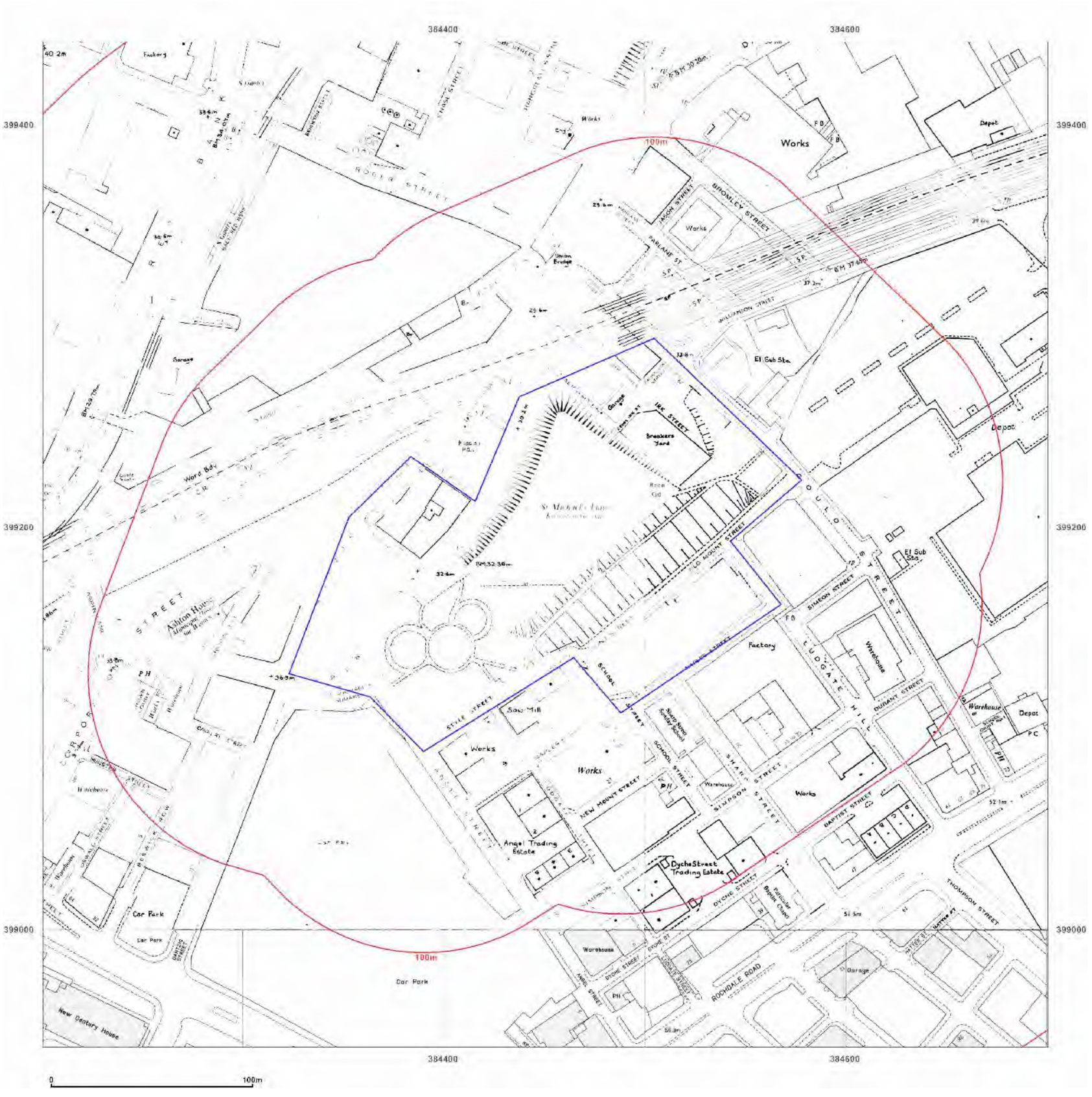
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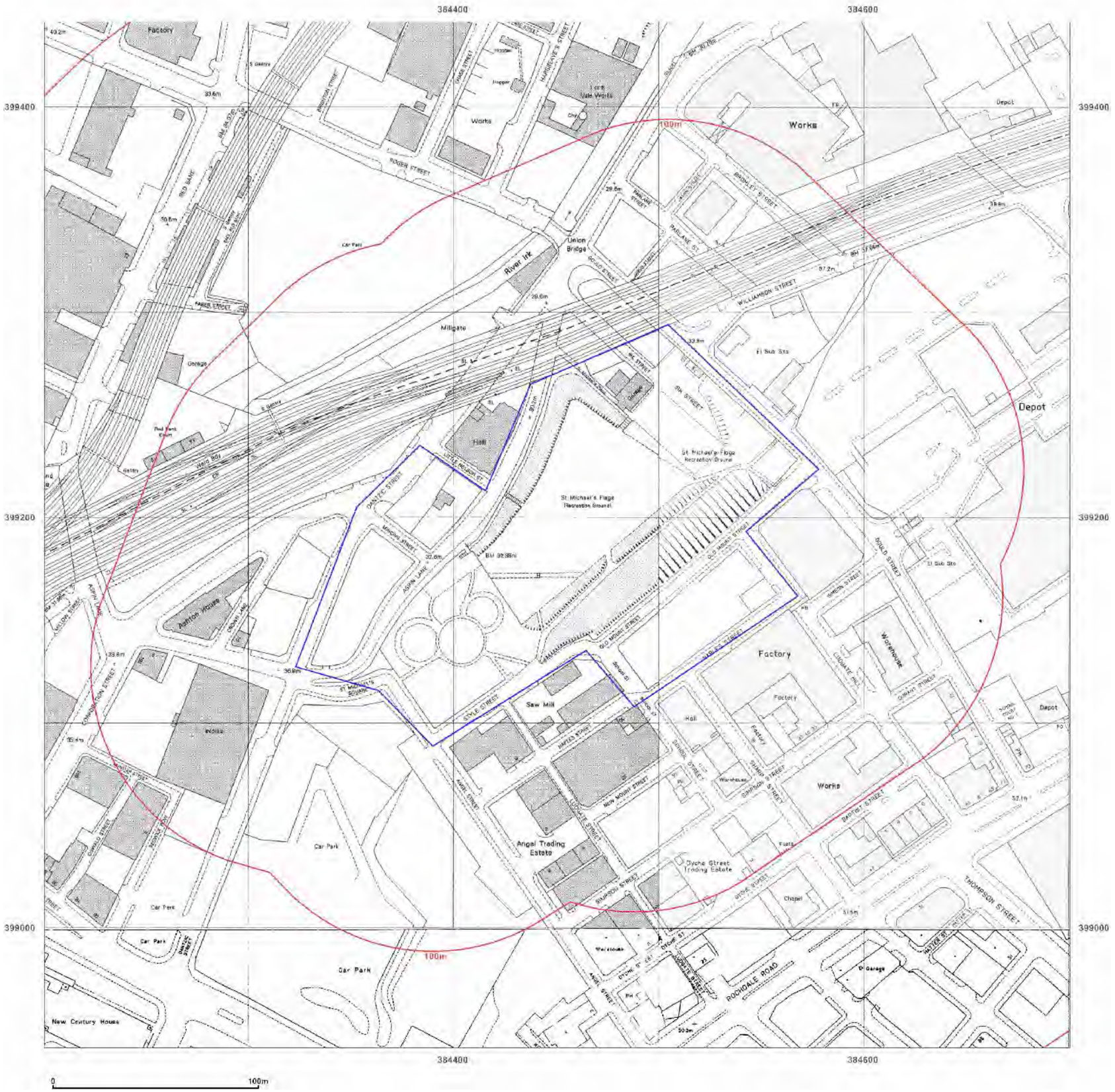
384600
399400
399200
399000
100m
Works
Depot
Factory
Warehouse
Car Park
Car Park
Works
Works
Works



Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1989-1992**

Scale: 1:1,250

Printed at: 1:2,000

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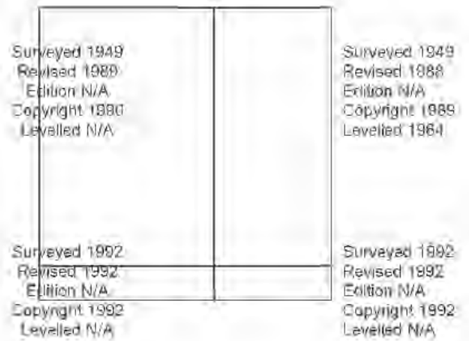

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Production date: 08 December 2016

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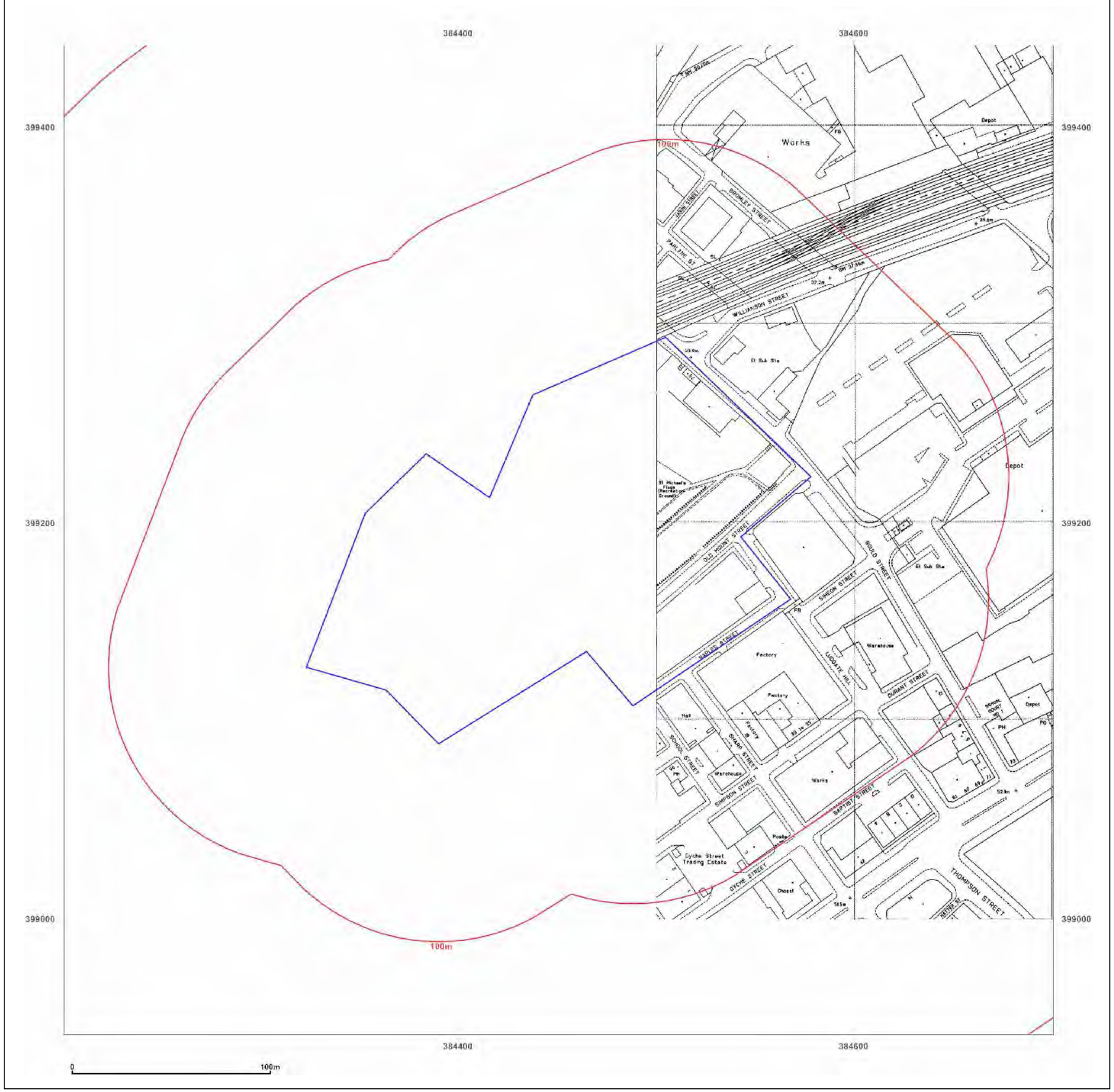

Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

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

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Production date: 08 December 2016

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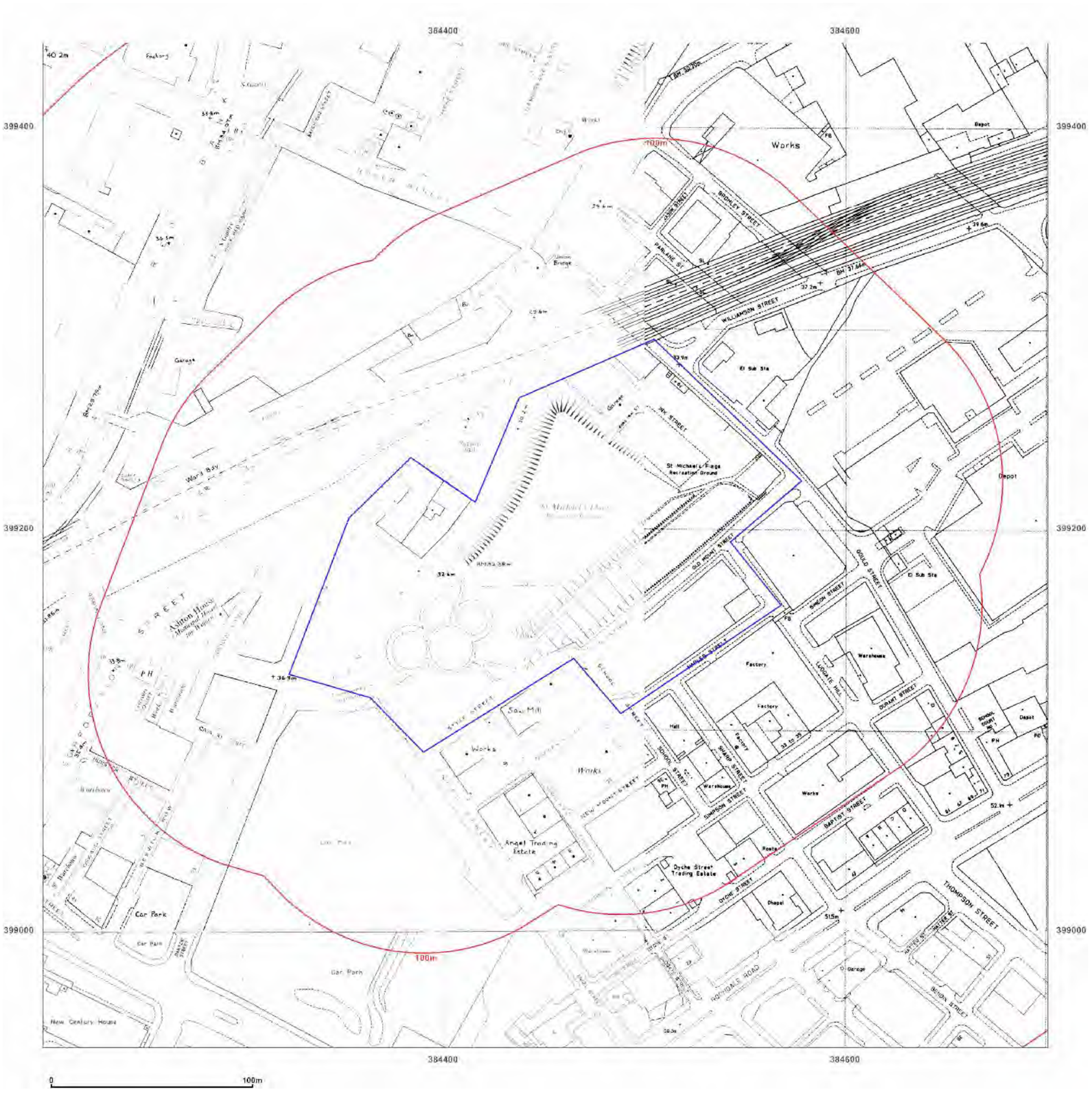

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1990-1995**

Scale: 1:1,250

Printed at: 1:2,000

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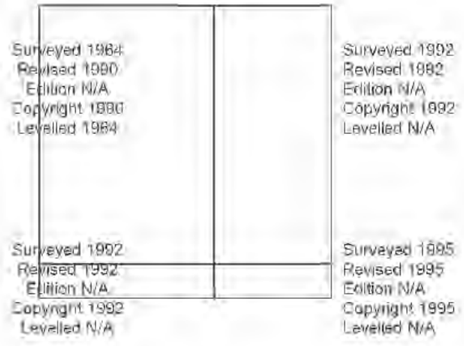

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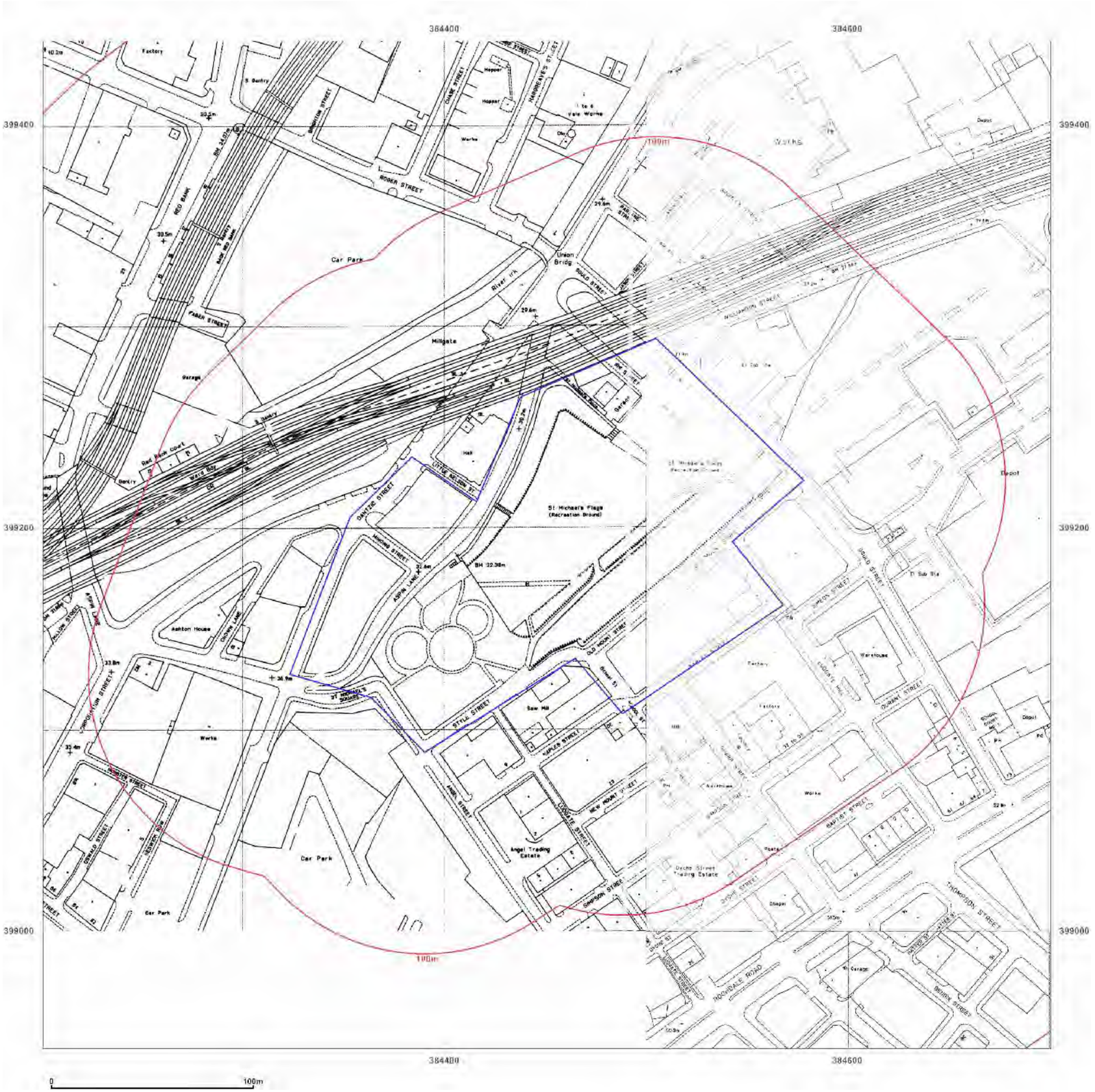
Production date: 08 December 2016

To view map legend click here *Legend*



Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1992-1995**

Scale: 1:1,250

Printed at: 1:2,000

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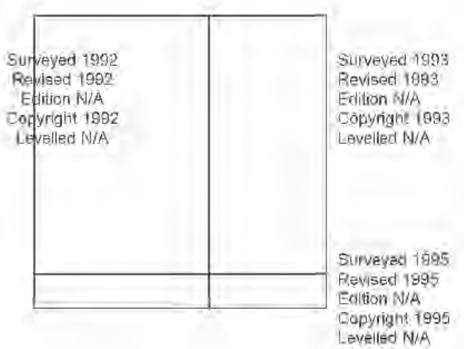

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Production date: 08 December 2016

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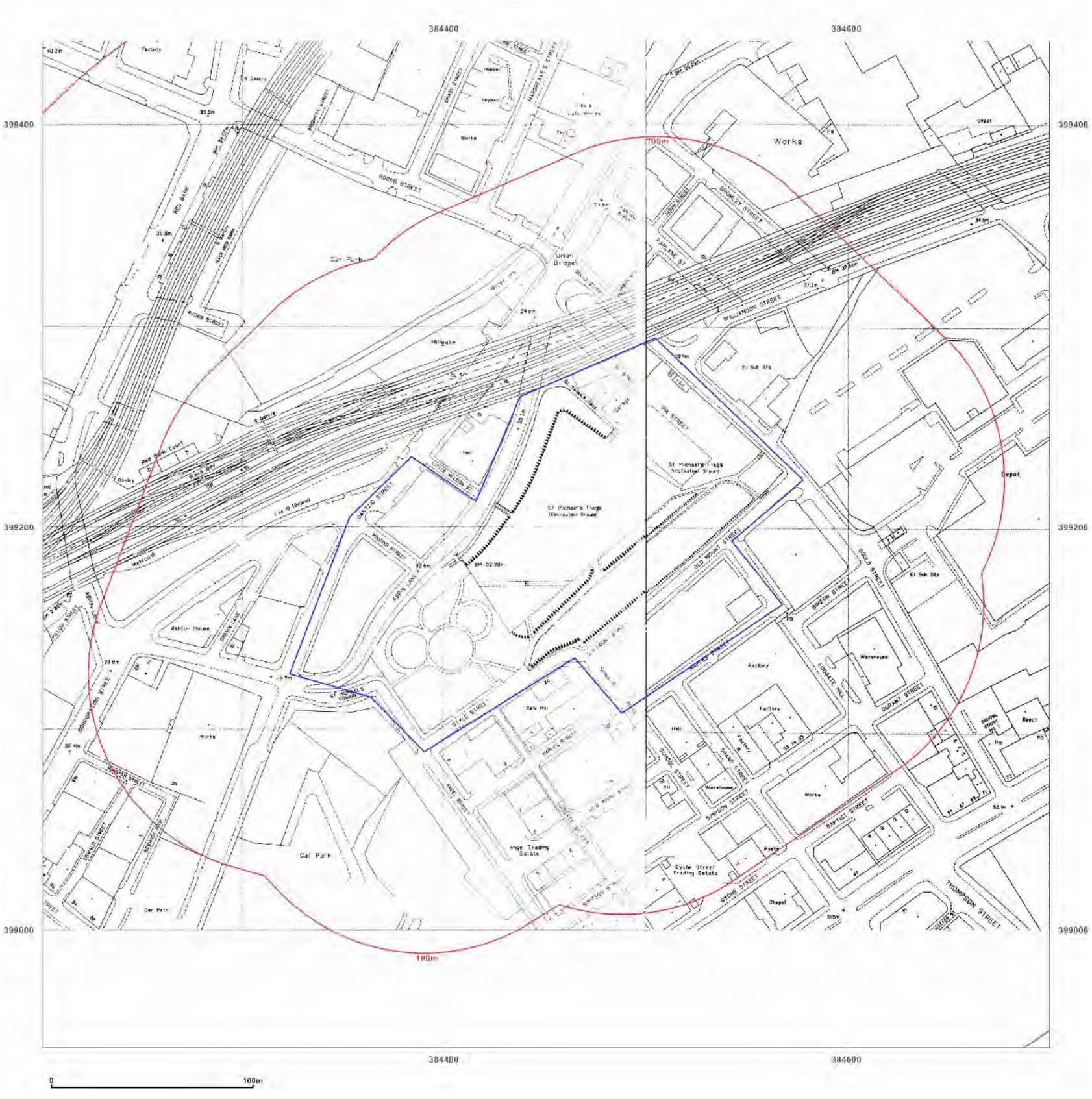
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399200
399000
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100m
Works
Depot
Factory
Warehouse
Car Park
Ashton House
St Michael's Flags
Dyche Street Trading Estate
Union Bridge
Millgate
Red Bank
Red Bank Court
Hopper
Hall
Chapel
Sub Sta
Pump
Metrolink
RODER STREET
WILLIAMSON STREET
BROWNLEY STREET
JOHN STREET
CLARKANE ST
OAK STREET
HANSOM LANE'S STREET
BROUGHTON STREET
RED BANK
OLD MOUNT STREET
ROULD STREET
SIMEON STREET
LUDGATE HILL
DURANT STREET
SCHOOL COURT
BAPTIST STREET
THOMPSON STREET
DYCHE STREET
LITTLE WILSON ST
WILSON ST
MANZO STREET
WILLIAM STREET
JOHNSON STREET
OSWALD STREET
BISHOP ST
ASPEN LANE
ASPEN LANE N
ASPEN LANE S
ST MICHAEL'S SQUARE
STYLE STREET
MARIA STREET
ANGE STREET
SAWLEY STREET
SCHOOL STREET
SIMPSON STREET
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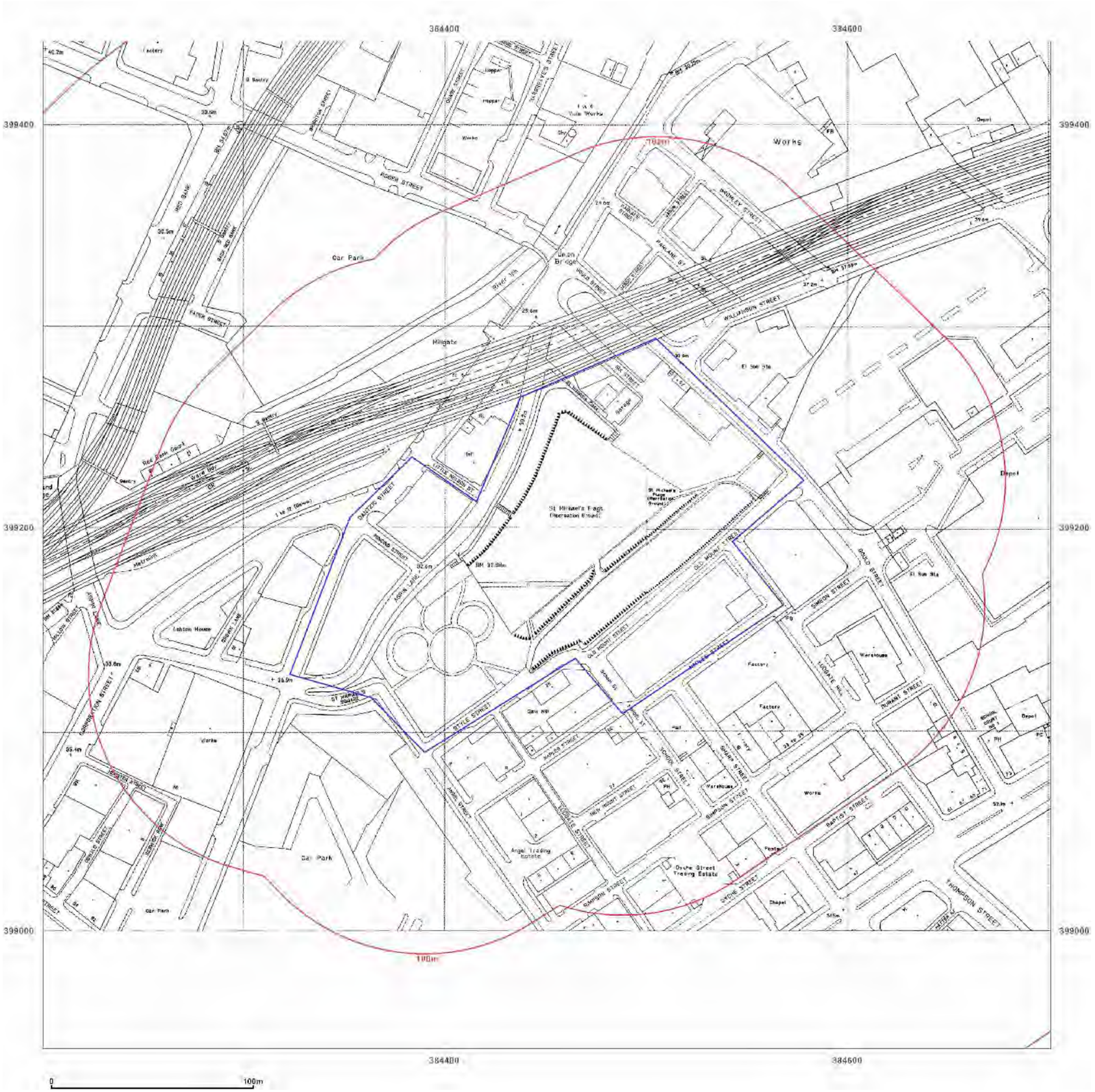
Sub Sta



Groundsure INSIGHTS

Site Details:

Angel Meadow

Client Ref: PO20037664
Report Ref: GS-3512619
Grid Ref: 384451, 399192

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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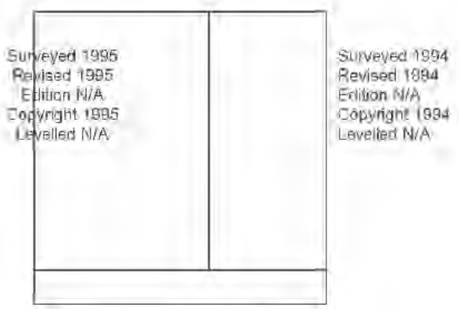

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Appendix E

ZETICA UXO DESK STUDY AND RISK ASSESSMENT

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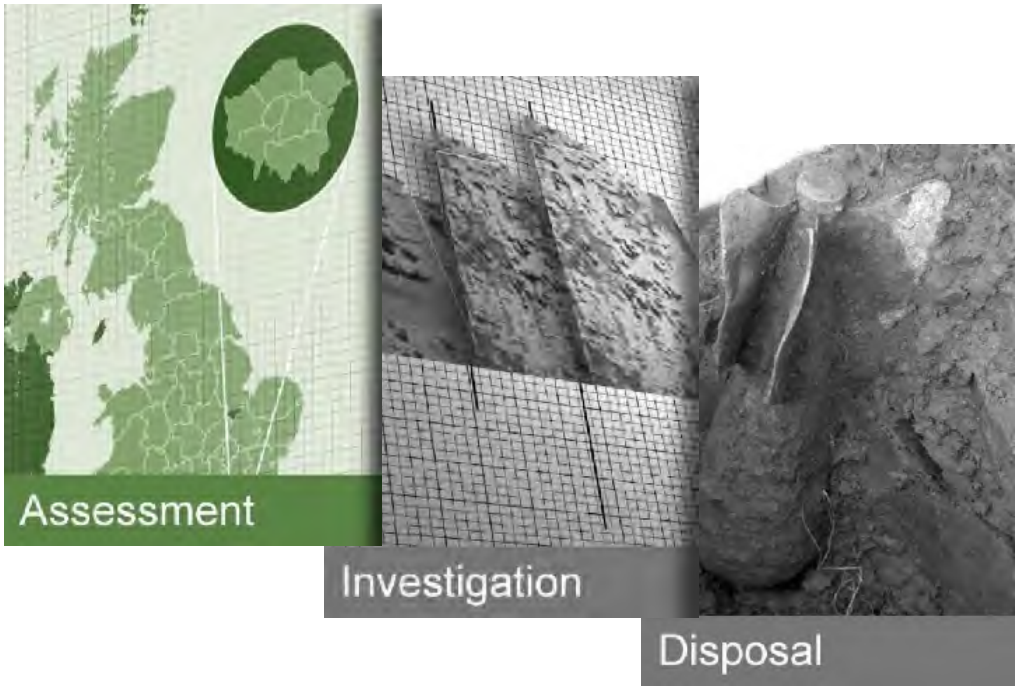

Angel Meadow, Manchester - UXO Desk Study & Risk Assessment

Drafted by Paul Jenkins
Checked by Stefan Lang
Authorised by Mike Sainsbury

Document Title	**UXO Desk Study & Risk Assessment**
Document Ref.	**P6594-17-R1**
Revision	**A**
Project Location	**Angel Meadow, Manchester**
Client	**WSP PB**
Date	**18th January 2017**

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UXO DESK STUDY & RISK ASSESSMENT

Angel Meadow, Manchester

EXECUTIVE SUMMARY

Zetica Ltd was commissioned by WSP PB to carry out an Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 3 hectares (ha) at Angel Meadow, Manchester ('the Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'.

No records have been found indicating that High Explosive (HE) bombs fell on the Site.

1No. Incendiary Bomb (IB) is recorded falling on the northern boundary of the Site during World War Two (WWII). There is no evidence that this caused any extensive damage likely to mask the impact of an Unexploded Bomb (UXB).

No other significant military activity is recorded on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in the following Figure, reproduced as Figure 7 in the main report.

Figure	UXO hazard zone plan of the Site



Source: Bing Maps *Not to Scale*

Legend					
	Very Low		Low		Moderate
	High		Very High		Site boundary

The main findings of the report are summarised below.

- No records of bombing or military activity on the Site during World War One (WWI) have been found.
- During WWII, the main strategic targets in the vicinity of the Site comprised major transport infrastructure and public utilities, iron and steel works, chemical works and munitions factories.
- During WWII the Site was located in the County Borough (CB) of Manchester, which officially recorded a low to moderate regional bombing density.
- No records have been found indicating that HE bombs fell on the Site during WWII. The nearest recorded HE bomb fell approximately 20 metres (m) south of the Site. Records indicate that a further 4No. HE bombs, in addition to at least 40No. IBs and 1No. Parachute Mine (PM), fell within 0.1km of the Site.
- No records of any post-WWII military activity on the Site have been found.

The Table below, reproduced as Table 4 in the main report, provides a UXO risk assessment for potential works on the Site.

Further details on the methodology for the risk assessment are provided in Section 11.1 of the main report.

Table UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Piling/boreholes	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Piling/boreholes	1	1	1	1	3	3	Low

PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)

Shallow excavations defined as <1.0m below ground level (bgl).

Risk Mitigation Recommendations

To ensure that the UXO risk is reduced to As Low As Reasonably Practicable (ALARP) the following mitigation is advised:

Where a low risk of UXO encounter is anticipated, industry good practice is simply to raise the awareness of those involved in excavations so that in the unlikely event that a suspect item is discovered, appropriate action is taken. This can be achieved through UXO awareness briefings to site staff.

Clearance certification for borehole or pile locations is considered prudent only if a zero tolerance to risk is adopted. Zero tolerance is commonly adopted for sites that have safety critical infrastructure such as nuclear establishments and oil refineries.

Table 5 in the main report gives recommended actions in relation to the potential UXO risk level and the anticipated Site activity. Further advice on the mitigation methods can be provided by Zetica on request.

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UXO DESK STUDY & RISK ASSESSMENT

Angel Meadow, Manchester

Note: To aid the reader of this report, Zetica has colour coded each paragraph. Paragraphs with black text on a white background are paragraphs that provide site-specific information or information specifically researched as part of this project.

Paragraphs in a dark green text with a green background are paragraphs containing background information or explanations which may appear as standard text in all similar reports.

1 INTRODUCTION

1.1 Project Outline

Zetica Ltd was commissioned by WSP PB to carry out an Unexploded Ordnance (UXO) Desk Study and Risk Assessment for an area of approximately 3 hectares (ha) at Angel Meadow, Manchester ('the Site').

The aim of this report is to gain a fair and representative view of the UXO hazard for the Site and its immediate surrounding area in accordance with the Construction Industry Research and Information Association (CIRIA) C681 'Unexploded Ordnance (UXO), a Guide for the Construction Industry'. This hazard assessment includes:

- Likelihood of ordnance being present.
- Type of ordnance (size, filling, fuze mechanisms).
- Quantity of ordnance.
- Potential for live ordnance (UXO).
- Probable location.
- Ordnance condition.

It is essential to note that the effects of military activity will often extend beyond the source of the activity. For example, a base for armed forces may use surrounding areas of open land outside the official or recorded military boundaries for practice and military related activities.

In addition, World War One (WWI) and World War Two (WWII) aerial bombardment was not discrete. 'Pinpoint' targeting did not exist in WWI or WWII. The effects of bombardment would be apparent in areas around the intended target.

It is for these reasons that it is important to address military activity both on the Site and in the relevant surrounding areas.

It should be noted that some military activity providing a source of UXO hazard may not be readily identifiable and therefore there cannot be any guarantee that all UXO hazards on the Site have been identified in this report.

1.2 The Site

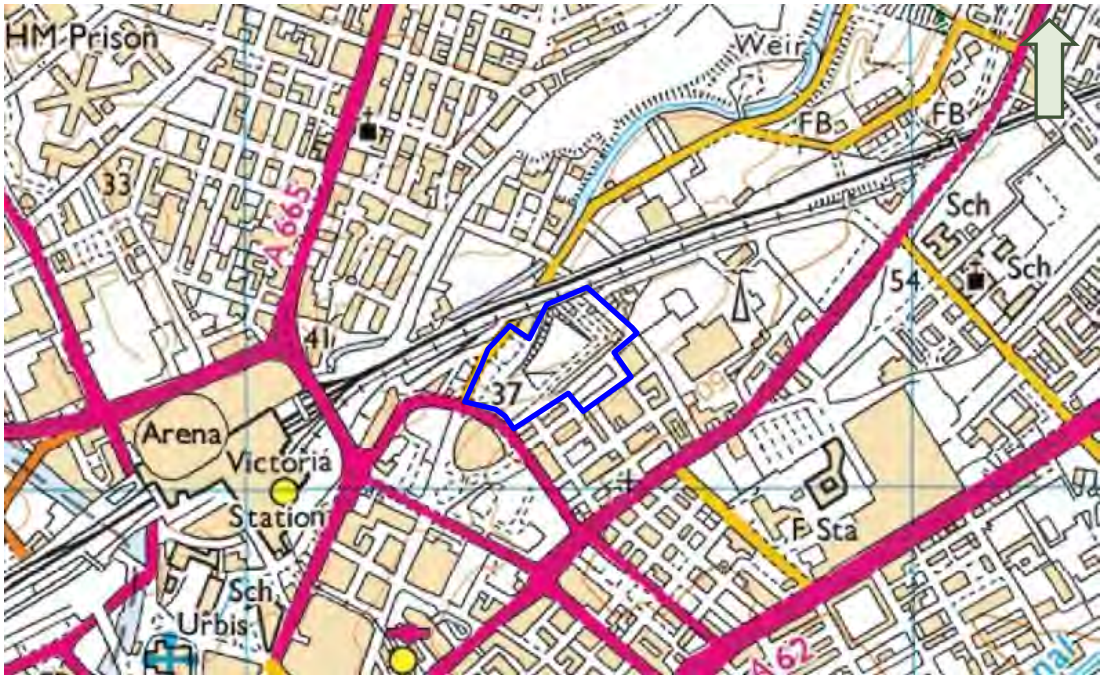
The Site is centred on Ordnance Survey National Grid Reference (OSNGR) SJ 844991. It is located on St Michael's Flags and Angel Meadow Park to the northeast of Manchester city centre, approximately 0.5km northeast of Manchester Cathedral.

The Site comprises a landscaped park and adjacent car parks. It is bounded by Naples Street and Style Street to the southeast, Rochdale Road to the southwest, Gould Street to the northeast and Dantzic Street to the northwest. A mainline railway on a viaduct abuts the Site to the north.

It is understood that planned works on the Site may include intrusive ground investigations, excavations and piling.

Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Figure 1 Site location map



Source: © Crown Copyright 2017. Reproduced by permission of Ordnance Survey *Not to Scale*

Legend Site boundary

Plate 1	Recent aerial photograph of the Site



Source: Bing Maps *Not to Scale*

Legend	Site boundary

2 SOURCES OF INFORMATION

2.1 Historical Information

With most locations, the potential presence of UXO as a result of enemy action, unauthorised disposal or unrecorded military activity can never be totally discounted.

Detailed records of military activity are rarely released into the public domain. Even when military information is made public there may be gaps in the records because files have been lost or destroyed.

Records for periods such as WWII are only as detailed and accurate as the resources and working conditions would allow at the time. Densely populated areas tend to have a greater number of records than rural areas. Such records may be inaccurate due to the confusion surrounding continuous air raids.

Press records can supplement local information, although this source of information must be treated with caution, as inaccuracies do exist, either inadvertently or intentionally in order to confuse enemy intelligence. Classified official records can sometimes be considered inaccurate for the same reason.

Recent research indicates that England alone had 17,434No. recorded defence sites, of which 12,464No. were classified as defensive anti-invasion sites. The precise locations of many of these sites are still to be identified, illustrating the scale of the problem when establishing potential risks from limited historical data.

Zetica Ltd researched the military history of the Site and its surrounding area utilising a range of information sources. The main sources of information are detailed in the following sections and referenced at the end of this report.

2.2 Zetica Ltd Defence Related Site Records

Zetica Ltd's in-house records were consulted, including reference books and archived materials from past work in the region. Relevant documents have been cited within the bibliography of this report.

2.3 Zetica Ltd Bombing Density Records and Maps

Reference has been made to the Zetica Ltd bomb risk maps located on ZeticaUXO's website (http://zeticauxo.com/downloads-and-resources/risk-maps/).

2.4 Ministry of Defence and Government Records

Various government departments and units within the Ministry of Defence (MoD) were approached for information of past and present military activity in the area. These included the Home Office records of abandoned bombs.

2.5 Other Historical Records, Maps and Drawings

Numerous reference documents including historical maps, aerial photographs and drawings have been consulted from sources such as the National Archives, Historic England and the Defence of Britain Project.

The British Geological Survey (BGS) was consulted for borehole information.
2.6 Local Authority Records
Information was obtained from Manchester City Council.
2.7 Local Record Offices and Libraries
The Greater Manchester County Record Office and Manchester Central Library Archive provided information.
2.8 Local Historical and Other Groups
Local history groups and archaeological bodies were consulted.
2.9 Data Confidence Level
In general, there is a high level of confidence in the researched information sources used for this report. Any exceptions to this are specifically detailed in the text of the report.

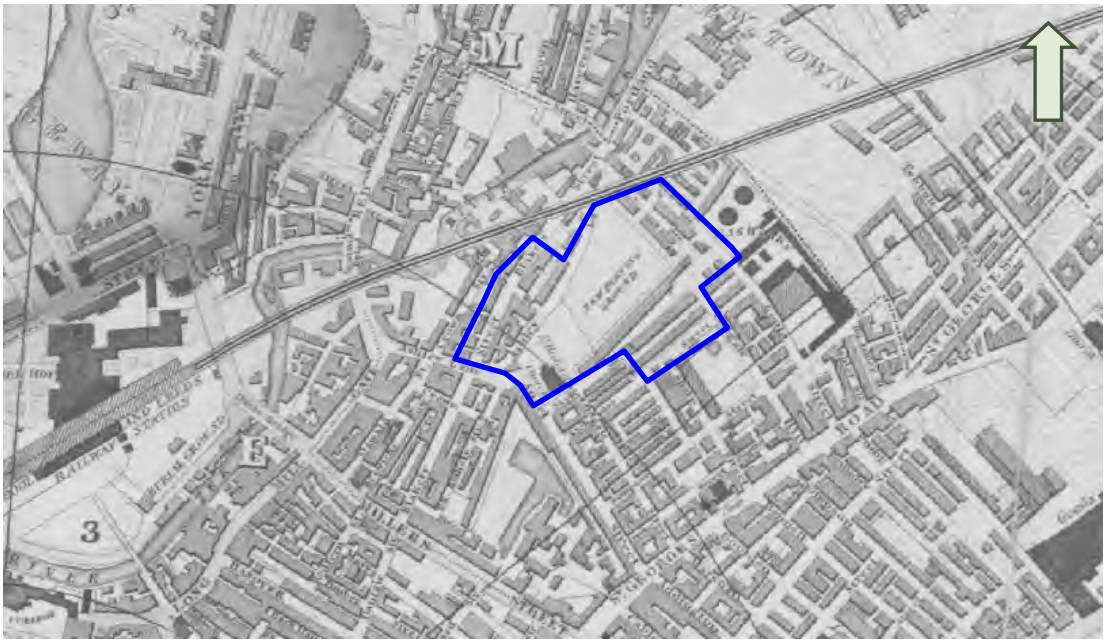
3 SITE HISTORY

3.1 General History

The historical map of 1848 (Figure 2) shows that in the mid-19th century the Site was occupied by St Michael's Church and a large adjacent grave yard (the New Burying Ground), along with terraced residential properties.

Manchester Gas Works was located adjacent to the east of the Site and Victoria Station was located approximately 0.3km west of the Site. The main Liverpool & Leeds Railway line into Victoria Station ran adjacent to the north of the Site.

Figure 2	Historical map, 1848



Source: Manchester Museum *Not to Scale*

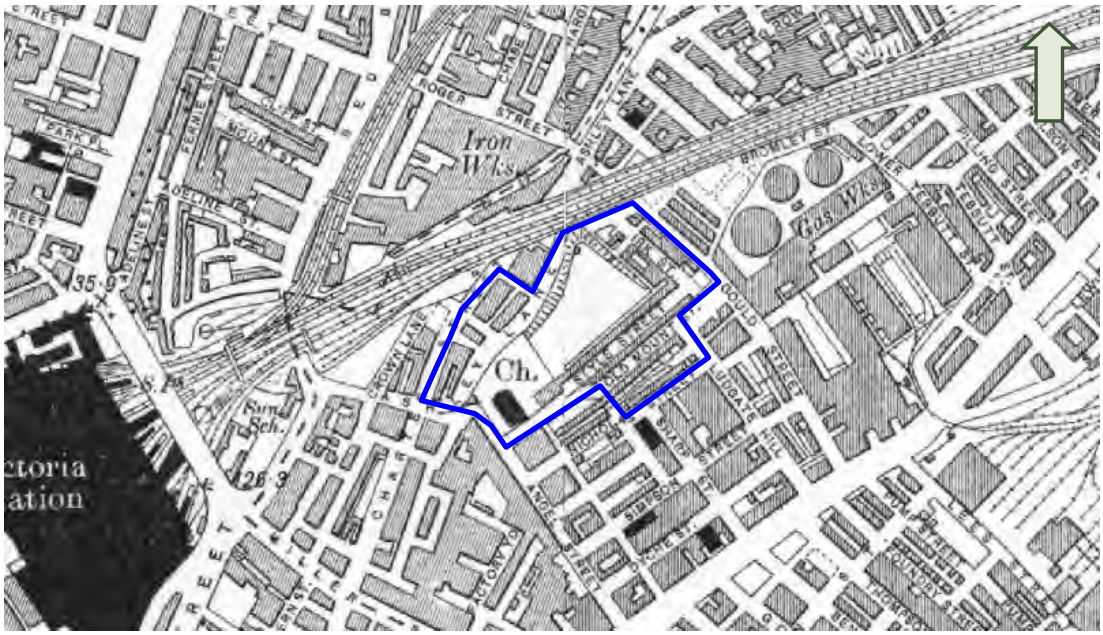
Legend	Site boundary

The historical map of 1906 (Figure 3) shows that the Site remained occupied by St Michael's Church and rectory, a church yard and residential properties. The large grave yard on the Site was disused and St Michael's Flags Recreation Ground had been established in its place.

The Manchester Corporation Gas Works had expanded to the east of the Site.

Victoria Station had been expanded at the end of the 19th century to within approximately 0.2km west of the Site to serve the London & North Western Railway (LNWR) line.

Figure 3	Historical map, 1906



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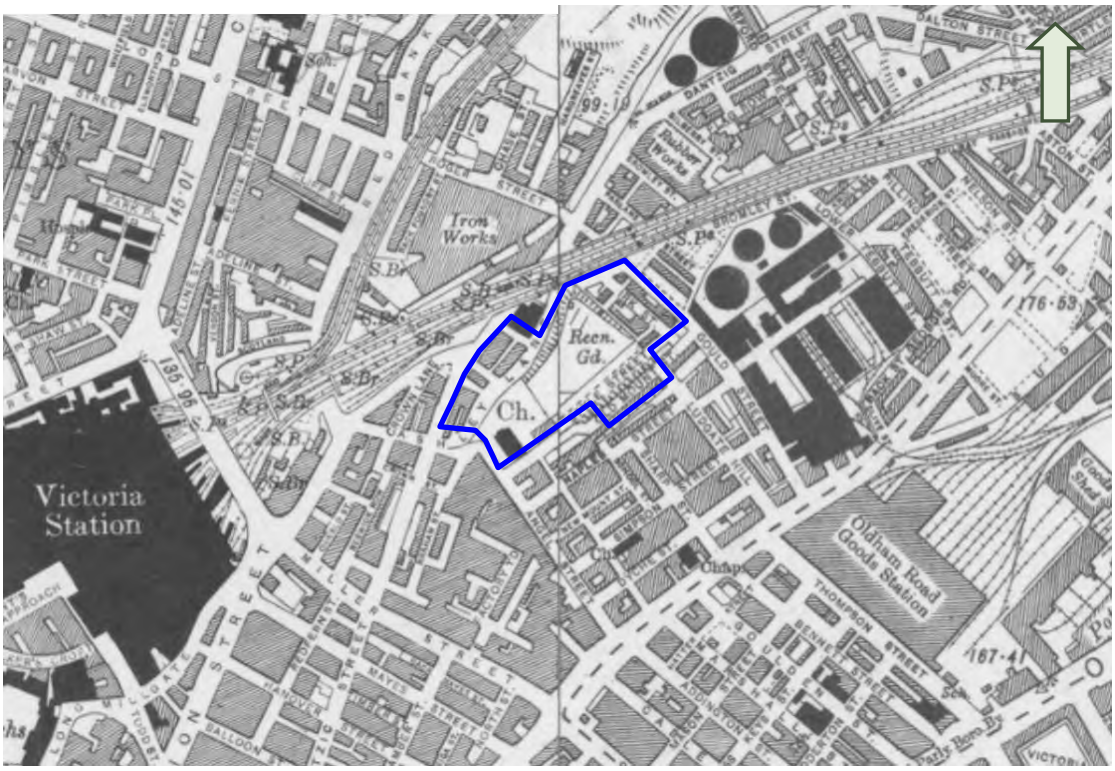
Legend	Site boundary

The historical map of 1933 (Figure 4) shows that the Site remained occupied by the buildings of St Michael's Church and rectory, a disused grave yard and St Michael's Flags Recreation Ground. The Ragged School was located adjacent to north of the Site on Ashley Lane and the Manchester Corporation Rochdale Road Gas Works, adjacent to the east of the Site, had been expanded further.

Figure 4	Historical map, 1933



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Legend	Site boundary

St Michael's Church was demolished in 1935. Plate 2, an aerial photograph dated the 16th August 1939, shows that the church had been demolished.

Terraced housing on the Site at Ashley Lane, Irk Street, Old Mount Street and Style Street had been demolished prior to WWII.

Plate 2	Aerial photograph, 16th August 1939



Source: Britain from Above

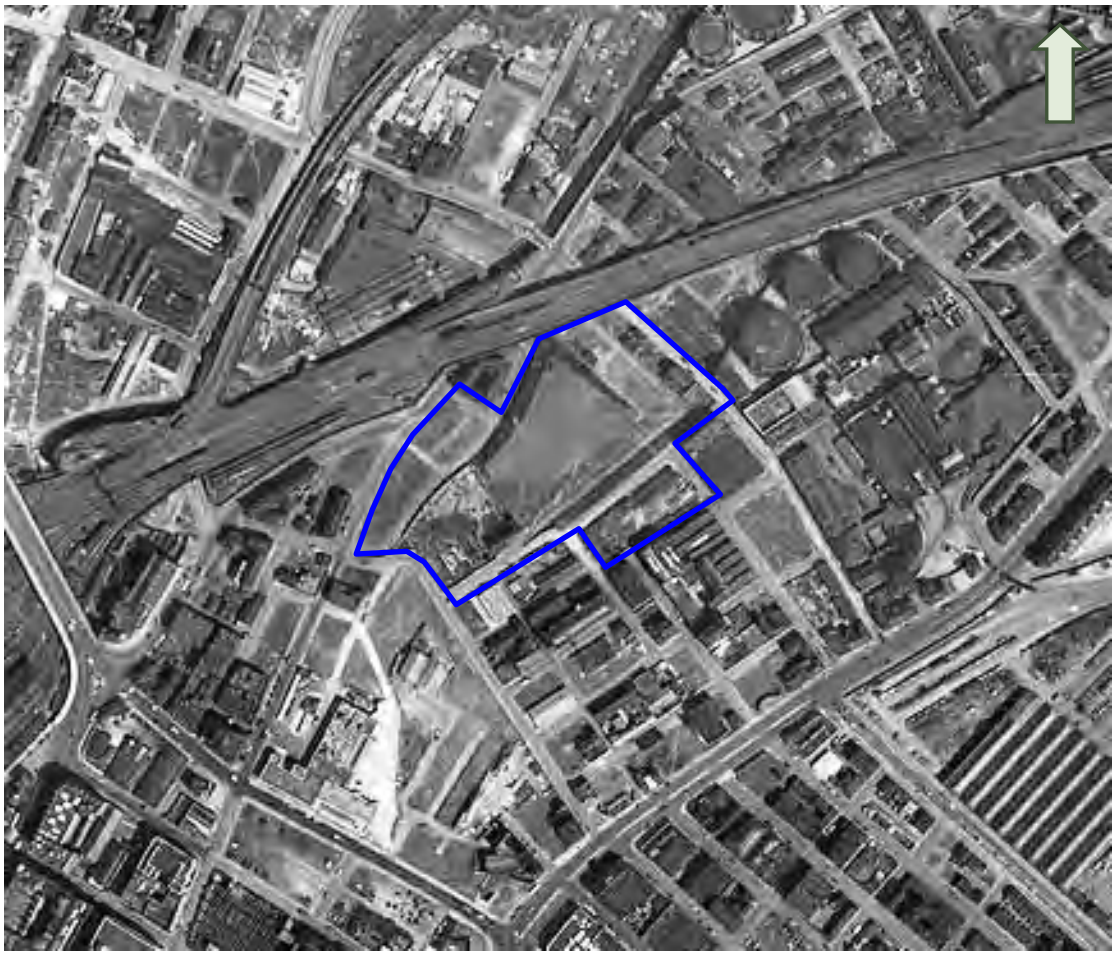
Legend	Site boundary

Plate 3, an aerial photograph dated the 2nd July 1953, shows that the Site was still occupied by a recreation ground, areas of demolished housing and a few remaining structures on Style Street, Irk Street and Gould Street.

Manchester city centre underwent a period of extensive redevelopment post-WWII with many of the former cotton mills demolished, along with the remaining associated 19th century terraced housing.

Extensive areas of demolished buildings are evident in the immediate vicinity of the Site. Most of this related to the pre-WWII and post-WWII clearance of terraced housing, although some of it towards the city centre and along Miller Street to the southwest of the Site was the result of WWII bomb damage (see Section 4.3 and Appendix 1).

Plate 3	Aerial photograph, 2nd July 1953



Source: Historic England *Not to Scale*

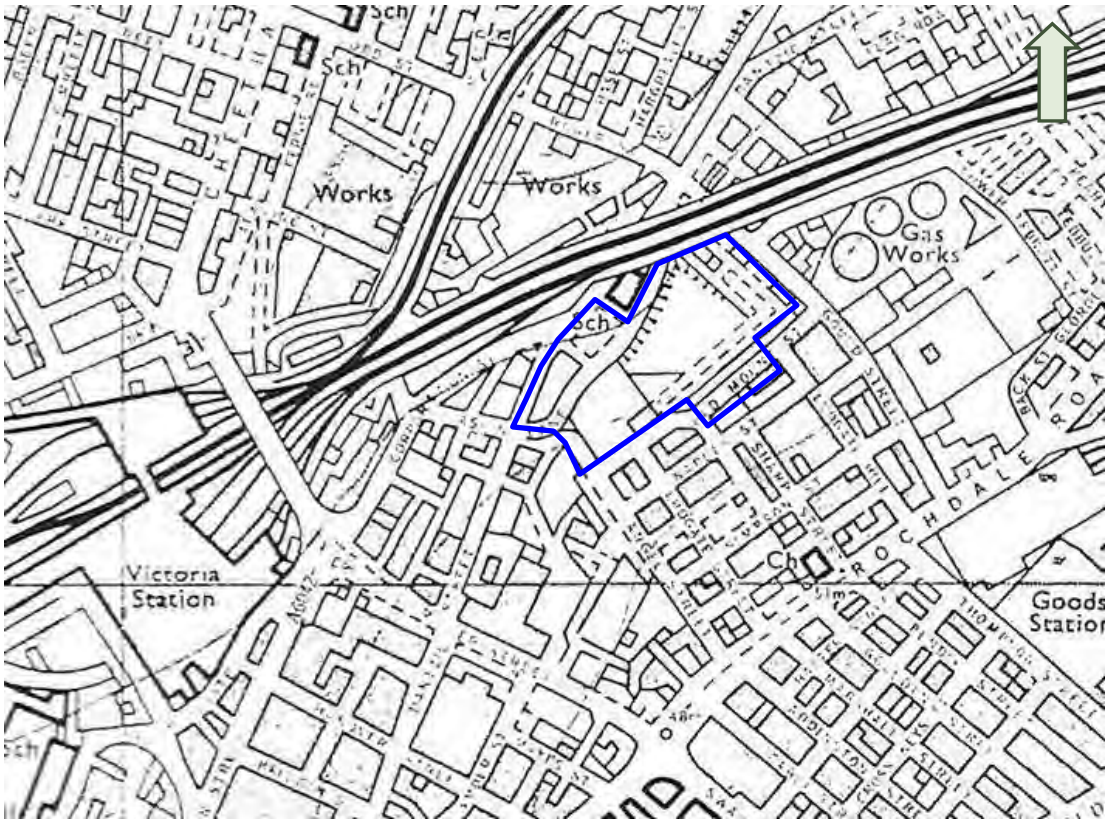
Legend	Site boundary

Extensive development took place adjacent to the Site during the 1960s, including the construction of the Miller Street Tower to the southwest of the Site. A series of car parks had been built on and in the immediate vicinity of the Site.

This development is shown on the historical map of 1972 (Figure 5).

Most of the Site was still occupied by open recreational and park land.

Figure 5	Historical map, 1972



Source: © Crown Copyright 2017. Reproduced by permission of Ordnance Survey *Not to Scale*

Legend	Site boundary

Plate 4, an aerial photograph dating from 2009, shows that there had been no changes on the Site except for minor landscaping and a slight redesigning of the existing car parks.

Plate 4	Aerial photograph, 2009



Source: Google Earth *Not to Scale*

Legend	Site boundary

Since 2009, redevelopment has occurred immediately adjacent to the southwest of the Site with the Co-Operative Group development at 1 Angel Square. There has been no significant development on the Site (see Plate 1).

3.2 Pre-WWI Military Activity

No records of pre-WWI military activity on or in close proximity to the Site have been found.

3.3 WWI Military Activity

During WWI, an estimated 9,000No. German bombs were dropped over Britain during the course of 51No. airship and 52No. aircraft raids. It was the first time that strategic aerial bombardment had been used.

During WWI the main strategic targets in the vicinity of the Site consisted of major transport infrastructure and industrial works, including munitions and explosives factories, in addition to aircraft component manufacturers.

No records have been found indicating that Manchester was bombed during WWI.

In response to regional air raids, Anti-Aircraft (AA) guns were established. These were potential sources of Unexploded AA (UXAA) shells which could land up to 13km from the firing point, although more typically fell within 10km during WWI.

Records indicate that 9No. static AA gun batteries were located within approximately 10km of the Site. The nearest were located in Pendleton (SJ 8129914) and Newton Heath (SJ 876994), approximately 3.2km west and 3.2km east of the Site, respectively. These were armed with 18-pounder guns.

WWI military activity is not considered to provide a source of UXO hazard to the Site.

3.4 WWII Military Activity

Manchester was a strategically important industrial region and several heavy air raids occurred across the city. Details of air raids in the vicinity of the Site are provided in Section 4 and Appendix 1.

Defensive and offensive military establishments were built during WWII. These included lines of defences (Stop Lines), pillboxes, AA guns and bombing decoys. Details for those nearest to the Site are provided in Section 5.

Other military establishments in the vicinity of the Site are described in Sections 6 to 8.

3.5 Post-WWII Military Activity

No records of post-WWII military activity on or in close proximity to the Site have been found.

4 WWII BOMBING

Bombing raids began in the summer of 1940 and continued until the end of WWII. Bombing densities generally increased towards major cities or strategic targets such as docks, industrial premises, power stations and airfields.

The German bombing campaign saw the extensive use of both High Explosive (HE) bombs and Incendiary Bombs (IBs). The most common HE bombs were the 50kg and 250kg bombs, although 500kg were also used to a lesser extent. More rarely 1,000kg, 1,400kg and 1,800kg bombs were dropped.

The HE bombs tended to contain about half of their weight in explosives and were fitted with one or sometimes two fuzes. Not all HE bombs were intended to explode on impact. Some contained timing mechanisms where detonation could occur more than 70 hours after impact.

Incendiary devices ranged from small 1kg thermite filled, magnesium bodied bombs to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. In some cases the IBs were fitted with a bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area. The C300 bombs were similar in appearance to 500kg HE bombs, although their design was sufficiently different to warrant a specially trained unit of the Royal Engineers to deal with their disposal.

Anti-Personnel (AP) bombs and Parachute Mines (PMs) were also deployed. 2No. types of anti-personnel bombs were in common use, the 2kg and the 12kg bomb. The 2kg bomb could inflict injury across an area up to 150m away from the impact, within 25m of this, death or fatal injury could occur.

PMs (which were up to 4m in length) could be detonated either magnetically or by noise/vibration. Anti-shipping parachute mines were commonly dropped over navigable rivers, dockland areas and coastlines. The Royal Navy was responsible for ensuring that the bombs were made safe. Removal and disposal was still the responsibility of the Bomb Disposal Unit of the Royal Engineers.

WWII bomb targeting was inaccurate, especially in the first year of the war. A typical bomb load of 50kg HE bombs mixed with IBs which was aimed at a specific location might not just miss the intended target but fall some considerable distance away.

It is understood that the local Civil Defence authorities in urban areas had a comprehensive system for reporting bomb incidents and dealing with any UXO. In more rural areas, fewer bombing raids occurred. It is known that Air Raid Precaution (ARP) records under-represent the number and frequency of bombs falling in rural and coastal areas.

Bombs were either released over targets or as part of 'tip and run' raids where bomber crews would drop their bombs to avoid Anti-Aircraft fire or Allied fighter aircraft on the route to and from other strategic targets. Bombs dropped as a result of poor targeting or 'tip and run' raids on rural, river, marsh or coastal areas were often unrecorded or entered as 'fell in open country', 'fell in the sea' or 'fell in the river' and left little evidence of the fall.

4.1 Bombing in Manchester

Manchester's industrial conurbations and port made it a principal target for enemy bombers. The Luftwaffe possessed detailed target photographs of many industrial complexes from as early as 1937.

Air raids on Manchester began in August 1940 and continued until 1945. The heaviest raid on the city occurred between the 22nd and 23rd December 1940, the 'Manchester Blitz', during which more than 400No. HE bombs fell over the region.

During WWII over 1,710No. HE bombs and 115No. PMs fell across the Manchester region.

Bombing was concentrated on the city centre and in West Manchester, where the Salford Docks and major industrial works at Trafford Park attracted heavy raids.

Bombing densities generally decreased away from the city centre and far less damage was sustained by properties in these areas.

4.2 Strategic Targets

The presence of strategic targets significantly increased the likelihood of bombing within the local area. Airfields, docks, industrial facilities, transport infrastructure and anti-invasion defences were all targeted by Luftwaffe bombers. The inherent bombing inaccuracies at the time meant that areas surrounding the targets were often subjected to bombing.

Details of the main targets in the vicinity of the Site are described in the following Sections.

4.2.1 Commercial and Industrial Targets

The Site was located in close proximity to the commercial centre of Manchester, a potential target. Additionally, there were numerous industrial works, cotton mills and warehouses in Manchester, many of which were engaged in the war effort. The nearest significant industrial targets are outlined below.

The Union Bridge Iron Works was located approximately 0.2km north of the Site and a rubber works was located on Bromley Road, approximately 0.2km northeast of the Site.

The Chapelfield India Rubber Works was located approximately 1.7km south of the Site.

The Ducie Saw Mills were located along the Rochdale Canal on Woodward Street, approximately 2.4km north-northeast of the Site.

The Manchester Corporation's car works and tramway depot were located approximately 2.6km southeast of the Site.

The Dunlop Rubber Company at Gaythorn, approximately 2.6km west of the Site, manufactured more than 28,000No. barrage balloons during WWII.

The Avro aircraft works at Newton Heath, approximately 3km east-northeast of the Site, expanded significantly for wartime production. The Newton Heath works specialised in the development and manufacturing of parts for the Lancaster Bomber and was highlighted on Luftwaffe target maps.

The Clayton Aniline Company (CAC) works, approximately 3.4km east-southeast of the Site, manufactured explosives and high octane fuel during WWII.

The Fluvent Works, engaged in electrical engineering, was located approximately 3.8km south-southeast of the Site.

Other important targets in the Manchester region were concentrated in the Trafford Park industrial complex, located approximately 5.8km southwest of the Site.

4.2.2 Manchester Ship Canal and Salford Docks

The Manchester Ship Canal connected to Salford Docks approximately 4km southwest of the Site. The Port of Manchester was Britain's second largest oil terminal during WWII and was responsible for storing and transporting a wide variety of goods used in the war effort.

From the Salford Docks the River Irwell was canalised and ran into the centre of Manchester. The River Irwell and the extension of the Manchester Ship Canal ran within approximately 0.3km of the Site and were important routes for transporting munitions and general supplies.

Because of their importance as a cargo terminal, the Manchester Docks were heavily targeted by the Luftwaffe during WWII.

4.2.3 Transport Infrastructure

The London Midland & Scottish Railway (LMSR) line ran adjacent to the northern boundary of the Site.

The Site was located in the vicinity of Victoria Station, approximately 0.2km west of the Site, Manchester Exchange Station, approximately 0.6km west of the Site, and Oldham Road Goods Station, approximately 0.8km southeast of the Site. All of these targets sustained bomb damage.

Ancoats Goods Station was approximately 1.8km southeast of the Site. Ardwick West Goods Depot and Mineral Yard was located approximately 2.4km southeast of the Site.

The Longsight Carriage and Engine Depot was located approximately 3.4km southeast of the Site.

The Manchester & Ashton-under-Lyne Canal, together with the Rochdale Canal, ran into the Dale Street Basin, approximately 0.9km south of the Site. These were also used by small chemical works in the preparation of dyes.

4.2.4 Public Utilities

Public utilities were frequently targeted by the Luftwaffe to disrupt power and water supplies to local industries.

The Rochdale Road Gas Works were located adjacent to the east of the Site and the Gaythorn Gas Works were located approximately 1.8km southwest of the Site.

Stuart Street Power Station (Target GB 5083) was located approximately 2.8km southeast of the Site and was marked on Luftwaffe target photographs, such as that shown in Plate 5.

Plate 5 Luftwaffe target photograph of Stuart Street Power Station



Source: Clarke *Not to Scale*

4.3 Bombing Density and Incidents

Table 1 gives details of the overall bombing statistics recorded for the Local Authority Districts of the Site and surrounding districts. These were categorised as County Boroughs (CB), Municipal or Metropolitan Boroughs (MB), Urban Districts (UD) and Rural Districts (RD). The Site was located in Manchester CB.

The figures for West Ham CB, generally considered to represent a high regional bombing density, are included for comparison.

Table 1 Bombing Statistics

Area	Bombs Recorded				
	High Explosive	Parachute Mines	Other	Total	Bombs per 405ha (1,000 acres)
Manchester CB	**712**	**18**	**7**	**737**	**27.0**
Stretford MB	456	64	0	520	147.3
Salford CB	406	29	16	451	86.7
West Ham CB	1,498	45	47	1,590	334.0

Note that Table 1 excludes the figures for Pilotless Aircraft (V1s, also known as 'Doodlebugs'), Long Range Rockets (V2s), AA shells and IBs.

The nearest recorded air raid incidents to the Site are described below. Further recorded incidents in the vicinity of the Site are described in Appendix 1.

7th October 1940

1No. IB fell on the corner of Dantzic Street and Little Nelson Street, near the Ragged School, on the northern boundary of the Site.

1No. IB fell on the rubber works off Dantzic Street, approximately 0.1km north of the Site.

1No. IB fell on Rochdale Road Gas Works yard, approximately 0.1km east of the Site.

24No. IBs fell on the Union Bridge Iron Works, approximately 0.1km north of the Site.

5No. IBs fell north of the River Irk, approximately 0.1km northwest of the Site.

22nd – 24th December 1940

Manchester and Salford were heavily bombed (the 'Manchester Blitz'). In total 171No. bomber aircraft attacked Manchester and dropped over 400No. HE bombs and more than 30,000No. IBs. The nearest recorded incidents to the Site during these raids are described below.

1No. HE bomb fell on Style Street, approximately 20m south of the Site.

1No. IB fell on Sharp Street Sunday School, approximately 20m southeast of the Site.

1No. IB fell on the tobacco factory on Sharp Street, approximately 30m southeast of the Site.

1No. IB fell on 9 Crown Lane, approximately 30m west of the Site.

1No. IB fell on 18 Sharp Street, approximately 40m southeast of the Site.

1No. HE bomb and 1No. AA shell fell on Crown Street, approximately 40m south of the Site.

1No. HE bomb and 4No. IBs fell on Corporation Street, approximately 50m west of the Site.

2No. HE bombs and 1No. IB fell on Ludgate Street, approximately 0.1km south of the Site.

1No. IB fell on the Baptist chapel on Rochdale Road, approximately 0.1km southeast of the Site.

1No. IB fell on the Balloon Vaults public house, Rochdale Road, approximately 0.1km southeast of the Site.

1No. PM fell on Shudehill Mill, approximately 0.1km south of the Site. This caused blast damage over a wide area on Factory Road, Miller Street and Mayes Street.

1st-2nd June 1941

Approximately 110No. bomber aircraft attacked Manchester, dropping 42No. HE bombs and many IBs.

3No. IBs fell on Rochdale Road Gas Works, approximately 0.1km east of the Site.

It should be noted that during WWII, many UXB were mapped and subsequently removed as and when conditions and demands on Bomb Disposal teams allowed. Their removal was not always accurately recorded and sometimes records were later destroyed. In practice, most UXB were probably removed and only a much smaller number were actually registered as officially abandoned bombs.

Figure 6 is a map showing the approximate location of bomb impacts in the vicinity of the Site. IBs shown are indicative of larger numbers of these devices that fell within the given area. AA shells have been omitted for clarity. The map has been compiled from a number of different sources, including air raid incident reports, historical aerial photographs and bomb census maps.

Note that air raid incident reports did not always record precise locations, often only indicating on which street or area a bomb fell.

The map demonstrates the considerable number of IBs that fell in the immediate vicinity of the Site and the low proportion of HE bombs that fell.

Figure 6	Compiled bomb impact map for the vicinity of the Site



Source: © Crown Copyright 2017. Reproduced by permission of Ordnance Survey *Not to scale*

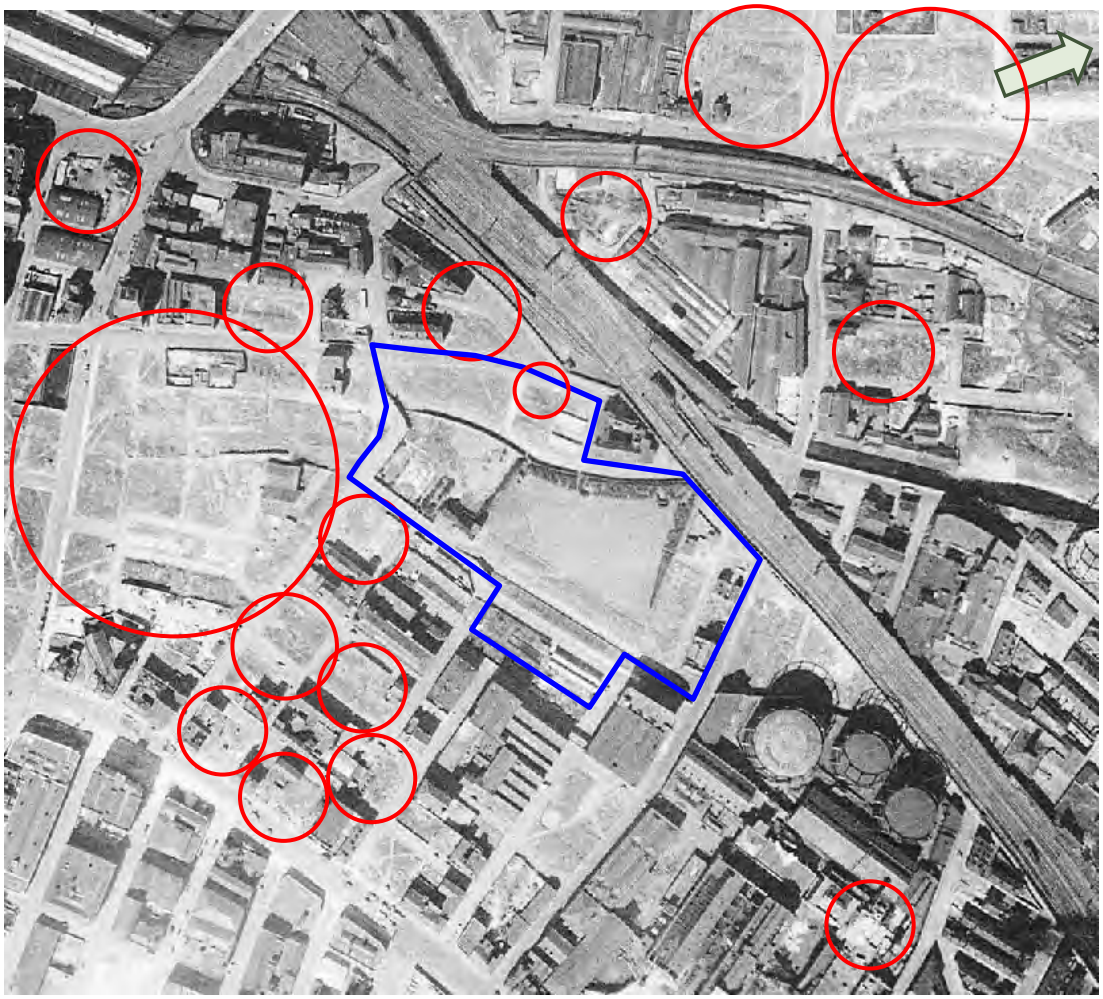
Legend	Site boundary	HE bomb	PM	IB

Plate 6 is an aerial photograph dated the 7th May 1946. No significant bomb damage has been identified on the Site.

Large areas of demolished buildings can be seen in close proximity to the Site. Some of these areas relate to WWII HE bomb and IB fire damage, although most are the result of pre-WWII slum clearance.

The most extensive area of bomb damage visible is on Miller Street, approximately 0.1km southwest of the Site, where a PM fell in December 1940.

Plate 6	Aerial photograph, 7th May 1946



Source: Historic England *Not to Scale*

Legend	Site boundary	Possible bomb damage

No records have been found indicating that HE bombs fell on the Site. 1No. IB is recorded falling on the northern boundary of the Site during October 1940. This did not cause any significant damage likely to mask the impact of a UXB. IBs themselves do not typically provide a significant UXO hazard (see Appendix 2.6).

Given this, and that the HE bombing density in the immediate vicinity of the Site was low, it is considered unlikely that a UXB would have fallen unnoticed on the Site.

WWII bombing is not considered to provide a source of UXO hazard to the Site.

4.4 Geology and Bomb Penetration Depths

It is important to consider the geological materials present at the time that a bomb was dropped in order to establish its maximum penetration depth. British Geological Survey (BGS) 1:50,000 Sheet 85 Manchester (Drift) and BGS borehole records were consulted.

The geology of the Site during WWII comprised Made Ground underlain by Glacial Till (Diamicton) overlying sandstone of the Chester Pebble Beds Formation.

Table 2 provides an estimate of average maximum bomb penetration depths assuming ground conditions during WWII of 1m of Made Ground, over 10m of stiff to very stiff clay overlying more than 20m of weak rock.

Table 2 Estimated average maximum bomb penetration depths

Estimated average bomb penetration depths for anticipated geology		
Bomb Weight	50kg	4.0m
	500kg	9.0m
	1,000kg	10.5m

The estimated bomb penetration depths given in Table 2 are from the WWII ground level and are based on the following assumptions:

a) High level release of the bomb resulting in an impact velocity of 260m/s (>5,000m altitude).

b) A strike angle of 10 to 15 degrees to the vertical.

c) That the bomb is stable, both in flight and on penetration.

d) That no retarding units are fitted to the bomb.

e) That the soil type is homogenous.

A high altitude release of a bomb will result in ground entry at between 10° and 15° to the vertical with the bomb travelling on this trajectory until momentum is nearly lost. The bomb will then turn abruptly to the horizontal before coming to rest. The distance between the centre of the entry hole and the centre of the bomb at rest is known as the 'offset'. A marked lateral movement from the original line of entry is common.

Low-level attacks may have an impact angle of 45° or more, which will frequently lead to a much greater amount of offset movement during soil penetration.

The average offset is one third of the penetration depth, i.e. an offset of 2m may be expected for a 50kg bomb in dry silts and clays. If hard standings or Made Ground were present during WWII, bomb penetration depths would have been significantly reduced but offset distances may have been up to four times greater.

5 WWII DEFENCES

5.1 Bombing Decoys

In order to draw enemy aircraft away from towns and other strategically important targets, a series of decoys were developed between 1940 and 1941.

They were estimated to have drawn at least 5% of the total weight of bombs away from their intended targets. Approximately 792No. static decoy sites were built at 593No. locations in England. In addition, numerous temporary and mobile decoys were deployed.

Several different types of decoy were devised:

- Night time dummy airfields (Q sites).
- Daytime dummy airfields (K sites).
- Diversionary fires to simulate successful bombing raids on airfields (QF sites), petroleum depots (P sites) and major towns and cities (Starfish or SF sites).
- Simulated urban lighting (QL sites).
- Dummy Heavy Anti-Aircraft (HAA) batteries, factories and buildings (C series).
- Mobile decoys representing 'hards' for troop embarkation (MQLs), tanks and other vehicles.

Machine gun emplacements and Light Anti-Aircraft (LAA) guns were used to prevent possible enemy landings at decoy airfields.

By their nature, decoy sites provide a potential risk from Unexploded Bombs (UXB), both within the decoy site boundary and in the surrounding areas.

The nearest bombing decoy (Civil Starfish Serial No. SF9h) was located at Reddish, approximately 8.5km southeast of the Site.

This is not considered to provide a source of UXO hazard to the Site.

5.2 Anti-Aircraft Defences

Anti-Aircraft (AA) gun batteries were targeted by the Luftwaffe. They were also a source of Unexploded AA (UXAA) Shells which could land up to 27km from the firing point during WWII, although more typically fell within 15km. These could be distributed over a wide area.

AA batteries present a potential source of UXO hazard as a result of the storage, use and disposal of ordnance associated with the armaments used. They may have a risk from small caches of ammunition buried locally to them. 3No. types of AA batteries existed:

- Heavy Anti-Aircraft (HAA) batteries of large guns designed to engage high flying bomber aircraft. These tended to be relatively permanent gun emplacements.
- Light Anti-Aircraft (LAA) weaponry, designed to counter low flying aircraft. These were often mobile and were moved periodically to new locations around strategic targets such as airfields.
- Rocket batteries (ZAA) firing 3" or 3.7" AA rockets with a maximum altitude of 5,800m and a ground range of 9km were also relatively permanent emplacements.

Many AA batteries were associated with searchlights and consequently 'visible' at night, providing clear targets to the Luftwaffe bombers and a potential for UXB.

During WWII the Site was within the range of guns deployed in the Manchester Gun Defended Area (GDA). Table 3 is a list of recorded HAA gun batteries and ZAA rocket batteries within 10km of the Site.

Table 3 WWII HAA gun and ZAA rocket batteries within 10km of the Site

Grid Reference	Serial No.	Location	Armament	Approximate Distance and Direction from Site
SD 848003	C	Manchester Central	Unknown	1.1km N
SD 851006	C/H16	Unknown	Unknown	1.5km NNE
SJ 821993	L/H13	Lower Broughton	Unknown	2.3km W
SJ 861950	ZH6	Birchfields Park	ZAA rockets	4.3km SSE
SJ 858948	R	Fallowfield	Unknown	4.5km SE
SD 880024	B/H20	Moston	4 x 3.7" guns	4.5km NE
SD 834037	A/H15	Heaton Park	4 x 4.5" guns	4.6km N
SD 801011	M/H8	Irlam	Unknown	4.7km NW
SD 890015	O/H22	Brookdale	Unknown	4.8km NE
SJ 862942	R/H18	Unknown	Unknown	5.1km SE
SD 899000	O/H22	Unknown	Unknown	5.4km SE
SD 817040	VH9	Besses o'th Barn	Unknown	5.6km NW
SJ 885948	E	Levenshulme	Unknown	5.8km SE
SJ 831934	F/H14	Hough End Fields	4 x 3.7" guns	5.8km SE
SJ 888948	E/H21	Levenshulme	4 x 4.5" guns	5.9km SE
SD 859055	N/H17	Middleton	Unknown	6.4km N
SJ 873933	-	Errwood Park	ZAA rockets	6.5km SE
SJ 806937	G/H10	Chortlton cum Hardy	Unknown	6.5km NW
SJ 778999	K/H7	Ellesmere	Unknown	6.6km W
SJ 778999	K/H7	Ellesmere	Unknown	6.6km W
SJ 913977	P/H23	Ashton under Lyne	Unknown	6.8km E
SD 915001	D/H24	Little Moss	Unknown	6.9km E
SJ 772958	H/H6	Lostock	Unknown	7.9km SW
SJ 922964	C/H25	Guide Bridge	4 x 4.5" guns	8.1km SE
SJ 879910	Z/H19	Stockport	Unknown	8.8km SE
SJ 753993	U/H4	-	Unknown	9.0km W
SJ 761950	T	Davyhulme	Unknown	9.2km SW
SJ 747979	J/H1	Barton	Unknown	9.6km W
SJ 808900	Y/H11	Baguley	Unknown	9.7km SW

It should be noted that the lack of official records of AA batteries or armaments cannot be taken to imply their absence because many units were mobile and were moved around as operational requirements dictated.

LAA guns were also deployed in the Manchester area to protect designated Vulnerable Points (VPs) such as important factories and railway junctions.

During WWII both large static and mobile searchlight units were used in the vicinity of the Site.

The nearest static searchlight battery was located in Miles Platting, approximately 1.4km east of the Site.

Given the number of gun batteries in the area, the possibility that a UXAA shell fell on the Site unnoticed, whilst unlikely, cannot be totally discounted.

5.3 Barrage Balloons and Anti-Landing Obstacles

Balloon barrages were flown in many British towns and cities to protect against air raids. Their presence deterred low flying aircraft, making it more difficult for bombs to reach their intended targets. Barrage balloon sites can be a source of UXO as they were targeted by the Luftwaffe. They also often had a small explosive charge fitted with tilt fuzes attached approximately 50m from each end of the balloon cables and designed to detonate if the cables were hit by an aircraft.

Measures were also taken to prevent enemy aircraft landing in the event of invasion. Obstructions were constructed around airfields and on other open sites deemed fit for use as landing grounds. Solid obstructions (such as concrete blocks), posts or stakes, felled trees, haystacks, scaffolding with wire and trenching were the main measures used.

No records of barrage balloons or anti-landing obstacles on or in close proximity to the Site have been found.

More than 28,000No. barrage balloons were manufactured in Manchester during WWII and mobile and static barrage balloons were deployed to defend the industrial and military targets in the city. The nearest recorded static balloon station was located at Newton Heath, approximately 4km east of the Site.

Barrage balloons and anti-landing obstacles are not considered to provide a source of UXO hazard to the Site.

5.4 Anti-Invasion Defences

Defence structures are a potential source of UXB as they were especially targeted by low flying enemy aircraft, particularly during 'tip and run' raids which were common in industrialised regions. These defences may also be associated with small caches of UXO in the form of small arms, used by the troops manning the emplacement.

The rapid advance of German Troops into France, Holland and Belgium after the start of WWII prompted the War Office to review the vulnerability of the UK to invasion and a decision was taken to begin work on a national plan of anti-invasion defences. Static defences were built to interrupt and delay the progress of any invading force.

Coastal defences were strengthened (the 'Coastal Crust'). These defences included barbed wire entanglements and minefields, which were often combined to give defence in depth.

Inland, lines of defence structures were constructed along 'Stop Lines' in order to impede enemy progress for long enough to allow mobile defending forces to counter-attack.

Stop Lines included the fortification of key 'centres of resistance', such as river crossings and important road or rail junctions that could seriously hamper the enemy's advance across country. Bridges were mined for demolition and tank traps installed.

Stop Lines were further integrated into a network of fortified nodal points and 'Anti-Tank (AT) Islands'.

No records of any anti-invasion defences on or in close proximity to the Site have been found.

5.5 Pillboxes, Mortar and Gun Emplacements

Defences also included spigot mortar positions and machine gun emplacements.

Spigot mortars, also known as Blacker Bombards, were used primarily in an anti-tank role at road blocks or to defend airfields. Typically they fired a 20 pound (lb) HE mortar bomb. The fixed positions, in weapons pits with ammunition lockers, were frequently positioned near pillboxes.

Spigot mortar positions could be either fixed or mobile.

No records of any spigot mortar or machine gun emplacements on or in close proximity to the Site have been found.

Pillboxes provide a potential UXO hazard both from the storage, use and disposal of ordnance associated with them and from UXB because they were targeted by enemy aircraft.

Pillboxes were common along Stop Lines, perimeters of airfields, potential land invasion sites and around important civil sites. Several different designs existed including Seagull Trenches (semi-buried structures), Alan Williams and Tett Turrets (small prefabricated pillboxes). Fortified sites, buildings or loop-holed walls also functioned as pillboxes.

No records of any pillboxes on or in close proximity to the Site have been found.

5.6 Home Guard and Auxiliary Units

Local Defence Volunteers (LDV) units, later known as the Home Guard, were located in all cities, towns and large villages.

Anti-invasion defences were to be defended by the Home Guard and regular Army troops for as long as possible in the event of an invasion. The troops were issued with 'No Withdrawal' orders.

Important elements of the ordnance supply for the use of the Home Guard included substantial supplies of Mills bombs (fragmentation grenades) and Self Igniting Phosphorus (SIP) grenades as well as machine gun and small arms ammunition.

Records of Home Guard activities and related sites are rarely preserved. Storage and disposal of munitions by the Home Guard was poorly documented and surplus supplies were either buried or dumped in lakes and ponds.

Given the irregular nature of this activity, the possibility of items of UXO being discovered at any locations occupied or used for training by the Home Guard can never be totally discounted.

In addition to the regular Home Guard, Auxiliary Units existed which were made up of guerrilla troops trained in sabotage and assassination in case of invasion. Sites used by these Units were Top Secret and many locations are still unknown.

No records of Home Guard activity on or in close proximity to the Site have been found.

The 49th Lancashire (Manchester) Battalion of the Home Guard was active in the area surrounding the Site.

Home Guard detachments defended VPs in the vicinity of the Site, including railway lines, chemical works and the Manchester Ship Canal.

Home Guard activity is not considered to provide a source of UXO hazard to the Site.

5.7 Minefields and Mined Locations

Minefields were laid along the coast, in estuaries and along the banks of major rivers to deter infantry invasion. Strategic points such as bridges and gaps in cliffs were mined to impede enemy advance.

Most of the mined locations in the UK have been cleared and the risk of finding UXO in these areas is considered to be low.

No minefields or mined locations are recorded on or in close proximity to the Site.

6 MILITARY AIRFIELDS

Military airfields offer the potential for significant UXO hazards due to the use, storage and disposal of ordnance and as a result of enemy bombing during WWI and WWII.

Airfields active during WWII were targeted by the Luftwaffe, providing a potential source of UXB on the airfield.

As bombing accuracy was so poor during WWII, it is likely to find UXB in the surrounding areas. Aircraft crashes are also associated with operational airfields.

No records have been found indicating that any military airfields were located in the immediate vicinity of the Site.

During 1916 Avro operated a factory airfield at Miles Plating, approximately 1.5km east of the Site.

Between 1918 and 1924 an aerodrome was operational at Alexandra Park, approximately 4.5km south of the Site. This aerodrome was used as a testing station for aircraft produced at the Avro works at Trafford Park, including Avians, Cadets, Tutors and Ansons.

There were no operational airfields in the vicinity of the Site during WWII. The closest military airfield was RAF Barton, approximately 9.9km west-southwest of the Site.

Military airfields are not considered to provide a source of UXO hazard to the Site.

6.1 Aircraft Crashes

Aircraft crash sites are a known UXO hazard. The MoD advises that if crashed aircraft are found, the safest policy is to leave them alone where possible. Unless disturbed there is no statutory requirement for the MoD to clear such sites.

No records of any aircraft crashes on or in close proximity to the Site have been found.

7 EXPLOSIVES AND MUNITIONS ESTABLISHMENTS AND DEPOTS

Explosives and munitions manufacturing or storage sites offer a particularly high risk from both explosive substances and UXO. Standard procedures of explosive/ordnance disposal through burial or burning means that explosive and UXO hazards will be present in some areas of such establishments.

In addition, UXB hazards may be present as a result of enemy bombing during WWI and WWII.

7.1 Explosives and Ordnance Factories

No records of any explosives or ordnance factories on or in close proximity to the Site have been found.

During WWI, the Manchester Corporation's tram depot, approximately 2.5km south-southeast of the Site, was converted into a National Shell Factory (NSF), which operated between 1916 and 1918. This was engaged in the production of machined shell bodies which went elsewhere for filling.

The M N Morris & Company's chemical works at Gorton Brook, approximately 3.3km southeast of the Site, was converted into His Majesty's Explosives Factory (HMEF) No. 29 West Gorton during WWI. It produced synthetic phenol and TNT between 1916 and 1918.

The Clayton Aniline Company (CAC) works, approximately 3.4km east-southeast of the Site, was established in the late 19th century to manufacture dyestuffs for the Manchester cotton and fabric trade. During WWI the factory manufactured explosives, including TNT. During WWII, the works manufactured explosives additives and boosting agents for high octane aviation fuel.

Explosives and ordnance factories are not considered to provide a source of UXO hazard to the Site.

7.2 Munitions Stores

Local ammunition caches would have been present near to defended road blocks, pillboxes, HAA and LAA sites. Most of those associated with the anti-invasion sites are understood to have been cleared.

No records of any official munitions stores on or in close proximity to the Site have been found.

7.3 Informal Munitions Depots

Informal munitions depots, often made by requisitioning roadside lay-bys or parks. Other informal munitions depots were commonly located in areas of woodland or on train wagons along sidings in marshalling yards.

No records of any informal munitions depots on or in close proximity to the Site have been found.

7.4 Munitions Disposal Areas and Bomb Cemeteries

Munitions disposal areas were often made by requisitioning open areas of land, usually away from habitation. Marshland, beaches or sand dunes were frequently used for this purpose. Disposal of munitions was carried out in many different ways, ranging from destruction to burial. Full records were not necessarily maintained for these locations, and so they can potentially be a source of UXO.

No records of any munitions disposal areas on or in close proximity to the Site have been found.

8 FIRING RANGES AND MILITARY TRAINING AREAS

By their nature, firing ranges and military training areas represent a potential source of UXO due to associated training activities. The training will involve both practice and live munitions and will offer a significant risk from a very wide range of potential UXO.

8.1 Small Arms Ranges

Small arms ranges (such as rifle ranges) and close combat ranges (such as mortar and grenade ranges) are likely to provide a significant source of UXO. It should be noted that even on small arms ranges, larger munitions such as mortars or grenades cannot be discounted.

No records of any small arms ranges on or in close proximity to the Site have been found.

8.2 Artillery Ranges

Artillery ranges will have utilised a wide range of munitions, predominantly shells, although close combat munitions such as mortars, or larger munitions such as bombs, cannot be discounted.

No records of any artillery ranges on or in close proximity to the Site have been found.

8.3 Bombing Ranges

Bombing ranges will have primarily used bombs, although other munitions such as shells and close combat munitions such as mortars cannot be totally discounted.

No records of any bombing ranges on or in close proximity to the Site have been found.

8.4 Training Areas

Training areas will have primarily used blank ammunition or practice shells in 'dry' areas, although live munitions such as shells and close combat munitions such as mortars cannot be discounted in any training area.

No records of any military training areas on or in close proximity to the Site have been found.

Heaton Park, approximately 5km north-northwest of the Site, was requisitioned by the military during both WWI and WWII.

During WWI, Heaton Park was used by the Manchester Pals as a training depot before the unit was deployed to the Western Front. A series of hutted camps were built to accommodate the troops, who trained on the parkland.

During WWII, Heaton Park was used as a training depot for the RAF. 133,000No. RAF cadets were billeted in and around the park in a series of hutted and tented camps. Because of its military presence, Heaton Park became an important strategic target and 20No. HE bombs are recorded as falling on the park during WWII.

After WWII, most of Heaton Park was returned to public use. Some parts were used for post-war prefabricated housing.

Military training areas are not considered to provide a source of UXO hazard to the Site.

9 EXPLOSIVE ORDNANCE CLEARANCE ACTIVITIES

Official UK bombing statistics have been compiled from both British and German sources. There were differences in the way the figures were originally reported and collated which has led to discrepancies in the summary data.

Based on data from 1939 to 1945, War Office statistics indicate that 200,195No. HE bombs exploded within Great Britain. Additionally, 25,195No. HE bombs (representing 11%) were recorded as UXBs. However, records from the Royal Engineers who were responsible for bomb disposal at the time indicate that as of 27th February 1946 upwards of 45,000No. UXBs were disposed of.

On average 8.5% UXBs later self-exploded. In some cases the bombs had delayed action fuzes or were never intended to explode, their purpose being to cause inconvenience and fear.

Given the discrepancy in records and the fact that UXBs are still being found unexpectedly, it is clear that the original figures are understated and provide only an approximation of the number of potential UXBs in the UK.

War Office statistics also show that between October 1940 and May 1941 most of the UXBs (93%) were either 50kg or 250kg. It should be noted that details of the recovery and the size of the UXB were not always accurately reported.

The larger WWII UXBs are often difficult to recover due to both penetration depths and the presence of two or more fuzes, combined with more sensitive fillings of explosive mixtures including Amatol and Trialen.

9.1 Abandoned Bombs

Information received from the Home Office confirms that there are no officially registered abandoned bombs on the Site.

9.2 EOC Tasks

Zetica Ltd holds records of the following post-WWII EOC tasks being undertaken in the vicinity of the Site.

3rd April 2007

1No. mortar shell was found on a building site in Cambridge Street, approximately 2km south-southwest of the Site. It was removed and found to have been empty.

16th August 2007

1No. UXAA shell was discovered in the garden of a house on Hill Lane, Blackley, approximately 4.4km north-northeast of the Site. The shell was transported to Heaton Park for a controlled detonation.

8th October 2008

1No. suspected UXB was found on a building site in Middlewood Street, Salford, approximately 2.1km southwest of the Site. It was removed and found to have been empty.

The MoD has provided no additional information on official EOC tasks on the Site.

10 UXO HAZARD ASSESSMENT

10.1 UXO Hazard Level

The definitions for the levels of UXO hazard are provided below.

Definitions of UXO Hazard Level for a Site	
Hazard Level	**Definition**
Very Low	There is positive evidence that UXO is not present, e.g. through physical constraints or removal.
Low	There is no positive evidence that UXO is present, but its occurrence cannot be totally discounted.
Moderate	There is positive evidence that ordnance was present and that other uncharted ordnance may be present as UXO.
High	There is positive evidence that UXO is present.
Very High	As high, but requires immediate or special attention due to the potential hazard.

No records have been found indicating that HE bombs fell on the Site.

1No. IB is recorded falling on the northern boundary of the Site during WWII. There is no evidence that this caused any extensive damage likely to mask the impact of a UXB.

No other significant military activity is recorded on the Site.

Given this, it is considered that the Site has a low UXO hazard level, as shown in Figure 7.

Figure 7 UXO hazard zone plan of the Site



Source: Bing Maps *Not to Scale*

Legend	Very Low	Low	Moderate
	High	Very High	Site boundary

11 UXO RISK ASSESSMENT

11.1 UXO Risk Level

A UXO risk assessment has been undertaken for the proposed works, taking into consideration the identified UXO hazard.

Firstly, the probability of encountering UXO (PE) has been considered and rated for the different construction techniques, as detailed below.

Probability of Encounter (PE)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Secondly, the probability of detonating a UXO (PD) has been considered and rated for the different construction techniques, as detailed below.

Probability of Detonation (PD)	Rating
Frequent, highly likely, almost certain.	5
Probable, more likely to happen than not.	4
Occasional, increased chance or probability.	3
Remote, unlikely to happen but could.	2
Improbable, highly unlikely.	1
Impossible	0

Next, the probability of encountering and detonating the UXO (PE x PD) have been used to generate an overall likelihood rating (P).

P = PE x PD	LIKELIHOOD of Encounter and Detonation	Rating
20 to 25	Frequent, highly likely, almost certain.	5
13 to 19	Probable, more likely to happen than not.	4
6 to 12	Occasional, increased chance or probability.	3
2 to 5	Remote, unlikely to happen but could.	2
1	Improbable, highly unlikely.	1
0	Impossible	0

P ranges from 25, a certainty of UXO being encountered and detonated on the Site by engineering activity, to 0, a certainty that UXO does not occur on the Site and will not be detonated by engineering activity.

The likelihood of encountering and detonating UXO during site works is multiplied by the severity of such an event occurring (P x S), in order to provide a risk level using the following matrix.

Severity (S)	Rating
Multiple fatalities	5
Major injury, long term health issues, single fatality.	4
Minor injury, short term health issues, no fatalities.	3
First aid case but no lost time or ill health.	2
Minor injuries, no first aid.	1
No injuries.	0

UXO Risk Matrix

		SEVERITY (S)					
		5	4	3	2	1	0
LIKELIHOOD (P)	5	25	20	15	10	5	0
	4	20	16	12	8	4	0
	3	15	12	9	6	3	0
	2	10	8	6	4	2	0
	1	5	4	3	2	1	0
	0	0	0	0	0	0	0

The final risk assessment for the Site is given in Table 4.

Table 4 UXO risk assessment for the Site

Potential UXO Hazard	Anticipated Works	PE	PD	P = PE x PD	Likelihood	Severity	Risk Rating	UXO Risk
UXB	Shallow Excavations	1	1	1	1	5	5	Low
	Deep Excavations	1	1	1	1	5	5	Low
	Piling/boreholes	1	1	1	1	4	4	Low
Other UXO	Shallow Excavations	1	1	1	1	4	4	Low
	Deep Excavations	1	1	1	1	4	4	Low
	Piling/boreholes	1	1	1	1	3	3	Low

PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)

Shallow excavations defined as <1.0m below ground level (bgl).

UXO Risk	Matrix Rating	Definition
Very Low	0-1	Little action is required by the client provided that suitable records and procedures are in place to ensure appropriate action is undertaken should the UXO risk level change.
Low	2-5	Tolerable to the client as engineering activity need not alter if UXO related procedures and controls are strictly adhered to.
Moderate	6-15	May be tolerable for the client, but it is prudent to reduce the risk where cost effective and reasonably practicable.
High	16-20	Tolerable to the client only where further risk reduction is impracticable or disproportionate to the risk involved. Essential that all practicable measures are taken to reduce the level of risk.
Very High	21-25	Unacceptable to the client except in extraordinary circumstances. Imperative that all control measures are taken.

11.2 Risk Mitigation Recommendations

To ensure that the UXO risk is reduced to As Low As Reasonably Practicable (ALARP) the following mitigation is advised:

Where a low risk of UXO encounter is anticipated, industry good practice is simply to raise the awareness of those involved in excavations so that in the unlikely event that a suspect item is discovered, appropriate action is taken. This can be achieved through UXO awareness briefings to site staff.

Clearance certification for borehole or pile locations is considered prudent only if a zero tolerance to risk is adopted. Zero tolerance is commonly adopted for sites that have safety critical infrastructure such as nuclear establishments and oil refineries.

Table 5 below gives recommended actions in relation to the potential UXO risk level and the anticipated Site activity.

Further advice on the mitigation methods can be provided by Zetica on request.

Table 5	Risk mitigation for assumed Site activities

Risk Level	Typical Future Activity on the Site			
	None	**Shallow Excavations (<1.0m)**	**Deep Excavations (>1.0m)**	**Boreholes or Pile Construction**
Very low	Ensure suitable records and procedures are in place to highlight the risk should future development be planned.	Ensure site staff, are informed as part of the site safety induction that the potential presence of UXO cannot be discounted. Appropriate action is required to be detailed within site procedures.	Ensure site staff, are informed as part of the site safety induction that the potential presence of UXO cannot be discounted. Appropriate action is required to be detailed within site procedures.	Ensure site staff, are informed as part of the site safety induction that the potential presence of UXO cannot be discounted. Appropriate action is required to be detailed within site procedures.
Low	**As very low.**	**As very low.** **+ It is considered prudent to include some UXO awareness training in site inductions.**	**As very low.** **+ It is considered prudent to include some UXO awareness training in site inductions.**	**As very low.** **+Clearance certification for borehole or pile locations would be considered prudent only if a zero tolerance to risk is adopted.** **Zero tolerance is commonly adopted for sites that have safety critical infrastructure such as nuclear establishments and oil refineries.**
Moderate	As very low.	As low. +Non-intrusive investigation methods considered prudent where practical. +Alternatively, EOC Engineer supervision is considered prudent.	As low. +Non-intrusive investigation methods considered prudent where practical. +Alternatively, EOC Engineer supervision is considered prudent.	As low. +Clearance certification for borehole or pile locations would be considered essential.
High	As very low.	As moderate. +Non-intrusive investigation methods considered essential where practical. + Alternatively, EOC Engineer supervision is considered essential.	As moderate. +Non-intrusive investigation methods considered essential where practical. + Alternatively, EOC Engineer supervision is considered essential.	As moderate.
Very High	Requires immediate or special attention.	Requires immediate or special attention.	Requires immediate or special attention.	Requires immediate or special attention.

The above table is for guidance only.

Appendices

Appendix 1 WWII Bombing Incident List

2nd October 1940

10No. HE bombs fell on the Collyhurst district, approximately 0.8km north-northeast of the Site.

7th October 1940

1No. IB fell on the corner of Dantzic Street and Little Nelson Street, near the Ragged School, on the northern boundary of the Site.

1No. IB fell on the rubber works off Dantzic Street, approximately 0.1km north of the Site.

1No. IB fell on Rochdale Road Gas Works yard, approximately 0.1km east of the Site.

24No. IBs fell on the Union Bridge Iron Works, approximately 0.1km north of the Site.

5No. IBs fell north of the River Irk, approximately 0.1km northwest of the Site.

2No. IBs fell on Dantzic Street, within approximately 0.2km northeast of the Site.

4No. IBs fell on the Red Bank Spring & Axle Works, within approximately 0.2km northwest of the Site.

6No. IBs fell south of the River Irk near Chase Street, approximately 0.2km north of the Site.

1No. IB fell on the gas holder off Dantzic Street, approximately 0.2km northeast of the Site.

15No. IBs fell on and near Red Bank, between approximately 0.2km and 0.4km north of the Site.

IBs fell on Victoria Station, approximately 0.3km west of the Site.

2No. IBs fell on Todd Street, approximately 0.4km southwest of the Site.

17th December 1940

7No. HE bombs fell along the tramline to the north of Portugal Street and Gunson Street, approximately 0.7km east of the Site.

22nd – 24th December 1940

Manchester and Salford were heavily bombed (the 'Manchester Blitz'). In total 171No. bomber aircraft attacked Manchester and dropped over 400No. HE bombs and more than 30,000No. IBs. The nearest recorded incidents to the Site during these raids are described below.

1No. HE bomb fell on Style Street, approximately 20m south of the Site.

1No. IB fell on Sharp Street Sunday School, approximately 20m southeast of the Site.

1No. IB fell on the tobacco factory on Sharp Street, approximately 30m southeast of the Site.

1No. IB fell on 9 Crown Lane, approximately 30m west of the Site.

1No. IB fell on 18 Sharp Street, approximately 40m southeast of the Site.

1No. HE bomb and 1No. AA shell fell on Crown Street, approximately 40m south of the Site.

1No. HE bomb and 4No. IBs fell on Corporation Street, approximately 50m west of the Site.

2No. HE bombs and 1No. IB fell on Ludgate Street, approximately 0.1km south of the Site.

1No. IB fell on the Baptist chapel on Rochdale Road, approximately 0.1km southeast of the Site.

1No. IB fell on the Balloon Vaults public house, Rochdale Road, approximately 0.1km southeast of the Site.

1No. PM fell on Shudehill Mill, approximately 0.1km south of the Site. This caused blast damage over a wide area on Factory Road, Miller Street and Mayes Street.

1No. IB fell on 63 Rochdale Road, within approximately 0.2km southeast of the Site.

1No. IB fell on the Victoria Inn, approximately 0.2km southeast of the Site.

5No. HE bombs fell between Mason Street and Chadderton Street, approximately 0.3km south of the Site.

1No. HE bomb fell on Victoria Station, approximately 0.3km west of the Site.

1No. HE bomb fell on Greengate Arches, Victoria Station, approximately 0.3km west of the Site.

1No. HE bomb and 2No. IBs fell between Long Millgate and Corporation Street, approximately 0.3km southwest of the Site.

1No. PM fell on Manchester Cathedral, approximately 0.4km southwest of the Site.

1No. HE bomb fell on Cheetham Hill Road, approximately 0.5km northwest of the Site.

1No. HE bomb fell on Reather Street, approximately 0.6km east of the Site.

1No. HE bomb fell on New Bridge Street, approximately 0.6km northwest of the Site.

1No. PM fell on Cateaton Street, approximately 0.7km southwest of the Site.

1No. PM fell at the junction between Great Ducie Street and Southall Street, approximately 0.7km northwest of the Site.

1No. HE bomb and 5No. IBs fell on The Royal Exchange, between Exchange Street and Cross Street, approximately 0.7km southwest of the Site.

1No. IB fell on 10 Norfolk Street, approximately 0.8km south-southwest of the Site.

1No. 1kg IB fell on the rear of the York Hotel, York Street, approximately 0.8km south-southwest of the Site.

Fires from several IBs destroyed a block of buildings between Mosley Street, George Street and Marble Street, approximately 0.8km south-southwest of the Site.

1No. IB fell on 12-14 Brown Street, at the junction with New Market Lane, approximately 0.8km south-southwest of the Site.

1No. IB fell on The Stock Exchange at 6 Norfolk Street, approximately 0.8km south-southwest of the Site.

1No. IB fell on 119 Market Street, approximately 0.8km south-southwest of the Site.

1No. IB fell on 6 New Market Lane, approximately 0.8km south-southwest of the Site.

1No. IB fell on New Market, approximately 0.8km south-southwest of the Site.

2No. HE bombs fell on Tortworth Street, approximately 0.8km west of the Site.

1No. HE bomb fell on Parker Street, approximately 0.9km south of the Site, destroying several of the surrounding buildings.

1No. HE bomb fell on Sherborne Street, approximately 0.9km northwest of the Site.

1No. IB fell on 28-30 Pall Mall, at the junction with Chapel Walk, approximately 0.9km south-southwest of the Site.

1No. 1kg IB fell on the rear of 15 York Street, approximately 0.9km south-southwest of the Site.

1No. OB fell on 38 Fountain Street, approximately 0.9km south-southwest of the Site.

1No. IB fell on 30 Brown Street, at the junction of Marsden Street, approximately 0.9km south-southwest of the Site.

7No. IBs fell on the General Post Office, Spring Gardens, within approximately 0.9km south-southwest of the Site.

6No. IBs fell on a printing works at 3 Cross Street, approximately 0.9km southwest of the Site.

2No. IBs fell on 22 Cross Street, approximately 0.9km southwest of the Site.

2No. IBs fell on 28 Cross Street, approximately 0.9km southwest of the Site.

1No. 1kg IB fell on York Street Chambers, 50 Fountain Street, approximately 1km south-southwest of the Site.

Fires from several IBs destroyed a block of buildings between Mosley Street, York Street and Back George Street, within approximately 1km south-southwest of the Site.

1No. HE bomb fell on the western corner of Piccadilly Gardens on Parker Street, approximately 1km south of the Site.

Over 100No. IBs fell on the Piccadilly district, within approximately 1km south of the Site, causing severe fires throughout the area.

1st-2nd June 1941

Approximately 110No. bomber aircraft attacked Manchester, dropping 42No. HE bombs and many IBs.

3No. IBs fell on Rochdale Road Gas Works, approximately 0.1km east of the Site.

IBs fell on a public house on Mason Street, approximately 0.2km south of the Site.

1No. HE bomb fell on open ground near Horrocks Sidings, approximately 0.3km north of the Site.

1No. HE bomb fell between Cowburn Street and Pimblett Street, approximately 0.4km northwest of the Site.

1No. HE bomb fell between Honey Street and Back Bank Street, approximately 0.4km north of the Site.

1No. HE bomb fell on commercial premises between Robert Street and Wood Street, approximately 0.5km northwest of the Site.

1No. HE bomb fell on open ground near Collyhurst Finishing Works, approximately 0.6km northeast of the Site.

1No. HE bomb fell on a warehouse on Great Ducie Street, approximately 0.7km northwest of the Site.

1No. HE bomb fell on the Assize Courts, Southall Street, approximately 0.7km northwest of the Site

4No. HE bombs fell on industrial works on Derby Street, approximately 0.7km northwest of the Site.

1No. HE bomb fell on the junction of Market Street and High Street, approximately 0.7km south of the Site.

2No. IBs fell on 17 Piccadilly and 1-3 Oldham Street, approximately 0.8km south of the Site.

1No. IB fell on 5 Piccadilly, approximately 1km south of the Site.

1No. IB fell on the rear of 7-9 Piccadilly, approximately 1km south of the Site.

1No. IB fell on the Mosley Hotel, 11 Piccadilly, approximately 1km south of the Site.

1No. IB fell on the Library in Piccadilly Gardens, approximately 1km south of the Site.

27th July 1942

The final bombing raid on Manchester took place. A single Junkers Ju88 bomber aircraft dropped a stick of HE bombs on Ancoats, within approximately 1km southeast of the Site.

Appendix 2 UXO Hazard and Ordnance Types

When assessing the risk from UXO including UXB, it is important to be aware of ordnance type and function. The following Section briefly describes the more common types of UXO. More data on these can be found at http://zeticauxo.com/downloads-and-resources/ordnance-data-sheets/.

A2.1 Small Arms Ammunition

Small Arms Ammunition (SAA) is one of the more recognisable categories of ordnance which is primarily designed for anti-personnel use. SAA include items such as bullets, generally up to a calibre (diameter) of 20mm.

Larger calibre small arms munitions can contain fuze mechanisms and high explosives or pyrotechnic fillings and may have been used for anti-aircraft or anti-vehicle purposes.

Generally small arms ordnance has a relatively low risk as UXO, although the larger calibre categories may have the same detonation risk as larger high explosive ordnance. SAA is often associated with discarded ammunition boxes around firing practice ranges. The Plate below illustrates some common SAA.

Plate	Photograph of typical WWII small arms ammunition



Source: Google Images

A2.2 Hand Grenades

Hand grenades can be filled with explosives or chemicals and have 3No. main parts, a body, a fuze with a pull ring and a safety-clip assembly. Fragmentation grenades are the most common and have a metal or plastic body filled with an explosive. Most use a burning delay fuze that functions for 3 to 5 seconds after the safety lever is released.

Some, such as smoke grenades, are activated instantly when the lever is released. The Plate below illustrates the typical character and condition of No. 36 hand grenades (Mills Bombs) that have been excavated from a site.

Plate	Photographs of a typical and an excavated WWII No. 36 hand grenades



Source: Google Images





Source: Zetica Ltd

A2.3 Projected Grenades

Projected grenades are among the most commonly found UXO items, particularly the 40mm type. These contain high explosives and use a variety of fuzes, including some of the most sensitive internal impact-fuzing systems. They are extremely dangerous and can explode if moved or handled.

A2.4 Mortars

A mortar is a short tube designed to fire a projectile at a steep angle. Mortars can range from approximately 50mm to 280mm in diameter and can be filled with explosives, toxic chemicals, white phosphorous or illumination flares. They generally have a thinner metal casing than projectiles, but use the same types of fuzing and stabilisation.

During WWII there are records that the target areas of RAF practice bombing ranges were occasionally used for mortar training.

The Plate below shows a typical 2-inch mortar bomb found (left) and a demonstration 3-inch mortar bomb (right).

Plate	Photographs of WWII 2-inch and 3-inch mortars



Source: Daily Mail



Source: Zetica Ltd

A2.5 Shells

Shells are a projectile containing an explosive charge designed to burst the casing that can contain High Explosives, pyrotechnic compounds or other chemicals.

Shells can be found in a range of sizes, from <20mm to several times this size. The most likely shells to be found on the Site are Small Arms Ammunition (SAA) or UXAA shells that have fallen back to the ground unexploded.

Most commonly used anti-aircraft shells were 2" and 3.7" HE shells.

If fired and found as UXO, shells can offer a particular hazard from accidental detonation as they can have sensitive fuze mechanisms. A fuze is a device which incorporates mechanical, electrical, chemical or hydrostatic components to initiate a train of fire or detonation.

The Plate below is a photograph of a 3.7" UXAA shell found in Camberwell, London.

Plate	Photograph of a recently excavated 3.7" AA shell



Source: Zetica Ltd

A2.6 Incendiary Bombs

Incendiary Bombs (IBs) ranged from small 1kg thermite filled, magnesium bodied bombs to a 250kg 'Oil Bomb' (OB) and a 500kg 'C300' IB. By far the most common air dropped devices across the UK during WWII were small 1kg to 2kg IBs.

In some cases the IBs were fitted with a very small High Explosive (HE) bursting charge. This exploded after the bomb had been alight for a few minutes causing burning debris to be scattered over a greater area. The C300 bombs were similar in appearance to 500kg HE bombs.

The small amount of HE, if any, and the almost negligible potential for IBs to remain active after more than 65 years in the ground means that these items have very little prospect of causing damage. In the majority of cases if IBs are found in the ground, the incendiary materials have deteriorated to such an extent that they are considered to provide a low UXO hazard level.

However, since magnesium and phosphorus were common components in IBs, some localised chemical contamination may occur where the contents have leached out of the IB into the surrounding soil.

The Plate below shows a typical variety of fragmentary remains of IBs and IBs recovered by the Civil Defence during WWII, along with a photograph of 4No. spent IBs found in Hertfordshire in January 2017 (lower right).

Plate	Photographs of an intact IB and typical fragmentary remains of IBs.



Source: ZeticaUXO

A2.7 German High Explosive Bombs

Probably the most common and certainly most publicised UXOs to be found in the UK are bombs. Air dropped bombs, as a result of WWII enemy action, are found on a relatively frequent basis as UXO. They tend to be highly publicised (at least on a local basis) due to the common disruption where an evacuation of the potentially affected area is put in place.

The amount of High Explosive and the potential for a fuze to still be activated means that these devices have the prospect of causing some of the most widespread damage. WWII bombs were particularly sophisticated for their time, with anti-tamper fuzes.

Many German bombs were designed to not explode on impact and instead to cause disruption as a UXB. Some fuzes were set with a delay time of over 70 hours. During this time, an anti-tamper fuze could also be activated to detonate should it be disturbed.

The most commonly used bombs during WWII were the 50kg and 250kg sized general purpose bombs. Less frequently, the 500kg bomb was also used. Larger bombs were used, but so infrequently that any assessment of hazard is more typically based on bombs ranging up to 500kg only.

It should be noted that the June 2008 find of a 1000kg bomb in London, does demonstrate that larger bombs can be found and any risk mitigation measures should consider this.

The Plates below show the variety of UXB recovered by the Civil Defence during WWII and examples of the 1,000kg UXB excavated in London and a 250kg HE bomb dredged up in Portsmouth Harbour during November 2016.

Plate	Photograph of a variety of UXB recovered by the Civil Defence during WWII



Source: Imperial War Museum

Plate	Photographs of recently excavated 1,000kg (LHS) and dredged 250kg UXB (RHS)



Source: East London Advertiser



Source: Sky News

A2.8 Detonators, Gaines and Fuzes

Bomb components such as detonators, gaines and fuzes were stored at operational airfields during WWII and typically contained some type of explosive charge to initiate the detonation of a munition.

A wide variety of these components were used and examples of some common fuzes are shown in the Plate below.

Plate	Photographs showing examples of WWII fuzes





Source: Zetica Ltd

A2.9 Land Mines

Wartime activities provide numerous sources of UXO within the land environment. Whilst efforts have been made to clear the known British minefields, it was common for mines to become lost for a variety of reasons and so not recovered. Additionally, such munitions might have been disposed of on an unofficial basis and so no records were kept.

Most of the mined beaches and other land areas in the UK have been cleared by the MoD. Occasionally, wave action or activities such as bombing caused mines to become displaced and these were missed as part of any past clearance activities.

The Plate below is a photograph of a typical WWII land mine used on the land area, beaches and cliffs around Britain. This example was found at Gatwick Airport formerly RAF Gatwick.

Plate	Photographs of original and recently excavated WWII land mines



Source: Google Images



Source: Zetica Ltd

A1.10 Canadian Pipe Mines

Often crudely made, pipe mines were pipes approximately 100mm in diameter and up to 55m long bored roughly horizontal beneath critical infrastructure such as airfield run ways, or angled between ten and thirty degrees into river banks in places were invasion forces may land. The pipes were filled with explosives and usually a sensitive fuzing mechanism. With nitro-glycerine or Polar Blasting Gelignite (PBG) being the primary component, over time, these devices can become increasingly unstable.

After WWII, most remaining Canadian pipe mine installations were removed. Due to the method and speed of placement of many of them during 1940-41, detailed plans and maps were sometimes not available and a small number were missed.

A2.11 Home Guard Weapons

Initially, the Home Guard's armoury was largely second-hand and much of it was of WWI vintage. Personal weapons (such as shotguns) and home-made devices were also employed.

By the end of WWII, some units were well equipped with a wide variety of small arms and munitions.

These included .32, .38 and .455 revolvers, .303 P14, .300 P17 and .303 Canadian Ross rifles, anti-tank rifles and a variety of Sub- Machine Guns (SMG) such as the .45 Thompson and 9mm Sten Guns.

Other heavier Machine Guns (MG) at their disposal included Browning, Hotchkiss, Lewis, Vickers and Marlin MG. Sub-artillery weapons were developed for them, including grenade throwers (the Northover Projector) and spigot mortars (the Blacker Bombard). 2-pdr anti-tank guns and Projector, Infantry Anti-Tank (PIAT) weapons were in circulation amongst some units, and the Home Guard also manned AA guns later in WWII.

Explosives were available to some Home Guard units and were used and stored by all Auxiliary Unit patrols. As well as the flame fougasse and hand grenades detailed in this Appendix, the Home Guard had stocks of Molotov Cocktails, Sticky Bombs and SIP grenades.

In October 2006 a cache of 76No. SIP grenades was found in a garden at Seend, Wiltshire. In October 2008, a further 26No. SIP grenades were discovered in a garden in Wimborne, Dorset.

Similar caches were discovered in October 2009 in Hove, Sussex and during May 2010 in Halesowen in the West Midlands, and a further cache of 20No. was uncovered on a construction site at Birdlip, Gloucestershire, in July 2010. Also in July 2010, a box of 24No. SIP grenades was found on Cogden Beach, Dorset. In April 2012, more than 8No. SIP grenades were found on a construction site in Banbury and destroyed by members of the Army Royal Logistic Corps (RLC).

In March 2015, 80No. SIP grenades were found at a building site in Eastbourne, some of which exploded before they could be made safe by a Bomb Disposal Unit (BDU).

In May 2016, 1No. No. 76 SIP grenade was found during excavation at Chapel Point, Lincolnshire forcing works to be delayed. During WWII, the site was occupied by a pillbox and gun emplacement associated with the heavily-defended 'Coastal Crust', manned by Home Guard units. The device was removed safely.

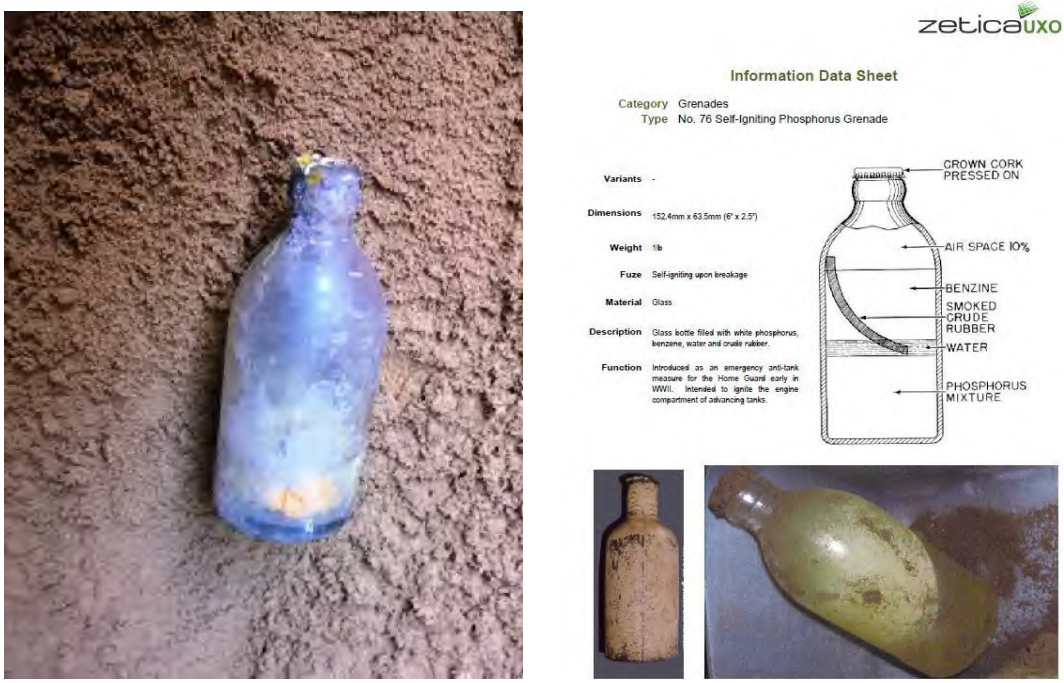
Also in May 2016, 49No. SIP grenades were found at a building site in Washington, Sunderland and were made safe by an RAF BDU.

In January 2017, a cache of 24No. SIP grenades was discovered at Derriford, Plymouth and made safe by a Royal Navy Bomb Disposal Unit.

In all these cases, the bottles were in good condition and most exploded in flames when broken.

The Plate below is a photograph of a No. 76 SIP grenade (LHS) with an explanatory leaflet produced by ZeticaUXO for site staff (RHS).

Plate	Photograph of the No. 76 SIP grenade



Source: Zetica Ltd

Given the irregular nature of Home Guard activity, the possibility of items of UXO or weapons being discovered at any locations occupied or used for training by them can never be totally discounted.

A2.12 UXO Migration

It is possible for explosive material, UXO or ordnance scrap to migrate to a site during landfill or dredging operations or other ground works which import Made Ground or natural materials already containing UXO. It is important to understand the nature and age of such landfill or dredging operations when assessing the potential UXO hazard level on the site.

A2.13 Effects and Consequences

There have been a limited number of recorded incidents in the UK since WWII where bombs have detonated during engineering works, though a significant number of bombs have been discovered. Incidents involving smaller ordnance are, however, relatively common in the UK.

In the UK, there are no recorded incidents since the decade after WWII, of a UXB accidentally detonating. In recent years, bombs have been found that have fuze mechanisms that have started to operate indicating that given the right conditions a UXB may still function.

In June 2008 the UXB uncovered in the Lea Valley caused difficulty to No. 33 Regiment (Explosive Ordnance Disposal) Royal Engineers because the fuze mechanism started to operate.

The 1,000kg 'Hermann' bomb, the first of this size to be found in over 30 years, took 5 days to deactivate. This demonstrates that larger bombs can be found and any risk mitigation measures should provide the option to deal with this size of device. Since WWII, UXBs have been found on a regular basis in London.

Since WWII, UXBs have been found on a regular basis throughout Britain. Some of the most recent cases are described below.

In May 2009 1No. 50kg WWII bomb was found on a building site in Bexhill-on-Sea, Sussex, and on the 16th August 2009, 1No. 250kg WWII bomb was found near Ebberston, North Yorkshire. Both of these were destroyed in controlled explosions by Bomb Disposal Units.

On the 8th March 2010 1No. 500kg WWII bomb was found at Bowers Marsh in Essex by Zetica EOC operatives following a Zetica desk study concluding a high risk of UXB on the site. The bomb was demolished in situ by members of the Army Royal Logistics Corps (RLC).

The Plate below is a photograph of the bomb in situ.

Plate	Photograph of the 500kg WWII UXB at Bowers Marsh, 8th March 2010



Source: Zetica Ltd

On the 23rd February 2011, 1No. WWII UXB was found on a building site in Notte Street in Plymouth City centre. The bomb was removed by EOD personnel and demolished at sea.

On the 22nd July 2012, a landslip in the cliffs at Mappleton in the East Riding of Yorkshire exposed over 1,000No. UXO items, including practice bombs, mortars, rockets, shells and grenades. The cliff was part of a former bombing and artillery range, used during WWII and until the 1970s.

UXO items were removed by Explosive Ordnance Disposal (EOD) officers from Catterick and MoD staff from Leconfield. 15No. controlled explosions were undertaken by the Royal Engineers (RE) to detonate the more volatile items in situ, while other less hazardous UXO devices were left in place to be dealt with at a later date.

1No. WWI bomb (shown in the Plate below) was found on the Isle of Sheppey on the 2nd August 2012 during a geophysical survey following desk study research by Zetica Ltd which had established that a previously unknown WWI bombing range existed on the site. A further WWI bomb was found in the same location in August 2015.

Plate	Photograph of WWI bomb, Isle of Sheppey, 2nd August 2012



Source: Zetica Ltd

On the 23rd March 2015, 1No. WWII 500kg UXB was found on a building site in The Grange, Bermondsey. The bomb was made safe by EOD personnel and removed for demolition.

On the 21st May 2015, 1No. 50kg UXB was found on a building site near Wembley Stadium, London Borough of Brent. The bomb was made safe by EOD personnel and removed for demolition.

On the 10th August 2015, 1No. 250kg UXB was found under the basement of a building site at Bethnal Green, London Borough of Tower Hamlets. It was made safe and removed by an EOD team from the RLC.

On the 21st September 2015, 1No. UXB was uncovered on a construction site in Cheylesmore, Coventry, by the operator of a mechanical digger. It was destroyed in situ by an EOD team from the RLC.

In January 2016, Zetica discovered 3No. 500lb British UXB at a former airfield in Cambridgeshire. These were destroyed in controlled explosions. The Plate below is a photograph of one of the bombs.

Plate	Photograph of a recently excavated WWII British 500lb GP bomb



Source: Zetica Ltd

On the 23rd March 2015, 1No. WWII 500kg UXB was found on a building site in The Grange, Bermondsey. The bomb was made safe by EOD personnel and removed for demolition.

On the 21st May 2015, 1No. 50kg UXB was found on a building site near Wembley Stadium, London Borough of Brent. The bomb was made safe by EOD personnel and removed for demolition.

On the 10th August 2015, 1No. 250kg UXB was found under the basement of a building site at Bethnal Green, London Borough of Tower Hamlets. It was made safe and removed by an EOD team from the RLC.

On the 21st September 2015, 1No. UXB was uncovered on a construction site in Cheylesmore, Coventry, by the operator of a mechanical digger. It was destroyed in situ by an EOD team from the RLC.

On the 20th April 2016 a WWII device found on a building site in Parnell Road, Tower Hamlets. The device was demolished in Victoria Park.

On the 12th May 2016, 1No. 250kg UXB was found on a building site in Bath. It was made safe and then taken to a local quarry for demolition.

In September 2016 1No. 500kg UXB and 1No. torpedo were discovered during dredging works in Portsmouth Harbour. An additional 250kg HE bomb was discovered in the Harbour on the 16th November 2016. These devices were towed out to sea and destroyed in controlled explosions.

There is a long list of incidents during construction work in Germany that in some cases have led to the deaths of workers.

In June 2010, 3No. members of a bomb disposal team were killed, and 6No. others injured, whilst attempting to defuze an unexploded WWII bomb in Goettingen, Central Germany.

The bomb, the second found in Goettingen in the space of a few days, was unearthed at a depth of 7.5m during excavations for a sports stadium.

In September 2008, 17No. people were injured and considerable damage occurred to adjacent buildings when a bomb exploded on a construction site in Hattingen, Germany.

In October 2006 during road works on a motorway near Aschaffenburg in Bavaria, southern Germany, a bomb was struck by a machine and detonated. The plant driver was killed and 5No. others injured, including passing motorists.

In a similar incident in October 2004 in Linz, Austria a bomb exploded injuring 3No. workers and causing considerable damage to plant. In the same month, a WWII bomb under a back garden in Vienna, Austria, was detonated without warning by a minor earth tremor, after remaining undiscovered for over 60 years.

Incidents involving UXO are also reported from the marine areas around the North Sea. For example, on 6th April 2005, 3No. Dutch fishermen were killed when they accidentally trawled up a WWII UX bomb which exploded when it hit the deck.

Further details of similar finds can be found at http://zeticauxo.com/news/.

The effects of a partial or full detonation of ordnance are usually shock, blast, heat and shrapnel damage. A 50kg buried bomb can damage brick / concrete structures up to a distance of approximately 16m away. Unprotected personnel on the surface up to 70m away from the blast could also be seriously injured. Larger ordnance would obviously be more destructive.

Explosives rarely lose effectiveness with age, although over time mechanisms such as fuzes and gaines can become more sensitive and therefore more prone to detonation, regardless of whether the device has been submersed in water or embedded in silt, clay or similar materials.

The effects of a detonation of explosive ordnance are usually extremely fast, often catastrophic and invariably traumatic to any personnel involved.

Appendix 3 Abbreviations	
AA	Anti-Aircraft
ACPO	Association of Chief Police Officers
ALARP	As Low As Reasonably Practicable
ARP	Air Raid Precaution
ASACS	Air Surveillance and Control System
AXO	Abandoned Explosive Ordnance
BD	Bomb Disposal
BDO	Bomb Disposal Officer
BDU	Bomb Disposal Unit
CBRN	Chemical, Biological, Radiological and Nuclear
CMD	Conventional Munitions Disposal
DCLG	Department of Communities and Local Government
EO	Explosive Ordnance
EOC	Explosive Ordnance Clearance
EOR	Explosive Ordnance Reconnaissance
ERW	Explosive Remnants of War
ESA	Explosive Substances and Articles
FFE	Free From Explosives
HAA	Heavy Anti-Aircraft
HE	High Explosive
HSE	Health and Safety Executive
JSEODOC	Joint Services EOD Operations Centre
IB	Incendiary Bomb
IED	Improvised Explosive Device

IEDD	Improvised Explosive Device Disposal
LAA	Light Anti-Aircraft
MoD	Ministry of Defence
PUCA	Pick Up and Carry Away
RAF	Royal Air Force
SIP	Self-Igniting Phosphorous
TEP	Time Expired Pyrotechnics
USAAF	United States Army Air Forces
UXB	Unexploded Bomb
UXO	Unexploded Ordnance

Appendix 4 Glossary & Definitions	
Abandoned Explosive Ordnance (AXO)	Abandoned Explosive Ordnance is explosive ordnance that has not been used during an armed conflict, that has been left behind or disposed of by a party to an armed conflict, and which is no longer under control of that party. Abandoned explosive ordnance may or may not have been primed, fuzed, armed or otherwise prepared for use.
Camouflet	The type of cavity produced when a charge explodes underground without breaking the surface of the earth to form a crater.
Demil	Derived from the term 'Demilitarisation', it refers to the break down and the recycling or disposal of ordnance components.
Detonation	The high-speed chemical breakdown of an energetic material producing heat, pressure, flame and a shock wave.
Device	This term is used for any component, sub-assembly or completed ordnance, which may or may not have an explosive risk. It can apply to detonators, primers, gaines, fuzes, shells or bombs.
Explosive	The term explosive refers to compounds forming energetic materials that under certain conditions chemically react, rapidly producing gas, heat and pressure. Obviously, these are extremely dangerous and should only be handled by qualified professionals.
Explosive Ordnance (EO)	Explosive Ordnance is all munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads, guided and ballistic missiles, artillery, mortar, rocket, small arms ammunition, mines, torpedoes, depth charges, pyrotechnics, cluster bombs & dispensers, cartridge & propellant actuated devices, electro-explosive devices, clandestine & improvised explosive devices, and all similar or related items or components explosive in nature.
Explosive Ordnance Clearance (EOC)	Explosive Ordnance Clearance is a term used to describe the operation of ordnance detection, investigation, identification and removal, with EOD being a separate operation.
Explosive Ordnance Disposal (EOD)	Explosive Ordnance Disposal is the detection, identification, on-site evaluation, rendering safe, recovery and final disposal of unexploded explosive ordnance.
Explosive Ordnance Reconnaissance (EOR)	Explosive Ordnance Reconnaissance is the detection, identification and on-site evaluation of unexploded explosive ordnance before Explosive Ordnance Disposal.

Explosive Remnants of War (ERW)	Explosive Remnants of War are Unexploded Ordnance (UXO) and Abandoned Explosive Ordnance (AXO), excluding landmines.
Explosive Substances and Articles (ESA)	Explosive substance are solid or liquid substance (or a mixture of substances), which is either: • capable by chemical reaction in itself of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. • designed to produce an effect by heat, light, sound, gas or smoke, or a combination of these as a result of a non-detonative, self-sustaining, exothermic reaction. Explosive article is an article containing one or more explosive substances.
Fuze	A fuze is the part of an explosive device that initiates the main explosive charge to function. In common usage, the word fuze is used indiscriminately, but when being specific (and in particular in a military context), fuze is used to mean a more complicated device, such as a device within military ordnance.
Gaine	Small explosive charge that is sometimes placed between the detonator and the main charge to ensure ignition.
High Explosive	Secondary explosives (commonly known as High Explosives (HE)) make up the main charge or filling of an ordnance device. They are usually less sensitive than primary explosives. Examples of secondary explosives are: Nitro glycerine (NG), Trinitrotoluene (TNT), AMATOL (Ammonia nitrate + TNT), Gunpowder (GP), and Cyclotrimethylenetrinitramine (RDX).
Munition	Munition is the complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in military operations, including demolitions. This includes those munitions that have been suitably modified for use in training, ceremonial or non-operational purposes. These fall into three distinct categories:- • inert - contain no explosives whatsoever. • live - contain explosives and have not been fired. • blind - have fired but failed to function as intended.
Primary Explosive	Primary explosives are usually extremely sensitive to friction, heat, and pressure. These are used to initiate less sensitive explosives. Examples of primary explosives are: Lead Azide, Lead Styphnate, and Mercury Fulminate. Primary explosive are commonly found in detonators.
Propellants	Propellants provide ordnance with the ability to travel in a controlled manner and deliver the ordnance to a predetermined target. Propellants burn rapidly producing gas, pressure and flame. Although usually in solid form they can be produced in liquid form. Examples of propellants are: Ballistite often found in a flake form and Cordite used in small arms ammunition.

Pyrotechnic	A pyrotechnic is an explosive article or substance designed to produce an effect by heat, light, sound, gas or smoke, or a combination of any of these, as a result of non-detonative, self-sustaining, exothermic chemical reactions.
Unexploded Ordnance (UXO)	UXO is explosive ordnance that has been either primed, fuzed, armed or prepared for use and has been subsequently fired, dropped, launched, projected or placed in such a manner as to present a hazard to operations, persons or objects and remains unexploded either by malfunction or design.

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Appendix F

STANDARD LIMITATIONS

Revised: 24/05/2016

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

GENERAL

1. WSP UK Limited 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 and outlined in the body of the report.

2. Unless explicitly agreed otherwise, in writing, this report has been prepared under WSP UK Limited standard Terms and Conditions as included within our proposal to the Client.

3. Project specific appointment documents may be agreed at our discretion and a charge may be levied for both the time to review and finalise appointments documents and also for associated changes to the appointment terms. WSP UK Limited reserves the right to amend the fee should any changes to the appointment terms create an increase risk to WSP UK Limited.

4. The report needs to be considered in the light of the WSP UK Limited proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

PHASE 1 GEO ENVIRONMENTAL AND PRELIMINARY RISK ASSESSMENTS

Coverage: *This section covers reports with the following titles or combination of titles: phase 1; desk top study; geo environmental assessment; development appraisal; preliminary environmental risk assessment; constraints report; due diligence report; geotechnical development review; environmental statement; environmental chapter; project scope summary report (PSSR), program environmental impact report (PEIR), geotechnical development risk register; and, baseline environmental assessment.*

5. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. WSP UK Limited cannot be held responsible for any disclosures that are provided post production of our report and will not automatically update our report.

6. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

7. It should be noted that any risks identified in this report are perceived risks based on the information reviewed. Actual risks can only be assessed following intrusive investigations of the site.

8. WSP UK Limited does not warrant work / data undertaken / provided by others.

REPORT LIMITATIONS - GROUND RISK AND REMEDIATION

INTRUSIVE INVESTIGATION REPORTS

Coverage: *The following report titles (or combination) may cover this category of work: geo environmental site investigation; geotechnical assessment; GIR (Ground Investigation reports); preliminary environmental and geotechnical risk assessment; and, geotechnical risk register.*

9. The investigation has been undertaken to provide information concerning either:

- **i.** The type and degree of contamination present at the site in order to allow a generic quantitative risk assessment to be undertaken; or
- **ii.** Information on the soil properties present at the site to allow for geotechnical development constraints to be considered.

10. The scope of the investigation was selected on the basis of the specific development and land use scenario proposed by the Client and may be inappropriate to another form of development or scheme. If the development layout was not known at the time of the investigation the report findings may need revisiting once the development layout is confirmed.

11. For contamination purposes, the objectives of the investigation are limited to establishing the risks associated with potential contamination sources with the potential to cause harm to human health, building materials, the environment (including adjacent land), or controlled waters.

12. For geotechnical investigations the purpose is to broadly consider potential development constraints associated with the physical property of the soils underlying the site within the context of the proposed future or continued use of the site, as stated within the report.

13. The amount of exploratory work, soil property testing and chemical testing undertaken has necessarily been restricted by various factors which may include accessibility, the presence of services; existing buildings; current site usage or short timescales. The exploratory holes completed assess only a small percentage of the area in relation to the overall size of the Site, and as such can only provide a general indication of conditions.

14. The number of sampling points and the methods of sampling and testing do not preclude the possible existence of contamination where concentrations may be significantly higher than those actually encountered or ground conditions that vary from those identified. In addition, there may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

15. The inspection, testing and monitoring records relate specifically to the investigation points and the timeframe that the works were undertaken. They will also be limited by the techniques employed. As part of this assessment, WSP UK Limited has used reasonable skill and care to extrapolate conditions between these points based upon assumptions to develop our interpretation and conclusions. The assumption made in forming our conclusions is that the ground and groundwater conditions (both chemically and physically) are the same as have been encountered during the works undertaken at the specific points of investigation. Conditions can change between investigation points and these interpretations should be considered indicative.

16. The risk assessment and opinions provided are based on currently available guidance relating to acceptable contamination concentrations; no liability can be accepted for the retrospective

effects of any future changes or amendments to these values. Specific assumptions associated with the WSP UK Limited risk assessment process have been outlined within the body or associated appendix of the report.

17. Additional investigations may be required in order to satisfy relevant planning conditions or to resolve any engineering and environmental issues.

18. Where soil contamination concentrations recorded as part of this investigation are used for commentary on potential waste classification of soils for disposal purposes, these should be classed as indicative only. Due consideration should be given to the variability of contaminant concentrations taken from targeted samples versus bulk excavated soils and the potential variability of contaminant concentrations between sampling locations. Where major waste disposal operations are considered, targeted waste classification investigations should be designed.

19. The results of the asbestos testing are factually reported and interpretation given as to how this relates to the previous use of the site, the types of ground encountered and site conceptualisation. This does not however constitute a formal asbestos assessment. These results should be treated cautiously and should not be relied upon to provide detailed and representative information on the delineation, type and extent of bulk ACMs and / or trace loose asbestos fibres within the soil matrix at the site.

20. If costs have been included in relation to additional site works, and / or site remediation works these must be considered as indicative only and must be confirmed by a qualified quantity surveyor.

EUROCODE 7: GEOTECHNICAL DESIGN

21. On 1st April 2010, BS EN 1997-1:2004 (Eurocode 7: Geotechnical Design – Part 1) became the mandatory baseline standard for geotechnical ground investigations.

22. In terms of geotechnical design for foundations, slopes, retaining walls and earthworks, EC7 sets guidance on design procedures including specific guidance on the numbers and spacings of boreholes for geotechnical design, there are limits to methods of ground investigation and the quality of data obtained and there are also prescriptive methods of assessing soil strengths and methods of design. Unless otherwise explicitly stated, the work has not been undertaken in accordance with EC7. A standard geotechnical interpretative report will not meet the requirements of the Geotechnical Design Report (GDR) under Eurocode 7. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. The report is likely to represent a Ground Investigation Report (GIR) under the Eurocode 7 guidance.

DETAILED QUANTITATIVE RISK ASSESSMENTS AND REMEDIAL STRATEGY REPORTS

23. These reports build upon previous report versions and associated notes. The scope of the investigation, further testing and monitoring and associated risk assessments were selected on the basis of the specific development and land use scenario proposed by the Client and may not be appropriate to another form of development or scheme layout. The risk assessment and opinions provided are based on currently available approaches in the generation of Site Specific Assessment Criteria relating to contamination concentrations and are not considered to represent a risk in a specific land use scenario to a specific receptor. No liability can be

accepted for the retrospective effects of any future changes or amendments to these values, associated models or associated guidance.

24. The outputs of the Detailed Quantitative Risk Assessments are based upon WSP UK Limited manipulation of standard risk assessment models. These are our interpretation of the risk assessment criteria.

25. Prior to adoption on site they will need discussing and agreeing with the Regulatory Authorities prior to adoption on site. The regulatory discussion and engagement process may result in an alternative interpretation being determined and agreed. The process and timescales associated with the Regulatory Authority engagement are not within the control of WSP UK Limited. All costs and programmes presented as a result of this process should be validated by a quantity surveyor and should be presumed to be indicative.

GEOTECHNICAL DESIGN REPORT (GDR)

26. The GDR can only be prepared following confirmation of all structural loads and serviceability requirements. All the relevant information needs to be provided to allow for a GDR to be produced.

MONITORING (INCLUDING REMEDIATION MONITORING REPORTS)

27. These reports are factual in nature and comprise monitoring, normally groundwater and ground gas and data provided by contractors as part of an earthworks or remedial works.

28. The data is presented and will be compared with assessment criteria.