



Apex Tower, Manchester

Phase 1 Desk Study Assessment Report

Project No: 2104-14
APT-REN-00-XX-RP-C-00010
January 2022
Rev: 01

This report has been prepared for the sole benefit, use and information of Arrowsmith Investment Ltd for the purposes set out in the report or instructions commissioning it. The liability of **renaissance** in respect of the information contained in the report will not extend to any third party. This document should not be used in whole or part by any third parties without the express written permission of **renaissance**. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and **renaissance** do not owe them any Duty of Care.

author **Joe Bullough**

date **28.01.2022**

approved **Andrew Isherwood**

date **28.01.2022**

Contact Details:-

Andrew Isherwood | Associate
BEng, CEng, MStructE

**Carvers Warehouse, 77 Dale Street
Manchester, M1 2HG**

e: andrewisherwood@renaissance-ltd.com

Revision	Description	Issued by	Date	Checked
Rev 00	Issued for comment	A Isherwood	11.10.2021	H Gribbon
Rev 01	Issued for Planning	J Bullough	28.01.2022	A Isherwood

CONTENTS

1.0	INTRODUCTION	1
1.1	CONTEXT	1
1.2	PROPOSED DEVELOPMENT	1
1.4	LIMITATIONS.....	1
2.0	THE SITE	3
2.1	LOCATION	3
2.2	SITE DESCRIPTION.....	3
3.0	GEO-ENVIRONMENTAL SETTING	4
3.1	HISTORICAL SETTING	4
3.2	PUBLISHED GEOLOGY	6
3.3	BGS BOREHOLES.....	7
3.4	NATURAL GEOLOGICAL HAZARDS.....	7
3.5	NATURAL SOIL CHEMISTRY	8
3.6	MINING AND MINERAL EXTRACTION	8
3.7	HYDROGEOLOGY	9
3.8	HYDROLOGY	9
3.9	GEO-ENVIRONMENTAL SEARCHES.....	10
3.10	RADON.....	11
3.11	UXO RISK.....	11
4.0	DESK STUDY SUMMARY AND RISK ASSESSMENT	12
4.1	INTRODUCTION	12
4.2	POTENTIAL CONTAMINATIVE SOURCES.....	12
4.3	PATHWAYS.....	13
4.4	RECEPTORS	14
4.5	PRELIMINARY CONCEPTUAL SITE MODEL.....	14
5.0	PRELIMINARY GEOTECHNICAL ASSESSMENT.....	20
5.1	HAZARD IDENTIFICATION.....	20
5.2	FOUNDATIONS DESIGN	20
5.3	SUSTAINABLE DRAINAGE SYSTEMS (SUDs).....	20
6.0	OTHER DEVELOPMENT CONSTRAINTS	21
6.1	CONSTRAINTS IDENTIFICATION	21
7.0	CONCLUSIONS AND RECOMMENDATIONS.....	22
7.1	GEO-ENVIRONMENTAL	22
7.2	GEOTECHNICAL	22
7.3	FURTHER WORK.....	22
8.0	REFERENCES.....	24

DRAWINGS

Drawing Number	Rev	Title
8158-L(00)69	G	Site A Ground Floor Plan
8158-L(00)72	E	Site B Ground Floor Plan.
C4889/01	-	Site Location Plan
C4889/02	-	Site Features Plan

APPENDICES

APPENDIX A	Methodology and Guidance
APPENDIX B	Historical Maps
APPENDIX C	Geo-Environmental Data Report
APPENDIX D	BGS Boreholes
APPENDIX E	Mining Search Report
APPENDIX F	UXO Screening Map

1.0 INTRODUCTION

1.1 Context

1.1.1 This report describes a desk-based Phase I Geo-Environmental Assessment Report carried out by renaissance, in conjunction with Brownfield Solutions Limited on a site off Albion Street, Manchester.

1.1.2 This report has been completed in general accordance with the following guidance:

- Environment Agency guidance - Land Contamination: Risk Management (LCRM).
- BS 10175:2011+A2:2017 Investigation of Potentially Contaminated Sites.
- BS5930: 2015+A1:2020 Code of Practice for Ground Investigations.
- BS EN 1997-1:2004+A1:2013 Eurocode 7. Geotechnical design. General rules plus UK National Annex.
- BS EN 1997-2:2007 Eurocode 7 Geotechnical design. Ground investigation and testing plus UK National Annex.

1.2 Proposed Development

1.2.1 The proposed development is for combined residential and commercial units, split over two sub-sites separated by the Britons Protection public house, which is to be retained. The development of Site A in the west will involve the construction of a 27 storey residential apartment building with ground floor amenities, substation, visitor parking and cycle stores, as shown on the Site A Ground Floor Plan, drawing ref. 8158-L(00)69 . The development of Site B in the east will involve the construction of a 7 storey office building, as shown on the Site B Ground Floor Plan, drawing ref. 8158-L(00)72.

1.3 Objectives and Scope

1.3.1 The objectives of this assessment were to determine the environmental setting and ground conditions of the site, highlighting potential areas of concern that may govern the redevelopment.

1.3.2 The scope of works comprises a Phase I Assessment and site walk-over, with a review of the site, surroundings, historical uses and environmental setting in order to develop a preliminary Conceptual Site Model (CSM).

1.3.3 This report is intended to meet the requirements of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and has been produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance.

1.4 Limitations

1.4.1 This Phase 1 Geo-Environmental Assessment Report has been prepared in accordance with the relevant legislative framework, guidance and risk assessment methodology as outlined in Appendix A.

1.4.2 The findings and opinions conveyed via this assessment are based on information obtained from a number of sources as detailed within this report, renaissance have assumed this information is correct and reliable. Nevertheless, renaissance cannot and does not guarantee the authenticity or reliability of the information it has relied upon.

-
- 1.4.3 There may be other conditions prevailing on the site which are outside the scope of work and have not been highlighted by this assessment and therefore have not been taken into account by this report. Responsibility cannot be accepted for such site conditions not revealed by the assessment.
- 1.4.4 This report has been prepared for the sole use and reliance of the Client, Arrowsmith Investment Ltd. No other third parties may rely upon or reproduce the contents of this report without the written permission of renaissance. If any unauthorised third party comes into possession of this report, they rely on it at their own risk and renaissance do not owe them any Duty of Care.
- 1.4.5 Any recommendations made in this report should be confirmed with the Regulatory Authorities prior to implementation to ensure compliance.
- 1.4.6 This assessment has been based on the proposed planning layouts provided. Any subsequent change to the planning layout may have an impact on the validity of recommendations made within this report. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.
- 1.4.7 The site plans enclosed in this report should not be scaled off. Any site boundary line depicted on plans does not imply legal ownership of land.
- 1.4.8 Notwithstanding site observations concerning the presence or otherwise of archaeological issues, asbestos-containing materials (ACM) or invasive weeds (e.g. Japanese knotweed), this report does not constitute a formal survey of these potential issues.

2.0 THE SITE

2.1 Location

- 2.1.1 The site is located on the corner of Albion Street and Great Bridgewater Street, Manchester M1 5LE. It is situated on the southern fringe of Manchester's Central Business District, centred on National Grid Reference 383671 397602 as shown on the Site Location Plan, Drawing No. C4889/01.

2.2 Site Description

- 2.2.1 Due to time constraints, it has not been possible to complete a site reconnaissance survey and this report will be updated once this has been completed. A review of satellite and street view imagery has been completed and the main site features and potential issues identified are detailed below and are shown on the Site Features Plan, Drawing No. C4889/02.

Feature	Description
Site Area	Approximately 0.04 hectares.
Site Access	Access is gained off Albion Street via Trumpet Street to the south and west of the site.
Current Land Use and Site Features	The site is split into two distinct halves, Site A is the western sub-site, whereas Site B is the eastern sub-site. The two sub-sites are separated by the Britons Protection public house and beer garden. No buildings are present on either site, which are both currently used for contract car parking and Site A also features several advertising billboards. Site A appears to be surfaced in macadam, whereas Site B appears to be surfaced in gravel.
Potential Sources of Gross Contamination	None are evident.
Vegetation	No vegetation appears to be present on site. A single semi mature tree is present within the Britons Protection Beer Garden located between Site A and Site B.
Topography	The site appears to be generally flat.
Site Boundaries	Site A is open to pedestrian access with bollards present along the northern, western and southern boundaries. The eastern side of Site A is bounded by a brick wall and the Britons Protection pub. Site B is bounded to the north by a circa 2m high wooden palisade fence. The eastern and western boundaries are enclosed by a combination of existing buildings, brick walls and wooden palisade fencing. The southern boundary is open for pedestrian access with retractable bollards present to allow vehicular access.
Surrounding Area	The site is set on the fringes of the Manchester Central Business District with the surrounding area predominantly comprising offices, shops and restaurants with occasional apartment blocks. An overhead Metrolink viaduct is located 25m north-west.

3.0 GEO-ENVIRONMENTAL SETTING

3.1 Historical Setting

3.1.1 A review of the available historical Ordnance Survey Maps and satellite imagery has been conducted, with the pertinent issues that may have affected the site, or its environs, summarised below. The Historical Maps are presented in Appendix B. A review of the historical industrial data within the geo-environmental data report has also been undertaken below, the report is presented in Appendix C.

3.1.2 Notable features within 100m of the site boundary have been presented. Any features that have potentially been infilled will be considered up to 250m from the site boundary.

Feature	Distance	Years Present	Description
Coal Yard	On site (A)	1851	A coal yard is present across Site A from the earliest mapping (1851) but is no longer present on mapping from 1981, when unnamed buildings occupy the site.
Timber Yard	On site (B)	1851	A timber yard is present to the east of Site B and associated timber yard buildings appear to occupy Site B on mapping from 1851, but are no longer be present on mapping from 1891.
Unknown buildings	On site	1891 - 1992	Both sites have been occupied by buildings since prior to 1891, with buildings present on Site A until 1990 and on site B until 1992. By 1995, both sites are featureless and have not changed to the present day.
The Briton's Protection inn	0m	1851 - present	The Briton's Protection public house is present from the earliest mapping centrally between the two sites. Mapping from 1851 shows a pump to be present on the site.
Cotton, Silk Mills and associated plant	From 5m S	1851 - 1932	A number of cotton mills are indicated to be present in the surrounding area on mapping from 1851. The closest and largest is located 5m north and also features a gasometer , chimney and boiler and engine house , although this mill is not shown on subsequent mapping from 1891. Further textile mills are located 5m south, 10m west, 15m south-west, 50m east, 50m south on 1851 mapping and subsequent years. The mill 5m south also features a boiler house and engine house , and many of the mills also contain chimneys on mapping from 1891. The majority of the textile mills are last shown on mapping from 1893, whereas the cotton mill 5m south of the site appears to be present on mapping from 1932, but is no longer shown on mapping from 1948.
Engineering Works	From 10m W	1948 - 1987	Engineering works are shown circa 10m west and 40m south-west on mapping from 1948 to 1985, at which time the closer works is no longer shown. The works 40m south-west is last labelled as works on mapping from 1987.
Stone Yards	From 15m NW	1851	Stone yards and associated buildings are shown occupying the land north-west of the site, as well as a further stone yard located circa 50m south-west. By mapping from 1891 the stone yards are no longer present.
Railway Features	From 15m NW	1891 - 1969	By 1891 mapping the Manchester Central Railway Station and associated railways are shown, with railway sidings orientated NE-SW. Two hydraulic capstans and a hydraulic crane are also shown to the south-east of the railways. The railway lines have maintained broadly the same orientation

				and by 1969 the Central Station was labelled as disused. On mapping from 1985 land containing the former railway lines is now used as a car park and 1986 mapping shows the former Central Station as an exhibition and event centre.
Electricity Substation	15m E	2003 - present		A substation is shown on 2003 mapping (not present on 1995 mapping) and is assumed to still be present.
Omnibus Station	From 20m NE	1932 - 1973		An omnibus station is shown to the north-east in 1932 and expanded to the east of the site in 1948. By 1985 the former omnibus station is used as a car park.
Gaythorn Finishing Works	50m S	1891 - 1893		The Gaythorn Finishing Works are first shown on mapping from 1891 in a location formerly occupied by a cotton mill. A tank and chimney are present. The works are last shown on mapping from 1893 and by 1908 the buildings occupying that site have changed layout and are unannotated, suggesting the finishing works was no longer present.
Tanks	75m W	1948 - 1964		Tanks are annotated to the west of the site on mapping between 1948 and 1964, no longer shown from 1973.
Saw Mill	80m NE	1908 - 1932		A saw mill is indicated to be present 80m north-east on mapping between 1908 and 1932.
Chemical Works	80m NE	1948 - 1973		A chemical works is indicated to be present from 80m north-east on mapping between 1948 and 1973. By the next mapping from 1985 the former chemical works is now occupied by car parking.
Dye Works	80m SE	1851 - 1893		The Gaythorn Dye works is first shown on mapping from 1851 and last shown on 1893 mapping. By 1908 the buildings occupying the site have changed layout and are unannotated, suggesting the dye works was no longer present.
Saw Mill and Timber Yard	90m SW	1851 - 1893		A saw mill and timber yard are shown 90m south-west on mapping from 1851 and appear to still be present on 1893 mapping although are unannotated. By 1908 mapping the saw mill and timber yard site have changed layout and are unannotated, suggesting they are no longer present.
Garage	90m E	1973		A garage is shown 90m east on mapping from 1973 but is no longer present by 1985.
Potentially infilled reservoir	95m SE	1851 - 1893		A reservoir circa 30m long is located 95m south-east on mapping from 1851 until 1893. On 1908 mapping the reservoir is no longer present, with buildings and Whitworth Street West shown in its place. Therefore, the reservoir is assumed to have been infilled with unknown materials between 1893 and 1908.
Infilled canal / Refuse Heap	100m NE	1851 - 1951		A canal spur off the Rochdale Canal is shown on mapping from 1851 and the north-western limit appears to have been curtailed between 1932 and 1948, with areas labelled 'refuse heap' shown along the canal fringes. The refuse heaps and canal are no longer evident on 1951 mapping, although more recent mapping from 1995 onwards shows a basin and waterway in the approximate location of the former canal. Nevertheless, a large section of the canal is assumed to have been infilled at some point between 1951 and 1995.

3.1.3 In summary, the map evidence indicates that in 1851 Site A was used as a coal yard, whereas Site B was part of a timber yard. Both sites were subsequently occupied by unnamed buildings until the 1990s, at which time the buildings were demolished and the site appears to have remained vacant since. The Britons Protection pub currently located between Site A and Site B has been present since prior to 1851.

3.1.4 The surrounding area has had an industrial past since prior to 1851, with works and mills including textile mills, engineering works, stone works, finishing works, dye works, sawmills and timber yards. A garage was also present to the north-east of the site. Significant nearby transport infrastructure includes the Manchester Central Railway Station and railway sidings, located north-west of the site, and an omnibus station to the north-east and east. A former reservoir, potentially infilled canal and former refuse heap are also located within the nearby surrounds.

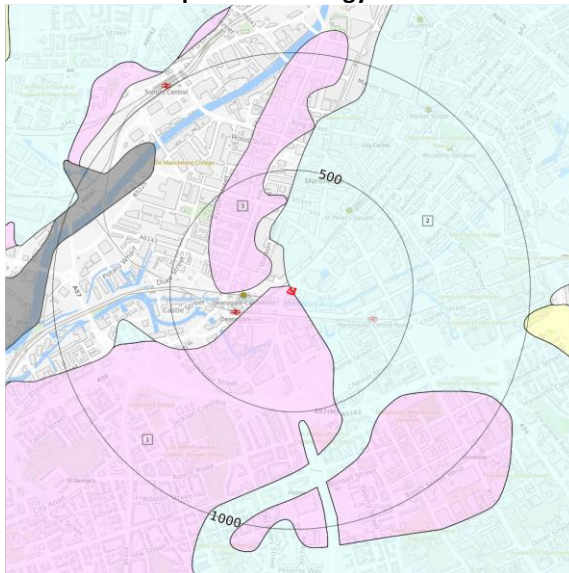
3.2 Published Geology

3.2.1 The following publications of the British Geological Survey (BGS) were examined in respect of the geology underlying the site:

- British Geological Survey (BGS) 1:50,000 Scale Geological Map Sheet 85 Manchester. Solid and Drift Edition.
- BGS Geology of Britain Map Viewer.
- BGS Geo Index Onshore.
- Coal Authority Interactive Map.
- Geo-Environmental Data Report.

3.2.2 Extracts of the 1:10,000 geological mapping from the Geo-Environmental Data Report are presented below for reference:

BGS 1:10 000 Superficial Geology



BGS 1:10 000 Solid Geology



Made Ground

3.2.3 BGS mapping does not display any made ground deposits on site, however based on the historical mapping and the development that has taken place, made ground deposits are highly likely to be present.

- 3.2.4 A large area of made ground is indicated to be present approximately 50m to the west, south and further afield to the east of the site according to BGS mapping.

Superficial Deposits

- 3.2.5 The western area (Site A) is indicated to be predominantly underlain by glaciofluvial sheet deposits, typically comprising sand and gravel. Glacial till, typically clay with minor silt, sand and gravel, is indicated to encroach into the northern end of Site A.
- 3.2.6 In contrast, the eastern area (Site B) is indicated to be predominantly underlain by glacial till (clays), with glaciofluvial deposits (sand and gravel) indicated to encroach into the southern area.

Solid Geology

- 3.2.7 The deeper solid geology is indicated to be part of the Chester Pebble Beds Formation which typically comprises sandstone.
- 3.2.8 No faults are shown on or within an influencing distance of the site.

3.3 BGS Boreholes

- 3.3.1 There are two relevant BGS borehole records within 50m which show broadly similar ground conditions. The closest is located immediately north of the site within the road intersection between Lower Mosley Street and Great Bridgewater Street. At this location the ground conditions comprised bituminous surfacing over reinforced concrete and hardcore to 0.70m bgl, underlain by natural strata comprising very stiff brown silty and sandy clay with grey fissures, stone inclusions and bands of silty laminated clay. Bedrock comprising very dense red fine/medium grained sandstone was encountered from 5.10m bgl.
- 3.3.2 The second borehole is located circa 40m north-east where concrete over ashy made ground was encountered to 1.00m bgl, underlain by natural strata comprising very stiff red brown sandy silty clay with grey stained fissures. Highly weathered brown medium to coarse grained sandstone was encountered at 5.50m bgl.
- 3.3.3 Rotary coring within both boreholes indicates solid core recovery typically exceeded 80% and rock quality designation often exceeded 50% below 7.50m bgl.
- 3.3.4 A summary of the ground conditions is presented in the table below.

Reference	Distance from Site (m) and Direction	Depth Made Ground (m)	Depth Superficial Deposits(m)	Depth Solid Geology (m)
SJ89NW3790	5m N	GL - 0.70: Bituminous surfacing, concrete, hardcore	0.70 – 5.10: Very stiff silty sandy clay	5.10 – 14.50: Sandstone
SJ89NW555	40m NE	GL – 1.00: Concrete, ash fill	1.00 – 5.50: Very stiff silty sandy clay	5.50 – 30.20: Sandstone

The BGS Borehole Logs are presented in Appendix D.

3.4 Natural Geological Hazards

- 3.4.1 The BGS GeoSure Data presented within the Geo-Environmental Data Report is summarised in the table below:

Hazard	BGS Hazard Rating	Comments
Shrink Swell Clays	Negligible Very Low	Site A: Ground conditions predominantly non-plastic. Site B: Ground conditions predominantly low plasticity.
Running Sands	Very Low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.
Compressible Ground	Negligible	Compressible strata are not thought to occur.
Collapsible Deposits	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.
Landslides	Very Low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
Soluble Rocks	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

3.5 Natural Soil Chemistry

3.5.1 Information contained within the environmental database report gives indicative natural concentration values (estimated) for the natural soils at the site.

3.5.2 The values presented in the table below indicate the expected natural background concentration levels, and thereby provide a baseline guideline estimate that can be used to assess the significance of any chemical test data acquired from any future intrusive investigations at the site.

Element	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
Concentration (mg/kg)	15-25	No data	100-200	60-120	1.8	60-90	30-45

3.6 Mining and Mineral Extraction

Coal Mining

3.6.1 The online Coal Authority Interactive Map layers have been reviewed and the details are summarised in the table below:

Relevant Interactive Map Data	Issue at Subject Site?
Coal Authority Reporting Area	Yes
Development High Risk Area	No
Past Shallow Coal Mine Workings	No
Portable Shallow Coal Mine Workings	No
Mine Entries within 20m	No

3.6.2 As the site lies within the Coal Authority Reporting Area, a mining search has been undertaken as the site could be affected by past or current coal mining.

3.6.3 The mining searches are presented in Appendix E, the main findings of which are presented below.

Highlighted Evidence	Issue	Details
----------------------	-------	---------

Past Underground Mining	No	
Present Underground Mining	No	
Future Underground Mining	No	
Mine Entries	No	There are no known coal mine entries within, or within 20 metres of, the boundary of the property. There may however be mine entries in the local area which the Coal Authority has no knowledge of.
Past, present and future opencast coal mining	No	
Coal mining subsidence	No	
Mine gas	No	
Withdrawal of support	No	
Information from the Cheshire Brine Subsidence Compensation Board	No	

3.7 Hydrogeology

3.7.1 Based on the inferred geology, a summary of the Environment Agency aquifer designations is presented in the table below:

Stratum	Coverage	Aquifer Designation	Groundwater Vulnerability
Glaciofluvial Deposits and Glacial Till	Full Site	Secondary (A) Aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.	High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
Chester Pebble Beds Formation	Full Site	Principal Aquifer. This is 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.	High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.

3.7.2 The site is indicated to lie 22m east of a Source Protection Zone, Zone III, Total Catchment (the area needed to support the discharge from the protected groundwater source) for a groundwater abstraction well.

3.7.3 The nearest groundwater abstraction licence is historical, located 559m north-east for general cooling purposes, licenced to British Telecom. The nearest active groundwater abstraction licence is located 697m south-east for general use / heat pumping, licenced to Manchester Metropolitan University.

3.7.4 There are no active potable water abstractions within 2000m but several historical licences, the closest located 1578m north licenced to Strangeways Brewery, inactive since 2000.

3.7.5 The nearest Water Framework Directive (WFD) Groundwater Body is located on site and is the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers, with an overall poor chemical rating (2015).

3.8 Hydrology

- 3.8.1 The nearest surface water feature is the Rochdale Canal which lies 36m south of the site, whereas the nearest natural watercourse is the River Medlock located 169m south and the flow direction is indicated to be from east to west.
- 3.8.2 There are no active surface water abstractions within 2000m of the site. The nearest historical surface water abstraction licence was located 1797m south for process water and general cooling at Hydes Brewery.
- 3.8.3 The closest licenced discharge consent is an historical discharge of sewage final/treated effluent to the River Tib culvert located 48m south-east, revoked in 1993. The closest active licenced discharge consent is for sewer storm overflow into the River Medlock, located 175m south-east.
- 3.8.4 Information obtained from the Environment Agency (EA) Risk of Flooding from Rivers and the Sea (RoFRaS) database indicates that the risk of flooding across the site is negligible as the site is not indicated to be within either an EA designated Zone 2 or Zone 3 flood plain.
- 3.8.5 The British Geological Survey indicate there is a potential for groundwater flooding at the subject site, with a moderate risk rating. 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.
- 3.8.6 No further consideration of flood risk is undertaken in this report. Specialist flood risk advice should be sought with regards to drainage and flooding.

3.9 Geo-Environmental Searches

- 3.9.1 A summary of the relevant environmental aspects, both on site and within 500m of the site contained in the Geo-Environmental Data Report, are presented in the table below:

Entry	On-site	0-249m	250-500m	Details
Environmental Permits, Incidents and Registers	0	2	4	The closest entries (59m north) are operated by Manchester heat Network Tradeco Limited, for new medium combustion plant. There are several licenced pollutant releases over 300m away from the site, all historical.
Pollution Incidents	0	0	1	An incident occurred 417m east in July 2001 involving diesel, with a Category 4 (No Impact) on water, land or air.
Landfill Sites	0	0	0	
Waste Sites	0	1	15	The majority of records are historical, including a recycling centre located 152m north of the site at the Manchester Central Convention Centre, as well as a historical scrap yard 299m south-west and a waste paper works 406m south-east. There is a licenced waste site located 375m south-east which appears to be active, named 'Terra Vac (UK) Ltd' with limited further details of relevance. There is a recorded waste site 299m to the east. No further details are provided.
Waste Exemptions	0	43	14	The closest record is 45m west related to use of waste in construction at Axis Tower.

Control of Major Accident Hazard (COMAH) Sites	0	0	0	
Consents issued under planning (Hazardous Substances) Act 1990	0	0	0	
Radioactive Substances	0	0	0	
Fuel Station Entries	0	0	1	There is an obsolete petrol station entry located 497m south-west.
Other Current industrial land uses	0	29	NA	The closest record is an electricity substation 15m east. 20m south is an electrical equipment repair and servicing business. There is a motorcycle repair and servicing business located 92m south.
National Grid Services	0	0	0	

3.10 Radon

- 3.10.1 Information from the environmental database report indicates the property is not in a radon affected area and therefore no radon protective measures are necessary in accordance with BRE Report 211 'Radon – Guidance on protective measures for new dwellings' 2015 Edition.

3.11 UXO Risk

- 3.11.1 In accordance with CIRIA Report C681, renaissance have reviewed non-specialist UXO data for the site using the online Zetica Bomb Risk Mapping data.
- 3.11.2 The map indicates the site to be in an area where the bomb risk is moderate. A copy of the map is presented in Appendix F.
- 3.11.3 Since the site is considered to be at moderate bomb risk a Pre-Desk Study Assessment (PDSA) has been requested which will further categorise the UXO risks at the site. At the time of writing this has not been returned to renaissance, however once available this report will be updated with the findings.
- 3.11.4 At this stage it would be prudent to make allowance for following the recommended process set out in CIRIA Report C681 which includes undertaking a preliminary risk assessment or a full detailed risk assessment. Intrusive works on site may also require supervision by a UXO specialist.

4.0 DESK STUDY SUMMARY AND RISK ASSESSMENT

4.1 Introduction

- 4.1.1 The risk posed by any contaminants in soil or groundwater will depend on the nature and level of the source, the probability of exposure occurring, the potential pollution pathway and the likely effects on the receptors.
- 4.1.2 A contaminant is defined as a substance that has the potential to cause harm, a risk is considered to exist if such a substance is present at sufficient concentrations to cause harm and if a pathway is present through which a receptor could be exposed to the contaminant.
- 4.1.3 The following sections discuss the identified potential on-site and off-site sources, and any pollution that could impact receptors via the pathways associated with the proposed development. Pollution linkages are assessed which may represent a risk to human health and/or controlled water receptors from the information gained from the Phase I Assessment searches. The assessment has been carried out on a qualitative basis and aims to produce a complete and comprehensive Preliminary Conceptual Site Model.
- 4.1.4 Three potential impacts exist for any given site and all three need to be considered in the qualitative risk assessment, these are:
- On- site impacts
 - The site impacting its surroundings.
 - Off-site sources impacting the subject site.

4.2 Potential Contaminative Sources

On-Site

- 4.2.1 From the information obtained, the following sources have been identified which may affect the redevelopment of the site for residential and commercial end use:
- Made ground associated with the previous developments including coal yard and timber yard.

Off-Site

- 4.2.2 The following off-site sources have been identified which may affect the redevelopment of the site:
- Textile Mills with associated tanks, chimneys, boiler and engine houses (from 5m south)
 - Engineering Works (from 10m west)
 - Stone Yards (15m north-west)
 - Railway Lands (15m north-west)
 - Electricity Substation (15m east)
 - Omnibus Station (20m north-east)
 - Mapped made ground (from 50m west and south)
 - Gaythorn Finishing Works including tank and chimney (50m south)
 - Tanks (75m west)
 - Saw Mill (80m north-east)
 - Chemical Works (80m north-east)
 - Dye Works (80m south-east)
 - Saw Mill and Timber Yard (90m south-west)
 - Garage (90m east)

- Potentially infilled reservoir (from 95m south-east)
- Infilled canal / refuse heap (100m north-east)

4.2.3 Given the industrial history of the area surrounding the site, the majority of industrial uses such as mills, works, factories etc have been considered as a combined potential source of contamination for the purpose of the assessments. This approach is considered appropriate in this instance given the broadly similar range of potential contaminants likely to have been used within industries, which are now no longer active and therefore the residual combined potential source of contamination is considered to be the made ground in the surrounding area.

4.2.4 The electricity substation located 15m east of the site appears to have been constructed since 1995 and therefore is likely to post-date the ban on PCBs within new equipment introduced in 1981. Therefore, the electricity substation is unlikely to be a significant source of contamination which could affect the redevelopment of the site.

Associated Contaminants

4.2.4 The contaminants commonly associated with the potential sources of contamination identified are tabulated below:

Contaminative Sources	Department of the Environment Industry Profile or Other Source	Commonly Associated Contaminants
On Site		
Made ground (inc. coal yard, timber yard)	Timber Products Manufacturing Timber Treatment	Heavy metals, PCBs, polycyclic aromatic hydrocarbons (PAHs), asbestos, ground gases (carbon dioxide and methane).
Off Site		
Works / Mills (textiles, engineering, stone, finishing works, sawmills, chemical works, dye works)	Textile and Dye Manufacturing Engineering Works - Railway Metal Manufacturing, refining and finishing works Chemical Works explosives, propellants and pyrotechnics	Heavy Metals, polycyclic aromatic hydrocarbons (PAHs), asbestos, PCBs, Petroleum Hydrocarbons, BTEX, MTBE, VOCs, SVOCs.
Railway	Railway Land Engineering works-Railway	Petroleum Hydrocarbons, PAHs, heavy metals, asbestos.
Omnibus Station, garage, tanks	Road vehicle fuelling, service and repair	Petroleum Hydrocarbons, VOCs, SVOCs
Mapped made ground, infilled reservoir/canal, refuse heap	-	Ground Gases (Carbon Dioxide and Methane)

4.3 Pathways

4.3.1 A pathway is defined as a medium by which a contaminant comes into contact with, or otherwise impacts a receptor.

4.3.2 At this stage the potential contaminants identified above are considered to present potential risks to site end users and controlled waters through the following pathways:

Potential Pathways	
Pathways in respect to Human Health	• Ingestion of contaminated soils. • Dermal contact with contamination. • Inhalation of dusts.

	Inhalation of gases or vapours in both indoor and outdoor air.
Pathways in respect to Controlled Waters – Surface water	- Surface run-off /over land flow. - Drainage discharge. - Base flow from groundwater.
Pathways in respect to Controlled Waters – Groundwater	- Leaching of mobile contamination into groundwater via the unsaturated zone. - Migration of perched groundwater in any permeable soils or along existing or proposed service runs. - Migration into the saturated zone and flow through the Secondary A Aquifer and the Principal Aquifer underlying the site.
Pathways in respect to Property/structures/water pipes	- Direct contact with substances deleterious to building materials and potable water supply pipelines. - Migration of ground gases (methane) into confined spaces (explosion and damage to property).

4.4 Receptors

4.4.1 The identified receptors are listed below:

- Residential and commercial end users (human health).
- Structures/Property/portable water supply pipes.
- Nearest watercourse. Rochdale Canal (Controlled waters).
- Superficial Aquifer. Glaciofluvial sheet deposits (Controlled waters).
- Bedrock Aquifer. Chester Pebble Beds Formation (Controlled waters).
- Construction workers.

4.5 Preliminary Conceptual Site Model

4.5.1 The information obtained in the previous sections has been used to compile a Preliminary CSM. The identified potential contaminants and receptors have been assessed in the table below as to whether a plausible source-pathway-receptor pollutant linkage for the proposed end use of the site exists. The risk classification has been estimated in accordance with information in the renaissance Guidance and Methodology in Appendix A.

4.5.2 The Preliminary CSM's are presented in the tables overleaf. Any assessed risk above moderate will possibly require further action:

Human Health						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
On site Made ground Metals, PAH's, asbestos, PCBs	Root uptake, ingestion, direct contact, inhalation of dusts	End-users	Unlikely	Medium	Low	Despite the former timber yard and coal works occupying the site, it is considered unlikely that any contaminants potentially present in the soils could impact the end users of the site. This is due to the current proposed layouts which indicate the entire site will be covered by buildings and hardstanding, therefore it is considered unlikely that future site users would come into contact with underlying contaminated soils and the overall risk is considered to be low.
On site Made ground Metals and organic contamination	Migration into/chemical attack of water supply pipelines	Water Pipelines / End users	Likely	Medium	Moderate	Contaminants within the soil/groundwater could potentially attack the clean potable water supply pipe and are likely to be present at typical pipeline depths. Therefore, contaminants should be assessed to determine the correct pipe material and level of precautions required.
On site Made ground Ground Gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/explosion	End-users / property / structures	Unlikely	Severe	Moderate / Low	The site has had previous uses including coal and timber yards, as well as unknown buildings, therefore made ground is probably present, but is likely to comprise demolition materials and other aggregates with a low organic content and low proportions of putrescible materials. In addition, the proposed development will likely involve the inclusion of a reinforced concrete ground beam / floor slab which will include an inherent level of protection to prevent ingress of ground gases into buildings. The risk is considered to be moderate / low at this stage, with ground investigation required to confirm the risk.
Off site Works / Mills Metal, PAHs, Asbestos, Petroleum Hydrocarbons, VOCs, SVOCs, PCBs	Ingestion, direct contact, inhalation of dusts	End users	Unlikely	Medium	Low	The surrounding area has historically been used for industrial purposes, with a variety of contaminants potentially present in soils. However, as stated above, it is considered unlikely that any contaminants potentially present in soils could impact the end users of the site. This is due to the proposed layouts which indicate the entire site will be covered by buildings and hardstanding, therefore it is considered unlikely that future site users would come into contact with underlying migrated contamination and the overall risk is considered to be low.

Off site Railways Petroleum Hydrocarbons, PAHs, metals, asbestos	Ingestion, direct contact, inhalation of dusts	End-users	Unlikely	Medium	Low	It is considered unlikely that any contaminants potentially present in soils associated with the former railway to the north of the site could impact end users. This is due to the current proposed layouts which indicate the entire site will be covered by buildings and hard standing. In addition, most if not all of the former railways are likely to have been raised above ground on viaducts, significantly reducing the potential for any associated land contamination at site levels. The overall risk is considered to be low.
Off site Omnibus Station, Garage, Tanks Petroleum Hydrocarbons, VOCs, SVOCs	Ingestion, direct contact, inhalation of dusts	End-users	Unlikely	Medium	Low	It is considered unlikely that any contaminants potentially present in soils associated with the former omnibus station, garage and tanks in the vicinity of the site could impact end users. This is due to the current proposed layouts which indicate the entire site will be covered by buildings and hard standing. The overall risk is considered to be low.
Off site Made ground, infilled reservoir and refuse filled canal Ground Gas (carbon dioxide and methane)	Migration into confined spaces, inhalation and asphyxiation/ explosion	End-users / property / structures	Low Likelihood	Severe	Moderate	The closest and largest potential source of ground gases is a large area of mapped made ground the south and east of the site as identified from BGS records. The southern part of the site and surrounding area to the south is indicated to be underlain by granular superficial deposits, therefore a potential pathway is considered to exist. However, based on the location of the made ground, this is likely to have been associated with construction of viaducts/transport infrastructure, and is therefore likely to comprise aggregates with a low organic content and low proportions of putrescible materials. The infilled reservoir may contain unknown materials, but is further from the site and infilled more than 100 years ago, therefore is considered to have a low likelihood of impacting the site. The infilled canal is located towards the north, where the ground conditions are indicated to comprise predominantly low-permeability superficial deposits, reducing the likelihood of migration to site. It should be noted that the proposed development will likely involve the inclusion of a reinforced concrete ground beam / floor slab which will include an inherent level of protection to prevent ingress of ground gases into buildings. The risk is considered to be moderate at this stage, with ground investigation and monitoring required to confirm the risk.

Controlled Waters						
Potential Source	Potential Pathway	Potential Receptor	Likelihood	Severity	Level of Risk	Justification
Made Ground PAH's, Metals, PCBs	Overland flow / migration through saturated zone	Rochdale Canal 36m away (Surface waters)	Unlikely	Medium	Low	It is considered unlikely that any contaminants potentially present in the made ground soils could impact the canal, which is likely to be clay lined providing protection from any potentially contaminated groundwater. Given the industrial setting of the surrounding area, which would appear to supersede the relatively minor industrial history of the site itself, it is unlikely that the site is contributing to any poor groundwater quality over and above contributions from the surrounding land which has seen heavier industrial use. In addition, the site is proposed to be covered in hardstanding and buildings with new drainage installed which will maintain an already minimal volume of surface water infiltration, therefore leaching of any contaminants present in soils is likely to remain low. Overland flow is also considered unlikely as new drainage at the site will divert surface water appropriately.
	Leaching through unsaturated zone / Migration through saturated zone	Secondary A Aquifer (Ground-water)	Low Likelihood	Medium	Moderate / Low	The depth and nature of any made ground is unknown at this stage, although it should be noted that the industrial setting of the surrounding area, would appear to supersede the relatively minor industrial history of the site itself, it is unlikely that the site is contributing to any poor groundwater quality over and above contributions from the surrounding land which has seen heavier industrial use. The historical mapping does not indicate the likely presence of any sources of gross contamination. In addition, the site is surfaced in hardstanding, in the majority, and will remain so, with and improved drainage system, therefore the site is unlikely to be worsened and by the development taking place this may lead to an overall 'betterment' of groundwater quality. Further assessment of the ground conditions is required to confirm the risk to the groundwater aquifers beneath the site.
	Migration through saturated zone	Principal Aquifer (Ground-water)	Low Likelihood	Medium	Moderate / Low	The depth and nature of any made ground is unknown at this stage, although it should be noted that the industrial setting of the surrounding area, would appear to supersede the relatively minor industrial history of the site itself, it is unlikely that the site is contributing to any poor groundwater quality over and above contributions from the surrounding land which has seen heavier industrial use. The historical mapping does not indicate the likely presence of any sources of gross contamination. In addition, the site is surfaced in hardstanding and will remain so, with and improved drainage system, therefore the site is unlikely to be worsened

						and by the development taking place this may lead to an overall 'betterment' of groundwater quality. If present, any made ground is indicated to be underlain by potentially permeable superficial deposits across the majority of the site, which are expected to be underlain by the Principal Aquifer, so a potential pathway is feasible. Therefore, further assessment of the ground conditions is required to confirm the risk to the groundwater aquifers beneath the site.
--	--	--	--	--	--	---

Human Health Risk - Summary

- 4.5.3 Based on the preliminary CSM and the current use of the site, the overall risk from land contamination at the site is considered to be **low to moderate** for a redeveloped site. This would need to be confirmed by appropriate intrusive investigation, testing and assessment.
- 4.5.4 A potential on-site gas source has been identified associated with the made ground associated with previous developments. Off site ground gas sources have also been identified, associated with mapped made ground and potentially infilled features. The preliminary CSM considers the sources to be a **low/moderate** to **moderate** risk to site end users and property.
- 4.5.5 In accordance with CIRIA C665 and as set out in Appendix A of this report, the gas generation potential is considered to be very low. The sensitivity of the development is low to moderate on account of the proposed high rise apartments and commercial use.
- 4.5.6 In line with current guidance it is recommended that ground gas monitoring should comprise 6 visits over a minimum 2 month period.

Controlled Waters Risk - Summary

- 4.5.7 Based on the preliminary CSM, renaissance believes the overall risk to controlled waters at the site is **low to moderate** for the following reasons:
- Despite the likely presence of made ground, no gross contamination is anticipated on site.
 - The site itself does not appear to have been used for industrial purposes for over 100 years, with the immediate surrounds appearing to have been used more heavily for industry.
 - The site is currently, in the majority, and will remain covered entirely in hardstanding and/or buildings, which will limit surface water infiltration and therefore help limit leaching of any contaminants, if present.
 - The site is located 22m away from a Source Protection Zone.
 - There are no active
 - potable water abstractions within 2000m.

The above assessed level of risk will need to be confirmed by intrusive investigation and quantitative risk assessment.

5.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

5.1 Hazard Identification

5.1.1 Potential geotechnical hazards based on the expected ground conditions are listed below:

- Made ground of unknown depth and nature; if placed in a non-engineered manner may cause excessive settlement of foundations, highways and infrastructure.
- Attack of buried concrete by aggressive ground conditions; the site may contain unknown made ground and potentially sulphate bearing soils.
- Shrink / swell of clay; settlement / heave of foundations when located within the influence of trees and vegetation.
- Running sands and shallow groundwater, leading to difficulty with excavation due to trench collapse.
- UXO; the site lies within an area at moderate risk from unexploded ordnance.
- The Briton's Protection Public House which is a Grade II listed building, located directly between the two areas of site, is likely to have a basement structure and therefore consideration is required to ensure that the proposed development and enabling works do not disturb this building.

5.2 Foundations Design

5.2.1 The proposed development will comprise a 27 storey residential apartment building and a 7 storey commercial office building. In light of the anticipated imposed loads, it is likely that a deep foundation solution, such as piles, will be required.

5.3 Sustainable Drainage Systems (SUDs)

5.3.1 Given the nature of the site, which is limited in terms of area and will be entirely covered by buildings, drainage to SuDS is unlikely to be feasible due to lack of space for construction of suitable attenuation tanks.

6.0 OTHER DEVELOPMENT CONSTRAINTS

6.1 Constraints Identification

- 6.1.1 If asbestos is present in soils, these will need to be dealt with in accordance with the Control of Asbestos Regulations (CAR) 2012.
- 6.1.2 No invasive species have been noted during the review of satellite and street view imagery, however it would be prudent to undertake a specialist survey prior to any works on site.
- 6.1.3 The preliminary risk assessment undertaken within this Phase I Assessment may identify potential risks to site demolition and construction workers. However, full consideration of occupational health and safety issues is beyond the scope of this report.
- 6.1.4 The general area of Manchester in which the site is located is known to be of Archaeological interest. Therefore, it is recommended that the Local Authority is contacted at the earliest opportunity with respect to any Archaeological Evaluations which may need to take place.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Geo-Environmental

- 7.1.1 The site has previously been used as a coal yard and timber yard until the late 1800s, with unknown buildings occupying the site since until the late 1900s, since which time it has remained vacant and used for car parking.
- 7.1.2 The surrounding area has had an industrial past since prior to 1851, with works and mills including textile mills, engineering works, stone works, finishing works, dye works, sawmills and timber yards. A garage was also present to the north-east of the site. Significant transport infrastructure includes the Manchester Central Railway Station and railway sidings, located north-west of the site, and an omnibus station towards the north-east and east.
- 7.1.3 Given the nature of the proposed development, which will not incorporate any gardens or soft landscaping areas, the overall risk to human health is considered to be low.
- 7.1.4 Potentially infilled features including a reservoir, canal and former refuse heap have been identified in the surrounding area within the desk study, as well as made ground likely to be present on site associated with the previous developments. There is considered to be a low to moderate risk from ground gas based on the above and intrusive investigation with subsequent ground gas monitoring will be required.
- 7.1.5 The risk to controlled waters is considered to be low to low/moderate from the anticipated made ground on site associated with the previous industrial usage of the site.

7.2 Geotechnical

- 7.2.1 The proposed development will comprise the construction of a 27 storey residential apartment building and a 7 storey commercial office building. Based on the likely imposed loads, piled foundations are anticipated to be required for the development. Intrusive investigations will be required to investigate the ground conditions and obtain parameters for foundation design, concrete classification, floor slab and highways design.

7.3 Further Work

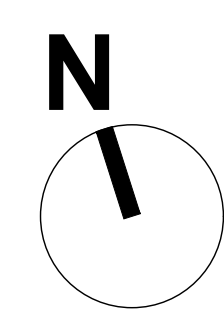
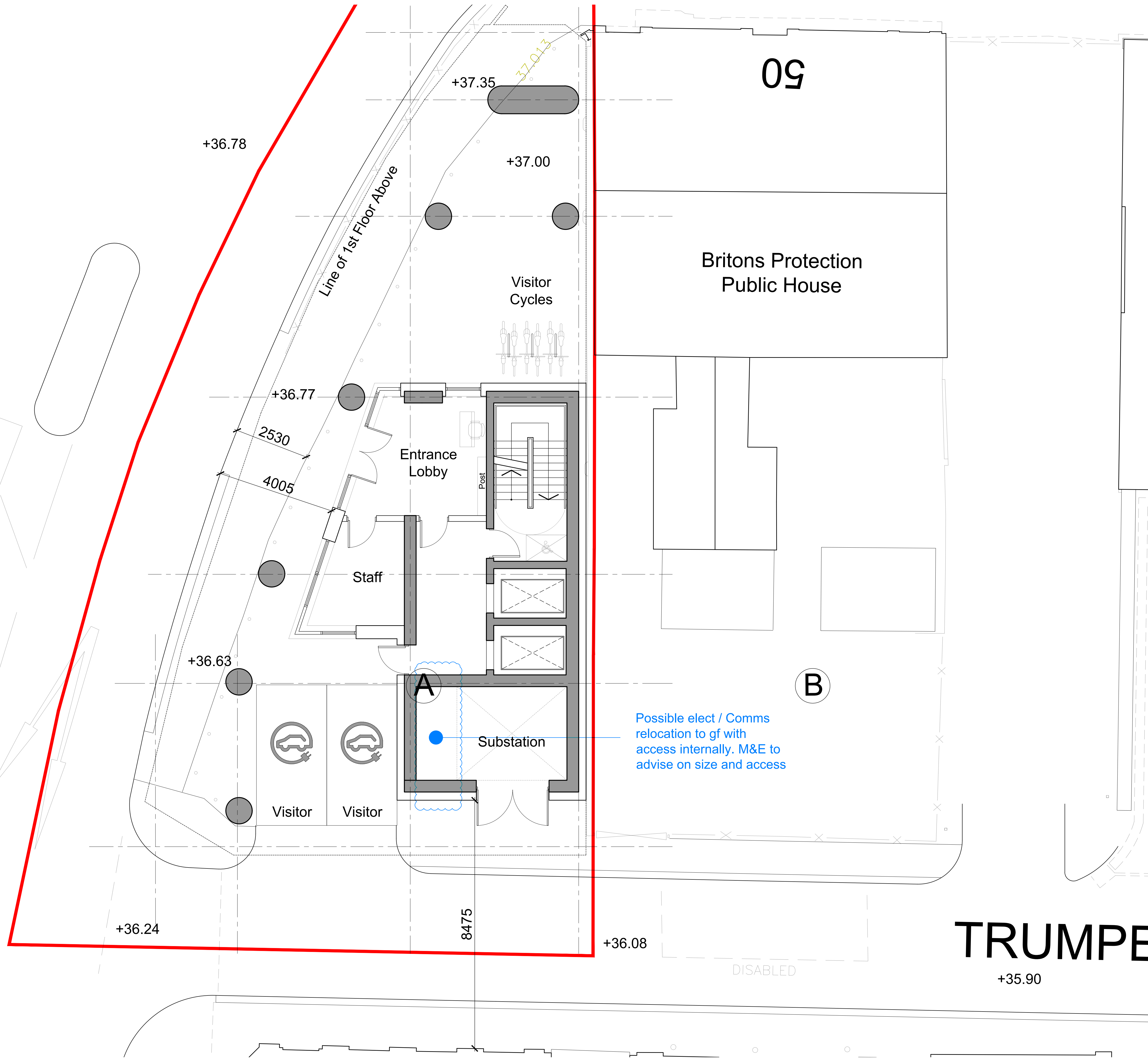
- 7.3.1 To confirm the risks to the identified receptors and confirm the ground conditions in respect to the identified geotechnical and geo-environmental risks, an appropriate intrusive investigation will need to be undertaken.
- 7.3.2 Therefore, to allow future development of the site the following further works are recommended, although this list is not exhaustive and should be read in conjunction with any planning conditions that are applicable to the site.
- Topographical survey / service trace.
 - Further assessment of the UXO risk at the site.
 - Intrusive site investigations comprising:
 - Cable percussive drilling with rotary cored follow-on.
 - Installation of standpipes in boreholes to allow gas concentrations and groundwater levels to be monitored.
 - Geotechnical testing of soils and rocks.
 - Contamination analyses of soil and groundwater, if required.

-
- Assessment and recommendations based on the above, including requirements for further work, if necessary.

8.0 REFERENCES

- BS 5930+A1:2020: 'Code of Practice for Site Investigations'. 2020.
- BS 10175:2011+A2:2017 'Investigation of Potentially Contaminated sites - code of practice'. 2017.
- BRE Report BR211, Scivyer, C. 'Radon – Guidance on protective measures for new buildings' 2015 Edition.
- CIRIA C665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings'. 2007.
- CIRIA C681 'Unexploded Ordnance (UXO) A guide for the construction industry'. 2009.
- CIRIA C753 'The SuDS Manual'. 2015.
- CL:AIRE RB17 'A Pragmatic Approach to Ground Gas Risk Assessment'. 2012.
- Department of the Environment. 'Industry Profiles' - 48 separate publications available from The Stationery Office, London. 1995.
- DEFRA and the Environment Agency, CLR Report No 11 'Model Procedures for the Management of Contaminated Land'. 2004. [Withdrawn 2019.]
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.
- Health and Safety Executive (HSE). Control of Asbestos Regulations (CAR). 2012.
- National Planning Policy Framework (NPPF). 2021.
- National Planning Policy Framework - Technical Guidance. March 2012.
- NHBC. Boyle and Witherington. 'Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present.' Report No. 10627-R01(04). 2007.
- NHBC Standards. Chapter 4.1: Land Quality - Managing Ground Conditions. 2020.
- Water Framework Directive, 2000.

DRAWINGS

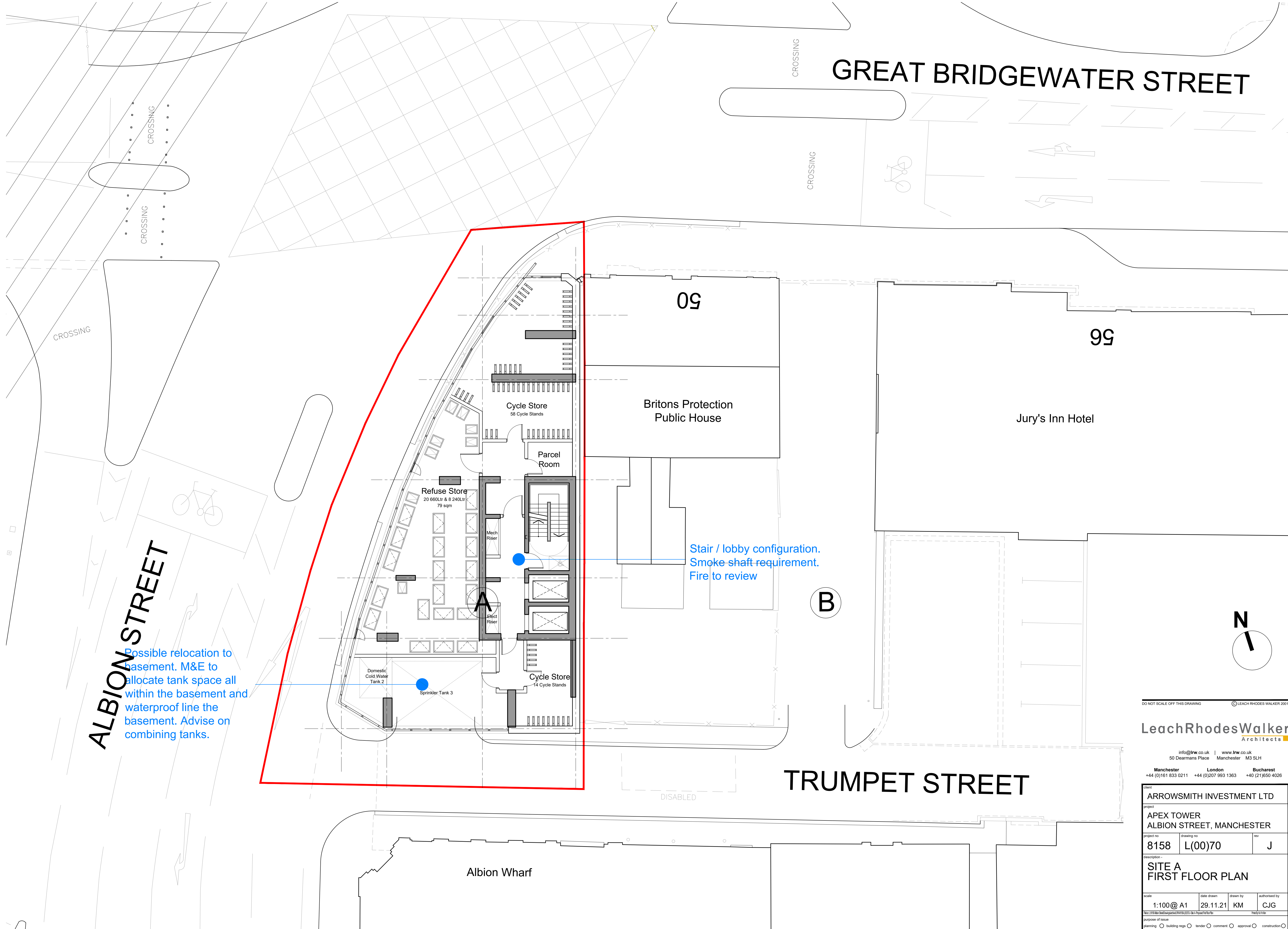


DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH
Manchester London Bucharest
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client			
ARROWSMITH INVESTMENT LTD			
project			
APEX TOWER ALBION STREET, MANCHESTER			
project no	drawing no	rev	
8158	L(00)69	K	
description -			
SITE A GROUND FLOOR PLAN			
scale	date drawn	drawn by	authorised by
1:100@ A1	29.11.21	KM	CJG
Rev: 01 04 2018 04/06/2019 01/01/2020 01/01/2020 01/01/2020			
purpose of issue			
planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			



GREAT BRIDGEWATER STREET

99

Jury's Inn Hotel

Britons Protection
Public House

Cycle Store

58 Cycle Stands

Parcel
Room

Refuse Store

20 660Ltr & 8 240Ltr

79 sqm

A

Mech
Riser

Elect
Riser

Cycle Store

14 Cycle Stands

Domestic
Cold Water
Tank 2

Sprinkler Tank 3

Stair / lobby configuration.
Smoke-shaft requirement.
Fire to review

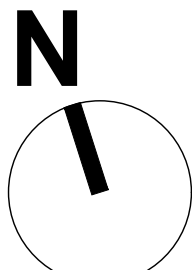
B

TRUMPET STREET

Albion Wharf

ALBION STREET

Possible relocation to
basement. M&E to
allocate tank space all
within the basement and
waterproof line the
basement. Advise on
combining tanks.

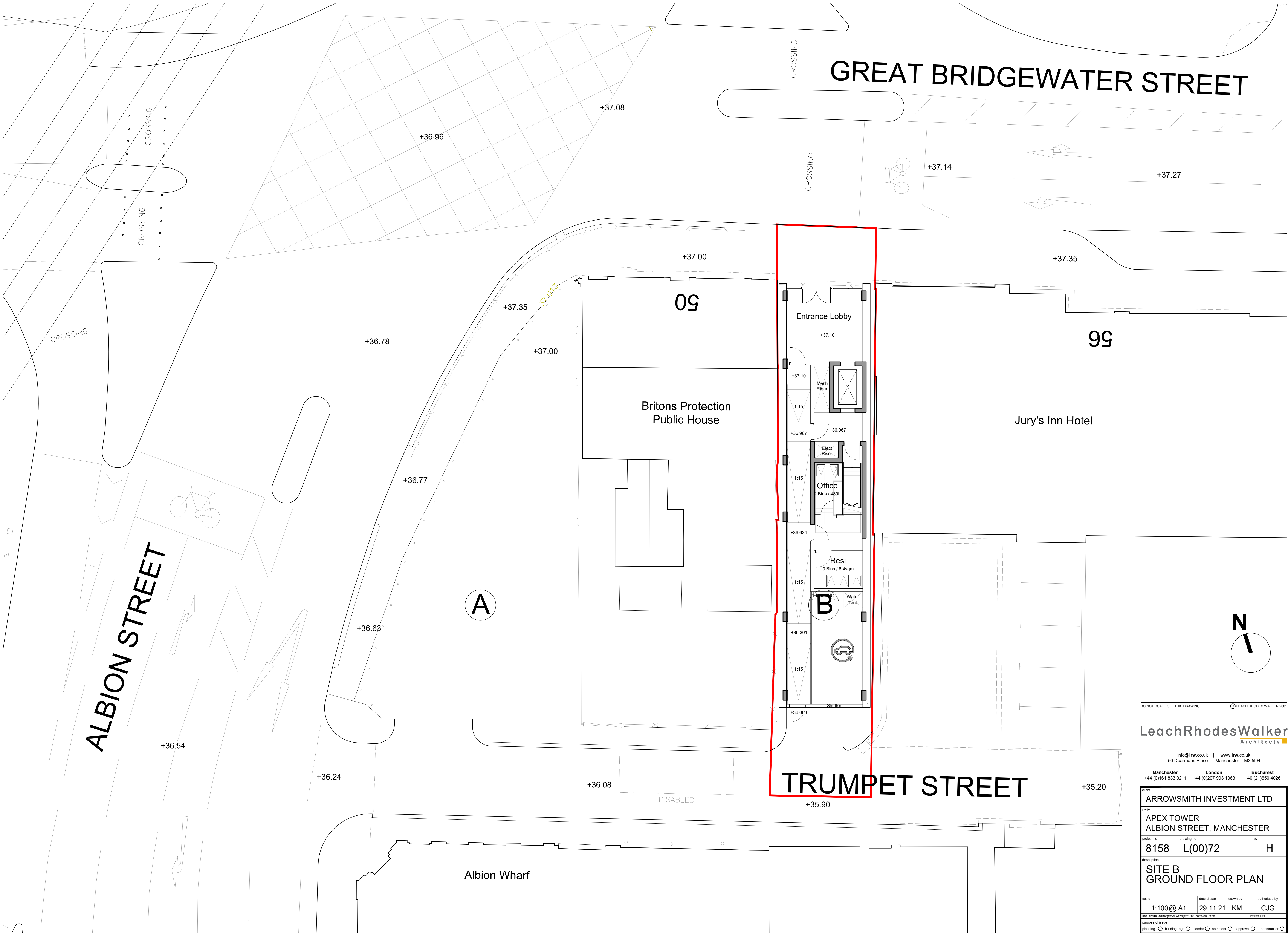


DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH
Manchester London Bucharest
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client			
ARROWSMITH INVESTMENT LTD			
project			
APEX TOWER ALBION STREET, MANCHESTER			
project no	drawing no	rev	
8158	L(00)70	J	
description -			
SITE A FIRST FLOOR PLAN			
scale	date drawn	drawn by	authorised by
1:100@ A1	29.11.21	KM	CJG
file: \\fs1\shared\engineering\2018\21\21-04-10\21-04-			

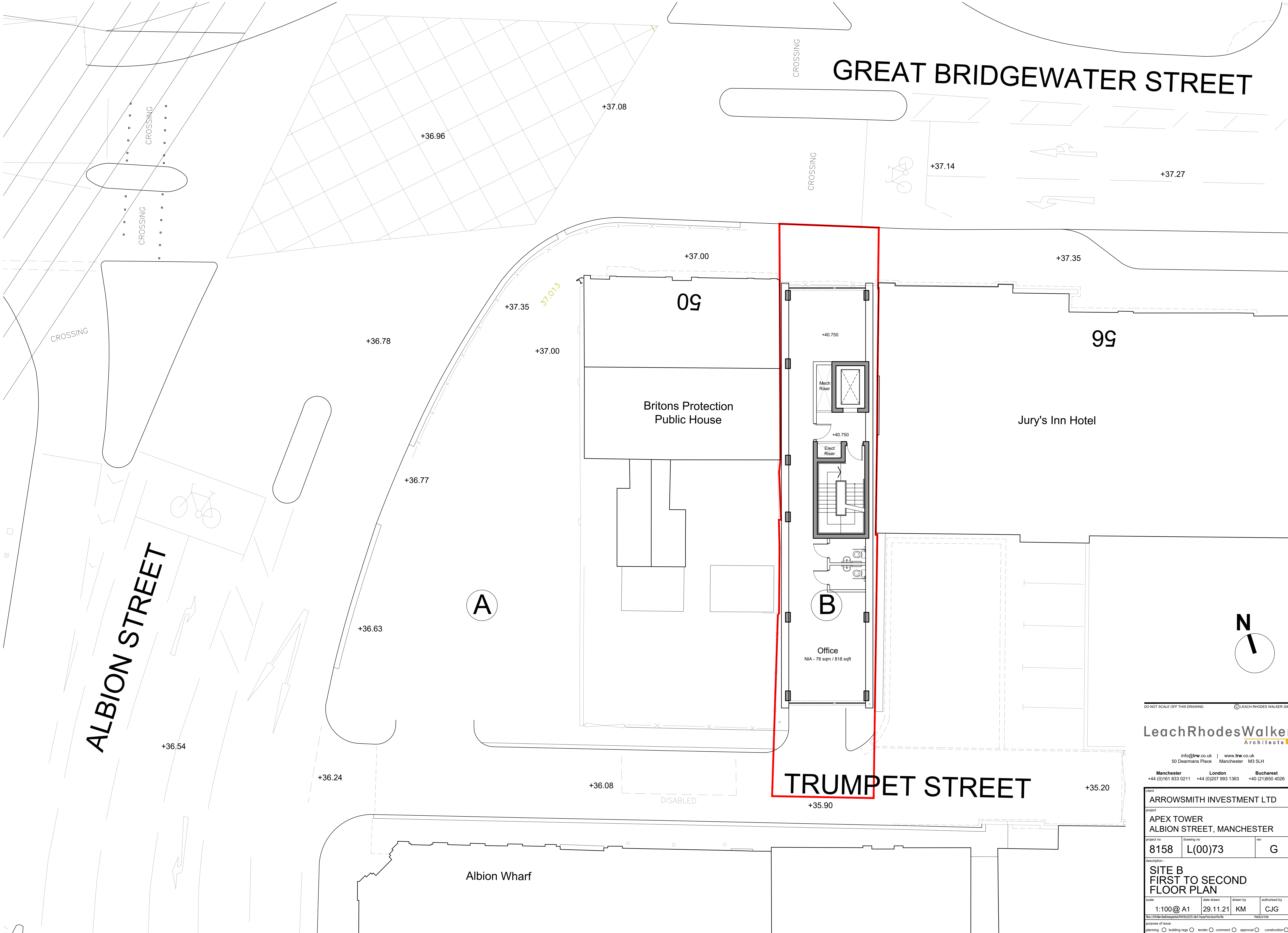


DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH
Manchester London Bucharest
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client			
ARROWSMITH INVESTMENT LTD			
project			
APEX TOWER ALBION STREET, MANCHESTER			
project no	drawing no	rev	
8158	L(00)72	H	
description -			
SITE B GROUND FLOOR PLAN			
scale	date drawn	drawn by	authorised by
1:100@ A1	29.11.21	KM	CJG
file: s:\drawings\overseas\2021\2021-08-28\2021-08-28\0072.dwg		sheet: 1 of 1	
purpose of issue			
planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			

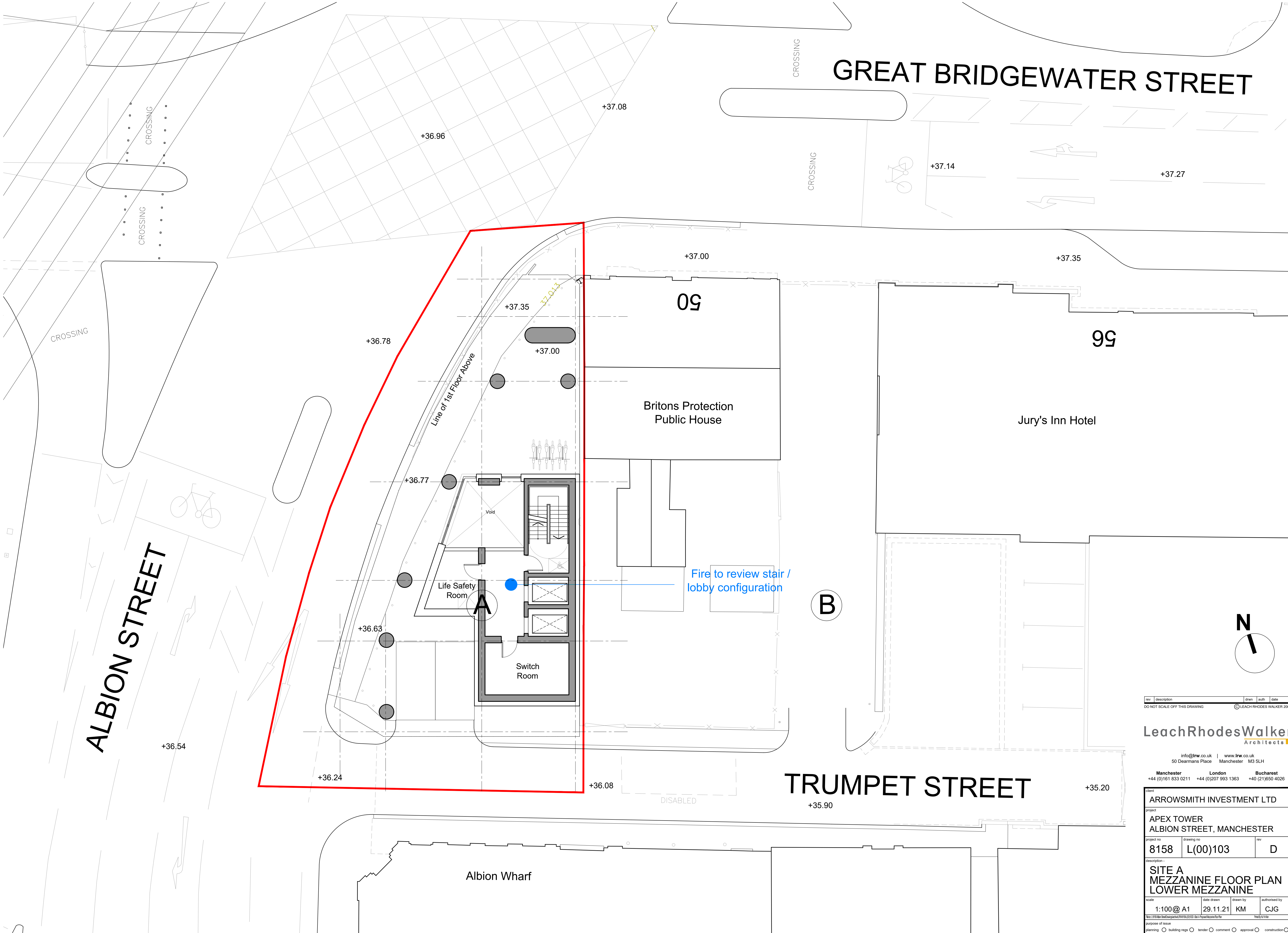


DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH
Manchester London Bucharest
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client			
ARROWSMITH INVESTMENT LTD			
project			
APEX TOWER ALBION STREET, MANCHESTER			
project no	drawing no	rev	
8158	L(00)73	G	
description -			
SITE B FIRST TO SECOND FLOOR PLAN			
scale	date drawn	drawn by	authorised by
1:100 @ A1	29.11.21	KM	CJG
https://www.leachrhodeswalker.co.uk/50-dearmans-place-manchester-m3-5lh/		https://www.leachrhodeswalker.co.uk/50-dearmans-place-manchester-m3-5lh/	
purpose of issue			
planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			



rev | description | drawn | auth | date
DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH

Manchester London **Bucharest**
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client
ARROWSMITH INVESTMENT LTD

project
APEX TOWER

ALBION STREET, MANCHESTER

project no. drawing no. rev
8158 L(00)103 D

description -
SITE A

MEZZANINE FLOOR PLAN

LOWER MEZZANINE

scale date drawn drawn by authorised by
1:100@ A1 29.11.21 KM CJG

purpose of issue
planning building regs tender comment approval construction

Can we have cross
bracing here on the upper
mezz instead of extending
the core past the void?

Jury's Inn Hotel

99

Possible elect / Comms relocation to gf with access internally. M&E to advise on size and access



B

DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH

Manchester **London** **Bucharest**
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

project

APEX TOWER
ALBION STREET, MANCHESTER

description -

SITE A
MEZZANINE FLOOR PLAN
UPPER MEZZANINE

purpose of issue
planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐

ALBION STREET

DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH

Manchester **London** **Bucharest**
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client
ARROWSMITH INVESTMENT LTD

project

APEX TOWER
ALBION STREET, MANCHESTER

project no	drawing no	rev
8158	L(00)116	B

description -

SITE A
TYPICAL FLOOR PLAN
(2-5, 10-13, 18-21)

scale	date drawn	drawn by	authorised by
1:100@ A1	29.11.21	KM	CJG

purpose of issue
 planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐

ALBION STREET

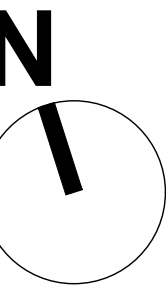
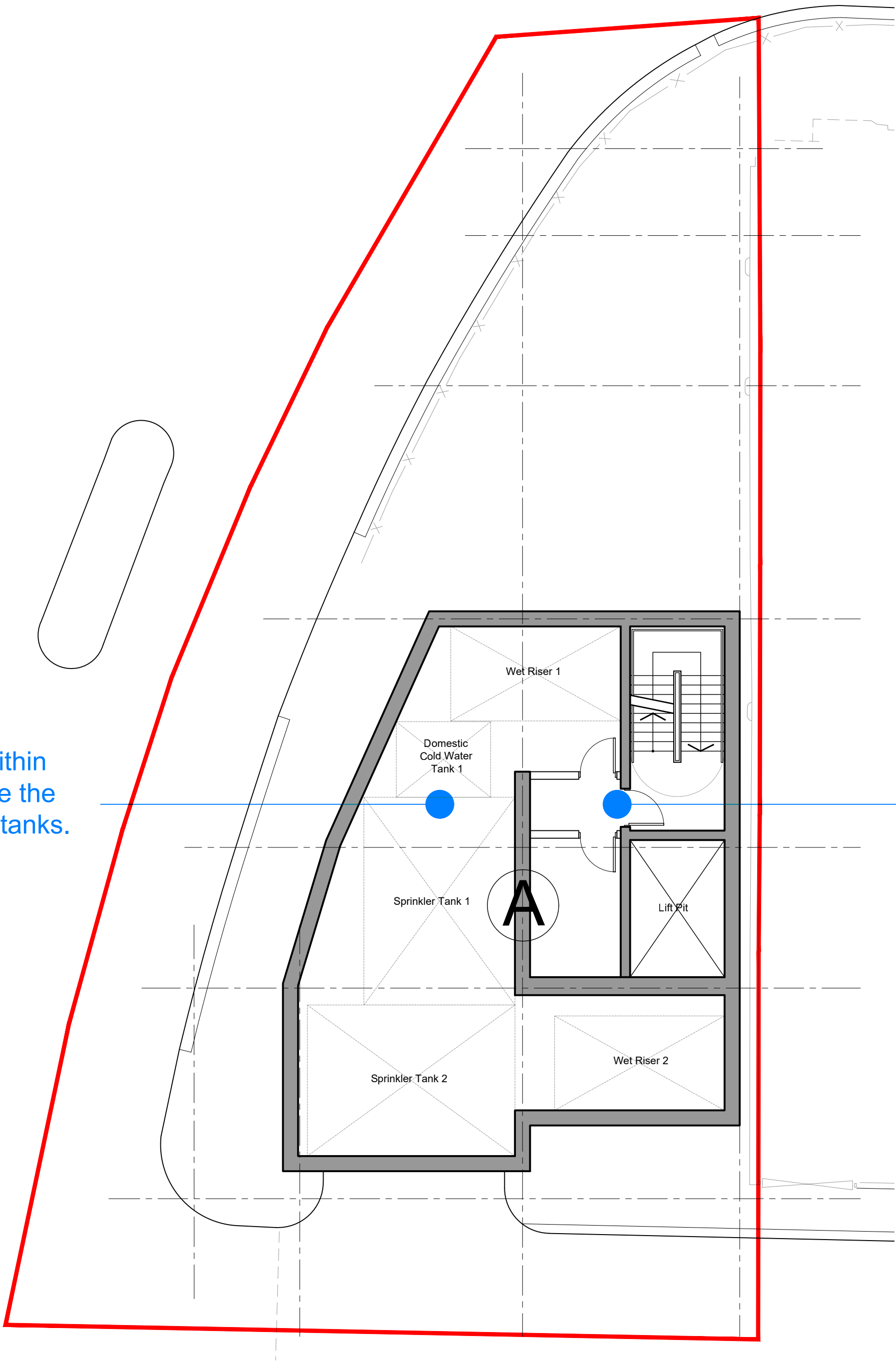
info@lrw.co.uk | www.lrw.co.uk
50 Dearnans Place Manchester M3 5LH

Manchester **London** **Bucharest**
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client			
ARROWSMITH INVESTMENT LTD			
project			
APEX TOWER			
ALBION STREET, MANCHESTER			
project no	drawing no	rev	
8158	L(00)117	B	
description			
SITE A TYPICAL FLOOR PLAN (6-9, 14-17, 22-25)			
scale	date drawn	drawn by	authorised by
1:100@ A1	29.11.21	KM	CJG
file:///C:/arrowsmith/engn/001/017/Sketches/21/21-04-2021/plan%20for%2014-17%2022-25.dwg			file:///C:/arrowsmith/engn/001/017/Sketches/21/21-04-2021/plan%20for%2014-17%2022-25.dwg
purpose of issue			
planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			

M&E to allocate tank space all within the basement and waterproof line the basement. Advise on combining tanks.

Means of escape via stairs or hatch tbc. Fire to review

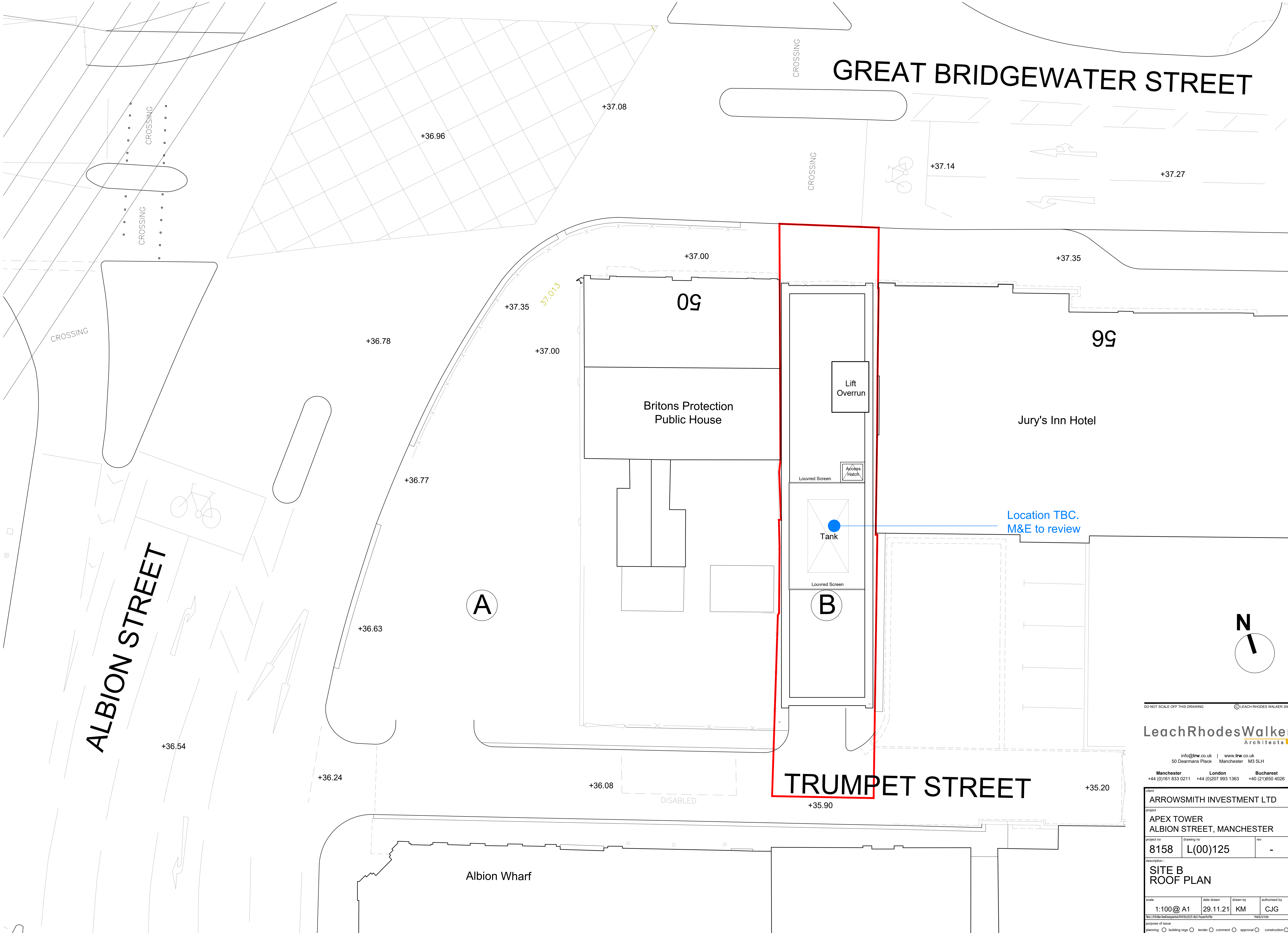


rev	description	drawn	auth	date
DO NOT SCALE OFF THIS DRAWING				

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH
Manchester London Bucharest
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client ARROWSMITH INVESTMENT LTD			
project APEX TOWER ALBION STREET, MANCHESTER			
project no 8158	drawing no L(00)124	rev -	
description - SITE A BASEMENT FLOOR PLAN			
scale 1:100 @ A1	date drawn 29.11.21	drawn by KM	authorised by CJG
file:///D:/bbs/bbsdmgad/2021/11/29/21-11-29-Arrowsmith/Tp1/1			
purpose of issue planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			



DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH
Manchester London Bucharest
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client			
ARROWSMITH INVESTMENT LTD			
project			
APEX TOWER ALBION STREET, MANCHESTER			
project no	drawing no	rev	
8158	L(00)125	-	
description :			
SITE B ROOF PLAN			
scale	date drawn	drawn by	authorised by
1:100@ A1	29.11.21	KM	CJG
https://www.leachrhodeswalker.co.uk/sitemap.html		https://www.leachrhodeswalker.co.uk/sitemap.html	
purpose of issue			
planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			

GREAT BRIDGEWATER STREET

99

Jury's Inn Hotel

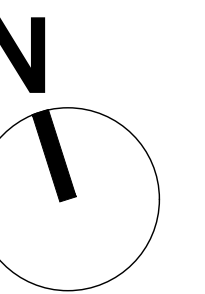
Britons Protection
Public House

Lift
Overrun

B

TRUMPET STREET

Albion Wharf



DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

LeachRhodesWalker
Architects

info@lrw.co.uk | www.lrw.co.uk
50 Dearmans Place Manchester M3 5LH

Manchester **London** **Bucharest**
+44 (0)161 833 0211 +44 (0)207 993 1363 +40 (21)650 4026

client
ARROWSMITH INVESTMENT LTD

project

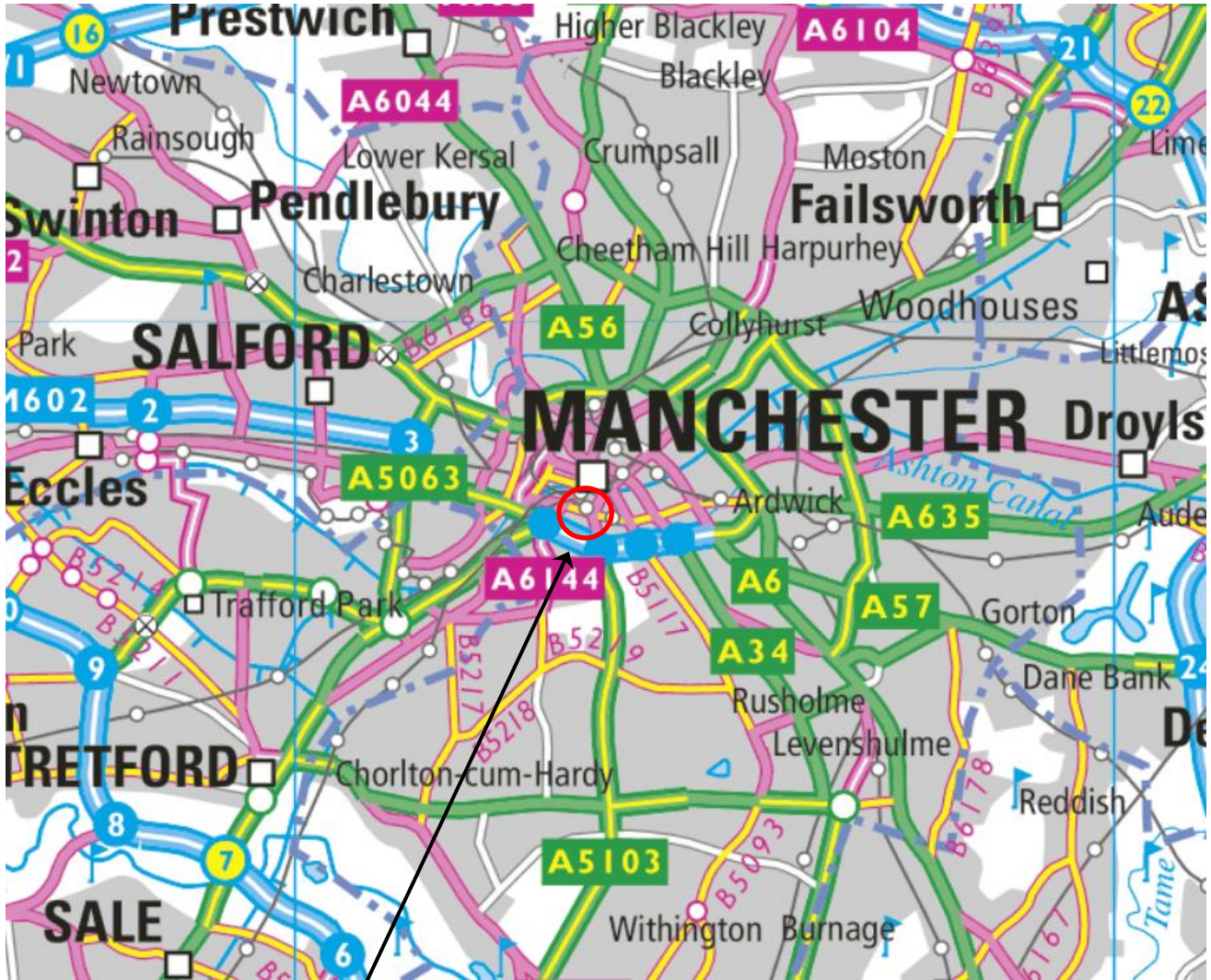
APEX TOWER
ALBION STREET, MANCHESTER

project no	drawing no	rev
8158	L(00)126	-

description -	
SITE A ROOF PLAN	

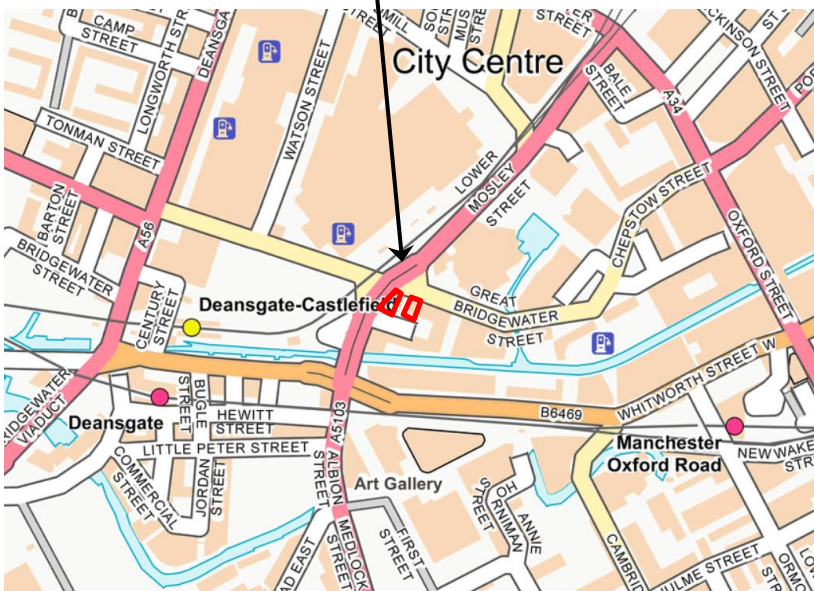
scale	date drawn	drawn by	authorised by
1:100@ A1	29.11.21	KM	CJG

File: C:\Program Files\Autodesk\Revit\Tools\Revit-360-Project-Run
 Priority: 0 Min
 purpose of issue
 planning ☐ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐



SITE LOCATION

NEAREST POSTCODE: M1 5LE



REV	DATE	DESCRIPTION	BY	CKD
 renaissance				
CLIENT				
ARROWSMITH INVESTMENT LTD				
PROJECT TITLE				
APEX TOWER, ALBION STREET, MANCHESTER				
DRAWING TITLE				
SITE LOCATION PLAN				
DRAWING No.	REVISION	SCALE	DATE	
C4889/01	-	NTS	29/09/21	
DRAWN BY		CHECKED BY		
SD		TM		



ADVERTISING BILLBOARDS

BRITONS PROTECTION PUB

SEMI MATURE TREE

BOLLARDS AROUND PERIMETER

SITE A –
MACADAM
SURFACING

SITE B –
GRAVEL
SURFACING

PH

Trumpet Street

VEHICULAR SITE ACCESS

KEY

— APPROXIMATE SITE BOUNDARY

REV	DATE	DESCRIPTION	BY	CKD



CLIENT
ARROWSMITH INVESTMENT LTD

PROJECT TITLE
APEX TOWER, ALBION STREET,
MANCHESTER

DRAWING TITLE
SITE FEATURES PLAN

DRAWING No.	REVISION	SCALE	DATE
C4889/02	-	NTS	01/10/21

DRAWN BY	CHECKED BY
TM	LC

APPENDIX A

Methodology and Guidance

BSL Phase I Geo-Environmental Assessment Reports - Methodology and Guidance

This Appendix provides information on the approaches, methods and guidance used by Brownfield Solutions Ltd in the preparation of this report.

The term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential soils and groundwater contamination). The term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements). It should be noted that this is an integrated investigation and these two main aspects are related, unless otherwise specified within the report.

Phase I reports are written in general accordance with the description of a Preliminary Investigation as defined in BS10175:2011+A2:2017 and are also produced in general accordance with the recommendations for a Tier 1 Preliminary Risk Assessment as described in LCRM guidance

The first stage of the investigation and assessment of a site is the Preliminary Investigation/Tier 1 Preliminary Risk Assessment, often referred to as a Phase 1 Desk Study, comprising a desk study and walk-over survey and collation of desk-based searches, which culminates in the Preliminary Risk Assessment and the development of a preliminary/initial Conceptual Site Model (CSM). From this are identified any potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them.

From the geo-environmental perspective, the hazard Identification process uses professional judgement to evaluate all the hazards in terms of possible contaminant linkages (of source-pathway-receptor). Possible contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment as part of Phase II investigations and reports.

Contaminated Land - Legislative Background

Environmental liabilities and risks have been evaluated in terms of a source -pathway - target relationship in accordance with the approach set out in:

- The 1995 Environment Act.
- The DETR circular 02/2000 Environmental Protection Act 1990: Part IIA Contaminated Land.
- The Contaminated Land (England) Regulations 2000.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM) 2019.

Contaminated land is defined within the legislative framework as land which is in such condition by reason of substances in, on or under the land that:

- 1) Significant harm is being caused or there is a significant possibility of such harm being caused.
- 2) Significant pollution of controlled waters is being or is likely to be caused.

The potential for harm is based on the presence of three factors:

Source - substances that are potential contaminants or pollutants that may cause harm.

Pathway - a potential route by which contaminants can move from the source to the receptor.

Receptor - a receptor that may be harmed, for example the water environment, humans and water.

Where a source, pathway and target are all present a pollutant linkage exists and there is potential for harm to be caused. The presence of a source does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and unacceptable risk of harm. The nature and importance of both pathways and receptors are site specific and will vary according to the intended end use of the site, its characteristics and its surroundings.

The key principle which supports the SPR approach is 'suitable for use' criteria. This requires remedial action only where contamination is considered to pose unacceptable actual or potential risks to health or the environment and, taking into account the proposed use of the site.

Relevant Guidance Documents

This report has been prepared in accordance with the list of guidance below, however the list is not exhaustive:

- DETR: Circular 02/2000: Environmental Protection Act 1990: Part IIA: Contaminated land. 2012.
- Environment Agency technical advice to third parties on Pollution of Controlled Waters for Part IIA of the EPA1990, May 2002.
- BS 10175:2011+A2:2017.
- Environment Agency (EA) - Land Contamination Risk Management (LCRM). 2019.

Relevant Legislative Documents

The following is a non-exhaustive list of legislative framework documents that has been considered in the production of this report:

- The Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance (2012).
 - The Environment Protection Act (1990).
 - The Water Resources Act (1991).
 - The Environment Act (1995).
 - The Contaminated Land (England) Act (2000).
 - The Pollution Prevention and Control (England and Wales) Regulations (2000).
 - The Landfill Regulations (England and Wales) Regulations (2002).
 - The Landfill (England and Wales) (Amendment) Regulations (2004).
 - Contaminated Land (England) Regulations (2012).
-

- Health and Safety at Work Act.
- National Planning Policy Framework (NPPF) 2021.

Contaminated Land Risk Assessment Approach

Contaminated Land Risk Assessment is a technique that identifies and considers the associated risk, determines whether the risks are significant and whether action needs to be taken. The four main stages of risk assessment are:

Hazard Identification ➡ Hazard Assessment ➡ Risk Estimation ➡ Risk Evaluation.

LCRM outlines the framework to be followed for risk assessment in the UK. The framework is designed to be consistent with UK legislation and policies including planning. The starting point of the risk assessment is to identify the context of the problem and the objectives of the process. Under LCRM, three tiers of risk assessment exist – Stage/Tier Preliminary Risk Assessment, Stage 2 Generic Quantitative and Stage 3 Detailed Quantitative.

Further information can be found at the below site:

<https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

Formulating and developing a conceptual model for the site is an important requirement of risk assessment, this supports the identification and assessment of pollutant linkages. Development of the conceptual model forms the main part of preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained through the risk assessment process.

Risk is a combination of the likelihood of an event occurring and the magnitude of its consequences. Therefore, both the likelihood and the consequences of an event must be taken into account when assessing risk.

The risk assessment process needs to take into account the degree of confidence required in decisions. Identification of uncertainties is an essential step in risk assessment.

The likelihood of an event is classified on a four-point system using the following terms and definitions from CIRIA C552:

High likelihood: There is a pollution linkage and an event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.

Likely: There is a pollution linkage and all the elements are present and in the right place, which means it is probable that an event will occur. Circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term.

Low likelihood: There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain even over a longer period such event would take place, and is less likely in the short term.

Unlikely: There is a pollution linkage but circumstances are such that it is improbable the event would occur even in the long term.

The severity is also classified using a system based on CIRIA C552. The terms and definitions are:

Severe: Short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. A short-term risk to a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

Examples – High concentrations of contaminant on surface of recreation area, major spillage of contaminants from site into controlled waters, explosion causing building to collapse;

Medium: Chronic damage to human health ('significant harm' as defined in DETR 2000). Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

Examples - Concentrations of contaminants exceed the generic assessment criteria, leaching of contaminants from a site to a Principal or Secondary Aquifer, death of species within a designated nature reserve;

Mild: Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures, services or the environment;

Examples – Pollution of non-classified groundwater or damage to buildings rendering it unsafe to occupy.

Minor: harm, not necessarily significant harm, which may result in financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by use of personal protective clothing etc). Easily repairable effects of damage to buildings, structures and services.

Examples – Presence of contaminants at such concentrations PPE is required during site work, loss of plants in landscaping scheme or discolouration of concrete.

Once the likelihood and severity have been determined, a risk category can be assigned using the table below.

		Consequences			
		Severe	Medium	Mild	Minor
Probability	Highly likely	Very high	High	Moderate	Moderate/low
	Likely	High	Moderate	Moderate/low	Low
	Low likelihood	Moderate	Moderate/low	Low	Very low
	Unlikely	Moderate/low	Low	Very Low	Very low
	No Linkage	Negligible			

Definitions of the risk categories obtained from the above table are as follows together with an assessment of the further work that might be required:

Very high: There is a high probability that severe harm could arise to a designated receptor from an identified hazard or there is evidence that severe harm is currently happening. This risk, if realised, could result in substantial liability. Urgent investigation and remediation are likely to be required.

High: Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation is required and remedial works may be necessary in the short term and are likely over the longer term.

Moderate: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it would be more likely to be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term.

Low: It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.

Very Low: There is a low possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

Some linkages may be identified which constitutes a theoretical connection between a source and a receptor, but professional judgement shows them not to be possible for some reason. These are labelled ‘no linkage’ in the summary table, which give rise to a **negligible** risk category and no further action is required.

Ground Gas Risk Assessment Guidance

BS8485:2015+A1:2019, BS 8576:2013, CIRIA C665 and CL:AIRE RB17 are the current guidance which gives up-to-date advice on all aspects of ground gas. They outline good practice in investigation, the collection of relevant data and monitoring programmes in a risk-based approach to ground gas contamination.

Within BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665, two semi-quantitative methods are set out for the assessment of risk:

- 1 For low rise housing with a ventilated under floor void at minimum 150 mm (Boyle and Witherington).
- 2 For all other development types (Wilson and Card).

Both methods use the concept of Gas Screening Values (GSVs) to identify levels of risk. The mitigation and management of potentially unacceptable risk is described with reference to both passive and active systems of gas. Source removal is also discussed as an option. A separate approach is discussed under the RB17 header further below.

The aim of the guidance is for a consistent approach to decision making, particularly relating to the scope of protective design measures on a site-specific basis.

Legislative Framework

BS8485:2015+A1:2019, BS 8576:2013 and CIRIA C665 provides technical guidance, however they also recognise the context into which the guidance has to be employed. Government policy is based upon a “suitable for use approach”, which is relevant to both the current and proposed future use of land. When considering the current use of land, Part IIA of the Environment Protection Act 1990 provides the regulatory regime. The presence of hazardous ground gases could provide the “source” in a “pollutant linkage” which could lead the regulator to determine that considerable harm or there is a significant possibility of such harm being caused. Under such circumstances, the regulator would determine the land to be “contaminated land” under the provisions of the Act, setting out the process of remediation as described in the DETR Circular 02/2000 *Statutory guidance on contaminated land*.

Generation Potential of Sources

BS 8576:2013 Figure 6 provides a basis for assessing the generation potential from sources identified as part of the Phase I Assessment. These are summarised below:

Generation Potential	Typical Sources
Very Low	- Natural carbonate soil and strata, e.g. chalk and limestone. - Natural soil strata with a low degradable organic content, e.g. alluvium, peat. - In-filled pond less than 15 m diameter, in-filled before 1930s to 1940s. - Made ground with low degradable organic content (e.g. up to 5% organic material such as pieces of wood, pieces of paper, rags, etc. with a high proportion of ash and no food or other easily degradable waste). - Mine workings shallow or shaft (where there is clear evidence that they are flooded). - Inert landfill sites.
Low	- Natural soil strata with a high degradable organic content (DOC). - Made ground with total organic carbon (TOC) up to 6% (e.g. dock silt, no food or other easily degradable waste). - Foundry sand (includes phenolic binders, rags and wood that decay, albeit at low rates). - Landfill 1945 to mid 1960s (see also Moderate below).

Generation Potential	Typical Sources
Moderate	- Sewage sludge. - Mine workings – unflooded, more than 50 years since last worked (gas is liberated from coal when mine workings are excavated; this continues for up to about 50 years). - Landfill 1945 to mid 1960s (this could also be “low” or, if disturbed, “high”).
High	- Landfill mid 1960s to early 1990s. - Mine workings – unflooded – less than 50 years since last worked.
Very High	- Municipal landfill sites. - Landfill early 1990s onward.

Frequency and Duration of Monitoring

The monitoring period for a specific site covers the “worst case” scenario. A “worst case” scenario will typically occur during falling atmospheric pressure and, in particular, weather conditions such as rainfall, frost and dry weather.

The benefits of the additional information and whether it is likely to change the scope of gas protection should be considered, as are the consequences of failing to characterise adequately pollutant linkages. Investigations concerned with soil gas are required to provide monitoring data sufficient to allow prediction of worst case conditions enabling the confident assessment of risk and subsequent design of appropriate gas protection schemes. Monitoring programmes should not be an academic exercise in data collection. CL:AIRE publication TB17 “Ground Gas Monitoring and ‘Worst-Case’ Conditions” provides further guidance.

Below are matrices that will aid in determining an appropriate number of gas monitoring visits and the length of monitoring period.

Typical/idealised periods of monitoring

		Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (Apartments)	2 months	3 months	6 months	12 months	24 months
	High (Low rise Residential)	3 months	6 months	6 months	12 months	24 months

Typical/idealised frequency of monitoring/Number of Visits Required

		Gas Generation of Potential Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of Development	Low (Commercial)	4	6	6	12	12
	Moderate (Apartments)	6	6	9	12	24
	High (Low rise Residential)	6	9	12	24	24

Note

- NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).
- Generation potential of sources based on descriptions within BS 8576:2013.
- At least two sets of readings should be at low and falling atmospheric pressure (but not restricted to periods below <1000 mb) known as worst case conditions. Historical data can be used as part of the data set (Table 5.5b).

It is recommended that newly installed monitoring wells are left for 24 hours to allow the soil gas to reach equilibrium. It should be recognised, however, that some soil gas regimes could take considerably longer (up to seven days). Interpretation of any initial readings should take this equilibrium process into account.

RB17 Approach

CL:AIRE RB17 (Card et al 2012) is a pragmatic approach to ground gas risk assessment and was developed because gas concentration, pressure and flow rate measured in a well headspace may not be representative of the conditions in the surrounding formation.

In these low-risk situations, the approach is to use the conceptual site model and the estimation of the likely gas generation from a source to identify where or if gas monitoring is required to better define the risks.

Under this approach, for sites with natural soils only with no credible methane source, then no action is required (no monitoring or gas protection measures) as this represents Characteristic Situation 1 (CS1).

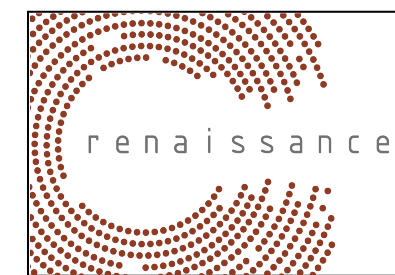
Unexploded Ordnance (UXO) Guidance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA report C681.

BSL carry out non-specialist UXO screening exercises by considering any evidence of UK defence activities on or near the site evident from gathered desk study information and the unexploded aerial delivered bomb (UXB) online risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available online Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experienced and considered competent in the assessment of UXO.

APPENDIX B

Historical Maps



Site Details:

CAR PARK, TRUMPET STREET,
MANCHESTER, M1 5LE

Client Ref: C4889-2475-SD
Report Ref: BRO-8223856
Grid Ref: 383678, 397602

Map Name: 1056 Scale Town Plan

Map date: 1851

Scale: 1:1,056

Printed at: 1:1,056



Surveyed 1849
Revised N/A
Edition 1851
Copyright N/A
Levelled N/A

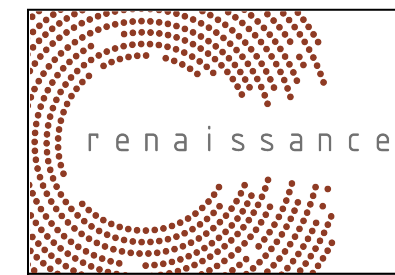


Distributed by Brownfield Solutions
T: 01606 334844
E: info@brownfield-solutions.co.uk
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.aroundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 29 September 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

CAR PARK, TRUMPET STREET,
MANCHESTER, M1 5LE

Client Ref: C4889-2475-SD
Report Ref: BRO-8223856
Grid Ref: 383678, 397602

Map Name: County Series Town Plan

Map date: 1891

Scale: 1:500

Printed at: 1:1,000



Surveyed 1891
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1891
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

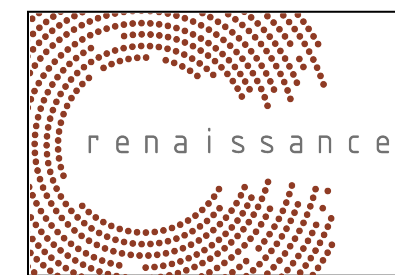
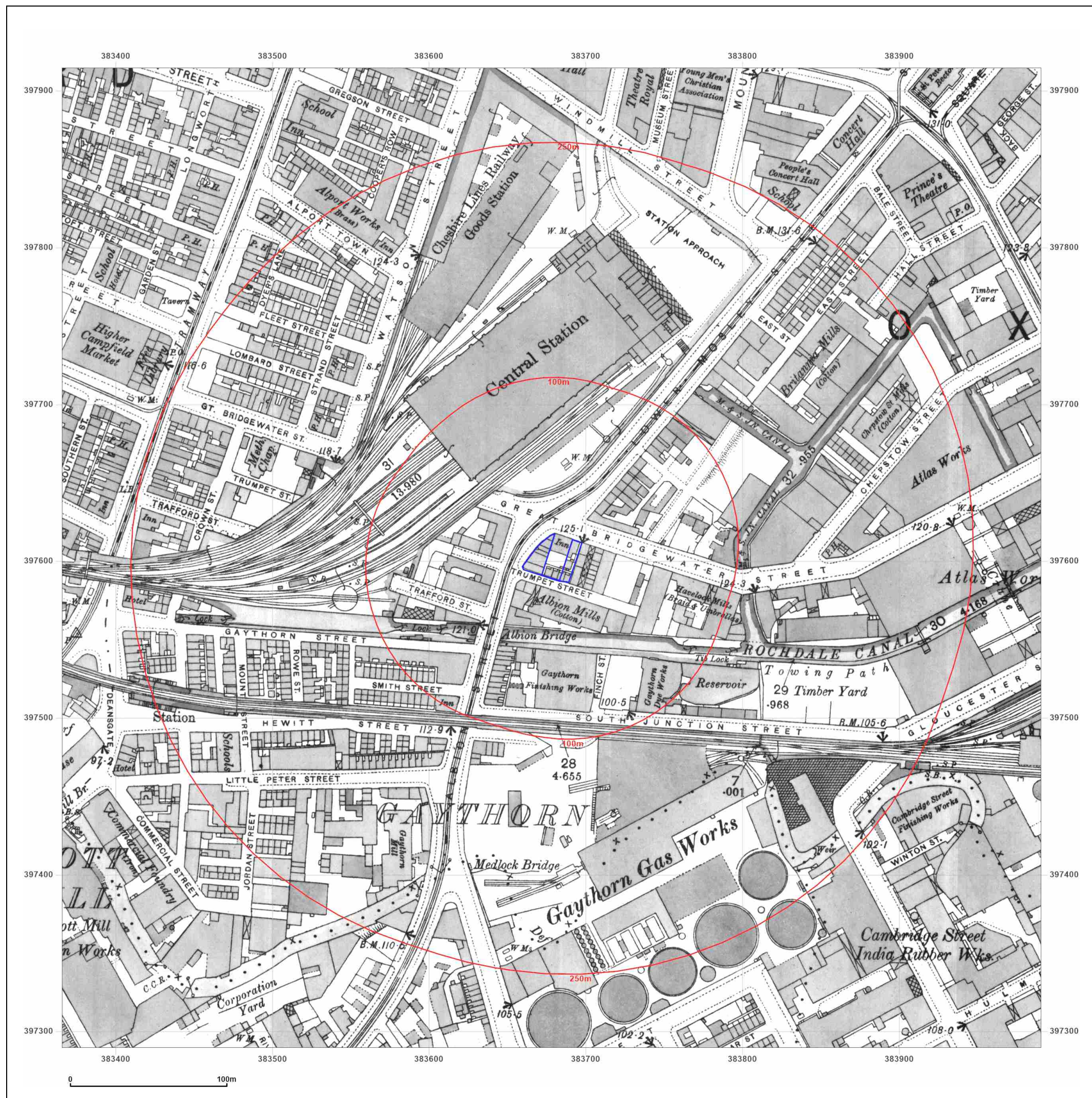


Distributed by Brownfield Solutions
T: 01606 334844
E: info@brownfield-solutions.co.uk
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 29 September 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

CAR PARK, TRUMPET STREET,
MANCHESTER, M1 5LE

Client Ref: C4889-2475-SD
Report Ref: BRO-8223856
Grid Ref: 383678, 397602

Map Name: County Series

Map date: 1893

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1893
Revised N/A
Edition 1893
Copyright N/A
Levelled N/A

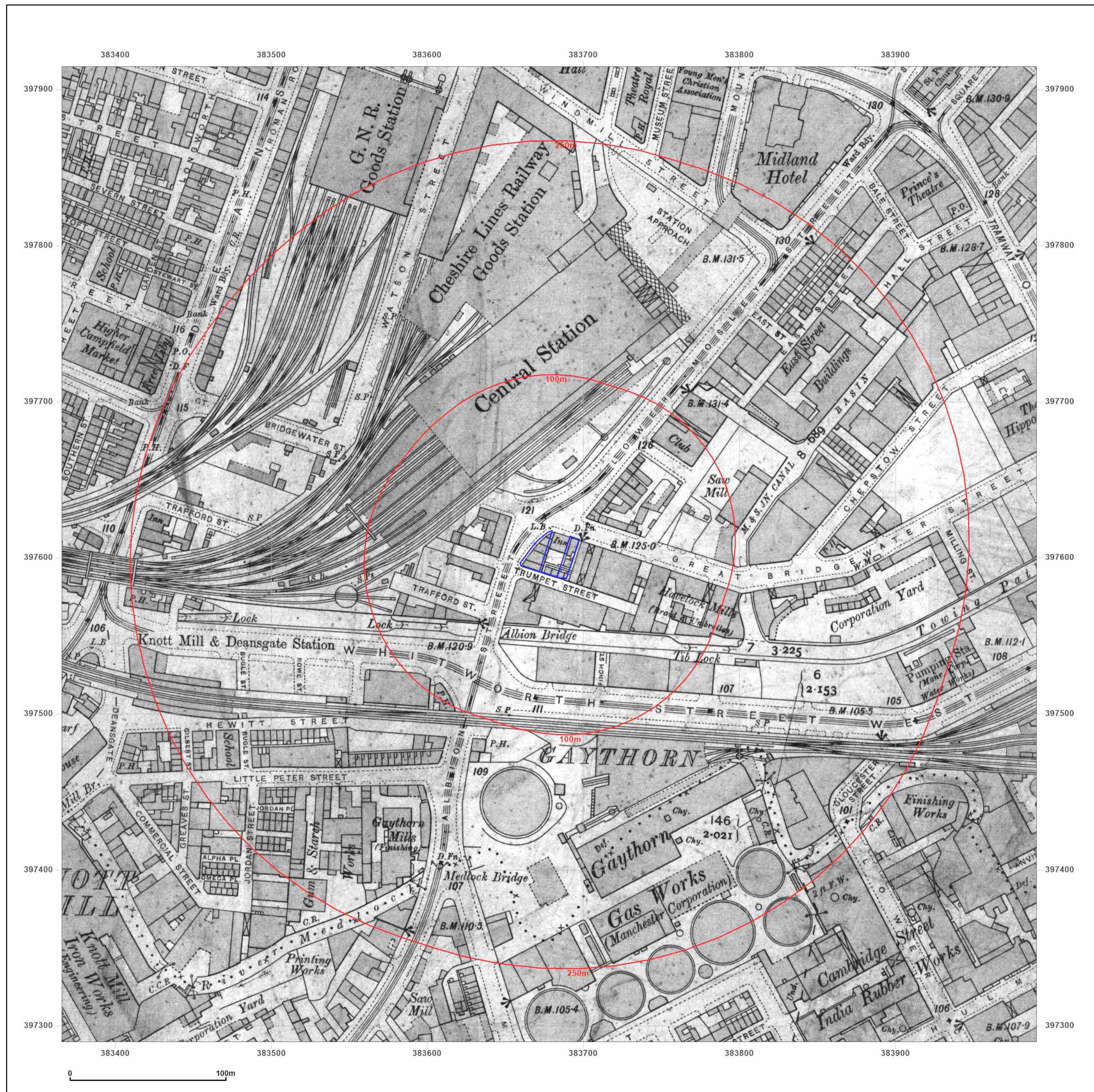


Distributed by Brownfield Solutions
T: 01606 334844
E: info@brownfield-solutions.co.uk
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.aroundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 29 September 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

CAR PARK, TRUMPET STREET,
MANCHESTER, M1 5LE

Client Ref: C4889-2475-SD
Report Ref: BRO-8223856
Grid Ref: 383678, 397602

Map Name: County Series

Map date: 1908

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1891
Revised 1905
Edition 1908
Copyright N/A
Levelled N/A

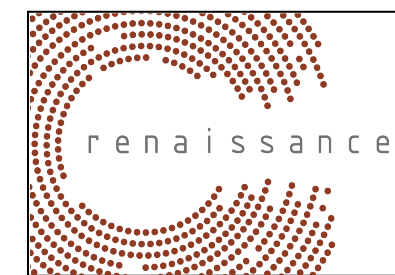


Distributed by Brownfield Solutions
T: 01606 334844
E: info@brownfield-solutions.co.uk
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 29 September 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

CAR PARK, TRUMPET STREET,
MANCHESTER, M1 5LE

Client Ref: C4889-2475-SD
Report Ref: BRO-8223856
Grid Ref: 383678, 397602

Map Name: County Series

Map date: 1922

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1922
Revised 1916
Edition 1922
Copyright N/A
Levelled 1915

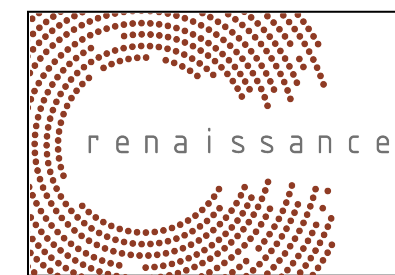
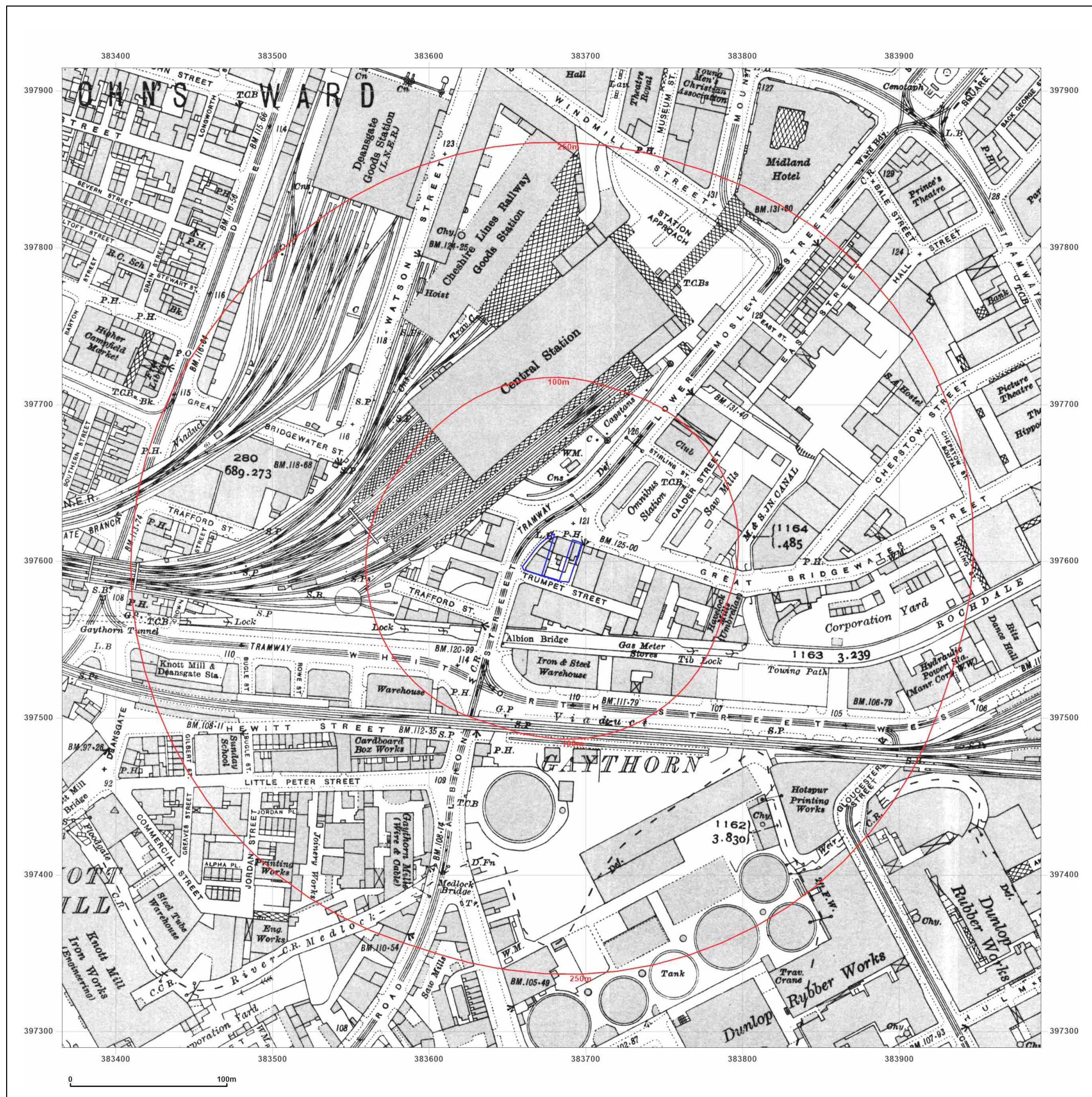


Distributed by Brownfield Solutions
T: 01606 334844
E: info@brownfield-solutions.co.uk
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 29 September 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

CAR PARK, TRUMPET STREET,
MANCHESTER, M1 5LE

Client Ref: C4889-2475-SD
Report Ref: BRO-8223856
Grid Ref: 383678, 397602

Map Name: County Series

Map date: 1932

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1873
Revised 1932
Edition N/A
Copyright N/A
Levelled 1927



Distributed by Brownfield Solutions
T: 01606 334844
E: info@brownfield-solutions.co.uk
Produced by
Groundsure Insights
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2018 Ordnance Survey 100035207

Production date: 29 September 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf