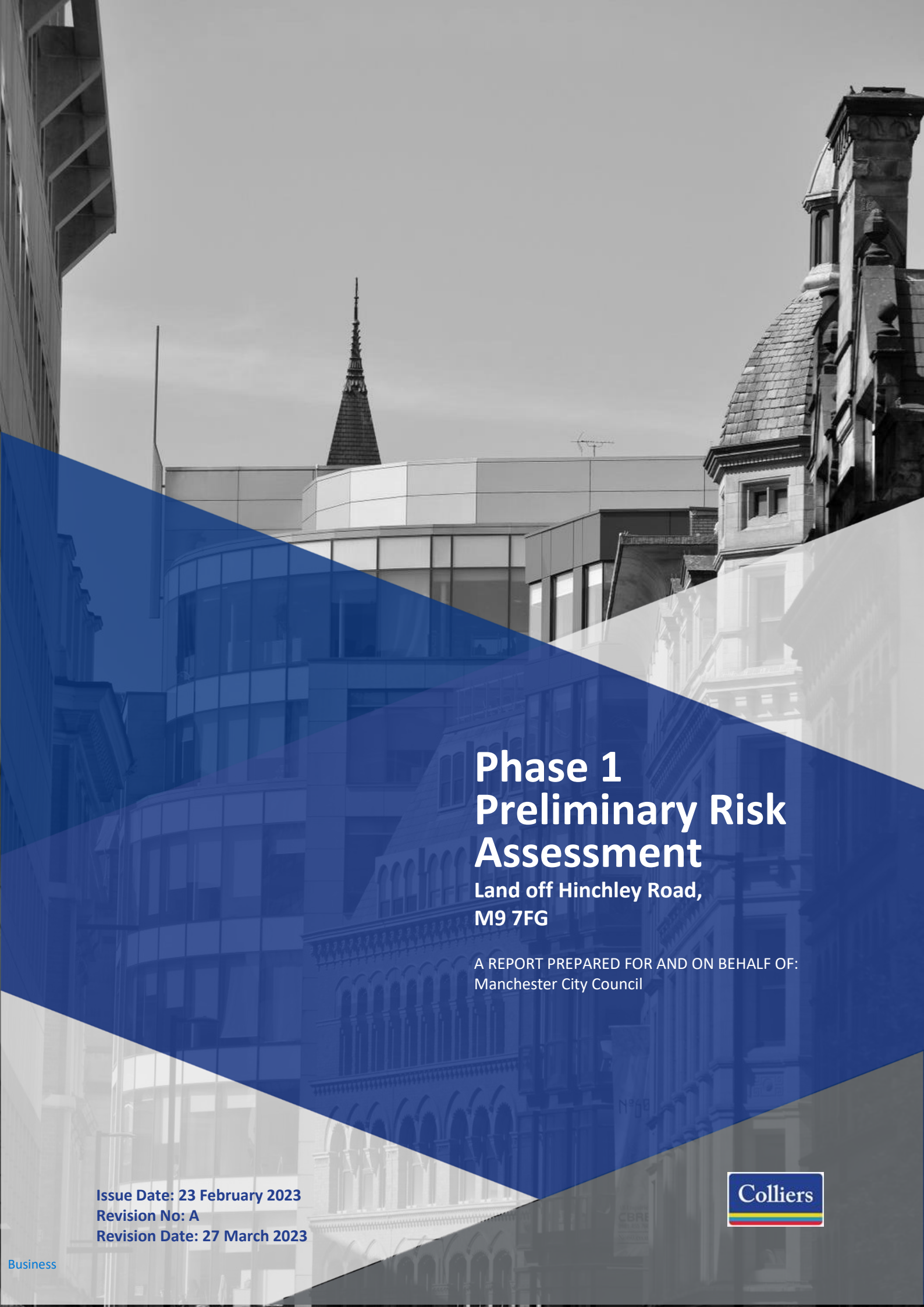


Phase 1 Preliminary Risk Assessment

Land off Hinchley Road, M9 7FG

A REPORT PREPARED FOR AND ON BEHALF OF:
Manchester City Council

Issue Date: 23 February 2023
Revision No: A
Revision Date: 27 March 2023

Business



Issuing Office:	Colliers, The Harlequin Building, 65 Southwark Street, London, SE1 0HR Tel: 020 7125 0112
Date:	23 February 2023
Reference:	22.1784/CW/LC
Report Prepared By:	Charlotte Walker BSc
Signature:	[redacted]
Report Checked By:	Charlie Bruinvels BSc MSc CEnv C.WEM
Signature:	[redacted]

For and on behalf of
Colliers Building Consultancy Limited

DASHBOARD SUMMARY

KEY SURVEY FINDINGS

H *Critical or high risk issue for urgent management attention*

M H *Moderate to high risk issue considered as a significant management item*

M *Medium risk issue for ongoing management or action*

L M *Low to medium risk issue that may require management or action*

L *Low risk item or for information only*

	The following issues represent the key matters for consideration as a result of our Preliminary Risk Assessment, with regards to ground conditions, as part of the proposed development. The information provided is to inform potential purchasers' due diligence for proposed residential development prior to entering a purchase contract.
	Site Setting
1.	The development site is situated at Hinchley Road, Manchester, M9 7FG (Figure 1, Appendix 1). Manchester City Council has appointed Colliers to complete a Phase 1 Preliminary Risk Assessment to support the development of the site.
2.	The site currently comprises roughly vegetated, undeveloped land with no significant use. The site surface is uneven, with mounding along the north western boundary of the site approximately 2-3 m in height.
3.	The site is situated in a predominantly residential area with a school and sports facility to the west, residential properties to the north, west and south of the Site, with the M60 further to the north.
4.	Historically the site has been predominantly undeveloped or in use as open recreation grounds since the earliest available mapping, with the exception of the presence of two former buildings in the south associated with likely agricultural use between 1893 and 1938.
5.	During a site walkover on 22 February 2022, subsurface utility features and evidence of previous ground investigation was noted. Some limited domestic fly tipping was also noted across the site, however this was not extensive in nature and no hazardous materials such as asbestos were noted.
	Ground Conditions
6.	From a review of British Geological Survey (BGS) mapping, the geology of the subject site comprises superficial deposits of peat in the north of the site and till in the south of the site, underlain by bedrock of the Pennine Middle Coal Measures Formation.
	Environmental Findings
7.	Given the sites historical development and noted mounding in the north east the potential for Made Ground and some degree of contamination within the shallow soils cannot be discounted. Where the make-up of the mounding on the north eastern boundary will need to be analysed further to determine whether there is a risk to future site users.

	Geotechnical Findings
8.	The underlying geology is considered to be compressible, particularly in areas of peat deposits. Furthermore, an area of the site is classified as within a development high risk area in relation to outcropping coal seams. As such, suitable foundations will need to be designed. Therefore, a ground investigation and geotechnical classification of the soils is considered to be required.
9.	The anticipated cohesive nature of the underlying soils indicates that soakaway drainage is unlikely to be feasible. As such, offsite drainage is likely to be required at this stage.

RECOMMENDATIONS AND COSTS

Although no gross contamination is anticipated, prior to development commencing, a ground investigation is recommended to assess the risk associated with the underlying coal measures and peat deposits. This should include shallow and deep boreholes, trial pitting, chemical analysis and ground gas/groundwater monitoring. The investigation should also include in-situ geotechnical testing of the soils (Standard Penetration Testing), and geotechnical laboratory analysis. A permit to drill through coal seams understood to be present at the site will also be required prior to commencement. Any further reports relating to the site should be made available for review prior to undertaking any further ground investigation.

It would be anticipated that a Coal Mining Risk Assessment (CMRA) will be required as part of the planning application and to adequately design future site investigations for geotechnical purposes.

A Stage 2 Unexploded Ordnance (UXO) risk assessment is required as the site is considered to be in a medium risk zone for UXO (based on Zetica risk ratings). Depending on the outcome of the risk assessment further UXO support may be required as part of the investigation.

This report should be submitted to the Local Planning Authority in support of a planning application for the development.

CONTENTS

DASHBOARD SUMMARY		
1.0	INSTRUCTIONS	1
2.0	AIMS AND OBJECTIVES	1
3.0	SCOPE OF WORKS	1
4.0	INTRODUCTION	2
5.0	PRELIMINARY CONCEPTUAL SITE MODEL	8
6.0	PRELIMINARY GEOTECHNICAL RISK ASSESSMENT	10
7.0	CONCLUSIONS AND RECOMMENDATIONS	11
APPENDIX 1:	FIGURES	13
APPENDIX 2:	PHOTOGRAPHS	15
APPENDIX 3:	HISTORICAL MAP RECORD	18
APPENDIX 4:	COAL REPORT	28
APPENDIX 5:	FLOOD RISK ASSESSMENT	29
APPENDIX 6:	PRELIMINARY RISK ASSESSMENT MATRIX	30
APPENDIX 7:	EXTENT OF SURVEY AND LIMITATIONS	34

PHASE 1 PRELIMINARY RISK ASSESSMENT

CLIENT NAME: Manchester City Council

PROPERTY ADDRESS: Land off Hinchley Road, M9 7FG

INSPECTION DATE: 22 February 2023



1.0 INSTRUCTIONS

1.1	Colliers was instructed by Manchester City Council to complete a Phase 1 Preliminary Risk Assessment on a site referred to as Land off Hinchley Road, M9 7FG. These works have been completed in connection with the sale and anticipated development of the site into residential properties or public open space.
1.2	The information provided is to inform potential purchasers' due diligence for proposed residential development prior to entering a purchase contract.

2.0 AIMS AND OBJECTIVES

2.1	The aim of this report is to assess the environmental and geotechnical risks associated with redeveloping the site.
2.2	The objective of this report is to complete a site walkover and review various data sources, in order to prepare a Preliminary Risk Assessment.

3.0 SCOPE OF WORKS

3.1	This assessment has been carried out in general accordance with current best practice requirements of the National Planning Policy Framework (NPPF) and guidance; as given in the Land Contamination: Risk Management (LCRM, 2020), Contaminated Land Exposure Assessment (CLEA) framework, Part 2A of the Environmental Protection Act (EPA) 1990 (and subsequent amendments), DEFRA (2012) Part 2A Contaminated Land Statutory Guidance and CIRIA Contaminated Land Risk Assessment Guide to Good Practice C552 (2001).

4.0 INTRODUCTION

4.1	**Site Location**
4.1.1	The site is centred approximately at National Grid Reference: 387821, 403141, and extends to approximately 2.67 Ha. The approximate elevation of the site is 101.0m Above Ordnance Datum (mAOD). A site location plan is provided as Figure 1, in Appendix 1.
4.2	**General Description and Current Site Use**
4.2.1	The site is currently undeveloped and comprises a vegetated open space. To the north and east of the site, residential fencing restricts access to the Site. To the west, access is restricted by palisade fencing from the neighbouring school. The southern boundary of the Site does not currently benefit from a fence/boundary wall.
4.2.2	The site is situated in a predominantly residential area with a school and sports facility to the west, residential properties to the north, west and south of the Site, with the M60 further to the north.
4.2.3	A site walkover was undertaken on 22 February 2022, photographs taken during the inspection are presented in Appendix 2. A summary of the key information for this assessment is presented below.
4.2.4	The site currently comprises roughly vegetated, undeveloped land with no significant use. The site surface is uneven, with mounding along the north western boundary of the site approximately 2-3 m in height.
4.2.5	Some subsurface utility features were noted including likely foul water drainage. Furthermore, three boreholes were noted across the site and evidence of sunken ground considered to be a former trial pit from previous ground investigation. It is recommended that any previous reports relating to the site should be made available for review.
4.2.6	Some limited domestic fly tipping was noted across the site, however this was not extensive in nature and no hazardous materials such as asbestos were noted. Access to the site is freely available.
4.3	**Proposed Development**
4.3.1	At this stage no formal proposed development has been provided at present. However, it is likely given the surrounding area that the nature of the development will be of a residential or public open space use.
4.3.2	We have not been provided with foundation requirements or proposed loadings, and it is anticipated that an assessment will be completed in the future.
4.4	**Planning**
4.4.1	A review of Manchester City Councils planning portal did not identify any relevant planning applications for the site area.
4.4.2	It is understood that this report will form part of the planning application and no information has been submitted to date.

4.5 Site History

4.5.1 Colliers has completed a review of the historical map records for the site. A summary is presented in Table 1 below.

4.5.2 **Table 1. Site History**

Date	Key Features Onsite	Key Features Offsite
1848	Undeveloped fields in likely agricultural use. With the Moss House in the south of the site, and a potential on site culvert.	The site is surrounded by undeveloped fields.
1891	No pertinent change.	No pertinent change.
1906	No pertinent change.	A cotton waste mill is present approximately 250m east of the site. Further afield Moston Collieries has developed approximately 800m to the south east.
1915	No pertinent change.	A clay pit is present, approximately 100 m south of the site.
1923	No pertinent change.	No pertinent change.
1933	The north east of the site is shown to be occupied by recreational grounds associated with the local high school.	A brick works is noted to be present in the area of the former clay pit to the south of the site.
1938	No pertinent change.	No pertinent change.
1956	Moss House is no longer noted in the south of the site.	The surrounding area has developed high density residential housing to the north and south, and further schools to the west. A large factory and brick works is noted approximately 750 north east.
1966	No pertinent change.	No pertinent change.
1975	Tennis courts are present in the south of the site.	The previously high density housing to the north of the site has been redeveloped into high rise flats.
1980 - 2001	No pertinent change.	No pertinent change.
2010	No pertinent change.	M60 Developed to the north of the site.

4.6 Geology

4.6.1 From a review of the British Geological Survey (BGS) mapping, the geology of the subject site comprises superficial Peat deposits (in the northern part of the site) and Till deposits (in the south of the site), over bedrock of the Pennine Middle Coal Measures.

4.6.2 A review of the BGS mapping records has identified a third-party borehole situated some 230m south east of the site. A summary of the ground conditions is presented below. Further boreholes are noted to have been undertaken in closer proximity to the site (in relation to the neighbouring Charlestown School development) however, are listed as confidential.

4.6.3 **Table 2. Ground Conditions**

Depth From (mbgl)	Depth To (mbgl)	Soil Type
Ground Level	2.00	Fill
2.00	6.15	Silty Sandy Clay/ Silt

4.6.4 Groundwater was encountered at 3.5m bgl (approximately 97 mAOD).

4.7 Hydrogeology

4.7.1 The Environment Agency (EA) classify the Peat/Till Deposits as Unproductive Strata/ Secondary undifferentiated in the most southern point of the site. The underlying bedrock is classified as a Secondary (A) Aquifer.

4.7.2 The site is not within a Groundwater Source Protection Zone (SPZ).

4.7.3 There are no groundwater abstraction licences within 1km of the site.

4.7.4 Whilst there may be some perched groundwater within the superficial Peat Deposits, groundwater is anticipated to be within the Pennine Middle Coal Measures.

4.8 Hydrology

4.8.1 There are no surface water features onsite, or within 250m of the site.

4.8.2 There are no surface water abstraction licences within 1km of the site.

4.8.3 There are no discharge consents relating to site activities.

4.9 **Environmental Data**

4.9.1 The following information has been ascertained from publicly available Environment Agency, BGS, Local Authority and NRPB records.

Environmental Records	On site	0-250m	Description
Pollution Incidents to controlled waters	0	0	N/A
Registered landfill or other waste disposal sites	0	1	One historical landfill site has been identified approximately 125m south east of the site. Accepting commercial, household and liquid sludge.
Waste transfer sites	0	0	N/A
Part A(2) and B activities	0	0	N/A
Integrated Pollution Prevention and Control authorisations	0	0	N/A
Licensed radioactive substances	0	0	N/A
Enforcements, prohibitions or prosecutions	0	0	N/A
Fuel sites	0	0	N/A
Is the site in an area where there is a known risk of subsidence?			Records indicate that the area in general has a high risk of subsidence hazards as a result of highly compressible ground conditions underlying the site.
Is the site in a radon-affected area?			Less than 1% of homes are above the radon action levels, as such, no radon protection measures are considered necessary.
Are there any overhead transmission lines, masts or pylons for electricity on or within 250 metres of the site?			There are no obvious masts or pylons within 250 metres of the subject site.
Is the site at risk from Coal Mining?			The site is situated within a Coal Mining Reporting Area and an area of Development High Risk is present within the south of the Site.

4.10 **Flooding**

4.10.1 A flood risk assessment has been undertaken by GeoSmart and has been provided within Appendix 5. A summary of key findings is presented below.

4.10.2 The site is not located within a flood zone and has a very low risk of flooding from rivers and the sea. Very low risk means that this area has a chance of flooding of less than 0.1% each year. This takes into account the effect of any flood defences in the area.

4.10.3 The site has a final risk rating of very low to low for risk from surface water, which was reduced from initially very low to high within baseline national risk maps following detailed analysis.

4.10.4 According to environmental data (Ambiental Risk Analytics) there is a low to negligible risk of groundwater flooding.

4.10.5 Flood maps can be found in Appendix 4.

4.11 Regulatory Enquiries

4.11.1 A request for Environmental Information has been submitted. However, upon review of the Manchester City Council's Contaminated Land Register, there are no entries for the site. This means the regulators have not classified the site as Contaminated Land under Part 2A of the Environmental Protection Act 1990.

4.12 Environmental Database Information

4.12.1 No Sites of Special Scientific Interest (SSSI), Conserved Wetland Sites (Ramsar sites), Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Areas of Outstanding Natural Beauty (AONB) have been identified within 1km of the site.

4.12.2 One historical landfill site has been identified approximately 125m south east of the site. Accepting commercial, household and liquid sludge.

4.12.3 No fuel entries have been identified within 500m of the site boundary.

4.13 Ground Stability Hazards

4.13.1 The following data is obtained from the Groundsure report, which is based on natural subsidence information provided by the British Geological Survey.

4.13.2 **Table 3. Ground Stability Hazards**

Hazard	Groundsure Risk Rating
Shrink-Swell	Very Low
Landslide	Very Low
Soluble Rocks	Negligible
Compressible Ground	High
Collapsible Rocks	Very Low
Running Sand	Very Low

4.13.3	The site is situated within a Coal Mining Reporting Area and an area of Development High Risk is present within the south of the Site.
4.14	**Unexploded Ordnance (UXO)**
4.14.1	In general accordance with CIRIA C681 (Stone et al 2009), a non-specialist UXO evaluation has been undertaken. This has included our review of Zetica Bomb Risk Mapping[1], which indicates that there is a moderate risk associated with UXO. As such, further assessment is considered to be necessary.
4.15	**Radon**
4.15.1	The site is situated within an area where less than 1% of homes are above the Radon Action Level. As such, no special radon protection measures are required. This is based on information provided by the British Geological Survey (Radon Atlas) and Public Health England.
4.16	**Previous Reports**
4.16.1	No third-party reports have been provided for review.
4.17	**Coal Authority**
4.17.1	The site is in a coal mining reporting area. The full Consultant's Coal Authority report is provided below. However, in summary the following points are noted: **Past underground mining –** Yes, depth 113 m. Year last mined 1884. Extraction thickness 2.20m. Seam – Roger. Unnamed colliery. **Probable unrecorded shallow workings –** None **Spine roadways at shallow depth –** No spine roadway recorded at shallow depth. **Mine entries –** None recorded within 100 metres of the enquiry boundary. **Abandoned mine plan catalogue numbers –** 2147, 16820, and 14942. **Outcrops –** Two outcrops are recorded across the Site - Radley. As shown within Appendix 6. **Geological faults, fissures and breaklines –** None recorded within 500m of the site. **Opencast mines** – None recorded within 500m of the site.
4.17.2	Based on the limited information that is comprised within the coal report and owing to the anticipated ground conditions and high-risk development area. Including past underground mining and two outcrops within the site, it would be anticipated that a Coal Mining Risk Assessment (CMRA) will be required to adequately design future site investigations for geotechnical purposes.

[1] https://zeticauxo.com/downloads-and-resources/risk-maps/

5.0 PRELIMINARY CONCEPTUAL SITE MODEL

5.1 Qualitative Risk Assessment of Pollutant Linkages

5.1.1 In order to assess the risks associated with the presence of ground contamination, the linkages between the sources and potential receptors need to be established and evaluated. This is in accordance with Part 2A of the Environmental Protection Act (EPA) 1990 (and relevant amendments), which provides a statutory definition of Contaminated Land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that:

- Significant harm is being caused or there is a significant possibility of such harm being caused; or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.

5.1.2 Risk from contamination is assessed by consideration of possible linkages between contaminant sources and potential pathways between them. A contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part 2A, including evidence of the actual presence of contaminants.

5.1.3 This assessment is based on the potential current and historical sources identified, the site's environmental setting and the development proposals to evaluate the potential source-pathway-receptor linkages, which must exist to define a site as contaminated land. The risk assessment considers the site within an area context and assesses potential risks to identified receptors in relation to the existing site setting and the proposed development.

5.2 Potential Sources

5.2.1 The following limited potential onsite sources have been identified:

- Heavy Metals, Polyaromatic Hydrocarbons (PAH), Petroleum Hydrocarbons (PHC), Asbestos, Volatile Organic Compounds (VOCs) within suspected Made Ground; and,
- Ground gases (Carbon Dioxide and Methane) from organic materials within the Peat, Made Ground and nearby historical landfill.

5.3 Potential Receptors

5.3.1 The following potential receptors have been identified:

- Site end users;
- Construction workers;
- Offsite users; and,
- Groundwater: Secondary (A) Aquifer (Pennine Middle Coal Measures).

5.4 Potential Pathways

5.4.1 The following potential pathways have been identified:

- Ingestion, direct contact (dermal), inhalation of dust and outdoor air;
- Ground gas ingress into property; and
- Migration of contamination into water courses/groundwater.

5.5 Risk Evaluation

5.5.1 CIRIA C552 (2001) has been used to define the risk rating presented in the Preliminary Qualitative Risk Assessment below in Table 3. The methodology and definition of risk associated with these linkages is set out in detail in Appendix 4. In summary, an evaluation of each viable pollutant linkage is made in relation to the 'probability of a risk being realised' (P) against the 'consequence of a risk being realised' (C) to establish a 'risk classification' (R). From this, the potential risk management requirements are established.

5.5.2 **Table 3. Preliminary Conceptual Site Model**

Potential sources	Pathways	Receptor	Risk	Justification
Heavy Metals, Polyaromatic Hydrocarbons (PAH), Petroleum Hydrocarbons (PHC), Asbestos, Volatile Organic Compounds (VOCs) within suspected Made Ground	Ingestion, inhalation or direct contact	Site Users	L M	The potential for some degree of Made Ground cannot be discounted. As such, further assessment is considered to be required.
		Construction workers	L M	The potential for some degree of Made Ground cannot be discounted. As such, further assessment is considered to be required.
		Offsite users	L	The sensitivity of the offsite receptors is considered to be moderate. However, it is unlikely that significant levels of contamination are present onsite. In addition, the underlying clay geology would mitigate the potential for migration. As such, the likelihood of harm occurring to offsite users is considered to be low.
	Migration of contamination into water courses/groundwater.	Groundwater: Secondary Undifferentiated Aquifer (Head Deposits	L	The likelihood of gross contamination being present is low. Furthermore, the underlying superficial aquifer is cohesive and unproductive, thus mitigating the potential for migration.
		Surface Water (None Identified)	L	No potential surface water receptors have been identified in proximity to the site. Furthermore, the likelihood of gross contamination being present is considered to be minimal. As such, no linkage has been identified.
Ground gases (carbon dioxide and methane) from organic materials within the Made Ground and superficial deposits.	Ingestion or direct contact	Site Users	L M	The potential for contaminants and hazardous ground gases within Made Ground/peat deposits underlying the site cannot be entirely discounted. As such, further assessment is considered to be required.
		Construction workers	L	The potential for contaminants within Made Ground underlying the site cannot be entirely discounted. As such, further assessment is considered to be required.

		Offsite users	L	The sensitivity of the offsite receptors is considered to be moderate. However, it is unlikely that significant levels of contamination is present onsite. In addition, the underlying clay geology would mitigate the potential for migration. As such, the likelihood of harm occurring to offsite users is considered to be low.

5.6 Key Environmental Risks Requiring Further Investigation

5.6.1 Based on the foregoing additional testing is required.

6.0 PRELIMINARY GEOTECHNICAL RISK ASSESSMENT

6.1 Preliminary Geotechnical Risk Assessment

6.1.1 The Phase 1 Preliminary Risk Assessment has also identified potential geotechnical hazards, which have been summarised in Table 5.

6.1.2 The identification of preliminary geotechnical hazards has been undertaken in general accordance with the Managing Geotechnical Risk (Institution of Civil Engineers (ICE) / Department of the Environment, Transport and the Regions (DETR), 2001), Eurocode 7: Geotechnical Design and The Highways Agency Design Manual for Roads and Bridges (DMRB) CD 622: Managing Geotechnical Risk (2021).

6.1.3 **Table 5. Preliminary Geotechnical Risk Assessment**

Hazard	Risk	Rationale
Made Ground	L M	The potential for Made Ground cannot be discounted. Due to the variable nature, strength and compressibility of Made Ground, further testing is required to design appropriate foundations.
Collapsible / Unstable Excavations	L M	Previous coal mining at the site has been undertaken at depths in excess of 100m bgl, and unrecorded shallow coal mining has not been listed as anticipated underlying the site. However, the risk of unstable shallow excavations cannot be discounted, particularly if shallow groundwater is encountered. As such, further testing is considered to be required to assess the risk of unstable excavations and voids.
Shallow Groundwater	L M	The likelihood of perched groundwater within peat deposits cannot be discounted. As such, ground water monitoring wells should be installed to determine the groundwater level.
Compressible strata	M H	Due to the presence of highly compressible Peat and Till Deposits underlying the site, there is the potential for a high volume change potential. As such, further investigation is required.
Aggressive ground conditions for concrete	L M	Due to the potential for Made Ground, sulphate testing is considered to be required.
Mining	M	The site is situated within an area of coal mining reporting area and an area of development high risk. As such, further investigation is required to further define risk to potential development and development abnormals.
Dissolution	L	The site is not situated in an area where dissolution is considered to be a significant risk.

	Landslide	L	The site is relatively flat and landslides are not considered to be a significant risk.

6.2 Ground Model

6.2.1 Based on a review of the above, the geotechnical elements at risk include buildings, roads, pavements, services, and earthworks. As such, further investigation should be completed

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conclusions

7.1.1 Colliers has completed a Phase 1 Preliminary Risk assessment to support the sale and subsequent redevelopment of the site. In summary, whilst the likelihood of gross widespread contamination being present is unlikely, the potential for some degree of contamination cannot be entirely discounted as there are mounds of soil, of unknown origin, in the south and northwest parts of the site. As such, some degree of ground investigation is likely to be required.

7.1.2 Furthermore, the presence of suspected compressible deposits and potential for unrecorded shallow mining within coal seams underlying the site requires further geotechnical assessment to support the design of foundations and roads.

7.2 Recommendations

7.2.1 Although no gross contamination is anticipated, prior to development commencing, a ground investigation is recommended to assess the risk associated with the underlying coal measures and peat deposits. This should include shallow and deep boreholes, trial pitting, chemical analysis and ground gas/groundwater monitoring. The investigation should also include in-situ geotechnical testing of the soils (Standard Penetration Testing), and geotechnical laboratory analysis. A permit to drill through coal seams understood to be present at the site will also be required prior to commencement.

7.2.2 A Stage 2 Unexploded Ordnance (UXO) risk assessment is required as the site is considered to be in a medium risk zone for UXO (based on Zetica risk ratings). Depending on the outcome of the risk assessment further UXO support may be required as part of the investigation.

7.2.3 This report should be submitted to the Local Planning Authority in support of a planning application for the development. Although no gross contamination is anticipated, prior to development commencing, a small-scale ground investigation is recommended to assess the risk associated with the historical use on the proposed development. This should include shallow boreholes, chemical analysis and ground gas/groundwater monitoring. The investigation should also include in-situ geotechnical testing of the soils (Standard Penetration Testing), and geotechnical laboratory analysis. This report should be submitted to the Local Planning Authority in support of a planning application for the development.

7.2.4	Although asbestos may be present within Made Ground deposits, based on an assessment using the JIWG Control of Asbestos 2012 Industry Regulations (2016) guide, CAR-12 Regulations would not apply to the ground investigation. If asbestos is visually identified, damping down of excavations should be completed on site and personnel should adopt Personal Protective Equipment (PPE) appropriate to the ground conditions highlighted by this report including FFP3 disposal masks. Decontamination units are not considered required at this stage.
7.2.5	Based on the limited information that is comprised within the coal report and owing to the anticipated ground conditions. Including past underground mining and two outcrops within the site, it would be anticipated that a Coal Mining Risk Assessment (CMRA) will be required to adequately design future site investigations for geotechnical purposes.
7.2.6	Although this inspection is not intended to be definitive, no evidence for Japanese Knotweed or Giant Hogweed was identified during the site inspection.

APPENDIX 1: FIGURES



Title: Site Location Plan

APPENDIX 2: PHOTOGRAPHS



01: Mounds in north east of the Site



02: Mounds in north east of the Site



03: Domestic fly tipping



04: General site view from south to north



05: North Western Boundary



06: North Eastern Boundary

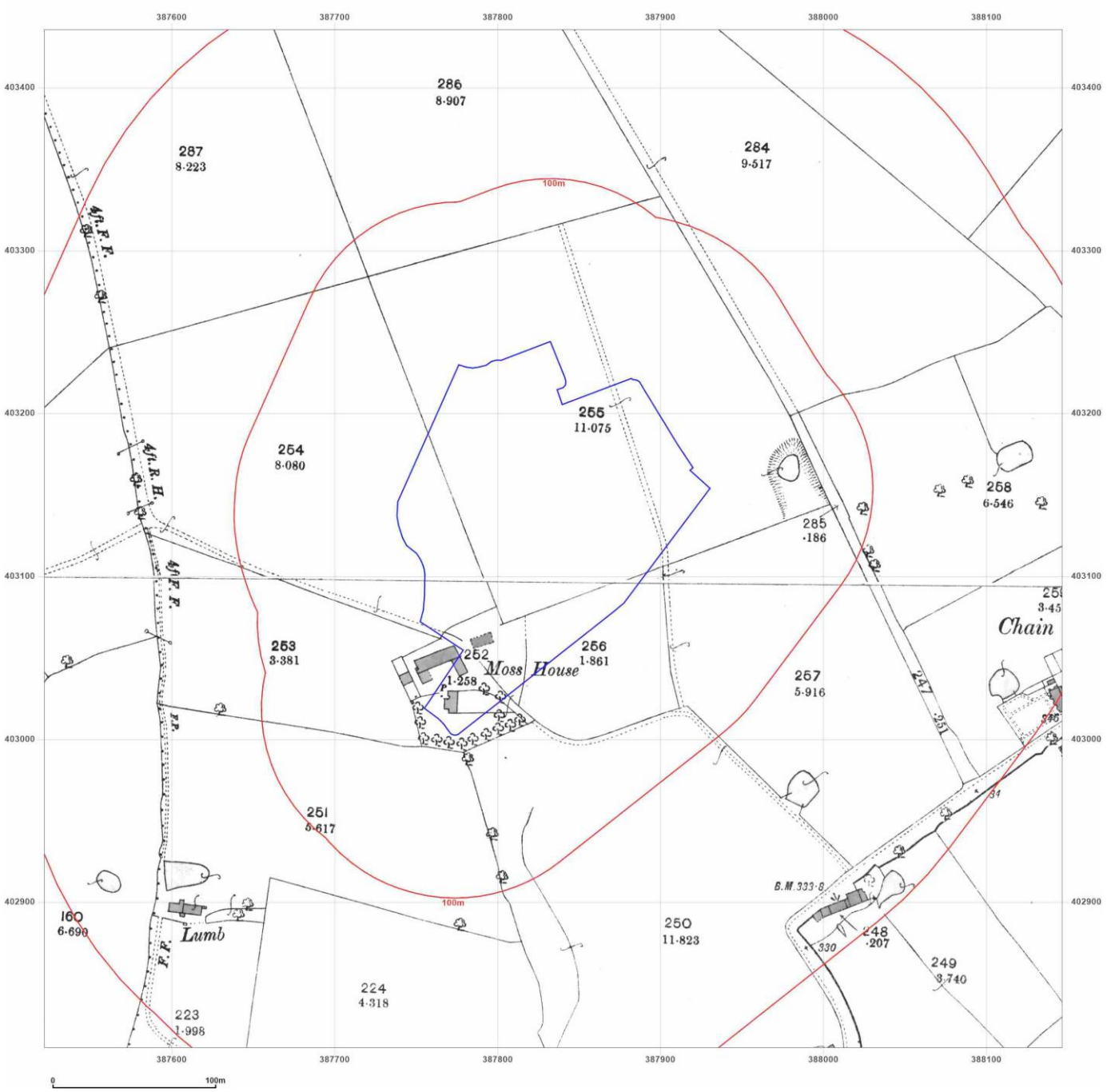


07: Evidence of possible recent ground investigation (trial pitting) or compressible soils

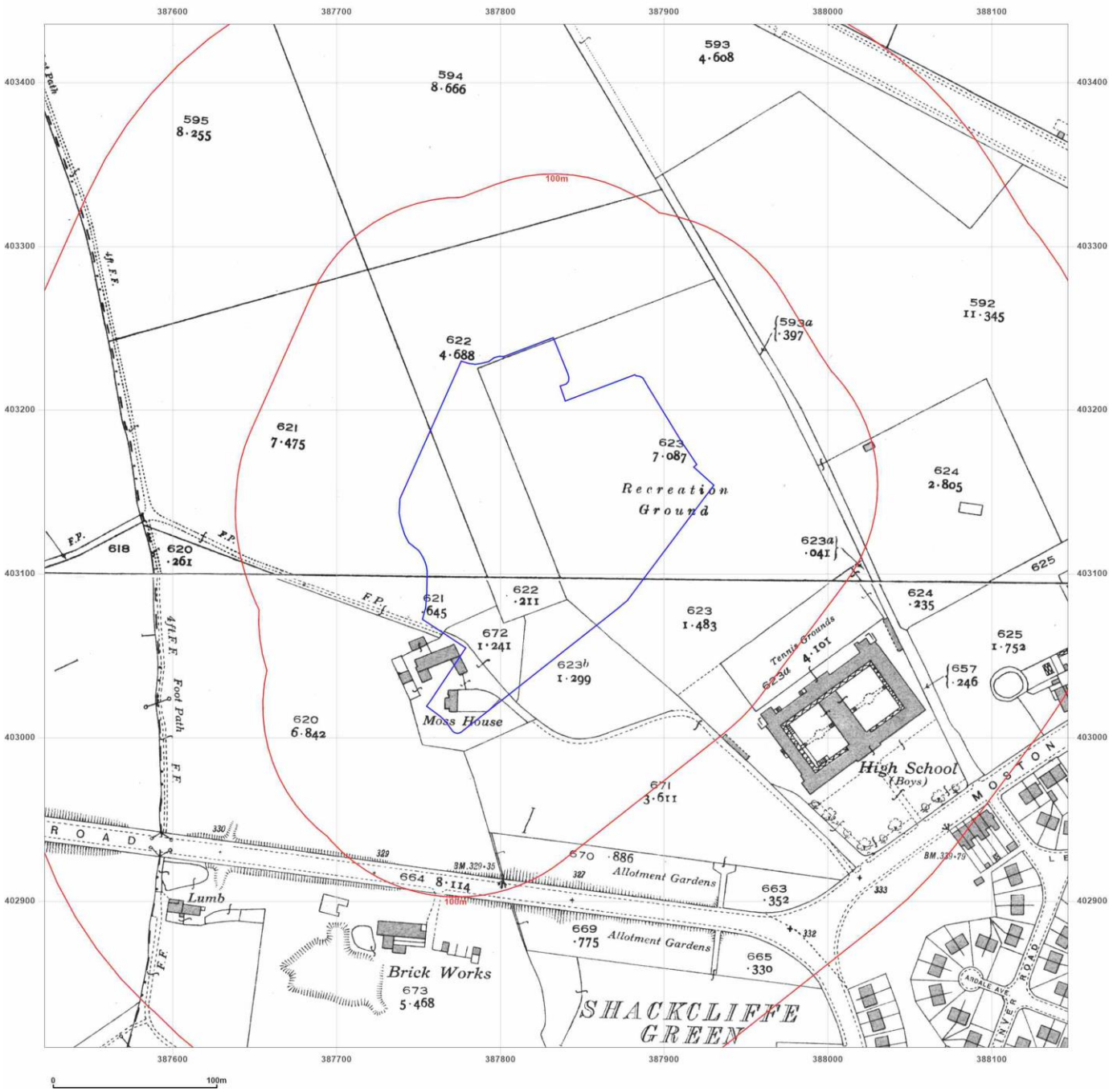


08: Southern boundary

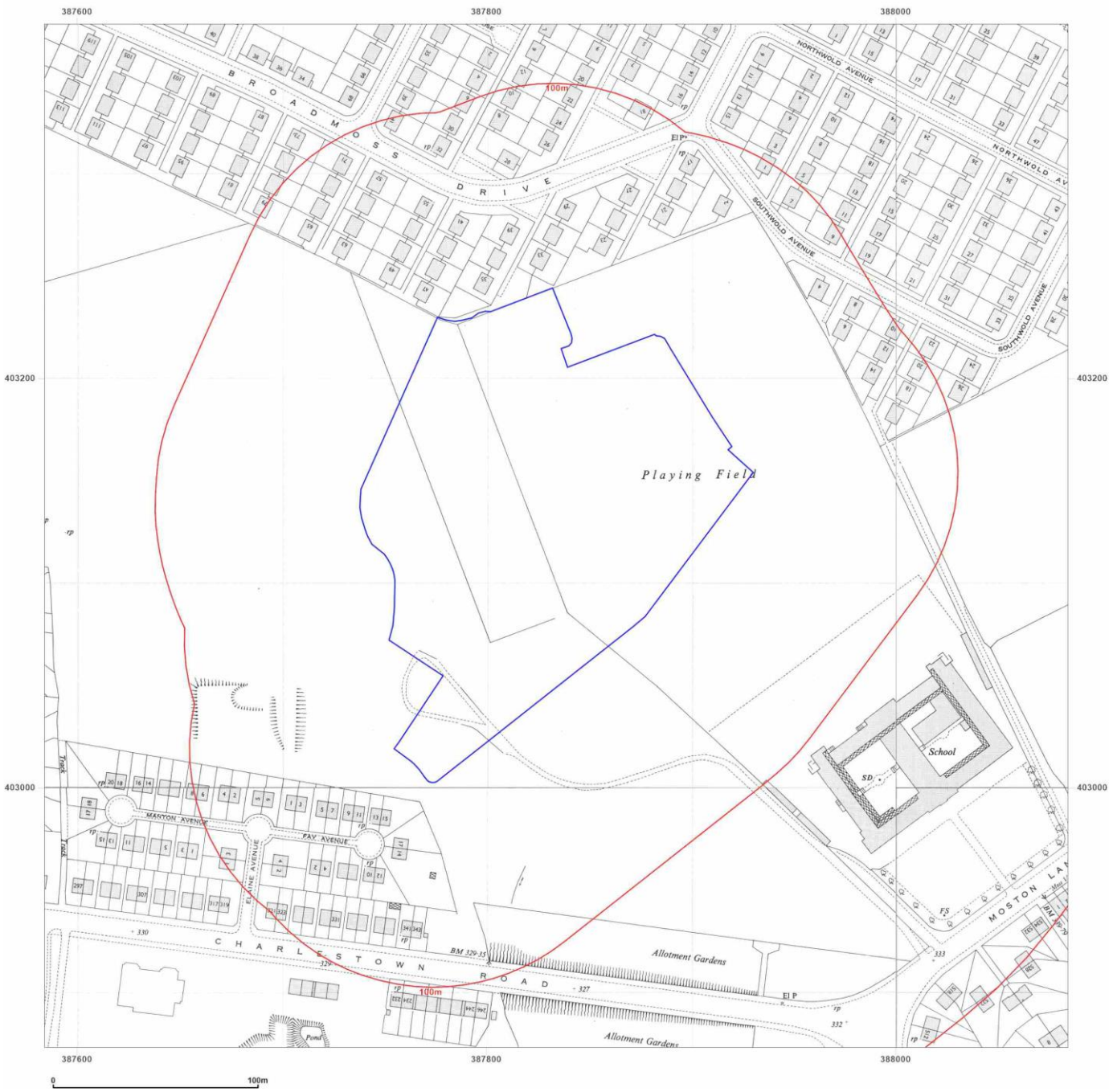
APPENDIX 3: HISTORICAL MAP RECORD


387600
387700
387800
387900
388000
388100
403400
403300
403200
403100
403000
402900
286
8·907
287
8·223
284
9·517
100m
255
11·075
254
8·080
258
6·546
285
·186
253
3·381
252
1·258
Moss House
256
1·861
257
5·916
Chain
251
5·617
160
6·690
Lamb
B.M. 333·8
250
11·823
248
·207
249
3·740
224
4·318
223
1·998
0
100m

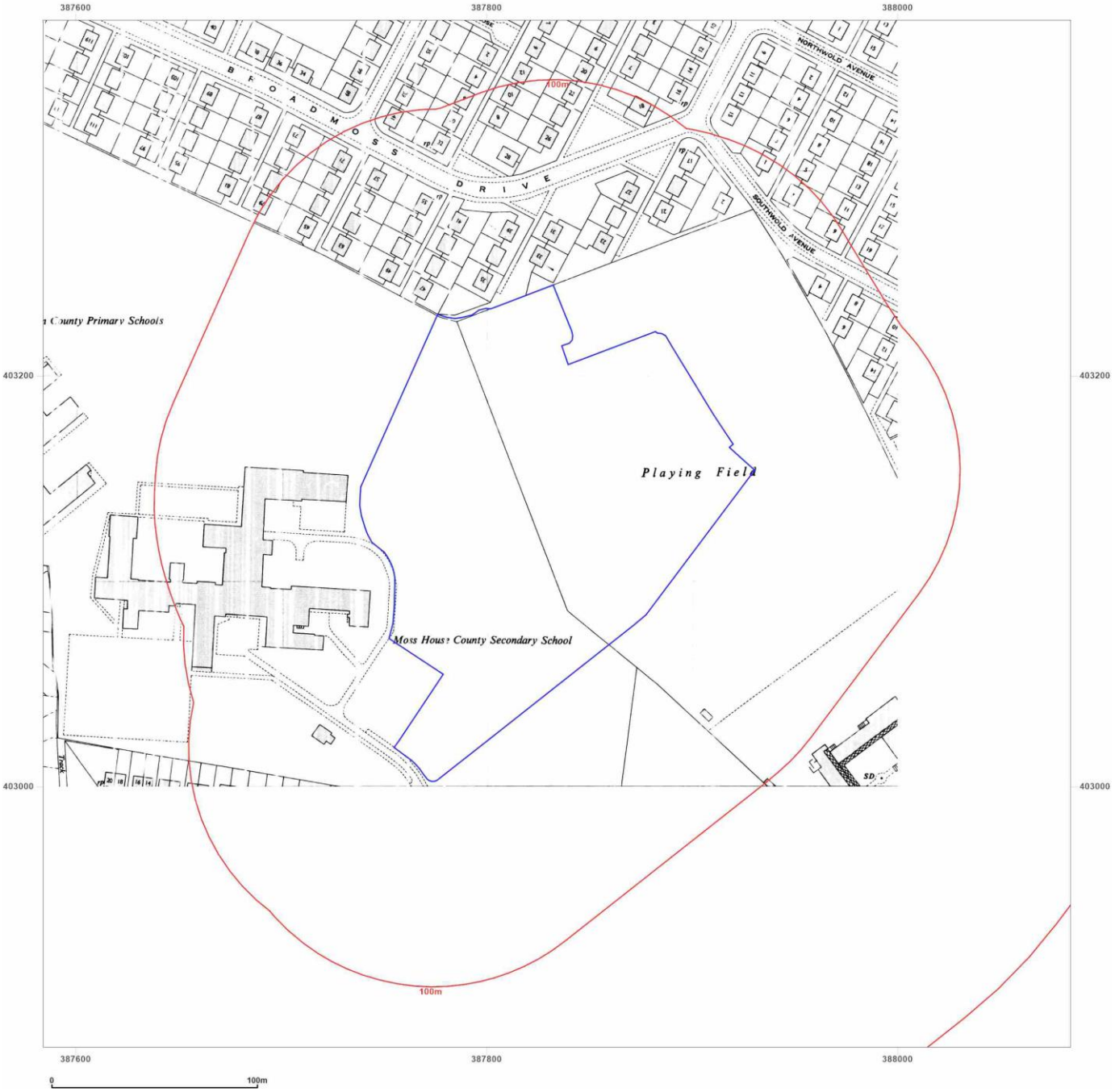
Title: 1893


387600
387700
387800
387900
388000
388100
403400
403300
403200
403100
403000
402900
593
4·608
594
8·666
595
8·255
592
II·345
593a
·397
622
4·688
621
7·475
623
7·087
Recreation
Ground
624
2·805
623a
·041
625
618
620
·261
621
·645
622
·211
624
·235
623
1·483
672
1·241
623b
1·299
Tennis Grounds
623a
4·101
625
1·752
657
·246
620
6·842
Moss House
671
3·611
High School
(Boys)
MOSTON
ROAD
670
·886
Allotment Gardens
663
·352
664
8·114
669
·775
Allotment Gardens
665
·330
Lumb
Brick Works
673
5·468
SHACKCLIFFE
GREEN
Foot Path
F.P.
100m
0
100m

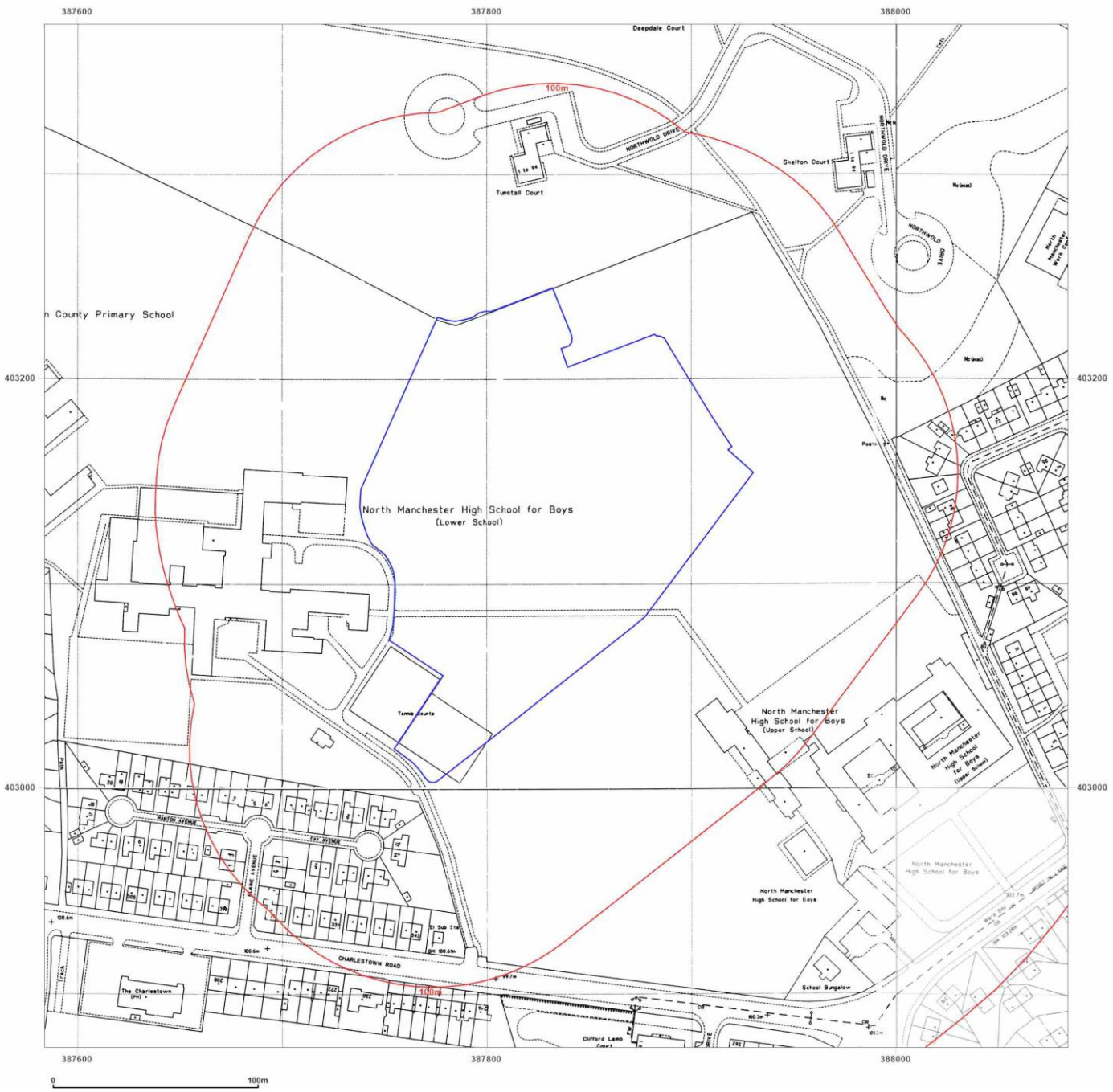
Title: 1933


387600
387800
388000
403200
403000
B R O A D M O S S D R I V E
NORTHWOLD AVENUE
SOUTHWOLD AVENUE
100m
Playing Field
School
SD
MANTON AVENUE
FAY AVENUE
PINE AVENUE
C H A R L E S T O W N R O A D
Allotment Gardens
BM 329.35
MOSTON LA
FS
0
100m

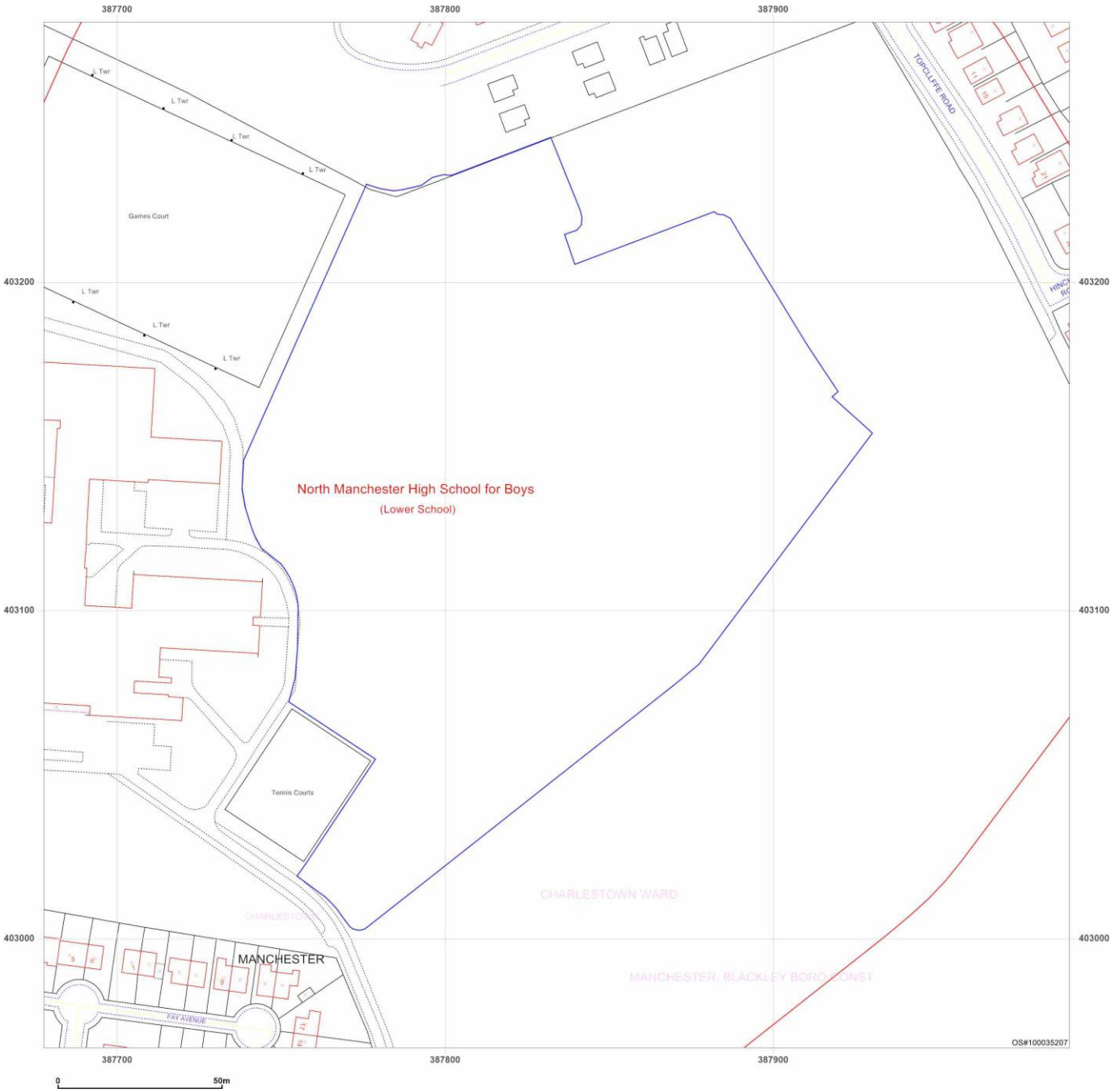
Title: 1952


387600
387800
388000
403200
403000
BROADMOSS DRIVE
NORTHWOLD AVENUE
SOUTHWOLD AVENUE
100m
County Primary Schools
Playing Field
Moss House County Secondary School
SD
0
100m

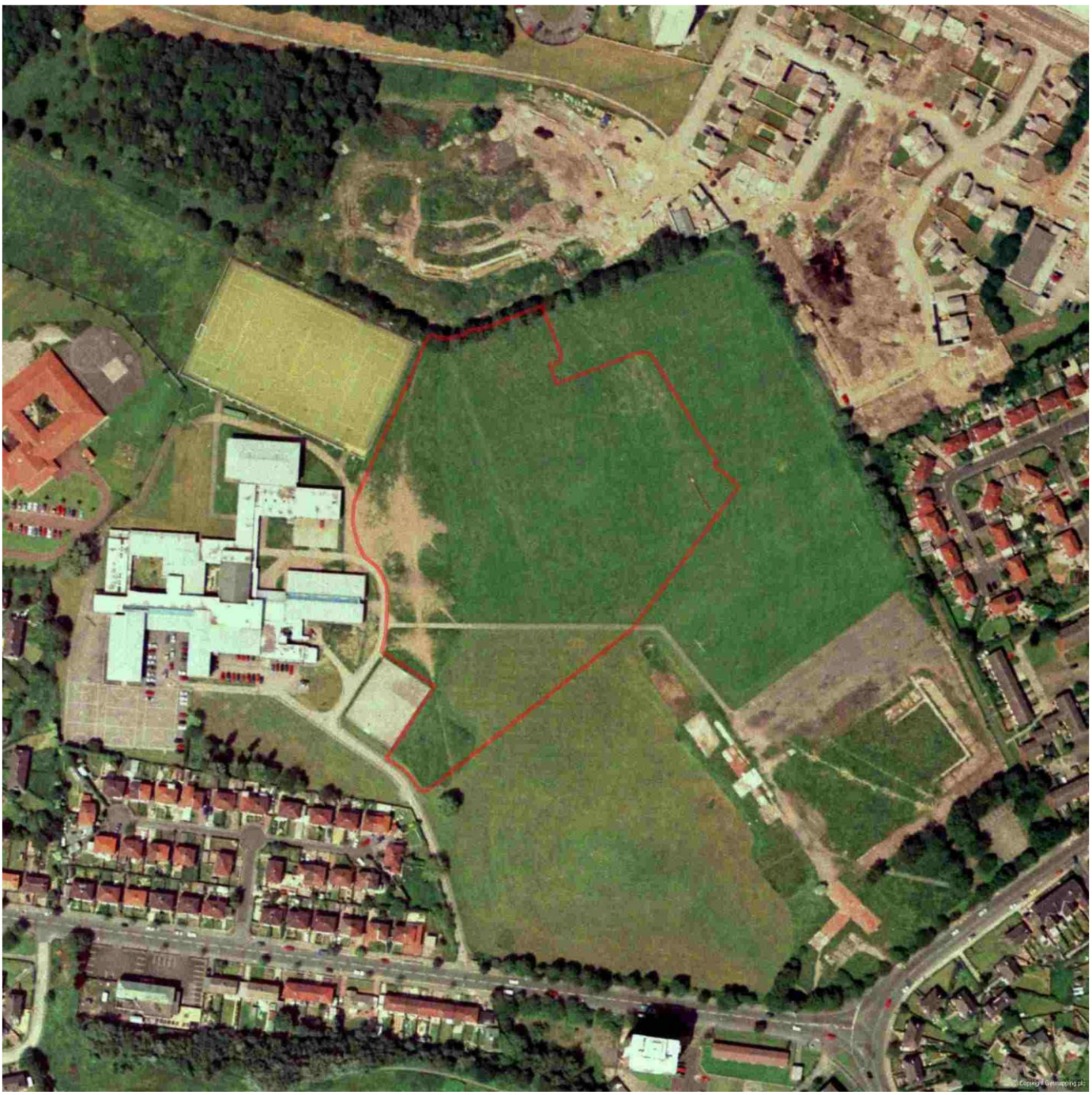
Title: 1954


387600
387800
388000
403200
403000
Deepdale Court
100m
NORTHWOLD DRIVE
Tunstall Court
Skelton Court
n County Primary School
North Manchester High School for Boys
(Lower School)
Tennis Courts
North Manchester
High School for Boys
(Upper School)
North Manchester
High School for Boys
HARTON AVENUE
EAST AVENUE
CHARLESTOWN ROAD
The Charlestown
School Bungalow
Clifford Lamb
0
100m

Title: 1992


387700
387800
387900
403200
403100
403000
L Twr
Games Court
North Manchester High School for Boys
(Lower School)
Tennis Courts
TOPCLIFFE ROAD
CHARLESTOWN WARD
MANCHESTER
FAY AVENUE
OS#100035207
0
50m

Title: 2003



Title: 2000



Title: 2009



Title: 2019

APPENDIX 4: COAL REPORT

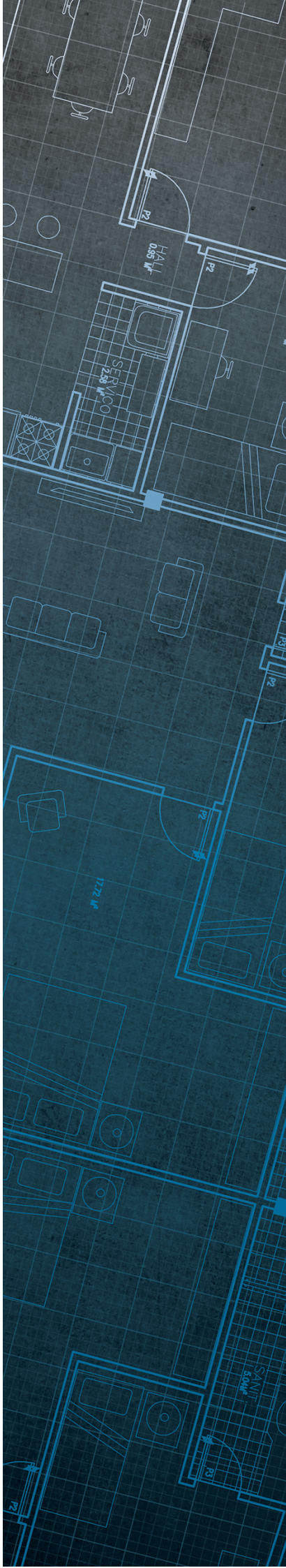
The Coal Authority

Consultants

Coal Mining Report

Hinchley Road, Manchester, M9 7fg
Greater Manchester

Date of enquiry:	**15 February 2023**
Date enquiry received:	**15 February 2023**
Issue date:	**15 February 2023**
Our reference:	**51003338982001**
Your reference:	**GS-9358702**



Consultants

Coal Mining Report

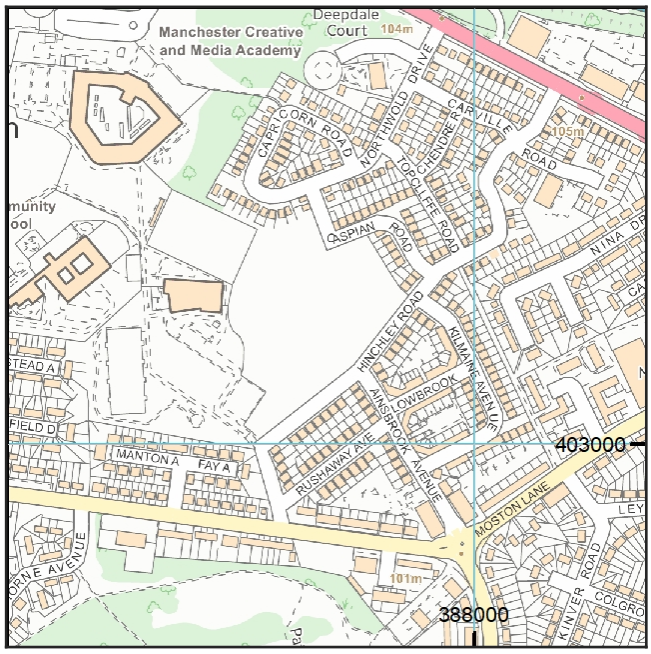
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

Hinchley Road, Manchester, M9 7fg
Greater Manchester



Approximate position of property

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2018. All rights reserved.

Ordnance Survey Licence number: 100020315

How to contact us

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

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

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

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	ROGER	Coal	35AG	113	Beneath Property	20.0	South	220	1884

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

None recorded within 100 metres of the enquiry boundary.

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

2147	16820	14942

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

Seam name	Mineral	Seam workable	Distance to outcrop (m)	Direction to outcrop	Bearing of outcrop
RADLEY	Coal	Yes	Within	N/A	129
RADLEY	Coal	Yes	Within	N/A	319

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Copyright © 2023 The Coal Authority

Section 2 – Investigative or remedial activity

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

Site investigations
None recorded within 50 metres of the enquiry boundary.

Remediated sites
None recorded within 50 metres of the enquiry boundary.

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

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

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

Mine gas
None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes
None recorded within 500 metres of the enquiry boundary.

Copyright © 2023 The Coal Authority

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

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

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

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

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Copyright © 2023 The Coal Authority

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Future development

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

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

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Copyright © 2023 The Coal Authority

Section 5 – Data definitions

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

Past underground coal mining

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

Probable unrecorded shallow workings

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

Spine roadways at shallow depth

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

Mine entries

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

Abandoned mine plan catalogue numbers

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

Outcrops

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

Geological faults, fissures and breaklines

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

Copyright © 2023 The Coal Authority

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

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

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

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

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

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

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

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

Copyright © 2023 The Coal Authority

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

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

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

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

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

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

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

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

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

Copyright © 2023 The Coal Authority

APPENDIX 5: FLOOD RISK ASSESSMENT

a Colliers Company.

GeoSmart Information

FloodSmart

Flood Risk Assessment

Site Address

Land at Hinchley Road,
Blackley,
Manchester,
M9 7FG

Grid Reference

387829, 403158

Report Prepared for

Paragon bc (Colliers)
The Harlequin Building, 65 Southwark Street
London
SE1 0HR

Date

2023-01-27

Report Status

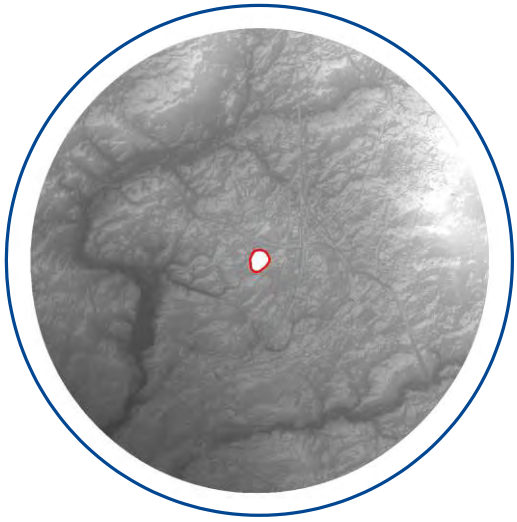
DRAFT

Site Area

2.6 ha

Report Reference

78341R1



Summary of risk and mitigation

Baseline	After Analysis	With Mitigation
Very Low to High	Very Low to High[1]	Very Low to Low

The baseline and after analysis flood risk ratings are based on present-day scenario modelled flood data and an assessment of ground and threshold levels.

The Site is located in Flood Zone 1; this equates to a Very Low risk of flooding from rivers and the sea.

Surface water (pluvial) flood risks are Very Low-High.

Groundwater flood risks are moderate and flooding risks from artificial sources (i.e. canals, reservoirs and sewers) are Low.

Mitigation measures are recommended in this report to reduce the risks to an acceptable level over the lifetime of the development.

Report Author
Rebecca Conway
Consultant

Report Checker
Jessica Bayliff
Senior Project Consultant

Report Reviewer
Mike Piotrowski
Principal Hydrologist

GeoSmart Information Ltd
1st Floor, Old Bank Buildings,
Bellstone, Shrewsbury, SY1 1HU
+44(0)1743 298 100
info@geosmartinfo.co.uk
www.geosmartinfo.co.uk

The Property Ombudsman Consumer Redress
COPSO ASSOCIATE MEMBER
SearchCode™
RIBA CPD PROVIDERS NETWORK

1. Executive summary

A review has been undertaken of national environmental data sets to assess the flood risk to the Site from all sources of flooding in accordance with the National Planning Policy Framework (NPPF) (2021) and National Planning Practice Guidance (NPPG) (Published in 2014 and updated in August 2022). A site-specific flood risk assessment, to assess the flood risk to and from the development Site, is provided within this concise interpretative report written by an experienced GeoSmart consultant. Baseline flood risk and residual risks that remain after the flood risk management and mitigation measures are implemented are summarised in the table below.

Site analysis

Source of Flood Risk	Baseline*	Final **
River (fluvial) flooding	Very Low	N/A
Sea (coastal/tidal) flooding	N/A	N/A
Surface water (pluvial) flooding	Very Low-High	Very Low-Low
Groundwater flooding	Negligible	N/A
Other flood risk factors present	No	N/A
Is any other further work recommended?	No	No

*BASELINE risks have been calculated for the whole Site, using national risk maps, including the benefit of EA flood defences.

**FINAL RISK RATING Includes a detailed analyses of flooding risks over the lifetime of the proposed development, including allowances for climate change AND assumes recommended mitigation measures are implemented. N/A indicates where mitigation is not required.

Existing Site

The Site is currently undeveloped and comprises a vegetated open space. To the north and east of the Site, residential fencing restricts access to the Site. To the West, access is restricted by commercial fencing. The southern boundary of the Site does not currently benefit from a fence/boundary wall. A Site plan is include din Appendix A.

Development proposals are not fixed currently, but this report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared in Table 4 of this report (Table 2 of the NPPG (2022)).

Ground elevations

In the absence of a Site-specific topographic survey, LiDAR ground elevation data (to a 1 m resolution with a vertical accuracy of ±0.15 m) has been used to assess ground levels on Site. This confirms that the general ground levels on the Site are between 99.1 and 102.9 mAOD. The Site generally falls in elevation towards the south west; however an isolated area of higher topography is located in the west of the Site.

Summary of flood risks

The flood risks from all sources have been assessed as part of this report and are as follows:

Historic flooding

According to the EA's Historical Flood Map (Figure below) and Figure 6-7 of the SFRA (JBA, 2019, Appendix C), there have been no flooding events affecting the Site.

River (fluvial) flooding

According to the Environment Agency's (EA) Flood Map for Planning Purposes, the Site is located Choose an item. a fluvial Flood Zone 1 (Low Probability)

According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map, which considers the type, condition and crest height of flood defences, the Site has a Very Low risk of flooding

Surface water (pluvial) flooding

According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site has a risk of pluvial flooding ranging from Very Low to High.

- An area in the centre of the Site (covering approximately 1.5%) is at a High risk of surface water flooding
- A further area in the centre, south and north of the Site (covering approximately 6%) is at a Medium risk of surface water flooding
- A further area in the north, centre and south of the Site (approximately 17%) is at a Low risk of surface water flooding.
- The rest of the Site (approximately 75.5%) is at a Very low risk of surface water flooding.

The Low risk (1 in 1000 year) surface water flooding event has been used as a proxy in this instance for the Medium risk (1 in 100 year) plus climate change event.

It is noted that the area anticipated to experience surface water flooding reflects a topographical depression on Site; ground levels in this area are between 0.3m and 1.3m below average ground elevations on Site (100.5mAOD). Future development may include the

regrading of land and the installation of an on-Site drainage system which would minimise the flood depths anticipated on Site.

Groundwater flooding

Groundwater Flood Risk screening data and Site specific assessment indicates there is a Negligible potential risk of groundwater flooding at the surface in the vicinity of the Site during a 1 in 100 year event.

Artificial sources of flooding

The risk of flooding from artificial (man-made) sources such as reservoirs, sewers and canals has been assessed:

- The EA's Risk of Flooding from Reservoir map confirms the Site is not at risk of reservoir flooding. The potential for a breach of a reservoir to occur and flooding affecting the Site is low.
- Ordnance Survey (OS) data confirms there are no canals near to the Site.
- Figure 6-8 of the SFRA confirms that there have been incidences of sewer flooding in the vicinity of the Site; however, due to the resolution of the Site it is not possible to confirm whether incidences occurred on Site (JBA, 2019).

  A risk has been identified from sewers, although the level of risk could not be determined. Further consultation with the local water supplier, United Utilities, is recommended.

The risk to the development has been assessed over an expected 100 year lifetime, including appropriate allowances for the impacts of climate change which could increase the flood risk to the Site. Risks identified include increases in river flooding and/or an increased potential for surface water flooding and appropriate mitigation measures are proposed.

Recommendations

Recommendations for flood mitigation are provided below, based upon the proposed development and the flood risk identified at the Site.

- There is a risk of flooding from surface water sources, where flood depths could be up to 0.6 m in depth during a 1in 100 year (+ climate change allowance) flooding event in the south of the Site.
  - Where future development is proposed, development should be located in areas not anticipated to experience flooding.
  - Alternatively, development should include the regarding of land on Site and the installation of a surface water drainage system to minimise the anticipated flood depths.
- Where proposals are set in areas of flooding, Finished Floor Levels should be raised 0.3m above the flooding depths shown in the 1 in 100 year (low risk) scenario event, with an allowance for climate change (the Low risk (1 in 1000 year) surface water flooding event

has been used as a proxy in this instance for the Medium risk (1 in 100 year) plus climate change event.

- Where development is proposed within areas shown to flood, and flood flow routes are altered as a result of development, this could impact flood storage volumes on the Site. Where floodplain storage is lost, compensatory floodplain storage is required.
- Drawing SS_4.5 of the 2011 Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA indicates that a lost watercourse is located immediately adjacent to the south west of the Site (JBA, 2011, Appendix C). The watercourse is mapped to flow into the Boggart Hole Brook, located approximately 10m to the south west of the Site.
    - Site investigation is recommended to confirm the presence of any historic or culverted watercourse on Site, in the location of the identified flood flow route.
    - It is noted that the Greater Manchester Core Strategy Development Document states "*where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.*" (Manchester City Council, 2012).
- Where future development proposes an increase in impermeable area on Site, a Sustainable Drainage Strategy (SuDS) should be developed, for effective management of surface water runoff over the lifetime of the proposed development.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

2. Introduction

Background and purpose

A site-specific flood risk assessment has been undertaken, to assess the flood risk to and from the development Site. This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information gathered was then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the NPPF (2021) and the source(s) of any flood risk present, guided by the NPPG (Published in 2014 and updated in August 2022). Finally, a preliminary assessment of the steps that can be taken to manage flood risk to the development was undertaken.

This report has been prepared with reference to the NPPF (2021) and NPPG (2022).

"*The National Planning Policy Framework set out the Government's planning policies for England and how these are expected to be applied*" (NPPF, 2021).

The NPPF (2021) and NPPG (2022) promote a sequential, risk based approach to the location of development. This also applies to locating a development within a Site which has a variable risk of flooding.

"*The approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding*" (Paragraph: 023. NPPG, 2022).

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

Report scope

In accordance with the requirements set out within NPPG 2022 (Paragraph: 021 Reference ID: 7-021-20220825), a thorough review of publicly and commercially available flood risk data and EA supplied data indicating potential sources of flood risk to the Site from rivers and coastal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Information obtained from the EA and a review of the Level 1 Strategic Flood Risk Assessment for Greater Manchester- update (SFRA) (JBA, 2019) and the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA (JBA, 2011) are used to ascertain local flooding issues and, where appropriate, identify information to support a Sequential and/or Exception test required as part of the NPPF (2021).

The existing and future flood risk to and from the Site from all flood sources is assessed in line with current best practice using the best available data. The risk to the development has been assessed over its expected lifetime, including appropriate allowances for the impacts of climate change. Residual risks that remain after the flood risk management and mitigation

measures are implemented, are considered with an explanation of how these risks can be managed to keep the users of the development safe over its lifetime.

An indication of whether the Site will potentially increase flood risk elsewhere is provided, including where the proposed development increases the building footprint at the Site. A drainage strategy to control runoff can be commissioned separately if identified as a requirement within this report.

Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions, we can offer no guarantee as to its validity and a proportionate programme of site investigations would be required to fully verify these findings.

The basemap used is the OS Street View 1:10,000 scale, however the Site boundary has been drawn using BlueSky aerial imagery to ensure the correct extent and proportion of the Site is analysed.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

Datasets

The following table shows the sources of information that have been consulted as part of this report:

Table 1. Datasets consulted to obtain confirmation of sources of flooding and risk

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency	OS Data
Historical	X	X	X	
River (fluvial) / Sea (tidal/coastal)	X	X	X	

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency	OS Data
Surface water (pluvial)	X	X	X	
Groundwater	X	X		
Sewer		X		
Culvert/bridges		X		X
Reservoir		X	X	

*Local guidance and policy, referenced in Section 6, has been consulted to determine local flood conditions and requirements for flood mitigation measures.

Local policy and guidance

Manchester's Local development Framework: Core Strategy Development Document (Manchester City Council, 2012):

Policy EN 14 Flood Risk

In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).

In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.

All new developments should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.

Guidance

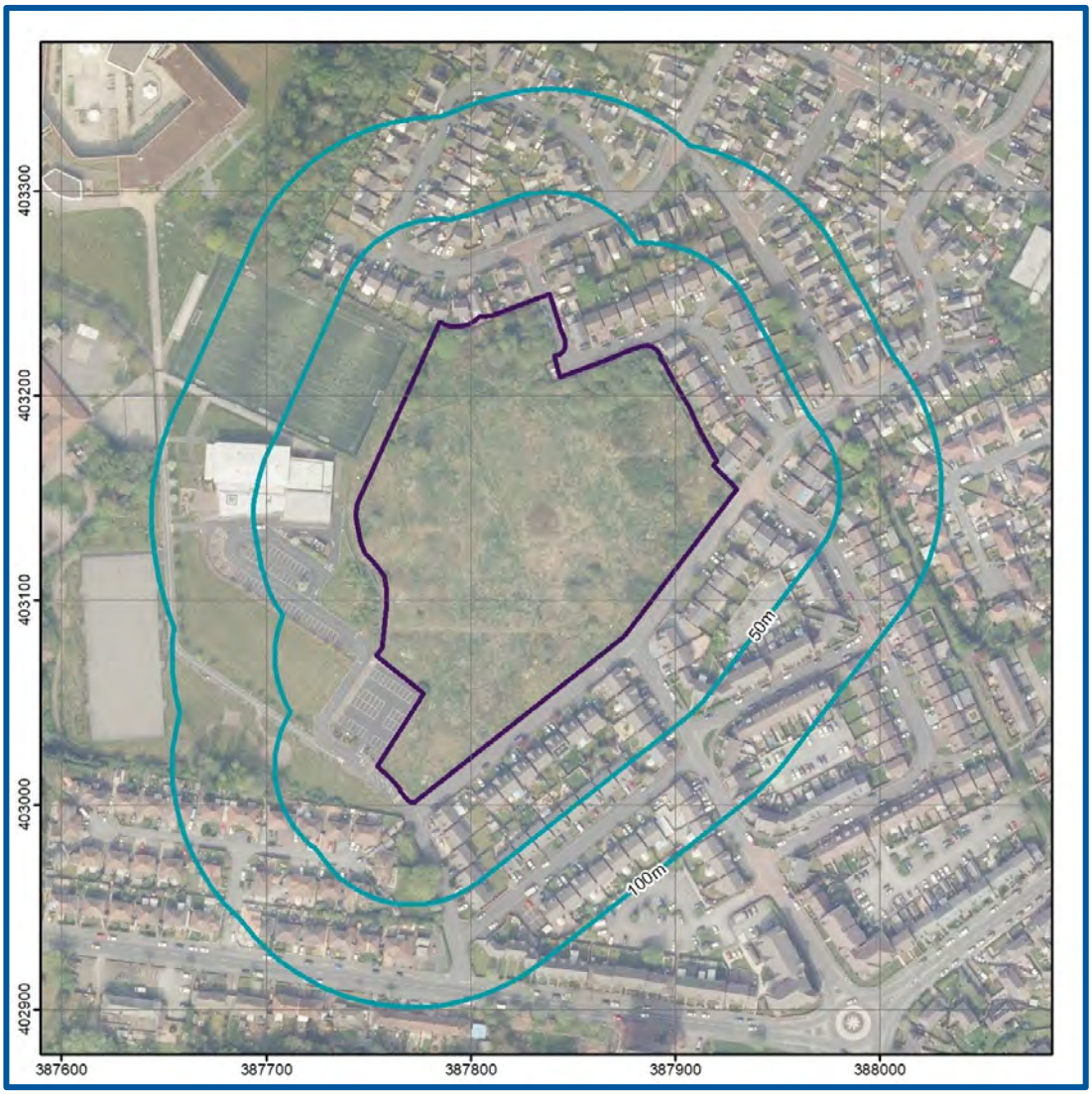
Strategic Flood Risk Assessments are carried out by local authorities, in consultation with the Environment Agency, to assess the flood risk to the area from all sources both now and in the future due to climate change. They are used to inform planning decisions to ensure inappropriate development is avoided (NPPF, 2021).

3. Site analysis

Site information

The Site is located in Moston in a setting of residential land use at National Grid Reference SD 87849 03159.

Figure 1. Aerial imagery of the Site (Bluesky, 2023)

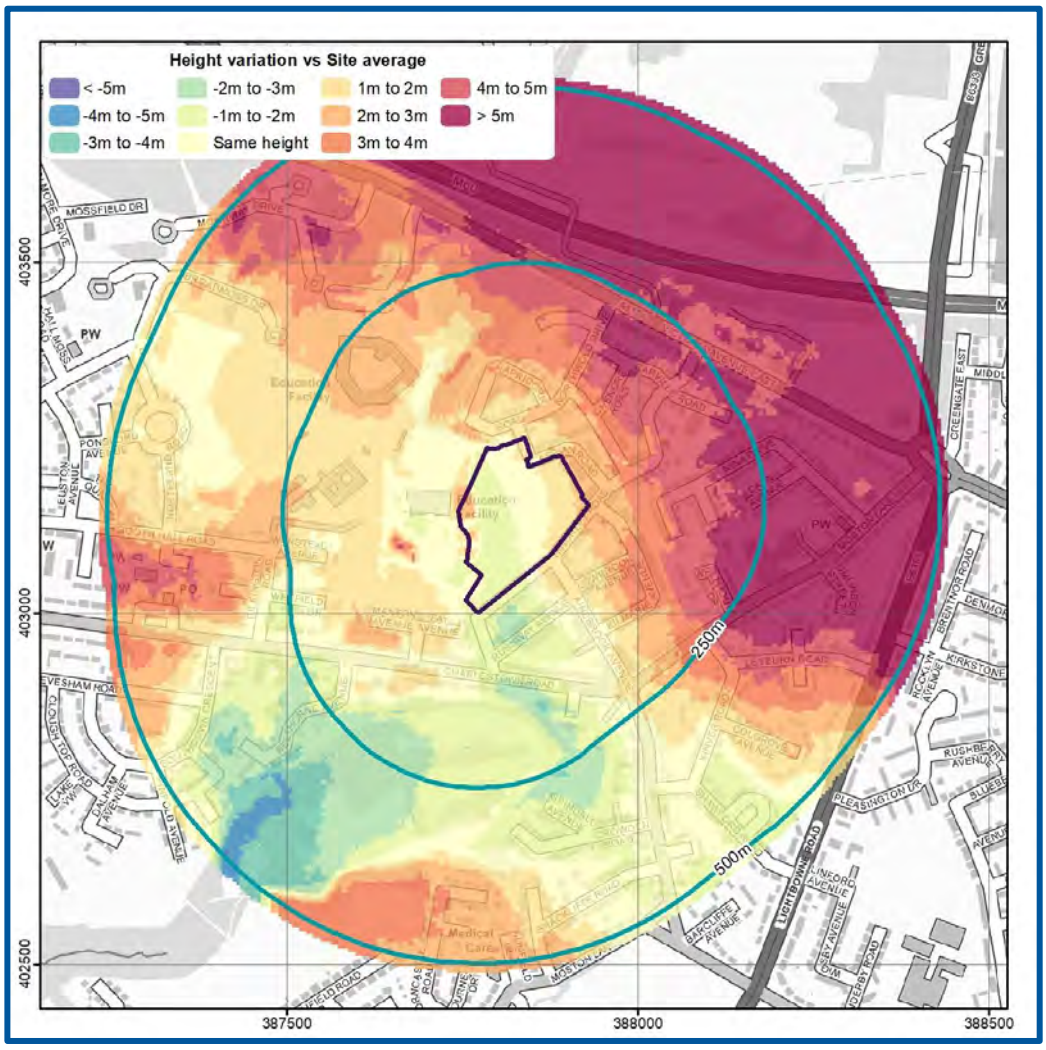


BlueSky copyright and database rights 2023

The Figure overleaf indicates ground levels within 500m of the Site fall in a south westerly direction

The general ground levels on the Site are between 99.1 and 102.9 mAOD. The Site generally falls in elevation towards the south west; however an isolated area of higher topography is located in the west of the Site. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ±0.15 m (Appendix B).

Figure 2. Site Location and Relative Elevations (GeoSmart, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

Existing Site

The Site is currently undeveloped and comprises a vegetated open space. To the north and east of the Site, residential fencing restricts access to the Site. To the west, access is restricted by commercial fencing. The southern boundary of the Site does not currently benefit from a fence/boundary wall.

Hydrological features

According to Ordnance Survey (OS) mapping included in Figure 3 overleaf, there are no mapped surface water features within 500 m of the Site.

However, drawing SS_4.5 of the 2011 Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA indicates that a lost watercourse is located immediately adjacent to the south west of the Site (JBA, 2011, Appendix C). The watercourse is mapped to flow into the Boggart Hole Brook, located approximately 10m to the south west of the Site.

The nearest OS mapped surface water feature, Boggart Hole Brook is located approximately 610m to the south west of the Site at a similar elevation to the Site.

The Rochdale Canal is located approximately 1.5km to the east of the Site at a similar elevation.

The Moston Brook is located approximately 1.5km to the south of the Site at a lower elevation.

Figure 3. Surface water features (EA, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

Hydrogeological features

British Geological Survey (BGS) mapping indicates the underlying superficial geology (Figure 4 overleaf) consists of Devensian Till (TILLD) and Peat (PEAT) (BGS, 2023) and is classified as a Secondary Undifferentiated Aquifer(EA, 2023).

Figure 4. Superficial Geology (BGS, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Contains British Geological Survey materials © NERC 2023

BGS mapping indicates the underlying bedrock geology (Figure 5 overleaf) consists of the Penine Middle Coal Measures (PMCM) (BGS, 2023) and is classified as a Secondary (A) Aquifer (EA, 2023).

Figure 5. Bedrock Geology (BGS, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Contains British Geological Survey materials © NERC 2023

Geological conditions

A review of the BGS borehole database (BGS, 2023) indicates the nearest, accessible borehole (ref: SD80SE57) is located approximately 250m to the east of the Site at an elevation of 105.1mAOD. The borehole indicates that the underlying geology consists of

- 14.32m of clay, overlying
- 2.13m of sand and gravel, overlying
- 5.80m of clay and boulder, overlying
- 6.40m of running sand, overlying
- 1.22m of grey sandstone, overlying
- 11.58m of running sand and gravel, overlying
- 4.57m of red marl, overlying

- 0.61m of grey sandstone, overlying
- 5.79m of gravel and sand, overlying
- 1.22m of loamy sand, overlying
- 0.91m of marl, overlying
- 1.53m of loamy sandstone and coal, overlying
- 4.57m of marl, overlying
- 1.22m of sand and gravel, overlying
- 1.22m of sandstone, overlying
- 3.96m of gravel, overlying
- 1.22m of shale, overlying
- 1.83m of coal, overlying
- 4.88m of stone, overlying
- 2.74m of dark stone at which point the borehole ended.

Groundwater

Groundwater levels are not recorded by the nearby borehole (ref: SD80SE57). However, a shallow groundwater table is not anticipated on Site.

4. Flood risk to the development

Historical flood events

According to the EA's Historical Flood Map (Figure 6 below) and Figure 6-7 of the SFRA (JBA, 2019, Appendix C), there have been no flooding events affecting the Site

The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

Figure 6. EA Historic Flood Map (EA, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

Rivers (fluvial) / Sea (coastal) / Estuarine (tidal) flooding

According to the EA's Flood Map for Planning Purposes (Figure 7 below), the Site is located within fluvial Flood Zone 1 and is therefore classified as having a Low probability of fluvial flooding.

Figure 7. EA Flood Map for Planning Purposes (EA, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

Guidance

As defined in the NPPF (2021):

Ignoring the presence of any defences, land located in a Flood Zone 1 is considered to have a Low probability of flooding, with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

Development of all uses of land is appropriate in this zone (see glossary for terminology).

Flood defences

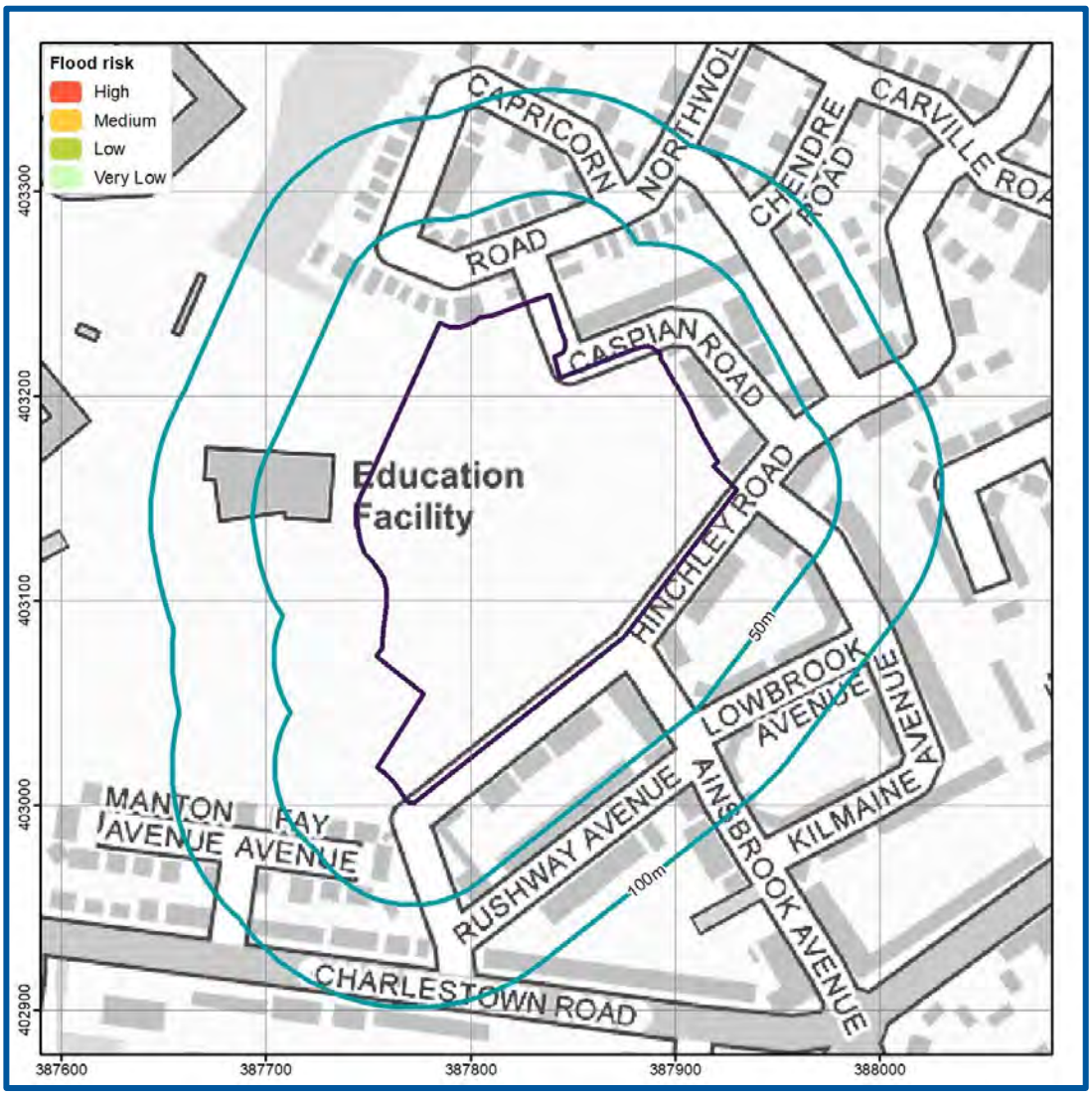
The Site is not located in an area benefiting from flood defences.

Flood risk including the benefit of defences

The type and condition of existing flood defences influence the 'actual' risk of fluvial flooding to the Site, albeit the long-term residual risk of flooding (ignoring the defences) should be considered when proposing new development.

According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map (Figure 8 overleaf), which considers the type, condition and crest height of flood defences, the Site has a Very Low risk of flooding.

Figure 8. Risk of Flooding from Rivers and Sea map (EA, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

Surface water (pluvial) flooding

Surface water flooding occurs when intense rainfall exceeds the infiltration capacity of the ground and overwhelms the drainage systems. It can occur in most locations even at higher elevations and at significant distances from river and coastal floodplains.

Drawing ref: SS_4.5 of the 2011 Level 2 Hybrid SFRA confirms that the Site is located within a conurbation core CDA (JBA, 2011, Appendix C).

Whilst the SFRA identifies surface water flooding as a *"challenge across the whole of Greater Manchester"* the report does not provide evidence of any historical surface water flooding incidents (JBA, 2019). Therefore, it is not possible to confirm whether surface water flooding has occurred historically on Site.

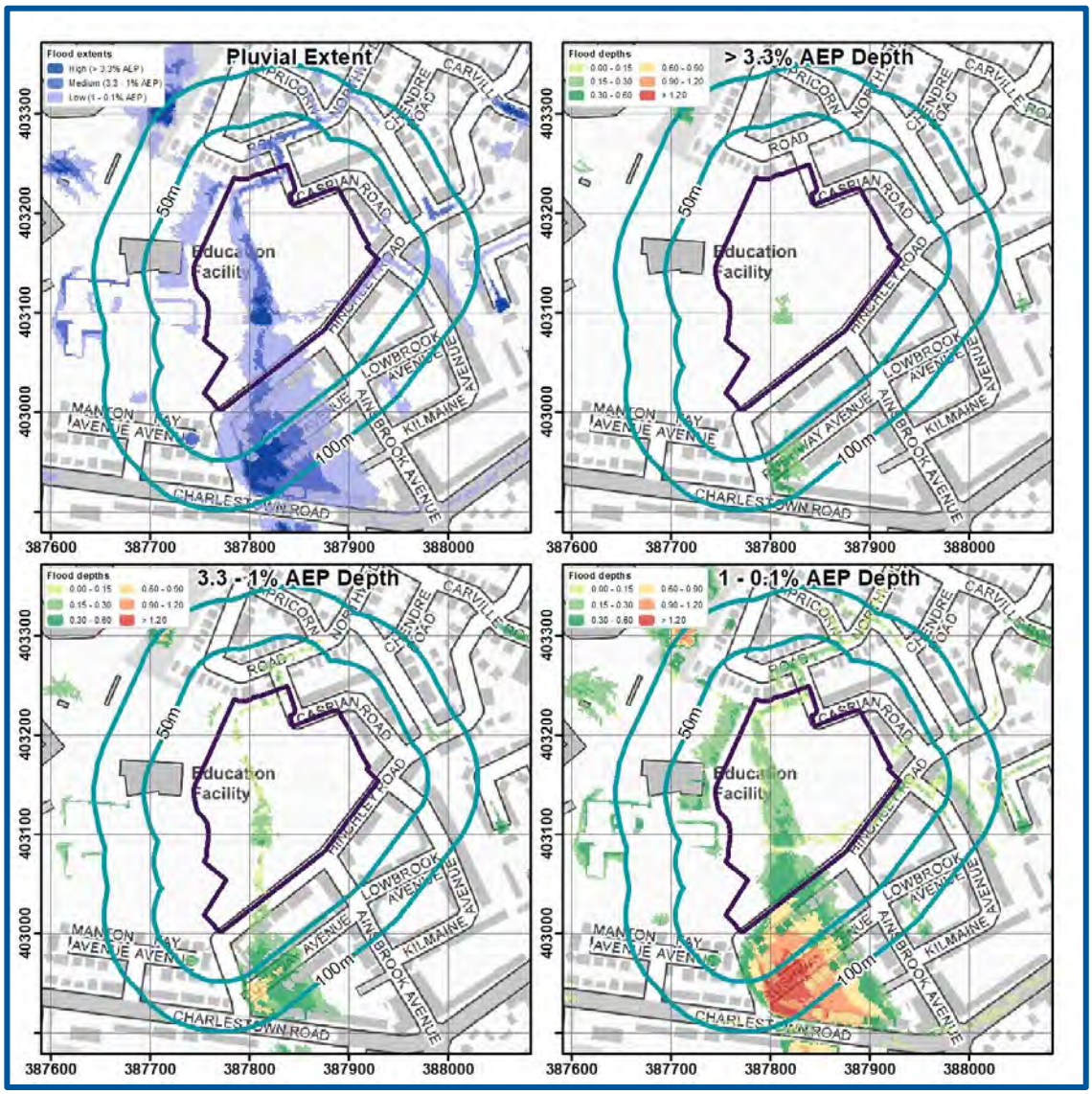
According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping (Figure 9 overleaf), the Site is at a variable risk of pluvial flooding ranging from Very Low to High.

- An area in the centre of the Site (covering approximately 1.5%) is at a High risk of surface water flooding. During this event, flood depths of up to 0.15m could be experienced (Figure 9).
- A further area in the centre, south and north of the Site (covering approximately 6%) is at a Medium risk of surface water flooding. During this event flood depths of up to 0.15m could be experienced (Figure 9).
- A further area in the north, centre and south of the Site (approximately 17%) is at a Low risk of surface water flooding. During this event, flood depths of up to 0.6 m could be experienced. Access to the Site from the south (Hinchley Road) may be affected during this flooding event.
- The rest of the Site (approximately 75.5%) is at a Very low risk of surface water flooding.

It is noted that the area anticipated to experience surface water flooding reflects a topographical depression on-Site; ground levels in this area are between 0.3m and 1.3m below average ground elevations on-Site (100.5mAOD).

Figure 9 confirms the extent and depth of flooding in multiple modelled flood scenarios.

Figure 9. EA surface water flood extent and depth map (EA, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

Guidance

According to EA's surface water flood risk map the Site is at:

- Very Low risk - chance of flooding of less than 1 in 1000 (0.1%).
- Low risk - chance of flooding of between a 1 in 1000 & 1 in 100 (0.1% and 1%).
- Medium risk - chance of flooding of between a 1 in 100 and 1 in 30 (1% and 3.3%).
- High risk - chance of flooding of greater than 1 in 30 (3.3%).

Guidance

According to EA's surface water flood risk map the following advisory guidance applies to the Site:

Flood Depth

- 0.15 to 0.3 m - Flooding would: typically exceed kerb height, likely exceed the level of a damp-proof course, cause property flooding in some areas
- 0.3 to 0.9 m - Flooding is likely to exceed average property threshold levels and cause internal flooding. Resilience measures are typically effective up to a water depth of 0.6 m above floor level.

Climate change factors

Paragraph 002 of the National Planning Practice Guidance (August, 2022) requires consideration of the 1% AP (1 in 100 year) event, including an appropriate allowance for climate change.

The 0.1% AP (1 in 1000 year) surface water flooding event has been used as a proxy in this instance for the 1% AP (1 in 100 year) plus climate change event.

During this event flood depths of up to 0.6m are anticipated in the south of the Site. It is again noted that the area anticipated to experience flooding reflects a topographical depression on Site.

Surface water flooding flow routes

Analysis of OS mapping, ground elevation data and the EA's pluvial flow route mapping in the 1 in 1000 year (Low probability) event confirms the Site is located on a potential overland flow route.

The 1 in 1000 year event indicates the extent of flooding in a worst-case future 100 year with climate change scenario, where a flood flow route does develop within the Site.

During this event some of flow velocities are greater than 0.25 m/s. The flows could potentially affect future development and/or access routes to the Site.

Drawing SS_4.5 of the 2011 Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA indicates that a lost watercourse is located immediately adjacent to the south west of the Site (JBA, 2011, Appendix C). The watercourse is mapped to flow into the Boggart Hole Brook, located approximately 10m to the south west of the Site.

Site investigation is recommended to confirm the presence of any historic or culverted watercourse on Site, in the location of the identified flood flow route.

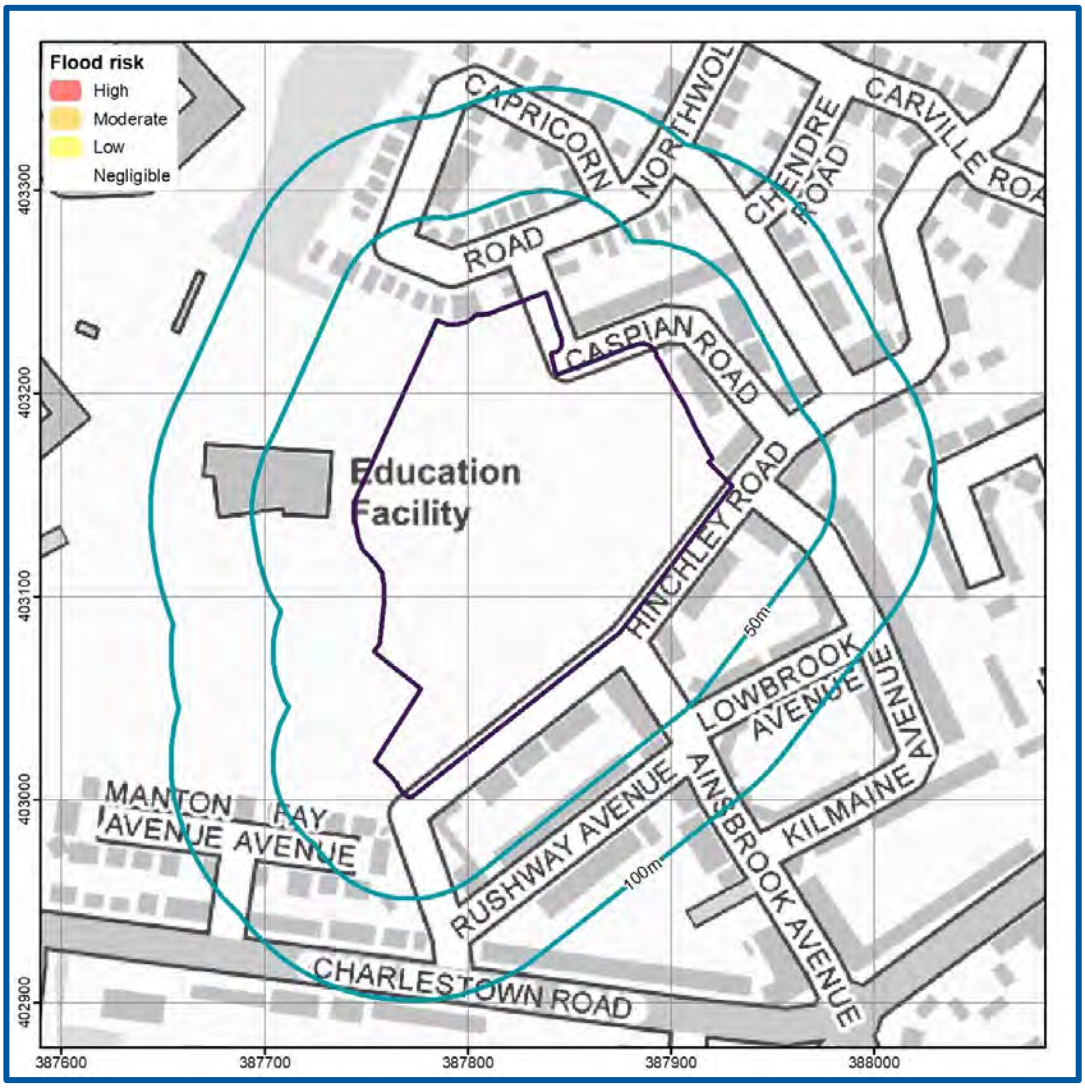
It is noted that the Greater Manchester Core Strategy Development Document states *"where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure."* (Manchester City Council, 2012).

Groundwater flooding

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface or into Made Ground and structures. This may be as a result of persistent rainfall that recharges aquifers until they are full; or may be as a result of high river levels, or tides, driving water through near-surface deposits. Flooding may last a long time compared to surface water flooding, from weeks to months. Hence the amount of damage that is caused to property may be substantially higher.

Groundwater Flood Risk screening data (Figure below) indicates there is a Negligible risk of groundwater flooding at surface in the vicinity of the Site during a 1 in 100 year event.

Figure 10. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Contains British Geological Survey materials © NERC 2023

Mapped classes within the screening map combine likelihood, possible severity and the uncertainty associated with predicting the subsurface system. The map is a national scale screening tool to prompt site-specific assessment where the impact of groundwater flooding would have significant adverse consequences. Mapping limitations and a number of local

factors may reduce groundwater flood risk to land and property even where it lies within mapped groundwater flood risk zones, which do not mean that groundwater floods will occur across the whole of the risk area.

A site-specific assessment has been undertaken to refine the groundwater risk screening information on the basis of site-specific datasets (see Section 3) including BGS borehole data, and the EA's fluvial and tidal floodplain data (where available) to develop a conceptual groundwater model. The risk rating is refined further using the vulnerability of receptors including occupants and the existing and proposed Site layout, including the presence of basements and buried infrastructure. The presence of any nearby or on-Site surface water features such as drainage ditches, which could intercept groundwater have also been considered.

According to a review of the hydrogeology (Section 3), the Site is underlain by low permeability superficial deposits above low permeability bedrock. There is therefore unlikely to be a significant aquifer beneath the Site and there is unlikely to be a mechanism for groundwater flooding at the Site.

The nearest, accessible borehole (ref: SD80SE57) did not record groundwater levels.

The SFRA does not include reference to historical groundwater flooding events within 50m of the Site (JBA, 2019).

Guidance
Negligible Risk - There will be a remote possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Climate change predictions suggest an increase in the frequency and intensity of extremes in groundwater levels. Rainfall recharge patterns will vary regionally resulting in changes to average groundwater levels. A rise in peak river levels will lead to a response of increased groundwater levels in adjacent aquifers subject to the predicted climate change increases in peak river level for the local catchment.

The impact of climate change on groundwater levels beneath the Site is linked to the variation in rainfall recharge which is uncertain.

Flooding from artificial sources

Artificial sources of flood risk include waterbodies or watercourses that have been amended by means of human intervention rather than natural processes. Examples include reservoirs (and associated water supply infrastructure), docks, sewers and canals. The flooding mechanism associated with flood risk from artificial sources is primarily related to breach or failure of structures (reservoir, lake, sewer, canal, flood storage areas, etc.)

Sewer flooding

Figure 6-8 of the SFRA confirms that there have been incidences of sewer flooding in the vicinity of the Site; however, due to the resolution of the Site it is not possible to confirm whether incidences occurred on Site (JBA, 2019).

Guidance

Properties classified as "at risk" are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

Canal failure

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site.

Water supply infrastructure

Water supply infrastructure is comprised of a piped network to distribute water to private houses or industrial, commercial or institution establishments and other usage points. In urban areas, this represents a particular risk of flooding due to the large amount of water supply infrastructure, its condition and the density of buildings. The risks of flooding to properties from burst water mains cannot be readily assessed.

If more information regarding the condition and history of the water supply infrastructure within the vicinity of the Site is required, then it is advisable to contact the local water supplier United Utilities.

Culverts and bridges

The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage and percolation leading to failure of earth embankments or other structures. Debris accumulations can change flow patterns, leading to scour, sedimentation or structural failure.

Drawing SS_4.5 of the 2011 Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA indicates that a lost watercourse is located immediately adjacent to the south west of

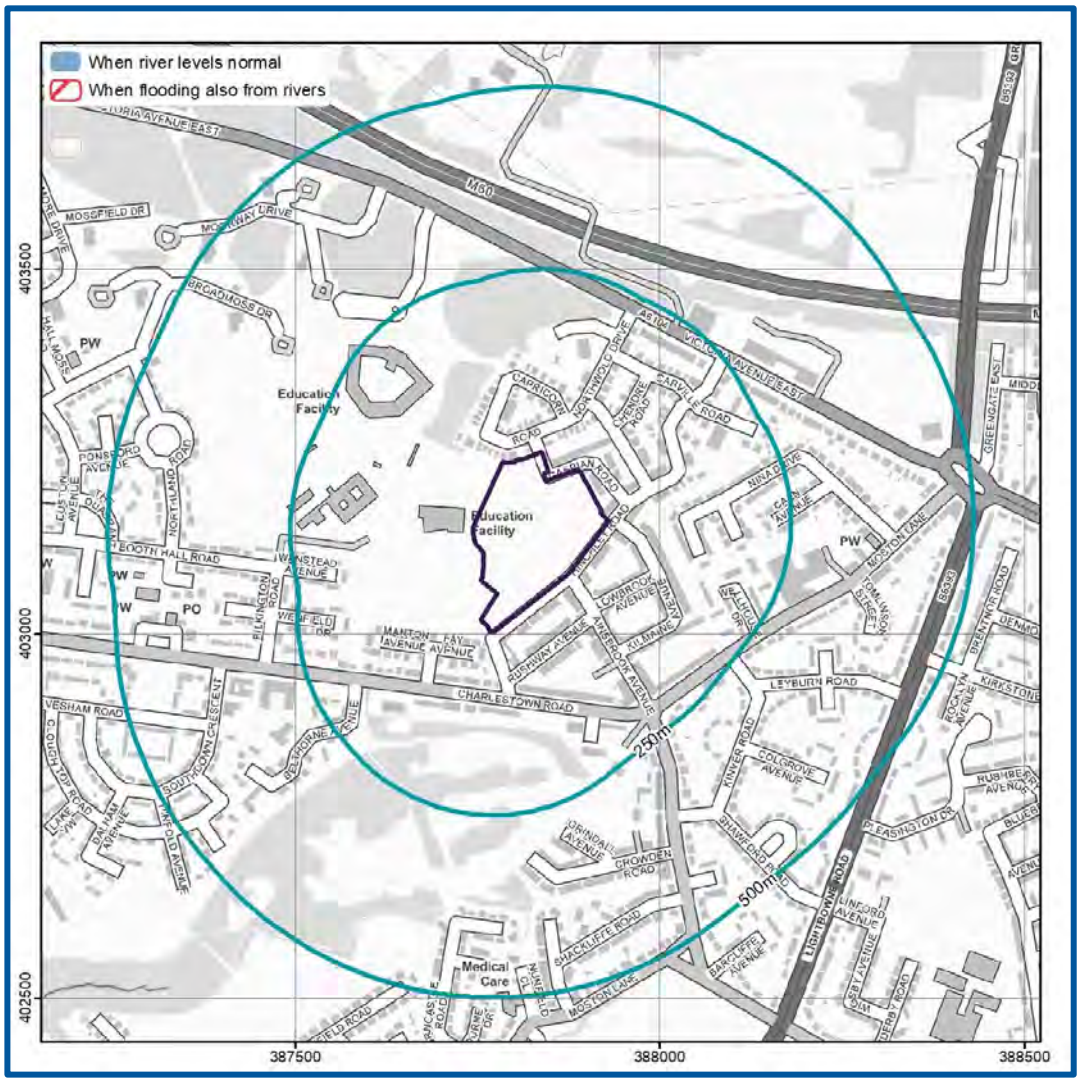
the Site (JBA, 2011, Appendix C). The watercourse is mapped to flow into the Boggart Hole Brook, located approximately 10m to the south west of the Site.

The SFRA has not identified any historic drainage issues within the Site area (JBA, 2019).

Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is not at risk of flooding from reservoirs (Figure below) (EA, 2023).

Figure 11. EA Risk of Reservoir Flooding (EA, 2023)



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m^3 of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (EA, 2023).

5. Suitability of future development

The information below outlines the suitability of potential future development in relation to national and local planning policy.

National policy and guidance

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

Guidance

Sequential test: The aim of this test is to steer new development towards areas with the lowest risk of flooding (NPPF, 2021). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

Exception test: In some cases, this may need to be applied once the Sequential Test has been considered. For the exception test to be passed it must be demonstrated that the development would provide wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of future development, and whether the Sequential and Exception Tests are required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the existing and proposed development. Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

This report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared within the table overleaf (Table 2 of the NPPG (2022)).

As the Site is located within Flood Zone 1, all types of development listed within the Table overleaf would be acceptable according to National Policy.

Table 2. Flood risk vulnerability and flood zone 'incompatibility' (taken from NPPG, 2022)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3a - high probability	Exception test required	✓	X	Exception test required	✓
	Zone 3b – functional flood plain	Exception test required	✓	X	X	X

6. Resilience and mitigation

Based on the flood risk identified at the Site and the national and local policies & guidance the mitigation measures outlined within this section of the report are likely to help protect the development from flooding.

Sea (coastal/tidal) flood mitigation measures

As the Site is not identified as being at risk of flooding from sea (coastal/tidal) sources, mitigation measures are not required.

Rivers (fluvial) flood mitigation measures

As the Site is not identified as being at risk of flooding from fluvial sources, mitigation measures are not required.

Surface water (pluvial) flood mitigation measures

A Very Low-High surface water (pluvial) flooding risk has been identified at the Site. In order to ensure the development includes sufficient flood mitigation measures to reduce the risk of pluvial flooding over its lifetime, the flood depths, levels and appropriate mitigation measures have been assessed.

Where future development is proposed, Finished Floor Levels should be set at least 300mm above the maximum 1 in 100 year plus climate change event pluvial flood level.

> The Low risk (1 in 1000 year) surface water flooding event has been used as a proxy in this instance for the Medium risk (1 in 100 year) plus climate change event.

The anticipated surface water flooding on Site reflects a topographic depression on Site. Where future development is proposed it is likely to include the regrading of land and the installation of an on-Site drainage system. Where these features are implemented the anticipated surface water flooding may be minimised.

It is noted that drawing SS_4.5 of the 2011 Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA indicates that a lost watercourse is located immediately adjacent to the south west of the Site (JBA, 2011, Appendix C). The watercourse is mapped to flow into the Boggart Hole Brook, located approximately 10m to the south west of the Site.

Site investigation is recommended to confirm the presence of any historic or culverted watercourse on Site, in the location of the identified flood flow route.

Additional Mitigation

Where regarding of land is not proposed and it is not considered feasible to raise the minimum finished floor levels to the recommended elevation, these should be raised as high as possible. It may be appropriate to adopt a water exclusion strategy for flood depths up to 600mm in line with the EA's Standing Advice. A water exclusion strategy, using avoidance and

resistance measures, is appropriate where floods are expected to last for short durations (but a structural engineer should be consulted). Potential water exclusion strategies include:

- Passive flood door systems;
- Temporary flood barriers;
- Air brick covers (manual or automatic closing);
- Non-return flap valves on sewer outfalls.
- Construction of local bunds;
- Landscaping to divert water away from the property;
- Sustainable Drainage Systems (SuDS) to store/intercept flood water;
- Boundary walls/fencing;

Avoidance and resistance measures are unlikely to completely prevent floodwater entering a property, particularly during longer duration flood events. Therefore, it is recommended that the following flood resilience measures are also considered.

- Flood resilient materials and designs:
    - Use of low permeability building materials up to 0.6 m such as engineering bricks (Classes A and B) or facing bricks;
    - Hard flooring and flood resilient metal staircases;
    - The use of internal lime plaster/render or where plasterboards are used these should be fitted horizontally instead of vertically and/or using moisture resistant plasterboard at lower levels;
    - Water, electricity and gas meters and electrical sockets should be located 600mm above the predicted flood level;
    - Communications wiring: wiring for telephone, TV, Internet and other services should be protected by suitable insulation in the distribution ducts to prevent damage.

In addition, the regular maintenance of any drains and culverts surrounding/on the Site under the riparian ownership of the developer should be undertaken to reduce the flood risk.

Where future development proposals include an increase in impermeable area on Site a Sustainable Drainage Strategy (SuDS) should be developed, for effective management of surface water runoff from the proposed development.

Where future development is proposed on the identified overland flood flow route there may be a loss in floodplain storage , resulting in the displacement of flood water and an alteration of flood flow routes. In this case, floodplain compensation would be required to ensure flood risks area not increased to third parties and neighbouring land.

Groundwater flood mitigation measures

As the Site is not identified as being at risk of groundwater flooding, mitigation measures are not required.

Reservoir flood mitigation measures

The Site is not a risk of flooding from reservoirs; therefore, mitigation measures are not required.

Other flood risk mitigation measures

As the Site is not identified as at risk from other sources, mitigation measures are not required.

Residual flood risk mitigation measures

The risk to the Site has been assessed from all sources of flooding and appropriate mitigation and management measures proposed to keep the users of the development safe over its lifetime. There is however a residual risk of flooding associated with the potential for failure of mitigation measures if regular maintenance and upkeep isn't undertaken. If mitigation measures are not implemented or maintained, the risk to the development will remain as the baseline risk.

Further flood mitigation information

More information on flood resistance, resilience and water entry can be found here: http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

www.knowyourfloodrisk.co.uk

Emergency evacuation - safe access / egress and safe refuge

As the Site is located in a fluvial Flood Zone 1 and the anticipated surface water flooding is limited to 0.6m, emergency evacuation from the Site is not likely to be required.

However, where 'more vulnerable' and, where possible, development in general are proposed in the future, internal stair access to an area of safe refuge within proposed buildings to a level higher than the maximum likely water level should be provided. An area of safe refuge should be sufficient in size for all potential users and be reasonably accessible to the emergency services.

Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

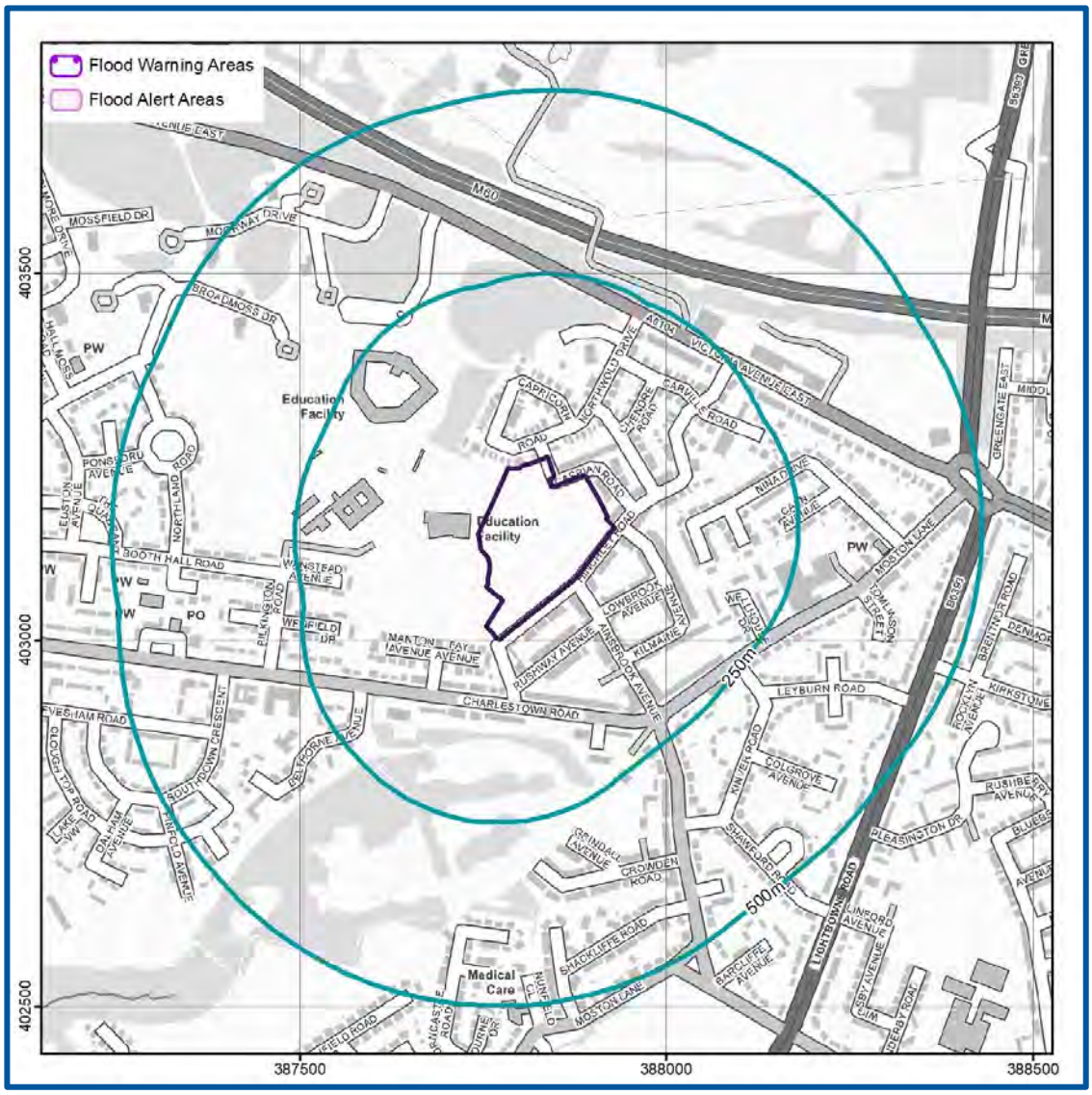
Flood warnings

The Site is not located within an EA Flood Alerts/Warning coverage area.

However, warnings for other catchments and watercourse are available through the EA's 24 hour Floodline Service 0345 988 1188. A nearby catchment could be signed up to, in order to provide some alert and warning service.

The EA aims to issue Flood Warnings 2 hours in advance of a flood event. Flood Warnings can provide adequate time to enable protection of property and evacuation from a Site, reducing risk to life and property.

Figure 12. EA Flood Warning Coverage for the local area (EA, 2023).



Contains Ordnance Survey data © Crown copyright and database right 2023
Environment Agency copyright and database rights 2023

7. Conclusions and recommendations

Table 3. Risk ratings following Site analysis

Source of Flood Risk	Baseline[1]	After analysis[2]	After Mitigation[3]
River (fluvial) flooding	Very Low	Very Low	N/A
Sea (coastal/tidal) flooding	N/A	N/A	N/A
Surface water (pluvial) flooding	Very Low-High	Very Low-High	Very Low-Low
Groundwater flooding	Negligible	Negligible	N/A
Other flood risk factors present	Yes[4]	Yes[4]	Yes[4]
Is any other further work recommended?	Yes	Yes	Yes (see below)

1 BASELINE risks assigned for the whole Site, using national risk maps, including the benefit of EA flood defences.

2 AFTER ANALYSIS modification of risk assessment based on detailed site specific analysis including some or all of the following: flood model data, high resolution mapping, building location, access routes, topographic and CCTV surveys. Reasons for the change in classification are provided in the text.

3 AFTER MITIGATION risks include risks to proposed development / asset and occupants if mitigation measures recommended in this report are implemented, including the impacts of climate change.

4 A possible risk has been identified from sewers and a culverted watercourse although the level of risk could not be determined. Further consultation with the local water supplier, United Utilities, is recommended.

N/A indicates where mitigation is not required.

The table below provides a summary of where the responses to key questions are discussed in this report. Providing the recommended mitigation measures are put in place it is likely that flood risk to this Site will be reduced to an acceptable level.

All developments in a Flood Zone 1 are acceptable according to the NPPF and providing the recommended mitigation measures are put in place (see previous sections) it is likely that flood risk to this Site will be reduced to an acceptable level.

Table 4. Summary of responses to key questions in the report

Key sources of flood risks identified	Surface water (see Section 4).
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	Yes (see Section 7).
Is any further work recommended?	Yes (See exec summary and section 7)

8. Further information

The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products			
	Additional assessment: SuDSmart Report		The SuDSmart Report range assesses which drainage options are available for a Site. They build on technical detail starting from simple infiltration screening and work up to more complex SuDS Assessments detailing alternative options and designs. Please contact info@geosmartinfo.co.uk for further information.
	Additional assessment: EnviroSmart Report		Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

9. References and glossary

References

British Geological Survey (BGS) (2023). GeoIndex Onshore. Accessed from: https://mapapps2.bgs.ac.uk/geoindex/home.html on 24/01/2023.

Defra/Environment Agency (2005). Flood Risk Assessment Guidance for New Development. *Phase 2 Framework and Guidance for Assessing and Managing Flood Risk for New Development – Fill Documentation and Tools*. R & D Technical Report FD232-/TR2.

Environment Agency [EA] (2022). Flood risk assessments: climate change allowances. Accessed from: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances on 24/01/2023.

Environment Agency [EA] (2023). MagicMap. Accessed from: http://magic.defra.gov.uk/MagicMap.aspx on 24/01/2023.

Environment Agency [EA] (2023). Flood map for planning. Accessed from https://flood-map-for-planning.service.gov.uk/ on 24/01/2023.

Environment Agency [EA] (2023). Long term flood risk assessment for locations in England. Accessed from https://flood-warning-information.service.gov.uk/long-term-flood-risk on 24/01/2023.

GeoSmart (2023). GeoSmart groundwater flood risk (GW5) map (version 2.4).

JBA Consulting (2011) Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA. Accessed from https://www.trafford.gov.uk/planning/strategic-planning/docs/manchester-salford-and-trafford-councils-level-2-hybrid-sfra-level-1-sfra-march-2011.pdf on 24/01/2023.

JBA Consulting (2019) Level 1 Strategic Flood Risk Assessment for Greater Manchester-update. Accessed from https://www.greatermanchester-ca.gov.uk/GMCAFiles/PFE/Supporting%20documents/04%20Sustainable%20and%20Resilient%20Places/04.02.01%20GM%20Strategic%20Flood%20Risk%20Assessment%20Level%201%20Report.pdf on 24/01/2023.

Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework (NPPF). Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf on 24/01/2023.

Ministry of Housing, Communities & Local Government (2022). Planning Practice Guidance (NPPG). Flood Risk and Coastal Change. Accessed from https://www.gov.uk/guidance/flood-risk-and-coastal-change on 24/01/2023.

Ordnance Survey Mapping (2023). © Crown copyright. All rights reserved. Licence number AL 100054687. For full terms and conditions visit: www.ordnancesurveyleisure.co.uk

LiDAR Survey Open Data (2023). Accessed from: https://environment.data.gov.uk/DefraDataDownload/?Mode=survey on 24/01/2023.

GeoSmart Information

Glossary

General terms

BGS	British Geological Survey
EA	Environment Agency
GeoSmart groundwater flood risk model	GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 100 year return period scenario.
Dry-Island	An area considered at low risk of flooding (e.g. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (e.g. Flood Zone 2 and 3)
Flood resilience	Flood resilience or wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring.
Flood resistance	Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.
Flood Zone 1	This zone has less than a 0.1% annual probability of river flooding
Flood Zone 2	This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding
Flood Zone 3	This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding
Functional Flood Plain	An area of land where water has to flow or be stored in times of flood.
Hydrologic model	A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is ±0.25m for estimating flood levels at particular locations.
OS	Ordnance Survey
Residual Flood Risk	The flood risk remaining after taking mitigating actions.
SFRA	Strategic Flood Risk Assessment. This is a brief flood risk assessment provided by the local council

SuDS	A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a Site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDS Approval Board (SABs).

Aquifer Types

Principal aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Secondary A aquifer	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.
Secondary B aquifer	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
Secondary undifferentiated	Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.

NPPF (2021) terms

Exception test	Applied once the sequential test has been passed. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
Sequential test	Aims to steer new development to areas with the lowest probability of flooding.
Essential infrastructure	Essential infrastructure includes essential transport infrastructure, essential utility infrastructure and wind turbines.

Water compatible	Water compatible land uses include flood control infrastructure, water-based recreation and lifeguard/coastal stations.
Less vulnerable	Less vulnerable land uses include police/ambulance/fire stations which are not required to be operational during flooding and buildings used for shops/financial/professional/other services.
More vulnerable	More vulnerable land uses include hospitals, residential institutions, buildings used for dwelling houses/student halls/drinking establishments/hotels and sites used for holiday or short-let caravans and camping.
Highly vulnerable	Highly vulnerable land uses include police/ambulance/fire stations which are required to be operational during flooding, basement dwellings and caravans/mobile homes/park homes intended for permanent residential use.

Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2023 BlueSky copyright and database rights 2023
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2023 Ordnance Survey data © Crown copyright and database right 2023
Flood Risk (Flood Zone/RoFRS/Historic Flooding/Pluvial/Surface Water Features/Reservoir/ Flood Alert & Warning)	Environment Agency copyright and database rights 2023 Ordnance Survey data © Crown copyright and database right 2023
Flood Risk (Groundwater)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2023) Contains British Geological Survey materials © NERC 2023 Ordnance Survey data © Crown copyright and database right 2023
Location Plan	Contains Ordnance Survey data © Crown copyright and database right 2023
Topographic Data	OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2023 Environment Agency copyright and database rights 2023

10. Appendices

GeoSmart Information

Appendix A

Site plans



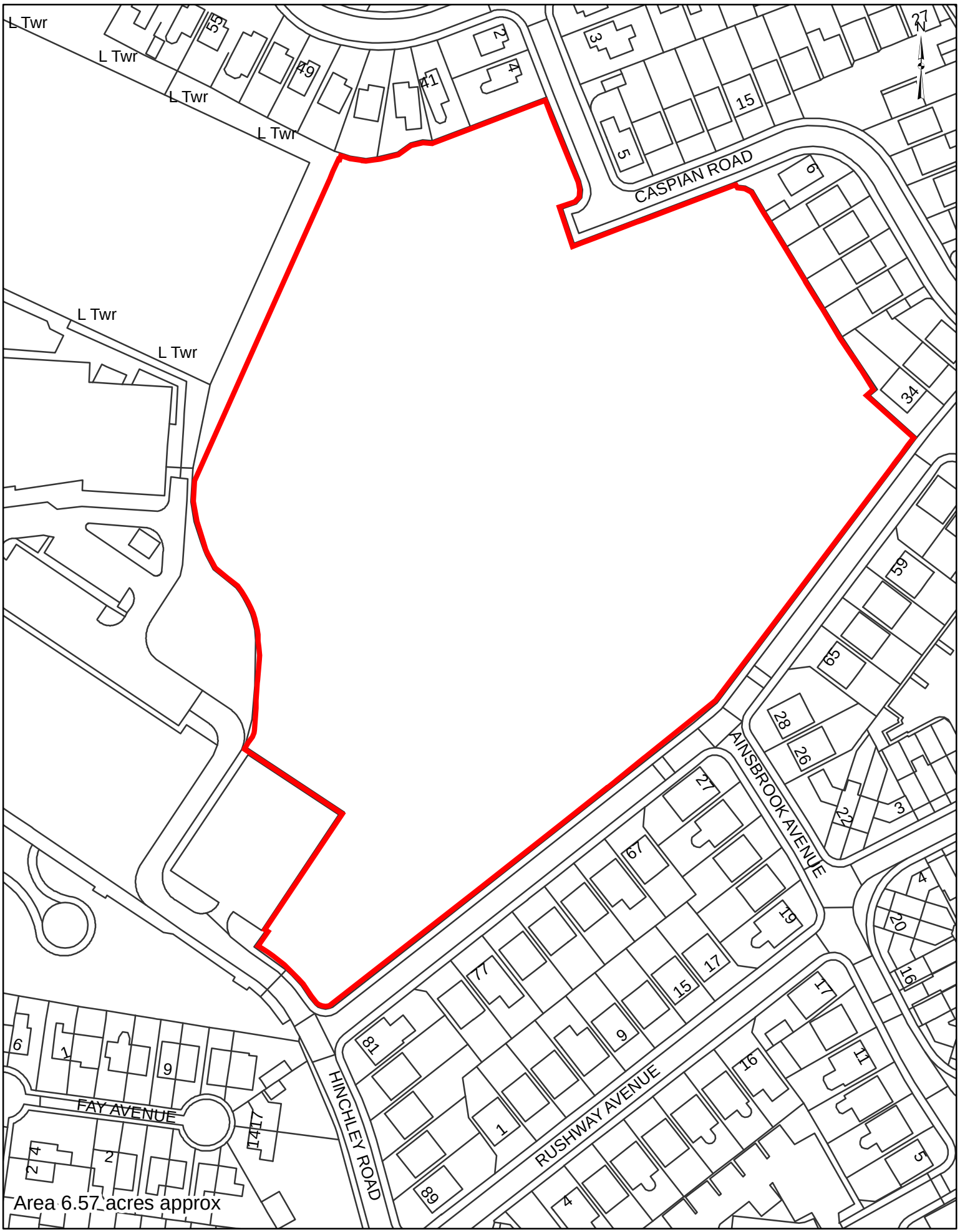
A4 Scale 1:1,250

Plan for Identification Purposes Only

Development Team
Growth & Development Directorate
P.O. Box 532
Manchester M60 2LA

MANCHESTER CITY COUNCIL

© Crown copyright and database rights 2022. Ordnance Survey 100019568



A4 Scale 1:1,250

Plan for Identification Purposes Only

Development Team
Growth & Development Directorate
P.O. Box 532
Manchester M60 2LA

MANCHESTER CITY COUNCIL

© Crown copyright and database rights 2022. Ordnance Survey 100019568

GeoSmart Information

Appendix B

Environment Agency LiDAR ground elevation data

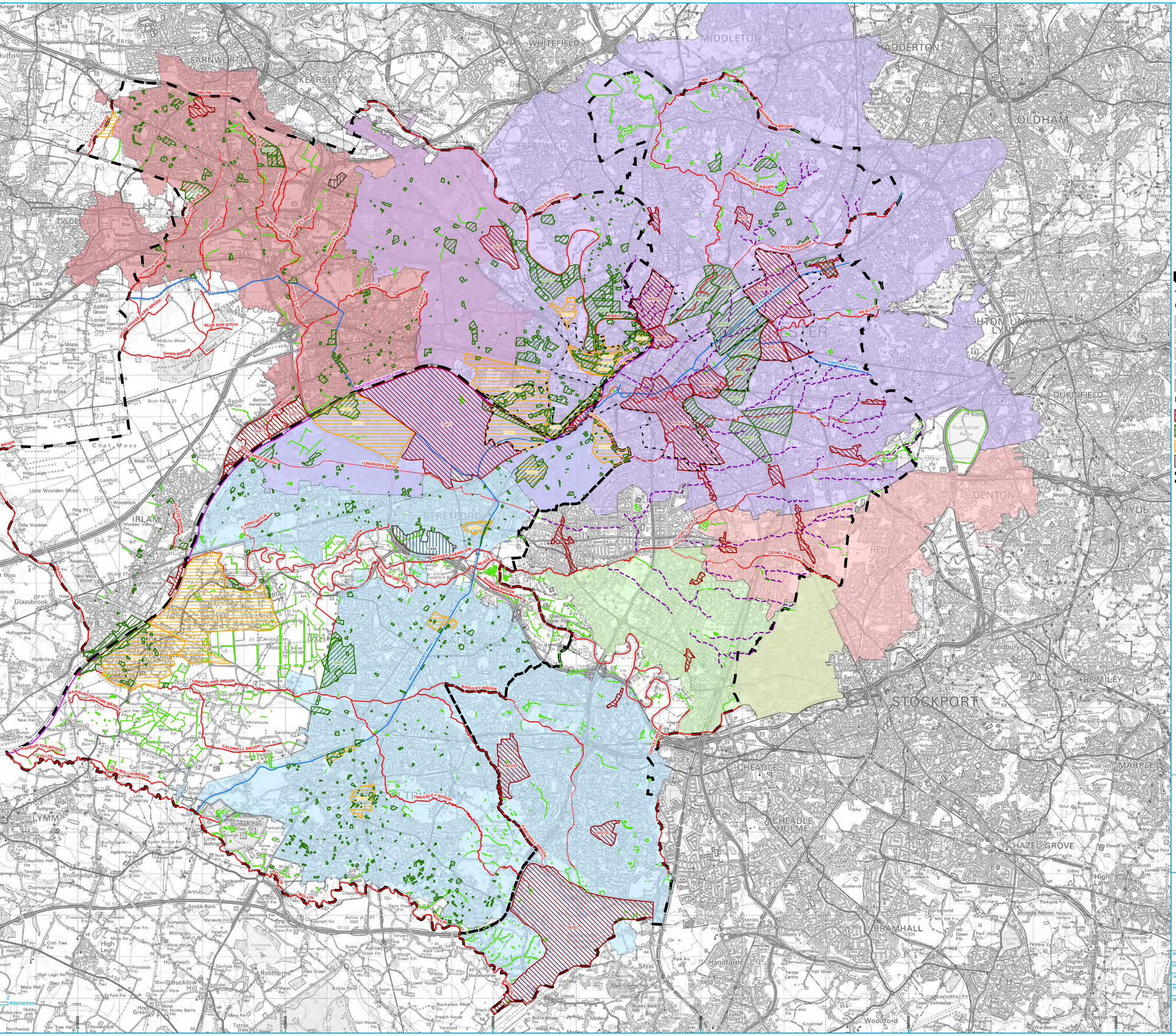

387700
387800
387900
388000
403300
403200
403100
403000
MANTON AVENUE
FAY AVENUE
LOWBROOK AVENUE
AINSBROOK AVENUE
KILMAINE AVENUE
0 25 50 m
Elevation on Site (LiDAR Data)
Contours (0.25m)
Site boundary
Elevation (mAOD)
99.0200
100.0100
101.0000
101.9900
102.9800

GeoSmart Information

Appendix C



Local Council document mapping



- Council Boundary
- Lost Watercourses

Critical Drainage Areas

- Conurbation Core
- Didsbury
- Levenshulme and Fallowfield
- Manchester and Trafford South
- Salford North West

Potential Development Sites / Locations

- Employment
- Housing
- Mixed Use
- Other
- Regional Centre Boundary

- Ashton, Bridgewater and Rochdale Canals
- Manchester Ship Canal / Grey Irwell
- Other Waterbodies

Main Rivers (V8.0)

- Culverted
- Open

Digitised River Lines

- Culverted
- Open

This map has been produced in accordance with PPS25: Development and Flood Risk.

Certain locations are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. There are generally known local flooding problems associated with these areas. These areas have been defined as Critical Drainage Areas in the SFRA. Specific drainage requirements are required in these areas to help reduce local flood risk.

Chapter 5 of the Level 2 SFRA covers the flooding from surface water and sewers and how Critical Drainage Areas have been defined.

The Main River information shown in the SFRA is provided by the Environment Agency; the centreline data may deviate from that shown on basemapping due to inherent differences in data resolution. Further information on Main Rivers is provided on the Environment Agency's website. The mapping of culverted sections of watercourse is a strategic screening only based upon Ordnance Survey 1:10,000 mapping and should be confirmed for more detailed studies such as site specific Flood Risk Assessment. The canals layer does not necessarily cover all the canal arms, but the modelled overtopping/breaching and hydraulic interactions with rivers and other waterbodies is complete and accurate as appropriate for a Strategic Flood Risk Assessment.

The River Irwell between Victoria Station and Pomona Island is not shown as a Main River on the Environment Agency's Flood Map although Flood Zones related to the river are. The same approach has been taken in this SFRA.

JBA consulting

www.jeremybenn.co.uk
t 01925 570876
f 0845 8627772
e info@jbaconsulting.co.uk

Bank Quay House
Sankey Street
Warrington
WA1 1NN
United Kingdom

Other offices at Atherstone, Doncaster, Edinburgh, Haywards Heath, Limerick, Newcastle upon Tyne, Newport, Northallerton, Saltaire, Skipton, Tadcaster & Wallingford

for

Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Critical Drainage Areas

Drawn by:	J Cheetham	Date:	16/03/2011
Checked by:	J Dimelow	Date:	01/02/2011
Approved by:	J Cooper	Date:	01/02/2011

This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Licence number: 100015568 2011.

File Name: ...ArcView\Mapping\Level2\MST_CDA_Current_V1.2.mxd

Drawing Number:	Status:	Scale:
SS_4.5	FINAL	1:45,000

Original @ A1

Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see http://geosmartinfo.co.uk/terms-conditions

Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

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

The Code's core principles

Firms which subscribe to the Search Code will:

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

Complaints

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

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

TPOs contact details:

The Property Ombudsman scheme

Milford House

43-55 Milford Street

Salisbury

Wiltshire SP1 2BP

Tel: 01722 333306

Fax: 01722 332296

Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk. Please ask your search provider if you would like a copy of the search code

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

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

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

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

Martin Lucass

Commercial Director

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

Tel: 01743 298 100

martinlucass@geosmartinfo.co.uk

11. Terms and conditions, CDM regulations and data limitations

Terms and conditions can be found on our website:

http://geosmartinfo.co.uk/terms-conditions/

CDM regulations can be found on our website:

http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/

Data use and limitations can be found on our website:

http://geosmartinfo.co.uk/data-limitations/

APPENDIX 6: PRELIMINARY RISK ASSESSMENT MATRIX

6.0 PRELIMINARY RISK ASSESSMENT MATRIX

6.1 Preliminary Risk Assessment

6.1.1 The method of risk evaluation is a qualitative method taken from CIRIA (2001) Contaminated land risk assessment. A guide to good practice (C552). The risk evaluation process involves the classification of the:

- Magnitude of the potential consequence (severity) of risk occurring; and
- Magnitude of the probability (likelihood) of the risk occurring.

6.2 Classification of Consequence

6.2.1 The potential consequences of contamination risks occurring at the site have been classified in accordance with Table A below, which is adapted from the CIRIA C552 guidance (2001):

Table A Classification of Consequence

Classification	Definition	Example
Severe	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part 2A. Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short term risk to a particular ecosystem, or organism forming part of such ecosystem.	High concentrations of a contaminant at the surface in an area of landscaping / recreation. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse or asphyxiation.
Medium	Chronic damage to human health ("significant harm" as defined by DEFRA, 2012). Pollution of sensitive water resources. A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of a contaminant from site exceed the generic, or site specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary Aquifer. Death of a species within a designated nature reserve, e.g. a SSSI.
Mild	Pollution of non-sensitive water resources. Significant damage to buildings/structures and crops ("significant harm" as defined by DEFRA, 2012). Damage to sensitive buildings/structures or the environment.	Pollution of non-classified groundwater. Damage to the building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as Personal Protective Clothing, etc.). Easily repairable effects of damage to buildings/structures.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

6.3 Classification of Probability

6.3.1 The process of risk assessment is an evaluation of the probability of harm, and comprises the identification of sources of contamination, receptors that may be affected by the contamination and pathways by which the receptors may be harmed.

6.3.2 The classification of probability, which is adapted from the CIRIA C552 guidance (2001), is set out in Table B below.

Table B Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.
Moderate Likelihood	There is a pollution linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an 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 that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

6.4 Risk Matrix

6.4.1 Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned from Table C below, adapted from CIRIA (2001).

6.4.2 ***Table C Consequence Against Probability***

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate / Low Risk
	Likely	High Risk	Moderate Risk	Moderate / Low Risk	Low Risk
	Low Likelihood	Moderate risk	Moderate / Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate / Low Risk	Low Risk	Very Low Risk	Very Low Risk

6.5 Risk Description

6.5.1 Definitions of the risk categories are as shown in Table D, adapted from C552, with an assessment of the further work that might be required:

Table D Description of the Classified Risks and Likely Action Required

Classification	Definition
Very High Risk	There is a high probability that severe harm could occur or there is evidence harm is currently happening. This risk, if realised, could result in substantial liability and urgent investigation and remediation are likely to be required.
High Risk	Harm is likely to occur. Realisation of the risk is likely to present a substantial liability and urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term.
Moderate Risk	It is possible that harm could arise, but it is unlikely that the harm would be severe and it is more likely that harm would 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 Risk	It is possible that harm could occur, but it is likely that if realised this harm would at worst normally be mild.
Very Low Risk	There is a low possibility that harm could occur and if realised the harm is not likely to be severe.
No Potential Risk	There is no potential risk if no pollution linkage has been established. The pollutant linkage will be discounted from the final Conceptual Site Model.

6.5.2 In some cases there may be some pollutant linkages that have a degree of risk that is considered between the classifications above, for example, low to moderate and moderate to high. In this scenario, Colliers P&BC would apply a precautionary principle and assess the risk in relation to the more conservative aspect of the risk until further data can be obtained to make an informed judgement of the risk.

6.6 Preliminary Conceptual Site Model (CSM)

6.6.1 Using the foregoing approach, a risk based assessment has been completed to assess the potential pollutant linkages associated with the development to assess the need for further action.

6.6.2 The detailed conceptual site model is provided in Table 3 (Section 5.0) of the main report.

APPENDIX 7: EXTENT OF SURVEY AND LIMITATIONS

EXTENT OF SURVEY AND LIMITATIONS

The report has been designed to identify potential source, pathway and receptor pollutant linkages by assessing the following:

- Current, former and proposed land uses on site including an inspection of the site and the immediate environs, information provided by the client on the current use of the site and a review of historical data;
- Environmental sensitivity of the site location as determined by factors including geology, hydrogeology, surface watercourses and neighbouring land uses; and
- Pertinent information provided by environmental regulators.

The environmental risk assessment will be undertaken with due regard to Contaminated Land Guidance documents (available and relevant at the time of issuing our report) issued by (but not limited to) the Environmental Protection Act Part IIA 1990 (and subsequent amendments), Department for Environment, Food and Rural Affairs (DEFRA) and its predecessors, the Environment Agency (and its devolved equivalents), British Standards Institute (BSi), the Royal Institution of Chartered Surveyors (RICS) and the American Society for Testing and Materials (ASTM) Standard E 1527-13. No liability can be accepted for the effects of any future changes to such guidelines and legislation. In the event that guidance / legislation changes it may be necessary for Colliers to update or modify reports.

Specific comment is made regarding the site's status under Part 2A of the Environmental Protection Act (EPA) 1990, which provides a statutory definition of Contaminated Land and as revised under The Contaminated Land (England) (Amendment) Regulations 2012 (or devolved nation equivalents where relevant). Unless specifically stated as relating to this definition, references to 'contamination' and 'contaminants' relate in general terms to the presence of potentially hazardous substances in, on or under the site.

The risk assessment is dictated by the finite data on which it is based and is relevant only for the purpose of which the report is commissioned. If additional information or data becomes available which may affect the opinions expressed in our report, we reserve the right to review such information and, if warranted, to modify the risk assessment accordingly. We reserve the right to charge an additional fee for un-anticipated second opinion reviewing of previous reports. A site inspection was carried out within the scope of this assessment.

Colliers has been able to identify perceived risks based on the information reviewed and made available. Our Phase I Environmental Audit will be based on a visual inspection of the site, a review of available historical and environmental setting records, consultations with site representatives, pertinent information provided from the client and regulatory consultations. No samples will be taken as part of this study. No intrusive ground investigation work was carried out and, as such, actual risks have not been established. Actual risks can only be assessed following an intrusive investigation of the site.

With regard to flooding our commentary is based on the publicly available mapping only, which is available at the time of writing via the EA, NRW, SEPA and / or the BGS. We cannot accept any liability where the information is updated following the issue of our report. No inspection or comment is made on the below ground drainage installations or service conduits unless instructed otherwise.

Where budget costs are included in our report, these costs are for guidance purposes only.

Our report will be for the attention and purposes of the Addressee only and consequently we cannot accept any third party liability for the whole or any part thereof. Neither may the whole nor any part of our report, nor any reference thereto, be published in any way nor included in any published document, circulate or statement without our prior written approval of the form and context in which it may appear.



London

The Harlequin Building
65 Southwark Street
London SE1 OHR
T: +44 (0)20 7125 0112

Manchester

Chancery Place
50 Brown Street
Manchester M2 2JT
T: +44 (0)161 260 0500

Esher

Warwick House
1 Claremont Lane
Esher, Surrey KT10 9DP
T: +44 (0)1372 469 985

Edinburgh

1 Exchange Crescent
Conference Square
Edinburghc EH3 8AN
T: +44 (0)131 300 0070

Bristol

Unit 1 Temple Studios
Temple Gate
Bristol BS1 6AQ
T: +44 (0)117 301 7800

Leeds

1 Broad Gate
The Headrow
Leeds LS1 8EQ
T: +44 (0)113 532 6673

Colliers is the licensed trading name of Colliers Building Consultancy Limited.
Company registered in England and Wales No. 08482471.
Registered Office: The Harlequin Building, 65 Southwark Street, London, SE1 0HR.

Business