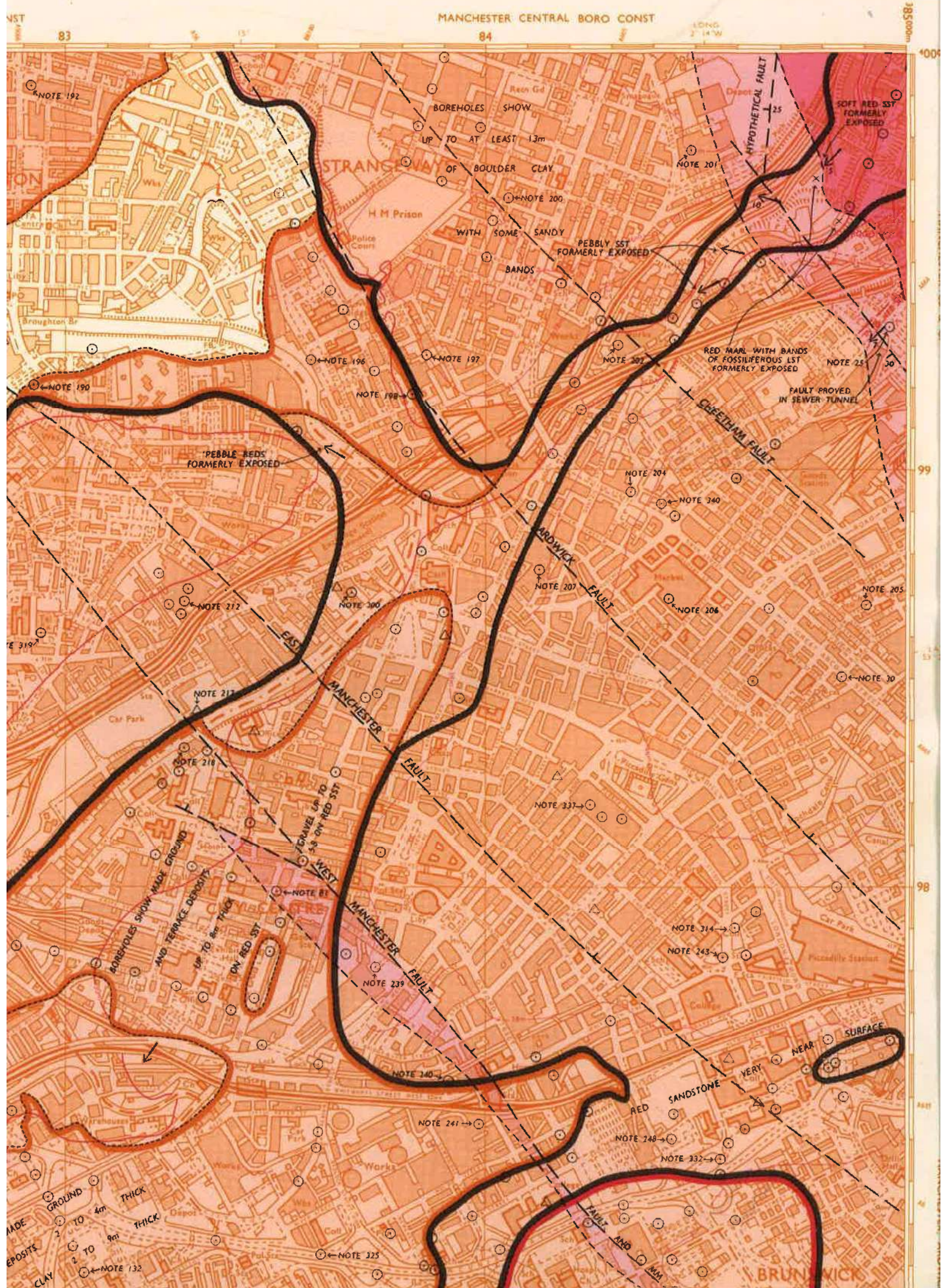


APPENDIX 6
EXTRACTS OF BGS GEOLOGICAL MAPS AND BGS BOREHOLE LOGS



INDEX AND EXPLANATION

GENERALIZED VERTICAL SECTION
Scale 1:4000 (1cm to 40m)

DRIFT

	Alluvium
	First Terrace
	Second Terrace
	Fluvio-Glacial Deposits
	Glacial Sand and Gravel
	Boulder Clay (includes layers of sand and gravel in places)

SOLID

BS	Bunter Sandstone
MM	Manchester Marls
CS	Collyhurst Sandstone
	Westphalian D, undifferentiated red and grey strata, mainly mudstone
	Westphalian C, undifferentiated red strata, mainly mudstone
	Westphalian C, undifferentiated grey strata, mainly mudstone and siltstone
	Sandstone (S on uncoloured part of vertical section)
	Limestone

See also Generalized Vertical Section

RECENT AND PLEISTOCENE

PERMIAN AND TRIASSIC

CARBONIFEROUS

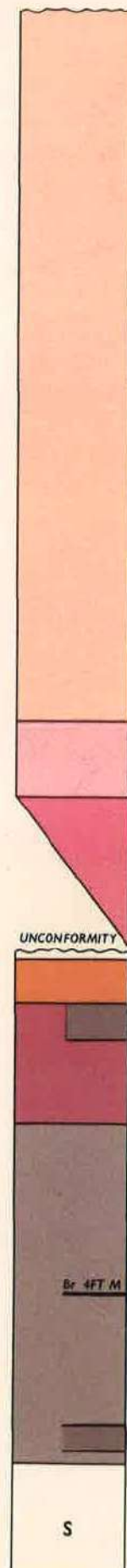
BUNTER SANDSTONE

MANCHESTER MARLS
COLLYHURST SANDSTONE

ARDWICK GROUP

- Inclined strata, dip in degrees
- Inclined strata underground in seam named, dip in degrees
- Geological boundary, Drift
- Geological boundary, Solid
- Coal-crop
- Fault at surface
- Fault underground in seam named; the note on the side from which fault was proved

Approximate throw of fault where known is given in metres at the point indicated



LIMESTONE (?GREAT MINE) 4-6

Br 4FT M

BRADFORD FOUR FOOT MINE

S

WORSLEY DELF ROCK

48 G.S.M. Nos. 75-79
SJ 89 NW 64-68SECTION OF Series Shaft at Deansgate, ManchesterMaps; One-inch 85 Six-inch 104 S.W.E County Lancs.

Height above O.D. _____ Latitude _____ Longitude _____

Communicated by Manchester Corporation Date of Sinking _____

Made by _____ Dip of Strata _____

		Thickness.		Depth from Surface.	
		Metres		metres	
No. ~~76~~ 68 68	Deansgate: Corner of Lombard St. made ground, Sandstone	3.66	12 -	3.66	12 -
		7.01	23 -	10.67	35 -
No. ~~76~~ 67 67	2. Deansgate opposite Camp St. corner. Ballast & made ground, Sandstone.	2.13	7 -	2.13	7 -
		11.28	37 -	13.41	44 -
No. ~~77~~ 66 66	03. Deansgate, opposite St. John's Street corner. Ballast & loose ground. Ballast & loose ground Sandstone.	3.66	12 -	3.66	12 -
		4.27	14 -	7.93	26 -
		5.18	17 -	13.11	43 -
No. ~~78~~ 65 65	05. Deansgate, Jackson's Row corner. Ballast & loose ground Sandstone.	3.66	12 -	3.66	12 -
		9.14	30 -	12.80	42 -
No. ~~79~~ 64 64	07. Deansgate, corner of John Dalton Street. made ground Ballast & gravel Gravel, sand, & marl. Sandstone	3.35	11 -	3.35	11 -
		3.05	10 -	6.40	21 -
		7.32	24 -	13.72	45 -

British Geological Survey

SECTION OF

Mantles in

SJ 89

W 81

84

MANCHESTER.

Maps: One-inch 85 Six-inch 104 S.W.E. County Lancs.

Height above O.D. — Latitude — Longitude —

Communicated by *Mantle Corporation City Engineer* Date of sinking —Made by *Contractor Resident Engineer Notes* Dip of Strata —

No. 58

81

Corner of Quay St. & Longwall St.

Gravel & sand.

Red loam

Grey loam.

Blue clay

Hard red marl.

Thickness.

Depth from Surface.

0.91	3	-	0.91	3	-
2.44	8	-	3.35	11	-
4.12	13	6	7.47	24	6
1.98	6	6	9.45	31	-
1.37	4	6	10.82	35	6

No. 59

82

Corner of Byron St. & Quay St.

Filling

Gravel & sand.

Yellow loam.

Red sand rock.

2.44	8	-	2.44	8	-
2.74	9	-	5.18	17	-
4.22	4	-	6.40	21	-
2.13	7	-	8.53	28	-

No. 60

83

Corner of Quay St. & Lower Byron Street.

Filling

Yellow marl

Blue clay.

Yellow clay

Dark loam.

Gravel & sand.

Hard red sand rock.

0.91	3	-	0.91	3	-
0.31	1	-	1.22	4	-
0.31	1	-	1.52	5	-
1.22	4	-	2.74	9	-
0.76	2	6	3.51	11	6
0.61	2	-	4.12	13	6
2.74	9	-	6.82	22	6

84

Corner of Quay St. & Atterton Street.

Filling

Sand

Red sand rock

0.91	3	-	0.91	3	-
1.83	6	-	2.74	9	-
2.74	9	-	5.49	18	-

RECORD OF WELL SHAFT (OR BORE)

1" N.S. 85

At Allied Dairies Ltd. Hardman Street, Deansgate

Town or Village Manchester

County Lancs.

Six-inch quarter sheet 104 SW.

Exact site

in parish of

(A rough sketch-map or a tracing from a map is very desirable)

Level of ground surface above sea-level (O.D.) + 93 ft. If well starts below ground surface, state how far _____ ft.

Shaft _____ ft., diameter _____ ft. Bore 448 ft. Diameter of bore: at top _____ ins.; at bottom _____ ins.

Details of permanent lining tubes (internal diameters preferred)

Water struck at depths of (feet)

Rest-level of water ^{below} top of well 160 ^{above} 9 feet. Suction at _____ feet. Yield on _____ hours' test giving _____ days' index

200,000 gallons per day. (with pump of capacity _____ g.p.h.); depressing water level to _____ feet

below top. Time of recovery _____ hrs. Amount normally pumped daily _____ g.p.h. for _____ hours.

Quality (attach copy of analysis if available)

Sunk by T. Matthews for Mr. _____ Date of well 1934.

Information from

(For Survey use only).
GEOLOGICAL
CLASSIFICATION.

NATURE OF STRATA
(and any additional remarks).

THICKNESS

DEPTH

Feet.

Inches.

Feet.

Inches.

cellar floor 9 ft. below street level.

Gravel

8

-

8

-

Red sandstone

122

-

130

-

Red marl

6

-

136

-

Sandy marl

3

6

139

6

Marly sandstone

12

6

152

-

Mottled marl

24

-

176

-

Marly sandstone

10

-

186

-

Sandstone

16

-

202

-

Marl

10

6

218

6

Marly sandstone

11

6

224

-

Red sandstone

47

-

271

-

Grey sandstone

12

-

283

-

Red & grey sandstone

114

-

397

-

Red & green mottled marls

51

-

448

-

No cores preserved.

Saw sample from 332 ft. of dark red & white fissured sandstone limy

Saw samples from 440 ft. of red & green mottled marl rough textured & purplish - on breaking samples yielded comparing with marly boring at Power Supply Station, Water St. (104 NW):-

The record may be interpreted as Bunter with marl partings to 397 ft. & fault into Ardwick Marls, or as

Bunter to 130 ft. (Fault in the first 100 ft.)

M/or marls to 224 ft.

Collyhurst to 397 ft.

Ardwick marls to 448 ft.

I am a bit doubtful about referring all the red & grey sst. (114 ft. to 397 ft.) to the Collyhurst. The sample brought in (332 ft.) is most unlike Collyhurst and could well be one of grits of Ardwick Group cf. the grit proved in Salford Gas Works boring.

L.H.T.

For Survey use only

GEOLOGICAL SURVEY AND MUSEUM,
SOUTH KENSINGTON,
LONDON. S.W.7.

Date
received

G.S.M. Office
File No.

Site marked
on 1" map
(use symbol)

(*11815) Wt.29051/0.869 10,000 9/89
A.& E.W.Ltd. Gp.686

CITY ENGINEER AND SURVEYORS DEPARTMENT

British Geological Survey

British Geological Survey

British Geological Survey

SITE INVESTIGATION FOR Main Drainage				DATE COMMENCED 6.11.83						
LOCATION Hardman Street		REF:		BORING METHOD Cable Percussive						
BOREHOLE No. 4				BORING DIAMETER 150mm		383556				
GRID REFERENCE				SCALE: 1:50 approx.		398121				
DATE	CASING DEPTH (m)	WATER LEVEL MORNING & EVENING	DEPTH OF STRATA BELOW GL	Reduced Level	DESCRIPTION	No. and Type of Sample	SAMPLE DEPTH PENETRATION		No. of Blows	Legend
							From	To		
6.11.83			0.05		Bituminous Surfacing					
			0.20		Setts					
			0.40		Concrete					
			0.70		Clay, gravel, bricks etc. Made Ground.	D1	0.5			
			2.0		Compact very silty fine/medium SAND	D2 P1 D3	1.0 1.35 1.90	1.65	21	
			2.85		Compact very silty and gravelly fine/medium SAND.	P2	2.35	2.65	26	
					Very dense red/brown fine/medium grained SANDSTONE with occasional pebbles.	P3 D4 P4	3.05 3.5 4.15	2.65 4.225	26 50	
6.11.83	3.60	Dry	4.50							
WATER OBSERVATIONS DURING BORING					WATER LEVEL IN CASED/UNCASED BOREHOLE ON COMPLETION					
DEPTH OF WATER ENTRY (m)	ESTIMATED SEE PAGE	STANDING LEVEL (m)	DEPTH OF CASING WHEN SEALED (m)	DATE	WATER LEVEL	DEPTH OF CASING				
				REMARKS:—						
SAMPLE TEST KEY				D – DISTURBED SAMPLE B – BULK SAMPLE U – UNDISTURBED SAMPLE P – SPT SAMPLE W – WATER SAMPLE						
NOTE: WHERE FULL 0.3 PENETRATION HAS NOT BEEN ACHIEVED, THE NUMBER OF BLOWS FOR THE QUOTED PENETRATION IS GIVEN (NOT N – VALUE)										
ALL DEPTHS AND REDUCED LEVELS IN (m) UNLESS OTHERWISE STATED										
REMARKS Trial hole excavated to 1.0m below ground level. Borehole backfilled on completion, no final overnight water level observed.										

APPENDIX 7
COAL AUTHORITY MINING REPORT

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG

Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**LANDMARK INFORMATION GROUP
LIMITED
SOWTON INDUSTRIAL ESTATE
ABBEY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY**

Our reference: **51000968793001**
Your reference: **71053485_2**
Date of your enquiry: **07 August 2015**
Date we received your enquiry: **07 August 2015**
Date of issue: **07 August 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

FLIX, INVICTA HOUSE, 2-4 ATKINSON STREET, GREATER MANCHESTER,

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

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

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

The property is not in an area that is likely to be affected at the surface from any planned future workings.

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

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

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

Coal mining geology

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

Opencast coal mining

Past

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

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

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

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

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

Mine gas

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

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

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

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

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

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

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

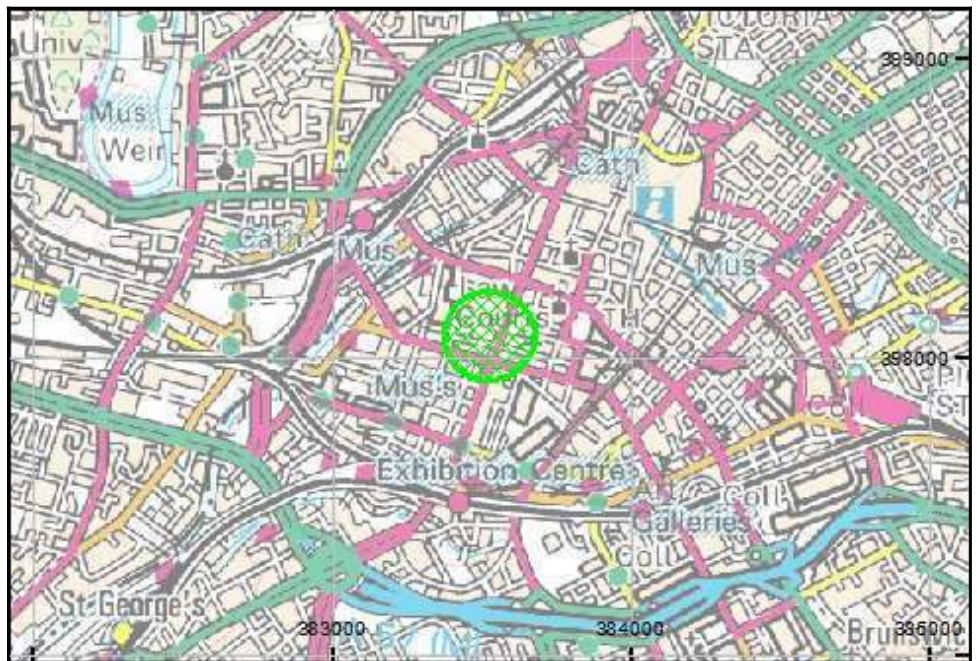
Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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Location map



Approximate position
of property

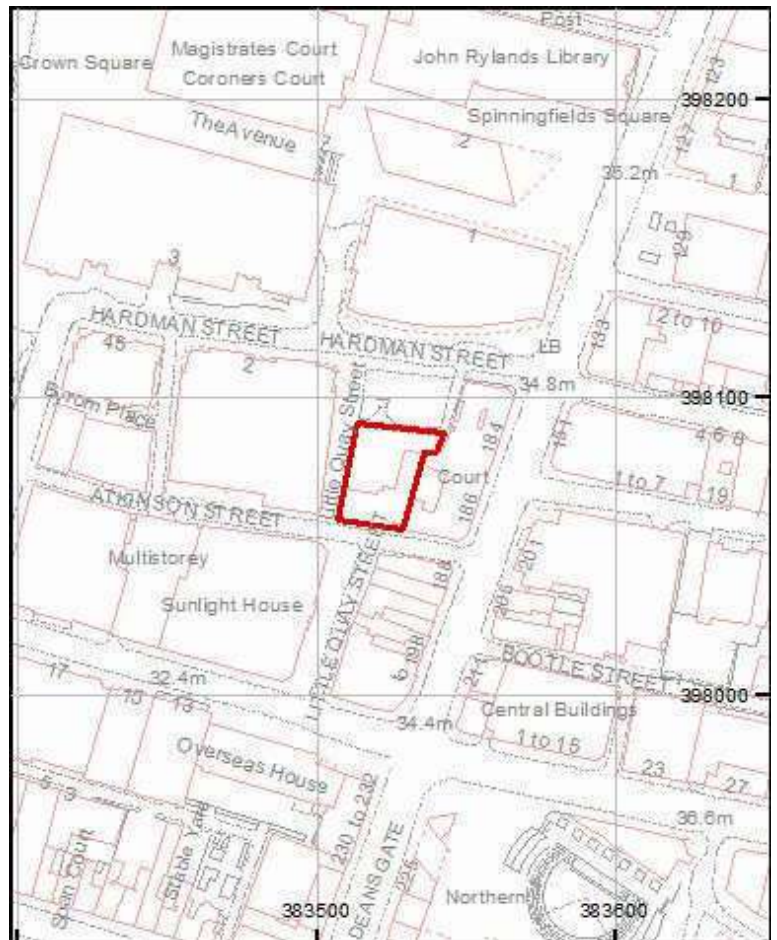


Enquiry boundary

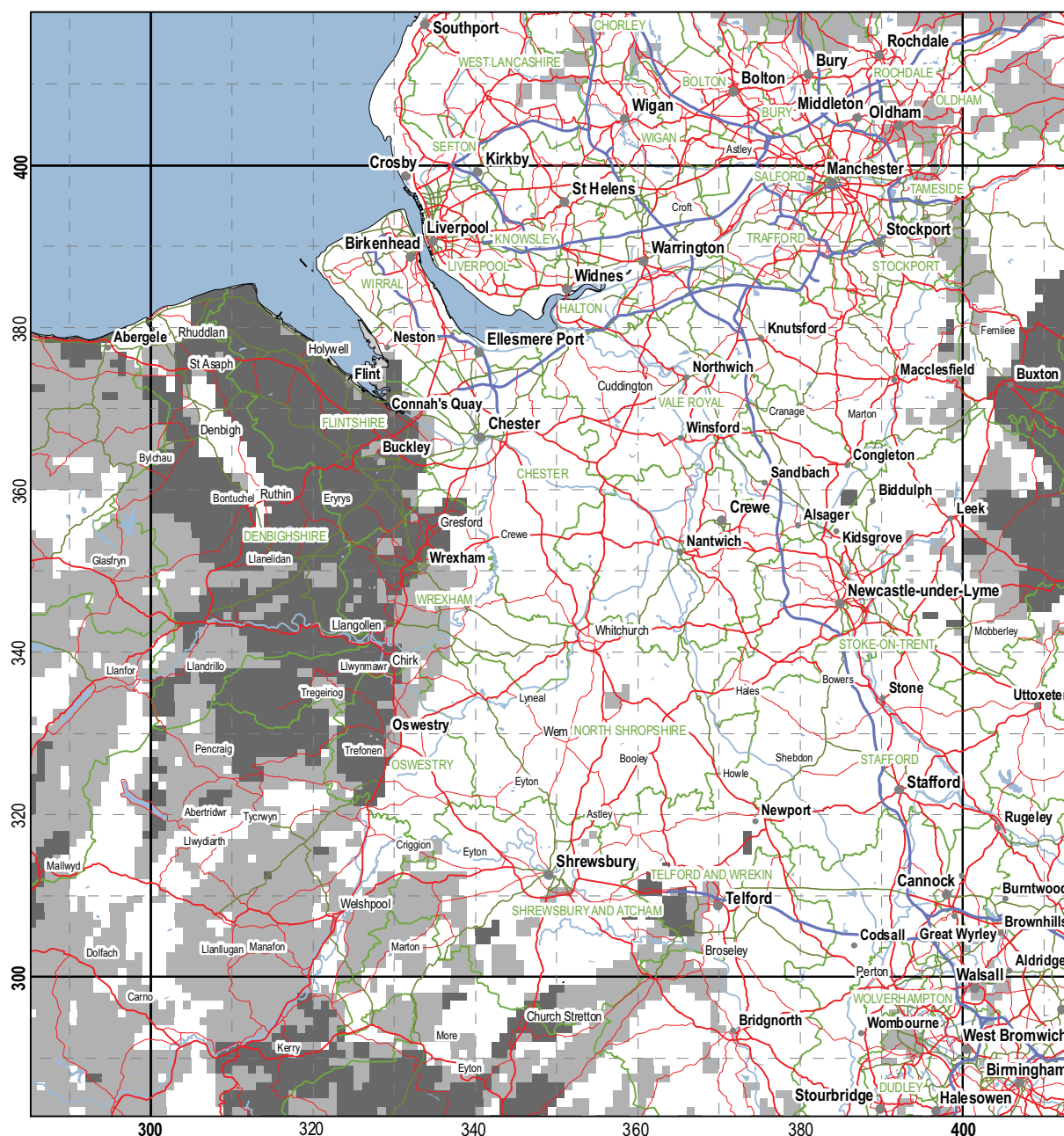
Reproduced by permission of Ordnance Survey
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Ordnance Survey Licence number: 100020315

Key

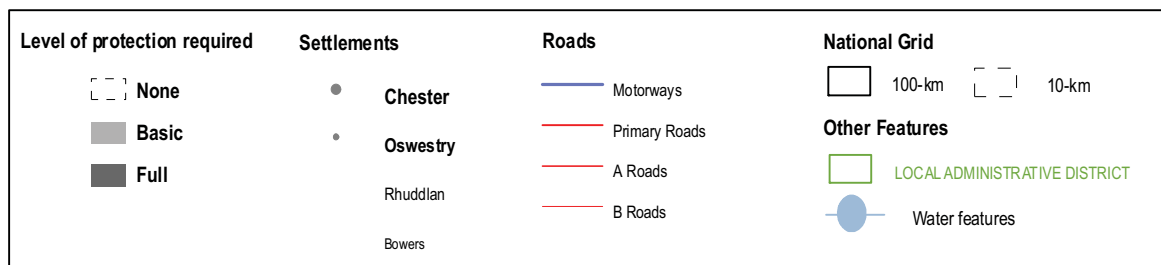
Approximate position of enquiry
boundary shown



APPENDIX 8
EXTRACTS FROM RADON ATLAS FOR ENGLAND AND WALES



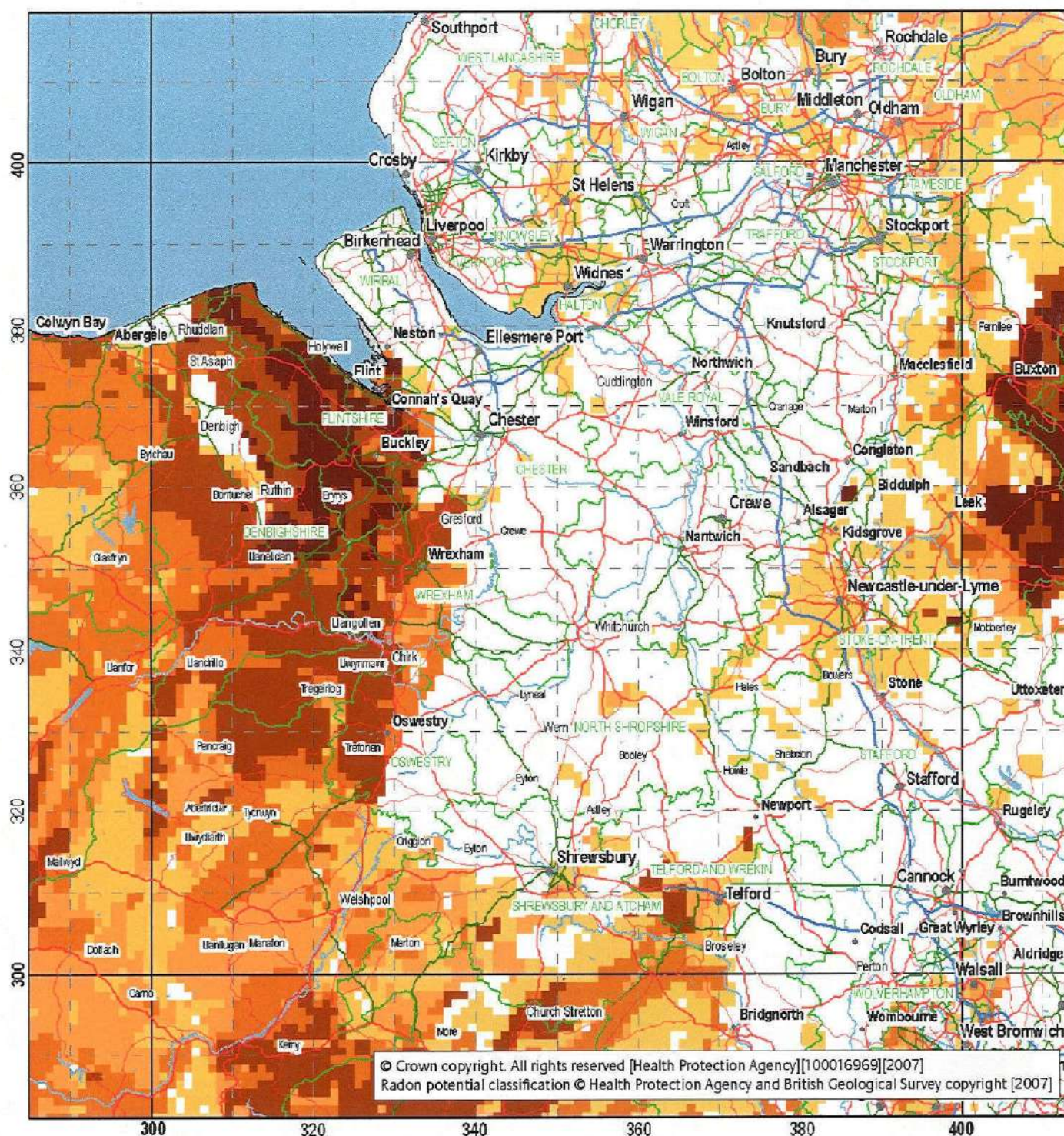
The shading indicates the maximum requirements for radon protective measures in any location within each 1-km grid square to satisfy the guidance in Building Regulations Approved Document C. The requirement for an existing building with a valid postal address can be obtained for a small charge from www.ukradon.org. The requirement for a site without a postal address is available through the British Geological Survey GeoReports service, <http://shop.bgs.ac.uk/GeoReports/>.



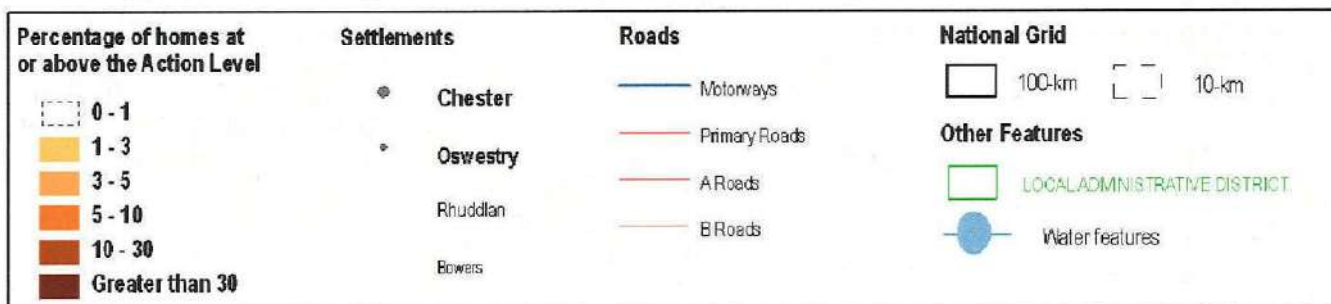
Map 13 Northern Welsh Marches and Liverpool, 100-km grid square SJ (axis numbers are the coordinates of the National Grid)

© Crown copyright. All rights reserved [Health Protection Agency][100016969][2007]

Radon potential classification © Health Protection Agency and British Geological Survey copyright [2007]



The colours show the maximum percentage band within each 1-km grid square of the national grid (see page 4). The best estimate for an individual property in a coloured square can be obtained for a small charge from www.ukradon.org. The white squares, the 0-1% band, contain no Affected Areas as defined by the HPA.

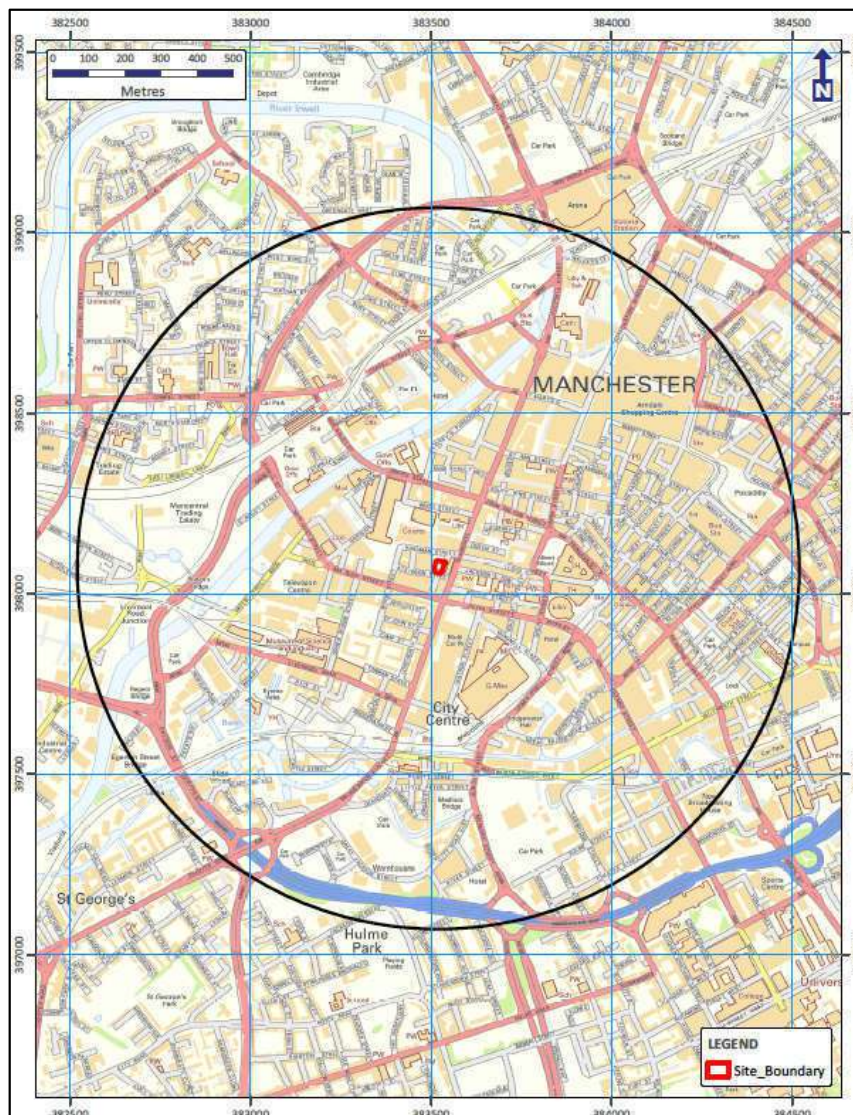


MAP 13 Northern Welsh Marches and Liverpool, 100-km grid square SJ (axis numbers are the coordinates of the national grid)

APPENDIX 9
PRELIMINARY UNEXPLODED ORDNANCE (UXO) RISK ASSESSMENT

Preliminary Unexploded Ordnance (UXO) Risk Assessment

Meeting the requirements of CIRIA C681 “Unexploded Ordnance (UXO) – A guide for the Construction Industry” Risk Management Framework



Site: Flix, Invicta House, 2-4 Atkinson Street, Manchester, M3 3HH

Originator: Rachel Bullock

Released By: Lisa Askham (13th August 2015)

Study Site

The Study Site is described as “Flix, Invicta House, 2-4 Atkinson Street, Manchester, M3 3HH”, and it is centred on National Grid Reference 383520, 398070.

Threat Potential

UXO PROBABILITY ASSESSMENT = 3 RATING, INDICATING A
MEDIUM PROBABILITY OF UXO ENCOUNTER

The rating scale can be seen on *Figure 2* (Probability of UXO Encounter). In accordance with current guidelines (CIRIA C681 Chapter 5), the highest risk rating has been determined at this specific site for UXO risk consideration and has been used for the final assessment and recommendations.

Summary

During WWII the Study Site was situated within *Manchester County Borough*, which recorded 26 High Explosive (HE) bomb strikes per 1,000 acres; a relatively low level of bombing.

Luftwaffe aerial reconnaissance photography associated with the Site identified *Central Station*, *Deansgate Goods Station* and engineering works (located 45m the southeast) as primary bombing targets. In addition, multiple works and a warehouse located in the vicinity may have been considered secondary bombing targets.

Air Raid Precaution (ARP) HE bomb strike records did not identify HE bomb strikes within the Site itself, although HE bomb strikes were recorded within the Site’s vicinity, the closest of which was recorded 55m to the southwest. In addition, an IB strike was recorded within the Study Site and additional IBs were recorded in the vicinity.

Official bomb damage mapping did not record damage to the Site’s structures. Nonetheless, damage was recorded within the Site’s eastern vicinity.

Given that a primary bombing target was located nearby, coupled with the fact that both bombing and bomb damage was recorded within the Site and its vicinity, would suggest that further action is warranted to address the potential for UXO encounter.

Recommendations

In accordance with CIRIA C681 Chapter 5 on managing UXO risks, 6 Alpha recommends that the next stage in the risk management framework is:

DETAILED UXO THREAT & RISK ASSESSMENT

We would be pleased to provide this service, please contact Envirocheck for further details:

Telephone: +44 (0)844 844 9952

Email: customerservice@envirocheck.co.uk

Using This Report

This Preliminary Assessment is designed to inform environmental and construction professionals of the potential threat of military related explosives and/or ordnance on, or in, the vicinity of the Study Site.

This assessment is designed to be employed as a site-screening tool to meet with the requirement of Phase One of the CIRIA UXO Risk Management Framework; there are two broad prospective outcomes; either the threat level requires a detailed UXO threat & risk assessment; or no further action is required. In the former instance we can provide a report within 10 working days (or more quickly upon application).

Two figures accompany the report, the *Second World War* (WWII) High Explosive (HE) Bomb Density and the final Probability of UXO Encounter. The purpose of this approach is to demonstrate that whilst bomb density statistics give an indication for WWII bombing, they should not be relied upon exclusively to generate a holistic assessment.

For further information, please contact Envirocheck:

Telephone: +44 (0)844 844 9952

Website: <http://www.envirocheck.co.uk>

Email: customerservice@envirocheck.co.uk

Data Findings

Threat Source (Within 1,000m)	Detail	
	Identified	Comments
 Airfields/Military Facilities	✗	None recorded within 1,000m.
 Ordnance Manufacture/Storage	✓	Munitions were manufactured in a building 510m to the west.
 WWII Decoy Bombing Sites	✓	A site was decoyed 385m to the north.
 WWII Defensive Features	✗	None recorded within 1,000m.
 WWII <i>Luftwaffe</i> Designated Bombing Targets	✓	<i>Luftwaffe</i> aerial photography identified railway facilities and a works located 45m the southeast as primary bombing targets.
 Secondary Bombing Targets	✓	The closest secondary targets included works (five located within 30m and 160m) and a warehouse (155m to the northwest).
 WWII Bomb Strikes Within Site Boundary	✓	ARP bomb strike records identified one IB strike within the Study Site.
 WWII Bomb Strikes Near Site Boundary	✓	ARP HE bomb strikes records identified strikes 55m to the southwest and 60m to the northeast.
 WWII Bomb Damage	✗	Official bomb damage mapping did not record damage to structures on-Site.
 Abandoned Bomb Register	✗	The official abandoned bomb list did not identify any abandoned bombs within 1,000m.
 WWII Bombing Density Per 1,000 Acres	✓	The Site was located within <i>Manchester County Borough</i> , which recorded 26 HE bomb strikes.

Important Notes

1. The term 'Preliminary UXO Risk Assessment' has been used to describe this report, to fall inline with the CIRIA C681 guidelines. Whilst the term 'Risk' can be justifiably used at this stage, the reader should note that the 'Consequence' function of 'Risk' is not considered. Should it be required, this would be addressed in the 'Detailed UXO Threat & Risk Assessment' (Stages 2 and 3).
2. This report is accurate and up to date at the time of writing.
3. The assessment levels have been generated from historical data and third party sources. Where possible 6 Alpha have sought to verify the accuracy of such data, but cannot be held accountable for inherent errors that may be in third party data sets (e.g. National Archive or library sources).
4. 6 Alpha have exercised all reasonable care, skill and due diligence in producing this service.
5. Whilst every effort has been used to identify all potential UXO/explosive threats, there were a number of private facilities, which may not have released privately recorded information concerning UXO/explosive threats into the public domain. It is therefore possible that some of the aforementioned sites may not be included within the database.



BRITISH NATIONAL GRID

FLIX, INVICTA HOUSE, 2-4 ATKINSON STREET,
MANCHESTER, M3 3HH

WWII High Explosive Bomb Density

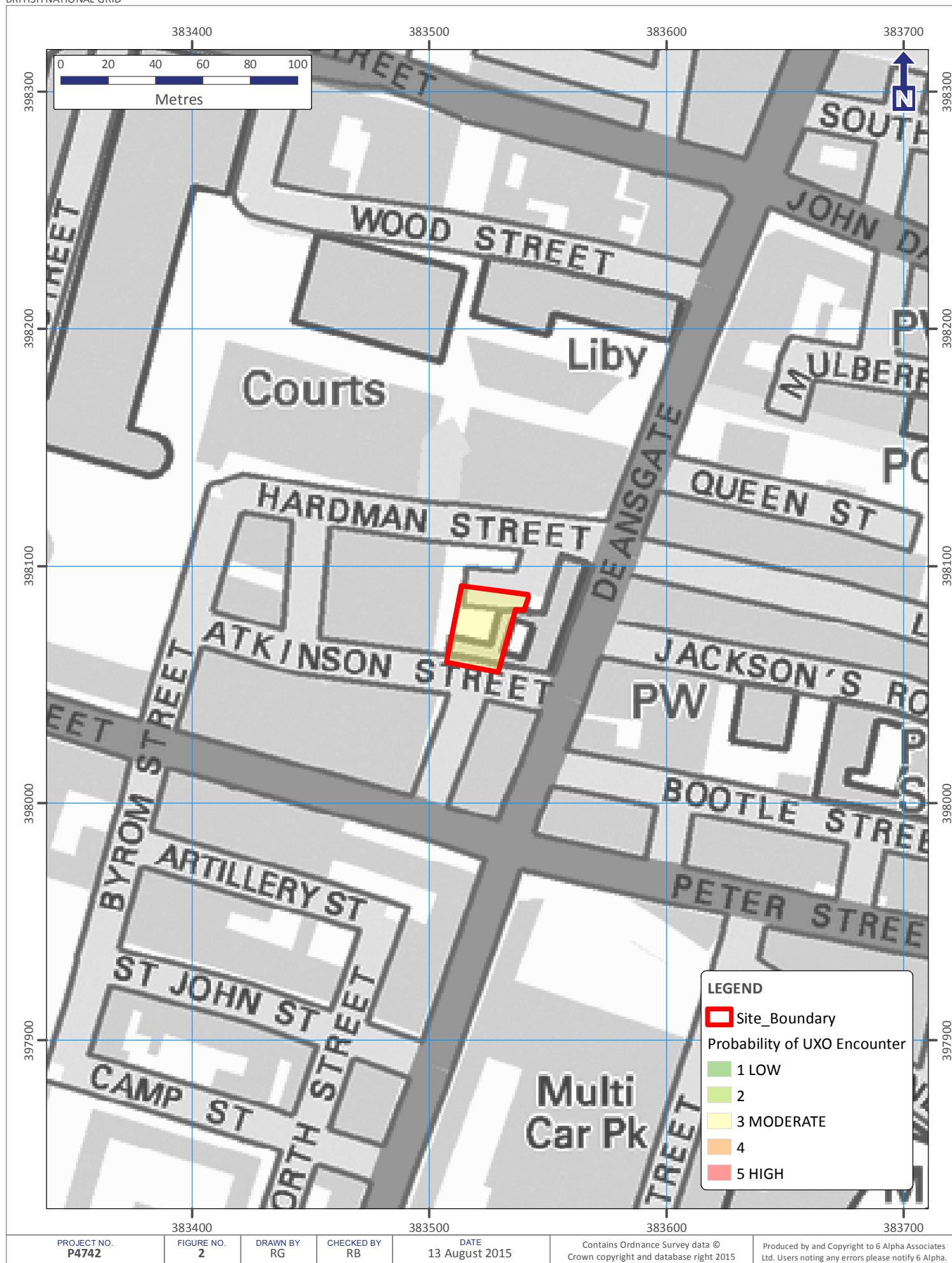




BRITISH NATIONAL GRID

FLIX, INVICTA HOUSE, 2-4 ATKINSON STREET,
MANCHESTER, M3 3HH

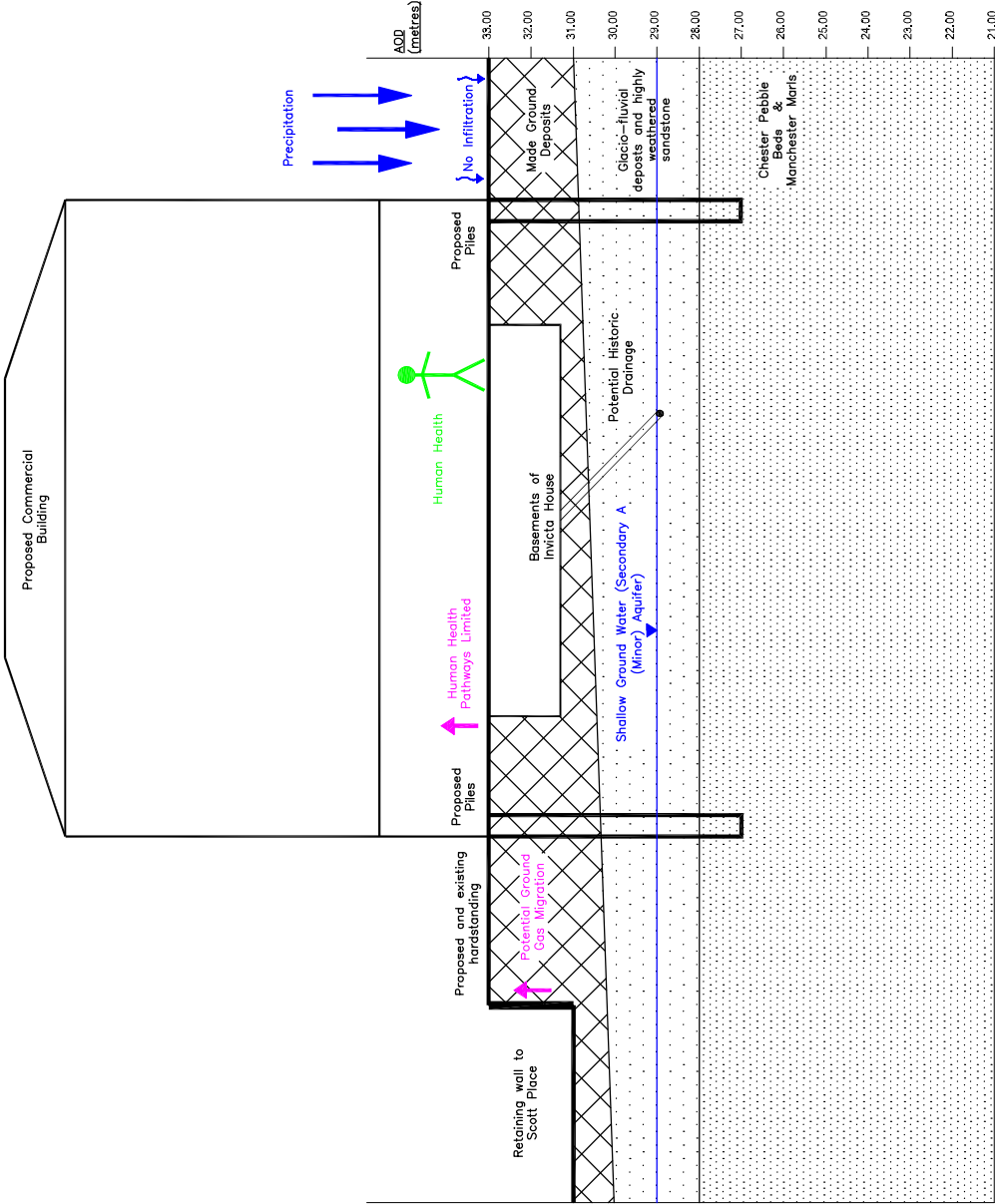
Probability of UXO Encounter



APPENDIX 10
DIAGRAM OF CONCEPTUAL MODEL

Notes.

- 1 All dimensions and levels are in metres unless noted otherwise.
- 2 This drawing is to be read in conjunction with all relevant Architects and Service Engineers drawings.
- 3 Vertical dimensions are illustrative only while horizontal dimensions and layout are abstracted.



Sources

- Contaminated made ground deposits associated with potential historic landscaping or demolition.

Pathways

- Human health pathways: impeded by hard standing nature of proposed development (excluding indoor soil vapour).
- Infiltration pathway: prevented by provision of hard standing.
- Vertical migration: low risk due to reduced infiltration
- Historic drainage: to be investigated

Receptors

- Site occupants
- Construction workers
- Groundwater: Principal (Major) Aquifer and Secondary A (Minor) Aquifer at unknown depth

Rev	Drawn	Date	Description
Drawing Status			
INFORMATION			
Contract			
INVICTA HOUSE, ATKINSON STREET, MANCHESTER			
Drawing Title			
DIAGRAM OF CONCEPTUAL MODEL			
Integra consulting environmental			
Suite 4, 14-22 Hewitt Street, Manchester, M15 4GB email: manchester@integraconsulting.co.uk web: www.integraconsulting.co.uk tel: 0161 237 9310			
Scales	–	Date	AUG 2015
Drawn	LR	Checked	AE
Contract No	2801	Drawing No	SI-01
			P1