sanderson associates (consulting engineers) ltd
Highways | Traffic | Transportation | Water

Sanderson Associates (Consulting Engineers) Ltd, Sanderson House
Jubilee Way, Grange Moor, Huddersfield, West Yorkshire WF4 4TD
T 01924 844080
F 01924 844081
mail@sandersonassociates.co.uk
www.sandersonassociates.co.uk

Prepared on behalf of

Forshaw Land + Property Group Ltd.

FLOOD RISK ASSESSMENT

Proposed Residential Development At
Hyde's Anvil Brewery, Moss Lane West, Moss Side, Manchester

Flood Risk Assessment

Directors
A J France IEng FIHE AMICE MCIHT
C R France

Associate Directors
P Maurice BEng (Hons) CEng MICE
R Greenwood IEng FIHE
D Colley BEng MCIHT
J McKellar GradIHE

VAT No. GB 673219218
Company No. 3235830
Registered Office
Sanderson House, Jubilee Way
Grange Moor WF4 4TD

ISO 9001 REGISTERED FIRM
IHE

Acknowledgements:

Environment Agency
JLP Design UK Ltd
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Disclaimer

The methodology adopted and the sources of information used by Sanderson Associates (Consulting Engineers) Ltd in providing its services are outlined within this Report.

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Report Ref:	7781/DH/001/01		January 2014
Author:	Darren Hawkyard		
Checked & Approved:	Jason McKellar	**Date:**	23 January 2014

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5 Sequential and Exception Tests 10
6 Assessment of Flood Risk 11
7 Mitigation Measures 15
8 Conclusions 18

Appendices

APPENDIX A - Drawings

Site Location: 7781-001

Existing Impermeable and Permeable Areas: 7781-002

Proposed Impermeable and Permeable Areas: 7781-003

1 in 1000 year Flood Extent: 7781-004

Topographical Survey

Architects Layout Plan

APPENDIX B - Consultations

Environment Agency

Appendix C – Calculations

Existing Run Off Rate Estimation

Appendix D – SFRA Extracts

1 Introduction

1.1 Sanderson Associates (Consulting Engineers) Ltd have been appointed to undertake a Flood Risk Assessment for a Change of Use application from sui generis use to a Residential (C3) use at Hyde's Anvil Brewery, Moss Lane West, Moss Side, Manchester.

1.2 The aim of this assessment is to discuss the present and future flood risk to the site using available data and to assess the requirement for mitigation measures to protect the development and the end user.

1.3 The Assessment has been undertaken in accordance with the National Planning Policy Framework (NPPF), March 2012 and associated technical guidance.

1.4 Consultation with the Environment Agency (EA) has taken place. The consultation response is discussed in Section 3 and 6, the received documentation is contained in Appendix B.

2 Existing Situation

2.1 Existing Site Description

2.1.1 The site is situated in the Hulme and Moss Side area of Manchester, a short distance to the south of the city centre. Drawing 7781/001 included in Appendix A shows the site location.

2.1.2 The site itself is bound to the North by Moss Lane West, a car park to the east with Bond Street bounding the site to the South. A barrel yard makes up the boundary to the West.

2.1.3 The site itself is currently the vacant former Hyde's Anvil Brewery site. The building was vacated in the late summer 2012.

2.1.4 Vehicular access is currently gained to the North of the site off Moss Lane West.

2.1.5 The closest watercourse to the site is the Corn Brook which is a culverted watercourse that is located 120m to the North West of the site at its closest point.

2.2 Existing Site analysis

2.2.1 The existing site layout has been assessed to establish the estimated surface water runoff from the site. Drawing 7781/002 shows the existing permeable and impermeable areas of the site.

2.2.2 The site area is 5,308m² (0.53Ha). This can be divided into 5,308m² (0.53Ha) of impermeable surfaces and 0m² of permeable areas. The site is therefore considered to be currently 100% impermeable.

2.2.3 From the Topographical Survey the external site levels range from 31.212m AOD at the south eastern corner of the existing car park to 31.699m AOD on the building frontage. The lowest ground floor finished floor level of the building is approximately 31.488m AOD with a basement finished floor level of 28.845m AOD.

2.2.4 The existing surface water runoff rate from the site has been assessed using WinDES software. The rate is calculated at 66.4l/s, based on an unrestricted discharge. The WinDES calculation is contained in Appendix C.

3 Consultations

3.1 Environment Agency

3.1.1 Flood data has been obtained from the EA. The provided information includes a flood map showing the site is within Flood Zone 2 (between 1 in 100 and 1 in 1000 annual probability of flooding from a fluvial source in any given year). Watercourse flood model locations and levels have also been provided. The EA information is contained within Appendix B.

3.1.2 Watercourse levels have been provided for the Corn Brook for a 1 in 100 year + climate change and 1 in 1000 year flood scenario as part of the Corn Brook 2009 Study.

3.1.3 From the data provided, the nearest node to the site is node 4 and shows a 1 in 100 year + climate change flood level is given at 30.67m AOD and a 1 in 1000 year flood level is given at 31.53m AOD.

3.1.4 The Environment Agency have not provided any information regarding historic flood data or flood defences within this area.

4 Proposed Development

4.1 It is proposed that the site is developed for Residential (C3) use with the conversion of the building.

4.2 The scheme is for 73 apartments, consisting of mainly one-bed and two-bed accommodation, with a small number of studios only where the building layout is constrained.

4.3 It is proposed to raise the lower ground finished floor level by 200mm from 31.488m AOD to 31.688m AOD. It is also proposed to build a small wall around the edge of the lightwells to stop flood water from entering.

4.4 The central courtyard is to be pedestrianised and landscaped, leaving car parking to remain in its current position along the eastern edge of the site

4.5 Pedestrian access will then enter the residential accommodation via the front gates facing Moss Lane West, or via a level access opening centrally on the eastern boundary wall between the courtyard and the car park.

4.6 The proposed development is a change of use of the existing building and therefore, equivalent in height, footprint and volume to the existing building. The amount of development is therefore entirely appropriate to the size of the original building.

4.7 The total impermeable areas of the proposed site will reduce from the existing to 4,898m^2 making the site 410 m^2 (32%) permeable. As the proposals do not increase the amount of impermeable areas within the site compared to that of the existing, the proposals will not increase the amount of surface water run-off and will have no significant effect on the existing surface water drainage system on site. The existing mains foul and surface water connections will be retained.

5 Sequential and Exception Tests

5.1 Sequential Test

5.1.1 Paragraph 104 of the National Planning Policy Framework states that applications for minor development and changes of use should not be subject to the Sequential or Exception Tests but should still meet the requirements for site-specific flood risk assessments.

6 Assessment of Flood Risk

6.1 Flooding from Land

6.1.1 The main risk of flooding from overland flow comes from the highways and impermeable areas within the vicinity of the site.

6.1.2 Drawings SS_4.1 E and SS_4.2 E of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA identifies area Susceptibility to Surface Water Flooding for the Current and Future Scenario. As can be seen from the drawing the site would have a low susceptibility of surface water flooding mainly to the car park located on the eastern boundary of the site.

6.1.3 The total impermeable areas of the proposed site will reduce by 410m^2 (31% decrease) compared to that of the existing.

6.1.4 As the proposals do not increase the amount of impermeable areas within the site compared to that of the existing, the proposals will not increase the amount of surface water run-off and will have no significant effect on the existing surface water drainage system on site.

6.1.5 It is concluded that the risk of flooding from surface water flooding to the site is a betterment on the existing scenario due to the impermeable area decrease.

6.2 Flooding from Rivers / Watercourses

6.2.1 As discussed in Section 3, the site falls within Flood Zone 2, it is located on land which is deemed to have between a 1 in 100 and 1 in 1000 annual probability of flooding from a fluvial source in any given year.

6.2.2 The EA data provided states the following anticipated watercourse flood levels (related to m AOD - meters above ordnance datum, Corn Brook 2009 Study). The nearest node to the site is node 4 and shows a 1 in 100 year + climate change

flood level of 30.67m AOD and a 1 in 1000 year flood level is given at 31.53m AOD.

6.2.3 The lower ground floor finished floor level of the building will be raised by 200mm from 31.488m AOD to 31.688m AOD. From the data provided by the EA the internals of the building would not be affected by a 1 in 100 year + climate change or a 1 in 1000 year event. With a freeboard of 1.018m above the 1 in 100 year + climate change event.

6.2.4 The higher ground floor finished floor level of the building is approximately 32.702m AOD which will also remain unchanged. From the data provided by the EA the internals of the building would not be affected by a 1 in 100 year + climate change event or a 1 in 1000 year event. With a freeboard of 2.032m above the 1 in 100 year + climate change event.

6.2.5 Both the lower and higher ground floor give access to the basement via stair wells. The basement floor has a finished floor level of 28.845m AOD. As both the lower ground floor and higher ground floor finished floor levels are above the 1 in 100 year + climate change and 1 in 1000 year event, flood waters would not be able to gain access to the basement apartments.

6.2.6 Drawing 7781-004 shows the extents of a 1 in 1000 year event within the external areas of the site. The drawing shows that only a small area to the north of the building were residents would have to walk through in order to gain access to the development would be affected by this event with depths up to 220mm expected. The drawing also shows that the existing car park located upon the eastern boundary of the site would flood from this event.

6.2.7 The proposal to build a small wall around the edge of the lightwells will stop flood water from entering lightwells and further protect the development.

6.2.8 To manage the residual risk to the development, mitigation measures are proposed which are described and recommended in Section 7.

6.3 Flooding from Infrastructure Failure

6.3.1 The site is shown on the EA online mapping to be outside an area at risk of reservoir flooding.

6.3.2 The EA consultation confirms that there are no raised flood defences in the vicinity of the site.

6.4 Flooding from Sewers

6.4.1 If any of the sewers/drainage apparatus adjacent to the site were to surcharge and flood, it is likely that any floodwaters would be shallow, relatively slow moving and constrained within the limits of the carriageway. The development is not located within a low point in the local topography, therefore the surcharge is unlikely to pool within the vicinity of the site.

6.4.2 Drawing SS-4.5 of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA identifies areas within Critical Drainage Areas. As can be seen from the drawing the site falls within the Conurbation Core Critical Drainage Area.

6.4.3 At the time of writing the report there was no evidence available to suggest the site has been directly affected from flooding from overloaded sewers/drainage apparatus in the past.

6.4.4 As the proposals are for a change of use and decreasing the amount of impermeable areas it is concluded that the risk of flooding from sewer flooding to the site is no worse from the proposals than the existing scenario.

6.5 Flooding from Groundwater

6.5.1 Drawing GW_2.1 of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA identifies areas at risk of Ground Water Flooding. As can be seen from the drawing the site would not be at risk of Ground Water Flooding.

6.5.2 It is concluded that the risk of flooding from groundwater flooding to the site is no worse from the proposals than the existing scenario. The mitigation measures proposed for the development as discussed in section 7 will also protect against any flooding from this source should the risk increase over the lifetime of the development.

6.6 Flooding from Climate Change

6.6.1 It is considered that a precautionary response be provided about the effects of climate change. The intensity of rainfall is estimated to increase by up to 10% by the year 2055 and up to 30% by the year 2115.

6.6.2 These factors have been considered in the assessment of flood risk from all sources including watercourses and the mitigation measures recommended in Section 7 manage this risk and reduce the risk to acceptable levels.

7 Mitigation Measures

7.1.1 It is important that any proposed development that has the potential to change the flood mechanisms on a site is designed such that there is no increased flood risk to the site itself, or sites upstream and downstream of the development and where possible reduce flood risk.

7.1.2 If the site was to flood, then it is considered that if required (if residents do not evacuate at the time of a flood alert from the Environment Agency) any resident can take refuge from any floodwaters by simply staying within their property as the ground floor finished floor levels are a minimum of 1.018m above the anticipated 1 in 100 year + climate change flood level for this site.

7.1.3 A flood evacuation plan should be provided for every apartment on the proposed site. The flood information pack should include the following information:

- *How to register for 'Flood Alerts Direct', a free Environment Agency service which provides flood alerts to each registered member by selected media such as telephone, email, text message which is tailored to each registered members requirements.*
- *What the different flood codes mean for the property when issued by the Environment Agency and what actions to take.*
- *Confirmation on what the sources of flood risk are to the properties*
- *Time to inundation*
- *Anticipated Depths and Velocities of flooding to be expected*
- *Confirmation of escape routes from the site should evacuation be attempted*
- *Advice on what to include in the flood kit.*
- *Useful contact numbers if required.*

7.1.4 The inclusion of these flood evacuation plans should be conditioned to be provided and approved by the Local Planning Authority before occupation as part of a planning application for this site.

7.1.5 The developer should also refer to the publication 'Preparing for Floods' published by the Office of the Deputy Prime Minister in October 2003. This document is an interim guidance for improving the flood resistance of domestic properties and small businesses.

7.1.6 The site lies within an Environment Agency flood alert area. To obtain up to date flood warnings Call Floodline on 0845 988 1188, select option 1 and enter quick-dial number 143116 to get more information. Any flood warnings will also be broadcast on local television and radio.

7.2 Recommended Mitigation Measures

7.2.1 The layout of external surfaces within the new development should ensure that the grades of such surfaces fall away from any access points into the building to reduce the risk of flooding from overland flow.

7.2.2 Consideration should be given to introduce a removable flood gate to all ground floor doorways and air brick covers which can be installed quickly should the development become at risk of flooding to stop the ingress of flood water.

7.2.3 The replacement of any chipboard / reconstituted wood fixtures and fittings with plastic or steel fittings at ground floor level should be considered to decrease the need for replacement after a flood event.

7.2.4 All electrical circuits on the ground floor of the building should be at least 450mm above the finished floor levels at ground floor level in accordance with Part M of the Building Regulations 2000. The electrical circuits should be run to sockets and switches from the ceiling cavity between the ground and first floors to ensure that they are not affected should any flood water enter the building.

7.2.5 It is recommended that solid concrete floors with damp proof membranes are installed. This is because they are generally regarded as the most flood resilient floor types with effective connections between the damp proof course and the

damp proof membranes. The damp proof membranes should be between the surface screed and the concrete slab as this enables the concrete floor to dry out quickly should flooding occur.

8 Conclusions

8.1 This report serves to review and assess the sources of potential flooding to the site, the impact of the proposed development on the flooding mechanisms of the site and the impact on existing development both upstream and downstream of the site.

8.2 In this instance the Sequential and Exception tests was not required as the development is for a Change of Use.

8.3 The report have been undertaken in accordance with the National Planning Policy Framework (NPPF) and the supplementary technical guidance, March 2012 and it is concluded that the development is suitable for this location taking into account the proposed end use site.

8.4 Suitable mitigation measures have been recommended in Section 7 that will reduce this risk to acceptable levels for the end user should a flood event occur.

8.5 This report concludes that the proposed development can take place without being at an unacceptable risk of flooding and without increasing the risk to the site itself or other sites in the vicinity.

APPENDIX A - Drawings

Site Location: 7781-001

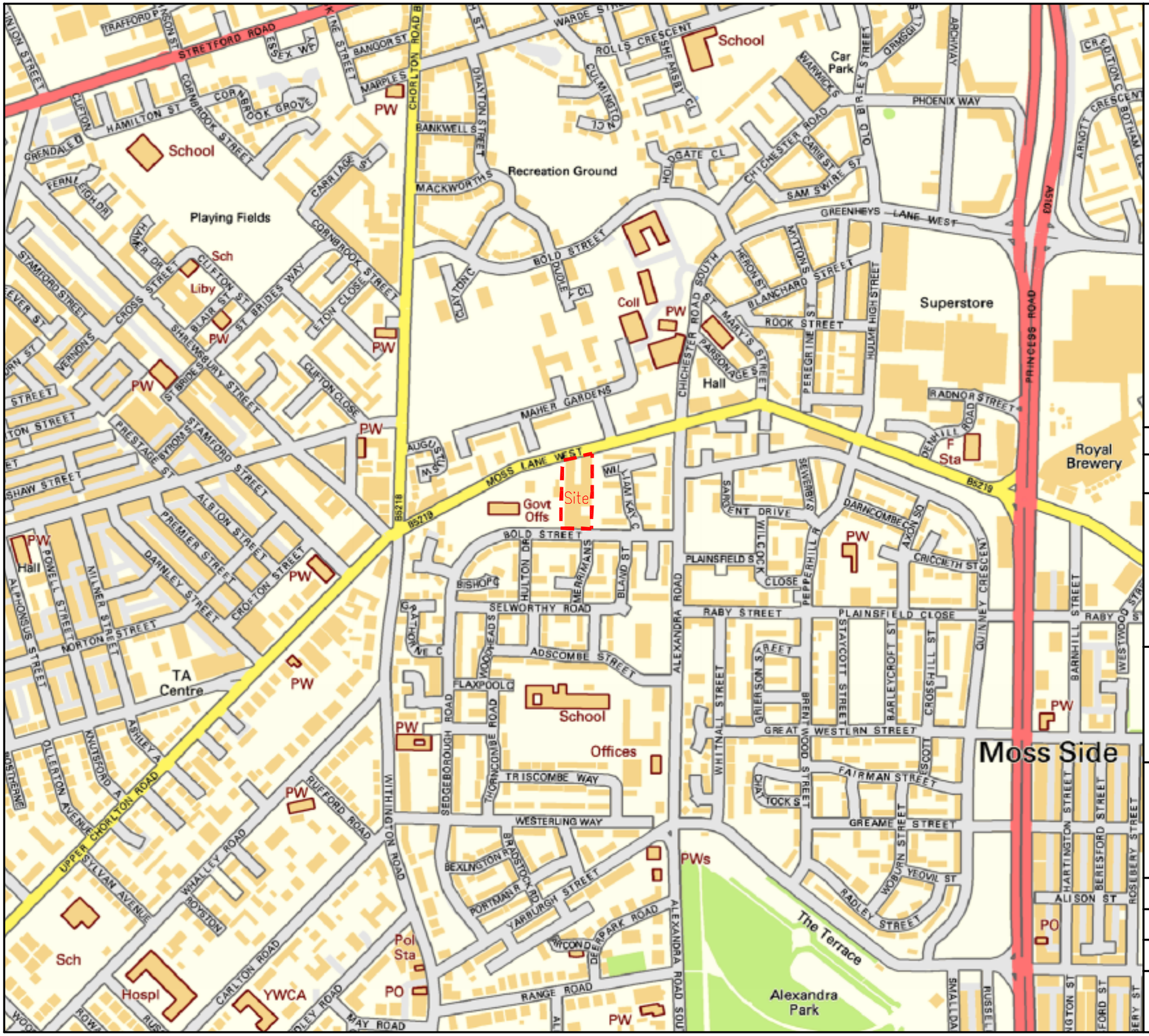
Existing Impermeable and Permeable Areas: 7781-002

Proposed Impermeable and Permeable Areas: 7781-003

1 in 1000 year Flood Extent: 7781-004

Topographical Survey

Architects Layout Plan



Site O.S. Ref: 383200,395869

Rev	Amendment	Drawn	Date	Checked

sanderson associates (consulting engineers) ltd
Highways | Traffic | Transportation | Water
T 01924 844080 mail@sandersonassociates.co.uk
F 01924 844081 www.sandersonassociates.co.uk

Project Name

FORMER HYDE BREWERY, BOLD STREET
MOSS SIDE, MANCHESTER, M15 5PH
FLOOD RISK ASSESSMENT

Drawing Title

SITE LOCATION

Scale N.T.S		Drawn By	TW
Drawing Size	A3	Checked By	JMcK
Date	12/13	Approved By	JMcK

QMS ISO 9001 REGISTERED FIRM

Drawing Number 7781-001

Rev

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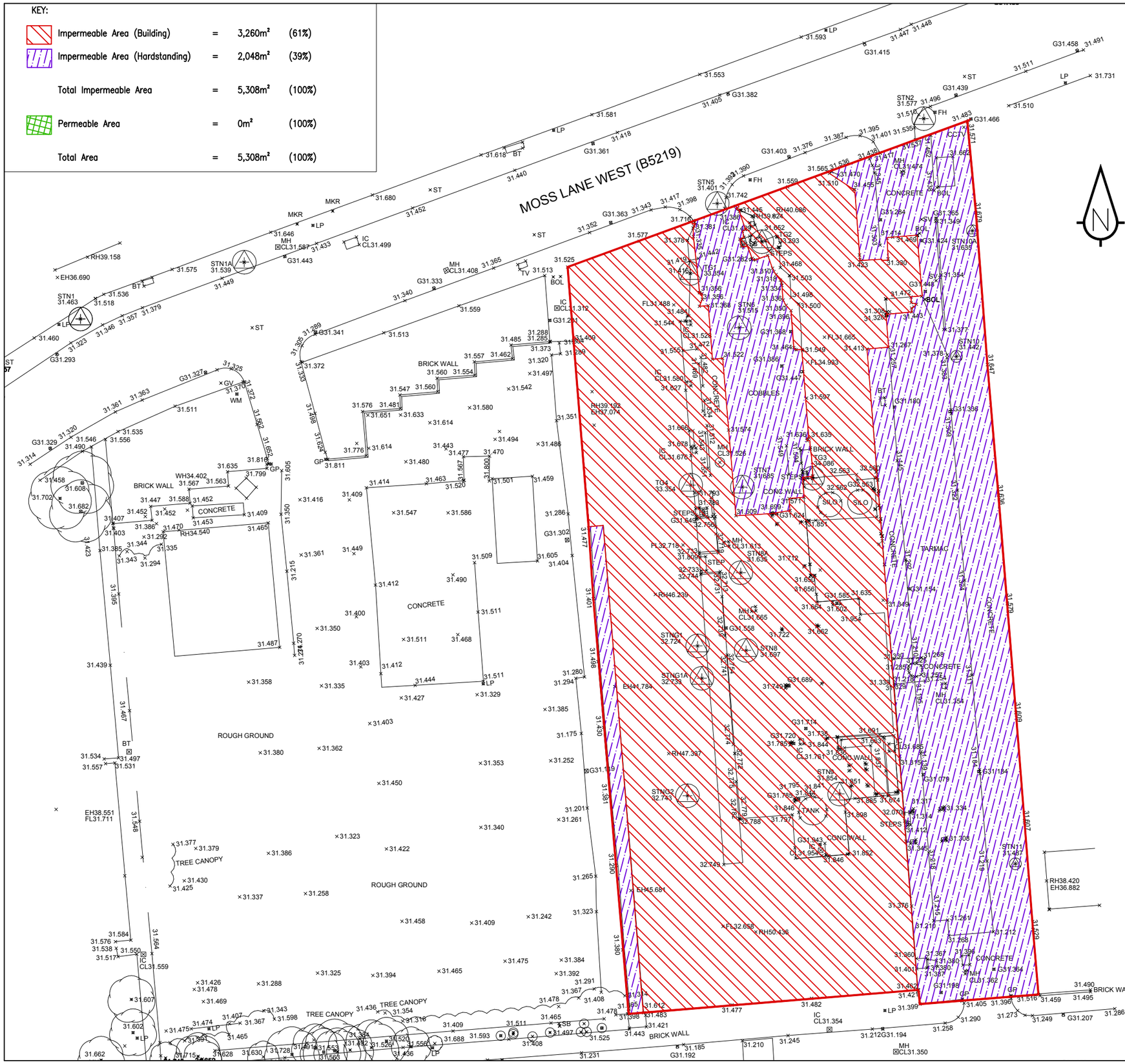

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Highways | Traffic | Transportation | Water
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F 01924 844081 www.sandersonassociates.co.uk

Project Name

FLOOD RISK ASSESSMENT HYDE'S BREWERY MANCHESTER

Drawing Title

EXISTING PERMEABLE AND IMPERMEABLE AREAS

Scale 1:500		Drawn By	TC
Drawing Size	A3	Checked By	DH
Date	10.01.14	Approved By	JMcK

QMS ISO 9001 REGISTERED FIRM

Drawing Number 7781/002

Rev

FILE REF:

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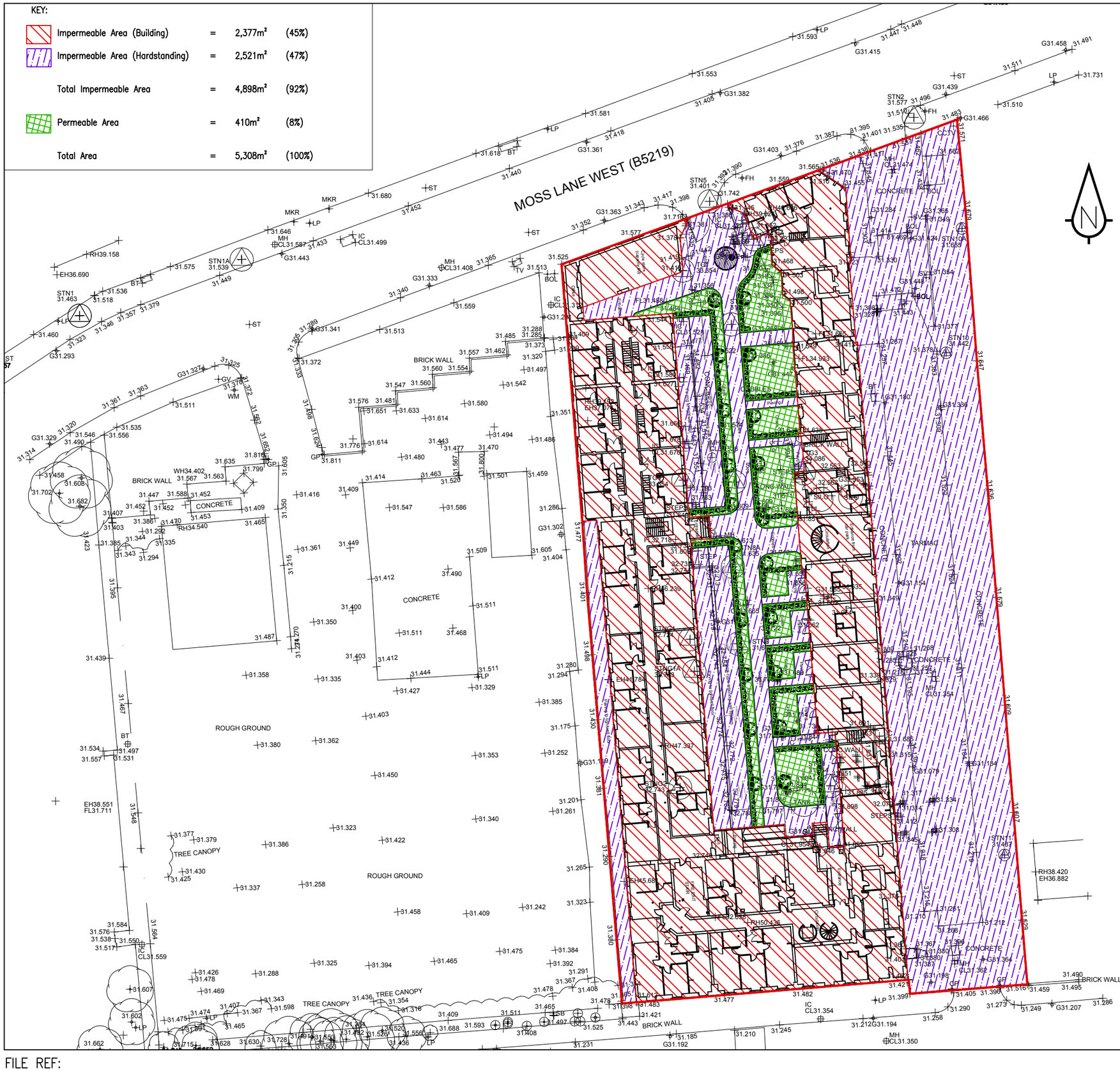
KEY:

Impermeable Area (Building)	=	2,377m²	(45%)
Impermeable Area (Hardstanding)	=	2,521m²	(47%)
Total Impermeable Area	=	4,898m²	(92%)
Permeable Area	=	410m²	(8%)
Total Area	=	5,308m²	(100%)



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Highways | Traffic | Transportation | Water
T 01924 844080 mail@sandersonassociates.co.uk
F 01924 844081 www.sandersonassociates.co.uk

Project Name

FLOOD RISK ASSESSMENT
HYDE'S BREWERY
MANCHESTER

Drawing Title

PROPOSED PERMEABLE AND IMPERMEABLE AREAS

Scale 1:500		Drawn By	TC
Drawing Size	A3	Checked By	DH
Date	10.01.14	Approved By	JMcK

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Drawing Number 7781/003

Rev

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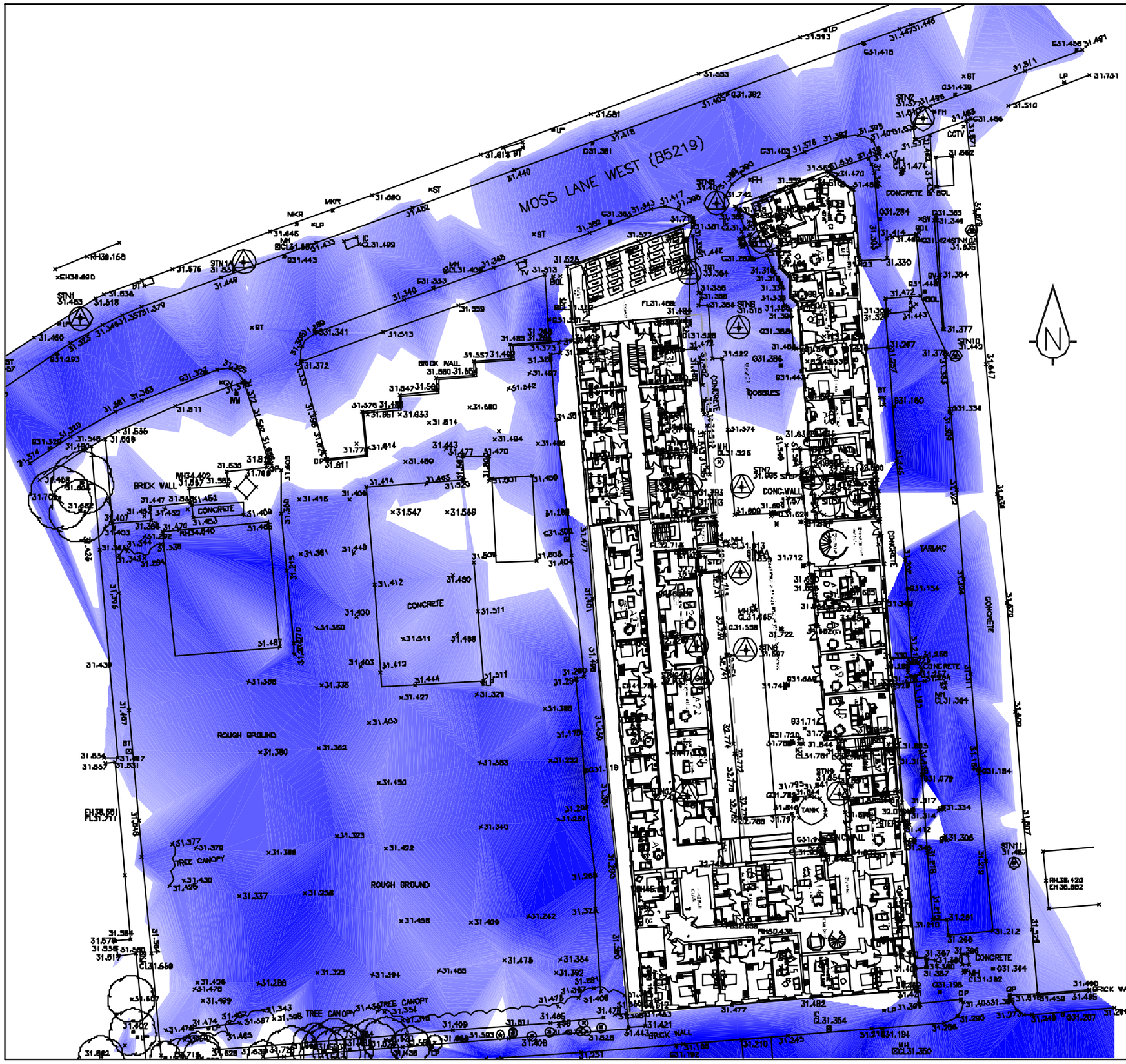

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Highways | Traffic | Transportation | Water

T 01924 544080 mail@sandersonassociates.co.uk
F 01924 544081 www.sandersonassociates.co.uk

Project Name

FLOOD RISK ASSESSMENT
HYDE'S BREWERY
MANCHESTER

Drawing Title

1 in 1000 YEAR FLOOD EXTENT PLAN
31.530m AOD

Scale 1:500		Drawn By	TC
Drawing Size	A3	Checked By	DH
Date	10.01.14	Approved By	JMcK

Drawing Number 7781/004 Rev

FILE REF:

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N

SURVEY ORIENTATED TO NORTH

MOSS LANE WEST (B5219)

BOLD STREET

BRICK WALL

CONCRETE

TARMAC

COBBLES

ROUGH GROUND

TREE CANOPY

CONC.WALL

STEPS

SILO

TANK

STEP

BRICK WALL

CONCRETE

Topographical Land Survey
(SCALE 1:200)

NOTES AND AMENDMENTS
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REVISIONS

REV.	DESCRIPTION	DRAWN	CHKD.	DATE

LEGEND

AV AIR VALVE	MK SURVEY MARKER POST
BL BOLLARD	MP MONITORING POINT
BT BT PLATE	MT METAL POLE
BS BUS STOP	PS POST
CB CATCHPIT	PYL ILLUMINARY PYLON
CP CATCH PIT	RE RODDING EYE
CT CATHODIC TEST	RI RAILWAY LINE
ES ELECTRICS COVERED BOX	RO ROAD SIGN
FL FLOOR LEVEL	RH RIDGE HEIGHT
FH TELEPHONE	SP STOP SIGN
G GULLY	SF SOFFIT LEVEL
SH MANHOLE	SN SIGN POST
GP GUY PYLON	ST STUMP LINE
GV GAS VALVE	TCB TRAFFIC CONTROL BOX
HP HYDRANT	TS TRAFFIC SIGNALS
IC INSPECTION CHAMBER	TP TELEGRAPH POLE
L ANGLE LEVEL	W WATER LEVEL
LP LAMP POST	WV WATER VALVE
MH MAN HOLE	

CWF	CHAINLINK FENCE
CPSF	CONCRETE POST/SPAN EL FENCE
CPSW	CONCRETE POST/TIMBER PANEL FENCE
PSF	POST & WIRE FENCE
SPCF	PALISADE/SPECIALIST FENCE
TF	TIMBER FENCE
ZIG	ZIG-ZAG FENCE
RSF	RAIL STEEL POST FENCE
RTF	KNEE RAIL TIMBER FENCE
BWL	BLOCK WALL
CWL	CONCRETE WALL
RWL	RETAINING WALL
SWL	STONE WALL

NOTES:
1. ALL LEVELS ARE TO ORDNANCE DATUM NEWLYN
2. DRAINAGE INFORMATION IS APPROXIMATE AND SHOULD BE VERIFIED BY THE APPROPRIATE AUTHORITIES
3. ALL DIMENSIONS ARE IN METRES

ACCURACY OF FIELD SURVEY DETAIL IS TO BE 0.05 WITHIN 0.2/3

BENCH MARK INFORMATION
All levels are to ordnance datum newlyn

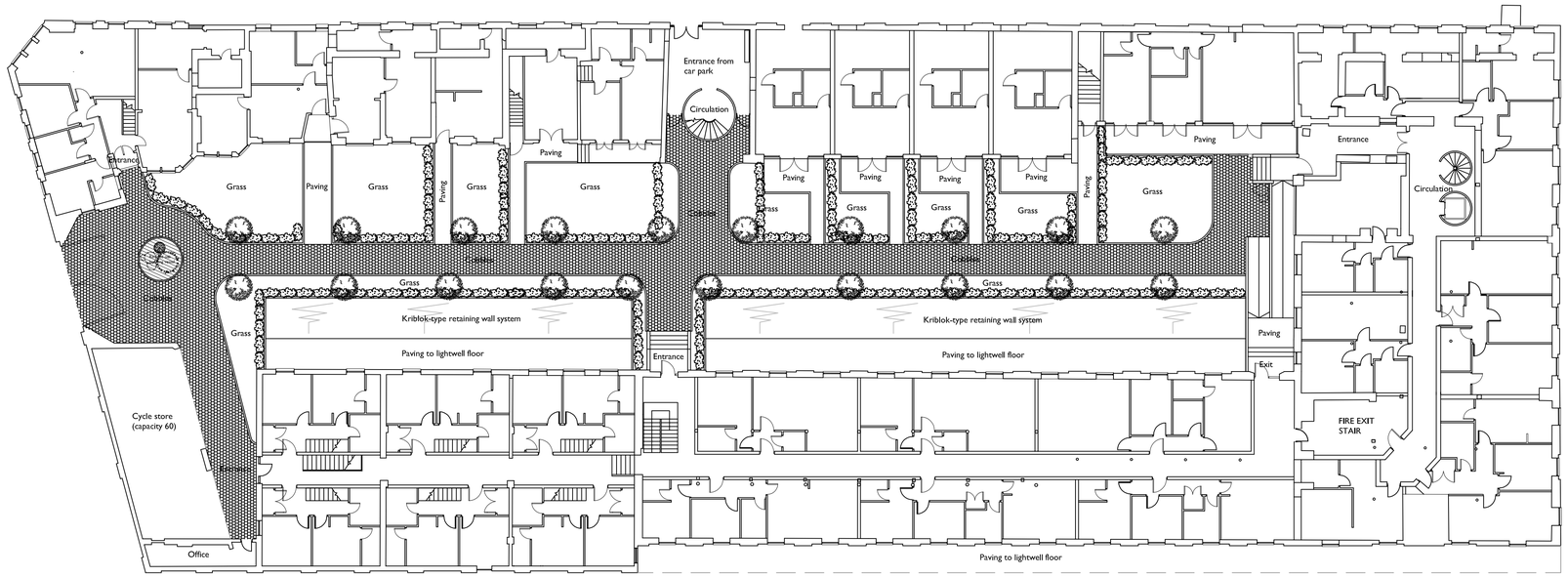
JLP DESIGN UK LTD
Unit 23
Bell Lane Office Village
Wix
Essex
CO7 8QN
Tel: 01206 240 210
Fax: 01206 240211
Email: jlpdesign@jlpuk.com

PROJECT
Former Hydes Brewery
Moss Lane West
Stretford
Manchester

DRAWING TITLE
Topographical Land Survey

SCALE	SHEET SIZE	No. OF SHEETS	DATE	STATUS
1:200	A1	1	30.05.13	PLANNING

DRAWING NUMBER
13-021-1



REVISION	AMENDMENTS	DATE	CHKD

Proposed Accommodation
Hydes Brewery
Moss Side

SCALE 1:200 **A1**

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DATE	DRAWN BY
Jan 14	mjbs
APPROVED BY	ISSUED TO SITE

Landscape Plan

2350-01-14

HATTRELL DS ONE Architects LLP
CHARTERED ARCHITECTS
MANCHESTER COVENTRY
ARTHUR HOUSE CHORLTON STREET MANCHESTER M1 3EJ
TELEPHONE 0161 236 3521 FACSIMILE 0161 228 7801
e-mail design@hattrelldsone.co.uk / www.hattrelldsone.co.uk
1 COPTHALL HOUSE STATION SQUARE COVENTRY CV1 2FQ
TELEPHONE 02476 226 446 FACSIMILE 02476 520 460

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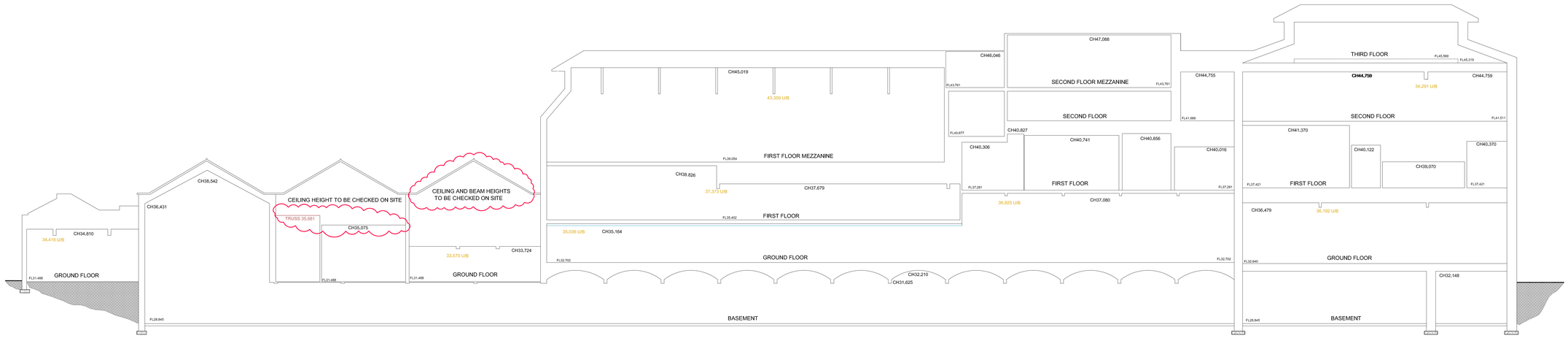
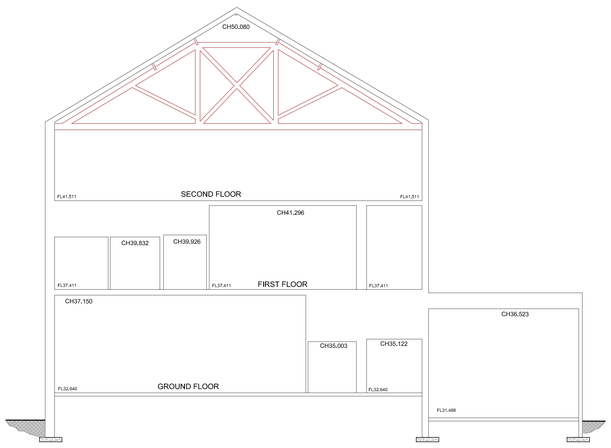


Section A-A
(SCALE 1:100)



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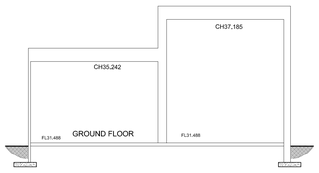

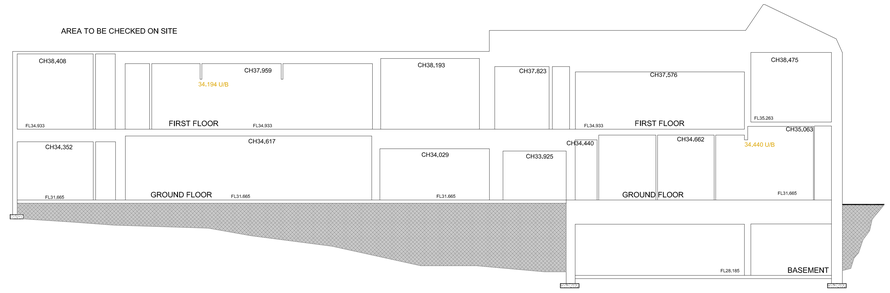

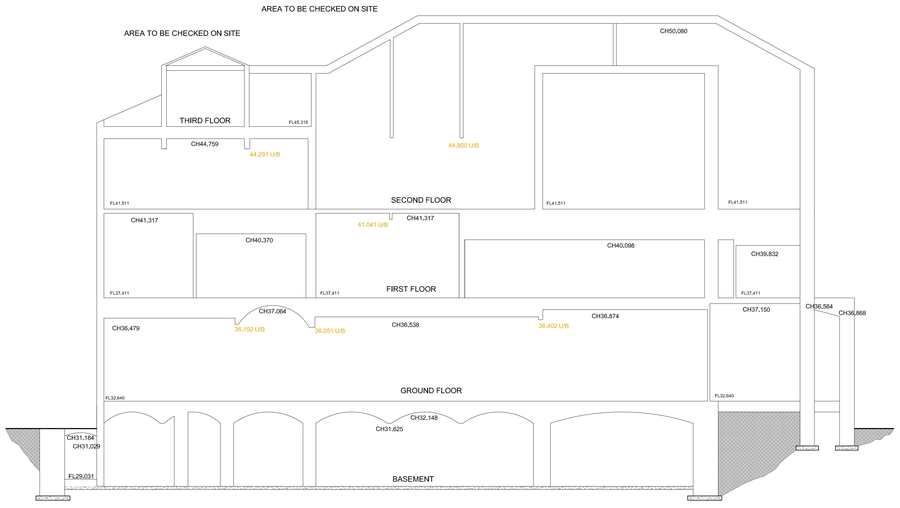

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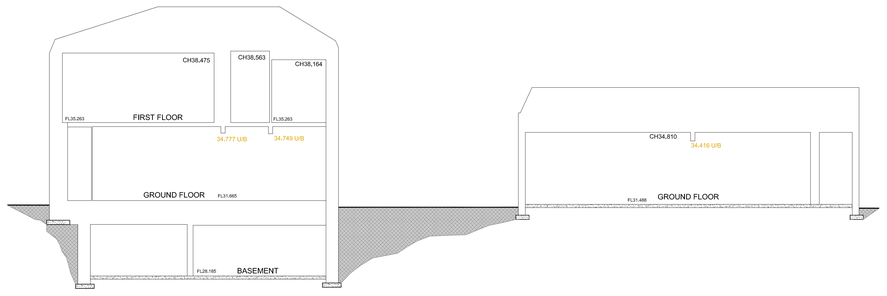


Section C-C
(SCALE 1:100)

JLP DESIGN UK LTD
Suite 25
Rodney House,
King Street,
Wigan
WN1 1BT
Tel:-01942 243313
Fax:-01942 492230
Mobile:-07917 878010
EMAIL:- jlpdesignuk@googlemail.com

PROJECT
Former Hydes Brewery
Moss Lane West
Stretford
Manchester

DRAWING TITLE
Existing Sections Through Property

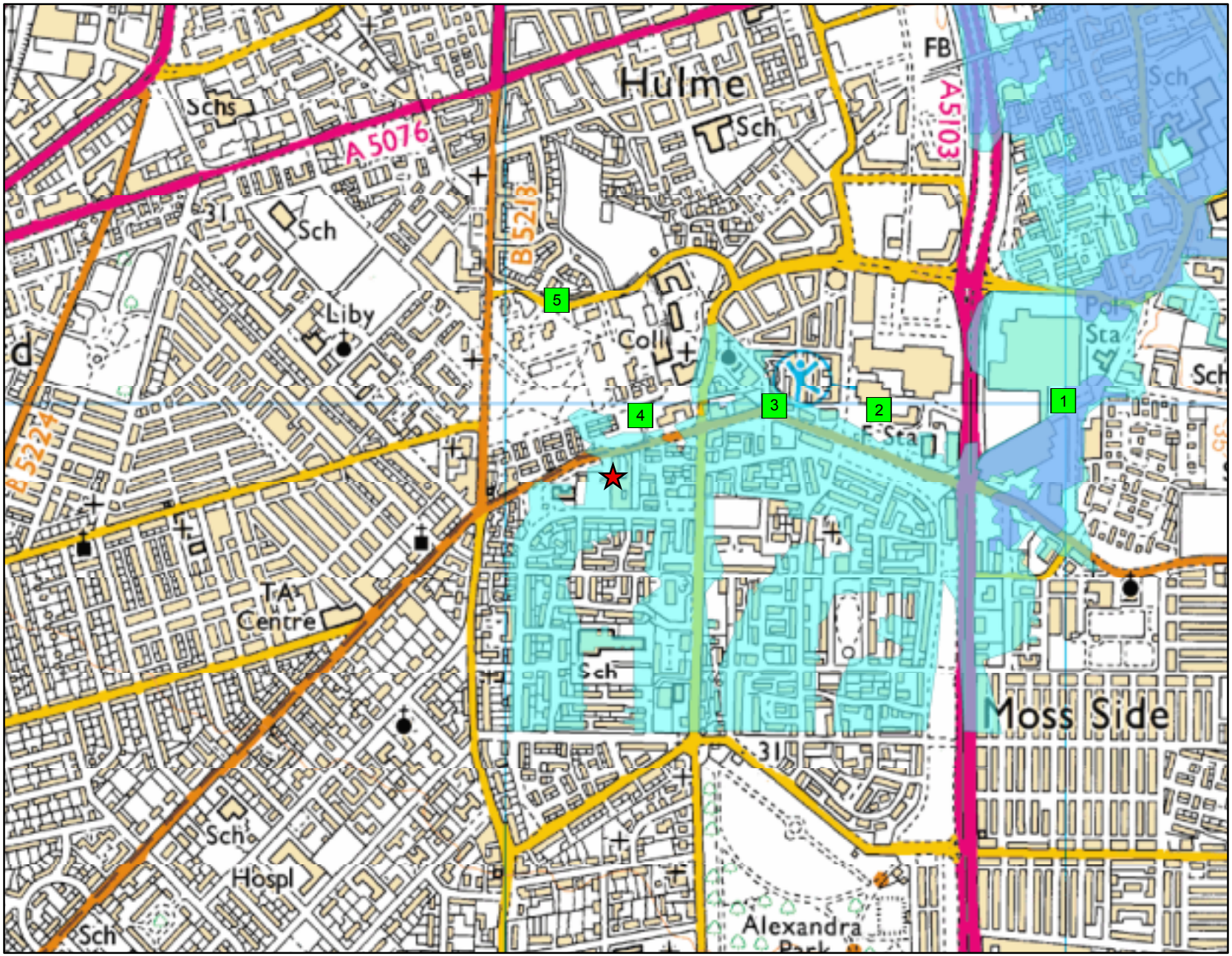
SCALE	SHEET SIZE	No. of SHEETS	DATE	REVISION
1:100	A0	1	15.02.13	

DRAWING NUMBER
13-021-11

APPENDIX B - Consultations

Environment Agency

Detailed Flood Map centred on Bold Street, Moss side. Created 24th December 2013 [STJ1015]



Environment Agency

Scale 1:10,000

N

Legend

- Site Location
- Model Measurements
- Main River
- Areas Benefiting from Defences
- Flood Zone 3
- Flood Zone 2

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					Fluvial Undefended			
Map Reference	Model Node Reference	Easting	Northing	Data	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + Climate Change*	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)
1	ea013_Model_CORN02_00012	384001	396008	Modelled Water Level (m aod)	33.17	33.24	33.23	33.46
				Modelled Flow (cumecs)	8.84	8.96	8.96	8.85
2	ea013_Model_CORN01_00032	383671	395992	Modelled Water Level (m aod)	30.47	30.51	30.50	31.43
				Modelled Flow (cumecs)	9.08	9.25	9.23	9.73
3	ea013_Model_CORN02_00010	383484	396000	Modelled Water Level (m aod)	32.00	32.10	32.09	32.47
				Modelled Flow (cumecs)	8.7	8.8	8.79	8.94
4	ea013_Model_CORN01_00031	383244	395982	Modelled Water Level (m aod)	30.62	30.67	30.66	31.53
				Modelled Flow (cumecs)	9.08	9.26	9.24	9.77
5	ea013_Model_CORN02_00003	383094	396189	Modelled Water Level (m aod)	32.87	32.95	32.94	33.21
				Modelled Flow (cumecs)	8.8	8.95	8.95	8.84

Model data taken from Corn Brook 2009 Study

Notes:

AEP - Annual Exceedence Probability

m aod - metres above ordnance datum

cumecs - cubic metres per second

*Climate Change Scenario - 20% increase in flow

Appendix C – Calculations

Existing Run Off Rate Estimation

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.362	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500
PIMP (%)	100		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)
1.000	10.000	0.041	241.6	0.530	5.00	0.0	0.600	o	300

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	46.29	5.17	0.000	0.530	0.0	0.0	0.0	1.01	71.2	66.4

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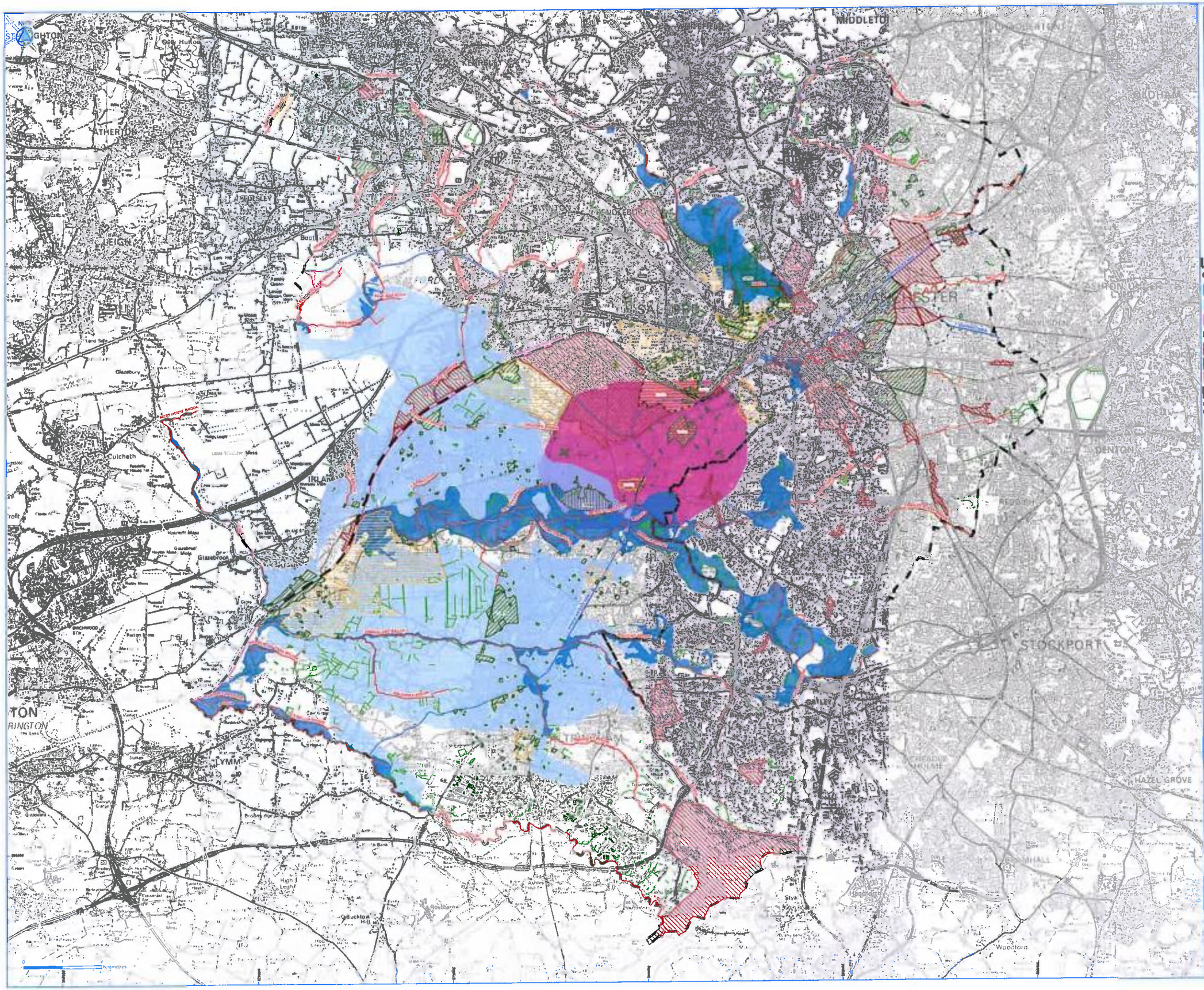
Appendix D – SFRA Extracts



JBA consulting

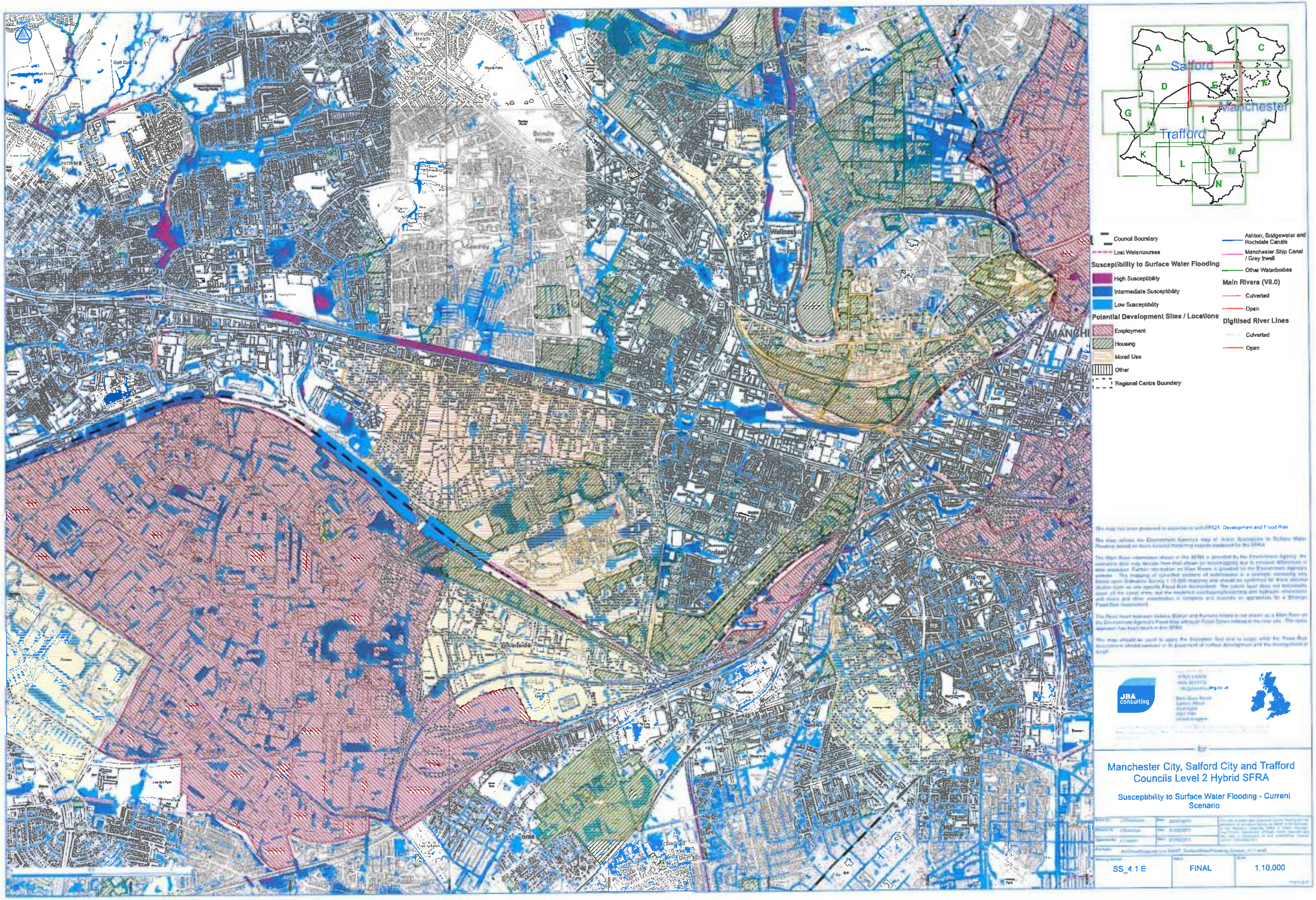
Bank Quay House
Sankey Street
Warrington
WA1 1NN
United Kingdom

for

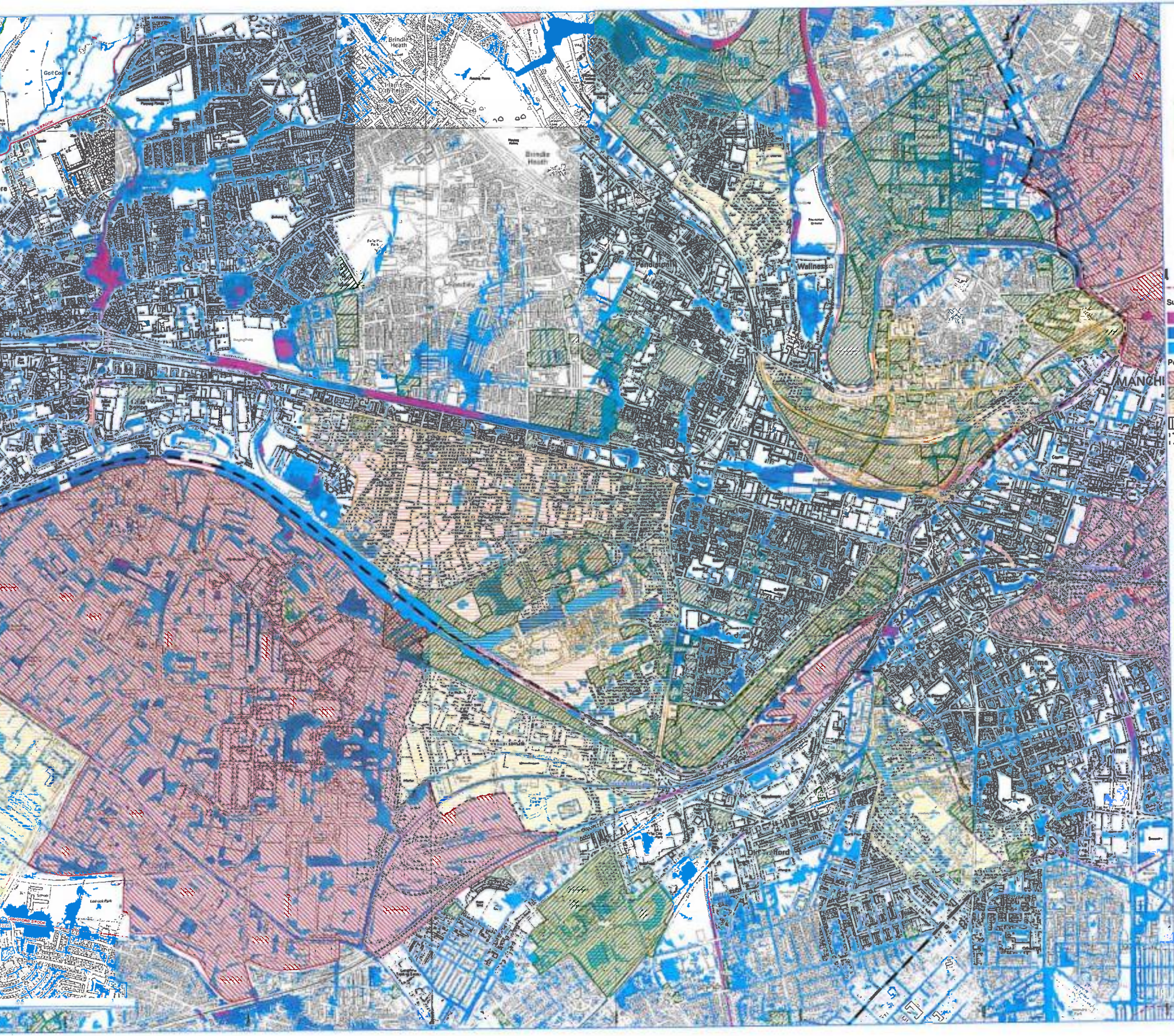
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

Groundwater Flooding

GW_2 1	FINAL	1:45,000



Brindle Heath
Pendleton
Wellness
Ordsall
Old Trafford
Hulme Park
Salford
Manchester
Trafford
A
B
C
D
E
F
G
H
I
J
K
L
M
N
Council Boundary
Lost Watercourses
Susceptibility to Surface Water Flooding
High Susceptibility
Intermediate Susceptibility
Low Susceptibility
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
JBA consulting
Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA
Susceptibility to Surface Water Flooding - Current Scenario
SS_4.1 E
FINAL
1:10,000



Council Boundary
Lost Watercourses

Susceptibility to Surface Water Flooding

- High Susceptibility
- Intermediate Susceptibility
- Low Susceptibility

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

The map refines the Environment Agency's map of Areas Susceptible to Surface Water Flooding based on more detailed modeling outputs produced for the SFRA. This map can be used to assess the sensitivity of surface water flooding to climate change and urban development.

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.

This map should be used to apply the Exception Test and to scope what the Flood Risk Assessment should consider in its placement of surface development and the management of runoff.

JBA consulting

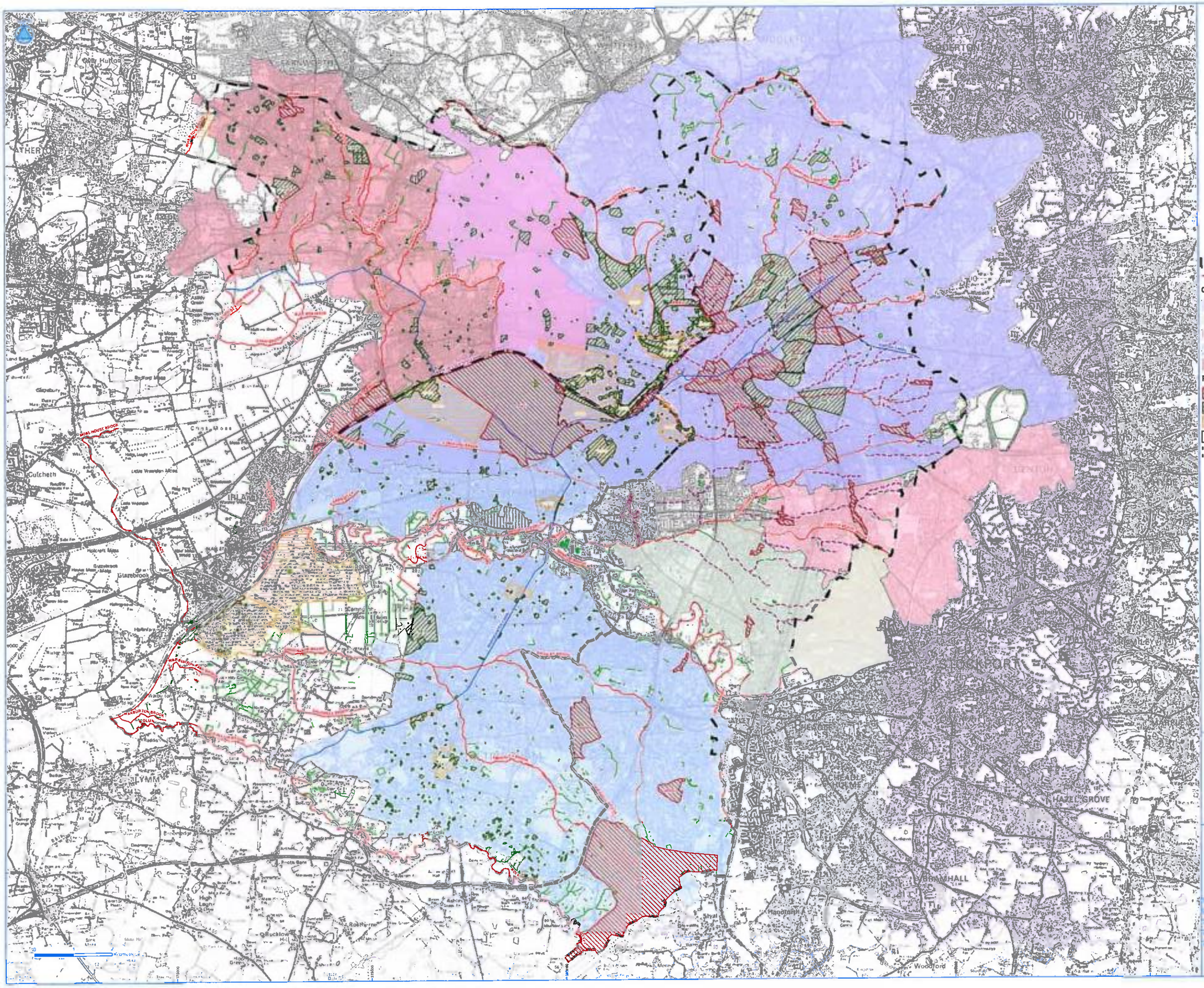
Bank Quay House
Sankey Street
Warrington
WA1 1NN
United Kingdom

for

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

Susceptibility to Surface Water Flooding - Future Scenario

SS_4.2 E	FINAL	1:10,000



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 the SFRA.

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

Critical Drainage Areas

SS_4.5	FINAL	1:45,000