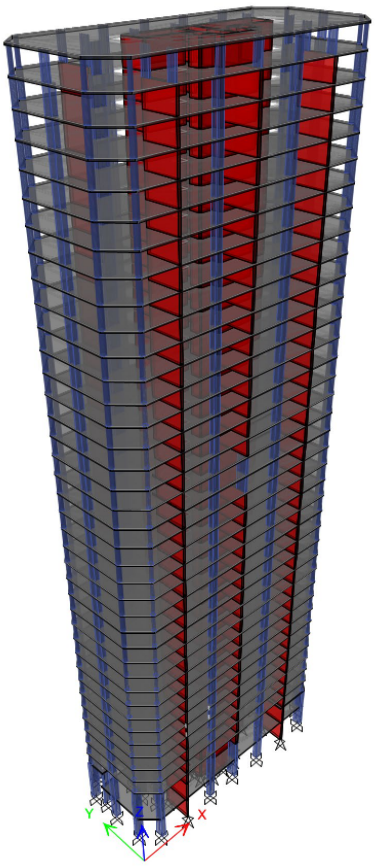
SHEAR design
Consulting Civil and Structural Engineers

FUSION STUDENT ACCOMMODATION

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY
PROPOSED STUDENT ACCOMMODATION,
10-12 WHITWORTH STREET, MANCHESTER M1 5NZ



MAY 2026
24093.D150.B

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Issue	Prepared by	Checked by	NOTES	Date
-	EL	SM	FIRST ISSUE	NOVEMBER 2025
A	SM	SM	PLANNING ISSUE	MARCH 2026
B	SM	SM	PLANNING ISSUE	MAY 2026

1.0 INTRODUCTION

1.1 This report has been prepared by Shear Design Ltd on behalf of their client Fusion ATtri7 6 Limited. to support the residential development of a 38-storey high-rise student accommodation building for the site at 10-12 Whitworth Street, Manchester, M1 5NZ. A site plan is included in Appendix A. The proposed site use is purpose-built student accommodation with 818 rooms.

1.2 The site occupies area is approximately 880m^2; and is entirely within Flood Zone 1. Despite the proposed development site being entirely within Flood Zone 1 and having an area less than 1 hectare; the site is also in the Conurbation Core critical drainage area, so a Flood Risk Assessment is required.

1.3 The purpose of this report is to describe the existing site and associated drainage infrastructure and to identify a sustainable solution for the proposed surface and foul water drainage. A review of flood risk has also been carried out.

1.4 A previous drainage strategy was produced for this site for residential apartments, Planning Reference 135272/JO/2022. The current proposal will follow the principles of the originally consented scheme wherever possible.

1.5 The drainage strategy proposes to restrict surface water runoff rates and will consider allowances for climate change at a level of 40%. Due to the size of the proposed building footprint relative to the overall site, urban creep has not been considered as there will be little or no scope to increase impermeable areas.

1.6 The information noted in the Flood Risk Assessment is based upon the data available at the time of writing which has been obtained from the UK Environment Agency and the gov.uk Flood Maps as well as the Environment Agency Product 4 information. If this data were to change or be updated, then the conclusions noted herein may no longer be valid and would require review.

1.7 Shear Design Ltd have prepared this report in accordance with the instructions of their client: Fusion ATtri7 6 Limited for their client's sole and specific use. This report is not assignable without the prior written permission of Shear Design Ltd. This report should not be relied upon exclusively for decision making purposes and should be read in conjunction with other Engineer's reports, specifications, and drawings in addition to all other relevant reports, drawings, and specifications relevant to the site.

2.0 TOPOGRAPHY & SITE DESCRIPTION

2.1 The total site area is 878m^2 and is a brownfield site.

2.2 The site is bordered by:

- Whitworth Street West to the north
- A pub to the east separated by a shared private alleyway.
- Cameron Street to the west
- A Network Rail railway bridge to the south (Bridge COL/85A, Cheetham Street at Deansgate)

2.3 Levels range across the site range from 34.50m AOD to 33.40m AOD. These levels have been obtained from the topographical survey (see Appendix B). The gradient of the site is approximately 1 in 53 and the average fall is from the north-east to the south-west.

3.0 EXISTING DRAINAGE & SITE INVESTIGATION

3.1 A utility search report was produced by EDI surveys (see Appendix C). which found existing public combined sewers in Whitworth Street to the north and Cameron Street to the west of the site. No other adopted drainage was indicated within the utility search report.

3.2 A site investigation was undertaken by Brownfield Solutions Ltd. A desktop study was initially undertaken and was followed by an intrusive investigation.

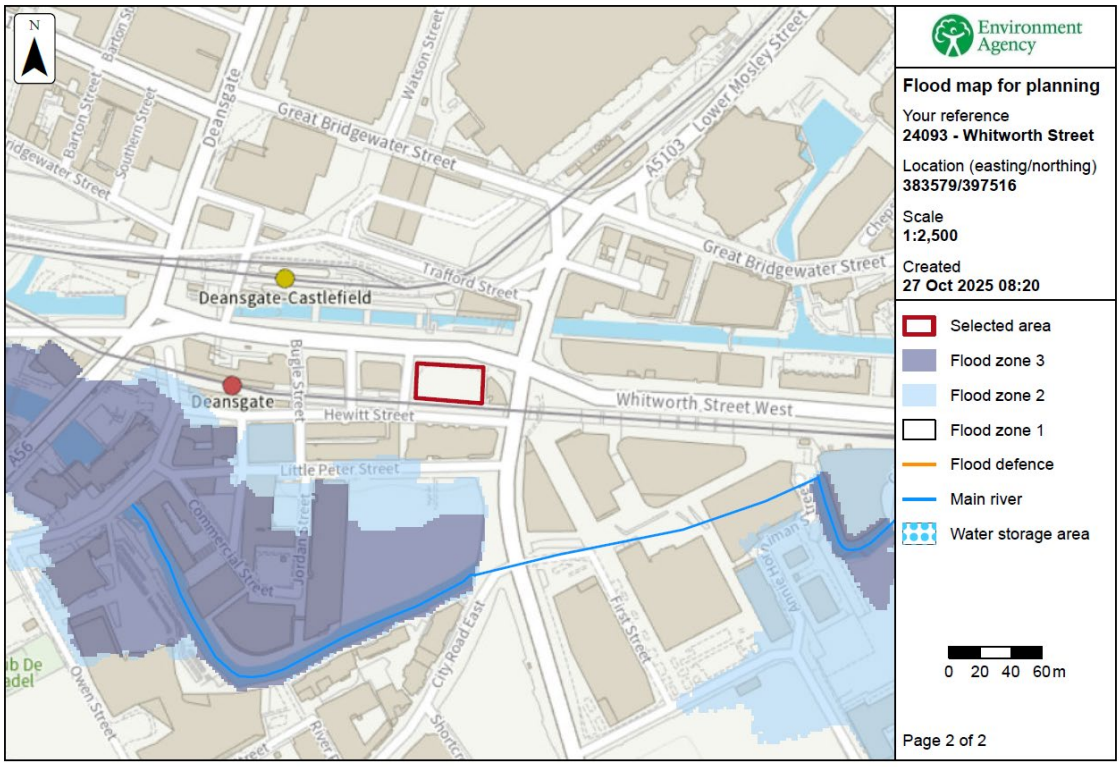
3.3 The desktop study indicated that the site is underlain by Glaciofluvial Sheet Deposits, which is typically made up of sand and gravel. The deeper geology is made up of Chester Pebble Beds Formation, typically comprising sandstone. The desktop study further notes that radon protection measures are not required and that there is a low risk of unexploded ordnance.

3.4 During the intrusive ground investigation, groundwater was not encountered during the initial site works. Post site works monitoring indicated depths to groundwater varying between 9m – 1.5m. The site investigation involved soakaway testing in accordance with BRE365, the results of the soakaway testing vary between 2.99×10^{-3} m/s to 8.37×10^{-6} m/s.

3.5 A knotweed survey was conducted by Zirkon. The survey found no visible invasive plant species with in the boundary of the site.

4.0 Flood Risk Assessment

4.1 The Environment Agency Flood Map for Planning shows that the site proposed for development is located entirely within Flood Zone 1. A site within Flood Zone 1 is defined by the Environment Agency as having an annual probability of flooding. of less than 0.1% (1 in 1000). An extract of the Environment Agency flood map for planning is shown below:



© Environment Agency copyright and/or database rights 2025. All rights reserved. © Crown copyright and database rights 2025 Ordnance Survey licence number AC0000807064.

4.2 A site in Flood Zone 1 that is less than 1 hectare does not ordinarily require a Flood Risk Assessment; however, the proposed development site is within the Manchester Conurbation Core critical drainage area; therefore, a Flood Risk Assessment is required.

4.3 Product 4 flood data is a detailed Flood Risk Assessment map for development sites. Product 4 data was requested for the proposed development site and has been provided by the Environment Agency. The received data provided information relating to modelled fluvial flood events in the vicinity of the development site. Refer to Appendix D for Product 4 data.

4.4 Sequential & Exception Test

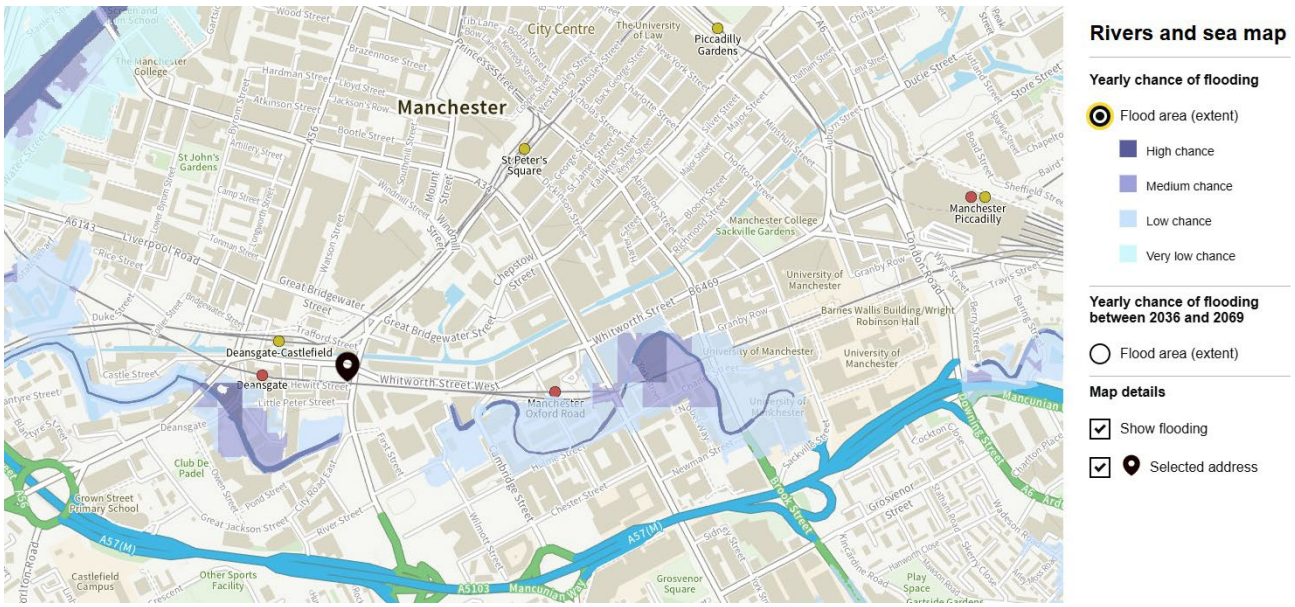
4.5 The purpose of the Sequential Test is to ensure that areas with little or no risk of flooding are prioritised for development over those areas where flood risk would be higher (Gov.uk Flood Risk and Coastal Change Guidance, 17/09/2025, last accessed October 2025).

4.6 The proposed site is entirely within Flood Zone 1 and is at low or very low risk of flooding, now and in the future, from all sources. Therefore, the Sequential Test has been passed (Gov.uk Flood Risk and Coastal Change Guidance, 28/08/2022, last accessed October 2025).

4.7 As the Sequential Test has been passed, the Exception Test is not required.

4.8 Fluvial & Tidal Flooding

4.8.1 Fluvial flooding is flooding from rivers, and tidal flooding is flooding from the sea. The Environment Agency flood maps show the risk of flooding from rivers and sea:



4.9 The risk of flooding from rivers and sea is expected to remain very low from 2036 to 2069, as stated in the long-term flood risk checker online service (last accessed October 2025). Very low risk of flooding means that there is a less than 0.1% (1 in 1000) chance of flooding each year.

4.10 Rivers

4.11 The Product 4 data received from the Environment Agency showed modelling for various storm events for watercourses near to the development site. The nearest main river to the site is the River Medlock, to the south of the site.

4.12 The modelling for the River Medlock is for the 1 in 100-year (1%) and 1 in 1000-year (0.1%) annual exceedance probability storm events. The modelling data for the River Medlock shows that there are no flooded extents within 50m of the proposed development site 1 in 1000-year (0.1%) storm event (see Appendix D).

4.13 Canals

4.14 The Manchester Ship Canal is west of the development site. The flood scenarios for the Manchester Ship Canal have been modelled up to the 1 in 1000-year (0.1%) annual exceedance probability. The modelling data for the Manchester Ship Canal shows that there are no flooded extents within 50m of the proposed development site for the 1 in 1000-year (0.1%) storm event (see Appendix D).

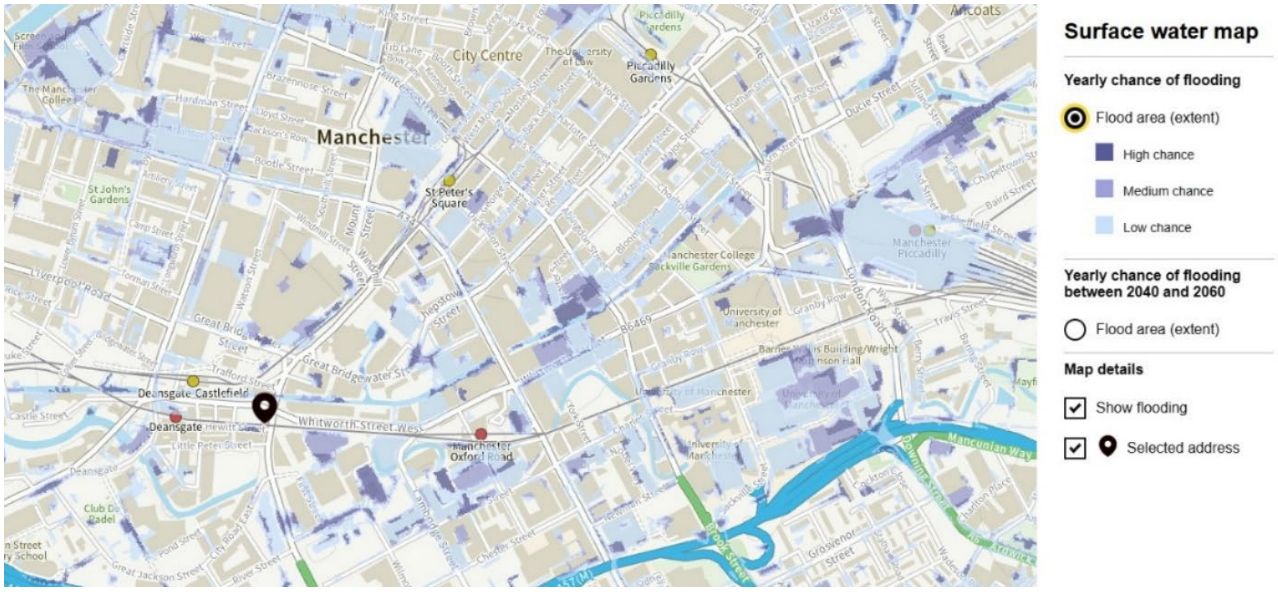
4.15 The Rochdale Canal is approximately 20m to the north of the proposed development site and is managed by British Waterways. The Rochdale Canal is a "*broad canal*" which is a canal that is fairly shallow with raised embankments and would have been built during the industrial revolution (Manchester City, Salford City and Trafford Councils, Level 1 SFRA, March 2010).

4.16 The Manchester Strategic Flood Risk Assessment (SFRA) notes that there is not a direct flood risk posed by broad canals as they are controlled bodies with regulated flows The SFRA notes that there are residual risks associated with lower probability events such as the breaching of embankments or overtopping as result of embankment failure at Miles Platting, approximately 2.5km away from the site.

4.17 The Rochdale Canal towpath is approximately, 2-3m below the level of Whitworth Street. Therefore, in the case of an embankment breach or overtopping of the canal the risk to the proposed development site would be low due to the difference in levels between the surface of the canal and the site.

4.18 Pluvial Flooding

4.19 Pluvial flooding is also known as surface water flooding. Surface water flooding can occur during an extreme rainfall event when surface water runoff cannot drain away. The Environment Agency flood maps show the risk of flooding from surface water:



The risk of surface water flooding is very low and is expected to remain as such from 2040 to 2060, as stated in the Gov.uk long-term flood risk checker online service (last accessed October 2025). *Very low* risk of flooding means that there is a less than 0.1% (1 in 1000) chance of flooding each year.

4.20 The Gov.uk flood map for surface water flooding shows some extent of surface water flooding along Hewitt Street to the south of the site and there is a road under the railway bridge in the south-west corner of the site. However, the levels of Hewitt Street slope to the east, away from the road under the bridge, meaning that any surface water flooding in this area would be directed away from the site. See Appendix F for existing SW flow route.

4.21 Groundwater

4.22 There is no indication that there is any risk of groundwater flooding at the application site and the long-term flood risk checker online service (last accessed October 2025) further notes that flooding from groundwater is unlikely in this area.

4.23 Sewers

4.24 Sewer flooding can be exacerbated by surface water flooding where surface water runoff overloads the sewer network.

4.25 A pre-development enquiry was submitted to United Utilities as the statutory undertaker and a response was received in October 2025. United Utilities confirmed as part of their response that there was no modelled flood risk within the vicinity of the proposed development.

4.26 There are no known instances of sewer flooding in the area around the proposed development site, therefore, the risk of flooding from sewers is considered to be low.

4.27 Reservoirs

4.28 Reservoirs are natural or man-made lakes that are designed to collect and store water. The Environment Agency uses predicted scenarios to model and understand the risk of flooding from reservoirs.

4.29 The risk of reservoir flooding for the proposed site is unlikely, according to the Gov.uk long-term flood risk checker online service (last accessed October 2025).

4.30 Flood Mitigation

4.31 Flood mitigation measures are proposed when an application site is at sufficient risk of flooding that there is a significant risk to life or infrastructure that could occur because of flooding.

4.32 In the case of the proposed site, there is a low or very low risk of flooding from all possible sources; therefore, there are no recommended flood mitigation measures required in this instance.

5.0 SURFACE WATER DRAINAGE STRATEGY

5.1 A pre-development enquiry was submitted to United Utilities as the statutory undertaker and a response was received in October 2025.

5.2 The response from United Utilities to the pre-development enquiry was that they would consider a surface water connection to the 375mm combined public sewer in Cameron Street to the west of the site and that the surface water discharge rate for the development site should not exceed 5 L/s. Refer to Appendix C for United Utilities correspondence

5.3 United Utilities further noted in their response to the pre-development enquiry that the National Planning Policy Guidance drainage hierarchy should be followed to discount higher priority levels prior to considering discharge into a combined sewer. The NPGG drainage requirements have since been enforced through the National SUDS Standards.

5.4 National Standards for SUDS (NSS)

5.5 The NNS Standard 1 states Best current practice should be used to determine suitable Sustainable Drainage Systems (SuDS) selection where possible. Surface water runoff generated from the proposed impermeable areas should seek to meet the following hierarchy:

- Infiltration to ground as close as possible to source to recharge groundwater and watercourse base flows (depending on ground condition and existing site uses),
- Attenuate and control surface water runoff from proposed impermeable areas to the equivalent of the Greenfield runoff rate.
- Manage surface water runoff from the site so that it does not increase and where possible reduces flood risk to third parties.
- Improve the quality of surface water discharge.

5.6 Several SuDS are ideally used throughout a site, linked together to form a SuDS train providing treatment, control and attenuation processes.

5.7 To determine the best possible solution for managing surface water runoff, it is necessary to consider options in the order presented in the drainage hierarchy below:

- Priority 1: collected for non-potable use
- Priority 2: infiltrated to ground
- Priority 3: discharged to an above ground surface water body
- Priority 4: discharged to a surface water sewer, or another piped surface water drainage system
- Priority 5: discharged to a combined sewer

(Priority 1 is the highest and priority 5 is the lowest (NSS 2025)

5.8 The options within the sustainable drainage hierarchy have been considered as follows:

5.9 **Rainwater re-use has been discounted** -A rainwater harvesting system of the sort that would allow for the re-use of rainwater for applications such as flushing toilets but would require large upfront investment for a substantial secondary pumping system, storage tank and filter requirement for a 38-storey building. Introducing a substantial second pumped (non potable) system would also be an environmental issue through electrical power of pumps throughout the lifetime of the system and doubling building materials and fire break penetrations for a secondary pipe system.

5.10 In addition to the infrastructure requirement above, due to the proposed use of the building being student accommodation, there would be long periods of time throughout the year, e.g. during the academic holidays, when the building would be virtually empty. As a result, any water stored within a rainwater harvesting system would be vulnerable to developing harmful bacteria such as legionella.

5.11 The substantial infrastructure issues, combined with the ongoing operation and maintenance costs, as well as the potential health considerations mean that a rainwater harvesting/reuse system is not considered suitable for this building.

5.12 **Soakaways or Infiltration have been discounted** - the proposed building covers approximately 95% of the site area. Therefore, there is no suitable location to place a soakaway, such that it would be far enough away from the proposed building, neighbouring property, public highway and the 20m soakaway exclusion from the National Rail boundary.

5.13 **Watercourse has been discounted** - the Rochdale Canal is approximately 20-25m to the north of the site. However, despite the relative proximity, discharge to the Rochdale Canal is not suitable for this site due to several factors.

5.14 Installing the drainage across the adopted road, Whitworth Street, to the north would require highway works and road closures to allow the sewer to cross the road. This would cause significant disruption to the local area. Furthermore, the level of the Rochdale Canal towpath, alongside the canal is approximately 2-3m lower than the road level of Whitworth Street. This would require 4m plus excavation depths. The scale of excavation works to discharge into the canal would be deep and risk undermining the existing highway retaining wall that runs along the Whitworth Street and compromise the canal wall integrity when forming the submerged outfall.

5.15 The drainage route would cross third party land.

5.16 Furthermore, the Rochdale Canal is a hydraulically controlled body of water and additional flows, especially during a significant storm event, could affect the function of the canal.

5.17 Based on the factors noted above, it is not possible to discharge into the Rochdale Canal. Discharge to any other nearby watercourse result in extensive works involving numerous areas of third-party land and external stakeholders, which means that this is not a viable option.

5.18 **Discharge to a surface water sewer, highway drain, or other drainage system has been discounted** - as there are no known surface water sewers or highway drains within the vicinity of the proposed site, as per the utility search report provided by EDI Surveys (see Appendix D).

5.19 **Discharge of surface water to a combined sewer is proposed -** As per the Utility Search Report (EDI Surveys, see Appendix D) there is a combined sewer in Cameron Street that can be used as a discharge location. This sewer served the original building for foul and surface water.

5.20 There is no possible higher priority level achievable for this site and the drainage hierarchy has been exhausted, the proposed surface water discharge location is to the existing adopted combined sewer in Cameron Street to the west of the site.

5.21 Surface Water Drainage Strategy

5.22 The proposed surface water drainage strategy for the site at Whitworth Street is to discharge all surface water flows from the proposed development site to the existing public combined sewer in Cameron Street, to the west of the site.

5.23 The proposed SuDS solutions for the site is to use attenuation with restricted discharge. Surface water discharge will be restricted by an orifice plate to 5L/s . This flow rate has been approved by Manchester Council as the Lead Local Flood Authority and United Utilities.

5.24 Surface water will be stored in a geocellular attenuation tank which is to be designed to attenuate flows for the 1 in 100-year storm with a 40% allowance for climate change. The proposed attenuation tank will be approximately 40m^3. Urban creep has not been considered for the development site as there will be no scope to increase the amount of impermeable area in the future.

5.25 Surface water that lands on the building will discharge via internal pipework (designed by others) to below-ground drainage and will then discharge into the proposed attenuation tank. Surface water runoff that lands on the external areas will drain to porous paving and drainage channels, all discharging into the proposed attenuation tank via below-ground drainage.

5.26 Permeable paving has been proposed to the path adjacent the southern/ Network Rail boundary as an additional SuDS feature. The porous subbase will be lined with connections into the attenuation crates.

5.27 Surface water runoff & Exceedance

5.28 The historic warehouse building on the site matches the footprint of the proposed building. Surface water from the historic building was unrestricted, discharging into the local combined sewer network. Both the past and proposed surface water volumes generate the same volumes of water discharging to the combined sewer network over all storm events. The use of a restricted surface discharge rate for the proposed drainage will provide flood mitigation to the combined sewer network, releasing flow rate capacity in the existing combined sewer network. This contributes to reduce activation of CSO's and therefore contributes to environmental improvement of water quality.

5.29 The existing warehouse, noted above, was demolished in 2017/2018. The surface was left as remnants of slab and crushed stone. Some landscape works have been done. There are no positive drainage connections on the surface. From post demolished survey levels, the SW flows to the underpass in the Network Rail viaduct down to the low spot in Hewitt Street. The pluvial flood mapping shows ponding on Hewitt Street. The pluvial modelling of this catchment would account for this flow route. Refer to Appendix F for current SW flow route plan.

5.30 The proposed surface water drainage will provide a positive connection to the combined sewer system intercepting all of the site surface water currently flowing to Hewitt Street. This will reduce the ponding issue on Hewitt Street.

5.31 Our proposed drainage is designed for the 1 in 100 year storm event plus 40% climate change with a 5 l/s discharge rate. The low spot of the development is at a level of 34.430m AOD adjacent the Hydrobrake chamber. Any failure exceedance would emanate as surface flow from the porous paving at the low spot of the site. As previous commentary on flow routes this exceedance flow would head to Hewitt Street which already receives flow from the current site.

5.32 Any exceedance flows will only occur under two scenarios

- A storm event beyond the 1 in 100 year storm plus 40% climate change. In this situation the surrounding areas would be subject to the same storm event with exceedance flows from several sources. The exceedance SW flow routes will be to Hewitt Street.
- Blockage of the drainage system causing failure. The 2 main potential sources of blockage are siltation through lack of maintenance, and debris entering the system such as leaves. The site is a managed facility and inspection, and maintenance will be in line with Ciria753 guidance. The site is low risk for debris as the catchment has no trees and none in immediate proximity, the catchment is 95% roof which is approximately 118m above ground level, therefore low level of particulates and the internal rain water pipes are sealed

6.0 FOUL WATER DRAINAGE

6.1 A pre-development enquiry was submitted to United Utilities as the statutory undertaker, with a response received in October 2025 (see Appendix E).

6.2 United Utilities have confirmed that foul flows from the proposed development site will be allowed to drain into the public combined sewer system.

6.3 The preferred point of discharge is the 375mm combined sewer within Cameron Street to the west of the proposed development. United Utilities have also confirmed that an unrestricted discharge rate is allowed for the discharge of foul water from the site.

6.4 Foul Water Drainage Strategy

6.5 Foul water flows generated as part of the proposed development will be collected using above-ground pipework and will be discharged to the proposed below-slab foul drainage network and then will discharge to the proposed adoptable combined sewer in Cameron Street to the west of the site.

6.6 The proposed foul discharge rate can be estimated using Flows and Loads 4. A calculation of the proposed foul flows generated from the development has been included in Appendix F.

6.7 The estimated peak foul flow rate from the proposed development is 8.5 L/s however this may be subject to change following any changes to proposed room numbers or onsite facilities arising from the design development process.

6.8 It should be noted that United Utilities have agreed to an unrestricted discharge rate for foul water from the proposed development site. Therefore, any increase to the number of accommodation rooms will not require further consultation with United Utilities.

7.0 CONCLUSION

7.1 The proposed development comprises a 38-storey purpose-built student accommodation building with approximately 850 rooms.

7.2 The site is in Flood Zone 1 and is less than 1 hectare. However, as the site is in the Conurbation Core critical drainage area, a Flood Risk Assessment is required.

7.3 The Flood Risk Assessment reviewed the risk of flooding from all known sources of flooding and found that there is no significant risk of flooding to the proposed development site. All flood risk to the development site is either *low* or *very low*.

7.4 A pre-development enquiry was submitted United Utilities and who have confirmed that they will accept a surface water flow rate into the existing that does not exceed 5 L/s into the 375mm combined public sewer in Cameron Street to the west of the site. Therefore, the proposed peak surface water flow rate for the site is 5 L/s, subject to approval from Manchester City Council as the Lead Local Flood Authority.

7.5 The proposed surface water drainage strategy is to use attenuation with restricted discharge. An orifice plate will be used to restrict the surface water discharge rate to 5 L/s and a geocellular attenuation tank, or similar, will be used to attenuate surface water flows up to the 1 in 100-year storm event, with a 40% allowance for climate change.

7.6 The proposed peak foul flow rate is 8.5 L/s and United Utilities have confirmed that they will accept an unrestricted foul discharge into the existing combined public sewer in Cameron Street to the west of the site. As United Utilities have approved an unrestricted discharge rate, if the proposed number of rooms changes with the design process, it will not be necessary to re-consult United Utilities.

Report prepared by: -

ON BEHALF OF SHEAR DESIGN LTD



EDWARD LAW

CIVIL ENGINEER

Approved by: -

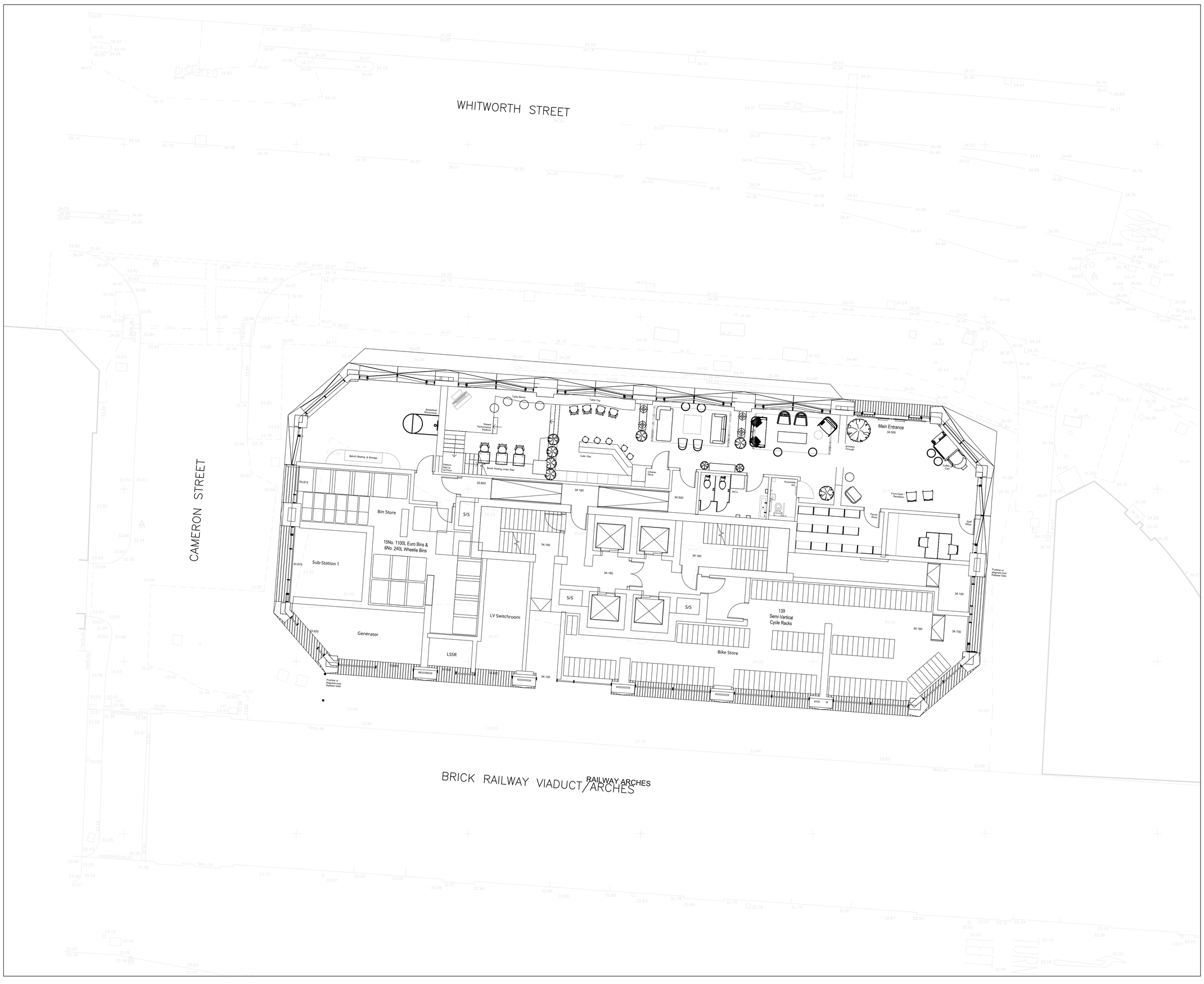
ON BEHALF OF SHEAR DESIGN LTD

SIMON MASON

ASSOCIATE

APPENDIX

A) PROPOSED SITE PLAN



NOTES

GENERAL

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS RELATE TO ORDNANCE DATUM UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
6. THIS DRAWING IS COPYRIGHT © PROPERTY OF SHEAR DESIGN LIMITED.

TOTAL SITE AREA 880M^2

REV	DATE	DESCRIPTION	BY	CHK
AMENDMENTS				
P02	16.05.26	UPDATED TO SUIT LATEST ARCHITECTS LAYOUT	JG	SM
P01	13.03.26	FIRST ISSUE	JG	SM

CLIENT:
FUSION GROUP

PROJECT:
WHITWORTH STREET
MANCHESTER

TITLE:
SITE PLAN

SHEAR design
Consulting Civil and Structural Engineers
7 Ashtree Court - Woodsy Close - Cardiff Gate Business Park - Cardiff - CF23 8RW
Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com

DRAWN:	CHECKED:	DATE:	SCALE:
JG	SM	SEPT 2025	1:100 @ A1

SHEAR DESIGN REF:	DRAWING NUMBER:	REVISION:
24093	24093-SK110	P02
		STATUS: I

APPENDIX

B) TOPOGRAPHICAL SURVEY

Topographic detail only, please refer to utility sheets for results of buried utility survey.

GRID NORTH

Original Drawing Size: A0

NOTES:-

The accuracy and content of the drawing is commensurate with the graphical scale of mapping and the original specification. The drawing should only be used for its original intended purpose.

Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only. Unless indicated otherwise connections between inspection covers are shown as direct.

Tree species (where shown) are indicative, if crucial expert identification by an arborist is advised.

Boundary features may not represent the extent of legal ownership.

Please note that not all buried pipes, cables and ducts can be detected and mapped in built-up areas. Services may exist which are unknown to us, or to the owners of the utilities. Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate. Where an area of utilities is likely to affect client project arrangements, it is strongly recommended that a PAS128 Quality Level A verification survey is carried out.

LEGEND

Features:
AB Air Brick
ACU Air Conditioning Unit
AV Air Valve
BB Bollard
BH Borehole
BP Boundary Post
BT BT Cover
BT British Telecom
CL Cover Level
CP Control Panel
CTV Cable TV Cover
DCH Drainage Channel
DF Decorative Fountain
DS Downpipe
DK Drop Kerb
DPC DPC Damp Proof Course
DC Electricity IC
EJ Expansion Joint
FB Flower Bed
FB Flower Bed
FH Fire Hydrant
FR Flagpole Post
FS Flagstaff
GV Gas Valve
HH Hatch
HP Helipad
IC Inspection Cover
JB Junction Box
JN Junction Box
KO Kerb Outlet
LB Letter Box
LPL Lighting Column
LLP Low Level LP
LP Lamp Post
MP Marker Post
OHL Overhead Line
OP Overflow Pipe
PM Parking Meter
PP Power Pole
RAD Radiator
RE Rodding Eye
RSJ Road Stud Plate
RS Road Sign
RSD Roller Shutter Door
SCP Satellite Dish Type
SD Service Duct
SV Stop Valve
TBX Telephone Call Box
THL Threshold Level
TPL Top of Pipe Level
TSP Traffic Signal Pole
TW Top of Wall
UB Universal Beam
UC Universal Column
UM Unmad
UTL Unable To Lift
VP Vent Pipe
WM Water Meter
WP Waste Pipe
WSB Vehicle Safety Barrier

Building Level Details:
D Door
GFL Ground Level
FFL Floor Level
FRL Flat Roof Level
PFL Pavement Level
PL Pitched Level
RL Ridge Level
SL Sill Level
TA Top of Arch
TA Top of Arch
W Window
FCSE Ceiling/Beam Soffit

Boundary Types:
BW Barbed Wire
BRW Brick Wall
CB Close Boarded
CH Chain Link
CI Corrugated Iron
CP Chestnut Paling
HH Hit & Miss
IR Iron Railing
IW Interwoven
PA Palisade
PAL Palisade
PI Picket
PR Post & Rail
PW Post & Wire
TKR Timber Knee Rail
WR Wire Railing
WMF Wire Mesh Fence

Surfaces & Finishes:
B Brickwork
BS Brick/Block
C Concrete
CLT Ceiling Tiles
CP Carpet
CPS Concrete Paving Slabs
CPT Carpet Tiles
CT Ceramic Tiles
CS Concrete Setts
FT Floor Tiles
HBD Hardboard
P Plaster
S Stone
PAV Brick Pavors
T Tarmac
TSP Textured Safety Paving
VT Vinyl Tiles

Survey Station
Building
Overhead Building Detail
Fence
Gate
Wall
Painted Road Markings
Tree
Edge of Vegetation
Banks
Kerb/Drop Kerb

Utilities
CATV Cables
Electricity Cables
Fuel Pipes
Gas Pipes
Service ducts
Traffic Control
Unidentified GPR
Water pipes
Overhead Lines
Token From Records
Extent of utility survey
CCTV Cables
Fibre Optic
Foul Water Drain
Storm Drain
Storm water drain
Telecom cables
Unidentified EML
Unidentified Trace
End Of Trace
Unable To Trace
No Pipes Visible
Pipe Diameter/Flow

Control: All levels and co-ordinates are related to the datums described.

Horizontal control is on OS National Grid and all coordinates shown are translated from GPS coordinates using Leica's Smartnet service. We have applied a reverse scale factor to maintain true ground distances, based on station 573. The vertical control of this survey is based on OS datum as translated from GPS coordinates using the OSGM15 transformation as supplied by the OS. This may differ from the existing OS benchmarks in the area which should be disregarded, all levels should be taken from EDI survey stations.

Station Schedule

Station	Easting	Northing	Level	Type
1	383551.033	397515.002	33.587	Road Nail
2	383564.311	397532.423	34.722	Road Nail
3	383606.331	397532.423	34.722	Road Nail
4	383629.349	397488.457	33.876	Road Nail
5	383500.419	397492.727	33.180	Road Nail

Rev	Job No.	Date	Revision Detail	Surveyor	Check
-	----	--/--/--		--	--

CLIENT
Atri7 6 Limited
1st Floor, Spitalfields House
Stirling Way
Hertfordshire
WD6 2FX

PROJECT
Topographic Survey
Vision
Whitworth Street West
Manchester
M1 5NZ

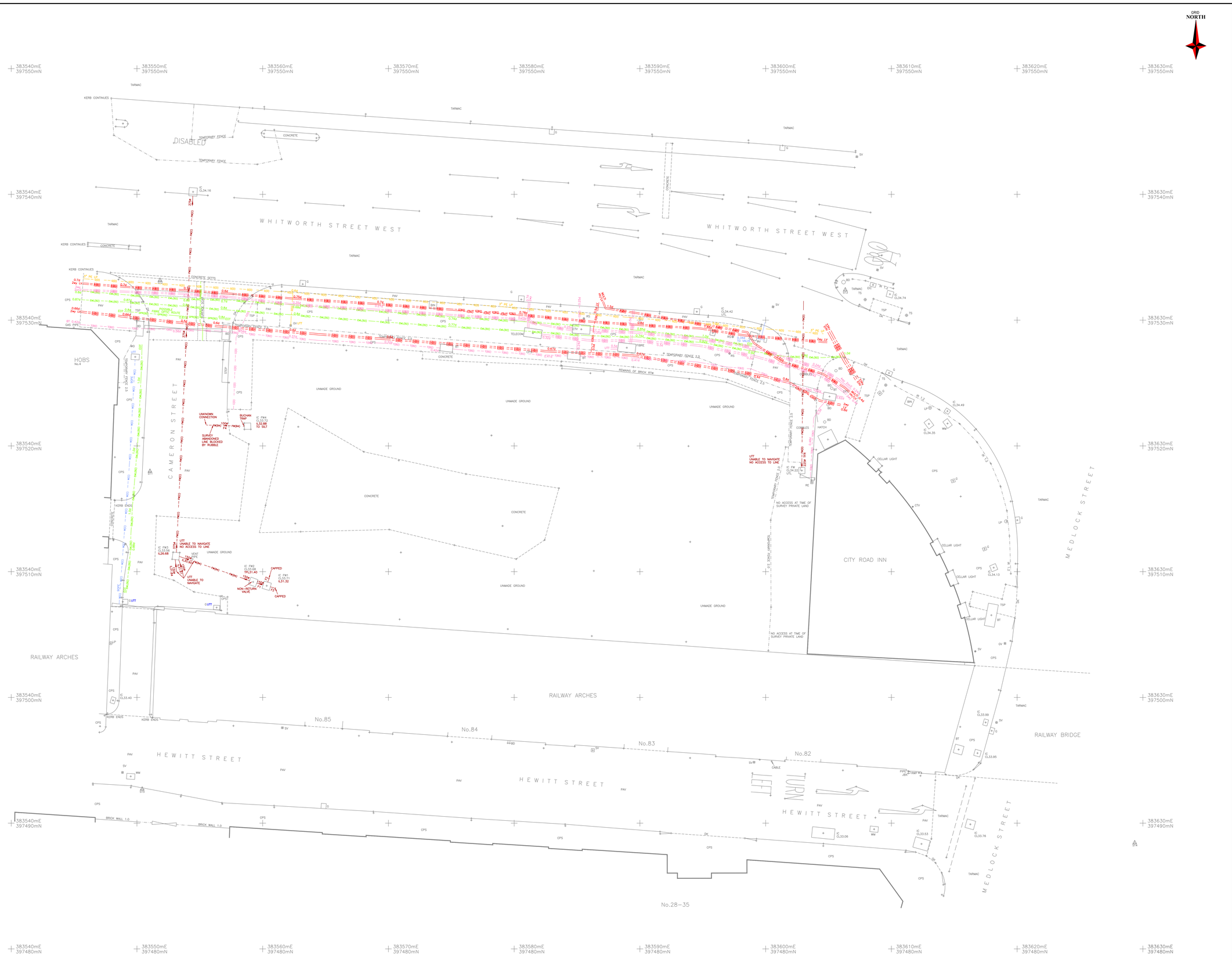
Job No.	Surveyor	Checked	Date	Scale
22184	E Grandinetti	AR	Oct. 2024	1:100

EDI SURVEYS LTD
163-165 Ranelagh Road, Ipswich, Suffolk IP2 0AH
Telephone | 01473 211222
Email | admin@edisurveys.co.uk
Our Services: Topographic Surveys, Measured Building Surveys, GPS Surveying and Control, 3D Laser Scanning, UAV Surveys, Utility Surveying and CCTV Drainage Investigation.
Click the link below to visit our website and find out more.
www.edisurveys.co.uk

DRAWING No. 22184/T/01-01
REV. -

APPENDIX

C) UTILITY SEARCH REPORT



Original Drawing Size: A0

NOTES:–

The accuracy and content of the drawing is commensurate with the graphical scale of mapping and the original specification. The drawing should only be used for its original intended purpose.

Drainage pipe sizes (where shown) have been gauged from the surface for safety reasons and should be regarded as approximate only. Unless indicated otherwise connections between inspection covers are shown as direct.

Tree species (where shown) are indicative, if crucial expert identification by an arborist is advised.

Boundary features may not represent the extent of legal ownership.

Please note that not all buried pipes, cables and ducts can be detected and mapped in built-up areas due to the presence of numerous other services, fences, trees and other utilities. Even an appropriate and professionally executed survey may not be able to achieve a 100% detection rate. Where an area of utilities is likely to affect client project commencement, it is strongly recommended that a PAS128 Quality Level A verification survey is carried out.

LEGEND

Features:
AB Air Brick
ACU Air Conditioning Unit
AV Air Valve
BH Borehole
BM Benchmark
BP Boundary Post
BT British Telecom
BT Service Duct
CL Cover Level
CP Control Panel
CTV Cable TV Cover
DCH Drainage Channel
DF Decorative Fountain
DS Downpipe
DK Drop Kerb
EC Edge Of Carriageway
EC Electricity IC
EJ Expansion Joint
FB Flower Bed
FH Fire Hydrant
FR Flood Relief Rivet
FS Flagstaff
GV Gate Valve
HL Hatch
HP Hydrant
IC Inspection Cover
IL Invert Level
JB Junction Box
KD Kerb Outlet
LB Letter Box
LDN Lamp Column
LLP Low Level LP
LP Lamp Post
MP Marker Post
OHL Overhead Line
OP Overflow Pipe
PM Parking Meter
PP Power Pole
RAD Radiator
RE Rodding Eye
RG Road Gully Plate
RS Road Sign
RSD Roller Shutter Door
SC Service Cover Type
SD Service Duct
SV Stop Valve
TBM Temporary Bench Mark Blow
TFL Threshold Level
TPL Top of Pipe Level
TS Traffic Signal
TW Top of Wall
UB Universal Beam
UC Universal Column
UM Unmet
UTL Unable To Lift
VC Vent Cap
VP Vent Pipe
WM Water Meter
WP Water Pipe
WS Waste Pipe
VSB Vehicle Safety Barrier

Building Level Details:
D Door
FFL Floor Level
FFL Floor Level
FRL Flat Roof Level
PFL Pavement Level
PFL Ground Level
RL Ridge Level
SL Silt Level
SS Top Of Sill Of Arch
TA Top Of Arch
W Window
FCSE Ceiling/Beam Soffit

Boundary Types:
BW Barbed Wire
BRW Brick Wall
CB Close Boarded
CI Chain Link
CI Corrugated Iron
CP Chestnut Paling
HH Hedge Height
IR Iron Railing
IW Interwoven
PA Post & Rail
PAL Palisade
PI Picket
PR Post & Rail
PW Post & Wire
TKR Timber Knee Rail
WF Wire Fence
WMF Wire Mesh Fence

Surfaces & Finishes:
B Brickwork
BS Brick Block
C Concrete
CLT Ceiling Tiles
CP Carpet
CPS Concrete Paving Slabs
CPT Carpet Tiles
CR Concrete Render
CT Ceramic Tiles
FT Floor Tiles
HBD Hardboard
P Plaster
PB Plasterboard
PAV Brick Pavors
T Tarmac
TG Gravel
TSP Textured Safety Paving
VT Vinyl Tiles

Survey Station
Building
Overhead Building Detail
Fence
Gate
Wall
Painted Road Markings
Tree
Edge of Vegetation
Kerb/Drop Kerb
Banks

Utilities
CATV Cables
Electricity Cables
Fuel Pipes
Gas Pipes
Service ducts
Traffic Control
Unidentified GPR
Water pipes
Overhead Lines
Token From Records
Extent of utility survey
CCTV Cables
Fibre Optic
Foul Water Drain
Gully Connection
Storm water drain
Telecom cables
Unidentified EML
Unidentified Trace
EOT End Of Trace
UTT Unable To Trace
NPV No Pipes Visible
Pipe Diameter/Flow

Datum: All levels and co-ordinates are related to the datums described.

Grid: Survey control was established using GPS and the coordinates are translated from GPS coordinates onto Ordnance Survey National Grid. We have applied a reverse scale factor to maintain true ground distances, based on station 373. The vertical control of this survey is based on OS datum as translated from GPS coordinates using the OSGM15 transformation as supplied by the OS. This may differ from the existing OS benchmarks in the area which should be disregarded; all levels should be taken from EDI survey stations.

Station Schedule

Station	Easting	Northing	Level	Type
1	383551.033	397515.002	33.587	Road Nail
2	383586.331	397532.423	34.722	Road Nail
3	383606.331	397532.423	34.722	Road Nail
4	383629.349	397488.457	33.876	Road Nail
5	383550.419	397492.727	33.180	Road Nail

This survey has been carried out to PAS 128 Detection Method M2: EML search traverse at 5m intervals and 2m for GPR.

Utility Depths–
Depths obtained by EML are to the centre of the utility
Depths obtained by GPR are to the top of the utility
All depths are shown in metres in the format 0.76

Utility Confidence Levels–
(A) Horizontal and vertical position verified visually
(B1) Horizontal and vertical position detected by multiple methods (Estimated Accuracy: ±150mm OR ±15% of detected depth)
(B2) Horizontal and vertical position detected by a single method (Estimated Accuracy: ±250mm OR ±40% of detected depth)
(C1) Route detected by multiple methods (Estimated Accuracy: ±500mm in the Horizontal – Depth is undefined)
(B4) A utility segment which is suspected to exist but has not been detected and is therefore shown as an assumed route
(C) Route transcribed from utility asset plans and correlated to visual clues and surface features (accuracy undefined)
(D) Route transcribed from utility asset plans (accuracy undefined)

Rev	Job No.	Date	Revision Detail	Surveyor	Check
-	---	--/--/--		--	--

CLIENT
Atri7 6 Limited
1st Floor, Spitalfields House
Stirling Way
Hertfordshire
WD6 2FX

PROJECT
Buried Utilities & CCTV Survey
Vision
Whitworth Street West
Manchester
M1 5NZ

Job No.	Surveyor	Checked	Date	Scale
22184	J.Kingham	AR	Oct. 2024	1:100

EDI SURVEYS LTD
163–165 Ranelagh Road, Ipswich, Suffolk IP2 0AH
Telephone | 01473 211222
Email | admin@edisurveys.co.uk
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DRAWING No. 22184/U/01–01
REV. –

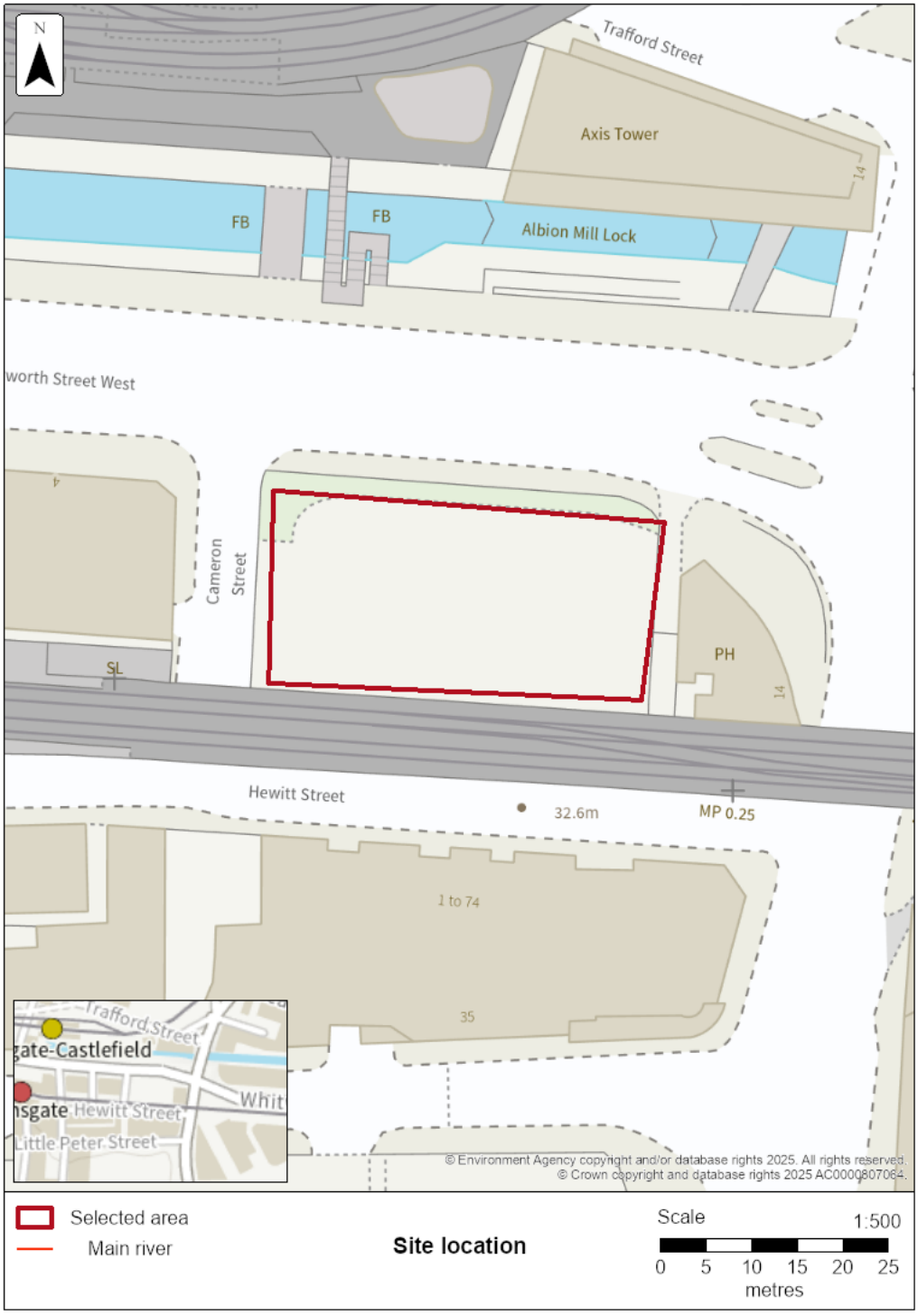
APPENDIX

D) PRODUCT 4 FLOOD DATA

Flood risk assessment data

Location of site: 383579 / 397516 (shown as easting and northing coordinates)
Document created on: 14 May 2025
This information was previously known as a product 4.
Customer reference number: THYCG5JX9MM5

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

> **We recommend that you work with a flood risk consultant to get your flood risk assessment.**

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- past floods
- modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- flood defences and attributes

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

When using the surface water map on the check your long term flood risk service the following considerations apply:

- surface water extents are suitable for use in planning
- surface water climate change scenarios may help to inform risk assessments, but the available data fall short of what is required to assess planned development
- surface water depth information should not be used for planning purposes

To find out about other factors that might affect the flood risk of this location, you should also check:

- reservoir flood risk
- groundwater flood risk - you could use the British Geological Survey groundwater flooding data, groundwater: current status and flood risk and the guide on mining and groundwater constraints for development - further information may be available from the lead local flood authority (LLFA)
- your local planning authority's SFRA, which includes future flood risk

Your Lead Local Flood Authority is Manchester District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: River Medlock 2011
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 22 December 2010

Model name: Manchester Ship Canal 2018
Scenario(s): No defences exist fluvial, no defences exist climate change fluvial
Date: 1 May 2020

These models contain the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occuring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 1.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change



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Environment Agency

Flood map for planning

Location (easting/northing)
383579/397516

Scale
1:10,000

Created
14 May 2025

- Selected area
- Main river
- Flood defence
- Water storage area

Flood Zones 2 and 3
Rivers and Sea

- Flood Zone 3
- Flood Zone 2

0 100 200 300 400 500
metres

Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

The climate change data included in the models may not include the latest flood risk assessment climate change allowances. Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



Environment Agency

No defences exist climate change modelled fluvial extent

Location (easting/northing)
383579/397516

Scale
1:10,000

Created
14 May 2025

Model name
Manchester Ship 2018

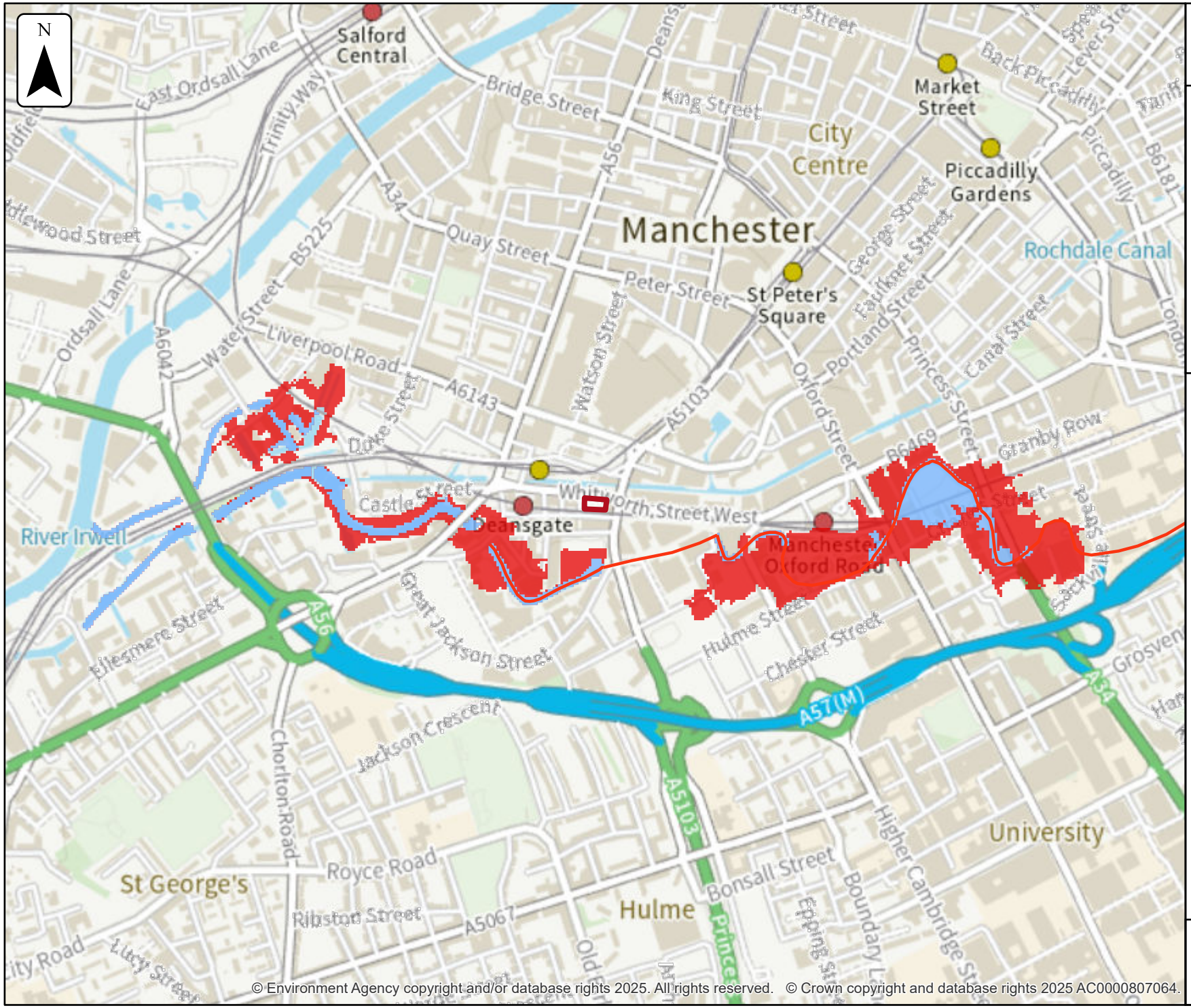
- Selected area
- Main river

Modelled flood extent

- 1% AEP (+30%)
- 1% AEP (+35%)
- 1% AEP (+70%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
383579/397516

Scale
1:10,000

Created
14 May 2025

Model name
River Medlock 2011

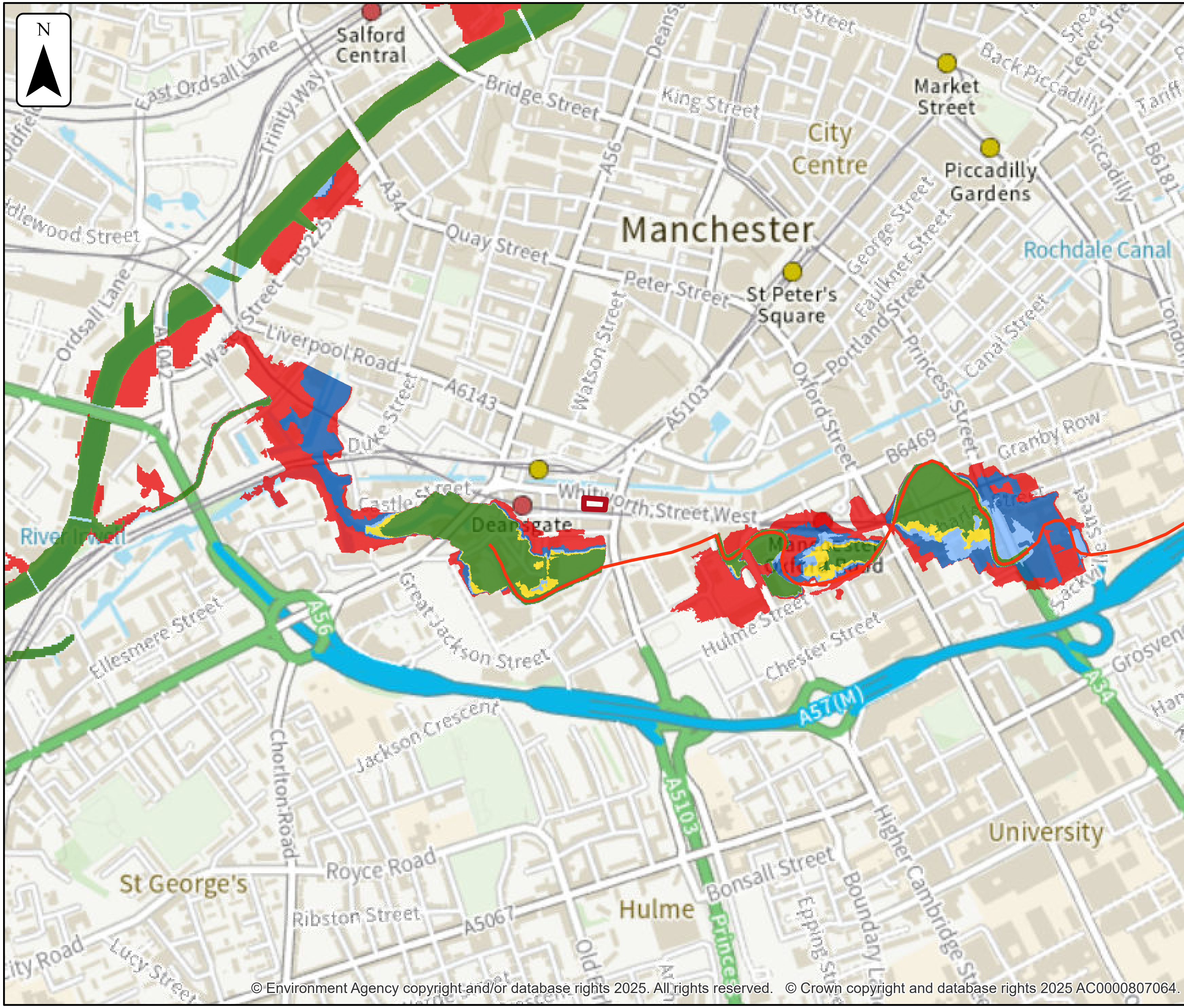
- Selected area
- Main river

Modelled flood extent

- 1% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



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Environment Agency

No defences exist modelled fluvial extent

Location (easting/northing)
383579/397516

Scale
1:10,000

Created
14 May 2025

Model name
Manchester Ship 2018

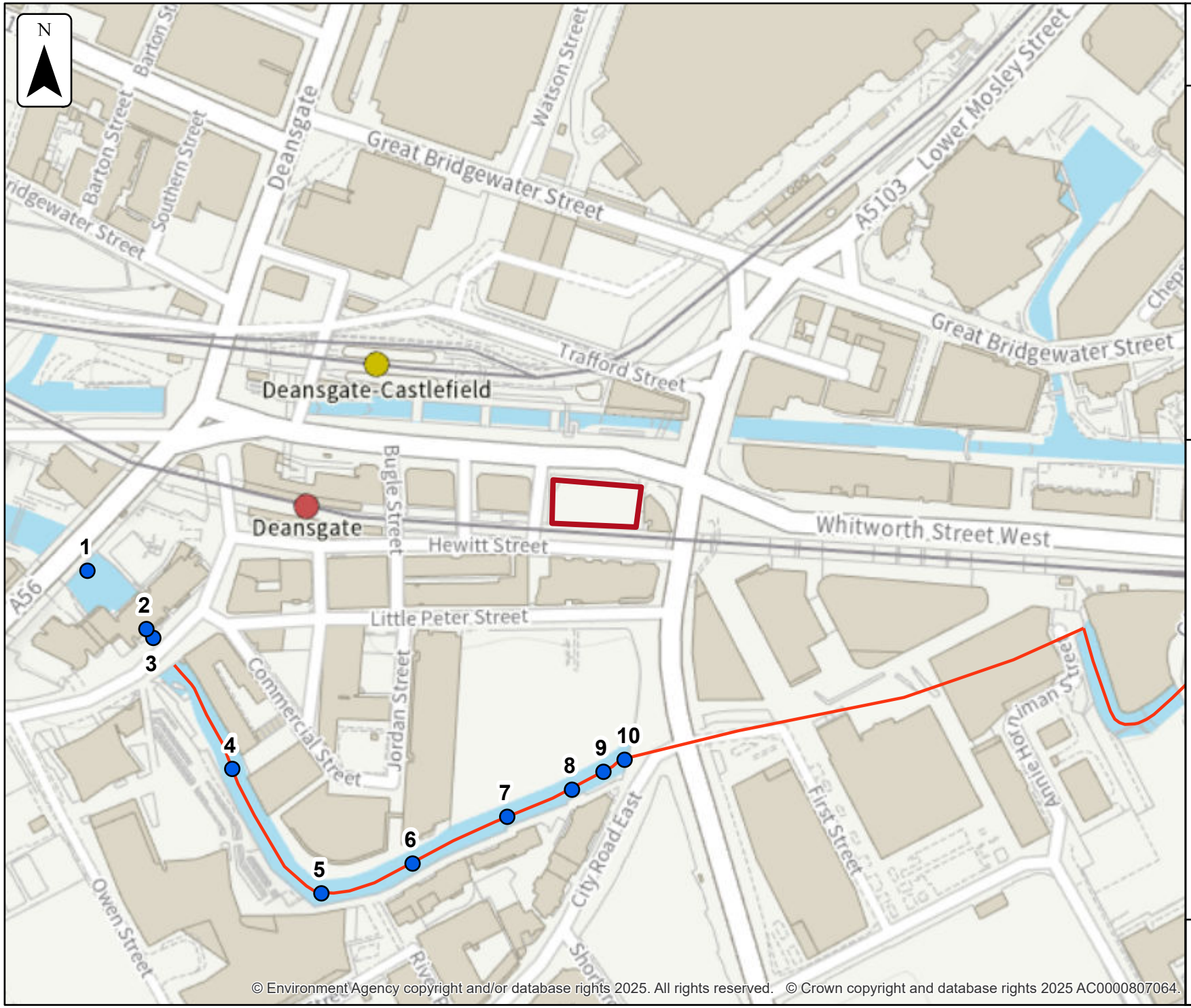
- Selected area
- Main river

Modelled flood extent

- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500
metres



Environment Agency

No defences exist climate change modelled fluvial node locations

Location (easting/northing)
383579/397516

Scale
1:2,500

Created
14 May 2025

Model name
River Medlock 2011

- Selected area
- Modelled location
- Main river

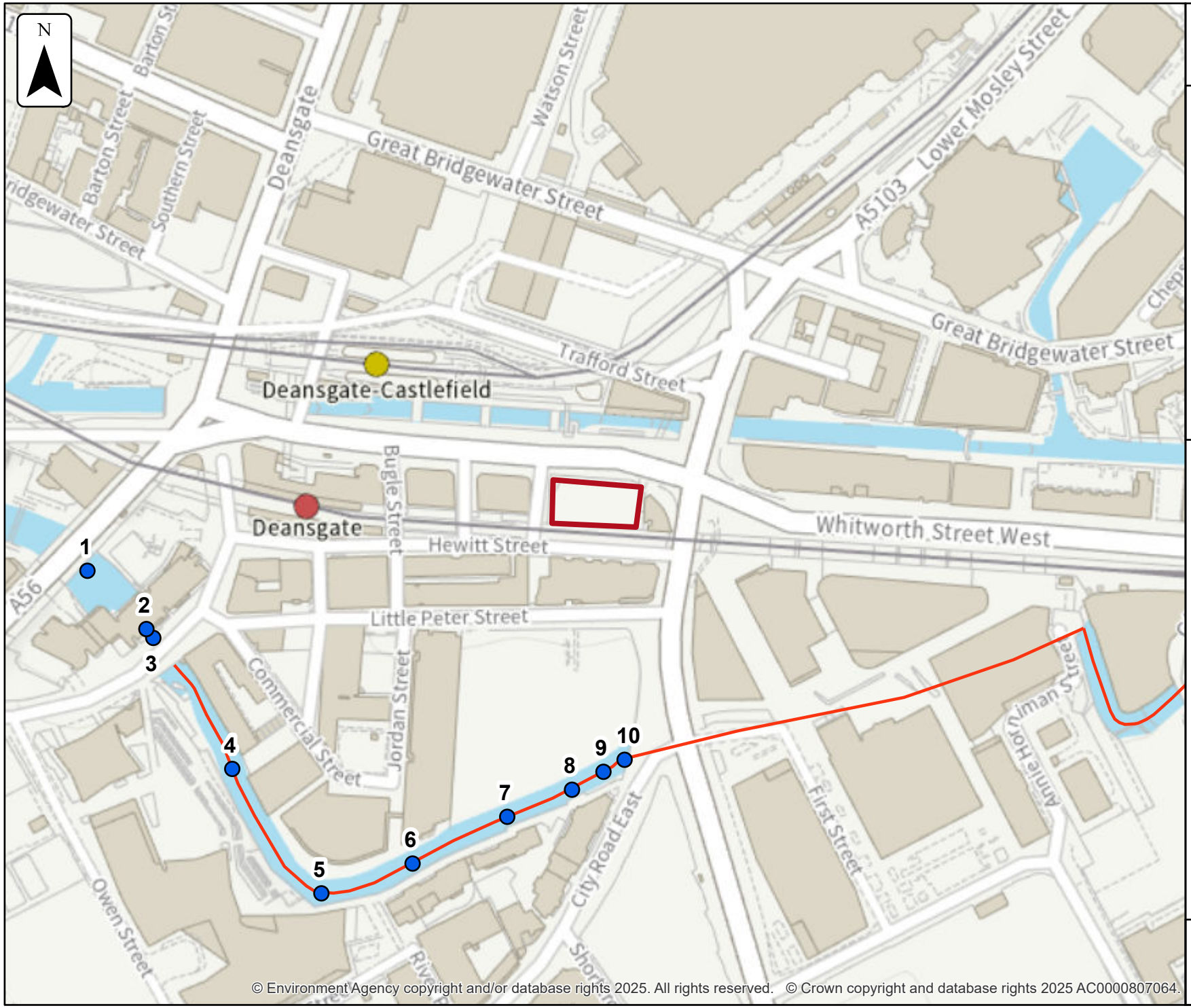
0 25 50 75 100
metres

Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)	1% AEP (+20%)	1% AEP (+35%)	1% AEP (+70%)
				Level	Level	Level	Flow	Flow	Flow
1	1468172	383332	397483	26.01	26.13	26.49	51.28	54.81	62.96
2	1468034	383360	397455	26.13	26.25	26.65	51.29	54.82	57.07
3	1467997	383364	397450	26.14	26.27	26.66	51.29	54.83	57.05
4	1468122	383402	397387	28.36	28.75	28.98	65.05	69.14	76.91
5	1468046	383446	397326	28.42	28.80	29.04	65.05	69.16	77.04
6	1468053	383490	397341	28.41	28.79	29.02	65.05	69.17	77.09
7	1468052	383536	397363	28.46	28.84	29.14	65.06	67.98	69.84
8	1468141	383568	397377	28.66	29.05	29.30	62.41	62.49	62.50
9	1468184	383583	397385	28.81	29.12	29.35	63.27	68.51	76.08
10	1468117	383593	397391	28.81	29.12	29.34	65.13	69.39	77.12

Data in this table comes from the River Medlock 2011 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



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Environment Agency

No defences exist modelled fluvial node locations

Location (easting/northing)
383579/397516

Scale
1:2,500

Created
14 May 2025

Model name
River Medlock 2011

- Selected area
- Modelled location
- Main river

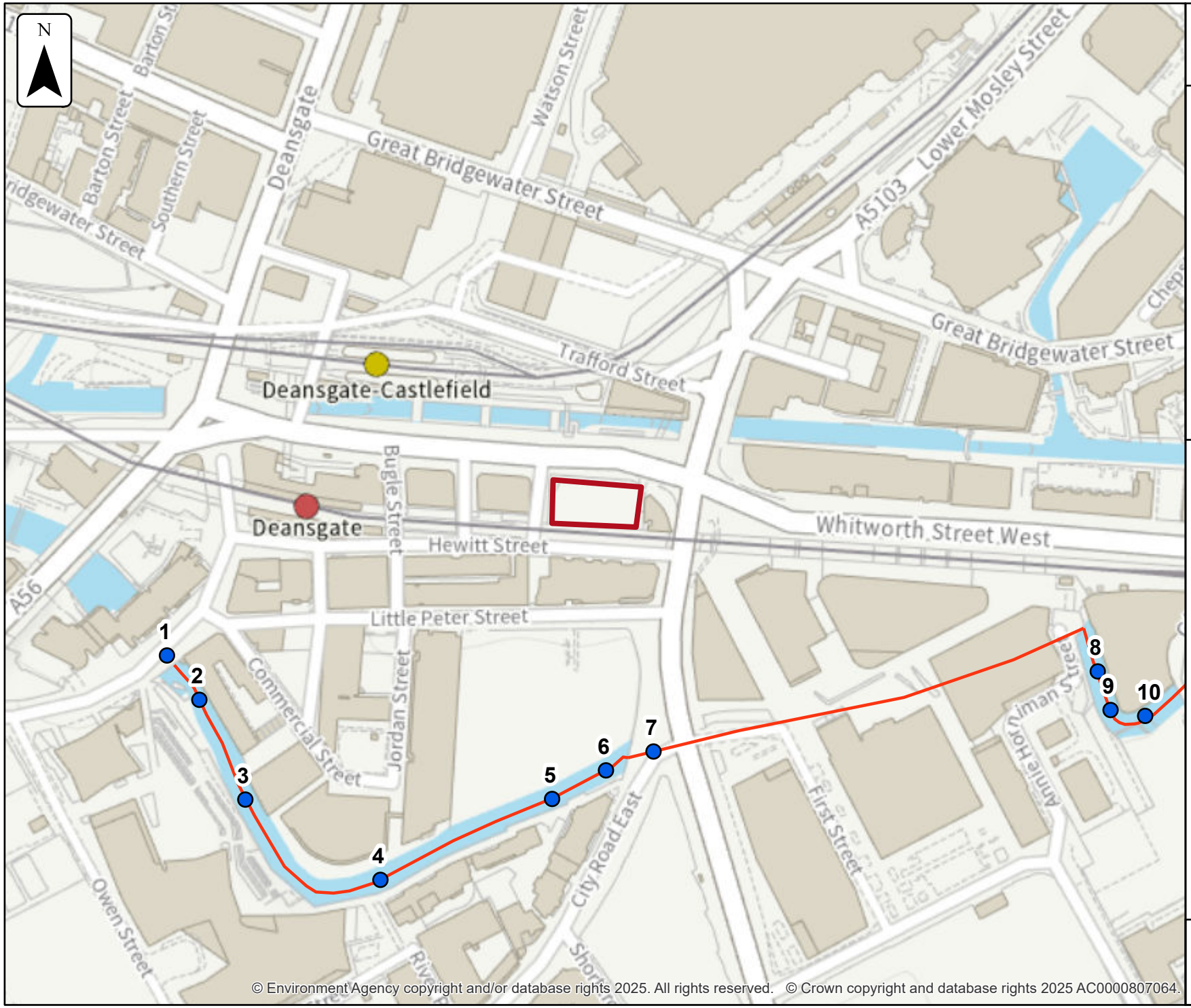
0 25 50 75 100
metres

Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	4% AEP	1% AEP	0.1% AEP	4% AEP	1% AEP	0.1% AEP
				Level	Level	Level	Flow	Flow	Flow
1	1468172	383332	397483	25.66	25.85	27.05	38.45	46.15	75.23
2	1468034	383360	397455	25.75	25.96	27.23	38.45	46.15	58.78
3	1467997	383364	397450	25.77	25.97	27.23	38.45	46.15	58.78
4	1468122	383402	397387	27.76	28.06	29.15	51.45	59.54	89.62
5	1468046	383446	397326	27.82	28.13	29.22	51.45	59.55	88.55
6	1468053	383490	397341	27.82	28.12	29.18	51.45	59.55	89.50
7	1468052	383536	397363	27.88	28.18	29.40	51.45	59.55	71.32
8	1468141	383568	397377	28.05	28.36	29.52	51.45	59.50	68.04
9	1468184	383583	397385	28.23	28.54	29.55	51.47	59.55	88.19
10	1468117	383593	397391	28.23	28.54	29.55	51.47	59.55	89.52

Data in this table comes from the River Medlock 2011 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.



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Environment Agency

Modelled fluvial node locations

Location (easting/northing)
383579/397516

Scale
1:2,500

Created
14 May 2025

Model name
Manchester Ship 2018

- Selected area
- Modelled location
- Main river

0 25 50 75 100
metres

					Normal Operation											Latchford 1 Gate Closed	Latchford 3 Gates Closed	
Map Reference	Model Node Reference	Easting	Northing	Data	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flow	1 % AEP (1 in 100 year) + 35% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year)	0.1 % AEP (1 in 1000 year)
1	ea013_0251_MEDL01_0000u	383370	397442	Modelled Water Level (m aodN)	28.59	28.73	28.88	29.03	29.12	29.19	29.46	29.51	29.81	29.39	30.11	29.19	29.19	30.12
				Modelled Flow (cumecs)	32.90	38.43	45.39	52.76	57.93	62.30	79.44	82.26	104.14	74.52	127.68	62.30	62.30	128.24
2	ea013_0251_MEDL01_0034	383386	397420	Modelled Water Level (m aodN)	28.59	28.73	28.88	29.03	29.12	29.20	29.47	29.51	29.82	29.39	30.12	29.20	29.20	30.12
				Modelled Flow (cumecs)	32.84	38.36	45.30	52.66	57.81	62.18	79.29	82.10	103.97	74.37	127.34	62.19	62.19	127.72
3	ea013_0251_MEDL01_0074	383408	397372	Modelled Water Level (m aodN)	28.60	28.74	28.89	29.04	29.13	29.20	29.48	29.52	29.82	29.40	30.11	29.20	29.20	30.12
				Modelled Flow (cumecs)	32.59	38.06	44.95	52.25	57.36	61.70	78.66	81.45	103.23	73.80	125.99	61.70	61.70	126.18
4	ea013_0251_MEDL01_0165	383474	397333	Modelled Water Level (m aodN)	28.61	28.76	28.92	29.07	29.16	29.24	29.54	29.58	29.91	29.45	30.23	29.24	29.24	30.23
				Modelled Flow (cumecs)	32.42	37.86	44.71	51.98	57.06	61.38	78.24	81.02	102.79	73.41	124.41	61.38	61.38	124.61
5	ea013_0251_MEDL01_0270	383558	397372	Modelled Water Level (m aodN)	28.64	28.80	28.96	29.12	29.23	29.31	29.62	29.67	30.03	29.54	30.35	29.31	29.31	30.35
				Modelled Flow (cumecs)	32.32	37.75	44.58	51.82	56.89	61.19	78.00	80.77	102.62	73.19	122.66	61.19	61.19	122.77
6	ea013_0251_MEDL01_0290	383584	397386	Modelled Water Level (m aodN)	28.65	28.80	28.97	29.13	29.24	29.32	29.64	29.69	30.05	29.55	30.37	29.32	29.32	30.37
				Modelled Flow (cumecs)	32.25	37.66	44.47	51.70	56.76	61.05	77.81	80.58	102.40	73.03	122.13	61.05	61.05	122.18
7	ea013_0251_MEDL01_0300	383607	397395	Modelled Water Level (m aodN)	28.65	28.81	28.98	29.14	29.25	29.33	29.65	29.70	30.07	29.56	30.39	29.33	29.33	30.39
				Modelled Flow (cumecs)	32.18	37.58	44.38	51.59	56.64	60.92	77.65	80.40	102.20	72.88	121.64	60.93	60.93	121.63
8	ea013_0251_MEDL01_0532	383824	397434	Modelled Water Level (m aodN)	28.78	28.96	29.17	29.37	29.51	29.62	30.04	30.11	30.59	29.92	30.92	29.62	29.62	30.92
				Modelled Flow (cumecs)	32.18	37.58	44.38	51.59	56.64	60.92	77.65	80.40	101.99	72.88	122.90	60.92	60.92	122.90
9	ea013_0251_MEDL01_0573	383830	397415	Modelled Water Level (m aodN)	28.80	28.99	29.20	29.41	29.55	29.67	30.11	30.18	30.67	29.98	31.02	29.67	29.67	31.02
				Modelled Flow (cumecs)	32.03	37.40	44.17	51.34	56.38	60.63	77.27	80.01	101.31	72.53	122.59	60.64	60.64	122.59
10	ea013_0251_MEDL01_0605u	383847	397413	Modelled Water Level (m aodN)	28.85	29.05	29.27	29.50	29.65	29.78	30.24	30.32	30.85	30.11	31.25	29.78	29.78	31.25
				Modelled Flow (cumecs)	31.95	37.30	44.06	51.21	56.23	60.48	77.07	79.81	100.93	72.35	122.39	60.48	60.48	122.39

Model data taken from Manchester Ship Canal 2018

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

For the Manchester Ship Canal Model, we provide the following three scenarios:

1. Normal Operation: All sluice gates operate automatically to maintain a navigable pounded water level upstream of each set of sluice gates. During times of high flow the gates are opened automatically to allow excess water pass downstream. During extreme conditions the sluice gates can be manually overridden to extend the opening heights.

2. Latchford 1 Gate Closed Scenario: This scenario represents a single operational sluice gate at Latchford Locks fixed closed. Therefore, only operational movements from 2 active sluice gates.The model setup removes the gate from PID controller setup and an IED file is used to define the sluice gate as fixed in the closed position.

3. Latchford 3 Gates Closed Scenario: This scenario has been defined as the removal of operational rules at all three sluice gates at Latchford Locks, thus, all gates are fixed in the closed position resulting in no regulation of upstream water levels. The model setup removes each of the gates from PID controller setup and an IED file is used to define sluice gates fixed in the closed position.

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115).

Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance.

The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Manchester District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

Find out more about flood risk activity permits

Help and advice

Contact the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@environment-agency.gov.uk for:

- more information about getting a product 5, 6, 7 or 8
- general help and advice about the site you're requesting data for

APPENDIX

E) PRE-DEVELOPMENT ENQUIRY RESPONSE

Simon Mason

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 22 December 2025 11:01
To: Jacob George
Subject: Re: 24093 - Whitworth Street Flow Rate Enquiry[Reviewed by JG 05-01-2026]

Hi Jacob,

Thank you for consulting the LLFA. Yes, we can accept the proposed discharge rate of 5 l/s.

Michael O'Brien

Development Control and Flood Risk Management Intern

Email [redacted]

Highways Service

Neighbourhoods Directorate

Manchester City Council

PO Box 532

Town Hall

Manchester

M60 2LA

Web:http://www.manchester.gov.uk

****
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From: Jacob George <Jacob@shear-design.com>
Sent: 25 November 2025 11:11

[redacted]

You don't often get email from jacob@shear-design.com. Learn why this is important

ALERT This message originated outside of the Manchester City Council network. **BE CAUTIOUS** before clicking any links or opening any attachments. Please remember your Cyber Training and report anything suspicious.

Good morning,

Wanted to check in and see if there is any update on getting a response over to us regarding the below email. I have re-attached both documents that the previous email contained.

Would be great to heard back from you.

Best Regards

Jacob George
Civil Engineer Technician
Shear Design Ltd
7 Ashtree Court | Woodsy Close
Cardiff Gate Business Park
Cardiff | CF23 8RW
T: +44 (0)29 2054 7000 | W: www.shear-design.com









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[redacted]

Good Morning,

We are in the process of putting together a planning application pack for our client's site in Manchester, at Whitworth Street, (nearest known postcode: M1 5LH). The site is subject to an existing application, reference: 135272/JO/2022. The site area is approximately 900m^2 and is a Brownfield site.

We have received confirmation from United Utilities (attached for reference) that they would accept a surface water discharge into the combined sewer of 5 L/s, subject to exhaustion of the drainage hierarchy (to be covered in our drainage strategy report being submitted with the planning application).

Please can you confirm by return, your acceptance of the proposed site discharge rate of 5 L/s?

Many thanks

Ed Law
Civil Engineer
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Cardiff Gate Business Park
Cardiff | CF23 8RW
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M: +44 (0)7960 236 566

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WASTEWATER PRE-DEVELOPMENT ENQUIRY

United Utilities
Water for the North West

United Utilities Grasmere House, 2nd Floor
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP

13/10/2025

Dear **Simon,**

Pre-Development Enquiry for **10-12 Whitworth Street, Manchester, M1 5LH** UU Reference Number: **08232678**

We have assessed your application based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your strategy will need review by other authorities as part of the planning process. We advise conducting necessary site investigations to confirm viability of your proposals.

Modelled Flood Risk

Please see the image at the end of this letter for details

I can confirm that we do not have modelled flood risk within the vicinity of the proposed development.

Please note that our modelling data is indicative, and only representative of the 1:100year storm event.

Please see **comment 2** of the attached guidance sheet

Asset Protection

1. We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of the proposed development.

Please see **comment 3** of the attached guidance sheet and **Working Near Our Pipelines Guidance document**

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 375mm diameter public combined sewer within Cameron Street located West of your proposed development at an unrestricted rate.

Manhole reference SJ83975508, **Grid reference** 383553, 397510

Please see the images at the end of this letter for clarification

WASTEWATER PRE-DEVELOPMENT ENQUIRY

Surface Water

Follow the National Planning Policy Guidance drainage hierarchy and Provide evidence for discounting higher options before considering public sewer discharge. Consult the Lead Local Flood Authority regarding surface water concerns.

Please see comment **4** within the guidance sheet

Infiltration

Please see comment **4** within the guidance sheet

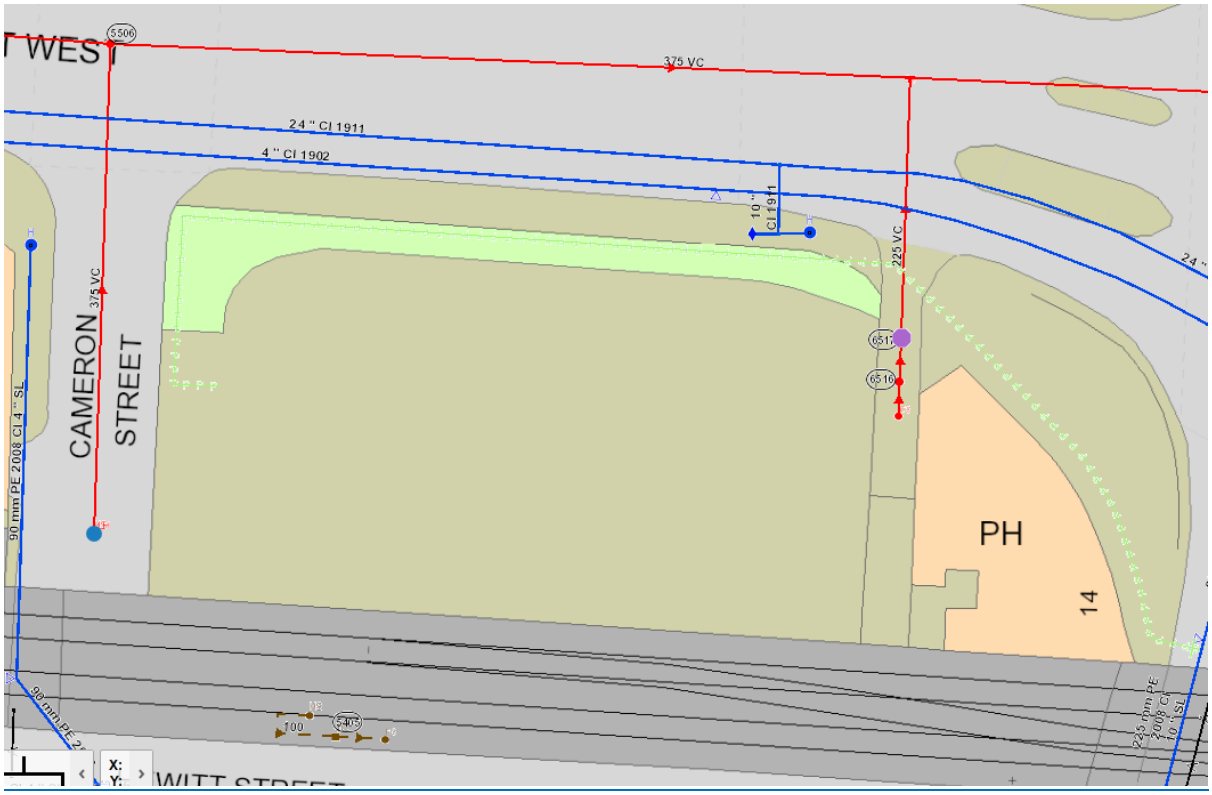
Public Sewer

United Utilities will consider a connection 375mm diameter public combined sewer within Cameron Street located West of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities requests that any agreed rate does not exceed **5l**/s.

Manhole reference SJ83975508, **Grid reference** 383553, 397510

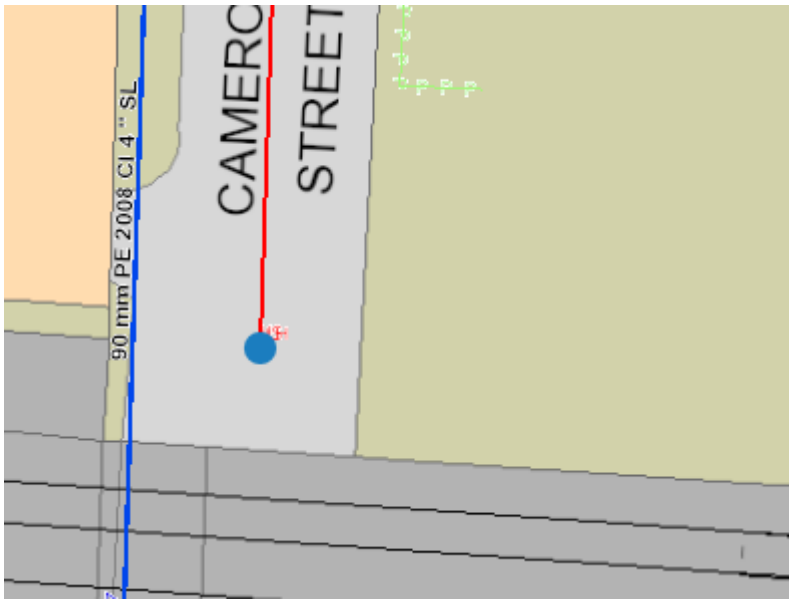
Please see the images at the end of this letter for clarification

Site Images



WASTEWATER PRE-DEVELOPMENT ENQUIRY

Connection point



Modelling information

Node reference - SJ83975508

Ground Level – 33.445m AOD

Max TWL 100yr event – 27.557m AOD

Pre Development Enquiry Guidance

Version 1 (September 24)

(This document should be read in conjunction with PDE response letter)

United Utilities
Water for the North West

Comment no.	Technical Guidance
General Guidance	
1	**Sewer Access** If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below: https://www.unitedutilities.com/builders-developers/working-near-our-assets/ **Sewer Adoption Under S104** If you intend to offer sewers for adoption, design per current Design and Construction and local practices which have now replaced Sewers for Adoption 6th Edition.. **S104 Pre-Design Assessment** We recommend submitting a pre-design assessment. This is a free service to discuss the high level design and potential challenges. Please see link to application form in guidance sheet. **Adoption of Sewers** • Designs must comply with current Design & Construction Guidance. • S104 1b Pre-design assessment, and S104 for adoption of new sewers applications can be found at Sewer adoptions - United Utilities • Submit pre-design assessment to SewerAdoptions@uuplc.co.uk. • No construction should commence until detailed design is approved in writing. **Sewer Connections:** • Formal S106 application required for sewer connections. Application details available at: www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/ **Water Assets** • Contact DeveloperServicesWater@uuplc.co.uk regarding clean water assets on site. • Further information: Water pre-development - United Utilities **Additional Considerations** • Land drainage, overland flows, and track drainage are not accepted into public sewer network. **Useful Resources:** • Codes for Adoption: www.water.org.uk/technical-guidance/developers-services/codes-for-adoption/ • Design & Construction Guidance: www.water.org.uk/sewerage-sector-guidance-approved-documents/ • United Utilities website: www.unitedutilities.com/builders-developers/ **Contact Information:** • Main contact number: 0345 6723 723 • Sewer Adoptions and Pre-Development: SewerAdoptions@uuplc.co.uk
2	**Flooding Events** Please note that United Utilities Water Limited (UUW) can only record and check flooding events which are reported to us, and we must comply with our Regulators instructions on the qualification of flooding events. Our response does not include: • any sewer flooding events caused by blockages or collapses which are the result of third-party actions, natural events, or other actions over which UUW has no control and not a facet of sewer capacity; or • any historical sewer flooding events that have been resolved from investment in our infrastructure.

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	Further consideration. • For low-lying sites, care should be taken to ensure that the property is not at increased risk of flooding. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme. • Consult Lead Local Flood Authority (LLFA) for surface water drainage concerns. • Check Environment Agency guidelines if site is in a Groundwater Source Protection Zone.
3	**Asset Protection** • Due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records. We ask that you proceed with caution and conduct adequate site investigation works. If any uncharted sewers are identified while conducting your investigation, we ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records. • Obtain asset data records before planning development United Utilities - Property Search : • Please be aware that any proposed diversion may require modelling. This process may take up to 6 months to reach an acceptable design. • Maintain minimum easement in line with our easement local practice, unless there is a formal easement in place, in which case the specified easement width would apply. easement-local-practice.pdf (unitedutilities.com) • Contact United Utilities for guidance on work near assets or if diversion is necessary.
4	**Surface Water Drainage Hierarchy** Follow the hierarchy as per National Planning Practice Guidance: **1.** Infiltration **2.** Discharge to waterbody **3.** Discharge to surface water sewer or highway drain **4.** Discharge to combined sewer (last resort) For guidance, The Northwest SuDS Pro-Forma provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted. The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area). The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining the cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities. **SuDS (Sustainable Drainage Systems)** • Prioritise multi-functional SuDS in accordance with national planning policy. • Design SuDS components as per CIRIA SuDS Manual (C753). • Consult the North West SuDS Pro-Forma for required evidence at each stage of the drainage hierarchy. **Infiltration** Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible. A detailed evidence-based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal. Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website: https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below: https://www.gov.uk/government/publications/groundwater-protection-position-statements Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site. **Surface Water Discharge Rates** Please note the given discharge rate is based on the site area believed to be developed. If there are significant areas of the site that will not be developed, the discharge rate should be reduced accordingly.
5	Please note that this guidance is current as of the date of issue. Always check for the most up-to-date regulations and guidelines when planning your development.

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APPENDIX

F) PROPOSED DRAINAGE LAYOUT
EXISTING SW FLOW ROUTE PLAN
PROPOSED SW EXCEEDANCE ROUTE PLAN

WHITWORTH STREET

DISABLED

EXISTING 375ø COMBINED SEWER

EXISTING 225ø COMBINED SEWER

UU MANHOLE CL 34.163 IL 30.738

NEW BACK-DROP CONNECTION TO EXISTING SEWER

BD IL 29.265

IL 29.800

BD IL 31.500

IL 31.700

BD IL 31.500

IL 31.300

CL 33.810 IL 33.150

CL 33.820 IL 32.350

CL 33.820 IL 32.300

CL 34.100 IL 32.200

CL 34.100

CL 34.100 IL 32.100

CL 34.500 IL 32.700

CL 34.100 IL 32.470

BD IL 32.780

IL 31.900

INLINE NON-RETURN VALVE TO PREVENT SURCHARGE IN PRIVATE DRAINAGE

OROFICE FLOW CONTROL MAX 5L/s

BRICK RAILWAY VIADUCT/ARCHES

35m X 750mm X 1.5m DEEP LINED CELLULAR TANK. 37.4m³ STORAGE FOR 1/100YR + 40%CC

NOTES

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KEY

- PROPOSED ACO DRAINAGE CHANNEL
- PROPOSED SURFACE WATER PIPES
- PROPOSED FOUL WATER PIPES
- PROPOSED COMBINED SEWER CONNECTION
- EXISTING COMBINED SEWER CONNECTION

DRAINAGE LAYOUT IS FOR INTENT & SUBJECT TO COORDINATION DURING PLANNING & PRE-CONSTRUCTION CHANGES

TOTAL SITE AREA 880M²

REV	DATE	DESCRIPTION	BY	CHK
P02	29.09.25	AMENDED TO LATEST GROUND FLOOR LAYOUT	JG	SM
P01	29.09.25	FIRST ISSUE – PDE APPLICATION	JG	SM

AMENDMENTS

CLIENT: FUSION GROUP

PROJECT: WHITWORTH STREET MANCHESTER

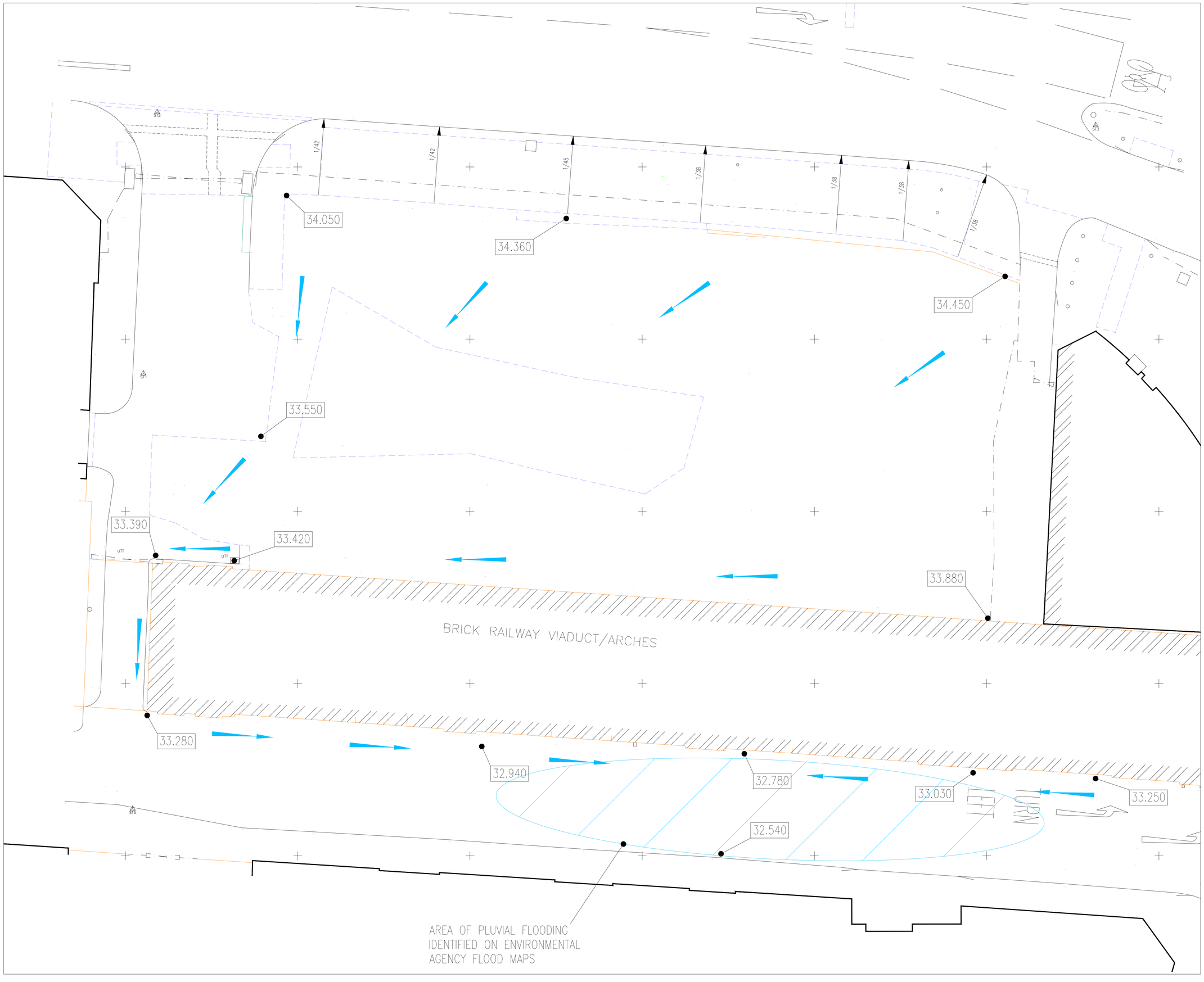
TITLE: DRAINAGE LAYOUT INTENT PLAN

SHEAR design
Consulting Civil and Structural Engineers
7 Ashtree Court - Woodsy Close - Cardiff Gate Business Park - Cardiff - CF23 8RW
Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com

DRAWN:	CHECKED:	DATE:	SCALE:
JG	SM	SEPT 2025	1:100 @ A1

SHEAR DESIGN REF:	DRAWING NUMBER:	REVISION:
24093	24093-SK100	P02

STATUS: I



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KEY

- EXISTING SURFACE WATER FLOW ROUTE
- 34.450 EXISTING SPOT LEVELS
- EXISTING PLUVIAL FLOODING

WORK IN PROGRESS

REV	DATE	DESCRIPTION	BY	CHK
P01	12.03.26	FIRST ISSUE	JG	SM

AMENDMENTS

CLIENT:
FUSION GROUP

PROJECT:
WHITWORTH STREET
MANCHESTER

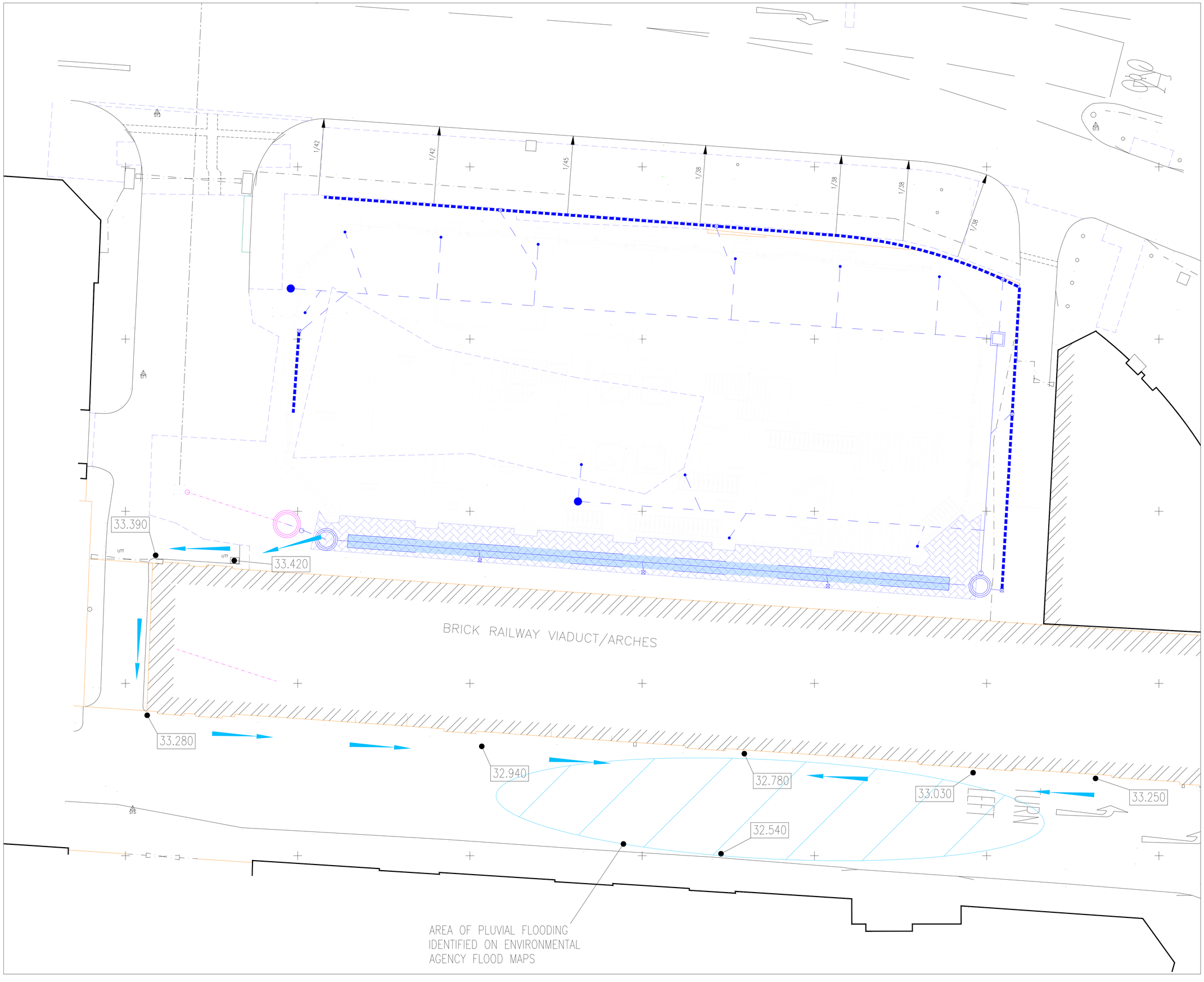
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SJM	SM	MARCH 2026	1:100 @ A1

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24093	24093-SK102	P01

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KEY

- PROPOSED EXCEEDANCE ROUTE
- 34.450 EXISTING SPOT LEVELS
- EXISTING PLUVIAL FLOODING
- PROPOSED ACO DRAINAGE CHANNEL
- PROPOSED SURFACE WATER PIPES
- PROPOSED COMBINED SEWER CONNECTION
- EXISTING COMBINED SEWER CONNECTION

WORK IN PROGRESS

REV	DATE	DESCRIPTION	BY	CHK
P01	12.03.26	FIRST ISSUE	JG	SM

AMENDMENTS

CLIENT:
FUSION GROUP

PROJECT:
WHITWORTH STREET
MANCHESTER

TITLE:
POST DEVELOPMENT SURFACE WATER FLOW ROUTE PLAN

SHEAR design
Consulting Civil and Structural Engineers
7 Ashtree Court - Woodsy Close - Cardiff Gate Business Park - Cardiff - CF23 8RW
Tel: 029 2054 7000 - Fax: 029 2054 7001 - www.shear-design.com - enquiries@shear-design.com

DRAWN:	CHECKED:	DATE:	SCALE:
SJM	SM	MARCH 2026	1:100 @ A1

SHEAR DESIGN REF:	DRAWING NUMBER:	REVISION:
24093	24093-SK102	P01

STATUS:

APPENDIX

G) HYDRAULIC DRAINAGE CALCULATIONS

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	999.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.080	5.00	33.900	450	31.859	70.120	1.400
1_OUT			33.900	450	34.786	67.874	1.700

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	1_OUT	3.689	0.600	32.500	32.200	0.300	12.3	150	5.02	51.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	2.888	51.0	15.0	1.250	1.550	0.080	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	3.689	12.3	150	Circular	33.900	32.500	1.250	33.900	32.200	1.550

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	1_OUT	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	31.859	70.120	33.900	1.400	450	 0	1.000	32.500	150
1_OUT	34.786	67.874	33.900	1.700	450	1 	1.000	32.200	150

Flow+ v15.0 Copyright © 1988-2025 Causeway Technologies Ltd

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.950	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.950	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	69.266	19.600
1 year 15 minute winter	48.608	19.600
1 year 30 minute summer	45.013	12.737
1 year 30 minute winter	31.588	12.737
1 year 60 minute summer	30.343	8.019
1 year 60 minute winter	20.159	8.019
1 year 120 minute summer	22.136	5.850
1 year 120 minute winter	14.707	5.850
1 year 180 minute summer	18.291	4.707
1 year 180 minute winter	11.890	4.707
1 year 240 minute summer	15.088	3.987
1 year 240 minute winter	10.024	3.987
1 year 360 minute summer	12.079	3.108
1 year 360 minute winter	7.852	3.108
1 year 480 minute summer	9.770	2.582
1 year 480 minute winter	6.491	2.582
1 year 600 minute summer	8.146	2.228
1 year 600 minute winter	5.566	2.228
1 year 720 minute summer	7.357	1.972
1 year 720 minute winter	4.945	1.972
1 year 960 minute summer	6.163	1.623
1 year 960 minute winter	4.082	1.623
1 year 1440 minute summer	4.599	1.233
1 year 1440 minute winter	3.091	1.233
1 year 2160 minute summer	3.400	0.940
1 year 2160 minute winter	2.342	0.940
1 year 2880 minute summer	2.910	0.780
1 year 2880 minute winter	1.955	0.780
1 year 4320 minute summer	2.332	0.610
1 year 4320 minute winter	1.536	0.610
1 year 5760 minute summer	2.024	0.518
1 year 5760 minute winter	1.310	0.518
1 year 7200 minute summer	1.806	0.461
1 year 7200 minute winter	1.166	0.461
1 year 8640 minute summer	1.650	0.421

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 8640 minute winter	1.065	0.421
1 year 10080 minute summer	1.535	0.392
1 year 10080 minute winter	0.991	0.392
30 year 15 minute summer	260.958	73.842
30 year 15 minute winter	183.129	73.842
30 year 30 minute summer	172.043	48.682
30 year 30 minute winter	120.732	48.682
30 year 60 minute summer	116.288	30.732
30 year 60 minute winter	77.259	30.732
30 year 120 minute summer	69.173	18.280
30 year 120 minute winter	45.957	18.280
30 year 180 minute summer	52.337	13.468
30 year 180 minute winter	34.020	13.468
30 year 240 minute summer	41.036	10.845
30 year 240 minute winter	27.263	10.845
30 year 360 minute summer	31.095	8.002
30 year 360 minute winter	20.212	8.002
30 year 480 minute summer	24.449	6.461
30 year 480 minute winter	16.244	6.461
30 year 600 minute summer	20.039	5.481
30 year 600 minute winter	13.692	5.481
30 year 720 minute summer	17.897	4.797
30 year 720 minute winter	12.028	4.797
30 year 960 minute summer	14.797	3.896
30 year 960 minute winter	9.802	3.896
30 year 1440 minute summer	10.848	2.907
30 year 1440 minute winter	7.291	2.907
30 year 2160 minute summer	7.819	2.161
30 year 2160 minute winter	5.387	2.161
30 year 2880 minute summer	6.512	1.745
30 year 2880 minute winter	4.376	1.745
30 year 4320 minute summer	4.906	1.283
30 year 4320 minute winter	3.231	1.283
30 year 5760 minute summer	4.032	1.032
30 year 5760 minute winter	2.610	1.032
30 year 7200 minute summer	3.431	0.875
30 year 7200 minute winter	2.215	0.875
30 year 8640 minute summer	3.008	0.767
30 year 8640 minute winter	1.941	0.767
30 year 10080 minute summer	2.698	0.688
30 year 10080 minute winter	1.741	0.688
100 year +40% CC 15 minute summer	462.486	130.868
100 year +40% CC 15 minute winter	324.552	130.868
100 year +40% CC 30 minute summer	308.052	87.168
100 year +40% CC 30 minute winter	216.177	87.168
100 year +40% CC 60 minute summer	209.585	55.387
100 year +40% CC 60 minute winter	139.244	55.387
100 year +40% CC 120 minute summer	122.571	32.392
100 year +40% CC 120 minute winter	81.434	32.392
100 year +40% CC 180 minute summer	92.264	23.743
100 year +40% CC 180 minute winter	59.974	23.743
100 year +40% CC 240 minute summer	72.253	19.094

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 240 minute winter	48.003	19.094
100 year +40% CC 360 minute summer	54.879	14.122
100 year +40% CC 360 minute winter	35.673	14.122
100 year +40% CC 480 minute summer	43.391	11.467
100 year +40% CC 480 minute winter	28.828	11.467
100 year +40% CC 600 minute summer	35.753	9.779
100 year +40% CC 600 minute winter	24.428	9.779
100 year +40% CC 720 minute summer	32.078	8.597
100 year +40% CC 720 minute winter	21.559	8.597
100 year +40% CC 960 minute summer	26.676	7.025
100 year +40% CC 960 minute winter	17.671	7.025
100 year +40% CC 1440 minute summer	19.645	5.265
100 year +40% CC 1440 minute winter	13.203	5.265
100 year +40% CC 2160 minute summer	14.123	3.903
100 year +40% CC 2160 minute winter	9.731	3.903
100 year +40% CC 2880 minute summer	11.698	3.135
100 year +40% CC 2880 minute winter	7.862	3.135
100 year +40% CC 4320 minute summer	8.713	2.278
100 year +40% CC 4320 minute winter	5.738	2.278
100 year +40% CC 5760 minute summer	7.083	1.813
100 year +40% CC 5760 minute winter	4.584	1.813
100 year +40% CC 7200 minute summer	5.961	1.521
100 year +40% CC 7200 minute winter	3.847	1.521
100 year +40% CC 8640 minute summer	5.169	1.319
100 year +40% CC 8640 minute winter	3.336	1.319
100 year +40% CC 10080 minute summer	4.589	1.171
100 year +40% CC 10080 minute winter	2.962	1.171

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Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	32.547	0.047	8.6	0.0074	0.0000	OK
15 minute summer	1_OUT	10	32.242	0.042	8.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1_OUT	8.6	1.987	0.168	0.0159	3.7

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Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	32.612	0.112	32.4	0.0178	0.0000	OK
15 minute summer	1_OUT	10	32.287	0.087	32.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1_OUT	32.3	2.614	0.633	0.0454	14.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	32.995	0.495	57.2	0.0787	0.0000	SURCHARGED
30 minute summer	1_OUT	17	32.352	0.152	52.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	1_OUT	56.0	3.182	1.097	0.0649	24.6

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Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	999.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.090	5.00	33.900	450	31.859	70.120	2.000
2			33.900		35.690	65.932	2.050
3			33.900	900	40.709	60.697	2.150
3_OUT			33.900	450	43.066	58.165	2.250

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	5.676	0.600	31.900	31.850	0.050	113.5	150	5.10	51.5
1.001	2	3	7.252	0.600	31.850	31.750	0.100	72.5	150	5.20	51.1
1.002	3	3_OUT	3.459	0.600	31.750	31.650	0.100	34.6	150	5.24	51.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	0.942	16.6	16.7	1.850	1.900	0.090	0.0
1.001	1.182	20.9	16.6	1.900	2.000	0.090	0.0
1.002	1.717	30.3	16.6	2.000	2.100	0.090	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	5.676	113.5	150	Circular	33.900	31.900	1.850	33.900	31.850	1.900
1.001	7.252	72.5	150	Circular	33.900	31.850	1.900	33.900	31.750	2.000
1.002	3.459	34.6	150	Circular	33.900	31.750	2.000	33.900	31.650	2.100

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	Adoptable	2		Junction	
1.001	2		Junction		3	900	Manhole	Adoptable
1.002	3	900	Manhole	Adoptable	3_OUT	450	Manhole	Adoptable

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	31.859	70.120	33.900	2.000	450	 0	1.000	31.900	150
2	35.690	65.932	33.900	2.050		1	1.000	31.850	150
						 0	1.001	31.850	150
3	40.709	60.697	33.900	2.150	900	1	1.001	31.750	150
						 0	1.002	31.750	150
3_OUT	43.066	58.165	33.900	2.250	450	1 	1.002	31.650	150

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node 3 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.600	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	5.0		
Invert Level (m)	31.750	Diameter (m)	0.043		

Node 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	31.850
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	78

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	26.2	0.0	1.500	26.2	0.0	1.501	0.0	0.0

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	69.266	19.600
1 year 15 minute winter	48.608	19.600
1 year 30 minute summer	45.013	12.737
1 year 30 minute winter	31.588	12.737
1 year 60 minute summer	30.343	8.019
1 year 60 minute winter	20.159	8.019
1 year 120 minute summer	22.136	5.850
1 year 120 minute winter	14.707	5.850
1 year 180 minute summer	18.291	4.707
1 year 180 minute winter	11.890	4.707
1 year 240 minute summer	15.088	3.987
1 year 240 minute winter	10.024	3.987
1 year 360 minute summer	12.079	3.108
1 year 360 minute winter	7.852	3.108
1 year 480 minute summer	9.770	2.582
1 year 480 minute winter	6.491	2.582
1 year 600 minute summer	8.146	2.228
1 year 600 minute winter	5.566	2.228
1 year 720 minute summer	7.357	1.972
1 year 720 minute winter	4.945	1.972
1 year 960 minute summer	6.163	1.623
1 year 960 minute winter	4.082	1.623
1 year 1440 minute summer	4.599	1.233
1 year 1440 minute winter	3.091	1.233
1 year 2160 minute summer	3.400	0.940
1 year 2160 minute winter	2.342	0.940
1 year 2880 minute summer	2.910	0.780
1 year 2880 minute winter	1.955	0.780
1 year 4320 minute summer	2.332	0.610
1 year 4320 minute winter	1.536	0.610
1 year 5760 minute summer	2.024	0.518
1 year 5760 minute winter	1.310	0.518
1 year 7200 minute summer	1.806	0.461
1 year 7200 minute winter	1.166	0.461
1 year 8640 minute summer	1.650	0.421
1 year 8640 minute winter	1.065	0.421
1 year 10080 minute summer	1.535	0.392
1 year 10080 minute winter	0.991	0.392
30 year 15 minute summer	260.958	73.842
30 year 15 minute winter	183.129	73.842
30 year 30 minute summer	172.043	48.682
30 year 30 minute winter	120.732	48.682
30 year 60 minute summer	116.288	30.732
30 year 60 minute winter	77.259	30.732
30 year 120 minute summer	69.173	18.280
30 year 120 minute winter	45.957	18.280
30 year 180 minute summer	52.337	13.468
30 year 180 minute winter	34.020	13.468
30 year 240 minute summer	41.036	10.845
30 year 240 minute winter	27.263	10.845
30 year 360 minute summer	31.095	8.002
30 year 360 minute winter	20.212	8.002

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 480 minute summer	24.449	6.461
30 year 480 minute winter	16.244	6.461
30 year 600 minute summer	20.039	5.481
30 year 600 minute winter	13.692	5.481
30 year 720 minute summer	17.897	4.797
30 year 720 minute winter	12.028	4.797
30 year 960 minute summer	14.797	3.896
30 year 960 minute winter	9.802	3.896
30 year 1440 minute summer	10.848	2.907
30 year 1440 minute winter	7.291	2.907
30 year 2160 minute summer	7.819	2.161
30 year 2160 minute winter	5.387	2.161
30 year 2880 minute summer	6.512	1.745
30 year 2880 minute winter	4.376	1.745
30 year 4320 minute summer	4.906	1.283
30 year 4320 minute winter	3.231	1.283
30 year 5760 minute summer	4.032	1.032
30 year 5760 minute winter	2.610	1.032
30 year 7200 minute summer	3.431	0.875
30 year 7200 minute winter	2.215	0.875
30 year 8640 minute summer	3.008	0.767
30 year 8640 minute winter	1.941	0.767
30 year 10080 minute summer	2.698	0.688
30 year 10080 minute winter	1.741	0.688
100 year +40% CC 15 minute summer	462.486	130.868
100 year +40% CC 15 minute winter	324.552	130.868
100 year +40% CC 30 minute summer	308.052	87.168
100 year +40% CC 30 minute winter	216.177	87.168
100 year +40% CC 60 minute summer	209.585	55.387
100 year +40% CC 60 minute winter	139.244	55.387
100 year +40% CC 120 minute summer	122.571	32.392
100 year +40% CC 120 minute winter	81.434	32.392
100 year +40% CC 180 minute summer	92.264	23.743
100 year +40% CC 180 minute winter	59.974	23.743
100 year +40% CC 240 minute summer	72.253	19.094
100 year +40% CC 240 minute winter	48.003	19.094
100 year +40% CC 360 minute summer	54.879	14.122
100 year +40% CC 360 minute winter	35.673	14.122
100 year +40% CC 480 minute summer	43.391	11.467
100 year +40% CC 480 minute winter	28.828	11.467
100 year +40% CC 600 minute summer	35.753	9.779
100 year +40% CC 600 minute winter	24.428	9.779
100 year +40% CC 720 minute summer	32.078	8.597
100 year +40% CC 720 minute winter	21.559	8.597
100 year +40% CC 960 minute summer	26.676	7.025
100 year +40% CC 960 minute winter	17.671	7.025
100 year +40% CC 1440 minute summer	19.645	5.265
100 year +40% CC 1440 minute winter	13.203	5.265
100 year +40% CC 2160 minute summer	14.123	3.903
100 year +40% CC 2160 minute winter	9.731	3.903
100 year +40% CC 2880 minute summer	11.698	3.135
100 year +40% CC 2880 minute winter	7.862	3.135

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 4320 minute summer	8.713	2.278
100 year +40% CC 4320 minute winter	5.738	2.278
100 year +40% CC 5760 minute summer	7.083	1.813
100 year +40% CC 5760 minute winter	4.584	1.813
100 year +40% CC 7200 minute summer	5.961	1.521
100 year +40% CC 7200 minute winter	3.847	1.521
100 year +40% CC 8640 minute summer	5.169	1.319
100 year +40% CC 8640 minute winter	3.336	1.319
100 year +40% CC 10080 minute summer	4.589	1.171
100 year +40% CC 10080 minute winter	2.962	1.171

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Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	1	78	32.007	0.107	5.3	0.0170	0.0000	OK
120 minute summer	2	78	32.006	0.156	6.5	3.8922	0.0000	SURCHARGED
120 minute summer	3	78	32.005	0.255	4.2	0.1624	0.0000	SURCHARGED
120 minute summer	3_OUT	78	31.675	0.025	1.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	1	1.000	2	5.3	0.800	0.316	0.0880	
120 minute summer	2	1.001	3	4.2	0.360	0.203	0.1277	
120 minute summer	3	1.002	3_OUT	1.8	0.910	0.061	0.0070	10.5

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Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	53	32.575	0.675	18.9	0.1073	0.0000	SURCHARGED
60 minute winter	2	54	32.572	0.722	18.3	17.9688	0.0000	SURCHARGED
60 minute winter	3	54	32.569	0.819	4.8	0.5206	0.0000	SURCHARGED
60 minute winter	3_OUT	54	31.684	0.034	3.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	1	1.000	2	18.3	1.189	1.099	0.0999	
60 minute winter	2	1.001	3	4.8	0.453	0.232	0.1277	
60 minute winter	3	1.002	3_OUT	3.4	1.072	0.112	0.0110	27.6

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	1	19	33.426	1.526	62.1	0.2427	0.0000	SURCHARGED
60 minute winter	2	59	33.284	1.434	32.9	35.6983	0.0000	SURCHARGED
60 minute winter	3	59	33.278	1.528	5.0	0.9717	0.0000	SURCHARGED
60 minute winter	3_OUT	59	31.690	0.040	4.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	1	1.000	2	59.7	3.390	3.585	0.0999	
60 minute winter	2	1.001	3	5.0	0.494	0.241	0.1277	
60 minute winter	3	1.002	3_OUT	4.7	1.163	0.155	0.0140	49.6

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Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

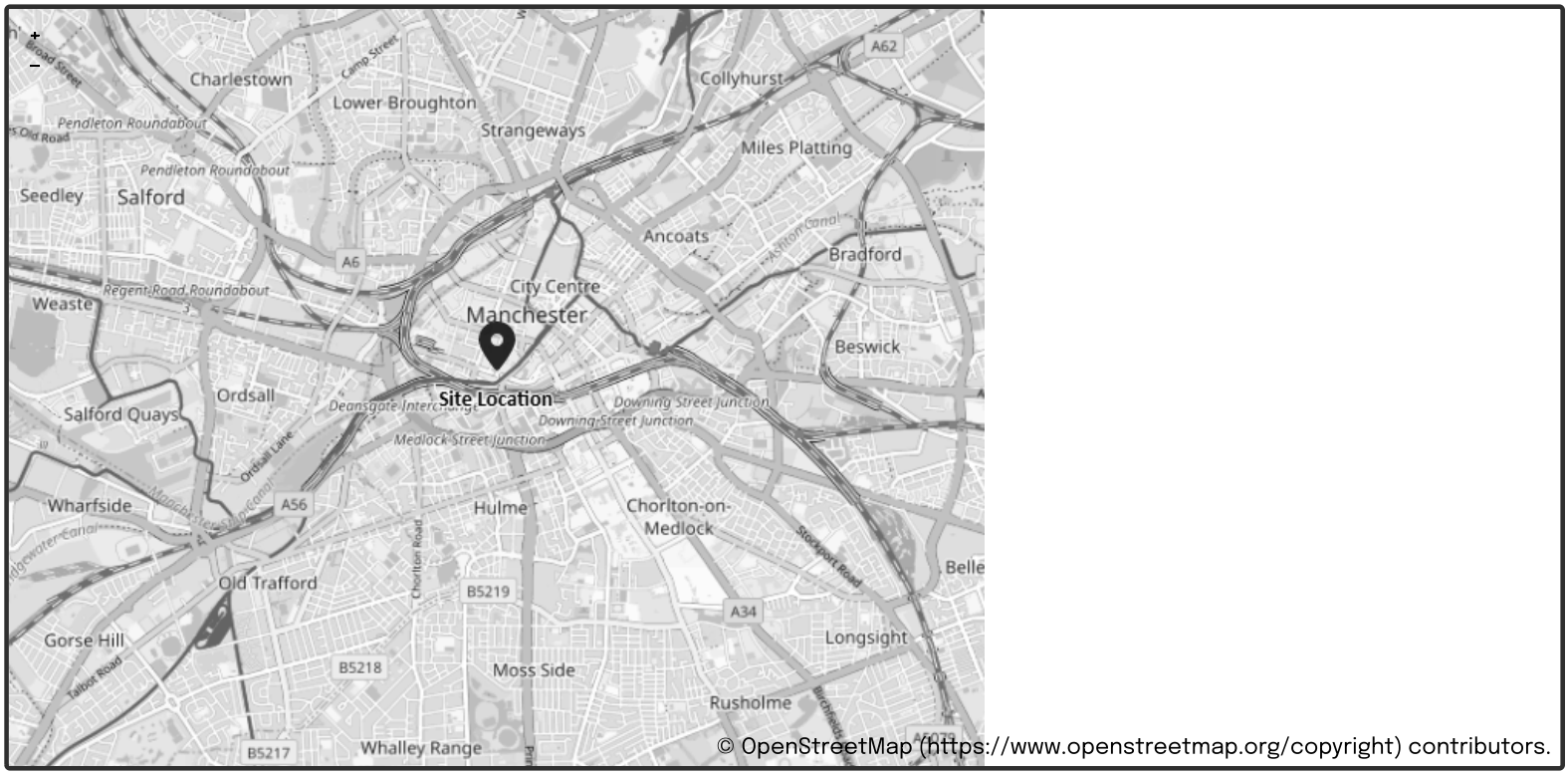
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	29/09/2025
Calculated by	Edward Law
Reference	24093
Model version	2.1.2

Location

Site name	Whitworth Street
Site location	Manchester



Site easting (British National Grid)	383587
Site northing (British National Grid)	397517

Site details

Total site area (ha)	.08 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	879 mm		879
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	0.5 l/s		

Growth curve factors

	My value		Map value
Hydrological region	10		10
1 year growth factor	0.87		
2 year growth factor	0.93		
10 year growth factor	1.38		
30 year growth factor	1.7		
100 year growth factor	2.08		
200 year growth factor	2.37		

Results

Method	IH124	
Flow rate 1 year (l/s)	0.4	l/s
Flow rate 2 year (l/s)	0.5	l/s
Flow rate 10 years (l/s)	0.7	l/s
Flow rate 30 years (l/s)	0.9	l/s
Flow rate 100 years (l/s)	1.0	l/s
Flow rate 200 years (l/s)	1.2	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.1.2) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX

H) FOUL DRAINAGE CALCULATIONS

SHEAR design
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Project Title: Whitworth Street West, Manchester			**Project No:** 24093
Element Title: Flows and Loads Calculation			**Sheet No:** 1 of 1
Des'd by: EL	**Date:** 28/10/2025	**Chk'd by:** EL	**Date:** 28/10/2025

COMMENTS:

Foul Drainage

The anticipated residential foul water flows from the proposed development can be estimated using the *British Water Code of Practice, Flows and Loads – 4.*

The proposed development is a student accommodation block with approximately 874 units, precise numbers to be confirmed following detailed design.
(For calculation purposes this has been rounded up to 900, to account for visitors/ building staff).

Flows and Loads Criteria:

- Occupants: 900
- Peak flow per person per day: 120 Litres
- Dry Weather Flow: Factor of 6
- Infiltration: 10%

Therefore, peak foul flow for the site is:

$$Q_{\text{Foul}} = \frac{900 \times 120 \times 6 \times 1.1}{86{,}400} = 8.25\ L/s$$

Therefore, with rounding up, the peak foul flow from the proposed site will be:

$$\text{Q}_{\text{Foul}} = \ 8.5\ \text{L/s}$$