

Flood Risk Assessment
for
Ferrous
at
Chapeltown Street, Manchester

Undertaken on behalf of
Capital & Centric

Report Title:	Ferrous, Chapeltown Street, Manchester – Flood Risk Assessment
Report Reference:	9861/FRA/02
Client:	Capital & Centric
Issue Date:	February 2022
Drafted By:	Kevin Tyldesley
Authorised By:	Anna Wildman

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Executive Summary

Background	WML Consulting have been commissioned by Capital & Centric to provide a Flood Risk Assessment to accompany a forthcoming planning application in respect of a proposed development at Chapeltown Street, Manchester. The proposed development is to be known as Ferrous. The proposed development involves the erection of a 15 storey building comprising 107 apartments (use Class C3), residential amenity facilities including a roof terrace, two ground floor commercial units (use Class E / Sui Generis), multipurpose event pavilion (use Class E / Sui Generis) and associated landscaping.
Flood risk	The Environment Agency (EA), Manchester City Council (MCC), and United Utilities (UU) have been asked to confirm if they have any information regarding past, present or future flooding issues that may affect the site. The responses from the EA and UU have confirmed that they have no records of flooding affecting the site. The response from MCC is still awaited, if it is received during the planning determination period, and if it contains any significant flood risk issues that may affect the proposed development, then this report will be updated to suit and re-submitted to the planning authority. The river and coastal (fluvial) flood mapping provided by the EA indicates that the site is located within flood zone 1, i.e. very low risk. The NPPF confirms that all forms of development are appropriate in flood zone 1. The site is also considered to be at low risk of flooding from surface water, sewers, reservoirs, ground water and other sources. Hence the overall flood risk associated with the proposed development is considered to be low.
Drainage proposals	The proposed drainage system will need to be designed in accordance with BS EN 752-4 and the Building Regulations Approved Document H (2010), which indicates the following hierarchy: discharge via infiltration first, discharge to watercourse second, and lastly discharge to sewer. However the ground conditions at are not be suited to the use of infiltration, and as there are no existing watercourses near the site it will be necessary to discharge the surface water runoff to the public drainage system. The existing site is considered to be "greenfield" in terms of surface water runoff. Hence the generally accepted practical minimum discharge rate of 5 l / sec shall be utilised in the design. This allowable discharge rate should not be exceeded for all storm events up to and including the critical 1 in 100 year event including a 40% climate change allowance. The new surface water drainage system will be designed so that there is no surcharging of sewers for the critical 1 in 1 year storm event, no surface flooding for the critical 1 in 30 year event and no surface flooding that may

affect buildings on or off site for the critical 1 in 100 year event including a 40% climate change allowance.

It is intended that the foul drainage from the development will discharge to the nearby existing public sewerage system.

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1.0 INTRODUCTION

Appointment

- 1.1 WML Consulting have been commissioned by Capital & Centric to provide a Flood Risk Assessment (FRA) to accompany a forthcoming planning application in respect of a proposed development at Chapeltown Street, Manchester. The proposed development is to be known as Ferrous.

Objective

- 1.2 This report comprises an FRA, as required by the National Planning Policy Framework (NPPF). It has been carried out in accordance with BS 8533:2011 – Assessing and Managing Flood Risk in Development.
- 1.3 The NPPF identifies that it is the responsibility of developers to demonstrate:
- whether the development would be affected by current or future flooding from any source
 - that the development is safe and where possible reduces flood risk overall
 - whether flood risk would be increased elsewhere
 - mitigation measures for any identified flooding risks
 - that the site can be developed and occupied safely
- 1.4 The FRA identifies whether there are any flooding or surface water management issues related to the development site that may warrant further consideration.

Site Location and Description

- 1.5 The development is proposed on Chapeltown Street, Manchester, M1 2EY. Whilst the site is currently a grassed area, it is noted that the site has been developed in the past.
- 1.6 The site is bounded on its northern side by Chapeltown Street, on its western side by an apartment block, on its southern side by Metrolink lines and to its northern boundary is a small scale engineering facility associated with the Metrolink lines.
- 1.7 The site is relatively level, with a slight slope from east (47m AOD) to west (46m AOD).

Development Proposals

- 1.8 The proposed development involves the erection of a 15 storey building comprising 107 apartments (use Class C3), residential amenity facilities including a roof terrace, two ground floor commercial units (use Class E / Sui Generis), multipurpose event pavilion (use Class E / Sui Generis) and associated landscaping. A plan indicating the development proposals can be found at Appendix 01.
- 1.9 The proposed building will not have a basement or any below ground level habitable rooms.
- 1.10 Vehicular and pedestrian access to the proposed development will be directly from Chapeltown Street.

2.0 ASSESSMENT OF FLOOD RISK

Correspondence

- 2.1** The Environment Agency (EA), Manchester City Council (MCC), and United Utilities (UU) have been asked to confirm if they have any information regarding past, present or future flooding issues that may affect the site.
- 2.2** The response from the EA, which can be found at Appendix 02, confirms that they have no records of flooding affecting the site.
- 2.3** The response from MCC is still awaited, if it is received during the planning determination period, and if it contains any significant flood risk issues that may affect the proposed development, then the report will be updated to suit and re-submitted to the planning authority.
- 2.4** The response from UU, which can be found in Appendix 04, confirms that they are not aware of any flooding issues in the vicinity of the site.
- 2.5** An extract from the UU public sewer records can be found at Appendix 05.

Potential Sources of Flooding

- 2.6 River and coastal (fluvial) flooding** - the fluvial flood mapping provided by the EA indicates that the site is located within flood zone 1 (very low risk), meaning that each year this area has a chance of flooding of less than 0.1%. The NPPF confirms that all forms of development are appropriate in flood zone 1. Hence it is considered that the risk to the development from this form of flooding is low.
- 2.7 Surface water (pluvial) flooding** – the online mapping indicates that the site is at very low risk of pluvial flooding, this means that each year this area has a chance of flooding of less than 0.1%. Given this it is considered that the risk to the development from this form of flooding is low.
- 2.8 Sewer flooding** – UU have not reported any sewer flooding incidents within, or in close proximity to the site. On this basis, it is considered that the risk to the development from this form of flooding is low.
- 2.9 Groundwater flooding** – the ground conditions at the site are summarised as cohesive glacial till to unknown depths but indicated in the wider area to extend to depths of between 8.4m and 11.0m. Relatively impermeable ground conditions such as this are likely to restrict the risk of groundwater flooding. On this basis it is considered that the risk to the development from this form of flooding is low.
- 2.10 Reservoir flooding** – the online reservoir flood mapping indicates that the site is well outside the potential envelope of any anticipated reservoir flooding. Hence it is considered that the risk to the development from this form of flooding is low.
- 2.11 Flooding from other sources** – with the exception of the nearby canal network, where the water level is managed by the canal owners, there does not appear to be any other significant bodies of water in the vicinity of the site. On this basis, it is considered that the risk to the development from this form of flooding is low.
- 2.12** Hence the overall flood risk associated with the proposed development is considered to be low.

3.0 DRAINAGE PROPOSALS

- 3.1** The surface water drainage proposals for the development should incorporate the principles of the NPPF and the SUDS manual.
- 3.2** The site is currently not developed and as such is considered to be a green field site.
- 3.3** The proposed drainage system will need to be designed in accordance with BS EN 752-4 and the Building Regulations Approved Document H (2010), which indicates the following hierarchy for the disposal of surface water drainage from new development sites:
1. discharge via infiltration
 2. discharge to watercourse
 3. discharge to sewer
- 3.4** These options are discussed in further detail below.
- 3.5** **Surface water discharge via infiltration** - the ground conditions at the site are summarised as cohesive glacial till to unknown depths but indicated in the wider area to extend to depths of between 8.4m and 11.0m. Relatively impermeable ground conditions such as these are generally considered to not be suited to the use of infiltration.
- 3.6** **Surface water discharge via watercourse** – as there are no existing watercourses within or in close proximity to the site it is not considered feasible to discharge the surface water runoff in this manner.
- 3.7** **Surface water discharge via the public sewerage system** – given the above it is proposed to drain the proposed development to the public sewerage system.
- 3.8** A plan indicating the development's drainage proposals can be found at Appendix 06.
- 3.9** The existing site is considered to be "greenfield" in terms of surface water runoff. Hence the generally accepted practical minimum discharge rate of 5 l / sec shall be utilised in the design.
- 3.10** This allowable discharge rate should not be exceeded for all storm events up to and including the critical 1 in 100 year event including a 40% climate change allowance.
- 3.11** To ensure that the allowable discharge rate is not exceeded, a hydro-brake flow control device will be employed at the downstream end of the proposed drainage system, with attenuation storage provided in a below ground geo-cellular tank.
- 3.12** To help the proposed development not exceed the maximum discharge rate referred to above, it is to include planting and soft landscaped areas both at roof level and at ground floor level externally.
- 3.13** All new surface water drainage systems will be designed to meet the following criteria:-
- No surcharging of sewers for the critical 1 in 1 year storm event.
 - No surface flooding for the critical 1 in 30 year event.
 - No surface flooding that may affect buildings on or off site for the critical 1 in 100 year event including a 40% climate change allowance.
- 3.14** **Foul drainage proposals** - it is intended that the foul drainage from the development will discharge to the nearby existing public sewerage system.

APPENDIX 01

Proposed development layout plan



0001 Ground Level
01 1:200

KEY

- | | | | |
|--|---|--|--|
| | Planning application boundary | | Proposed mixed ornamental planting at ground level (Refer to Planting Strategy) |
| | Proposed high quality block paving | | Proposed Hedge (Refer to Planting Strategy) |
| | Proposed grass paving system | | Proposed Lawn (Refer to Planting Strategy) |
| | Proposed fixed seating | | Proposed Tree (Refer to Planting Strategy) |
| | Proposed area for flexible seating and tables | | 1.8m high fence
Vertical timber slats with 50-75mm gap between. Steel frame to fence panels. Subject to detailed design |
| | Proposed spot level | | Cycle parking and shelter
Sheffield style cycle stands situated within bespoke timber and steel shelter structure
Subject to detailed design |
| | Existing retained spot level | | |



0001 Level 14
02 1:200

KEY

- | | | | |
|--|---|--|---|
| | Planning application boundary | | Proposed artificial lawn |
| | Proposed high quality flag paving | | Proposed mixed ornamental planting in raised planter (Refer to Planting Strategy) |
| | Proposed fixed seating integrated into planters | | Proposed Tree (Refer to Planting Strategy) |
| | Proposed area for flexible seating and tables | | |
| | Proposed ballustrade | | |

- Notes
- All dimensions in mm, unless otherwise stated.
 - Scaling from drawing if printed incorrectly may lead to errors.
 - All information outside red line boundary shown for contextual purpose only.
 - This drawing is to be read in conjunction with the following re-form landscape architecture documentation:
 - 0883-RFM-XX-ZZ-DR-L-0002-Planting Strategy
 - Landscape Chapter of Design and Access Statement
 - AND all relevant documentation from the design team
 - Levels information on this drawing illustrates the design intent. The contractor is to check and verify all levels and dimensions against site survey information.
 - Any discrepancies in the design information are to be brought to the attention of re-form landscape architecture, in writing, prior to commencement of construction works.
 - Refer to other consultants' drawings and specifications for the following design information:
 - Foundation details
 - Base course and/or sub bases design & specification
 - Waterproofing of any element
 - Levels & Drainage design and infrastructure
 - Lighting and ducting
 - Existing & proposed utilities



04.02.22 Layout updates to interface with Metrolink. Cycle shelter added

Date	Description of revision	Drawn	Checked	Approved	Revision
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re-form
landscape architecture

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Project
FERROUS, MANCHESTER
RF21-883

Client
CAPITAL & CENTRIC

Document title
ILLUSTRATIVE LANDSCAPE GENERAL ARRANGEMENT

Paper size A1	Scale 1:200
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Status FOR INFORMATION	Revision S2
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Drawing number 0833-RFM-XX-ZZ-DR-L-0001	Revision P05
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© re-form landscape architecture

APPENDIX 02

Environment Agency Correspondence

Kevin Tyldesley

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: 29 October 2021 10:55
To: Kevin Tyldesley
Subject: GMMC238449AB Response attached from the Environment Agency [Filed 29 Oct 2021 10:56]
Attachments: 9861 SITE LOCATION PLAN.PDF; GMMC238449AB - DFM.PDF; GMMC238449AB - Table.pdf

Dear Kevin,

Re: 9861 - Phoenix 2 - Chapletown Street, Manchester, M1 2EY

Thank you for your enquiry which was received on 25/10/21.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

I enclose the data requested.

Please be aware you can check your risk of flooding on our external website <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

Here are some useful links below:

<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

Anne Ball
Customer and Engagement Officer
Greater Manchester, Merseyside and Cheshire
Email: Inforequests.gmmc@environment-agency.gov.uk

From: Kevin Tyldesley [<mailto:Kevin.Tyldesley@wmlconsulting.com>]
Sent: 25 October 2021 13:24
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 211026/SRi09 9861 - Phoenix 2 - Chapletown Street, Manchester, M1 2EY - Proposed Residential Development

Hi

We have been asked to prepare a Flood Risk Assessment for a forthcoming planning application in respect of a proposed residential development at the above site, as shown edged red on the attached location plan.

Can you please advise if you are aware of any flood risk issues that may affect the site ?

Kind regards.

Kevin Tyldesley

WML Consulting Ltd

Civil, Structural & Geotechnical Engineers

No. 8 Oak Green | Earl Road | Stanley Green Business Park | Cheadle Hulme | Cheshire | SK8 6QL

Tel: 0161 482 0600 | email: kevin.tyldesley@wmlconsulting.com

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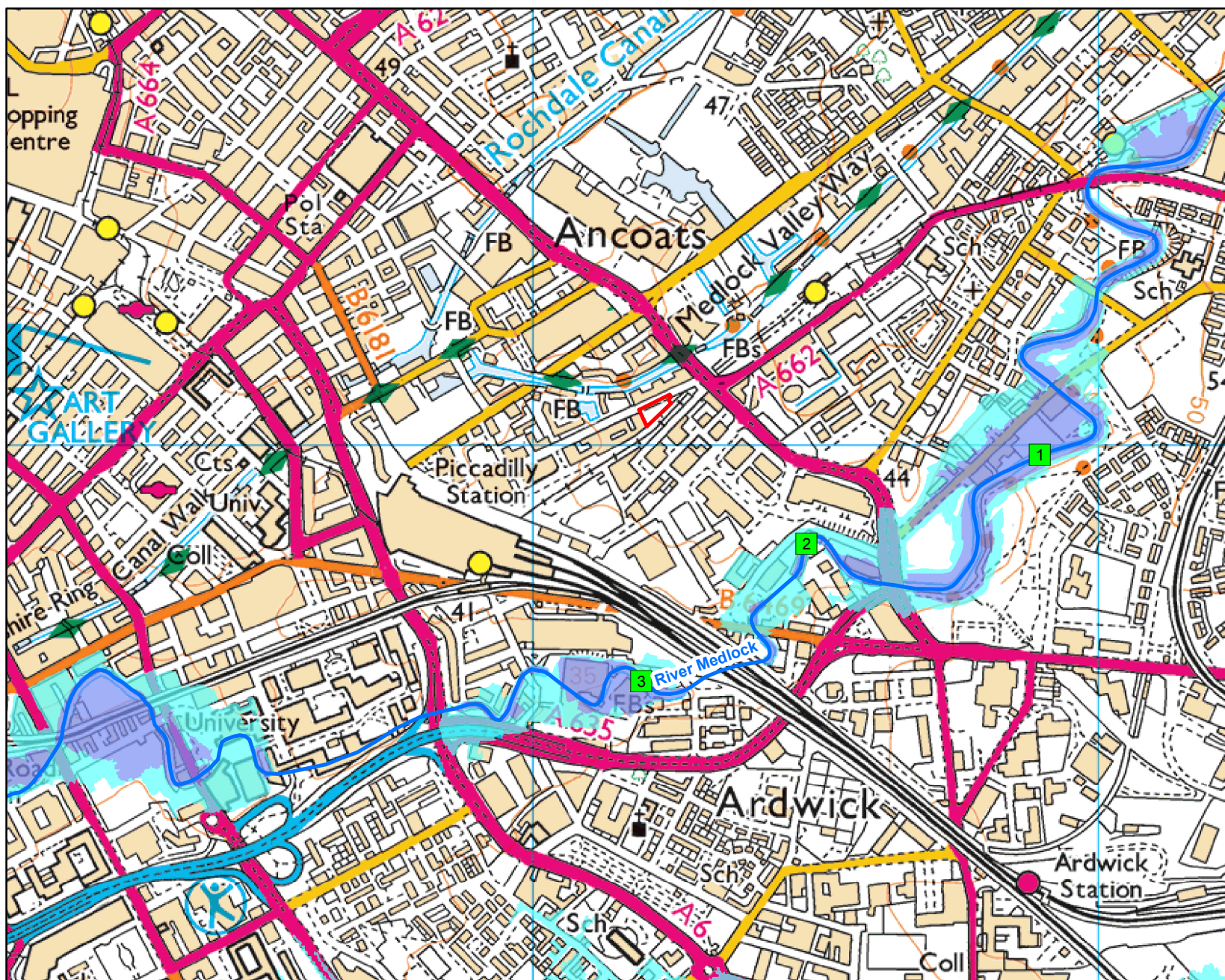


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Detailed Flood Map centred on Chapletown Street, Manchester, M1 2EY. Created on 27/10/2021 [GMMC238449AB]



1:10,001



Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

					Undefended				
Map Reference	Model Node Reference	Easting	Northing	Data	4 % AEP (1 in 25 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 35% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.1 % AEP (1 in 1000 year)
1	MEDL01_3709B	385927	397961	Modelled Water Level (m aodN)	37.35	38.12	39.45	40.37	40.66
				Modelled Flow (cumecs)	51.05	59.76	65.39	67.15	67.43
2	MEDL01_3093	385487	397825	Modelled Water Level (m aodN)	36.66	37.43	38.85	40.13	40.44
				Modelled Flow (cumecs)	50.01	59.51	74.42	87.43	92.42
3	MEDL01_2561	385194	397582	Modelled Water Level (m aodN)	34.51	34.84	35.53	36.08	36.36
				Modelled Flow (cumecs)	50.43	59.04	65.98	72.99	73.66

Model data taken from Medlock SFRA 2011 Study

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes: Climate Change Scenario - 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.

APPENDIX 03

Manchester City Council Correspondence

APPENDIX 04

United Utilities Correspondence

Kevin Tyldesley

From: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Sent: 27 October 2021 10:30
To: Kevin Tyldesley
Subject: 9861 - Phoenix 2 - Chapletown Street, Manchester, M1 2EY - Proposed Residential Development - UU Ref. 4200044646

Good Morning Kevin,

Thank you for contacting United Utilities.

I can confirm that we have no current record of sewer flooding within the vicinity of the proposed development.

Please note that United Utilities Water Limited (UUV) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the register.

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 UUV has no control and not a facet of sewer capacity; or
- any historical sewer flooding events that have been removed from the register as a result of investment in our infrastructure.

As with all development sites, we recommend you liaise with our water and wastewater engineers by contacting our Developer Services team so the details of your development proposal can be considered further. Details can be found at the following link.

<https://www.unitedutilities.com/services/builders-developers/>

I hope this helps.

Kind regards



Louise Dack
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 01925 233063 (33063 internal)
[unitedutilities.com](https://www.unitedutilities.com)

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry

<https://www.unitedutilities.com/builders-developers/> or you can email us at WastewaterDeveloperServices@uuplc.co.uk

From: Kevin Tyldesley [mailto:Kevin.Tyldesley@wmlconsulting.com]
Sent: 25 October 2021 13:26
To: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: 9861 - Phoenix 2 - Chapletown Street, Manchester, M1 2EY - Proposed Residential Development

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Hi

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Can you please advise if you are aware of any flood risk issues that may affect the site ?

Kind regards.

Kevin Tyldesley

WML Consulting Ltd

Civil, Structural & Geotechnical Engineers

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Tel: 0161 482 0600 | email: kevin.tyldesley@wmlconsulting.com

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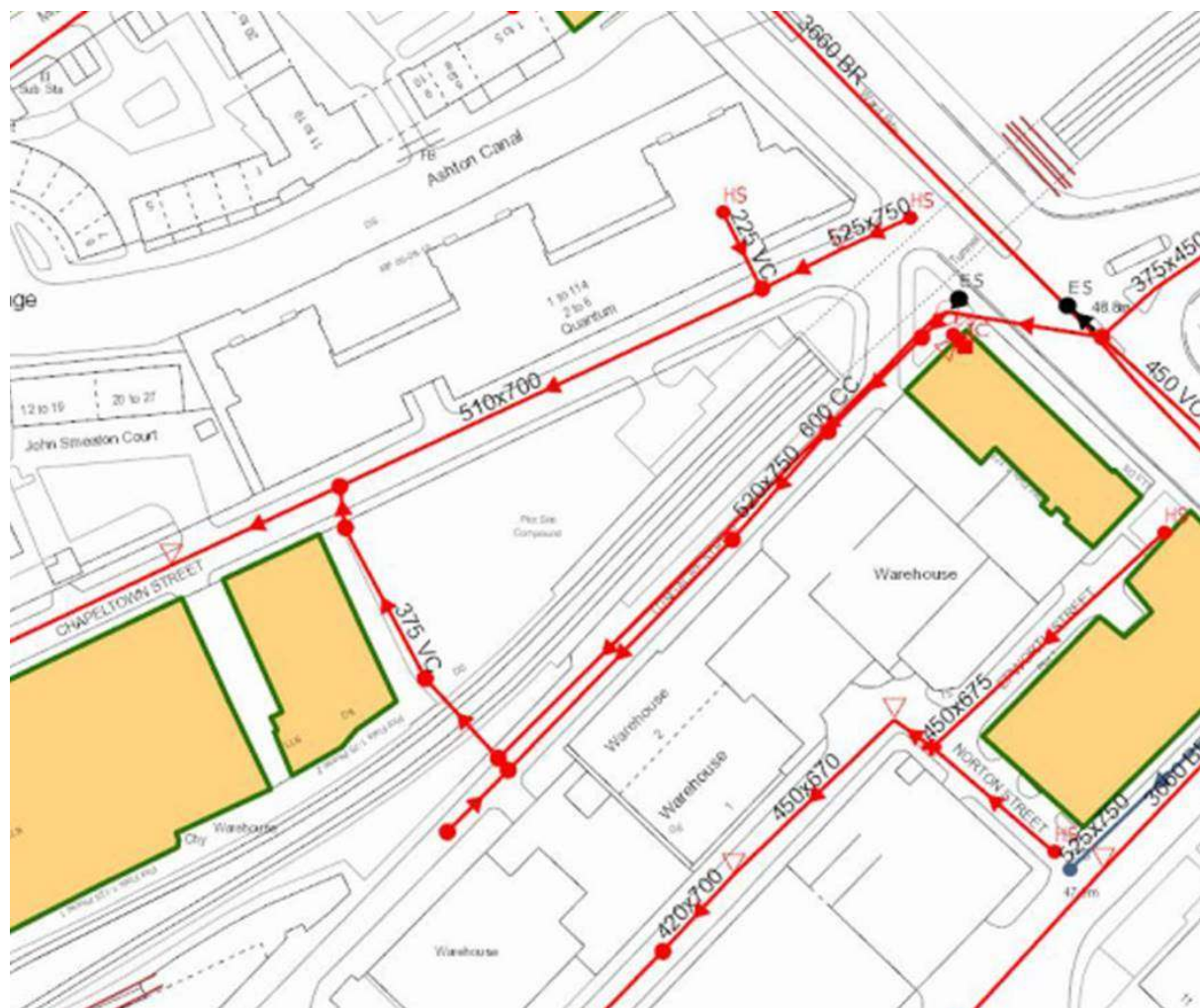
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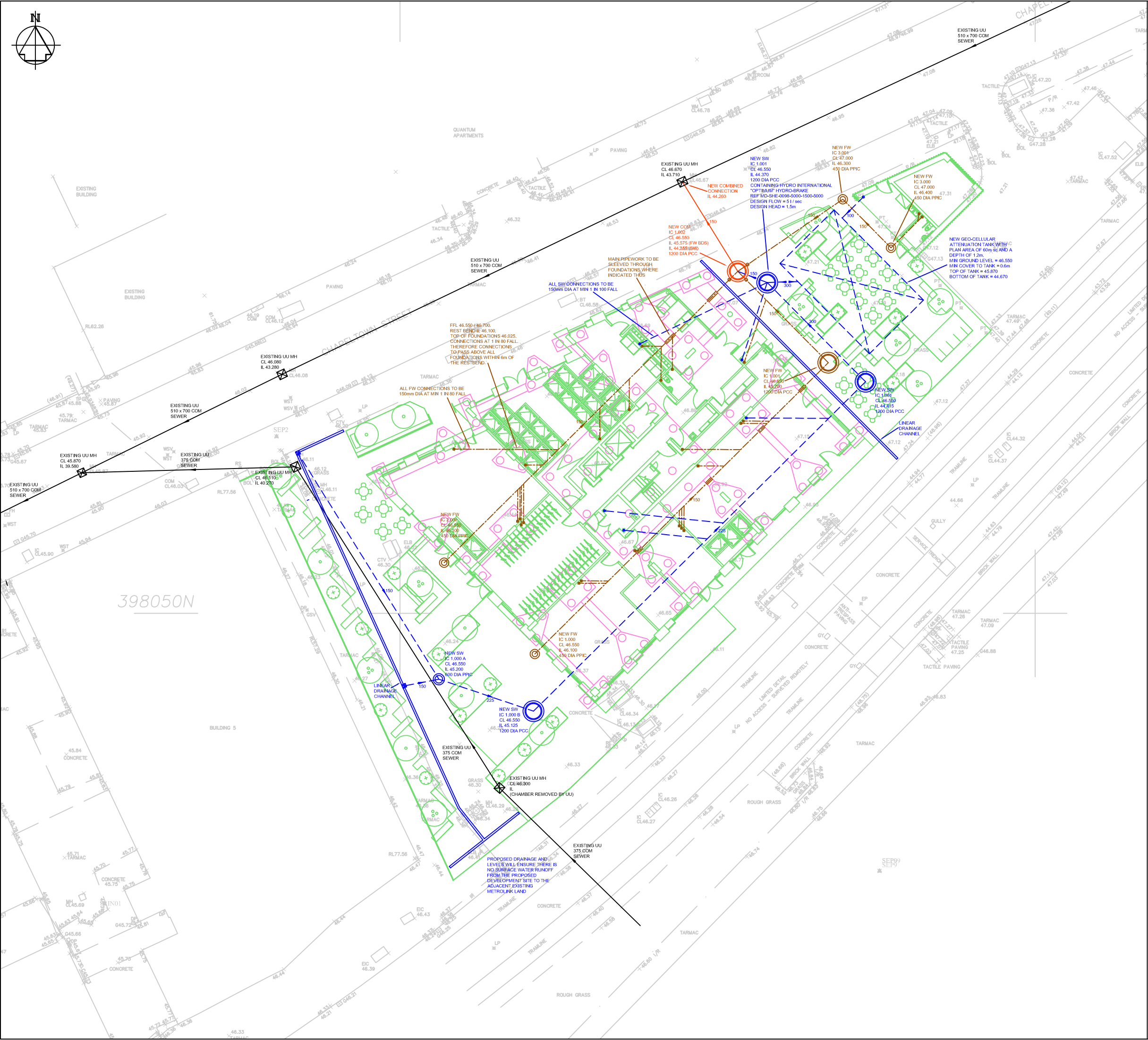
APPENDIX 05

United Utilities existing sewer record extract



APPENDIX 06

Proposed drainage layout drawing



APPENDIX 07

Proposed surface water drainage calculations

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8	9861 - FERROUS SURFACE WATER DRAINAGE DESIGN - REV 01	
Date OCT 2021 File 9861 - SW - 01.MDX	Designed by KPT Checked by AW	

Innovyze

Network 2014.1.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	Add Flow / Climate Change (%)	0
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.360	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	250	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.125	4-8	0.045

Total Area Contributing (ha) = 0.170

Total Pipe Volume (m³) = 2.390

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	37.000	0.635	58.3	0.140	5.00	0.0	0.600	o	225	
1.001	10.000	0.045	222.2	0.030	0.00	0.0	0.600	o	300	
1.002	3.000	0.015	200.0	0.000	0.00	0.0	0.600	o	300	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	134.25	5.36	45.125	0.140	0.0	0.0	0.0	1.72	68.3	50.9
1.001	132.80	5.52	44.415	0.170	0.0	0.0	0.0	1.05	74.3	61.1
1.002	132.40	5.56	44.370	0.170	0.0	0.0	0.0	1.11	78.3	61.1

WML Consulting Ltd		Page 2
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8	9861 - FERROUS SURFACE WATER DRAINAGE DESIGN - REV 01	
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Innovyze Network 2014.1.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN Invert Level (m)	Diameter (mm)	Pipes In PN Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	46.550	1.425	Open Manhole	1200	1.000	45.125	225		
2	46.550	2.135	Open Manhole	1200	1.001	44.415	300	1.000	44.490 225
3	46.550	2.180	Open Manhole	1200	1.002	44.370	300	1.001	44.370 300
	46.550	2.195	Open Manhole	0		OUTFALL	1.002	44.355	300

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No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8	9861 - FERROUS SURFACE WATER DRAINAGE DESIGN - REV 01	
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Innovyze	Network 2014.1.1	

Online Controls for Storm

Hydro-Brake Optimum® Manhole: 3, DS/PN: 1.002, Volume (m³): 3.1

Unit Reference MD-SHE-0098-5000-1500-5000

Design Head (m) 1.500

Design Flow (l/s) 5.0

Flush-Flo™ User Defined

Objective Minimise upstream storage

Diameter (mm) 98

Invert Level (m) 44.370

Minimum Outlet Pipe Diameter (mm) 150

Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	5.0	Kick-Flo®	0.878	3.9
Flush-Flo™	0.431	4.9	Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.2	1.200	4.5	3.000	6.9	7.000	10.3
0.200	4.4	1.400	4.8	3.500	7.4	7.500	10.7
0.300	4.8	1.600	5.1	4.000	7.9	8.000	11.0
0.400	4.9	1.800	5.4	4.500	8.4	8.500	11.3
0.500	4.9	2.000	5.7	5.000	8.8	9.000	11.6
0.600	4.8	2.200	6.0	5.500	9.2	9.500	11.9
0.800	4.3	2.400	6.2	6.000	9.6		
1.000	4.1	2.600	6.5	6.500	10.0		

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<u>Storage Structures for Storm</u> <u>Tank or Pond Manhole: 3, DS/PN: 1.002</u> Invert Level (m) 44.670 <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>60.0</td> <td>1.200</td> <td>60.0</td> <td>1.201</td> <td>0.0</td> </tr> </tbody> </table>			Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	0.000	60.0	1.200	60.0	1.201	0.0
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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																																												
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Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000 Hot Start Level (mm) 0 Inlet Coefficient 0.800 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000 Foul Sewage per hectare (l/s) 0.000																																												
Number of Input Hydrographs 0 Number of Storage Structures 1 Number of Online Controls 1 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0																																												
<u>Synthetic Rainfall Details</u>																																												
Rainfall Model FSR Ratio R 0.360 Region England and Wales Cv (Summer) 0.750 M5-60 (mm) 18.000 Cv (Winter) 0.840																																												
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON																																												
<u>Profile(s)</u>																																												
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080 Return Period(s) (years) 1, 30, 100 Climate Change (%) 0, 0, 40																																												
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