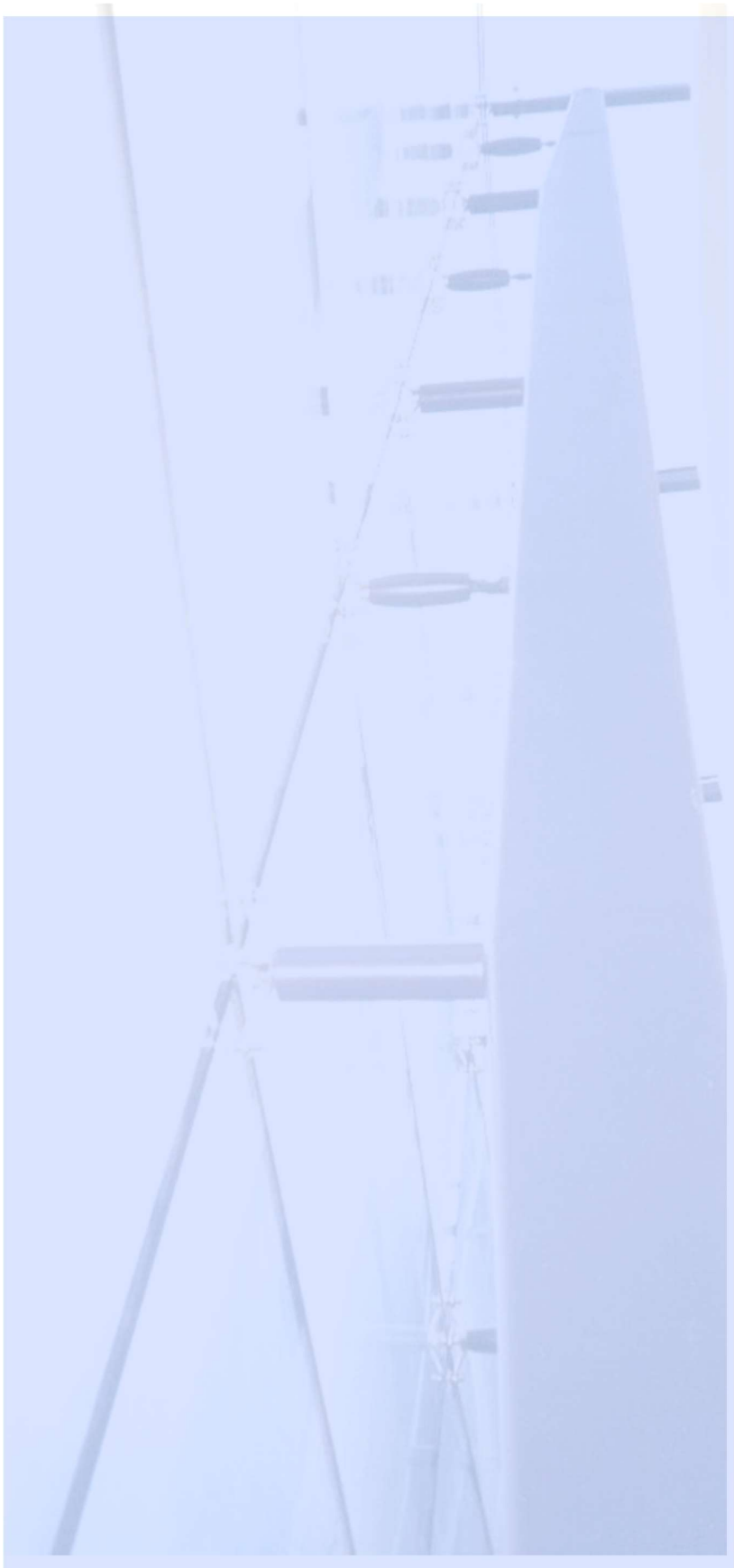




(dp)²

1983

**Student Accommodation
Charles Street**

Manchester

Drainage strategy

**1983-CS-DP2-A180-RP-XX-9040
Rev P01**

DP Squared Ltd

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Drainage Strategy
Student Accommodation
Charles Street, Manchester

For

Jadebricks (Charles Street Ltd)

January 2024

Ref: 1983-CS-DP2-A180-RP-XX-9040

Report prepared by E Strouts
MEng CEng MIStructE PG Dip Law



Report checked and approved by D Paine
BEng CEng MICE



Rev	Date	By	Comment
P01	18 Jan 2024	ES	Preliminary issue

This report has been prepared for the sole use of Jadebricks (Charles Street Ltd). This report should not be passed to or relied upon by any Third Party without the express written permission of DP Squared.

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1. Introduction

1.1. General

This Drainage Strategy has been prepared by DP Squared on behalf of Jadebricks (Charles Street Ltd) for the development of the site located on Charles Street/York Street in Manchester City Centre.

For a description of the buildings and its location please refer to the DP2 Stage 2 report **1983-CS-DP2-A180-RP-XX-9002**.



Figure 1 - Plan of the existing site

This study has been undertaken with the following objectives:

- Identify how the surface water and foul drainage is currently managed.
- Obtain records of existing drainage infrastructure
- Explore what sustainable drainage options are available
- Provide background evidence and modelling of the proposed drainage strategy

1.2. Consultations

1.2.1. United Utilities

We have contacted United Utilities and obtained asset maps indicating the public sewerage local to the site.

United Utilities Sewer Records show the following infrastructure within the vicinity of the site.

- 150mm public surface water sewer located within York Street
- 225mm public combined sewer located within York Street
- 300mm public combined sewer located within Charles Street

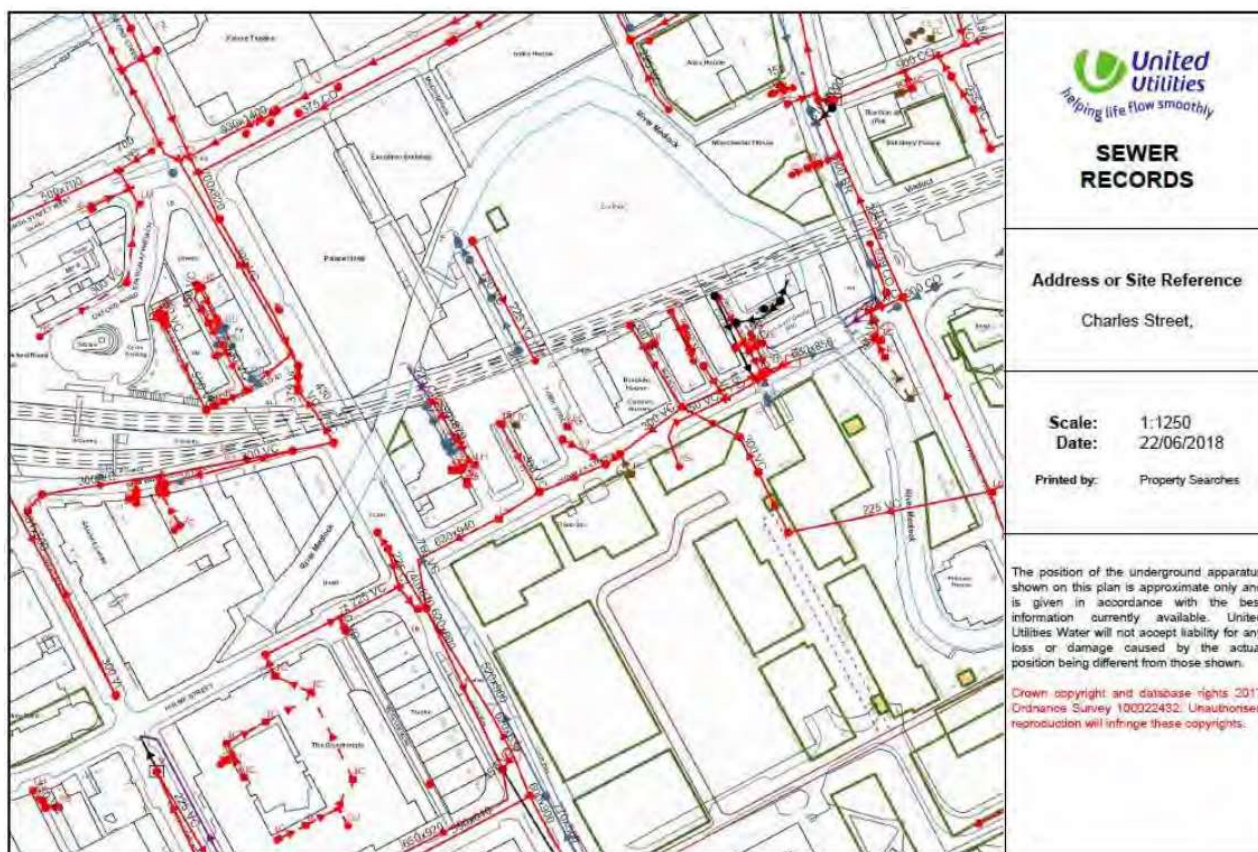


Figure 2 - UU information

A full copy of the UU information is shown in Appendix A.

1.2.2. The Environment Agency

We have not directly consulted with the Environment Agency in the production of this report; however, we have referred to the surface and river flood data / maps contained on their website for the postcode M1 7BD.

- Risk of flooding from rivers/sea – High Risk
- Risk of flooding from surface water – Very Low Risk

The EA recommends a flood risk assessment is carried out if the site has any of the following criteria provided below:

Criteria	Response	Reason for response
In flood zone 2, 3 and 3b	Yes	Refer to FRA Ref: 1983-CS-DP2-A180-RP-XX-9041 .
In flood zone 1 and bigger than 1 hectare (ha)	No	
In an area with critical drainage problems as notified by the Environment Agency	Yes	In CDA as noted in Manchester City council SFRA
Identified as being at increased flood risk in future by the local authority's strategic flood risk assessment	No	
At risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)	Yes	Surface water: Very Low risk

With respect to the above observations, a Flood Risk Assessment is required. Please refer to DP Squared report **1983-CS-DP2-A180-RP-XX-9041**.

2. Existing

2.1. Current Usage

The application site is located directly west of Bracken House and currently comprises of a car parking facility accessed from the west via York Street, directly south of the site is Charles Street.

The topographical survey provided identified that the site falls from south to north with levels ranging from 31.600m AOD (pavement of Charles Street) down to 30.620m AOD (adjacent to the bridge).

The nearest watercourse is the River Medlock located approximately 50m north west of the site, which meanders through Central Manchester in a westerly direction.

2.2. Site Investigations

2.2.1. Topographical Survey

A dimensional survey of the existing buildings on the site has been produced. See Point 2 Surveyors Ltd series of drawings.

2.2.2. Site Investigation Report

At the time of this study, there is no site investigation report.

2.2.3. Underground Drainage CCTV

At the time of writing a CCTV Survey was unavailable, however engineering judgment suggests that surface water from the site currently discharges either into the public surface water sewer or the public combined sewer located within York Street at the west of the site.

2.2.4. Existing Runoff Rates

The existing runoff rate for the site has been estimated using the Modified Rational Method for a total area of 350m² (0.035Ha).

- $2.78 \times 50 \times 0.035 = 4.9\text{l/s}$

3. Proposed development drainage strategy

3.1. Hierarchy of Surface Water Disposal

The hierarchy for disposal of surface water from new developments is outlined within the Building Regulations Approved Document H and specifies the following methods in order of preference:

- Infiltration via soakaway or other suitable infiltration device
- Discharge to watercourse
- Discharge to public surface water sewer
- Discharge to public combined sewer

Infiltration

Due to the nature of the proposed development being confined to the original buildings envelope with no available area surrounding the property, there is no available space to provide soakaways which require a 5m easements from buildings.

Watercourse

There are no watercourses within a suitable distance in which surface water from the development could be disposed.

Sewer

Taking into account that soakaways and discharge to watercourse are not viable, surface water from the site has been directed into the public surface water sewer network within York Road.

3.2. Proposed Discharge Rates

The site is shown to be located within a Critical Drainage Area, as such the proposed discharge rates are proposed to be 50% of the existing rate:

- Proposed Discharge Rate = 2.5l/s

3.3. Proposed Surface Water Strategy

Surface water flows from the roof area of level 15 are to be discharged direct into the blue roof located on level 9 via a rainwater down pipe. Flows are then restricted via a flow control at roof level, where they are then directed to ground level, before discharging into the public 150mm surface water sewer located within York Street.

- Post development the impermeable area equates to 0.0312Ha

Flows will be restricted to no more than 2.5l/s during the 1 in 100 year + 45% climate change event, flow control chamber integrated within the blue roof.

Non return valve to be installed into manhole S3 to prevent backflow from public surface water sewer.

Blue Roof

- Area = 43m³
- Depth = 0.400m
- Top water level during the 1 in 100 year + 45% Climate Change Event = 0.192m

Flows Control Details

- Integrated Blue Roof Specific Flow Control
- Design Flow = 2.5l/s

3.4. Exceedance Routes Normal Conditions

Modelling the proposed surface water network at level 9 at the blue roof determined that the volume within the blue roof provides adequate storage during the 1 in 100 year + 45% climate change event with the depth of water being 0.192m i.e. 0.208m below the top of the roof.

As such, there are no exceedance routes during normal conditions.

3.5. Model for Surcharged Outfall

Modelling the proposed surface water network at ground level with a surcharges outfall at the public surface water manhole of 1m, resulted in flows being contained below surface level with no flooding.

3.6. Exceedance Total System Failure

In the unlikely event of total system failure of blockage, a high-level overflow will be provided within the outlet for the blue roof to discharge water direct into the network and therefore prevent flooding at roof level.

If the drainage became blocked at ground flood level, flood waters would be contained at ground floor level. If they exited the building, this would be out of the west of the site onto York Street, where flows would be intercepted by highway drainage, resulting in a low risk to surrounding properties.

3.7. Maintenance

The management and maintenance of the drainage infrastructure serving the development will be the responsibility of the property owner via a facilities management team.

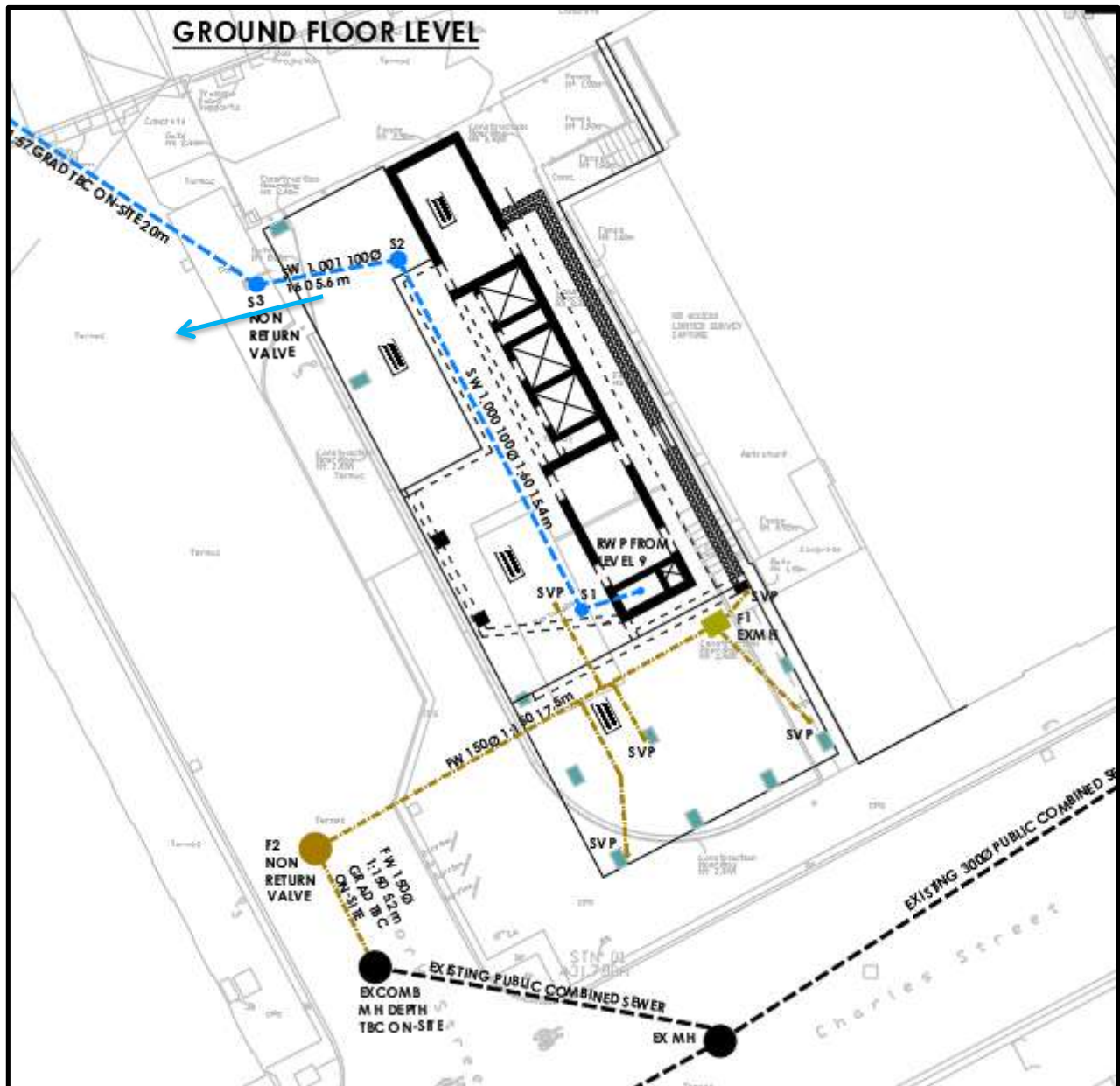
The blue roof and flow control will be managed and maintained in accordance with the chosen suppliers' recommendations.

3.8. Foul water

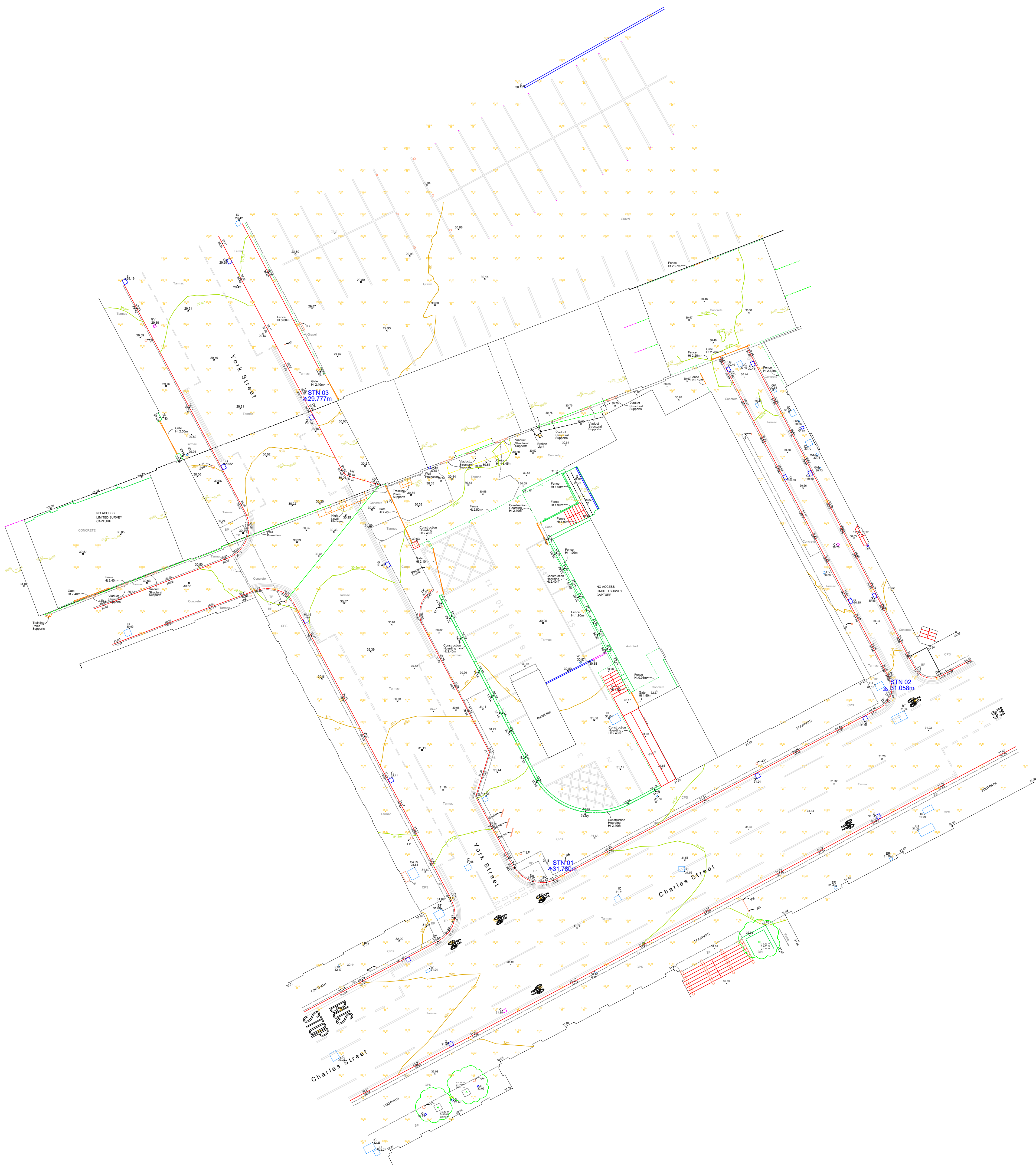
Foul from the proposed development is to be directed into the public combined sewer located within Charles Street via a single combined connection.

Non return valve to be installed into manhole F2 to prevent backflow.

Total System Failure Exceedance Flow Route



Appendix A – Topographical Survey



Appendix B – United Utilities Sewer Records

Appendix 1.2 United Utilities Sewer Record Plan



Appendix C – Existing and Proposed Impermeable Areas

Appendix D – Proposed Drainage Strategy

Appendix E – Typical Drainage Details

Appendix F – Surface Water Model Blue Roof



Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	150.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.000
CV	0.750	Include Intermediate Ground	x
Time of Entry (mins)	4.00	Enforce best practice design rules	x

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	1.000	58.8	100	Circular	100.000	99.617	0.283	100.000	99.600	0.300
1.001	1.000	60.0	100	Circular	100.000	99.600	0.300	100.000	99.583	0.317

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	LEVEL 15	1	Manhole	Adoptable	BLUE ROOF	1	Manhole	Adoptable
1.001	BLUE ROOF	1	Manhole	Adoptable	OUTLET	1	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
LEVEL 15	100.000	0.383	1	Manhole	Adoptable					
							0	1.000	99.617	100 Circular
BLUE ROOF	100.000	0.400	1	Manhole	Adoptable		1	1.000	99.600	100 Circular
							0	1.001	99.600	100 Circular
OUTLET	100.000	0.417	1	Manhole	Adoptable		1	1.001	99.583	100 Circular

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

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	45	0	0

Node OUTLET Online Orifice Control

Flap Valve	x	Design Depth (m)	0.400	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	2.5		
Invert Level (m)	99.583	Diameter (m)	0.054		

Node BLUE ROOF Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	99.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	64

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	43.0	0.0	0.400	43.0	0.0

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	LEVEL 15	9	99.681	0.064	3.4	0.0903	0.0000	OK
30 minute winter	BLUE ROOF	24	99.634	0.033	2.9	1.4471	0.0000	OK
30 minute winter	OUTLET	24	99.634	0.051	0.9	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	LEVEL 15	1.000	BLUE ROOF	3.5	1.298	0.447	0.0029	
30 minute winter	BLUE ROOF	1.001	OUTLET	0.9	0.371	0.118	0.0032	
30 minute winter	OUTLET	Orifice		0.9				2.1

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	LEVEL 15	9	99.720	0.103	8.3	0.1452	0.0000	FLOOD RISK
60 minute winter	BLUE ROOF	44	99.687	0.087	4.6	3.7525	0.0000	OK
60 minute winter	OUTLET	44	99.685	0.102	1.7	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)
15 minute summer	LEVEL 15	1.000	BLUE ROOF	8.4	1.433	1.066	0.0057	
60 minute winter	BLUE ROOF	1.001	OUTLET	1.7	0.360	0.214	0.0075	
60 minute winter	OUTLET	Orifice		1.7				6.6

Results for 100 year +45% 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	LEVEL 15	10	99.861	0.244	15.6	0.3443	0.0000	FLOOD RISK
60 minute winter	BLUE ROOF	46	99.779	0.179	8.6	7.7428	0.0000	FLOOD RISK
60 minute winter	OUTLET	46	99.775	0.192	2.5	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	LEVEL 15	1.000	BLUE ROOF	15.5	2.063	1.965	0.0078	
60 minute winter	BLUE ROOF	1.001	OUTLET	2.5	0.422	0.317	0.0078	
60 minute winter	OUTLET	Orifice		2.5				12.8

Appendix G – Surface Water Model at Ground Floor Level

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	150.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.500
CV	0.750	Include Intermediate Ground	x
Time of Entry (mins)	4.00	Enforce best practice design rules	x

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	15.400	59.5	100	Circular	31.600	31.000	0.500	31.600	30.741	0.759
1.001	5.600	100.0	150	Circular	31.600	29.356	2.094	30.600	29.300	1.150
1.002	20.000	28.2	150	Circular	30.600	29.300	1.150	29.890	28.590	1.150

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	600	Manhole	Adoptable	S2	600	Manhole	Adoptable
1.001	S2	600	Manhole	Adoptable	S3	600	Manhole	Adoptable
1.002	S3	600	Manhole	Adoptable	EXSWMH	1200	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
S1	31.600	0.600	600	Manhole	Adoptable					
							0	1.000	31.000	100 Circular
S2	31.600	2.244	600	Manhole	Adoptable					
							1	1.000	30.741	100 Circular
							0	1.001	29.356	150 Circular
S3	30.600	1.300	600	Manhole	Adoptable					
							1	1.001	29.300	150 Circular
							0	1.002	29.300	150 Circular
EXSWMH	29.890	1.300	1200	Manhole	Adoptable					
							1	1.002	28.590	150 Circular

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

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		0		
30	0		0		0		0		
100	45		0		0		0		

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	S1	6	31.040	0.040	2.5	0.0112	0.0000	OK
15 minute summer	S2	6	29.397	0.041	2.5	0.0115	0.0000	OK
15 minute summer	S3	6	29.328	0.028	2.5	0.0080	0.0000	OK
15 minute summer	EXSWMH	6	28.618	0.028	2.5	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	S1	1.000	S2	2.5	0.877	0.318	0.0439	
15 minute summer	S2	1.001	S3	2.5	0.895	0.141	0.0172	
15 minute summer	S3	1.002	EXSWMH	2.5	1.109	0.074	0.0451	38.0

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	S1	6	31.040	0.040	2.5	0.0112	0.0000	OK
15 minute summer	S2	6	29.397	0.041	2.5	0.0115	0.0000	OK
15 minute summer	S3	6	29.328	0.028	2.5	0.0080	0.0000	OK
15 minute summer	EXSWMH	6	28.618	0.028	2.5	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	S1	1.000	S2	2.5	0.877	0.318	0.0439	
15 minute summer	S2	1.001	S3	2.5	0.895	0.141	0.0172	
15 minute summer	S3	1.002	EXSWMH	2.5	1.109	0.074	0.0451	38.0

Results for 100 year +45% 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	S1	6	31.040	0.040	2.5	0.0112	0.0000	OK
15 minute summer	S2	6	29.397	0.041	2.5	0.0115	0.0000	OK
15 minute summer	S3	6	29.328	0.028	2.5	0.0080	0.0000	OK
15 minute summer	EXSWMH	6	28.618	0.028	2.5	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	S1	1.000	S2	2.5	0.877	0.318	0.0439	
15 minute summer	S2	1.001	S3	2.5	0.895	0.141	0.0172	
15 minute summer	S3	1.002	EXSWMH	2.5	1.109	0.074	0.0451	38.0

Appendix H – Surface Water Model at Ground Floor Level – Surcharged Outfall

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	150.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.500
CV	0.750	Include Intermediate Ground	x
Time of Entry (mins)	4.00	Enforce best practice design rules	x

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	15.400	59.5	100	Circular	31.600	31.000	0.500	31.600	30.741	0.759
1.001	5.600	100.0	150	Circular	31.600	29.356	2.094	30.600	29.300	1.150
1.002	20.000	28.2	150	Circular	30.600	29.300	1.150	29.890	28.590	1.150

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	600	Manhole	Adoptable	S2	600	Manhole	Adoptable
1.001	S2	600	Manhole	Adoptable	S3	600	Manhole	Adoptable
1.002	S3	600	Manhole	Adoptable	EXSWMH	1200	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
S1	31.600	0.600	600	Manhole	Adoptable					
						0	1.000	31.000	100	Circular
S2	31.600	2.244	600	Manhole	Adoptable					
						0	1.001	29.356	150	Circular
S3	30.600	1.300	600	Manhole	Adoptable					
						1	1.001	29.300	150	Circular
						0	1.002	29.300	150	Circular
EXSWMH	29.890	1.300	1200	Manhole	Adoptable					
						1	1.002	28.590	150	Circular

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

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		0		
30	0		0		0		0		
100	45		0		0		0		

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	6	31.040	0.040	2.5	0.0112	0.0000	OK
15 minute summer	S2	6	29.603	0.247	2.5	0.0698	0.0000	SURCHARGED
15 minute summer	S3	6	29.600	0.300	2.8	0.0848	0.0000	SURCHARGED
15 minute summer	EXSWMH	1	29.590	1.000	3.0	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	S1	1.000	S2	2.5	0.877	0.318	0.0439	
15 minute summer	S2	1.001	S3	2.8	0.920	0.158	0.0986	
15 minute summer	S3	1.002	EXSWMH	3.0	0.169	0.088	0.3521	37.3

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	6	31.040	0.040	2.5	0.0112	0.0000	OK
15 minute summer	S2	6	29.603	0.247	2.5	0.0698	0.0000	SURCHARGED
15 minute summer	S3	6	29.600	0.300	2.8	0.0848	0.0000	SURCHARGED
15 minute summer	EXSWMH	1	29.590	1.000	3.0	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	S1	1.000	S2	2.5	0.877	0.318	0.0439	
15 minute summer	S2	1.001	S3	2.8	0.920	0.158	0.0986	
15 minute summer	S3	1.002	EXSWMH	3.0	0.169	0.088	0.3521	37.3

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	6	31.040	0.040	2.5	0.0112	0.0000	OK
15 minute summer	S2	6	29.603	0.247	2.5	0.0698	0.0000	SURCHARGED
15 minute summer	S3	6	29.600	0.300	2.8	0.0848	0.0000	SURCHARGED
15 minute summer	EXSWMH	1	29.590	1.000	3.0	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	S1	1.000	S2	2.5	0.877	0.318	0.0439	
15 minute summer	S2	1.001	S3	2.8	0.920	0.158	0.0986	
15 minute summer	S3	1.002	EXSWMH	3.0	0.169	0.088	0.3521	37.3