

Project No. & Name:	10939 – St Vincent's	Prepared by:	Checked by:	Rev:	Date:
Document Ref:	LCNP-WML-00-XX-RP-D-053	Daniel Baker	Loughlin O'Gorman	P04	February 2025

Background

1. The below Drainage Strategy Report has been created by WML to support and inform detailed Planning Conditions for the St Vincent's development, located within the existing Loreto College grounds.
2. The proposed scheme involves the demolition of an existing single storey building and the construction of another which will provide administration, meeting space, eatery and a covered seating area.

Surface Water Drainage Strategy

3. Reference should be made to the Flood Risk Assessment – WML Consulting, April 2023, Phase 1: Desk Top Study Report – WML Consulting, February 2023 and Phase 2: Ground Investigation Report – WML Consulting, April 2023.
4. The proposed drainage strategy for this site will incorporate the principles of, and where appropriate demonstrate compliance with the NPPF and the SUDS manual.
5. The proposed drainage system should be designed in accordance with BS EN 752 and Building Regulations Part H (2010). Approved Document H indicates the following hierarchy for the disposal of surface water drainage from the new development sites, firstly discharge via infiltration, secondly discharge via watercourse and lastly discharge to sewer.
6. These options are discussed in further detail below.
7. **Surface water discharge via infiltration:** A review of the Phase 2: Ground Investigation Report by WML Consulting has confirmed that ground conditions on the site comprise made ground underlain by glacial deposits to a depth of circa 11mbgl and weathered sandstone of the Chester Pebble Bed Formation to a maximum depth of 12mbgl. These ground conditions are considered suitable for some infiltration techniques; however, it is noted that special consideration should be given to areas of deeper made ground and proximity with the existing brick surface water culvert immediately to the south.
8. **Surface water discharge via watercourse:** A review of the Ordnance Survey mapping around the site has confirmed the presence of Corn Brook Culvert which passes directly to the south of the development building and is understood to follow the line of the original watercourse.
9. A survey of the existing culvert undertaken by Survey Operations, March 2024, confirmed the route of the 3.7m x 1.45m Corn Brook Culvert as it passes through the site at a depth of approximately 2.5mbgl. A copy of the survey drawing can be found appended to this report.
10. **Surface water discharge via public sewer:** A review of the United Utilities (UU) public sewer records indicate that there are existing combined water sewers located within the adjacent Chichester Rd (south) and Moss Lane (west).
11. As-built drainage records for the previous development and a CCTV survey undertaken by Blocked Drains Northwest, April 2024 has confirmed that the existing building is served by a private combined drainage system which connects into the wider college drainage network before ultimately discharging to the UU public combined sewer located within Moss Lane.

Surface Water Drainage Proposals

12. Reference should be made to WML drawing LCNP-WML-00-FN-DR-D-5201.
13. In consideration of the above drainage hierarchy, the surface water proposals outlined within this report are based upon disposal of all surface water from the proposed development via a combination of both infiltration and a connection to the existing Corn Brook Culvert.
14. As noted within section 7, the findings of the Phase 2 Ground Investigation Report suggested that infiltration might be a viable solution for this development, however careful consideration should be given to presence of varying depths of made ground and the proximity to the existing surface water culvert.
15. It is understood that Corn Brook Culvert is of brick construction and therefore concentrated infiltration techniques such as cellular soakaways in the vicinity of the existing culvert could result in a weakening/wash out of the existing mortar or softening of the adjacent ground which could ultimately lead to structural failure.
16. It is therefore proposed to incorporate infiltration for new areas of hardstanding only i.e., footpaths where a permeable construction can be utilised to disperse of captured surface water runoff over a larger area and mitigate any risk associated with the structure of the existing culvert.
17. The permeable paving construction will include a stone sub-base layer which will act as storage for the captured surface water runoff prior to its percolation into the sub-strata.
18. In the absence of site-specific percolation test results, a nominal infiltration rate of 1×10^{-6} m/s has been utilised to determine the depth of sub-base required to store and disperse captured surface water runoff for all storm durations up to and including the critical 100-year event plus a 45% climate change allowance.
19. The intention is to dispose of surface water runoff from the remainder of the site (new building roof) via a new piped connection to the existing culvert.
20. The site is currently developed and comprises an existing structure along with a mixture of hardstanding (to be retained) interspersed with areas of soft landscaping. The site is classified as a 'Brownfield' site; thus, any new development requires a minimum 50% reduction in surface water runoff rate leaving the development site as outlined within the SFRA.
21. It is understood that LLFA policy is that any new development should aim to discharge surface water runoff at Greenfield runoff rates therefore a further assessment has been undertaken using MicroDrainage software which concluded the following flow rates;

Return Period	Flow (l/s)
1 in 1 year	0.4
1 in 30 year	0.7
1 in 100 year	0.8

22. A copy of the MicroDrainage calculations can be found appended to this report.
23. It should be noted that the above greenfield flow rates exclude the areas of proposed infiltration described in the above sections.
24. Due to the limitations of restricting forward flows to less than 1 l/s, and in agreement with the LLFA the proposals for the new development intend to discharge all remaining surface water runoff from the site to 5 l/s for all critical storm durations up to and including the critical 100-year event plus a 45% climate change allowance.
25. It is proposed to collect roof water via a traditional roof drainage system and discharge via a new below ground drainage network located around the building footprint.
26. Oversized pipework has been incorporated within the new below ground drainage system to provide storage for all captured surface water runoff (excluding infiltration areas) where it can be then released via a flow chamber at a controlled/restricted flow rate to suit the allowable Greenfield flow rates noted above.
27. Given the limited area of retained hardstanding is considered that the water quality being discharged to Corn Brook Culvert is acceptable, however the drainage proposals do include pollution/treatment controls which are discussed later in this report.

Residual Flood Risk Mitigation

28. As identified with the Flood Risk Assessment (FRA) – WML Consulting, April 2023, there is a low residual risk of flooding from all sources with the exception of flooding from Corn Brook Culvert which is considered as having a medium residual flood risk.
29. The FRA includes a series of modelled flood scenarios provided by the Environment Agency which offer a theoretical flood water level at 4 node points across/adjacent to the development site.
30. The most notable flood water levels are shown at node 2 located on the junction of Chichester Rd (south) and Moss Ln (west) which recorded the following levels;
 - 33.010m AOD during a simulated 0.1% probability (1:1000-year event) + 30% climate change allowance.
 - 32.630m AOD during a simulated 1% probability (1:100-year event) + 75% climate change allowance.
31. The FRA noted that the higher figure of 33.010 was the result of an extreme event with an annual exceedance probability (AEP) of 0.1%.
32. Given that there are no historic records of flooding in the vicinity of the proposed development it is considered that the following flood risk mitigation measures will be based upon the more probable flood water level of 32.630 which has an AEP of 1% i.e., a 10x greater chance of occurring in a given year.
33. In accordance with the recommendations outlined within the FRA, the new building's finished floor level (FFL) should be set to provide a sufficient freeboard above the theoretical flood water level noted above.
34. In addition, external ground levels should be designed as such to direct any overland flow routes resulting from extreme rainfall away from the new building.
35. Given the above it is considered that the mitigation of residual risk identified within the FRA has been satisfied and is acceptable with regards to flood risk.

Waste Water Drainage Strategy

36. As noted in sections 10 & 11, it is understood that there is an existing private drainage system currently serving the existing building which ultimately discharges to the UU public sewer network.
37. It is therefore proposed to collect waste water from the proposed development via traditional soil stacks & SVPs prior and discharge via the existing site drainage system to the public sewerage network located to the east, subject to UU approval.

SUDs Review

38. In accordance with current policies and guidelines, SUDs techniques have been considered for the development site's drainage proposals. The suitability of various SUDs techniques has been reviewed and are discussed below.
39. Storing water for later use could be a viable option for this site. Blue/green roof systems were considered as part of the design for the building however as the retail building is a lightweight long span building, the implications of including a green or blue roof system would add significant embodied carbon to the supporting structure & building foundations.
40. Given the above, the incorporation of blue/green roof systems within the drainage proposals for this site was considered not to be a sustainable solution, however the addition of a rainwater harvesting tank could allow captured rainwater to be reused for onsite operations such as cistern flushes etc. and should be discussed with the client during detailed design.
41. Above ground SUDs features such as storage basins and swales were deliberated during the drainage design for this site, however due to the limited area of soft landscaping available across the development to implement such features especially given the proximity to existing structures such as Corn Brook Culvert, they have been considered to be not a practical solution for this project.
42. Permeable paving construction has been incorporated within the drainage proposals for new external hardstanding areas across the site (footpaths), which will provide both an element of storage and treatment of captured surface water runoff.
43. The quality of surface water runoff prior to discharge from the site should also be considered when reviewing potential SUDs options for the development works and this is reviewed in further detail below.

Water Treatment

44. As discussed within the above strategies, due to the limited potential for vehicle movements across the site it is considered that the water quality being discharged to Corn Brook Culvert is acceptable, however the drainage proposals include pollution/treatment controls to promote improvements in water quality leaving the site.
45. From table 26.2 of the SUDs manual, the proposed roof area is deemed to have a "low" pollution hazard level. i.e. TSS = 0.3, Metals = 0.2, Hydrocarbons = 0.05.
46. Unfortunately, due to the site limitations it has not been possible to incorporate traditional SUDs treatment features (as discussed in the above SUDs review) and therefore it has been necessary to incorporate alternative proprietary systems to ensure water quality is achieved.
47. Gully traps, sump units and catch pits have been incorporated within the drainage proposals to remove contaminants/pollutants from all surface water runoff prior to disposal from the site.
48. In addition to the above a vortex separator has also been integrated into the drainage network prior the final connection with the Corn Brook Culvert to remove any remaining sediments etc. that have not already been captured by the above.
49. Finally, the permeable paving sub-base incorporates a stone filtration layer which will provide mitigation indices of TSS = 0.4, Metals = 0.4, Hydrocarbons = 0.4. Though these figures are halved in line with the guidance provided in the SUDs manual.

Maintenance Plan

50. It is understood that the new drainage network will be privately owned and maintained by the client or an appointed maintenance company on their behalf and will not be offered up for adoption by United Utilities.
51. The proposed drainage system has been designed in accordance with the current standards and guidelines to achieve a minimum self-cleansing velocity, however excessive debris in the system could still result in loss of performance.
52. The proposed drainage design will consists of traditional manholes, pipes and channels.
53. It is proposed to check the underground drainage system and lift manhole/inspection chamber covers to ensure that the pipework associated with each chamber is operating correctly twice yearly and ensure drainage channels are free from debris.
54. Any problems encountered should be investigated by CCTV survey if required and any remedial works necessary carried out in a timely manner.
55. It is recommended that the biannual inspections take place in spring and autumn where there is additional risk of blockage from debris associated with fallen leaves etc.
56. Attenuation has been provided in the form of oversized pipework therefore it is considered that maintenance of this element is captured as part of the general drainage maintenance requirements noted above.
57. Flow restriction has been achieved through the incorporation of a hydrobrake flow control. A recommended maintenance schedule, checklist and a preferred cleaning procedure should be included from the supplier in the O&M Manual however it is anticipated that this should include twice yearly checking that the upstream manholes are free from debris.
58. Lastly, permeable paving construction has been incorporated within the drainage proposals for this site. It is proposed to check and clean the permeable surfaces regularly to ensure that surface water runoff is not prevented from draining into the sub-base layer, especially during the autumn period where a build-up leaves could occur and result in a loss of performance.

**Proposed Drainage GA
LCNP-WML-00-FN-DR-D-5201**

**Surface Water Drainage Calculations
10939-WML-00-XX-CA-C-0002**

Surface Water Drainage Calculations

For a site referred to as

St Vincent's

Undertaken on behalf of

Loreto College

WML Job No: 10939

Document No: 10939-WML-ZZ-XX-CA-C-0002

Date: February 2025

Project No. & Name:	10939 – St Vincent’s	Status:	Prepared by:	Rev:	Date:
Document Ref:	10939-WML-ZZ-XX-CA-C-0002	Preliminary	Daniel Baker	P03	February 2025

General Notes

1. The calculations within this document have been undertaken using MicroDrainage Software version 2020.
2. This document is to be read in conjunction with the following documents;
 - a. LCNP-WML-00-FN-DR-D-5201 – Proposed Drainage GA
 - b. LCNP-WML-00-XX-RP-D-053 – Drainage Strategy Document

Summary of Results

1. The following summary demonstrates that the outgoing flow rates for the new development works are less than or equal to the 5 l/s allowable flow rate described within the drainage strategy document.

Proposed Site Runoff Rate – Manhole S6 (l/s)
1: 3.5
30: 5.0
100+45%: 5.0

Existing Greenfield Runoff Rates

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 15/05/2024 07:34 File	Designed by DBaker Checked by	
Innovyze		
Source Control 2020.1.3		
ICP SUDS Mean Annual Flood Input Return Period (years)1Soil0.450 Area (ha) 0.035Urban0.750 SAAR (mm)860Region NumberRegion 10 Results1/s QBAR Rural0.2 QBAR Urban0.5 Q1 year0.4 Q1 year0.4 Q30 years0.7 Q100 years0.8		
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Proposed Surface Water Network Calculation

WML Consulting Ltd											Page 1																																																																																																																																																																		
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Date 25/02/2025 17:00	Designed by DBaker	
File 10939 - Surface Water -...	Checked by	
Innovyze		Network 2020.1.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	32.350	0.825	Open Manhole	450	S1.000	31.525	150				
S2	32.350	0.825	Open Manhole	450	S2.000	31.525	150				
S3	32.350	0.950	Open Manhole	450	S1.001	31.400	150	S1.000	31.400	150	
								S2.000	31.400	150	
S4	32.300	1.175	Open Manhole	1500	S1.002	31.125	375	S1.001	31.350	150	
S5	32.300	1.250	Open Manhole	1500	S1.003	31.050	150	S1.002	31.050	375	
S6	32.300	1.350	Open Manhole	1050	S1.004	30.950	150	S1.003	30.950	150	
S	32.300	1.550	Open Manhole	0		OUTFALL		S1.004	30.750	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	383276.601	396053.418	383276.601	396053.418	Required	
S2	383295.464	396037.211	383295.464	396037.211	Required	
S3	383288.409	396057.520	383288.409	396057.520	Required	
S4	383292.660	396058.997	383292.660	396058.997	Required	
S5	383297.582	396044.828	383297.582	396044.828	Required	
S6	383298.960	396040.860	383298.960	396040.860	Required	
S	383302.155	396034.874			No Entry	

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No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 25/02/2025 17:00 File 10939 - Surface Water -...		
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Innovyze		Network 2020.1.3

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S1	32.350	31.525	0.675	Open Manhole	450
S2.000	o	150	S2	32.350	31.525	0.675	Open Manhole	450
S1.001	o	150	S3	32.350	31.400	0.800	Open Manhole	450
S1.002	o	375	S4	32.300	31.125	0.800	Open Manhole	1500
S1.003	o	150	S5	32.300	31.050	1.100	Open Manhole	1500
S1.004	o	150	S6	32.300	30.950	1.200	Open Manhole	1050

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	12.500	100.0	S3	32.350	31.400	0.800	Open Manhole	450
S2.000	21.500	172.0	S3	32.350	31.400	0.800	Open Manhole	450
S1.001	4.500	90.0	S4	32.300	31.350	0.800	Open Manhole	1500
S1.002	15.000	200.0	S5	32.300	31.050	0.875	Open Manhole	1500
S1.003	4.200	42.0	S6	32.300	30.950	1.200	Open Manhole	1050
S1.004	6.786	33.9	S	32.300	30.750	1.400	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	32.300	30.750	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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WML Consulting Ltd		Page 4																				
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL																						
Date 25/02/2025 17:00 File 10939 - Surface Water -...																						
Designed by DBaker Checked by																						
Innovyze		Network 2020.1.3																				
<u>Synthetic Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Profile Type</td> <td>Summer</td> </tr> <tr> <td>Return Period (years)</td> <td>1</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Storm Duration (mins)</td> <td>30</td> </tr> <tr> <td>Ratio R</td> <td>0.360</td> <td></td> <td></td> </tr> </table>			Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	1	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	18.000	Storm Duration (mins)	30	Ratio R	0.360		
Rainfall Model	FSR	Profile Type	Summer																			
Return Period (years)	1	Cv (Summer)	0.750																			
Region	England and Wales	Cv (Winter)	0.840																			
M5-60 (mm)	18.000	Storm Duration (mins)	30																			
Ratio R	0.360																					
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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S5, DS/PN: S1.003, Volume (m³): 3.7

Unit Reference	MD-SHE-0105-5000-1000-5000
Design Head (m)	1.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	105
Invert Level (m)	31.050
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	5.0
Flush-Flo™	0.296	5.0
Kick-Flo®	0.637	4.1
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	3.6	1.200	5.4	3.000	8.4	7.000	12.5
0.200	4.8	1.400	5.8	3.500	9.0	7.500	12.9
0.300	5.0	1.600	6.2	4.000	9.6	8.000	13.3
0.400	4.9	1.800	6.6	4.500	10.1	8.500	13.7
0.500	4.7	2.000	6.9	5.000	10.6	9.000	14.1
0.600	4.3	2.200	7.2	5.500	11.1	9.500	14.5
0.800	4.5	2.400	7.5	6.000	11.6		
1.000	5.0	2.600	7.8	6.500	12.1		

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Stanley Green Business Park
Earl Rd, Cheadle Hulme, SK8 6QL

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Micro
Drainage

Innovyze

Network 2020.1.3

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

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 0

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

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

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	1	+0%	100/15 Winter				31.549
S2.000	S2	15 Winter	1	+0%	100/15 Winter				31.558
S1.001	S3	15 Winter	1	+0%	100/15 Summer				31.449
S1.002	S4	15 Winter	1	+0%	100/15 Summer				31.174
S1.003	S5	15 Winter	1	+0%	30/15 Summer				31.145
S1.004	S6	15 Winter	1	+0%					30.986

Surcharged Flooded					Half Drain		Pipe		
PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)	Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.126	0.000	0.06			1.0	OK	
S2.000	S2	-0.117	0.000	0.11			1.4	OK	
S1.001	S3	-0.101	0.000	0.23			3.3	OK	
S1.002	S4	-0.326	0.000	0.03			3.6	OK	
S1.003	S5	-0.055	0.000	0.17			3.3	OK	
S1.004	S6	-0.114	0.000	0.13			3.3	OK	

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Stanley Green Business Park
Earl Rd, Cheadle Hulme, SK8 6QL

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Micro Drainage

Innovyze

Network 2020.1.3

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

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 0

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

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

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 45

Water

Level

US/MH

Return Climate

First (X)

First (Y)

First (Z)

Overflow

Water

PN

Name

Storm

Period

Change

Surcharge

Flood

Overflow

Act.

(m)

S1.000

S1 15 Winter

30

+0%

100/15 Winter

31.564

S2.000

S2 15 Winter

30

+0%

100/15 Winter

31.579

S1.001

S3 15 Winter

30

+0%

100/15 Summer

31.486

S1.002

S4 15 Winter

30

+0%

100/15 Summer

31.308

S1.003

S5 15 Winter

30

+0%

30/15 Summer

31.305

S1.004

S6 15 Winter

30

+0%

30.994

Surcharged Flooded

Half Drain Pipe

US/MH

Depth

Volume

Flow / Overflow

Time

Flow

Level

PN

Name

(m)

(m³)

Cap.

(l/s)

(mins)

(l/s)

Status

Exceeded

S1.000

S1

-0.111

0.000

0.15

2.5

OK

S2.000

S2

-0.096

0.000

0.27

3.4

OK

S1.001

S3

-0.064

0.000

0.60

8.4

OK

S1.002

S4

-0.192

0.000

0.08

8.6

OK

S1.003

S5

0.105

0.000

0.25

5.0

SURCHARGED

S1.004

S6

-0.106

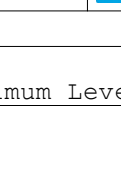
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0.19

5.0

OK

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Innovyze		Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

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	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	30 Winter	100	+45%	100/15 Winter				31.827
S2.000	S2	30 Winter	100	+45%	100/15 Winter				31.832
S1.001	S3	30 Winter	100	+45%	100/15 Summer				31.822
S1.002	S4	30 Winter	100	+45%	100/15 Summer				31.814
S1.003	S5	30 Winter	100	+45%	30/15 Summer				31.812
S1.004	S6	30 Summer	100	+45%					30.994

PN	US/MH Name	Surcharged Flooded			Half Drain	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Time (mins)	Flow (l/s)		
S1.000	S1	0.152	0.000	0.23		3.7	SURCHARGED	
S2.000	S2	0.157	0.000	0.41		5.2	SURCHARGED	
S1.001	S3	0.272	0.000	0.89		12.5	SURCHARGED	
S1.002	S4	0.314	0.000	0.11		11.4	SURCHARGED	
S1.003	S5	0.612	0.000	0.25		5.0	SURCHARGED	
S1.004	S6	-0.106	0.000	0.19		5.0	OK	

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Hydrobrake Flow Control Design/Specification

Technical Specification

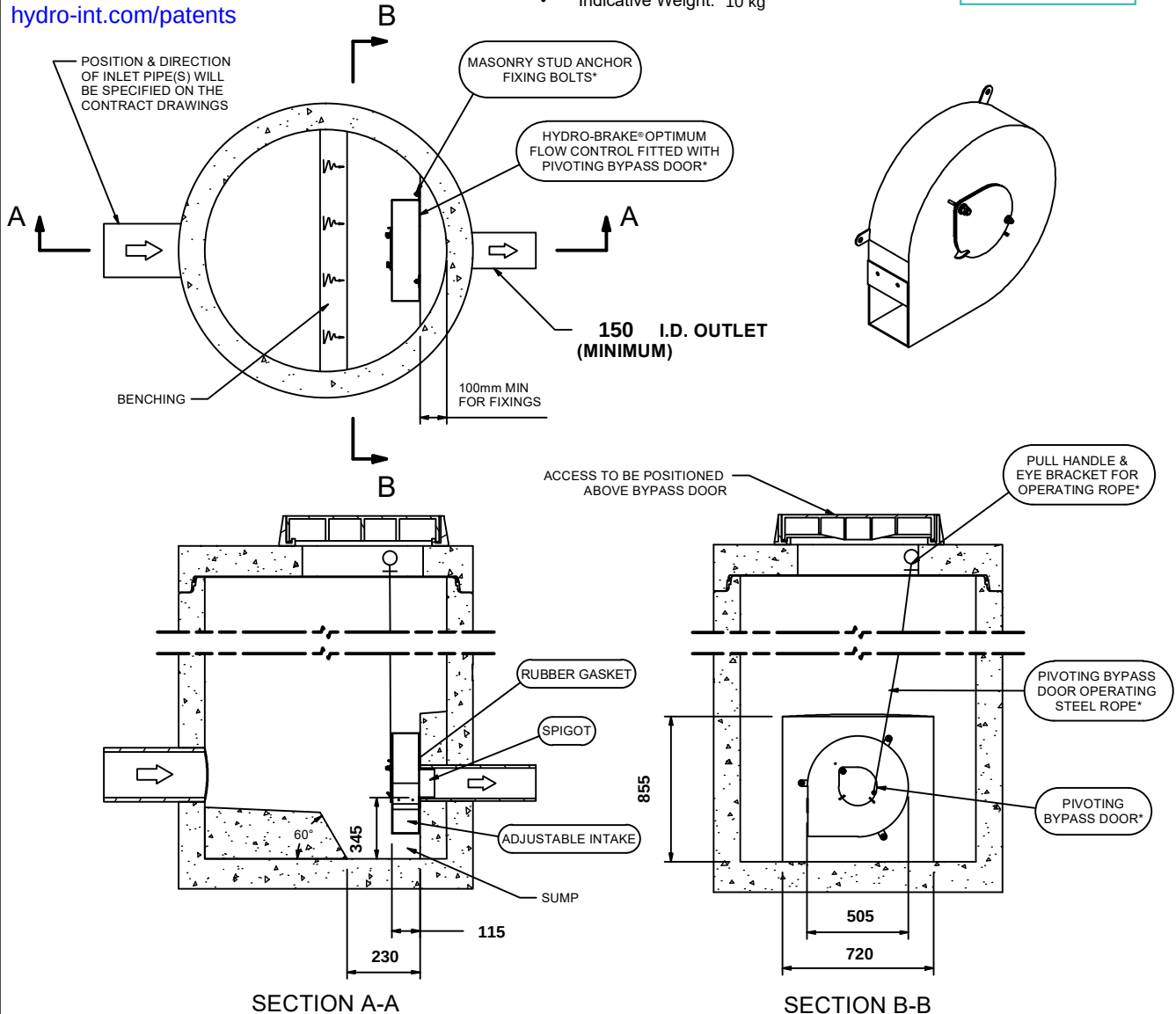
Control Point	Head (m)	Flow (l/s)
Primary Design	1.000	5.000
Flush-Flo™	0.296	4.974
Kick-Flo®	0.637	4.060
Mean Flow		4.334

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Variable flow rate post installation via adjustable inlet
- Indicative Weight: 10 kg



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IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
 CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0105-5000-1000-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

**Hydro
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 A CRH COMPANY

DATE 25/02/2025 17:07

SITE St Vincent's

DESIGNER Dan Baker

REF 10939

SHE-0105-5000-1000-5000

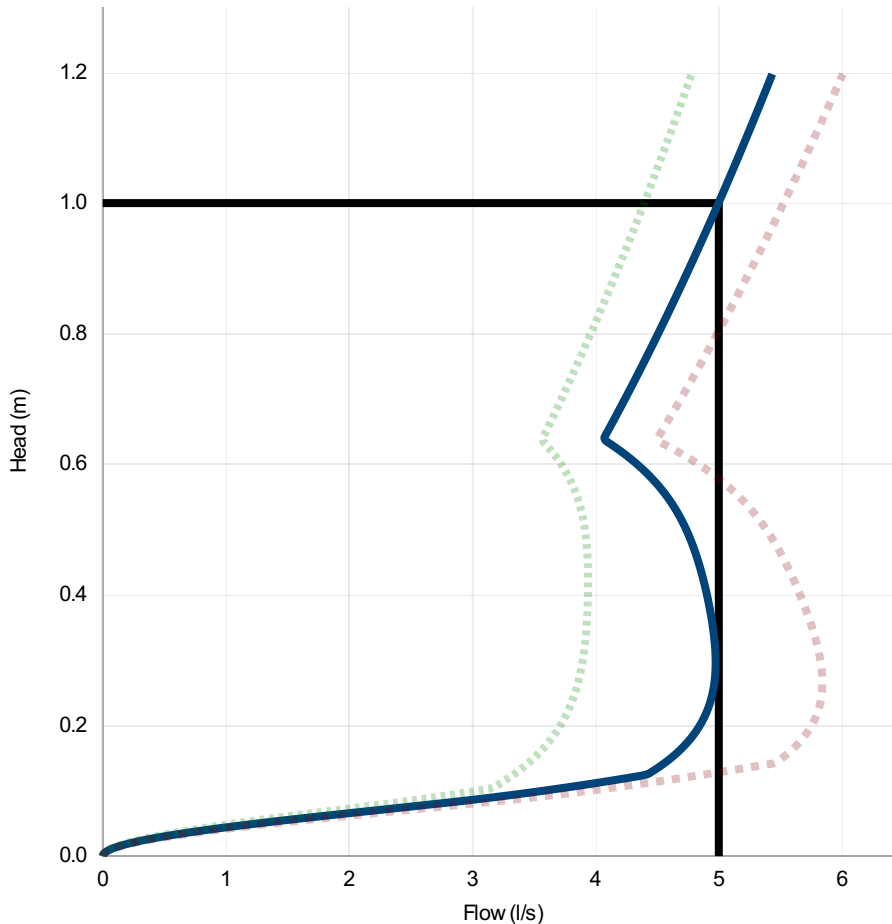
Hydro-Brake® Optimum

Technical Specification

	Original Setting		Minimum Setting		Maximum Setting	
Control Point	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
Primary Design	1.000	5.000	1.000	4.394	1.000	5.526
Flush-Flo™	0.296	4.974	0.420	3.939	0.266	5.841
Kick-Flo®	0.637	4.060	0.636	3.560	0.636	4.490
Mean Flow		4.334		3.611		4.914



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Head (m)	Flow (l/s)
0.000	0.000
0.034	0.638
0.069	2.159
0.103	3.702
0.138	4.526
0.172	4.737
0.207	4.866
0.241	4.939
0.276	4.970
0.310	4.973
0.345	4.956
0.379	4.926
0.414	4.887
0.448	4.838
0.483	4.775
0.517	4.691
0.552	4.575
0.586	4.416
0.621	4.200
0.655	4.111
0.690	4.210
0.724	4.305
0.759	4.398
0.793	4.489
0.828	4.579
0.862	4.666
0.897	4.751
0.931	4.835
0.966	4.917
1.000	4.997

DESIGN ADVICE



The head/flow characteristics of this SHE-0105-5000-1000-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
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DATE 25/02/2025 17:07

Site St Vincent's

DESIGNER Dan Baker

Ref 10939

SHE-0105-5000-1000-5000

Hydro-Brake® Optimum

LLFA Pre-Consent Enquiry Comments

Case Ref:	LOR/M15/A/LDC
Site Name:	Loreto College
Associated Planning Ref:	140110/FO/2024
Proposal:	☒ Connection ☐ Diversion ☐ Other: <specify>
Information Considered:	
Planning Portal uploads:	24/05/2024
Further submission emails:	NA
Pre-App Advice:	LOR/M15/A/PRE

LLFA Comments 12/07/2024

We have carried out an assessment of your pre-consent enquiry which is based on the information provided. This advice is valid for 12 months.

Where required, you must obtain Planning permission for your site and discharge Planning Conditions. Your drainage strategy will be reviewed by competent authorities during the Planning process.

Connection

We confirm connection agreement in principle to the 3.7m x 1.45 m diameter ordinary watercourse culvert within the site boundary at a pass forward flow up to 5 l/s.

Consent Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you must apply for and obtain Land Drainage Consent (LDC) before connection can be made.

Land Drainage Consent is a technical approvals process where we assess detailed design, the method of construction and control methods to safeguard the asset and properties.

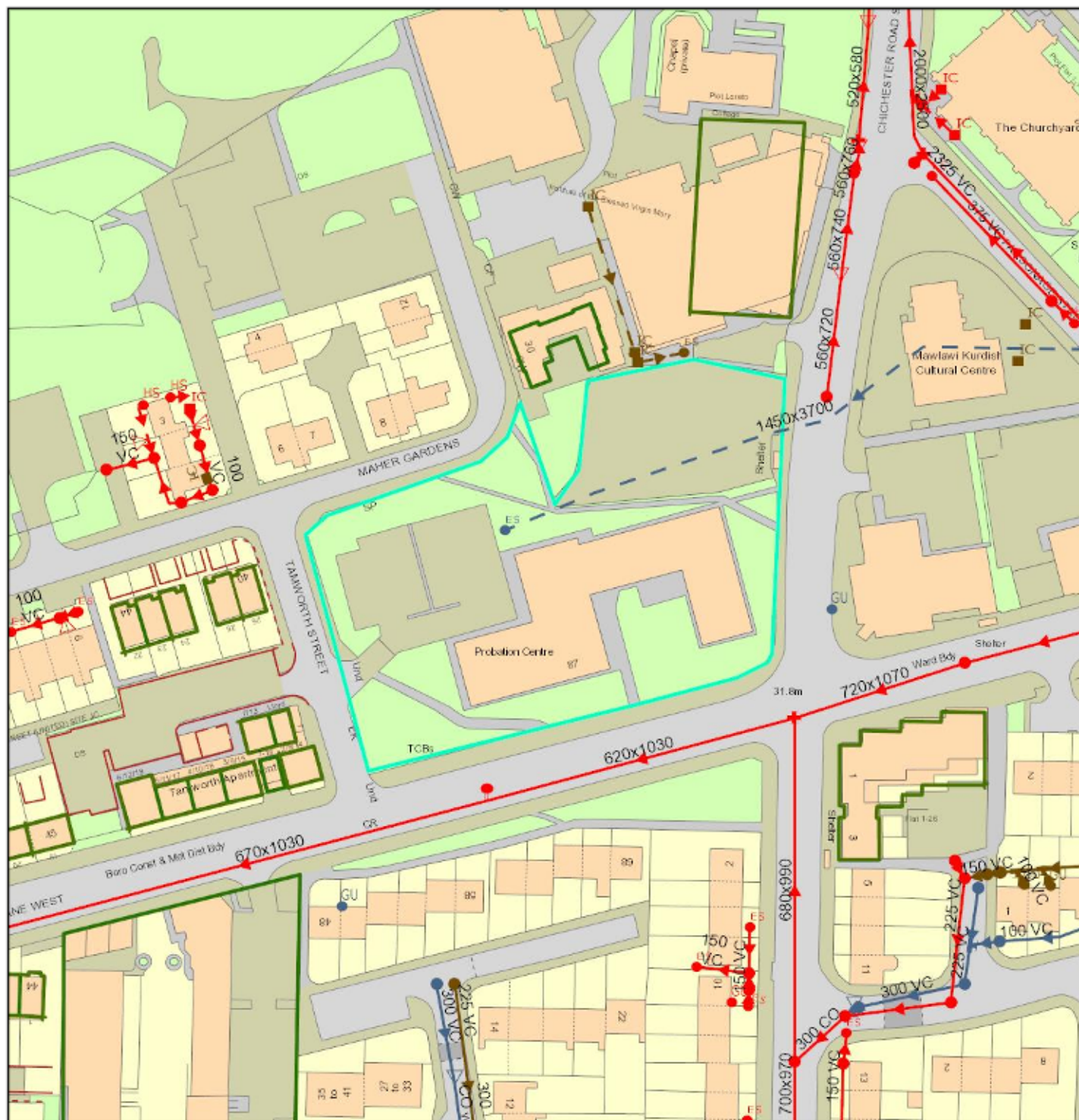
Please submit your LDC application with this agreement in principle attached. Details of the application process and required information can be obtained by contacting floodriskmanagement@manchester.gov.uk.

Construction cannot begin until the Land Drainage Consent has been approved. Manchester City Council LLFA does not issue retrospective Land Drainage Consents.

United Utilities Sewer Records

SEWER RECORD

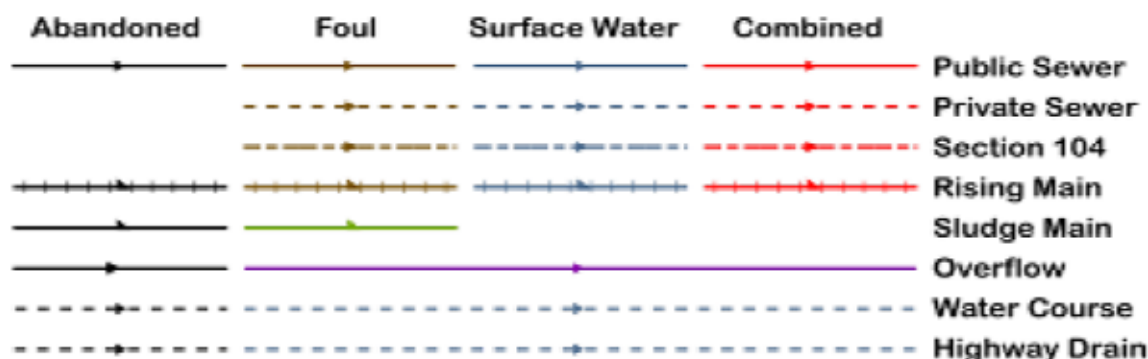
Former Moss Side Probation Offices 87 Moss Lane West Moss Side Manchester M15 5PE



The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water PLC will not accept any liability for any damage caused by the actual positions being different from those shown.

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Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	
Drop Shaft	Change of Characteristic
Orifice Plate	

Corn Brook Culvert Survey Drawings

