



8-8a St Johns Street

Drainage Strategy

For Pareto Properties LLP

Date: 10 August 2020

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1. INTRODUCTION

This report has been prepared by Hydrock Consultants Limited on behalf of Pareto Properties LLP in support of a Planning Application to be submitted to Manchester City Council for a proposed commercial/industrial development at 8-8a St Johns Street.

The surface water drainage strategy has been produced in accordance with the with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) requirements.

This report should be read in conjunction with the following drawings:

- C16495-HYD-XX-XX-DR-C-0500_Proposed Drainage Strategy
- Proposed Microdrainage Calculations

2. SITE INFORMATION

2.1 Location and Setting

The site is located on St John Street and Longworth Street in the centre of Manchester.

The development consists of a currently occupied office building, along with an external patio/yard area with planters and trees.

The site location is shown in Figure 1, with the full address and Ordnance Survey grid reference provided in Table 1.

Table 1: Site Referencing Information

Site Referencing Information	
Site Address	8-8a St John Street, Manchester, M3 4DU
Grid Reference	383459, 397928 SJ834979

Figure 1: Site Location



2.2 Topography

A copy of the topographical survey has been included within the planning submission.

The survey indicates that the site level varies from 33.90m AOD to 35.00m, with the external yard gradually falling to Artillery Street to the North.

Planning approval is being sought for a new two storey dwelling to the rear of the site fronting onto Artillery Street and Longworth Street, along with a change of use to 8/8a St John Street from office to two number of residential dwellings along with a new 3 storey extension to the rear of the listed property.

Details of the proposed development layout have been included within the Planning Application submission.

3. SURFACE WATER STRATEGY

3.1 Existing Site Drainage

United Utilities sewer records have been obtained (see Appendix A) which indicate existing combined sewers within Artillery Street to the north and Longworth Street to the east of the development. There are two no. combined chambers located nearby, 4902 falling west towards Bryom Street, and 4905 falling south towards St John Street. While United Utilities record information does not indicate depth information for these chambers it is assumed that they serve the neighbouring existing developments and will be of sufficient depth for a proposed drainage connection.

It is recommended that a drainage survey should be undertaken to confirm cover levels, invert levels, depths and condition of the existing sewer, along with confirming the presence of a positive connection from the existing site.

3.2 Existing Discharge Rates

In accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems;

For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

Greenfield run off for the external patio area (impermeable area of 0.021 Ha) of the development has been calculated using the ICP SUDS Mean Annual Flood method for determining the greenfield run-off. The resulting flows are indicated within Table 3 below. The full results can be found within the Appendix B).

Table 3: Existing Run Off Rates

Return Period (Years)	Greenfield Run Off Rate (l/s)
1	0.1
QBAR	0.1
30	0.2
100	0.2

Microdrainage has been used to provide a Quick Storage Estimate to determine an approximate attenuation size for the above 100 year event plus an allowance for 40% climate change. The resulting figures is a range of 10m³ to 15m³.

An additional review of the brownfield run off from the site has been calculated below using the modified rational method in order to comply with the non-statutory technical standards for sustainable drainage systems.

The following parameters were used to calculate the brownfield run-off from the site:

Peak Discharge $Q_p = 2.78 \times C_v \times C_r \times I \times A$ (Modified rational method as recommended by the Wallingford procedure)

Impermeable Area (A) = 0.021 Ha

Average Rainfall Intensity (i) = Based upon figures obtained from Microdrainage

Routing coefficient (dimensionless) (Cr) = 1.3 (as recommended by the Wallingford procedure)

Volumetric Runoff Coefficient (Cv) = 0.9 (catchment high in hardstanding areas)

Table 4 below summarises the calculated brownfield run-off rates for the 1 year, 2 year, 30 year and 100 year events.

Table 4: Modified Rational Method Flow rates

Storm Event (Years)	Rainfall Intensity mm/hr (15min tc)	Brownfield Discharge Rate (ls)
1	26.949	2.04
30	65.931	5.15
100	85.134	6.65

3.3 Proposed Site Discharge

To satisfy the requirements within Non-Statutory Technical Standards for Sustainable Drainage Systems, the proposed surface water discharge should be restricted to greenfield run-off for a 1 in 1 year and a 1 in 100 year event. Due to the minimal space available for large attenuation requirements, it is proposed the proposed building development achieves a 50% betterment on the existing brownfield run off rates as described above. The table below summarises the proposed run off rates that are to be achieved within the varying storm events and the betterments this achieves;

Table5: Proposed Discharge Rates

Storm Event	Brownfield Discharge Rate (l/s)	Proposed Discharge Rate (l/s)	Actual Discharge Rate Achieved (l/s)	Betterment Achieved (%)
1 Yr Event	2.04	1.02	1.1	46
30 Yr Event	5.15	2.57	1.3	75
100 Yr Event	6.65			
100 Yr Event + CC		3.37	2.0	70

For the purpose of determining cover levels for this drainage exercise an assumed finished floor level of 34.150m AOD has been used based on the existing site topography. The proposed site layout allows for an external yard area to the south, joining onto Longworth Street, which is the proposed location for surface water manholes.

The proposed building has a catchment area of 0.021 Hectares, will be collected via rainwater pipes and channels. Attenuation to the measure of approximately 4.0m³ will be required to store proposed run off from this catchment area, before discharging to a new chamber built on the existing combined sewer in Longworth Street via a proposed combined chamber.

A S106 agreement will be required to be submitted by the contractor to United Utilities prior to construction and connection of proposed drainage, although it is understood this will not be required for submission for planning.

The surface water drainage attenuation has been modelled using Microdrainage for a range of events including the 1 in 1year, 1 in 30year and 1 in 100year + 40% climate change event.

The model indicates no flooding occurs during a 1 in 100 year plus climate change event within the surface water network

The proposed drainage Microdrainage calculations can be found within Appendix D

It is assumed that the works of converting existing office space into residential units will re-utilise the existing drainage infrastructure.

3.4 Hierarchy of Drainage Discharge

A hierarchy for the preferred discharge of surface water states that surface water runoff should be disposed of in the following order of preference:

Surface water runoff not collected for use must be discharged to one or more of the following in the order of priority shown:

1. into the ground (infiltration).
2. to a surface water body.
3. to a surface water sewer, highway drain or other drain.
4. to combined sewer:

The feasibility of each discharge method is outlined below:

1. Due to the small site area and locations of proposed and existing buildings the use of a soakaway / infiltrations is not suitable as a 5m distance from buildings cannot be achieved.
2. There are no existing watercourses nearby to the development. Due to the proximity to the nearest watercourse it is unachievable to discharge surface water from the development to a watercourse.
3. United Utility record information indicates no surface water sewers within the vicinity of the development, and therefore it is considered unachievable to connect into a surface water sewer.
4. Therefore it is proposed to discharge surface water drainage to the existing combined sewer located with Longworth Street.

While final outfall locations will be determined in the detailed design stage, a Pre-Development Enquiry will be submitted to United Utilities to commence discussions.

The Proposed Drainage Layout can be found in Appendix B.

3.5 Suitability of SuDS Features

The following SuDS features have been considered during the design process, the table states which features have been incorporated and which have been excluded and reasons for their exclusion.

Table 6: Suitability of SuDS Features

SuDS Feature	Incorporated within design	Reasoning
Green Roofs / BluRoofs	Yes	Greenroof systems will be included as part of the new building within the existing patio area
Attenuation Pond (Above Ground)	No	Attenuation ponds have been excluded for the site due to lack of available space within the development proposals
Rainwater Harvesting	No	Rainwater harvesting is not effective for this type of development where there are a limited number of toilets/ uses for harvested water
Infiltration Methods	No	Infiltration was ruled out due to the lack of space available and the proximity to buildings of less than 5m.
Raingardens/Bio-retention areas	No	Excluded due to the residential nature of the development and ground conditions
Filter strips and swales	No	Excluded due to lack of space, level constraints and ground conditions
Permeable Paving	No	Excluded, given the nature of the development
Below ground attenuation systems / Oversized Pipework	Yes	Below ground attenuation will be achieved through the use of attenuation crates

3.6 Whole Life Maintenance of the Network

To enable the water treatment process to occur as intended the drainage network shall require maintenance. The maintenance strategy and responsibilities are as set out in the table below.

Component to be maintained	Actions	Frequency	Responsibility of:
Site wide external areas	Site to be generally kept free from litter and debris which may enter the drainage system.	On-going	Occupier / Owner
General network inc. pipes/ manholes/ catchpits	Manholes covers to be lifted and inspected for sediment build up, remove as required	Yearly	Occupier / Owner

4. FOUL WATER DRAINAGE

As part of the proposed building drainage strategy, it is proposed that foul drainage is to connect to a new combined chamber, before outfalling to a new chamber built on the existing public combined sewer located in Longworth Street.

United Utilities records indicate an existing 450 x 600mm sewer in this location however do not provide depth information. It is likely that the existing combined sewer serves neighbouring developments and will be of sufficient depth to support a gravity connection. Depths of the existing sewer at the proposed discharge location should be confirmed prior to construction.

A non return valve should be provided at the outfall to ensure surcharging from the public sewer does not enter the private drainage network.

Using the Units Discharge Method and the current architects site layout, an approximate peak flow has been calculated as 1.92 l/s for the proposed development.

It is assumed that the works of converting existing office space into residential units will re-utilise the existing drainage infrastructure.

5. CONCLUSIONS

In summary, the proposed building will be drained into separate surface water and foul networks, combining with a new chamber before outfalling to a new chamber built on existing United Utilities combined sewer located within Longworth Street.

Large diameter pipes will be provided to ensure the proposed discharge rates provide a minimum 50% betterment to existing brownfield runoff rates.

It is assumed that the works of converting existing office space into residential units will re-utilise the existing drainage infrastructure

Hydrock Consultants Limited

Appendix A - Existing Drainage Strategy

Reference	Title
1880277-05-08-2020-02-08-51.pdf	United Utilities Sewer Records

Luke Pilsbury

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SK14NP**

FAO:

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Property Searches
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Telephone: 0370 7510101

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**Your Ref: C-16495
Our Ref: UUPS-ORD-180277
Date: 05/08/2020**

Dear Sirs

Location: 8-8a St John Street

I acknowledge with thanks your request dated 30/07/2020 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.



Reho	Cover	Func	Invert	Size x	Size y	Shape	Mat	Length	Grad
35	35	CO	27.32	300	300	VC	27.32	1 in 161	
3066	30.86	CO	27.63	300	300	VC	37.10795		
3615		VC		225	225	VC	6.17599		
4007		VC		225	225	VC	6.69942		
5803		CO		0	0	VC	5.173639		
4103	30.8	CO	28.29	525	525	VC	12.68628	1 in 127	
3106	30.8	CO	26.68	525	525	VC	18.97692	1 in 90	
4712		VC		150	150	VC	9.006602	1 in 240	
5701	35.76	CO	32.7	450	450	CO	69.57011		
5053	39.9	CO	31.65	150	150	VC	18.12295		
2706	32.81	CO	28.87	375	375	CO	23.76975	1 in 10	
6603	37.02	CO	31.39	1500	1500	CO	13		
3604		VC		850	850	VC	18.12295		
2102	28.41	CO	25.48	450	450	BR	8.246211		
5202	35.26	VC	31.23	150	150	VC	9.846858		
6802	18.48	CO	14.43	600	600	VC	35.72598		
4107	39.9	CO	28.97	525	525	BR	7.786209		
4609		VC		100	100	BR	19.89062		
3009	30.93	CO	23.25	450	450	VC	11.7047		
5704		CO		450	450	CO	79.71198		
5104	34.99	CO	0	1500	1500	CO	14.62149		
5001	34.18	CO	31.23	225	225	VC	35.1534		
3650	34.2	CO	27.14	1500	1500	CO	48.76961	1 in 139	
4107	39.9	CO	28.97	525	525	BR	15.04418	1 in 84	
2006	28.55	CO	26.22	150	150	VC	4		
2701	33.05	CO	28.12	300	300	BR	10.1884		
2703	33.04	CO	25.9	1500	1500	CO	14.58341		
1703	31.98	CO	22.21	620	620	BR	106.6077		
4104	30.8	CO	26.47	525	525	CO	8.509722	1 in 53	
6602	36.37	CO	22.74	900	900	BR	19.39703	1 in 129	
7101	35.72	CO	30.06	450	450	VC	49.61968	1 in 66	
3710		VC		225	225	VC	12.82427		
2802		VC		150	150	VC	10.86396		
4106		CO		225	225	VC	47.43575		
3007	30.93	CO	27.38	300	300	VC	8.062258	1 in 17	
4205	30.9	CO	27.84	225	225	VC	9.446328	1 in 189	
4904		VC		150	150	VC	2.78273		
4003	30.83	CO	26.11	450	450	VC	8.062258		
5902	34.19	CO	31.03	375	375	CO	55.66567		
4100	33.12	CO	28.27	600	600	VC	71.66215	1 in 87	
2903	32.21	CO	28.18	525	525	BR	77.7945	1 in 37	
3105	30.9	CO	28.87	525	525	BR	22.526	1 in 78	
5912		VC		0	0	VC	5.017198		
4802	34.21	CO	31.75	150	150	VC	2.155489		
4608		VC		2400	2400	BR	27.90048		
1906		VC		375	375	VC	39.10498	1 in 81	
6601	35.88	CO	32.13	1500	1500	CO	74.2159	1 in 100	
3072	31.73	CO	27.84	300	300	CO	25.08195		
2001		VC		100	100	VC	5.741253		
3662	33.74	CO	0	500	500	BR	41.14608		
2707	33.5	CO	22.19	600	600	BR	63.15853	1 in 1263	
6906	19.09	CO	0	450	450	VC	18.24829		
7609	37.12	CO	36.04	1500	1500	VC	1.09062		
3001	39.2	CO	27.02	675	675	CO	45.35416	1 in 1402	
7907	37.82	CO	36.14	375	375	BR	94.1997		
7901	28.04	CO	24.74	610	610	VC	66.28725		
4204	30.9	CO	28.19	525	525	VC	48.85856	1 in 147	
6607	38.01	CO	30.0	300	300	CO	10.29693		
2022		VC		100	100	VC	13.99364	1 in 919	
2601	33.75	CO	26.77	1500	1500	VC	91.91747		
2806	33.42	CO	31.38	225	225	VC	32.69555		
3003	29	VC	23.4	500	500	VC	41.97618		
6907	27.13	CO	25.03	450	450	VC	22.56103		
2004	29.38	CO	22.86	610	610	BR	66.45038	1 in 3585	
3701	34.12	CO	22.12	600	600	BR	35.8489		
5025		VC		150	150	VC	3.688209		
2005	26.13	CO	23.27	375	375	VC	13.67286		
1106	27.68	CO	22.82	610	610	BR	57.98276		
5805		VC		0	0	VC	5.502263		
7803	39.37	CO	34.88	450	450	VC	4.472136		
6908		VC		150	150	VC	1.124853		
4021		CO		450	450	VC	8.062258		
2003	29.3	CO	25.97	675	675	CO	34.48188		
4203		BR		330	330	CO	29.31742		
6802	18.46	CO	0	600	600	CO	35.6743		
2906		VC		225	225	VC	38.38915		
6801		CO		450	450	CO	61.98387		
2808		VC		375	375	CO	21.99962	1 in 54	
5602	35.48	CO	31.92	450	450	CO	80.65358		
7905	37.89	CO	34.47	300	300	BR	25.491	1 in 67	
4704	35.36	CO	21.81	2400	2400	BR	137.6483		
2901		VC		225	225	VC	9.54094		
4803	34.44	CO	31.43	450	450	BR	43.9659	1 in 92	
2702	33.12	CO	25.87	1500	1500	CO	14.56022	1 in 89	
6016	36.47	CO	31.34	300	300	CO	95.6015	1 in 803	
5109		VC		1500	1500	CO	11.49039		
6105	35.85	CO	31.64	450	450	BR	32.11074		
3601	33.28	CO	25.58	540	540	BR	48.27007		
5801		VC		150	150	VC	5.380016		
4711		VC		150	150	VC	10.16274		
6215		VC		150	150	BR	14.88882	1 in	
5224		BR		330	330	VC	41.62415		
2103		CO		150	150	VC	25.4521		
2804		VC		100	100	SW	15.08994		
5101		VC		225	225	VC	11.71805		
4714		CO		150	150	VC	12.22432		
2203	26.62	CO	22.95	150	150	BR	12.20556		
5016	34.43	CO	22.9	1500	1500	CO	11.04536	1 in 33	
3905	33.63	CO	31.01	225	225	VC	9.216544	1 in 873	
4805	35.27	CO	21.7	2300	2300	BR	113.3019		
4013		CO		375	375	CO	89.73551		
2902		CO		675	675	VC	66.76077		
3011	30.95	CO	27.85	675	675	VC	3.398345		
4008		VC		225	225	VC	4.936335		
4801	34.39	CO	31.94	300	300	VC	17.72095	1 in 104	
5801	34.79	CO	21.81	2400	2400	BR	70.2262	1 in 760	
5703	17.87	CO	0	450	450	CO	32.57299		
7907	37.82	CO	36.14	375	375	VC	191.1125	1 in 342	
3807	33.44	CO	30.27	375	375	VC	48.00018		
7211	37.01	CO	30.72	450	450	BR	37.57699		
4707		VC		225	225	VC	8.214025		
3005	30.09	CO	28.98	225	225	VC	2		
4706		VC		150	150	VC	2.107917		
4713		VC		150	150	VC	7.194736		
2001	27.9	CO	0	900	900	VC	6.324555		
6006		VC		150	150	VC	4.035575		
3806	33.49	CO	30.48	440	440	BR	12.5996		
3008	30.99	CO	22.45	610	610	BR	15.29706		
6901	36.94	CO	34	375	375	CO	11.40175		
3601	33.4	CO	0	300	300	VC	31.89044		
6104	35.31	CO	22.7	500	500	BR	84.45054		
4105		VC		225	225	VC	36.7216		
5903	34.5	CO	29.58	450	450	CO	9.433951	1 in 1	
6204	25.52	CO	26.3	450	450	VC	6.324555		
7608	37.09	SW	34.32	300	300	VC	33.52111	1 in 17	
3804	34.07	CO	33.04	225	225	VC	1.170818		
5026		VC		150	150	VC	26.30589		
6812		VC		32.83	470	VC	4.046947		
2801	33.17	CO	30.67	300	300	BR	20.89061	1 in 54	
1708	32.57	CO	26.15	600	600	VC	56.73385		
5604	35.71	CO	32.67	450	450	VC	31.62278		
4809		VC		0	0	VC	6.123645		
5105	34.92	CO	29.32	600	600	BR	16.05497		
3603		CO		360	360	BR	5.385165		
4808	35.15	CO	31.85	450	450	BR	25		
3601	34.38	CO	26.9	375	375	VC	28.6531	1 in 60	
6107	35.29	CO	32.28	450	450	VC	28.4212		
5017		VC		150	150	VC	7.74434		
5102	34.62	CO	29.04	1500	1500	CO	56.58445		
3707	34.82	CO	30.88	100	100	VC	52.80151		
4805		VC		150	150	VC	1.887158		
3702	34.7	CO	22.08	600	600	BR	23.78973		
4715		VC		225	225	BR	8.51484		
5006	33.26	CO	30.04	500	500	VC	36.34556		
3004	30.09	CO	0	300	300	VC	77.88453		
3025		VC		150	150	VC	2.959502		
2704	33.44	CO	30.36	480	480	BR	19.64688		
5211		VC		150	150	VC	6.686747		
3618		VC		100	100	VC	13.90268	1 in 38	
1004	25.65	CO	22.97	675	675	CO	40.34083		
5029		VC		225	225	VC	18.49644		
5028		VC		225	225	VC	10.58126		
1104		BR		680	680	BR	7.211022		
5229		VC		150	150	VC	3.336106		
2007		VC		610	610	BR	61.04326		
5004									

Appendix B - Proposed Drainage Strategy

Reference	Title
C16495-HYD-XX-XX-DR-C-0500_P01	Proposed Drainage Layout



1. THIS DRAWING IS NOT TO BE SCALED.
2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BEFORE THE COMMENCEMENT OF WORKS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ARCHITECT AND ENGINEER FOR VERIFICATION. FIGURED DIMENSIONS ONLY ARE TO BE TAKEN FROM THIS DRAWING.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS' AND SERVICE ENGINEERS' DRAWINGS AND SPECIFICATIONS.
4. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
5. EXISTING GROUND INFORMATION SHOWN ON THIS DRAWING IS BASED UPON CPLTS TOPOGRAPHICAL SURVEY "130520JC-01" DATED 13.05.20.
6. PROPOSED SITE LAYOUT AND DRAINAGE LAYOUT BASED UPON TIM GROOM ARCHITECTS GROUND FLOOR PLAN DRAWING "1084-TGA-B2-00-DR-A-0300" REV P2 DATED 03/18/20.
7. EXISTING PUBLIC DRAINAGE BASED UPON UNITED UTILITIES RECORDS DRAWING "180277-05-08-2020-02-08-51.PDF" DATED 05/08/20.

- Proposed Building Works Boundary
- Proposed Office Conversion Boundary
- Proposed Surface Water Drainage
- Proposed Rain Water Pipe
- Proposed Drainage Channel
- Proposed Attenuation Tank
- Proposed Foul Drainage
- Proposed Combined Drainage
- Existing Combined Sewer

Hydrock

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e: manchester@hydrock.com

PROJECT

8-8A ST JOHN STREET,
MANCHESTER

HYDROCK PROJECT NO. C-16495	SCALE @ A1 1:100
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STATUS DESCRIPTION	STATUS
INFORMATION	
DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
C16495-HYD-XX-XX-DR-C-0500	P02

Appendix C - Existing Drainage Calculations

Reference	Title
ICP SUDS QBAR calculation	ICP SUDS QBAR calculation

Hydrock Consultants Ltd		Page 1
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Date 12/08/2020 10:45	Designed by Lukepilsbury	
File	Checked by	
Innovyze	Source Control 2018.1.1	
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 2 Soil 0.450 Area (ha) 0.021 Urban 0.000 SAAR (mm) 869 Region Number Region 10 Results 1/s QBAR Rural 0.1 QBAR Urban 0.1 Q2 years 0.1 Q1 year 0.1 Q30 years 0.2 Q100 years 0.2		
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Appendix D - Proposed Drainage Calculations

Reference	Title
C16495-HYD-XX-XX-CA-C-0500_P01	Proposed Surface Water Calculations

Hydrock Consultants Ltd		Page 2
		Micro Drainage
Date 12/08/2020 16:05	Designed by Lukepilsbury	
File Surface Water-P01.MDX	Checked by	
Innovyze	Network 2018.1.1	
Online Controls for Storm		
Hydro-Brake® Optimum Manhole: S2, DS/PN: S1.001, Volume (m³): 1.2		
Unit Reference MD-SHE-0061-1200-0300-1200 Design Head (m)0.300 Design Flow (l/s)1.2 Flush-Flo™Calculated ObjectiveMinimise upstream storage ApplicationSurface Sump AvailableYes Diameter (mm)61 Invert Level (m)33.086 Minimum Outlet Pipe Diameter (mm)75 Suggested Manhole Diameter (mm)1200		
Control Points Head (m)Flow (l/s) Design Point (Calculated)0.3001.2 Flush-Flo™0.0941.2 Kick-Flo®0.2181.0 Mean Flow over Head Range-1.0		
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) 0.1001.21.2002.23.0003.47.0005.2 0.2001.11.4002.43.5003.77.5005.4 0.3001.21.6002.64.0003.98.0005.6 0.4001.41.8002.74.5004.28.5005.8 0.5001.52.0002.85.0004.49.0005.9 0.6001.62.2003.05.5004.69.5006.1 0.8001.92.4003.16.0004.8 1.0002.12.6003.26.5005.0		
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Hydrock Consultants Ltd		Page 3
		
Date 12/08/2020 16:05 File Surface Water-P01.MDX	Designed by Lukepilsbury Checked by	
Innovyze Network 2018.1.1		

Hydrock Consultants Ltd							Page 5																																																													
. . .							Micro Drainage																																																													
Date 12/08/2020 16:05				Designed by Lukepilsbury																																																																
File Surface Water-P01.MDX				Checked by																																																																
Innovyze				Network 2018.1.1																																																																
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>																																																																				
<u>Simulation Criteria</u>																																																																				
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 Coeffiecient		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		0.363																																																														
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		ON																																																																		
DVD Status		OFF																																																																		
Inertia Status		OFF																																																																		
Profile(s)		Summer and Winter																																																																		
Duration(s) (mins)		15, 30, 60, 120, 240, 360, 480, 960, 1440																																																																		
Return Period(s) (years)		1, 30, 100																																																																		
Climate Change (%)		0, 0, 40																																																																		
<table><tr><td></td><td>US/MH</td><td></td><td>Return</td><td>Climate</td><td>First (X)</td><td>First (Y)</td><td>First (Z)</td><td>Overflow</td><td>Water</td></tr><tr><td>PN</td><td>Name</td><td>Storm</td><td>Period</td><td>Change</td><td>Surcharge</td><td>Flood</td><td>Overflow</td><td>Act.</td><td>Level</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>(m)</td></tr><tr><td>S1.000</td><td>S1</td><td>30 Winter</td><td>30</td><td>+0%</td><td>30/30 Winter</td><td></td><td></td><td></td><td>33.437</td></tr><tr><td>S1.001</td><td>S2</td><td>30 Winter</td><td>30</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td><td>33.436</td></tr><tr><td>S1.002</td><td>S2</td><td>30 Winter</td><td>30</td><td>+0%</td><td></td><td></td><td></td><td></td><td>33.102</td></tr></table>										US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water	PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level										(m)	S1.000	S1	30 Winter	30	+0%	30/30 Winter				33.437	S1.001	S2	30 Winter	30	+0%	30/15 Summer				33.436	S1.002	S2	30 Winter	30	+0%					33.102
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water																																																											
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	Level																																																											
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S1.000	S1	30 Winter	30	+0%	30/30 Winter				33.437																																																											
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S1.002	S2	30 Winter	30	+0%					33.102																																																											
<table><tr><td></td><td>US/MH</td><td>Depth</td><td>Volume</td><td>Flow /</td><td>Overflow</td><td>Pipe</td><td></td><td>Level</td></tr><tr><td>PN</td><td>Name</td><td>(m)</td><td>(m³)</td><td>Cap.</td><td>(l/s)</td><td>Flow</td><td>Status</td><td>Exceeded</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td>(l/s)</td><td></td><td></td></tr><tr><td>S1.000</td><td>S1</td><td>0.037</td><td>0.000</td><td>0.09</td><td></td><td>4.2</td><td>SURCHARGED</td><td></td></tr><tr><td>S1.001</td><td>S2</td><td>0.201</td><td>0.000</td><td>0.12</td><td></td><td>1.3</td><td>SURCHARGED</td><td></td></tr><tr><td>S1.002</td><td>S2</td><td>-0.119</td><td>0.000</td><td>0.10</td><td></td><td>1.3</td><td>OK</td><td></td></tr></table>										US/MH	Depth	Volume	Flow /	Overflow	Pipe		Level	PN	Name	(m)	(m³)	Cap.	(l/s)	Flow	Status	Exceeded							(l/s)			S1.000	S1	0.037	0.000	0.09		4.2	SURCHARGED		S1.001	S2	0.201	0.000	0.12		1.3	SURCHARGED		S1.002	S2	-0.119	0.000	0.10		1.3	OK							
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S1.001	S2	0.201	0.000	0.12		1.3	SURCHARGED																																																													
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