

DRAINAGE CONDITION REPORT

for

Armistead Property Limited

at

**59 Upper Chorlton Road,
Manchester, M16 7RQ**

Quality Management

Job No	12830		
Project	59 Upper Chorlton Road		
Location	Manchester, M16 7RQ		
Title	Drainage Condition Report		
Document Ref	-	Issue / Revision	01
File reference	59 Upper Chorlton Road - Drainage Condition Report.docx		
Date	30 th November 2021		
Prepared by	R Andrew James MEng CEng MIStructE	Signature (for file)	
Checked by	Mark B Donohue BEng(hons) CEng MIStructE	Signature (for file)	

Revision History

Rev	Date	Issue / Purpose/ Comment	Prepared	Checked
01	30.11.21	Final Issue	AJ	MD

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1 Introduction

- 1.1 In 2019 a planning application was submitted to Manchester City Council for the construction of a four storey extension to rear elevation, dormer extension and elevational alterations involved in refurbishment of 10 existing 1 bed/bedsit flats to provide 17 flats with associated car parking and landscaping works at 59 Upper Chorlton Road, Manchester, M16 7RQ. No Drainage information was submitted with the application. Planning approval was granted in December 2019 (Ref: 124976/FO/2019) subject to a number of planning conditions, including one condition relating to the drainage of the development.
- 1.2 This report has been prepared to remove the drainage related planning condition relevant to the application. This is condition No. 5.

2 Drainage Strategy

2.1 Existing Drainage

The United Utilities sewer records have been reviewed and confirms there are a number of large diameter combined water sewers located in Upper Chorlton Road.

There is also a 1350 x 1050mm surface water sewer at 6m depth.

The current site can be classed as brownfield and outfalls unrestricted to the combined sewer via a 150mm diameter connection.

Figure 1 below identifies the existing sewer records.

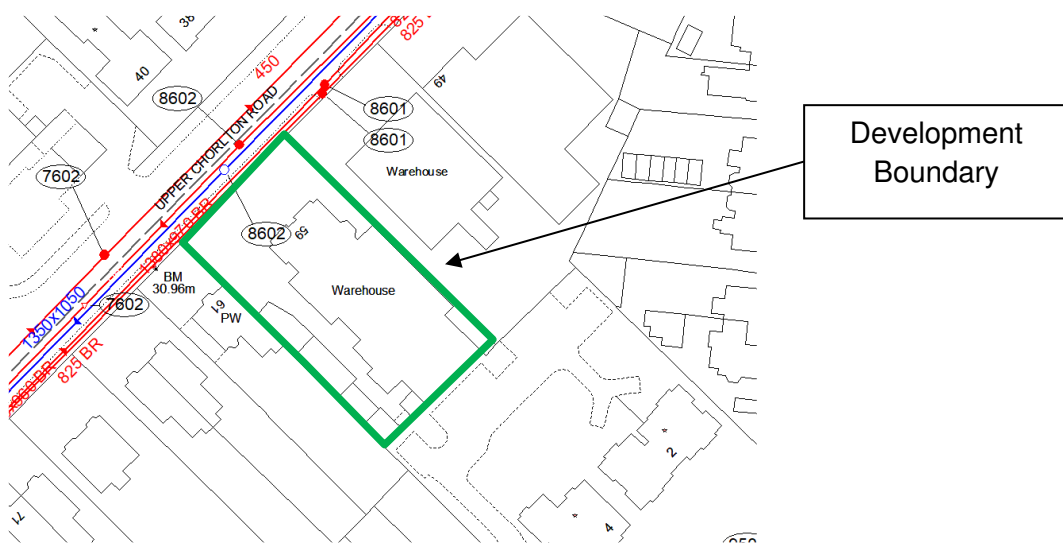


Figure 1: UU sewer Records

2.2 Geotechnical Assessment

A Phase 2 site investigation has not been completed at the site. However trial pits have determined the underlying ground to be sand and thus suitable for infiltration. Soakaway tests have been completed by the developer with results defined at 4.7×10^{-6} m/s.

2.3 SuDS Hierarchal Approach

Based on the existing drainage configuration, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in detail below:

Method	Suitability	Suitability for Development
Infiltration to Ground	Yes	Investigation of local ground conditions has confirmed that the underlying ground is suitable for infiltration.
Connection to Watercourse	No	There is no watercourse in close proximity to the site.
Connection to Surface Water Sewer	No	Higher options possible.
Connection to Combined Water Sewer	No	Higher options possible.

Figure 2: SuDS Hierarchal Approach

2.4 Surface Water Drainage Strategy

The general principal of the surface water drainage strategy is to collect the runoff from the roofs of the main building and direct it to a number of new RWPs that will drop down to a new surface water network on either side. The access road will drain to the parking bays that will be constructed in a permeable surfacing and allow infiltration direct to the underlying sand. The new drainage will then outfall to a geocellular soakaway chamber in the centre of the rear car park.

Full calculations have been carried out and show no flooding up to and including the 100yr + 40% climate change storm event.

2.5 Maintenance

The drainage network encompasses standard pipework, manholes and geocellular infiltration tank. As long as the gullies at the base of the rainwater pipes are kept clear of leaves and detritus by regular inspection by the property owners then this should negate it passing into the network.

All management and maintenance of the drainage will be with a management company. This will involve general maintenance of the drainage network in accordance with best practice. All drainage will remain private and not be adopted by the local sewerage authority.

Typically the maintenance regime will be in line with the table below.

Future Maintenance of the Drainage System			
Responsibility	Feature	Maintenance	Frequency
Management Company	Drainage Channel.	Regular maintenance / removal of blockages and silts.	Ad-hoc flushing / jetting and emptying of silt traps required.
	Rainwater gutters, downpipes and above ground drainage.	Regular maintenance and inspections.	Ad-hoc sweeping and emptying of silt and debris required. Annual visual inspections to check for damage/leaks.
	Geocellular Attenuation Tanks	Regular maintenance / removal of blockages and debris.	Annual inspection and following significant rainfall events.
	Pipes, sewers, manholes	Regular maintenance / removal of blockages and debris.	Annual inspection and removal of silts if required.

Figure 3: Management & Maintenance Plan

3 Drainage Related Planning Condition and Responses

3.1 Planning Conditions

The specific condition is written below with the M&G response in Blue beneath

Condition 5.

No development shall take place until surface water drainage works, designed in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacement national standards, have been submitted to and approved in writing by the Local Planning Authority. In order to avoid/discharge the above drainage condition the following additional information has to be provided:

As described in Section 2, an assessment of the existing ground conditions and a full assessment of the SuDS Hierarchal approach has been considered. This has determined that the surface water discharge option is to outfall to a geocellular infiltration tank.

The drainage GA drawing in Appendix A and calculations in Appendix B define further.

Below is the M&G response to the further 6 points raised as part of the condition:

1. Infiltration testing has proven that the ground is suitable for soakaways which is on top of the SuDS hierarchal approach.
2. Appendix A provides the drainage GA. Calculations in Appendix B has proven there is no exceedance flooding. Note that although the model shows flooding for the 100yr + 40% CC peak storm event, this volume would be encompassed within the area of permeable surfacing and land drainage, thus not flooding the surface.
3. Attenuation will take the form of a geocellular infiltration tank. Thus no flows discharging off site.
4. The building is elevated above the adjoining pathways, access road and car park. Any exceedance from blockage will be retained on the access road and car park and not pose a risk to the new building or adjacent properties. Flood flow arrows are shown on the drainage GA.
5. Refer to Appendix B for the hydraulic calculations.
6. All the drainage is standard drainage pipes, manholes and gullies. Details for maintaining the geocellular soakaway will be in line with Ciria guidance. A management company will take on the responsibility for maintaining all the new drainage within the scheme. Final details of the management company have yet to be confirmed.

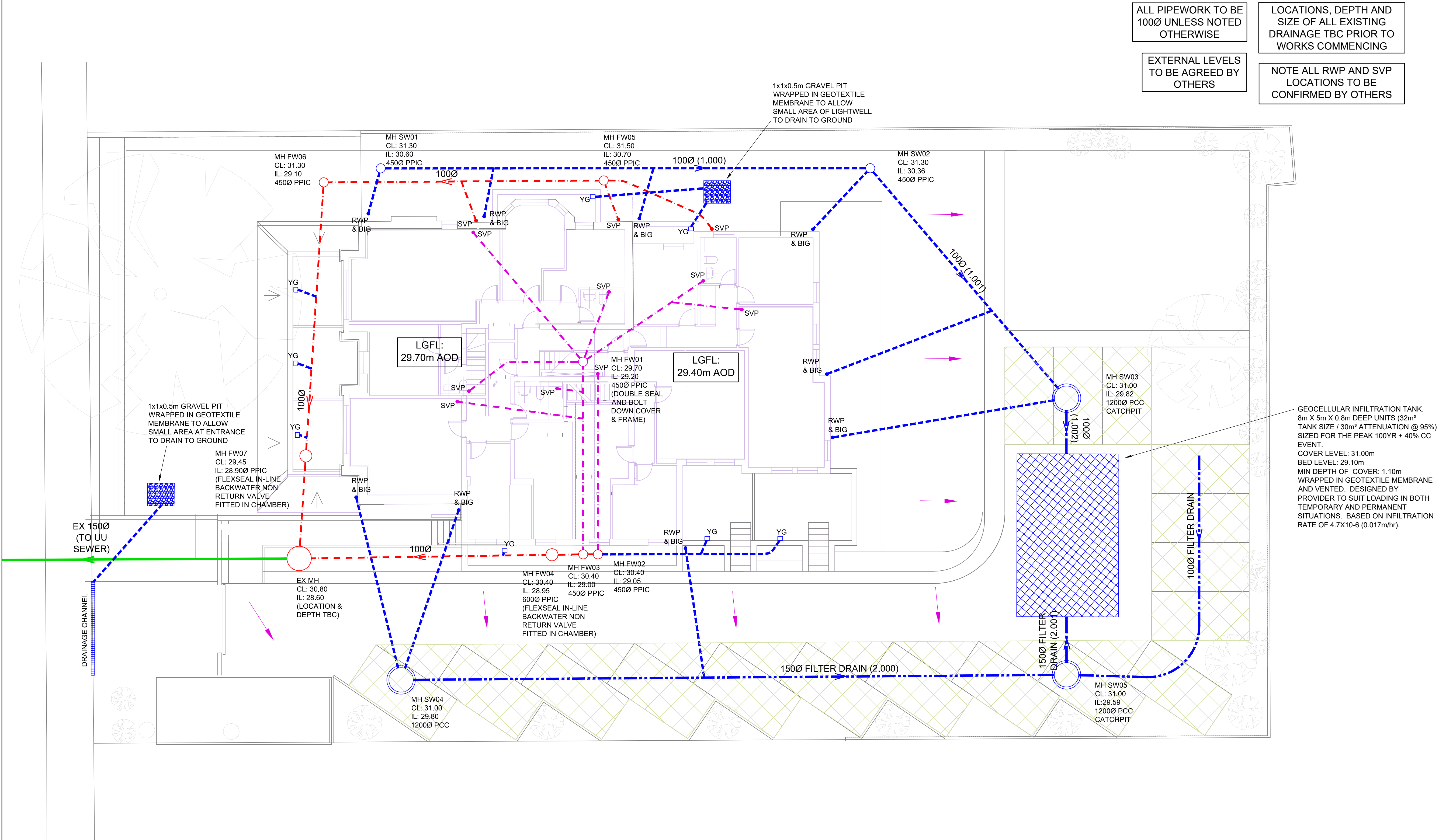
Appendix A – Marston & Grundy Drawings

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, SPECIFICATIONS AND DOCUMENTATION.
2. THE POSITION, SIZE AND LEVELS OF ALL DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.
3. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED. ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE NOTED.
4. THE CONTRACTOR SHALL ALLOW FOR THE PROTECTION, TEMPORARY AND PERMANENT SUPPORT AND DIVERSION WORKS AS NECESSARY, TO ALL EXISTING SERVICES TO THE SATISFACTION OF THE PUBLIC UTILITIES.
5. THE CONTRACTOR SHALL ALLOW FOR DEALING WITH SURFACE WATER RUN-OFF INTO EXCAVATIONS AND FROM GROUNDWATER BY MEANS OF SUMPS, PUMPING AND DE-WATERING AS APPROPRIATE, IN ORDER TO KEEP THE EXCAVATION AS REASONABLY DRY AS POSSIBLE DURING THE CONSTRUCTION OF THE WORKS.
6. ALL PRIVATE DRAINAGE WITHIN THE SITE IS TO COMPLY WITH THE REQUIREMENTS OF THE RELEVANT BRITISH/EUROPEAN STANDARD AND THE BUILDING REGULATIONS PART H. CONCRETE PROTECTION TO PIPEWORK IS TO BE PROVIDED AS FOLLOWS:
 - a) ALL PIPEWORK WITHIN PEDESTRIAN/SOFT AREAS WITH LESS THAN 600MM COVER.
 - b) ALL PIPEWORK SUBJECT TO VEHICULAR OVERRUN WITH LESS THAN 1.2M COVER.
7. ALL PIPEWORK WITHIN MANHOLES ARE TO BE LAID SOFFIT TO SOFFIT (U.N.O.) ALL CHAMBER INVERT LEVELS ARE FOR THE OUTGOING PIPE LEVELS. BACKDROP PIPEWORK SHALL BE CONNECTED AT SOFFIT TO SOFFIT WITH THE RODDING ACCESS LEVEL SPECIFIED.
8. ANY GRADIENTS OF DRAINS INDICATED ARE INDICATIVE ONLY AND THE CONTRACTOR SHALL INSTALL THE DRAINS TO THE SPECIFIED LEVELS SHOWN FOR EACH MANHOLE (U.N.O) CATCHPIT INVERT LEVELS ARE FOR THE OUTGOING PIPE WITH THE SUMP LEVEL SPECIFIED SEPARATELY.
10. CO-ORDINATE SETTING OUT INFORMATION FOR MANHOLES IS TO THE INTERSECTION THE DRAINS AND NOT THE CENTRE OF THE MANHOLE.

11. COVER LEVELS OF THE MANHOLES ARE PROVISIONAL AND SUBJECT TO ADJUSTMENT ON SITE TO SUIT THE FINISHED GROUND LEVELS. ALL EXTERNAL WORKS CONSTRUCTION AREAS TO BE AS LOCATED BY THE ARCHITECT.
12. MANHOLE COVERS AND FRAMES ARE TO BE IN ACCORDANCE WITH THE RELEVANT BRITISH/EUROPEAN STANDARD AND THE FOLLOWING:
 - a) VEHICULAR AREAS: CLASS E600 & D400, DOUBLE TRIANGULAR, 150MM DEEP DUCTILE IRON COVER AND FRAME WITH THREE POINT COVER SEATING, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
 - b) PEDESTRIAN AREAS: CLASS B125/C250, 100MM DEEP, BADGED FW OR SW FOR FOUL OR SURFACE WATER DRAINAGE.
 13. DOUBLE SEAL MANHOLE COVERS AND FRAMES ARE TO BE USED ON INTERNAL FOUL WATER DRAINAGE CHAMBERS. FINISH TO BE CONFIRMED BY THE ARCHITECT.
 14. HEAVY DUTY COVER SLABS ARE TO BE USED WITHIN VEHICULAR TRAFFICKED AREAS.
 15. GULLY GRATINGS AND STEEL CHANNEL COVERS ARE TO BE IN ACCORDANCE WITH THE RELEVANT BRITISH/EUROPEAN STANDARD AS FOLLOWS:
 - a) AREAS SUBJECT TO VEHICULAR OVERRUN: CLASS D400 MINIMUM.
 - b) AREAS NOT SUBJECT TO REGULAR VEHICLE OVERRUN (ADJACENT TO KERBS ETC): CLASS C250.
 - c) GULLY GRATES ADJACENT TO KERBS SHALL BE HINGED ON THE SIDE OF THE TRAFFIC DIRECTION (LEFT HAND SIDE).
 16. POSITIONS AND SIZES OF ABOVE GROUND FOUL AND SURFACE WATER DRAINAGE CONNECTIONS ARE TO BE CONFIRMED PRIOR TO CONSTRUCTION WITH THE ARCHITECT AND M&E ENGINEER.
 17. DIAMETER OF PCC MANHOLES VARIES WITH PIPE SIZE, AND IS TO BE IN ACCORDANCE WITH THE TABLES SHOWN ON THE ACCOMPANYING MARSTON & GRUNDY STANDARD DETAILS DRAWINGS.
 18. ALL BRICKWORK IN CONNECTION WITH DRAINAGE IS TO BE SOLID CLASS B ENGINEERING BRICK TO THE RELEVANT BRITISH/EUROPEAN STANDARD.

19. ALL PRECAST CONCRETE PIPES, CHAMBER PRODUCTS AND ROAD GULLIES SHALL BE TO THE RELEVANT BRITISH/EUROPEAN STANDARD AND SHOULD BE KITE-MARKED/CE-MARKED ACCORDINGLY.
20. INSITU CONCRETE GRADES TO BE AS STATED ON THE DRAWINGS. DESIGN CHEMICAL CLASS FOR ALL PRECAST CONCRETE PRODUCTS SHALL BE D4 UNLESS AGREED OTHERWISE.
21. ALL BELOW GROUND PLASTIC/GRP TANKS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS. THEY SHALL BE PROVIDED WITH SUFFICIENT CONCRETE SURROUND TO COUNTER FLOATATION AND SHALL HAVE A WALL THICKNESS ADEQUATE TO RESIST THE HIGHEST GROUND WATER LEVEL WHICH COULD BE ENCOUNTERED AT THEIR LOCATION.
22. ALL EXISTING DRAINAGE/STRUCTURES TO BE ABANDONED SHALL BE BROKEN OUT AND REMOVED FROM SITE, THE EXCAVATION SHALL BE BACKFILLED WITH A SUITABLE GRANULAR MATERIAL TO THE REQUIRED LEVEL. ALTERNATIVELY, DEEP DRAINS MAY BE CLEANED AND GROUTED WITH A 1:10 CEMENTITIOUS GROUT, WITH STRUCTURES BROKEN DOWN 1M BELOW FINISHED GROUND LEVEL AND BACKFILLED WITH A SUITABLE GRANULAR MATERIAL.
23. WHERE UTILITY/LAND DRAINAGE TRENCHES ETC CROSS OVER DRAINAGE TRENCHES, THE CONTRACTOR SHALL CONSTRUCT AN IMPERMEABLE BARRIER TO PREVENT GROUNDWATER INFILTRATING INTO THE DRAINAGE TRENCH.
24. UPON COMPLETION OF THE WORKS THE CONTRACTOR SHALL CLEAN ALL DRAINAGE BY JETTING, REMOVING ALL DEBRIS FROM SITE. NO DEBRIS SHALL BE PERMITTED TO ENTER THE EXISTING DRAINAGE SYSTEM.
25. ALL WORKS ARE ASSUMED TO BE WITHIN PUBLIC HIGHWAY OR WITHIN LAND OWNERS LANDS & NO WORKS ARE REQUIRED ON THIRD PARTY LAND OWNERS PROPERTY.
26. ALL RWP, GULLY AND CHANNEL CONNECTIONS SHALL BE 150MM DIA U.N.O. WASTE/SOIL STACK CONNECTIONS SHALL BE 100MM DIA. UNO AND SHALL HAVE INTERNAL ABOVE GROUND RODDING EYES OR LARGE ACCESS FITTINGS IN ACCORDANCE WITH BUILDING REGULATIONS.

27. DESIGN ASSUMES THAT NO WATER AUTHORITY SEWERS OR OTHER DRAINAGE SYSTEMS
REQUIRE MODIFICATION, DIVERSION OR ABANDONING.
28. BACKFILL TO ALL DRAINAGE TRENCHES TO BE CLASS GF1 MATERIAL.
29. ALL WORKS WITHIN THE PUBLIC HIGHWAY TO BE REINSTATED TO HIGHWAY AUTHORITY
REQUIREMENTS.
30. NO DEVELOPING TREES/VEGETATION SHOULD BE PLANTED WITHIN 5.0M OF ANY
DRAINAGE WORKS.
31. ALL WPC'S, SRWP'S AND RWP'S ARE SHOWN INDICATIVELY. LOCATIONS SHALL BE
CONFIRMED BY OTHERS.
32. ALL MANHOLES LESS THAN 1.5M DEEP ARE CONSIDERED AS NONE MAN ENTRY AND SHALL
BE MAINTAINED FROM GROUND LEVEL.



ALL PIPEWORK TO BE
100Ø UNLESS NOTED
OTHERWISE

EXTERNAL LEVELS TO BE AGREED BY OTHERS

LOCATIONS, DEPTH AND
SIZE OF ALL EXISTING
DRAINAGE TBC PRIOR TO
WORKS COMMENCING

NOTE ALL RWP AND SVP
LOCATIONS TO BE
CONFIRMED BY OTHERS

NOTES

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KEY

- | | |
|---|---------------------------------------|
|  | EXISTING COMBINED WATER DRAINAGE |
|  | PROPOSED FOUL WATER DRAINAGE |
|  | PROPOSED BASEMENT FOUL WATER DRAINAGE |
|  | PROPOSED SURFACE WATER DRAINAGE |
|  | PROPOSED LAND DRAIN |
|  | PROPOSED PERMEABLE SURFACING |
| RWP | RAINWATER PIPE |
| SVP | SOIL VENT PIPE |
| BIG | BACK INLET GULLY |
| RG | ROAD GULLY |
| YG | YARD GULLY |
| RE | RODDING EYE |
| SG | SUMP GULLY FOR DRAINAGE CHANNEL |
|  | EXCEEDANCE FLOOD ARROW |

P1	PRELIMINARY ISSUE	PG	30.11.21	MD
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Marston & Grundy LLP
Consulting Engineers

Priory House, Ellesmere Ave
Marple, Stockport, Cheshire, SK6 7AN
Telephone: 0161 427 7231
Email: mail@marstonandgrundy.com

Client
ARMISTEAD PROPERTY LIMITED

Project
59 UPPER CHORLTON ROAD
WHALLEY RANGE, MANCHESTER

DRAINAGE GA

PRELIMINARY

Project No.	Scale @ A1	Date	Drawn	Checked			
12830	1:100	30.11.21	PG	MD			
Drawing Identifier							
project	origin	zone	level	file type	role	number	revision
UCR-MaG-ZZ-00-DR-C-00100							P1

Appendix B – Hydraulic Calculations

		Page 1
	Upper Chorlton Road SW Network	
Date 30/11/2021 File UCR - SW Network.MDX	Designed by paulg Checked by	
Innovyze	Network 2017.1.2	

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)	2	PIMP (%)	100
M5-60 (mm)	18.000	Add Flow / Climate Change (%)	0
Ratio R	0.370	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.064	4-8	0.014

Total Area Contributing (ha) = 0.078

Total Pipe Volume (m³) = 1.117

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)	Section Type	Auto Design
1.000	24.000	0.240	100.0	0.011	4.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	14.000	0.440	31.8	0.008	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	3.000	0.030	100.0	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	32.000	0.213	150.2	0.044	4.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	3.000	0.020	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

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	50.00	4.52	30.600	0.011	0.0	0.0	0.0	0.77	6.0	1.5
1.001	50.00	4.69	30.360	0.019	0.0	0.0	0.0	1.37	10.8	2.6
1.002	50.00	4.76	29.920	0.024	0.0	0.0	0.0	0.77	6.0	3.2
2.000	50.00	4.65	29.800	0.044	0.0	0.0	0.0	0.82	14.4	6.0
2.001	50.00	4.71	29.587	0.044	0.0	0.0	0.0	0.82	14.5	6.0

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Upper Chorlton Road
SW Network



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Designed by paulg
Checked by

Innovyze

Network 2017.1.2

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)	Section Type	Auto Design
1.003	10.000	0.100	100.0	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	

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)
1.003	50.00	4.92	29.100	0.078	0.0	0.0	0.0	1.00	17.8	10.6

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PIPELINE SCHEDULES for Storm Upstream Manhole <table><tr><th>PN</th><th>Hyd Sect</th><th>Diam (mm)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>1.000</td><td>o</td><td>100</td><td>SW01</td><td>31.300</td><td>30.600</td><td>0.600</td><td>Open Manhole</td><td>450</td></tr><tr><td>1.001</td><td>o</td><td>100</td><td>SW02</td><td>31.300</td><td>30.360</td><td>0.840</td><td>Open Manhole</td><td>450</td></tr><tr><td>1.002</td><td>o</td><td>100</td><td>SW03</td><td>31.000</td><td>29.920</td><td>0.980</td><td>Open Manhole</td><td>1200</td></tr><tr><td>2.000</td><td>o</td><td>150</td><td>SW04</td><td>31.000</td><td>29.800</td><td>1.050</td><td>Open Manhole</td><td>1200</td></tr><tr><td>2.001</td><td>o</td><td>150</td><td>SW05</td><td>31.000</td><td>29.587</td><td>1.263</td><td>Open Manhole</td><td>1200</td></tr><tr><td>1.003</td><td>o</td><td>150</td><td>TANK</td><td>31.000</td><td>29.100</td><td>1.750</td><td>Open Manhole</td><td>1200</td></tr></table> Downstream Manhole <table><tr><th>PN</th><th>Length (m)</th><th>Slope (1:X)</th><th>MH Name</th><th>C.Level (m)</th><th>I.Level (m)</th><th>D.Depth (m)</th><th>MH Connection</th><th>MH DIAM., L*W (mm)</th></tr><tr><td>1.000</td><td>24.000</td><td>100.0</td><td>SW02</td><td>31.300</td><td>30.360</td><td>0.840</td><td>Open Manhole</td><td>450</td></tr><tr><td>1.001</td><td>14.000</td><td>31.8</td><td>SW03</td><td>31.000</td><td>29.920</td><td>0.980</td><td>Open Manhole</td><td>1200</td></tr><tr><td>1.002</td><td>3.000</td><td>100.0</td><td>TANK</td><td>31.000</td><td>29.890</td><td>1.010</td><td>Open Manhole</td><td>1200</td></tr><tr><td>2.000</td><td>32.000</td><td>150.2</td><td>SW05</td><td>31.000</td><td>29.587</td><td>1.263</td><td>Open Manhole</td><td>1200</td></tr><tr><td>2.001</td><td>3.000</td><td>150.0</td><td>TANK</td><td>31.000</td><td>29.567</td><td>1.283</td><td>Open Manhole</td><td>1200</td></tr><tr><td>1.003</td><td>10.000</td><td>100.0</td><td>dummy</td><td>31.000</td><td>29.000</td><td>1.850</td><td>Open Manhole</td><td>0</td></tr></table> Free Flowing Outfall Details for Storm <table><tr><th>Outfall Pipe Number</th><th>Outfall Name</th><th>C. Level (m)</th><th>I. Level (m)</th><th>Min I. Level (m)</th><th>D,L (mm)</th><th>W (mm)</th></tr><tr><td>1.003</td><td>dummy</td><td>31.000</td><td>29.000</td><td>29.000</td><td>0</td><td>0</td></tr></table> Simulation Criteria for Storm <table><tr><td>Volumetric Runoff Coeff</td><td>0.750</td><td>Additional Flow - % of Total Flow</td><td>0.000</td></tr><tr><td>Areal Reduction Factor</td><td>1.000</td><td>MADD Factor * 10m³/ha Storage</td><td>2.000</td></tr><tr><td>Hot Start (mins)</td><td>0</td><td>Inlet Coefficient</td><td>0.800</td></tr><tr><td>Hot Start Level (mm)</td><td>0</td><td>Flow per Person per Day (l/per/day)</td><td>0.000</td></tr><tr><td>Manhole Headloss Coeff (Global)</td><td>0.500</td><td>Run Time (mins)</td><td>60</td></tr><tr><td>Foul Sewage per hectare (l/s)</td><td>0.000</td><td>Output Interval (mins)</td><td>1</td></tr><tr><td>Number of Input Hydrographs</td><td>0</td><td>Number of Storage Structures</td><td>1</td></tr><tr><td>Number of Online Controls</td><td>1</td><td>Number of Time/Area Diagrams</td><td>0</td></tr><tr><td>Number of Offline Controls</td><td>0</td><td>Number of Real Time Controls</td><td>0</td></tr></table> Synthetic Rainfall Details				PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	1.000	o	100	SW01	31.300	30.600	0.600	Open Manhole	450	1.001	o	100	SW02	31.300	30.360	0.840	Open Manhole	450	1.002	o	100	SW03	31.000	29.920	0.980	Open Manhole	1200	2.000	o	150	SW04	31.000	29.800	1.050	Open Manhole	1200	2.001	o	150	SW05	31.000	29.587	1.263	Open Manhole	1200	1.003	o	150	TANK	31.000	29.100	1.750	Open Manhole	1200	PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)	1.000	24.000	100.0	SW02	31.300	30.360	0.840	Open Manhole	450	1.001	14.000	31.8	SW03	31.000	29.920	0.980	Open Manhole	1200	1.002	3.000	100.0	TANK	31.000	29.890	1.010	Open Manhole	1200	2.000	32.000	150.2	SW05	31.000	29.587	1.263	Open Manhole	1200	2.001	3.000	150.0	TANK	31.000	29.567	1.283	Open Manhole	1200	1.003	10.000	100.0	dummy	31.000	29.000	1.850	Open Manhole	0	Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)	1.003	dummy	31.000	29.000	29.000	0	0	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	1	Number of Online Controls	1	Number of Time/Area Diagrams	0	Number of Offline Controls	0	Number of Real Time Controls	0
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	Upper Chorlton Road SW Network																					
Date 30/11/2021 File UCR - SW Network.MDX	Designed by paulg Checked by																					
Innovyze	Network 2017.1.2																					
<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>2</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>0.370</td> <td></td> <td></td> </tr> </table>			Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	2	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	18.000	Storm Duration (mins)	30	Ratio R	0.370		
Rainfall Model	FSR	Profile Type	Summer																			
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Online Controls for Storm

Pump Manhole: TANK, DS/PN: 1.003, Volume (m³): 2.2

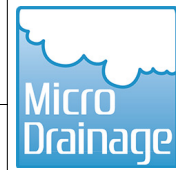
Invert Level (m) 29.100

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	0.0000	1.800	0.0000	3.400	0.0000	5.000	0.0000
0.400	0.0000	2.000	0.0000	3.600	0.0000	5.200	0.0000
0.600	0.0000	2.200	0.0000	3.800	0.0000	5.400	0.0000
0.800	0.0000	2.400	0.0000	4.000	0.0000	5.600	0.0000
1.000	0.0000	2.600	0.0000	4.200	0.0000	5.800	0.0000
1.200	0.0000	2.800	0.0000	4.400	0.0000	6.000	0.0000
1.400	0.0000	3.000	0.0000	4.600	0.0000		
1.600	0.0000	3.200	0.0000	4.800	0.0000		

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	Upper Chorlton Road SW Network																																																																																					
Date 30/11/2021 File UCR - SW Network.MDX	Designed by paulg Checked by																																																																																					
Innovyze	Network 2017.1.2																																																																																					
Storage Structures for Storm Cellular Storage Manhole: TANK, DS/PN: 1.003 Invert Level (m) 29.100 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.01700 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.01700 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>40.0</td><td>40.0</td><td>5.200</td><td>0.0</td><td>60.3</td></tr><tr><td>0.400</td><td>40.0</td><td>50.1</td><td>5.600</td><td>0.0</td><td>60.3</td></tr><tr><td>0.800</td><td>40.0</td><td>60.2</td><td>6.000</td><td>0.0</td><td>60.3</td></tr><tr><td>0.801</td><td>0.0</td><td>60.3</td><td>6.400</td><td>0.0</td><td>60.3</td></tr><tr><td>1.600</td><td>0.0</td><td>60.3</td><td>6.800</td><td>0.0</td><td>60.3</td></tr><tr><td>2.000</td><td>0.0</td><td>60.3</td><td>7.200</td><td>0.0</td><td>60.3</td></tr><tr><td>2.400</td><td>0.0</td><td>60.3</td><td>7.600</td><td>0.0</td><td>60.3</td></tr><tr><td>2.800</td><td>0.0</td><td>60.3</td><td>8.000</td><td>0.0</td><td>60.3</td></tr><tr><td>3.200</td><td>0.0</td><td>60.3</td><td>8.400</td><td>0.0</td><td>60.3</td></tr><tr><td>3.600</td><td>0.0</td><td>60.3</td><td>8.800</td><td>0.0</td><td>60.3</td></tr><tr><td>4.000</td><td>0.0</td><td>60.3</td><td>9.200</td><td>0.0</td><td>60.3</td></tr><tr><td>4.400</td><td>0.0</td><td>60.3</td><td>9.600</td><td>0.0</td><td>60.3</td></tr><tr><td>4.800</td><td>0.0</td><td>60.3</td><td>10.000</td><td>0.0</td><td>60.3</td></tr></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	40.0	40.0	5.200	0.0	60.3	0.400	40.0	50.1	5.600	0.0	60.3	0.800	40.0	60.2	6.000	0.0	60.3	0.801	0.0	60.3	6.400	0.0	60.3	1.600	0.0	60.3	6.800	0.0	60.3	2.000	0.0	60.3	7.200	0.0	60.3	2.400	0.0	60.3	7.600	0.0	60.3	2.800	0.0	60.3	8.000	0.0	60.3	3.200	0.0	60.3	8.400	0.0	60.3	3.600	0.0	60.3	8.800	0.0	60.3	4.000	0.0	60.3	9.200	0.0	60.3	4.400	0.0	60.3	9.600	0.0	60.3	4.800	0.0	60.3	10.000	0.0	60.3
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)																																																																																	
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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 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

Synthetic Rainfall Details

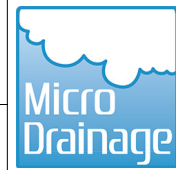
Rainfall Model	FSR	Ratio R	0.370
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	18.000	Cv (Winter)	0.840

```
Margin for Flood Risk Warning (mm) 300.0      DVD Status ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
```

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, 40

PN	US/MH		Return Period	Climate Change	First (X)		First (Y)		First (Z)	Overflow Act.
	Name	Storm			Surcharge		Flood		Overflow	
1.000	SW01	15 Winter	1	+0%	100/15	Summer				
1.001	SW02	15 Winter	1	+0%	100/15	Summer				
1.002	SW03	15 Winter	1	+0%	30/15	Summer	100/120	Winter		
2.000	SW04	15 Winter	1	+0%	30/15	Winter	100/120	Winter		
2.001	SW05	15 Winter	1	+0%	30/15	Summer	100/120	Winter		
1.003	TANK	960 Winter	1	+0%	1/60	Summer	100/120	Winter		

PN	US/MH Name	Water	Surcharged	Flooded	Pipe			Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	SW01	30.633	-0.067	0.000	0.24		1.4	OK	
1.001	SW02	30.392	-0.068	0.000	0.22		2.2	OK	
1.002	SW03	29.975	-0.045	0.000	0.57		2.8	OK	17
2.000	SW04	29.867	-0.083	0.000	0.40		5.5	OK	17
2.001	SW05	29.665	-0.072	0.000	0.53		5.6	OK	17
1.003	TANK	29.426	0.176	0.000	0.00		0.0	SURCHARGED	17

Upper Chorlton Road
SW Network

Date 30/11/2021
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Innovyze	Network 2017.1.2
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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 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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.370
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 ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
```

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, 40

PN	US/MH		Storm	Return Period	Climate Change	First (X)		First (Y)		First (Z)		Overflow Act.
	Name					Surcharge		Flood		Overflow		
1.000	SW01	480	Winter	100	+40%	100/15	Summer					
1.001	SW02	480	Winter	100	+40%	100/15	Summer					
1.002	SW03	1440	Winter	100	+40%	30/15	Summer	100/120	Winter			
2.000	SW04	1440	Winter	100	+40%	30/15	Winter	100/120	Winter			
2.001	SW05	1440	Winter	100	+40%	30/15	Summer	100/120	Winter			
1.003	TANK	1440	Winter	100	+40%	1/60	Summer	100/120	Winter			

PN	US/MH Name	Water	Surcharged	Flooded	Pipe			Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	SW01	31.018	0.318	0.000	0.12		0.7	FLOOD	RISK
1.001	SW02	31.010	0.550	0.000	0.12		1.2	FLOOD	RISK
1.002	SW03	31.006	0.986	5.790	0.14		0.7	FLOOD	17
2.000	SW04	31.007	1.057	6.639	0.08		1.2	FLOOD	17
2.001	SW05	31.006	1.269	5.806	0.10		1.0	FLOOD	17
1.003	TANK	31.006	1.756	5.663	0.00		0.0	FLOOD	17