



RIDGE

**MASON STREET
MANCHESTER**

**REPORT TO DISCHARGE
DRAINAGE RELATED PLANNING
CONDITIONS**

September 2021

MASON STREET, MANCHESTER

REPORT TO DISCHARGE DRAINAGE RELATED PLANNING CONDITIONS

September 2021

Prepared by

Ridge and Partners LLP
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VERSION CONTROL

[illegible]

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1. INTRODUCTION

Planning approval has been granted for the Erection of 6 story building comprising restaurant (Class A3) and retail unit (Class A1) at ground floor level and fourteen Apartments above, together with basement parking under planning approval – 117470/FO/2017 and is subject to a number of planning conditions.

This report seeks to address the conditions relating to the drainage of the development. Namely Planning Condition 10, as quoted below.

10) No development shall take place until surface water drainage works have been implemented in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details that have been submitted to and approved in writing by the Local Planning Authority.

Notwithstanding the information contained within the submitted Drainage Strategy, the following additional information shall be submitted to and agreed in writing by the City Council as Local Planning Authority:

- *Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site;*
-

Reason - To prevent the increased risk of flooding, to improve water quality and ensure future maintenance of the surface water drainage system pursuant to policy EN14 and DM1 of the Core Strategy.

2. OUTLINE DRAINAGE STRATEGY

2.1. Surface Water Strategy

- 2.1.1. This planning condition discharge statement should be read in conjunction with the drainage strategy approved at planning (HAT AND FEATHERS, MASON STREET, MANCHESTER SUSTAINABLE DRAINAGE STATEMENT – AUGUST 2017 - WEETWOOD).
- 2.1.2. The site is formed of an unmade car park. The exiting development site is considered brownfield with 100% of the site being impermeable.
- 2.1.3. Following consultation at planning the surface water discharge rate is to be limited to 6.5 l/s, upto and including the 100 year storm allowing for climate change.
- 2.1.4. The United Utilities (UU) Sewer Records are available for the site and indicate that there is a surface water sewer within Mason Street to the east. UU Sewer Records are included in **Appendix A**.
- 2.1.5. The National Planning Policy Framework (NPPF) hierarchy for the disposal of surface water (in line with CIRIA SuDs guidance) was considered. Based on the local ground conditions, distances to local waterways and lack of surface water sewers in the area – it was agreed at planning that the site can discharge to the UU combined sewer in Mason Street.
- 2.1.6. The outline strategy is to collect runoff from the roof and terraces and direct it to new below ground surface water drainage chamber at ground floor level. The above ground surface water drainage will be underslung to the basement ceiling.
- 2.1.7. The surface water drainage will have flow controlled to 6.5 l/s and will be attenuated within a manhole within the building at ground floor level before being discharged into the Combined Sewer on Mason Street. Discharge rates will be limited to the rates shown in Table 2 as contained within the approved drainage strategy.
- 2.1.8. In the event of exceedance (events >100 year), an overflow will be provided to the flow control (above the 100 year +40% event water level) chamber. This will prevent flooding within the building. The 500 year and 1000 year storms have been modelled to illustrate that this is the case. The presence of an overflow is in accordance with UU hydrobrake manhole detail STND/19/005, included in **Appendix D**. It is not feasible to provide a penstock bypass at this scheme due to space constraints at ground floor level. As such, the
- 2.1.9. In the event of blockage, the overflow and / or hydrobrake bypass door can be used to drain the flow control chamber. The floor level within the building will be sloped towards Mason Street to ensure that any out of chamber flooding experienced is routed out of the building and onto Mason Street. The surrounding highways are lower than the footway and buildings.

Table 2: Proposed Runoff Rates

Mason Street Manchester	Proposed Impermeable Area (m²)	Modelled Discharge Rate Hydrobrake (overflow)	Modelled Water Level	Total Flow
1 year	336	2.8 l/s (0 l/s)	49.249m	6.5 l/s
30 year	336	5.9 l/s (0 l/s)	49.407	6.5 l/s
100 year +40%	336	6.5 l/s (0 l/s)	50.397	6.5 l/s
Exceedance*	336	6.5 l/s (0 l/s)	49.881	0 l/s
200 yr		6.5 l/s (0.8 l/s)	50.424	7.3 l/s
500 yr		6.5 l/s (6.3 l/s)	50.747	12.8 l/s
1000 yr				
*Exceedance values are outside of the design storms and utilise an overflow for the protection of buildings in the area.				

- 2.1.10. A hydraulic model of the drainage network serving the retail development has been built and run for the 1 in 1 year, 1 in 30 year and 1 in 100 year storm events. The design life of the development is >50 years and therefore a **climate change allowance of 40% has been used for the 1 in 100 year simulations**. The hydraulic calculations are included in **Appendix C** of this report.
- 2.1.11. Hydraulic calculations have been provided for the 200, 500 and 1000 year events to demonstrate that the overflow will not be activated until the 500 year event and the drainage system will not cause out of chamber flooding in the 1000 year event. These are exceedance events and are outside the design parameters of the surface water drainage network.

3. DRAINAGE RELATED PLANNING CONDITIONS

3.1. Planning Conditions

3.1.1. The information below addresses Condition 10.

Planning Condition No. 10

10) No development shall take place until surface water drainage works have been implemented in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details that have been submitted to and approved in writing by the Local Planning Authority.

Notwithstanding the information contained within the submitted Drainage Strategy, the following additional information shall be submitted to and agreed in writing by the City Council as Local Planning Authority:

- *Assessment of overland flow routes for extreme events that is diverted away from buildings (including basements). Overland flow routes need to be designed to convey the flood water in a safe manner in the event of a blockage or exceedance of the proposed drainage system capacity including inlet structures. A layout with overland flow routes needs to be presented with appreciation of these overland flow routes with regards to the properties on site and adjacent properties off site;*

Reason - To prevent the increased risk of flooding, to improve water quality and ensure future maintenance of the surface water drainage system pursuant to policy EN14 and DM1 of the Core Strategy.

RESPONSE TO CONDITION 10.

The design drawings in Appendix B detail the surface water system. Calculations are included in Appendix C. A pass forward flow of 6.5 l/s has been used for all events upto the 100 year +40% return period in the detailing of the surface water drainage system.

A climate change allowance of 40% has been used in line with current standards.

Overland flow routes have been considered – generally there will be no out of chamber flooding producing overland flow.

This is deemed sufficient to remove this condition.

4. APPENDICES

- Appendix A – Yorkshire Water Records
- Appendix B – Ridge Design Drawings
- Appendix C – Hydraulic Calculation
- Appendix D – UU Flow Control Detail
- Appendix E – Overland Flow Routes

APPENDIX A – YORKSHIRE WATER RECORDS

**Weetwood
Suite 1 Park House, Broncoed Business Park
Wrexham Road**

**Mold
CH7 1HP**

FAO:

Dear Sirs

Location: 3724

I acknowledge with thanks your request dated 15/02/17 for information on the location of our services.

Please find enclosed plans showing the approximate position of our 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 our 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 telephone us on 0370 7510101.

Yours Faithfully,



Karen McCormack
Property Searches Manager

United Utilities Water Limited
Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP
DX 715568 Warrington
Telephone 0370 751 0101

Property.searches@uuplc.co.uk

Your Ref: 3724
Our Ref: 1269631
Date: 16/2/2017

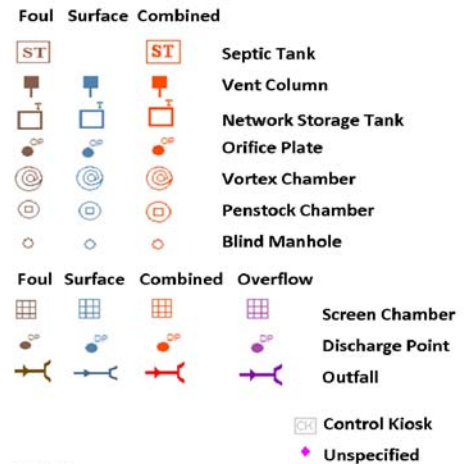
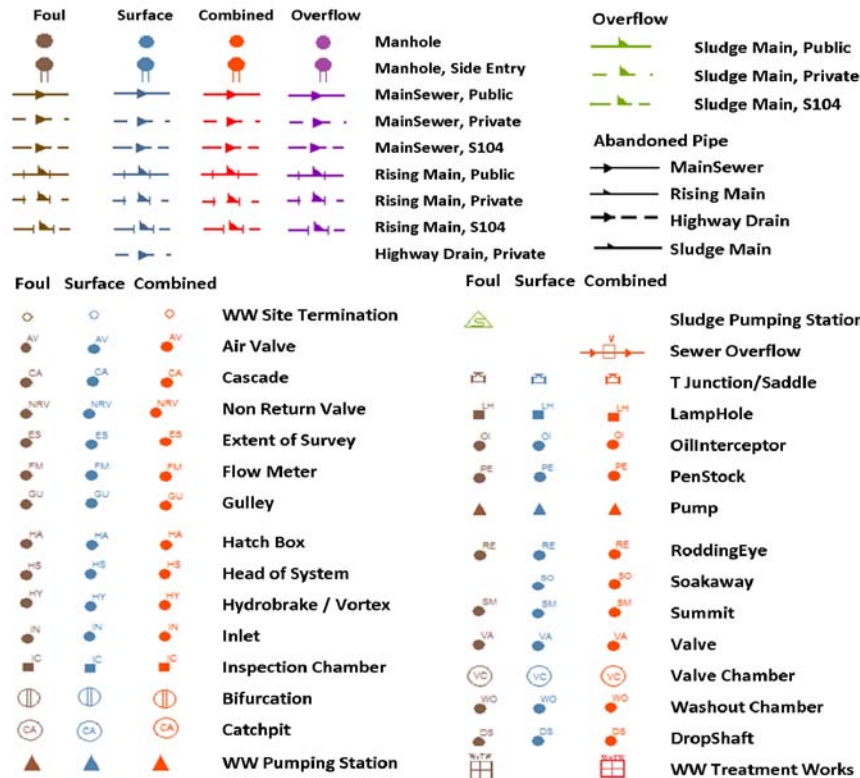
TERMS AND CONDITIONS - WASTERWATER & WATER DISTRIBUTION PLANS

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:

1. 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.
2. 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.
3. In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only and given in accordance with the best information available. The nature of the relevant system and/or its actual position may be different from that shown on the plan and UUWL is not liable for any damage caused by incorrect information provided save as stated in section 199 of the Water Industry Act 1991. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.

WASTE WATER SYMBOLOGY



Legend	
MANHOLE FUNCTION	SEWER SHAPE
FO Foul	CI Circular
SW Surface Water	EG Egg
CO Combined	OV Oval
OV Overflow	FT Flat Top
	RE Rectangular
	SQ Square
	TR Trapezoidal
	AR Arch
	BA Barrel
	HO HorseShoe
	UN Unspecified
SEWER MATERIAL	
AC Asbestos Cement	DI Ductile Iron
BR Brick	VC Vitrified Clay
CO Concrete	PP Polypropylene
CSB Concrete Segment	PF Pitched Fibre
CSU Concrete Segment	MA Masonry, Coursed
CC Concrete Box Culverted	MA Masonry, Random
PSC Plastic / Steel	RP Reinforced Plastic
GR Glass Reinforced	CI Cast Iron
GRP Glass Reinforced	SI Spun Iron
PVC Polyvinyl Chloride	ST Steel
PE Polyethylene	U Unspecified

CLEAN WATER SYMBOLOGY

PIPE WORK



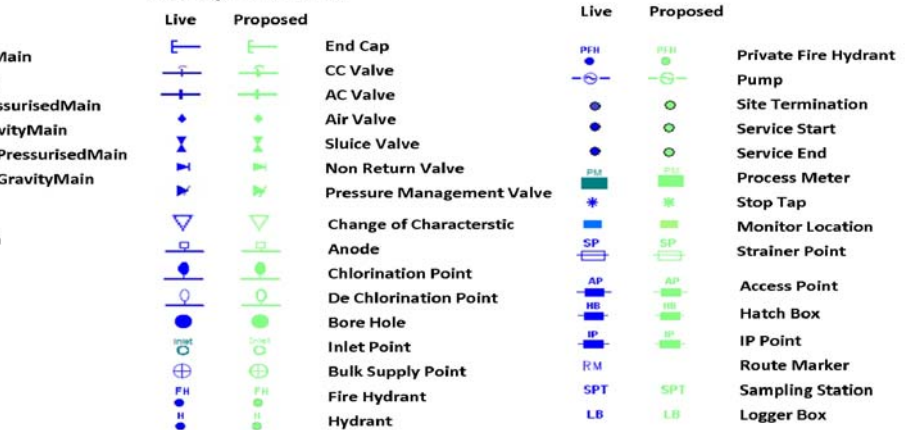
ABANDONED PIPE



PROPERTY TYPES



NODES/FURNITURES



Legend	
MATERIAL TYPES	LINING TYPES
AC ASBESTOS CEMENT	CL CEMENT LINING
CI CAST IRON	TB TAR OR BITUMEN
CU COPPER	ERL EPOXY RESIN
CO CONCRETE	
DI DUCTILE IRON	INSERTION TYPES
GI GALVANISED IRON	DD DIE DRAWN
GR GREY IRON	DR DIRECTIONAL DRILLING
OT OTHERS	MO MOLING
PB LEAD	PI PIPELINE
PV UPVC	SL SLIP LINED
SI SPUN IRON	
ST STEEL	
UN UNKNOWN	
PE POLYETHYLENE	

These general conditions and precautions apply to the wastewater network of United Utilities.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. United Utilities provides the approximate locations of its sewers according to its records. These records are not necessarily accurate or complete nor do they normally show the positions of every sewer culvert or drain, private connections from properties to the public sewers or the particulars of any private system. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated. The records do indicate the position of the nearest known public sewer from which the likely length of private connections can be estimated together with the need for any off site drainage rights or easements.

2. Special requirements relative to our sewers may be indicated. United Utilities employees or its contractors will visit any site at reasonable notice to assist in the location of its underground sewers and advise any precautions that may be required to obviate any damage. To arrange a visit or for further information regarding new supplies, connections, diversions, costing, or any notification required under these General Conditions, please call us on **0845 746 2200**.

3. Where public sewers are within a site which is to be developed and do not take any drainage from outside the area, they are from an operational viewpoint redundant. The developer must identify all redundant sewers affected by the development and apply to United Utilities in writing for these sewers to be formally closed. The developer shall bear all related costs of the physical abandonment work.

4. Public sewers within the site that are still live outside the area will be subject to a "Restricted Building zone". This would normally be a surface area equivalent to the depth of the sewer measured from the centre line of the sewer on either side. No construction will be permitted within that zone. The developer should also note that deep and wide rooted trees must not be planted in close proximity to live sewers. Access to public sewers must be maintained at all times and no interference to manholes will be permitted during construction work.

5. Where there is a public sewer along the line of a proposed development/building, arrangements shall be made by the developer at his cost to divert the sewer around the development. Where this is not possible and as a last resort, a "Building Over Agreement" will need to be completed under section 18 of the Building Act 1984. The developer shall design building foundations to ensure that no additional loading is transferred to the sewer and submit such details both to the Local Authority's Building Control Officer and to United Utilities for approval/acceptance. United Utilities on a rechargeable basis would normally undertake all aspects of design work associated with the diversion of any part of the operational wastewater network. For further advice please call asset protection on **01925 678 306**

6. Where there is a non-main river watercourse/culvert passing through the site, the landowner has the responsibility of a riparian owner for the watercourse/culvert and is responsible for the maintenance of the fabric of the culvert and for all works involved in maintaining the unrestricted flow through it. Building over the watercourse/culvert is not recommended. The developer must contact the local authority before any works are carried out on the watercourse/culvert. Where it is necessary to discharge surface water from the site into the watercourse/culvert the developer shall make an assessment of the available capacity of the watercourse/culvert (based on a 1 in 50 year event) and ensure that the additional flow to be discharged into the watercourse/culvert will not cause any flooding. In appropriate cases, flooding may be prevented by on-site storage. The developer shall submit the relevant details required to substantiate his development proposals. Details of any outfall proposed shall also be submitted to the Environment Agency, PO Box 12, Richard Fairclough House, Knutsford Road, Warrington, Cheshire, WA4 1HT for their approval.

7. Where there is a main river watercourse/culvert passing through the site, the developer shall submit all proposals affecting the river to the Environment Agency at the address stated in paragraph 6 for approval/acceptance.

8. Your attention is drawn also to the following:

• **Private drains or sewers which may be within the site.**

On 1 October 2011 all privately owned sewers and lateral drains which communicate with (that is drain to) an existing public sewer as at 1 July 2011 will become the responsibility of the sewerage undertaker. This includes private sewers upstream of pumping stations that have yet to transfer, but excludes lengths of sewer or drain that are the subject of an on-going appeal or which have been excluded from transfer as a result of an appeal or which are on or under land opted-out by a Crown body. The transfer specifically excludes sewers and lateral drains owned by a railway undertaker. Sewers upstream of such assets, however, are transferred. Such assets may not be recorded on the public sewer record currently as it was not a requirement to keep records of previously private sewers and drains.

• **Applications to make connections to the public sewer.**

The developer must write to United Utilities requesting an application form that must be duly completed and returned. No works on the public sewer shall be carried out until a letter of consent is received from United Utilities.

• **Sewers for adoption.**

If an agreement for the adoption of sewers under Section 104 of the Water Industry Act 1991 is being contemplated, a submission in accordance with "Sewers for Adoption", Seventh Edition, published by the Water Research Centre (2001) Plc, Henley Road, Medmenham, PO Box 16, Marlow, Buckinghamshire, SL7 2HD will be required, taking into consideration any departures from the general guide stipulated by United Utilities.

• **Further consultation with United Utilities.**

Developers wishing to seek advice or clarification regarding sewer record information provided should contact United Utilities to arrange an appointment. A consultation fee may be charged, details of which will be made available at the time of making an appointment.

9. Combined sewers, foul sewers, surface water sewers, and pumped mains. These are shown separately in a range of colours or markings to distinguish them on our drawings, which are extracts from the statutory regional sewer map. A legend and key is provided on each extract for general use, although not all types of sewer will be shown on every extract.

Combined sewers shown coloured red carries both surface water and foul sewage, especially in areas where there is no separate surface water sewerage system.

Foul sewers coloured brown may also carry surface water and there may be no separate surface water system indicated in the immediate area. Both combined and foul sewers carry wastewater to our treatment works before it can safely be returned to the environment.

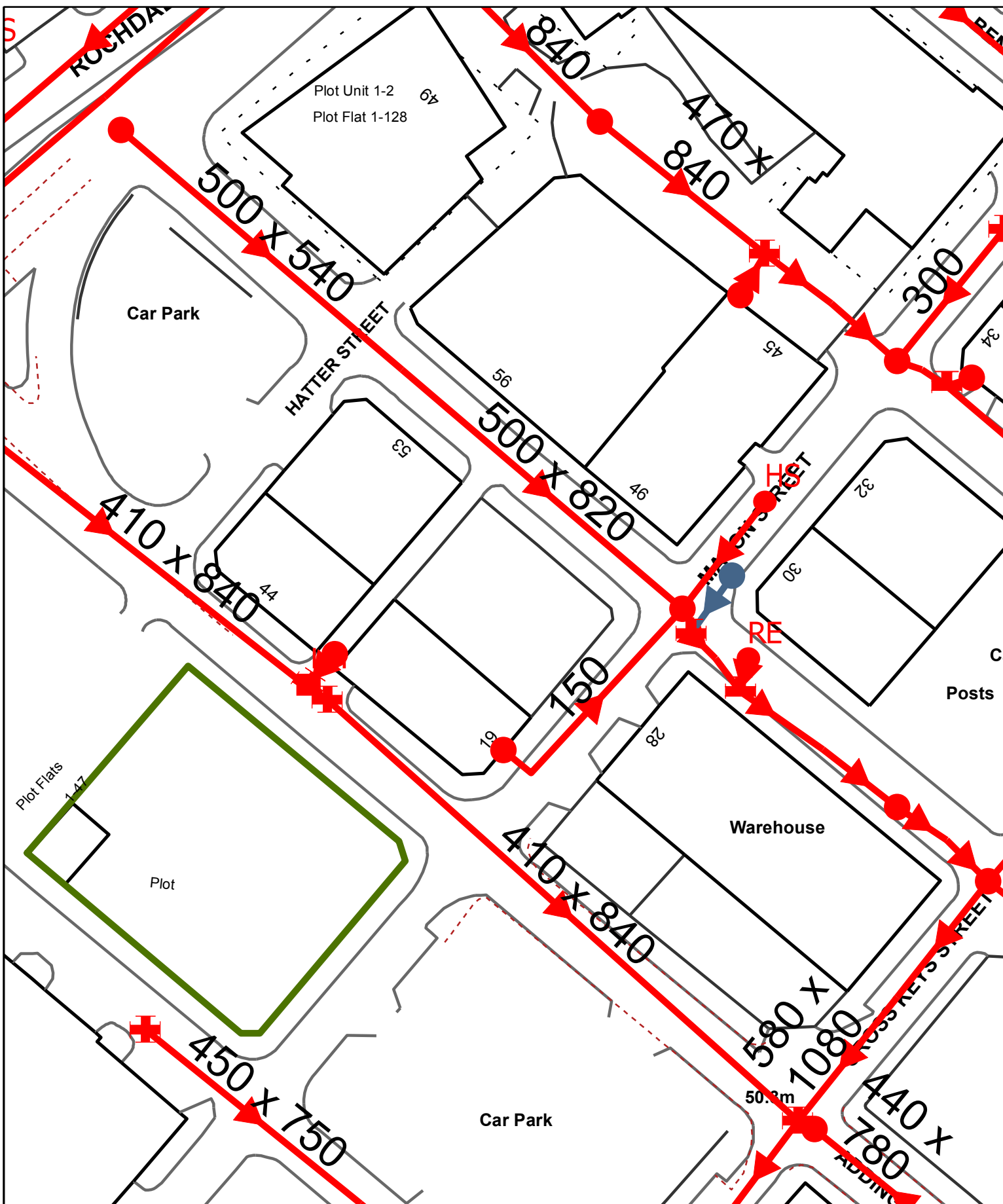
Surface water sewers coloured blue on our drawings are intended only to carry uncontaminated surface water (e.g. rainfall from roofs, etc) and they usually discharge into local watercourses. It is important for the protection of the environment and water quality that only uncontaminated surface water is connected to the surface water sewers. Improper connections to surface water sewers from sink wastes, washing machines and other domestic use of water can cause significant pollution of watercourses.

Pumped mains, rising mains and sludge mains will all be subject to pumping pressures and are neither suitable nor available for making new connections.

Highway drains, when included, show as blue and black dashed lines. Highway drains are not assets belonging to United Utilities and are the responsibility of local authorities.

10. For information regarding future proposals for construction of company apparatus please write to United Utilities, PO Box 453, Warrington, WA5 3QN.

11. For information regarding easements, deeds, grants or wayleaves please write to United Utilities Property Solutions, Coniston Buildings, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3UU (Tel: 01925 731 365).



Date: 16/02/2017

Extract from Map of Public Sewers

Printed By:
Property Searches

3724



The position of this 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 private service pipes may be shown by a broken blue line. United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown

United Utilities Water Limited 2014 The plan is based on the Ordnance Survey Map with the sanction of Controller of H.M. Stationery Office. Crown and Utilities copyrights are reserved. Unauthorised reproduction will infringe these copyrights.

From: [Harrison, William](#)
To: [Rhys Hughes](#)
Cc: [Wastewater Developer Services](#)
Subject: DE3181 Hat and Feather, Manchester
Date: 02 March 2017 17:20:09
Attachments: [image001.jpg](#)
[image002.png](#)

Good Afternoon Rhys,

We have carried out an assessment of your application which is based on the information provided; this pre development advice will be valid for 12 months

-

Foul and surface water can be discharged to the combined sewerage network, the surface water should have a pass forward flow no greater than 6.5l/s

Invert levels should be determined on site through site investigation.

Please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<http://www.unitedutilities.com/connecting-public-sewer.aspx>

Please be aware that on site drainage must be designed in accordance with Building Regulations, National Planning Policy, and local flood authority guidelines, we would recommend that you speak and make suitable agreements with the relevant statutory bodies.

Kind Regards

Will Harrison BSc (Hons)

Assistant Developer Engineer
Developer Services & Planning
Operational Services
United Utilities

T : 01925 679319

E : Wastewaterdeveloperservices@uuplc.co.uk

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**United Utilities Water Ltd. - Developer Services and Planning
Warrington North Wastewater Treatment Works
Garnard Street Off Old Liverpool Road
Gatewarth Industrial Estate
Warrington**

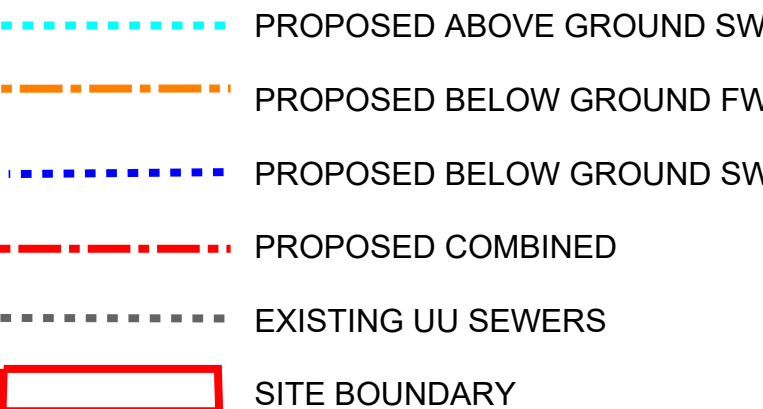
APPENDIX B – RIDGE DESIGN DRAWINGS

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.

2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.

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. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.

4. INFORMATION CONTAINED ON THIS DRAWING IS SCHEME DESIGN ONLY AND REQUIRES FURTHER DETAILED DESIGN AND CO-ORDINATION WITH THE CONTRACTOR, DESIGN TEAM AND APPROPRIATE SUB-CONTRACTORS.



P1	23.09.21	PB	PB	Issued for Planning
No	DATE	DRAWN	REV'D ENG.	AMENDMENT

STATUS	PURPOSE OF ISSUE
S2	FOR INFORMATION

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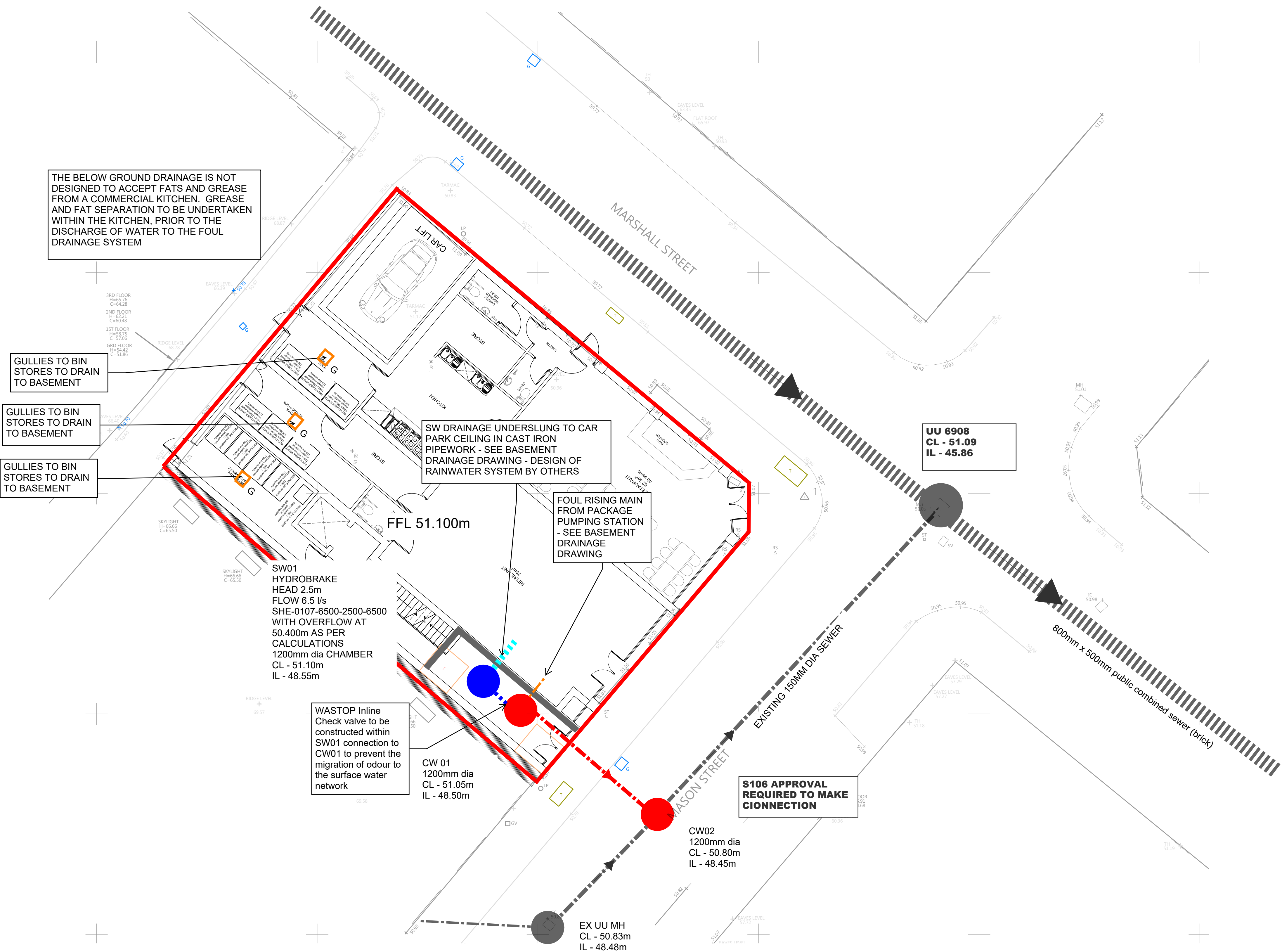
RIDGE

CLIENT		DEX CONSTRUCTION	
PROJECT		MASON STREET	
DRAFTER		PB	PB
TITLE		PROJECT REFERENCE	
BASEMENT DRAINAGE		GENERAL ARRANGEMENT	
SCALE	SHEET	DRAWING No	REV
1:100	A1	MAS-RDG-00-ZZ-DR-C-0100	P1

GENERAL NOTES

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
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- PROPOSED ABOVE GROUND SW
- PROPOSED BELOW GROUND FW
- PROPOSED BELOW GROUND SW
- PROPOSED COMBINED
- EXISTING UU SEWERS
- SITE BOUNDARY



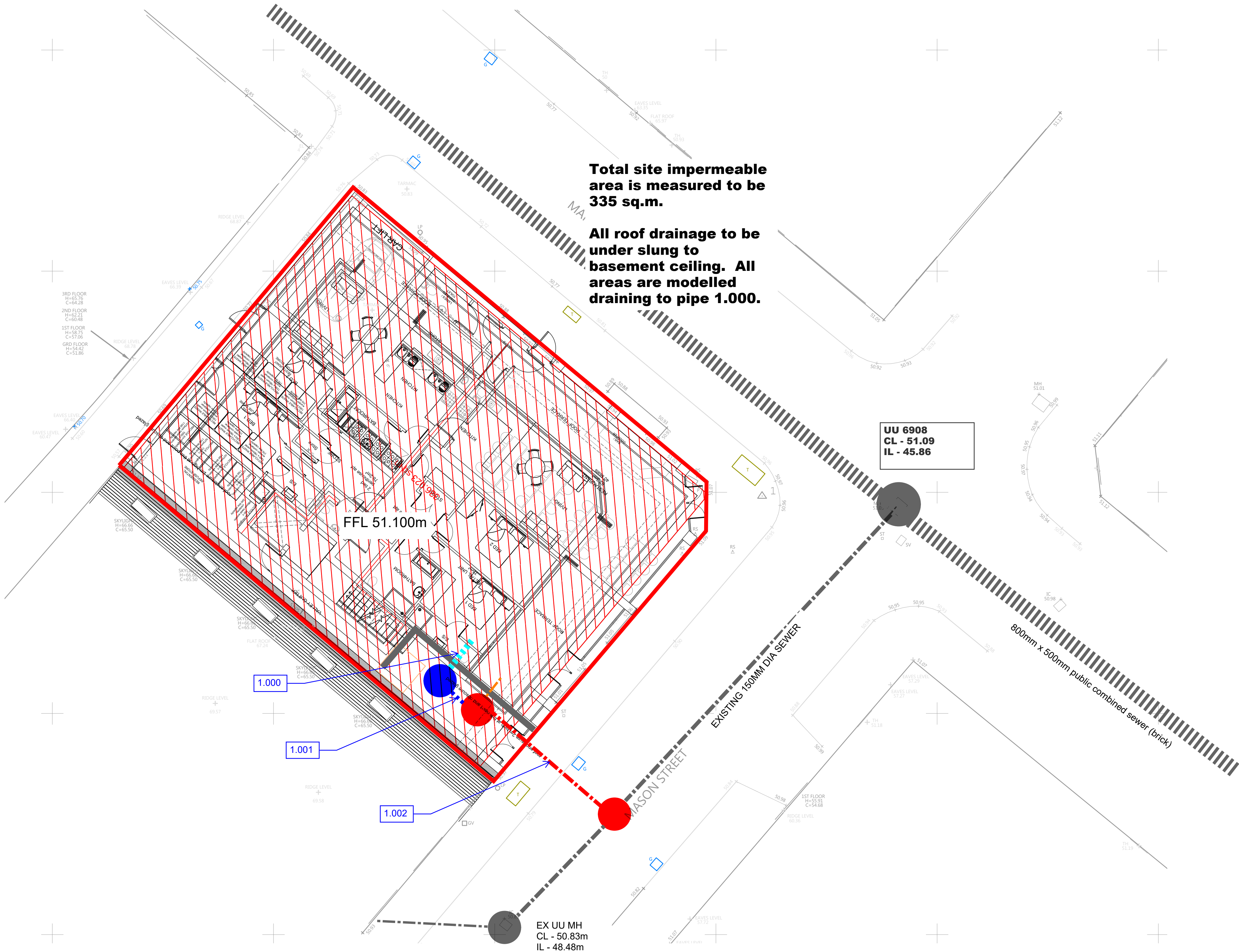
P1	23.09.21	PB	PB	Issued for Planning
No	DATE	DRAWN	REV'D ENG.	AMENDMENT
STATUS		PURPOSE OF ISSUE		
S2		FOR INFORMATION		
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RIDGE				
CLIENT DEX CONSTRUCTION				
PROJECT MASON STREET				
DRAFTER PB		ENGINEER PB		
TITLE		PROJECT REFERENCE:		
GROUND FLOOR DRAINAGE		GENERAL ARRANGEMENT		
SCALE 1:100	SHEET A1	DRAWING No MAS-RDG-00-ZZ-DR-C-0101	REV	P1

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- PROPOSED ABOVE GROUND SW
- PROPOSED BELOW GROUND FW
- PROPOSED BELOW GROUND SW
- PROPOSED COMBINED
- EXISTING UU SEWERS
- SITE BOUNDARY



1	23.09.21	PB	PB	Issued for Planning
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S2		FOR INFORMATION		
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RIDGE					
CLIENT DEX CONSTRUCTION					
PROJECT MASON STREET					
DRAFTER PB			ENGINEER PB		
TITLE			PROJECT REFERENCE:		
PROPOSED DRAINAGE IMPERMEABLE AREAS PLAN					
SCALE 1:100	SHEET A1	DRAWING No MAS-RDG-00-ZZ-DR-C-0104	REV P1		

APPENDIX C – HYDRAULIC CALCULATION

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The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Mason Street C&S SW Drainage	
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Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes Pipe Manhole Sizes Manhole

FSR Rainfall Model - England and Wales

Return Period (years)	1	Foul Sewage (l/s/ha)	0.000	Maximum Backdrop Height (m)	1.500
M5-60 (mm)	18.000	Volumetric Runoff Coeff.	0.750	Min Design Depth for Optimisation (m)	1.200
Ratio R	0.357	PIMP (%)	100	Min Vel for Auto Design only (m/s)	1.00
Maximum Rainfall (mm/hr)	110	Add Flow / Climate Change (%)	0	Min Slope for Optimisation (1:X)	500
Maximum Time of Concentration (mins)	30	Minimum Backdrop Height (m)	0.200		

Designed with Level Soffits

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	13.000	0.080	162.5	0.034	10.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	3.000	0.020	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	6.500	0.350	18.6	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	33.06	10.21	49.250	0.034	0.0	0.0	0.0	1.02	40.7	3.0
1.001	33.33	10.06	49.170	0.000	6.5	0.0	0.0	0.82	14.5	6.5
1.002	33.25	10.11	49.150	0.000	6.5	0.0	0.0	2.35	41.5	6.5

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)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
UNDERSLUNG	51.100	1.850	Open Manhole	1200	1.000	49.250	225				
SW01	51.050	1.880	Open Manhole	1200	1.001	49.170	150	1.000	49.170	225	
CW01	51.030	1.880	Open Manhole	450	1.002	49.150	150	1.001	49.150	150	
CW02	50.800	2.000	Open Manhole	0		OUTFALL		1.002	48.800	150	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
1.000	o	225	UNDERSLUNG	51.100	49.250	1.625	Open Manhole	1200
1.001	o	150	SW01	51.050	49.170	1.730	Open Manhole	1200
1.002	o	150	CW01	51.030	49.150	1.730	Open Manhole	450

Downstream Manhole

PN	Length	Slope	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	(mm)
1.000	13.000	162.5	SW01	51.050	49.170	1.655	Open Manhole	1200
1.001	3.000	150.0	CW01	51.030	49.150	1.730	Open Manhole	450
1.002	6.500	18.6	CW02	50.800	48.800	1.850	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall	Outfall	C. Level	I. Level	Min	D,L	W
Pipe Number	Name	(m)	(m)	I. Level (m)	(mm)	(mm)
1.002	CW02	50.800	48.800	48.000	0	0

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW01, DS/PN: 1.001, Volume (m³): 2.6

Unit Reference	MD-SHE-0112-6500-1500-6500	Sump Available	Yes
Design Head (m)	1.500	Diameter (mm)	112
Design Flow (l/s)	6.5	Invert Level (m)	49.170
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	150
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points			Control Points		
	Head (m)	Flow (l/s)		Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	6.5	Kick-Flo®	0.926	5.2
Flush-Flo™	0.450	6.5	Mean Flow over Head Range	-	5.7

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	0.600	6.4	1.600	6.7	2.600	8.4	5.000	11.5	7.500	13.9
0.200	5.8	0.800	5.9	1.800	7.1	3.000	9.0	5.500	12.0	8.000	14.3
0.300	6.3	1.000	5.4	2.000	7.4	3.500	9.7	6.000	12.5	8.500	14.8
0.400	6.5	1.200	5.9	2.200	7.8	4.000	10.3	6.500	13.0	9.000	15.2
0.500	6.5	1.400	6.3	2.400	8.1	4.500	10.9	7.000	13.4	9.500	15.6

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Offline Controls for Storm

Pipe Manhole: SW01, DS/PN: 1.001, Loop to PN: 1.002

Diameter (m)	0.100	Length (m)	3.500	Coefficient of Contraction	0.600
Section Type	Pipe/Conduit	Roughness k (mm)	0.600	Upstream Invert Level (m)	50.400
Slope (1:X)	50.0	Entry Loss Coefficient	0.500		

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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 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 1 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.358 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320,
5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100, 200, 500, 1000
Climate Change (%) 0, 0, 40, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged	Flooded	Pipe Flow (l/s)	Status	Level Exceeded
									Level (m)	Depth (m)	Volume (m³)	Flow / Cap.		
1.000	UNDERSLUNG	15 Winter	1	+0%	100/15 Summer				49.292	-0.183	0.000	0.08	2.8	OK
1.001	SW01	15 Winter	1	+0%	30/15 Summer		500/30 Winter	7	49.249	-0.071	0.000	0.26 0.0	2.8	OK
1.002	CW01	15 Winter	1	+0%					49.178	-0.122	0.000	0.08	2.8	OK

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

Areal Reduction Factor	1.000	Manhole Headloss Coeff (Global)	0.500	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Foul Sewage per hectare (l/s)	0.000	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Additional Flow - % of Total Flow	0.000	Flow per Person per Day (l/per/day)	0.000

Synthetic Rainfall Details

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

									Water	Surcharged	Flooded	Pipe			
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status
1.000	UNDERSLUNG	15 Winter	30	+0%	100/15 Summer				49.417	-0.058	0.000	0.18		6.4	OK
1.001	SW01	15 Winter	30	+0%	30/15 Summer		500/30 Winter	7	49.407	0.087	0.000	0.56	0.0	5.9	SURCHARGED
1.002	CW01	15 Winter	30	+0%					49.191	-0.109	0.000	0.17		5.9	OK

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<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u>																	
<table><tr><td></td><td>US/MH</td><td>Level</td></tr><tr><td>PN</td><td>Name</td><td>Exceeded</td></tr><tr><td>1.000</td><td>UNDERSLUNG</td><td></td></tr><tr><td>1.001</td><td>SW01</td><td></td></tr><tr><td>1.002</td><td>CW01</td><td></td></tr></table>				US/MH	Level	PN	Name	Exceeded	1.000	UNDERSLUNG		1.001	SW01		1.002	CW01	
	US/MH	Level															
PN	Name	Exceeded															
1.000	UNDERSLUNG																
1.001	SW01																
1.002	CW01																
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
1.000	UNDERSLUNG	
1.001	SW01	
1.002	CW01	

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

PN	US/MH Name	Level Exceeded
1.000	UNDERSLUNG	
1.001	SW01	
1.002	CW01	

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

Synthetic Rainfall Details

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

										Water	Surcharged	Flooded	Pipe			
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status	
1.000	UNDERSLUNG	30	Winter	500	+0%	100/15	Summer		50.436	0.961	0.000	0.26		9.0	SURCHARGED	
1.001	SW01	30	Winter	500	+0%	30/15	Summer	500/30	7	50.424	1.104	0.000	0.61	0.8	6.5	SURCHARGED
1.002	CW01	30	Winter	500	+0%				49.196	-0.104	0.000	0.20		6.9	OK	

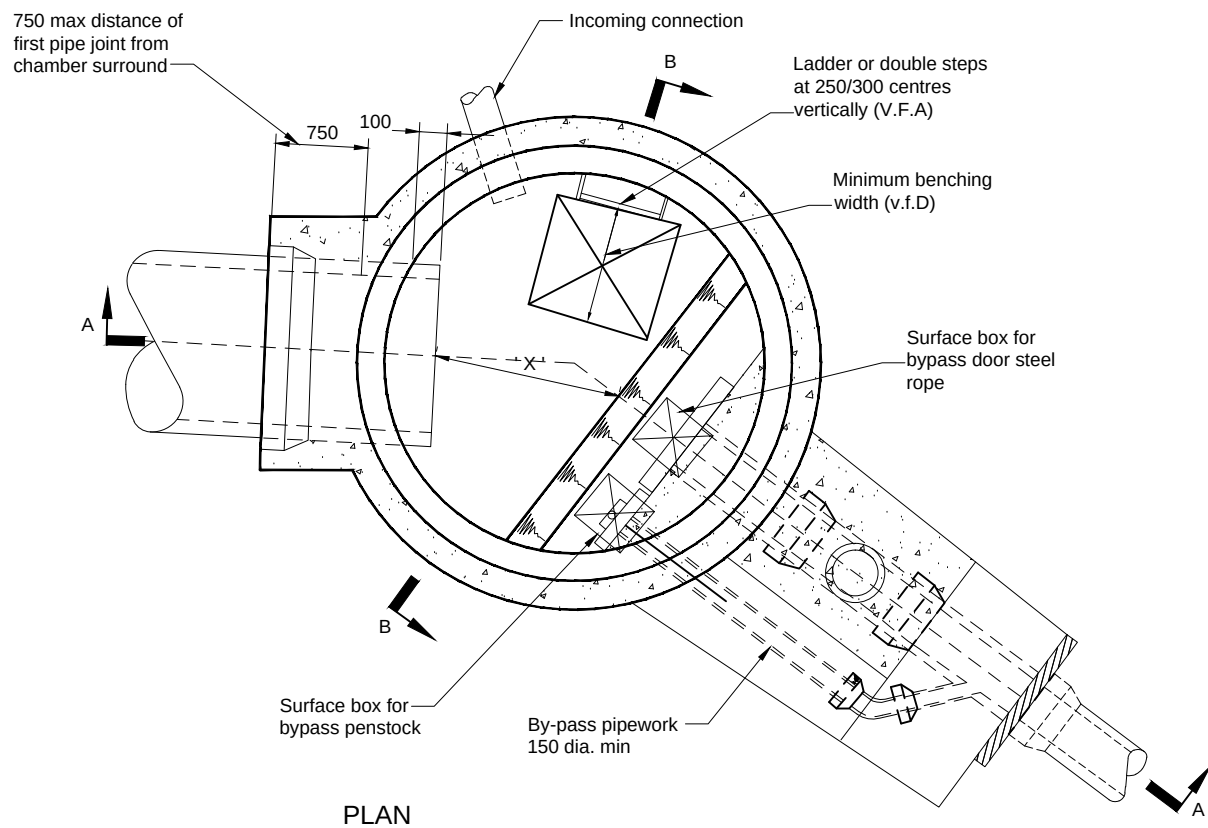
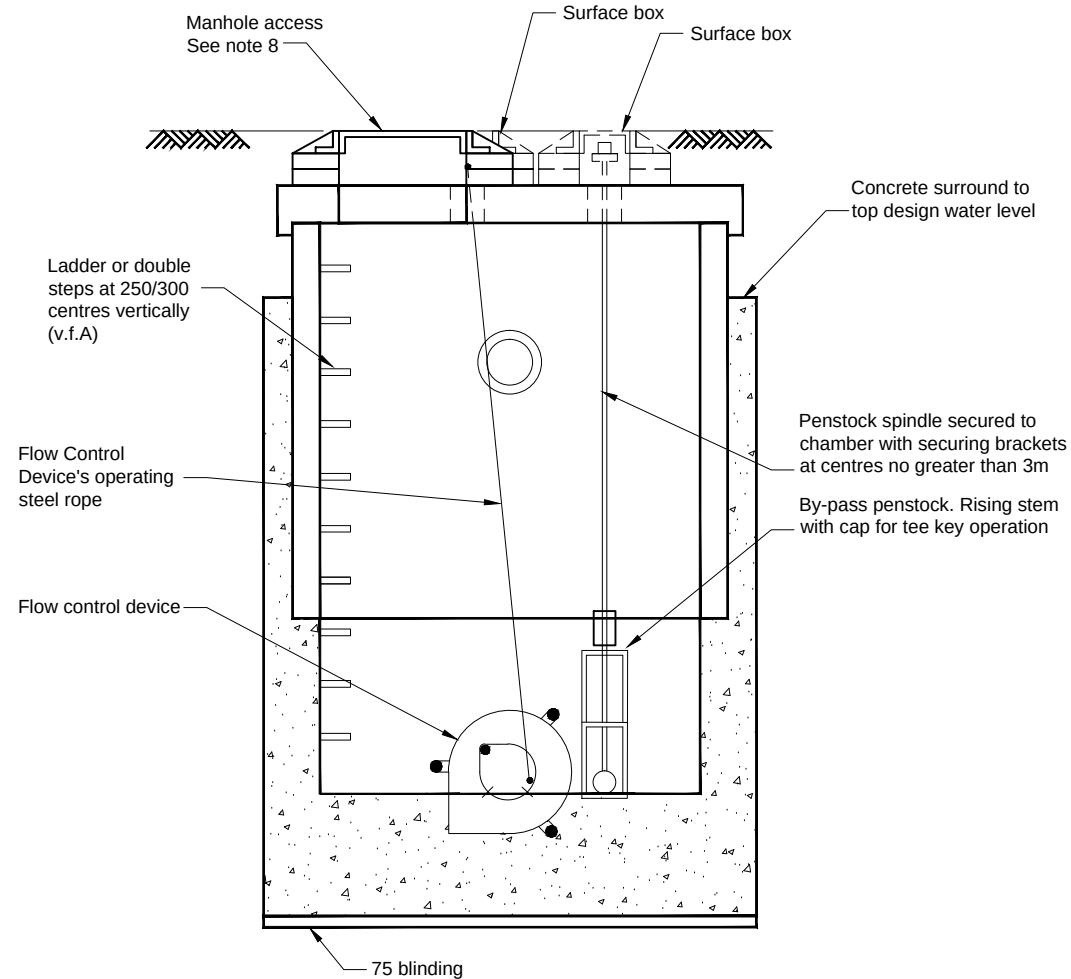
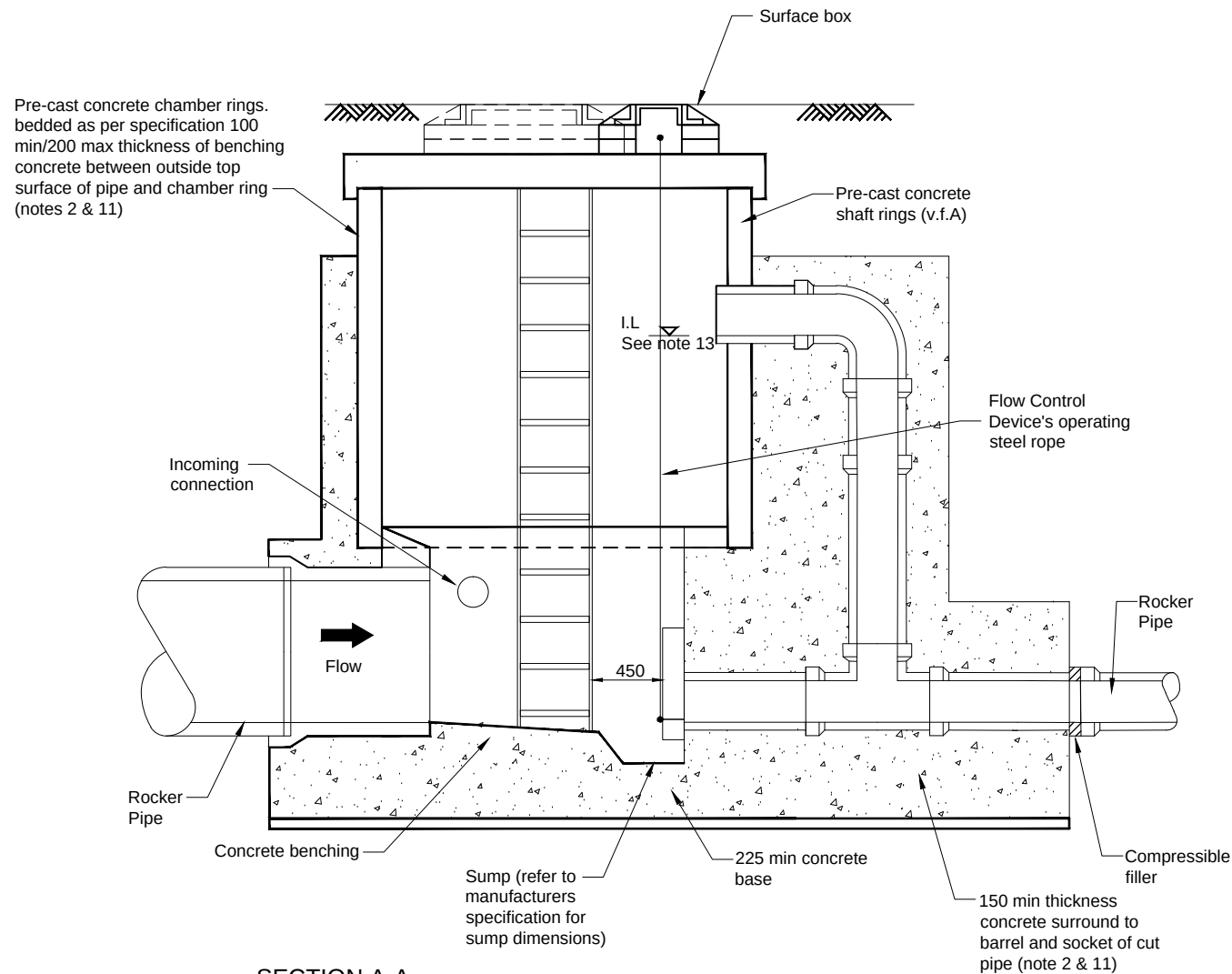
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500 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Level Exceeded
1.000	UNDERSLUNG	
1.001	SW01	
1.002	CW01	

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The Flint Glass Works 64 Jersey Street Manchester M4 6JW	Mason Street C&S SW Drainage													
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Micro Drainage		Network 2018.1												
<u>1000 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm</u> <table> <thead> <tr> <th>PN</th><th>US/MH Name</th><th>Level Exceeded</th></tr> </thead> <tbody> <tr> <td>1.000</td><td>UNDERSLUNG</td><td></td></tr> <tr> <td>1.001</td><td>SW01</td><td></td></tr> <tr> <td>1.002</td><td>CW01</td><td></td></tr> </tbody> </table>			PN	US/MH Name	Level Exceeded	1.000	UNDERSLUNG		1.001	SW01		1.002	CW01	
PN	US/MH Name	Level Exceeded												
1.000	UNDERSLUNG													
1.001	SW01													
1.002	CW01													
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APPENDIX D – UU FLOW CONTROL DETAIL



- NOTES**
- All dimensions are in millimetres
 - CONCRETE BENCHING AND PIPE SURROUND**
Shall be placed in single continuous operation from top of base slab to top of benching and pipe surround
 - CONNECTION INTO MANHOLES**
Shall be constructed with the soffits at the level unless detailed differently on contract drawings
 - METALWORK**
Ladders, handrailing and safety chain shall be as shown on Developer Services Detail 9 (STND/19/009)
 - CONCRETE SURROUND TO MANHOLES**
A 150mm surround of at least 20N/mm² concrete shall be provided to the top design water level. Any joints should be staggered with precast concrete joints
 - MINIMUM LENGTH OF CHANNEL (X Min)**

CHAMBER DIA	"X" MIN
1050	800
1200	950
1350	1000
1500	1050
1800	1150
2100	1300
2400	1450
2700	1550
3000	1700
 - CUT ENDS OF REINFORCED CONCRETE PIPES**
Shall be treated with epoxy resin paint/mortar
 - MANHOLE ACCESSSES AND VARIABLE FEATURES (v.f.)**
Refer to Developer Services Detail 10 (STND/19/010). Double steps shall be plastic encapsulated carbon steel. Double steps shall not be used where cover-to-soffit dimension is >3.0m
 - INVERT ACCESS DETAILS**
Refer to Developer Services Detail 2 (STND/19/002)
 - COVER AND FRAME**
150mm deep covers are to be used in category 1, 2, 3 roads.
100mm deep covers are to be used in Category 4 roads.
Double triangular covers are to be used in carriageway.
Road category to be designated by the highway authority.
Frame to be set as per specification
 - CONCRETE**
All in-situ concrete to be DC-3 or FND 3
 - Minimum headroom shall be 2000. Where 2000 cannot be achieved with benching set at half pipe level then the manhole cover size shall be increased to be in accordance with BS EN 752. Refer to Developer Services Detail 4 (STND/19/004)
 - Invert level for overflow to be site specific

A	SC	DH	SD	FOR INFORMATION	15.04.16
VERSION	DRWN	CHKD	REVD	DATE	



UNITED UTILITIES LTD

DEVELOPER SERVICES

DETAIL 5

FLOW CONTROL MANHOLE DETAIL

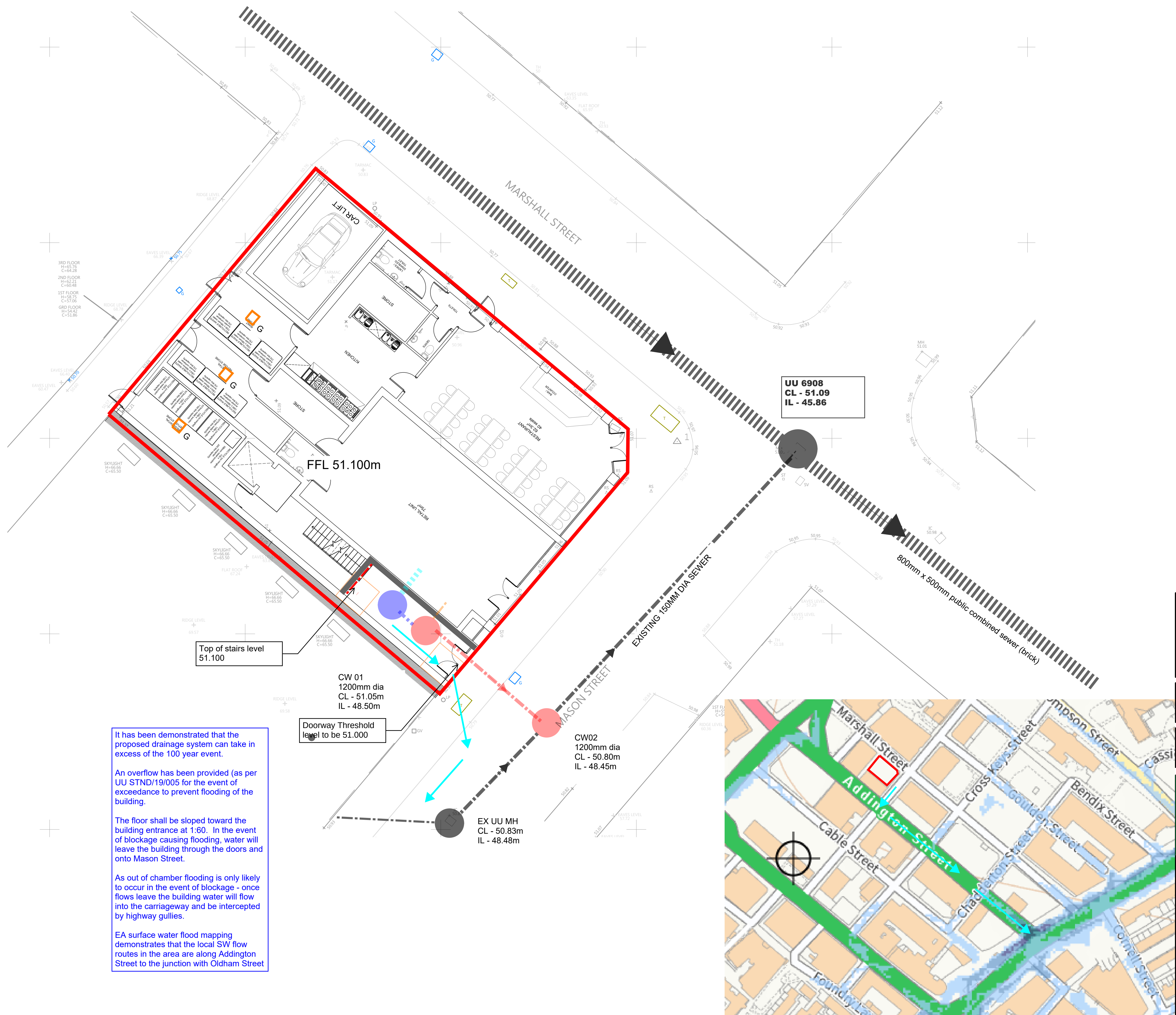
SCALE	NTS	SHEET SIZE	A3
DRAWING NUMBER	STND/19/005	REVISION	A

APPENDIX E – OVERLAND FLOW ROUTES

GENERAL NOTES

1. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS, ENGINEERS, ARCHITECTS & SERVICES DRAWINGS, INCLUDING APPROVED BUILDERS WORK DRAWINGS. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES BETWEEN STRUCTURAL DRAWINGS AND SPECIFICATIONS OR OTHER DRAWINGS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
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. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS, SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY.
4. INFORMATION CONTAINED ON THIS DRAWING IS SCHEME DESIGN ONLY AND REQUIRES FURTHER DETAILED DESIGN AND CO-ORDINATION WITH THE CONTRACTOR, DESIGN TEAM AND APPROPRIATE SUB-CONTRACTORS.

- PROPOSED ABOVE GROUND SW
- PROPOSED BELOW GROUND FW
- PROPOSED BELOW GROUND SW
- PROPOSED COMBINED
- EXISTING UU SEWERS
- SITE BOUNDARY
- OVERLAND FLOW ROTES



P1	23.09.21	PB	PB	Issued for Planning
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STATUS		PURPOSE OF ISSUE		
S2		FOR INFORMATION		
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RIDGE

CLIENT DEX CONSTRUCTION

PROJECT MASON STREET

DRAFTER PB ENGINEER PB

TITLE GROUND FLOOR DRAINAGE GENERAL ARRANGEMENT

SCALE 1:100 SHEET A1 DRAWING No MAS-RDG-00-ZZ-DR-C-0101 REV P1



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