

Flood Risk Assessment

For a site referred to as

Loreto College Expansion Project

Undertaken on behalf of

Loreto College

Report Title:	Loreto College Expansion Project Flood Risk Assessment
Report Reference:	10939-WML-00-XX-RP-C-9001
Client:	Loreto College
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Drafted By:	D Baker
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Revision:	P01

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CONTENTS

1.0	INTRODUCTION	1
	Appointment	1
	Proposed Development	1
	Objective	1
	Sources of Information	1
2.0	SITE LOCATION AND DESCRIPTION.....	2
	Site Address/Location	2
	Existing Site Description and Topography.....	2
3.0	EXISTING DATA	4
	Geo-Environmental Setting & Ground Conditions	4
	Hydrogeology & Hydrology.....	4
	Existing Site Drainage & Drainage Features.....	5
4.0	ASSESSMENT OF FLOOD RISK AND MITIGATION	6
	Sources of Flooding	6
	Historic Flooding.....	11
	Sequential & Exception Tests	11
	Climate Change	11
	Mitigation Measures.....	12

APPENDICES

Appendix 01	-	Proposed Development Plan
Appendix 02	-	Topographical Survey
Appendix 03	-	United Utilities Sewer Records
Appendix 04	-	Environment Agency Detailed Flood Map & Model Data
Appendix 05	-	Historic Flooding Correspondence
Appendix 06	-	WML Drainage Strategy

1.0 INTRODUCTION

Appointment

- 1.1 WML Consulting has been commissioned by Loreto College to produce a site-specific Flood Risk Assessment (FRA) for the proposed development known as Loreto College Expansion, located at the junction of Moss Lane (B5219) & Chichester Rd S.

Proposed Development

- 1.2 The proposed scheme involves the development of a new three-storey educational building located on the south eastern corner of the land adjacent to the Chichester Road South and Moss Lane East road junction.
- 1.3 The location of the new building has been determined, to a degree, due to the presence of the Corn Brook Culvert which extends roughly north-east to south-west across the central site area. External areas are to comprise hardstanding for access, with car parks to the north-western and north-eastern corners of the site. These will be interspersed with pedestrian walkways and general soft landscaping.
- 1.4 A proposed development plan is presented in Appendix 01.

Objective

- 1.5 This report comprises a Flood Risk Assessment (FRA), as required by the National Planning Policy Framework (NPPF 2021). The FRA has been carried out in accordance with BS 8533:2011 – Assessing and Managing Flood Risk in Development.
- 1.6 The NPPF identifies that it is the responsibility of developers to demonstrate:
- Whether the development would be affected by current or future flooding from any source.
 - That the development is safe and where possible reduces flood risk overall.
 - Whether flood risk would be increased elsewhere.
 - Likely mitigation measures for any identified flooding risks.
 - That the site can be developed and occupied safely.
- 1.7 The FRA identifies whether there are any flooding or surface water management issues related to the development site that may warrant further consideration, to comply with current Planning Policy and associated Flood Risk Practice Guide.

Sources of Information

- 1.8 Information has been obtained from the following sources:
- Phase 1: Desk Top Study Report – WML Consulting, February 2023.
 - Environment Agency Flood Mapping Ordinance Data
 - Manchester, Salford, Trafford Strategic Flood Risk Assessment (2011)

2.0 SITE LOCATION AND DESCRIPTION

Description	Comments
Site Address	87 Moss Lane West, Manchester, M15 5PE
National Grid Reference	383300E, 395989N
Site Area	0.62 hectares
Site Location	The site is bounded by:- North – Existing Loreto College. East – Chichester Road South with commercial properties beyond. South – Moss Lane West with residential properties beyond. West – Tamworth Street with residential properties beyond.
Site Description	At the time of the inspection (February 2023) the majority of the site comprised a disused single storey brick structure (former probation office) and car park to its west surrounded by areas of maintained grass landscaping to the north, south and east. The north-eastern part of the site formed a separate gravel surfaced car park used by Loreto College to the north, and separated from the main part of the site by a metal fence. An overhead service was noted to run roughly east to west across the car park forming the north-eastern part of the site. A strip of concrete extended across the otherwise asphalt car park, in the north-western part of the site, appears to indicate the location of Corn Brook culvert known to cross the site. Stands of semi-mature and mature deciduous trees were located in the south-western corner of the site and on the north-western site boundary. Further sporadic semi-mature deciduous trees were located on the eastern and north-eastern site boundaries. Vehicular access to the main part of the site is from Tamworth Street to the west, with vehicular access to the car park forming the north-eastern part of the site from Chichester Road South to the east.
Topography	A topographical survey undertaken by Survey Operations; March 2023 indicates that the site is relatively flat with levels ranging from circa 32.900m AOD in the north-east adjacent to the existing college building to circa 31.700m AOD to the south-west adjacent the existing access point from Tamworth Street. Localised grass mounds are also noted within the southern extent of the existing site. A copy of the existing site topographical survey can be found in Appendix 02.



Figure 2.1 – Aerial View from Google Maps

3.0 ENVIRONMENTAL SETTING & GROUND CONDITIONS

3.1 The following sections on the environmental setting and ground conditions are summarised from the Phase 1: Desk Top Study Report – WML Consulting, February 2023.

Description	Comments	
Geology (1:10, 000, 1:50,000 scale Map Sheets and digital mapping)	Artificial Deposits	None recorded.
	Superficial Deposits	The site is underlain by the Devensian Glaciofluvial Sheet Deposits, indicated to mainly comprise sand and gravel.
	Solid Strata	The drift deposits are in turn underlain by the Triassic Chester Peddle Beds Formation, indicated to comprise sandstone.
	Geological Faults	None indicated within 500m of the site.
	BGS Records	None available within 100m of the site.
Hydrogeology	Superficial Aquifer	Secondary A These comprise permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
	Bedrock Aquifer	Principle Aquifer These are layers of rock or drift deposits that have high intergranular and / or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and / or river base flow on a strategic scale.
	Source Protection Zone (SPZ) within 500m	A Zone 3 Total Catchment SPZ is located 212m east of the site with the associated Zone 2 Outer Catchment located 264m east and the Zone 1 Inner Catchment located 410m east.
	Groundwater Abstractions within 900m	None active within 500m. 1no historic abstraction located 102m south-east.
Hydrology	Surface Water Features within 250m	Corn Brook culvert extends roughly north-east to south-west across the central/northern section of the site.
	Surface Water Abstractions within 1Km	None.

Description	Comments
Existing Site Drainage & Drainage Features	From a review of the United Utilities (UU) public sewer records it is understood that there are existing combined water sewers located within the adjacent Chichester Rd (south) and Moss Lane (west). A copy of the UU sewer records can be found in Appendix 03. A Ground Penetrating Radar (GPR) survey undertaken by Survey Operations; March 2023 has indicated multiple existing outfalls serving the existing buildings to the adjacent UU sewer network noted above. It is recommended that a CCTV survey is undertaken to confirm the location, depth, condition of all existing site drainage and determine suitability for reuse by the new development.

4.0 ASSESSMENT OF FLOOD RISK AND MITIGATION

Description	Comments
Fluvial Flooding (Rivers & Sea)	Flood Risk Rating: Medium
	Online Environment Agency (EA) Fluvial Flood Map (figure 4.1) shows the site to be situated within an area designated as having a Low Risk (between 0.1% and 1%) chance of flooding each year, however detailed flood mapping received directly from the EA indicates part of the site to be situated within Flood Zone 2 (figure 4.2).
	 Figure 4.1 – Online EA Flood Map – Rivers & Seas
	 Figure 4.2 – Detailed EA Flood Map – 15/02/2023 [GMM298326AB] A complete copy of the detailed mapping can be found in appendix 03
	Zone 1 indicates an Annual Exceedance Probability (AEP) of 0.1% (1 in 1000 year) – ‘Low’ risk. Zone 2 comprises land assessed as having an AEP of 1% (1 in 100 year) – ‘Medium’ risk. Zone 3a comprises land assessed as having an AEP of 3.3% (1 in 30 year) – ‘High’ risk. Given the above, the risk of flooding is considered to be less than 0.1% and therefore can be classified as ‘very low’.

**Fluvial Flooding
(Rivers & Sea)**

As indicated in the above figures the extent of flooding appears to be due to the presence of Corn Brook Culvert which passes through the centre of the development site and is noted as having no 'flood defences' by the EA.

The detailed flood mapping data received from the Environment Agency also included model data taken from Corn Brook in 2017 at multiple node points which has been used to calculate theoretical water levels against various annual exceedance probabilities and climate change scenarios.

A review of the model data for nodes 2, 3, 5 & 6 which are shown to be within the vicinity of the development site indicates the following extreme flood water levels based upon a 0.1% (1 in 1000-year event) plus 30% increase in flow due to climate change;

Node 2: 33.01
Node 3: 32.65
Node 5: 31.98
Node 6: 32.05

As noted above, the topographical survey undertaken by Survey Operations; March 2023 indicated that the site is relatively flat with levels ranging from circa 32.900m AOD in the north-east adjacent to the existing college building to circa 31.700m AOD to the south-west adjacent the existing access point from Tamworth Street.

Using the highest noted value of 33.01 at modelled node 2 indicates an anticipated flood water depth across the site of between 0.11m – 1.31m.

It should be noted that the above figures represent an extreme storm scenario which has an AEP of 0.1%.

For comparison the below figures have also been assessed based upon a higher AEP event of 1% (1 in 100-year event) plus 75% climate change allowance;

Node 2: 32.63
Node 3: 32.22
Node 5: 31.82
Node 6: -

Using the same comparison with the levels shown on the topographical survey the anticipated flood water depth is now 0.93m in the south-west with other areas of the site experiencing little or no flooding.

A full copy of the model data tables can be found in Appendix 04.

Given the above it is considered that the flood risk to the site from Fluvial sources is classified as 'medium risk', however this risk level could be reduced through mitigation measures & detailed drainage design.

Description	Comments
Pluvial Flooding (Surface Water)	Flood Risk Rating: <u>Very Low</u>
	There is a potential risk of flooding from sheet run-off/overland flows from adjacent land / developments. Overland flow flooding is characterised by water flowing over the ground surface where there is no drainage system to accept it. It is caused when the intensity of rainfall exceeds the infiltration capacity of the surface onto which it falls, or when the soil is saturated and cannot accept more water. Overland flow may also occur where water flowing through the soil returns to the surface, for example in the saturated zone at the base of a slope.
	 Figure 4.3 – EA Flood Map – Surface Water
	EA mapping shows that the site isn't susceptible to surface water flooding but small areas of the adjacent road network might be subject to minor flooding during low-risk scenarios. Whilst no flood risk is indicated to be present on site it is recommended that future risks are managed through the proposed drainage strategy for the new development. Given the above, the risk of flooding from surface water is considered to be very low.

Description	Comments
Groundwater Flooding	Flood Risk Rating: <u>Low</u>
	The potential risk of groundwater flooding has been considered. Groundwater flooding often happens over and around aquifers, where the underlying geology is highly permeable and has a high capacity to receive and store rainfall. Elevated levels of groundwater resulting from prolonged periods of heavy rainfall can cause the flooding of basements and other underground structures and ponding of water in low lying areas.
	The BGS and Phase 1: Desk Top Study indicates the site to be situated within an area considered to have a moderate-high risk of ground water flooding.
	A review of window sample logs taken across the site March 2023, confirms the existence of groundwater within 1 sample only (WS03) at a depth of 4mbgl. This is considered to be perched water due to the presence of a band of clay which sits beneath the granular substrata generally across the site.
	Ongoing groundwater monitoring is being undertaken to assess ground water levels over a period of 3 months as it is understood that groundwater levels fluctuate seasonally.
Sewer Flooding	Given that the only groundwater strike to date is classified as perched water as a result of clay layer across the site and at a significant depth of 4mbgl combined with the fact that the development proposals do not include any underground structures/basements the risk of flooding from this source can be considered low, unless results from the ongoing groundwater monitoring indicate otherwise.
	Flood Risk Rating: <u>Low</u>
	There is a potential risk of flooding from existing sewers in close proximity to the site. When the scale of a rainfall or storm event exceeds the capacity of ditches, drains, culverts and sewers to convey the water out of an area, flooding may result. Such flooding can happen during events below the design capacity of the system, when capacity is temporarily reduced due to a blockage. Flood events of this type, while typically localised, can be particularly unpleasant, as the flood waters can be contaminated with sewage and can enter properties through the foul drainage system.
	A review of the United Utilities (UU) public sewer records indicates that there are existing public combined water sewers located beneath the adjacent road network.
	A copy of the sewer records can be found in Appendix 03.
Sewer Flooding	United Utilities have been contacted and have confirmed that they hold no current records of sewer flooding in the vicinity of the proposed development.
	Given the above it is considered that the potential risk of flooding from existing sewers is low.

Description	Comments
Flooding from other sources	Flood Risk Rating: <u>Low</u>
	A review of the online Flood Zone Mapping indicates that the site is also susceptible to flooding from reservoirs as shown in the below figure 4.4, however it doesn't indicate from which source the resulting flooding initially occurs or the probability of the event occurring.
	 ● when river levels are normal ● when there is also flooding from rivers Figure 4.4 – EA Flood Map – Reservoirs
	In the absence of detailed information, it has been assumed that the extent of flooding shown in the above figure is a catastrophic event originating from an overtopping of the Manchester Ship Canal located some 1.6km to the north-west. The below wider extract of the same map shows that the majority of Manchester, Salford, Stretford and beyond would be subject to flooding from the same event/circumstances.  Figure 4.5 – EA Flood Map – Reservoirs The Manchester Flood Risk Management Team (MFRMT) have been contacted regarding records of historic flooding within the vicinity of the site and a response is awaited at the time of writing. Given that extent of flooding and the likelihood of such an event occurring being extremely low it is considered that the risk of flooding from this source is considered to be low until such a time that the MFRMT confirm otherwise.

Description	Comments
Historic Flooding	A review of the Manchester, Salford, Trafford Strategic Flood Risk Assessment (2011) has indicated that the site is not subject to flooding with the exception of the risks associated with flooding from the Corn Brook culvert already noted within this report. The Environment Agency (EA), Manchester Flood Risk Management Team (MFRMT), and United Utilities (UU) have been contacted to confirm whether they hold information regarding past, present or future flooding issues that may affect the site. Both the EA and UU have confirmed that they hold no current records of flooding in the vicinity of the proposed development At the time of writing a response from MFRMT is still awaited. Upon receipt and if the responses alter the findings of this report, the report will be amended accordingly and reissued to all parties. A copy of received correspondence can be found in Appendix 05.
Sequential & Exception Tests	In accordance with the National Planning Policy Framework (NPPF) a sequential test is required for all developments situated with Flood Zone 2 or 3 or sites with historic flooding problems. As outlined in the above sections, the site is located within Flood Zone 2 and whilst the risk of flooding from most sources are considered low-very low there is a medium risk of Fluvial flooding associated with the Corn Brook Culvert. As noted within the above Fluvial flooding sections, the extent and depth of flooding can be mitigated through the proposed drainage strategy for the site combined with additional measures such as raised site levels. Given that the proposed development is an expansion of the existing college campus which has been established for a significant period of time it is considered that a sequential test for the new development is not required. An exception test is designed to assess the type of development against its location in terms of flood risk vulnerability and compatibility. NPPF table 2 shows that the development is classified as 'more vulnerable' which when read in accordance with NPPF table 3 is compatible with Flood Zones 1,2 & 3, therefore no exception test is required for this development.
Climate Change	When considering flood risk to the site it is necessary to fully consider the potential impacts of climate change for the lifetime of the development. The potential impacts of climate change on Peak Rainfall Intensities for the development site have been assessed as part of this FRA and will be applied at 40% for the purpose of design of any new site drainage system in accordance with the NPPF Technical Guidance, Table 5. The WML Drainage Strategy Document ref; 10939-WML-ZZ-XX-RP-C-9002 demonstrates that the development will be safe and does not increase the flood risk to third parties as required by the national policy and that this development is deliverable using the above climate change allowance.

Description	Comments
Mitigation Measures	Whilst it is considered that the flood risk to the development is principally low with the exception of flood risk associated with Corn Brook Culvert, it is considered that flood mitigation measures are required as part of the development proposals.
	Access & Egress Fluvial flooding from Corn Brook Culvert is the most likely risk to the proposed development in the event that the maximum culvert capacity is breached. The above Fluvial Flooding section describes the worst-case flood scenario modelled by the Environment Agency which resulted in a predicted flood water depth varying between 0.11m – 1.31m across the site. Whilst the above scenario is considered to only occur during an extreme storm event (0.1% AEP) the more probable flood level of 32.630m AOD resulting from a 1% AEP event could still hinder access & egress from parts of the site, especially in the western part of the site where the existing car park is to be retained with a nominal ground level of 31.800m. In the event that either of the above scenarios occurs it is considered that egress from the site would still be achievable from the north-east where the existing site topography is higher than the remainder of the site. In the very unlikely event of a sudden breach and no early warnings being received, it may not be possible to evacuate all occupants from the building in sufficient time as flood waters could prove problematic for certain individuals to pass through. Should this unlikely scenario occur, the developer should have a sufficient action plan in place to move vulnerable individuals to a place of safety (i.e., an upper floor) and provide essential survival items (i.e., food and blankets), until such a time as emergency services are able to attend or the flood water has retreated.
	Early Flood Warning The Environment Agency maintains a website that carries the latest information on flood alert states as well as a series of advice publications. Flood warnings may also be broadcast on the television and radio. Whilst flood warnings may not be an indication of imminent flooding of the site as significant flooding should only occur during an extreme storm event, they should be used to trigger a raised sense of vigilance by those attending the site.
	Finished Floor Levels Standard requirements for ground floor levels of new development are set out in BS8533:2011 'Assessing and managing flood risk in new development – Code of practice'. This recommends floor levels are set a minimum of 300mm above the modelled 1 in 100 annual probabilities plus allowance for climate change flood level. As noted above, there is a low residual risk of flooding to the site during an extreme rainfall event. To mitigate this, where practical it is recommended that the ground floor level is set an appropriate freeboard above surrounding ground, and that external ground levels around the site are contoured to ensure any overland flow routes in an extreme rainfall event are directed away from the building. The WML Drainage Strategy Document ref; 10939-WML-ZZ-XX-RP-C-9002 outlines the strategy for mitigating residual risk of flooding to the proposed development.

	Additional Mitigation Measures In the event it is not possible to raise the finished floor level above the modelled flood levels, consideration should be given to the following; Flood resilient construction techniques and specialist building materials should be considered for the building i.e., elevating electrical sockets & valuable machinery/plant that may be affected by flood water. Incorporation of flood protection barriers/guards to doorways and other openings throughout the ground floor, air brick covers or smart air bricks (where applicable) and non-return valves should to be included on all drainage pipework to prevent flood water ingress back into the building during extreme flood events.
Sustainable Drainage (SUDs)	The NPPF recognises that flood risk and other environmental damage can be managed by minimising changes in the volume and rate of surface runoff from development sites. It recommends that priority is given to the use of 'Sustainable Drainage Systems' ('SUDs') in new developments. SUDs and surface water is also considered in the SFRA and it is recommended that the following items are considered as part of the proposed site drainage strategy; <i>Sustainable Drainage Systems should be included in new developments unless it is demonstrably not possible to manage surface water using these techniques;</i> <i>Runoff rates from new developments on Greenfield sites should not exceed Greenfield runoff rates pre-development and should allow for climate change and;</i> <i>The vulnerability and importance of local ecological resources, such as water quality and biodiversity, should also be considered when determining the suitability of SUDs."</i> In accordance with current best practice guidelines, SUDS techniques have been considered for the development site's drainage proposals. The suitability of various SUDs techniques has been reviewed within the WML Drainage Strategy Document.
Summary	The site is situated in Flood Zone 2 and is noted as having between 0.1% - 1% risk of flooding. The risk of flooding from all sources listed above are noted as being 'low' with the exception of Fluvial Flooding from Corn Brook Culvert which is considered to have a 'medium' flood risk designation. Environment Agency modelled flood level data has been assess against the existing site topography and results in an anticipated flood depth varying between 0.11m – 1.31m across the site extent. The above figures are considered to be the result of and extreme AEP event (0.1%) only and a more probable flood water level of 32.63m AOD (1% AEP event) would result in a flood depth of 0.93m in the south-west with other areas of the site experiencing little or no flooding. At the time of writing, a response confirming the record of any historic flooding in the vicinity of the development is still awaited from the Manchester Flood Risk Management Team (MFRMT), however both the Environment Agency (EA) and United Utilities (UU) have confirmed they hold no records of flooding for the development site.

APPENDIX 01

Proposed Development Plan

1 : 200

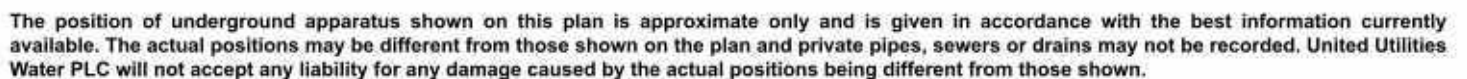


 Site Boundary	 Future THT Development	 Planting Areas
 Ownership Boundary	 Location of Culvert and 7m easement zone from culvert centre line.	 Soft Landscaping - Playpark
 Grass	 Existing Trees	 Lines of Demolition
 Tarmac	 Proposed Trees	 2.4m(H) metal and post rail fence to match existing (refer to DWG. 9201)
 Paving Slabs	 Existing 2.4m(H) metal and post rail fence	 External Compound
 New Build		
 New Pavement		

APPENDIX 02
Topographical Survey

APPENDIX 03

United Utilities Sewer Records



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Wastewater Symbolology

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

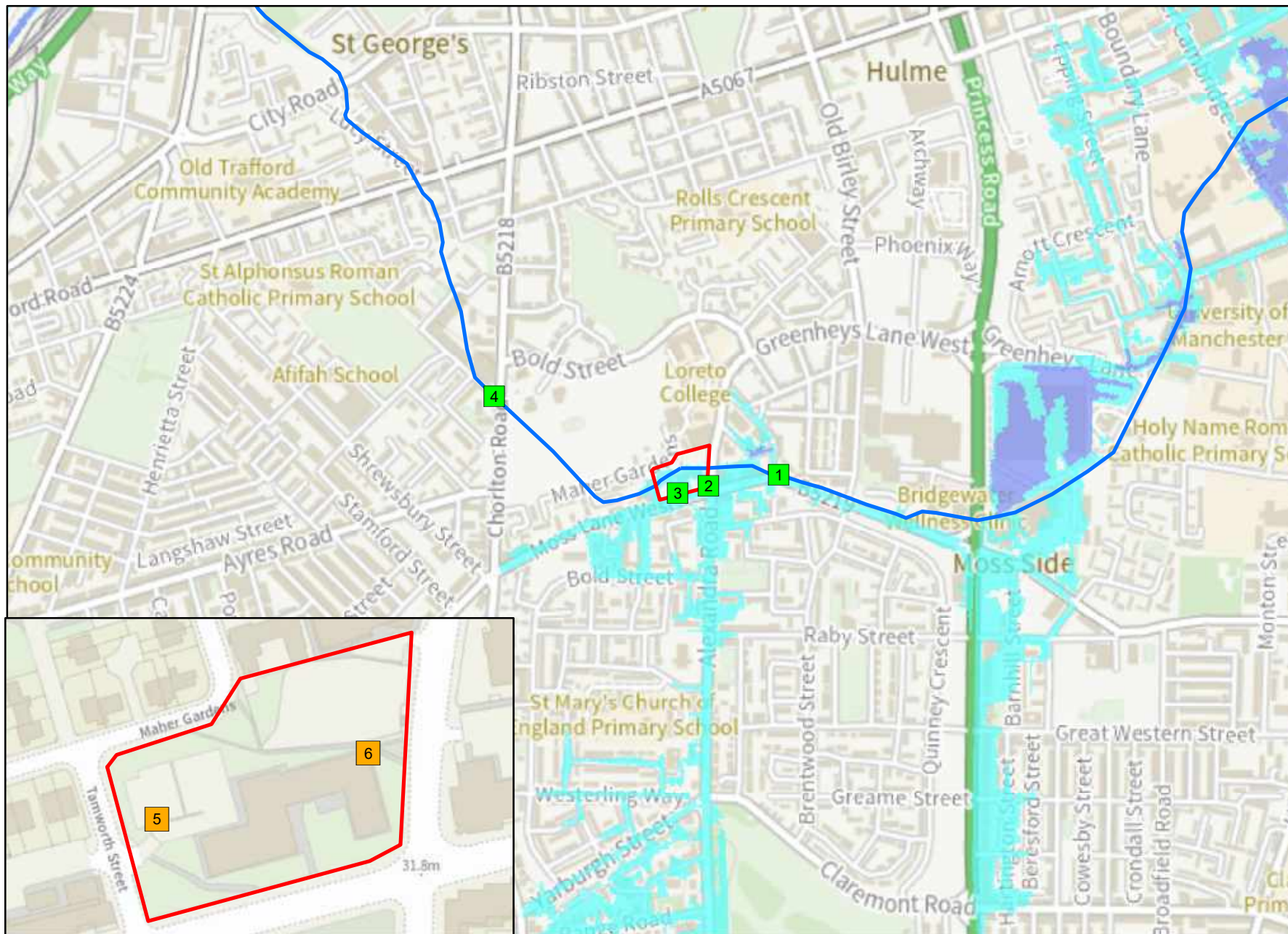
All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

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

APPENDIX 04

Environment Agency Detailed Flood Map & Model Data

Detailed Flood Map Centred on Chichester Road South, Manchester, M15 5PB. Created 15/02/2023 [GMMC298326AB]



1:10,001



Legend

- Site Location
- Model Measurements
- 2D Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

Undefended																		
Map Reference	Model Node Reference	Easting	Northing	Data	50 % AEP (1 in 2 year)	20 % AEP (1 in 5 year)	10 % AEP (1 in 10 year)	5 % AEP (1 in 20 year)	4 % AEP (1 in 25 year)	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 30% increase in flow	1 % AEP (1 in 100 year) + 35% increase in flow	1 % AEP (1 in 100 year) + 70% increase in flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
1	ea013_0249_corn2215	383467	395995	Modelled Water Level (m aodN)	30.61	30.71	30.80	30.90	31.01	31.93	32.43	32.58	32.78	32.81	32.99	32.84	33.28	33.39
				Modelled Flow (cumecs)	0.24	0.34	0.42	0.49	0.58	1.03	1.32	1.57	2.03	2.11	2.66	2.24	4.60	5.98
2	ea013_Model_CORN02_00006	383340	395972	Modelled Water Level (m aodN)	30.26	30.46	30.60	30.73	30.86	31.69	32.10	32.24	32.42	32.44	32.63	32.48	32.91	33.01
3	ea013_Model_CORN02_00004	383284	395969	Modelled Water Level (m aodN)	30.19	30.37	30.50	30.61	30.73	31.37	31.69	31.79	31.96	31.99	32.22	32.04	32.55	32.65
4	ea013_0249_corn2587	382944	396139	Modelled Water Level (m aodN)	29.22	29.36	29.46	29.55	29.63	29.95	30.07	30.16	30.34	30.39	30.82	30.47	31.73	31.99
				Modelled Flow (cumecs)	0.26	0.37	0.46	0.53	0.63	1.13	1.46	1.72	2.24	2.33	2.93	2.47	5.10	6.63

Undefended							
Map Reference	Model Node Reference	Easting	Northing	Data	1 % AEP (1 in 100 year) + 70% increase in flow	0.1 % AEP (1 in 1000 year)	0.1 % AEP (1 in 1000 year) + 30% increase in flow
5	2D Levels	383254	395983	Modelled Water Level (m aodN)	31.82	31.95	31.98
6		383327	396005	Modelled Water Level (m aodN)		32.03	32.05

Model data taken from Corn Brook 2017

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes: *Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

APPENDIX 05

Historic Flood Record Correspondence

Daniel Baker

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 15 February 2023 11:42
To: Kevin Tyldesley
Subject: 10939 - Loreto College - Expansion Project - Chichester Road South, Manchester, M15 5PB

Good Morning Kevin,

Thank you for contacting United Utilities.

I can confirm that we have no current record of sewer flooding within the vicinity of the proposed development.

Please note that United Utilities Water Limited (UW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the register.

Our response does not include:

- any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which UW has no control and not a facet of sewer capacity; or
- any historical sewer flooding events that have been removed from the register as a result of investment in our infrastructure.

As with all development sites, we recommend you liaise with our water and wastewater engineers by contacting our Developer Services team so the details of your development proposal can be considered further. Details can be found at the following link.

<https://www.unitedutilities.com/services/builders-developers/>

Should you require any further information please do not hesitate to contact me.

Kind regards



Louise Dack
Customer Advisor Advanced
Developer Services & Metering
Customer Services
T: 01925 233063 (33063 internal)
[unitedutilities.com](https://www.unitedutilities.com)

Did you know we now have a live chat facility available to you Mon to Friday 8 -5pm. You just click on the orange live chat box on our webpage and one of our advisors will be ready to chat to you and help you with your enquiry

<https://www.unitedutilities.com/builders-developers/> or you can email us at WastewaterDeveloperServices@uuplc.co.uk

----- Original Message -----

From: Kevin Tyldesley [kevin.tyldesley@wmlconsulting.com]

Sent: 10/02/2023 11:34

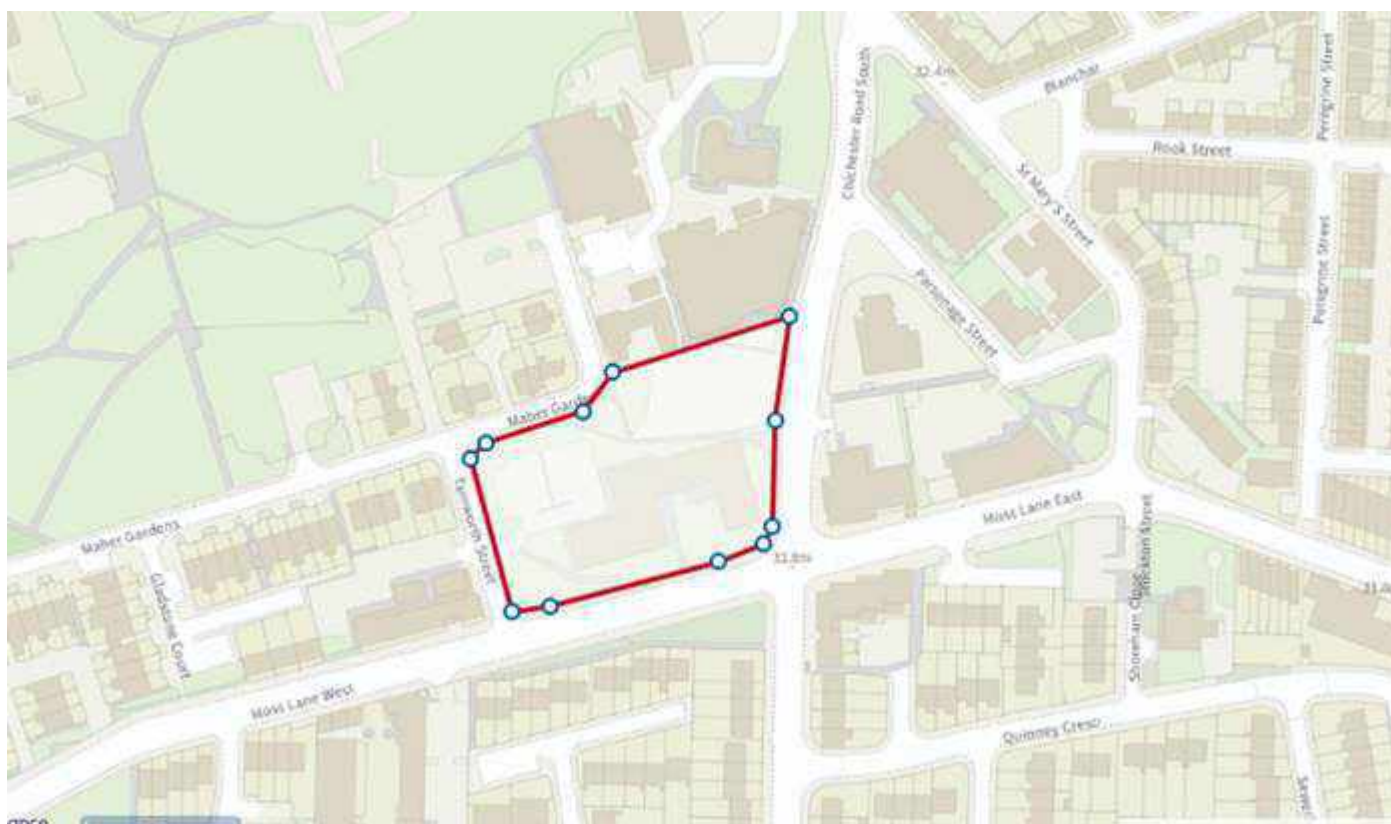
To: wastewaterdeveloperservices@uuplc.co.uk

Subject: 10939 - Loreto College - Expansion Project - Chichester Road South, Manchester, M15 5PB

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi.

We have been asked to provide a Flood Risk Assessment for a proposed development at the above site, as indicated on the screenshot below.



Can you confirm if you are aware of any flood risk issues that may affect the site please ?

Kind regards.

Kevin Tyldesley

WML Consulting Ltd

Daniel Baker

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: 21 February 2023 10:47
To: Kevin Tyldesley
Subject: GMMC298326AB Response attached from the Environment Agency
Attachments: GMMC298326AB - DFM.pdf; GMMC298326AB - Table.pdf

Dear Kevin,

Re: 10939 - Loreto College - Expansion Project - Chichester Road South, Manchester, M15 5PB

Thank you for your enquiry which was received on 10/2/23.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

I enclose the data requested.

There are no flood defences in the vicinity of the site.

We have no records of flooding affecting the site. However, this does not mean flooding has not occurred in the past or that it will not flood in future. We recommend that you also contact United Utilities and Manchester District Council who may hold additional information (the former especially in relation to sewer flooding).

Please be aware you can check your risk of flooding on our external website <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

Here are some useful links below:

<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

For surface water information please use link: <https://check-long-term-flood-risk.service.gov.uk/map?easting=362125.07&northing=388310.97&map=SurfaceWater>

Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

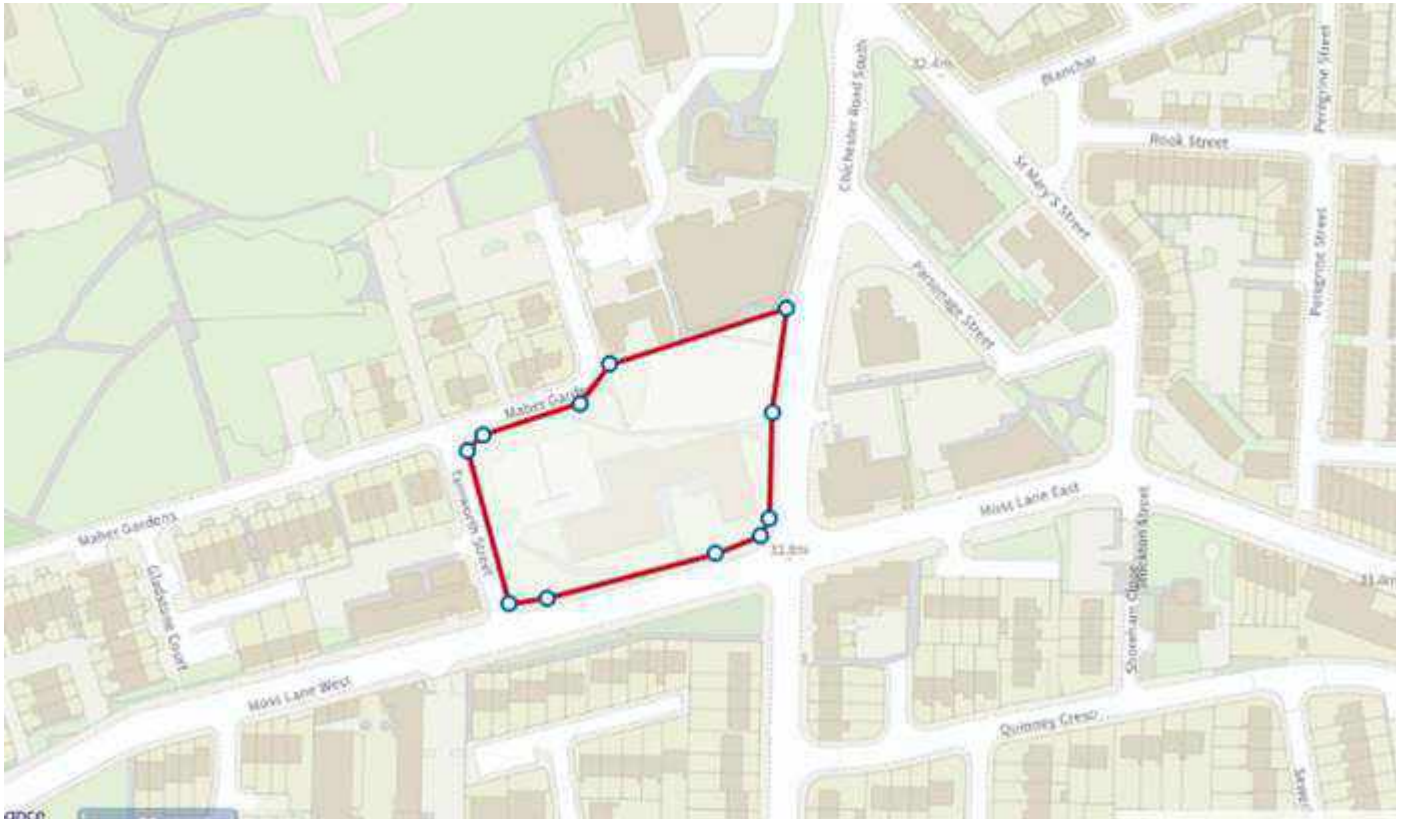
Anne Ball
Customer and Engagement Officer
Greater Manchester, Merseyside and Cheshire
Email: inforequests.gmmc@environment-agency.gov.uk
Office address: Richard Fairclough House, Knutsford Road, Latchford, Warrington, WA14 4UW

From: Kevin Tyldesley <Kevin.Tyldesley@wmlconsulting.com>
Sent: 10 February 2023 11:33
To: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>

Subject: GMMC298326AB 10939 - Loreto College - Expansion Project - Chichester Road South, Manchester, M15 5PB

Hi.

We have been asked to provide a Flood Risk Assessment for a proposed development at the above site, as indicated on the screenshot below.



Can you confirm if you are aware of any flood risk issues that may affect the site please ?

Kind regards.

Kevin Tyldesley

WML Consulting Ltd

Civil, Structural & Geotechnical Engineers

No. 8 Oak Green | Earl Road | Stanley Green Business Park | Cheadle Hulme | Cheshire | SK8 6QL

Tel: 0161 482 0600 | email: kevin.tyldesley@wmlconsulting.com

COVID-19 UPDATE

All our staff are able to work safely and flexibly from office or home.

Visit WML's Website: www.wmlconsulting.com

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Although this email and any attachments are believed to be free of any virus, or any other defect which might affect any computer or IT system, it is the responsibility of the recipient to ensure that they are virus free, and no responsibility is accepted by WML Consulting Ltd for any loss or damage arising from receipt or use.

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StructuralEngineers

CHAS

Constructionline
Gold Member



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We invest in people Standard

APPENDIX 06

WML Drainage Strategy: 10939-WML-ZZ-XX-RP-C-9002

Project No. & Name:	10939 – Loreto College Expansion	Prepared by:	Checked by:	Rev:	Date:
Document Ref:	10939-WML-00-XX-RP-C-9002	Daniel Baker	Loughlin O’Gorman	P01	April 2023

Background

1. The below Drainage Strategy Report has been created by WML to support and inform detailed Planning Conditions for Loreto College Expansion, located at the junction of Moss Lane (B5219) & Chichester Rd S.
2. The proposed scheme involves the development of a new three-storey educational building located on the south eastern corner of the land adjacent to the Chichester Road South and Moss Lane East Road junction.
3. The location of the new building has been determined, to a degree, due to the presence of the Corn Brook Culvert which extends roughly north-east to south-west across the central site area. External areas are to comprise hardstanding for access, with car parks to the north-western and north-eastern corners of the site. These will be interspersed with pedestrian walkways and general soft landscaping.

Surface Water Drainage Strategy

4. Reference should be made to the Flood Risk Assessment – WML Consulting, April 2023, Phase 1: Desk Top Study Report – WML Consulting, February 2023 and Phase 2: Ground Investigation Report – WML Consulting, April 2023.
5. The proposed drainage strategy for this site will incorporate the principles of, and where appropriate demonstrate compliance with the NPPF and the SUDS manual.
6. The proposed drainage system should be designed in accordance with BS EN 7524 and Building Regulations Part H (2010). Approved Document H indicates the following hierarchy for the disposal of surface water drainage from the new development sites, firstly discharge via infiltration, secondly discharge via watercourse and lastly discharge to sewer.
7. These options are discussed in further detail below.
8. **Surface water discharge via infiltration:** A review of the Phase 2: Ground Investigation Report by WML Consulting has confirmed that ground conditions on the site comprise made ground underlain by glacial deposits to a depth of circa 11mbgl and weathered sandstone of the Chester Pebble Bed Formation to a maximum depth of 12mbgl. These ground conditions are considered suitable for some infiltration techniques; however, it is noted that special consideration should be given to areas of deeper made ground and proximity with the existing brick surface water culvert.
9. **Surface water discharge via watercourse:** A review of the Ordnance Survey mapping around the site has confirmed the presence of Corn Brook Culvert which passes through the site and is understood to follow the line of the original watercourse.
10. A survey of the existing culvert undertaken by Malcolm Hughes Chartered Land Surveyors, April 2023, confirmed the route of the 3.7m x 1.45m Corn Brook Culvert as it passes through the site at a depth of approximately 2.5mbgl. A copy of the survey drawings can be found appended to this report.
11. **Surface water discharge via public sewer:** A review of the United Utilities (UU) public sewer records indicate that there are existing combined water sewers located within the adjacent Chichester Rd (south) and Moss Lane (west).
12. Further to the above, a GPR Survey undertaken by Survey Operations Ltd, March 2032 confirmed an existing combined outfall from the current site to the existing UU sewer located beneath Moss Lane (west).

Surface Water Drainage Proposals

13. Reference should be made to WML drawing 10939-WML-ZZ-XX-DR-C-1001.
14. In consideration of the above drainage hierarchy, the surface water proposals outlined within this report are based upon disposal of all surface water from the proposed development via a combination of both infiltration and a connection to the existing Corn Brook Culvert.
15. As noted within section 8, the findings of the Phase 2 Ground Investigation Report suggested that infiltration might be a viable solution for this development, however careful consideration should be given to presence of varying depths of made ground and the proximity to the existing surface water culvert.
16. It is understood that Corn Brook Culvert is of brick construction and therefore concentrated infiltration techniques such as cellular soakaways in the vicinity of the existing culvert could result in a weakening/wash out of the existing mortar or softening of the adjacent ground which could ultimately lead to structural failure.
17. It is therefore proposed to incorporate infiltration for new areas of hardstanding only i.e., footpaths where a permeable construction can be utilised to disperse of captured surface water runoff over a larger area and mitigate any risk associated with the structure of the existing culvert.
18. The permeable paving construction will include a stone sub-base layer which will act as storage for the captured surface water runoff prior to its percolation into the sub-strata.
19. In the absence of site-specific percolation test results, a nominal infiltration rate of 1×10^{-6} m/s has been utilised to determine the depth of sub-base required to store and disperse captured surface water runoff for all storm durations up to and including the critical 100-year event plus a 40% climate change allowance.
20. The intention is to dispose of surface water runoff from the remainder of the site (new building roof & retained hardstanding) via a new piped connection to the existing culvert.
21. The site is currently developed and comprises an existing structure along with a mixture of hardstanding (to be retained) interspersed with areas of soft landscaping. The site is classified as a 'Brownfield' site; thus, any new development requires a minimum 50% reduction in surface water runoff rate leaving the development site as outlined within the SFRA.
22. An existing site runoff calculation has been undertaken using a rainfall intensity of 50mm/hr and has resulted in a flow rate of 100.9 l/s, which after the 50% reduction would leave an allowable discharge rate of 55 l/s.
23. It is understood that LLFA policy is that any new development should aim to discharge surface water runoff at Greenfield runoff rates therefore a further assessment has been undertaken using MicroDrainage software which concluded the following flow rates;

Return Period	Flow (l/s)
1 in 1 year	1.4
1 in 30 year	2.7
1 in 100 year	3.3

24. A copy of the MicroDrainage calculations can be found appended to this report.
25. It should be noted that the above greenfield flow rates exclude the areas of proposed infiltration described in the above sections.
26. The proposals for the new development intend to discharge all remaining surface water runoff from the site at the above Greenfield runoff rates for all critical storm durations up to and including the critical 100-year event plus a 40% climate change allowance.
27. It is proposed to collect roof water via a traditional roof drainage system and discharge via a new below ground drainage network located around the building footprint.
28. Surface water runoff from external areas of retained hardstanding will be captured via a combination existing gullies and new channel drains. Where existing gullies and the associated below ground pipework/infrastructure can be retained/reused, they will be connected into the new below ground drainage system for disposal along with the roof water via the same new connection to Corn Brook Culvert.

29. A below ground cellular attenuation tank has been incorporated within the drainage network to provide storage for all captured surface water runoff (excluding infiltration areas) where it can be then released via a flow chamber at a controlled/restricted flow rate to suit the allowable Greenfield flow rates noted above.
30. Given the limited area of retained hardstanding (car parking) and the relatively low anticipated vehicular movements across the site it is considered that the water quality being discharged to Corn Brook Culvert is acceptable, however the drainage proposals do include pollution/treatment controls and are discussed later in this report.

Residual Flood Risk Mitigation

31. As identified with the Flood Risk Assessment (FRA) – WML Consulting, April 2023, there is a low residual risk of flooding from all sources with the exception of flooding from Corn Brook Culvert which is considered as having a medium residual flood risk.
32. The FRA includes a series of modelled flood scenarios provided by the Environment Agency which offer a theoretical flood water level at 4 node points across/adjacent to the development site.
33. The most notable flood water levels are shown at node 2 located on the junction of Chichester Rd (south) and Moss Ln (west) which recorded the following levels;
 - 33.010m AOD during a simulated 0.1% probability (1:1000-year event) + 30% climate change allowance.
 - 32.630m AOD during a simulated 1% probability (1:100-year event) + 75% climate change allowance.
34. The FRA noted that the higher figure of 33.010 was the result of an extreme event with an annual exceedance probability (AEP) of 0.1%.
35. Given that there are no historic records of flooding in the vicinity of the proposed development it is considered that the following flood risk mitigation measures will be based upon the more probable flood water level of 32.630 which has an AEP of 1% i.e., a 10x greater chance of occurring in a given year.
36. In accordance with the recommendations outlined within the FRA it is proposed to set the new building's finished floor level (FFL) at 32.930m AOD which provides a 300mm freeboard above the theoretical flood water level noted above.
37. In addition, it is proposed to also contour external ground levels as such to direct any overland flow routes resulting from extreme rainfall away from the new building.
38. Given the above it is considered that the mitigation of residual risk identified within the FRA has been satisfied and that the finished floor level of 32.930 shown on WML drawing 10939-WML-ZZ-XX-DR-C-1001 is acceptable with regards to flood risk.
39. It is understood that during exceedance events, parts of the site may still have the potential to flood until such a time that the proposed drainage system has the capacity to accept the additional flows. Whilst the flooded areas pose no increased risk to the building or the safe access/egress of people to and from the site, in the very unlikely event of a sudden breach and no early warnings being received, it may not be possible to evacuate all occupants from the building in sufficient time as flood waters could prove problematic for certain individuals to pass through.
40. Should this unlikely scenario occur, the developer should have a sufficient action plan in place to move vulnerable individuals to a place of safety (i.e., an upper floor) and provide essential survival items (i.e., food and blankets), until such a time as emergency services are able to attend or the flood water has retreated/the drainage system has the capacity to accept the additional flows.
41. Finally, it is important to ensure that the aforementioned areas don't raise the risk of flooding to third party land.
42. Reference should be made to the Exceedance Flow Plan within the WML Surface Water Calculation document 10939-WML-00-XX-CA-C-0001.
43. The Exceedance Flow Plan identities demonstrates that exceedance flood routes will be directed to the adjacent highways, therefore it is considered that the risk of increasing the flood risk to third party land during exceedance events can be classified as very low.

Waste Water Drainage Strategy

44. As noted in sections 11 & 12, it is understood that there are existing United Utilities combined sewers located within the adjacent road network and that an existing combined outfall serving the current site is situated to the south of the new building.
45. It is therefore proposed to collect waste water from the proposed development via traditional soil stacks & SVPs prior and discharge via a new below ground drainage system prior to reusing the existing outfall to the public sewerage network located to the south, subject to UU approval.

SUDs Review

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

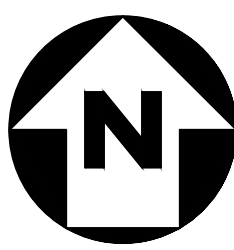
Water Treatment

53. As discussed within the above strategies, due to the limited potential for vehicle movements across the site it is considered that the water quality being discharged to Corn Brook Culvert is acceptable, however the drainage proposals include pollution/treatment controls to promote improvements in water quality leaving the site.
54. From table 26.2 of the SUDS manual, the proposed roof area is deemed to have a "low" pollution hazard level. i.e. TSS = 0.3, Metals = 0.2, Hydrocarbons = 0.05.
55. Whilst also from table 26.2 of the SUDS manual, the proposed, car park and access areas are deemed to have either a "medium" pollution hazard level. i.e., TSS = 0.7, Metals = 0.6, Hydrocarbons = 0.7.
56. Given the above it is considered that the following treatment stages will be incorporated for this project;
57. Unfortunately due to the site limitations it has not been possible to incorporate traditional SUDs treatment features (as discussed in the above SUDs review) and therefore it has been necessary to incorporate alternative proprietary systems to ensure water quality is achieved.
58. Gully traps, sump units and catch pits have been incorporated within the drainage proposals to remove contaminants/pollutants from all surface water runoff prior to disposal from the site.
59. In addition to the above a downstream defender has also been integrated into the drainage network prior the final connection with the Corn Brook Culvert to remove any remaining sediments and oils etc. that have not already been captured by the above.
60. Finally, the permeable paving sub-base incorporates a stone filtration layer which will provide mitigation indices of TSS = 0.4, Metals = 0.4, Hydrocarbons = 0.4. Though these figures are halved in line with the guidance provided in the SUDS manual.

Maintenance Plan

61. It is understood that the new drainage network will be privately owned and maintained by the client or an appointed maintenance company on their behalf and will not be offered up for adoption by United Utilities.
62. The proposed drainage system has been designed in accordance with the current standards and guidelines to achieve a minimum self-cleansing velocity, however excessive debris in the system could still result in loss of performance.
63. The proposed drainage design will consists of traditional manholes, pipes and channels.
64. It is proposed to check the underground drainage system and lift manhole/inspection chamber covers to ensure that the pipework associated with each chamber is operating correctly twice yearly and ensure drainage channels are free from debris.
65. Any problems encountered should be investigated by CCTV survey if required and any remedial works necessary carried out in a timely manner.
66. It is recommended that the biannual inspections take place in spring and autumn where there is additional risk of blockage from debris associated with fallen leaves etc.
67. Attenuation has been provided in the form of a below ground storage crate system. A recommended maintenance schedule, checklist and a preferred cleaning procedure should be included from the supplier in the O&M Manual however it is anticipated that this should include twice yearly checking that the upstream manholes are free from debris and ensure that no sediment is being passed into the storage crates.
68. Flow restriction has been achieved through the incorporation of an orifice plate flow control. A recommended maintenance schedule, checklist and a preferred cleaning procedure should be included from the supplier in the O&M Manual however it is anticipated that this should include twice yearly checking that the upstream manholes are free from debris.
69. Lastly, permeable paving construction has been incorporated within the drainage proposals for this site. It is proposed to check and clean the permeable surfaces regularly to ensure that surface water runoff is not prevented from draining into the sub-base layer, especially during the autumn period where a build-up leaves could occur and result in a loss of performance.

**Proposed Drainage GA
10939-WML-ZZ-XX-DR-C-1001**



LEGEND

- SW — SW — SW — EXISTING ADOPTED SURFACE WATER SEWER
- CW — CW — CW — EXISTING ADOPTED COMBINED WATER SEWER
- SW — SW — SW — EXISTING PRIVATE SURFACE WATER DRAIN
- FW — FW — FW — EXISTING PRIVATE FOUL WATER DRAIN
- CW — CW — CW — EXISTING PRIVATE COMBINED WATER DRAIN
- — — — — EXISTING PRIVATE DRAINAGE TO BE REMOVED
- — — — — EXISTING SURFACE WATER CULVERT
- — — — — EXISTING SURFACE WATER CULVERT - 7m EASEMENT
- — — — — PROPOSED PRIVATE SURFACE WATER SEWER
- — — — — PROPOSED PRIVATE WASTE WATER SEWER
- — — — — PROPOSED ATTENUATION TANK
- — — — — PROPOSED PERMEABLE PAVING CONSTRUCTION
- — — — — PROPOSED PERMEABLE SURFACING
- — — — — SITE BOUNDARY

DRAINAGE NOTES

- REFERENCE SHOULD BE MADE TO THE DRAINAGE STRATEGY DOCUMENT REF: 10939-WML-00-XX-RP-C-0001.
- THE EXISTING DRAINAGE SHOWN ON THIS DRAWING IS BASED UPON THE UNITED UTILITIES (U)SEWER RECORDS AND EXISTING DRAINAGE SITE PLAN PRODUCED FOR THE ADJACENT DEVELOPMENT WORKS AT TAMWORTH STREET.
- THE LOCATION OF THE EXISTING SURFACE WATER CULVERT IS SHOWN INDICATIVE ONLY AND IS BASED UPON SURVEY INFORMATION UNDERTAKEN BY MALCOLM HUGHES CHARTERED SURVEYORS - APRIL 2023.
- ALL DRAINAGE LEVELS SHOWN ARE FOR INFORMATION PURPOSES ONLY AND ARE BASED UPON THE EXISTING TOPOGRAPHICAL SURVEY AND PROPOSED FINISHED FLOOR LEVEL OF 32.93 AS OUTLINED IN THE DRAINAGE STRATEGY DOCUMENT REF: 10939-WML-00-XX-RP-C-0001.
- THE PROPOSED DRAINAGE DESIGN / INFORMATION SHOWN ON THIS DRAWING IS FOR INFORMATION PURPOSES ONLY AND IS SUBJECT TO DETAILED DESIGN.
- RAIN WATER PIPES AND SLAB PENETRATIONS ARE SHOWN INDICATIVE ONLY. ARCHITECT/MEP ENGINEER IS TO CONFIRM FINAL POSITIONS PRIOR TO CONSTRUCTION.
- (BD) DENOTES EXTERNAL BACKDROP
- (CP) DENOTES 'CATCH PIT' WITH 500mm DEEP SUMP BELOW OUTGOING INVERT LEVEL.
- (FC) DENOTES FLOW CONTROL CHAMBER
- (PVD) DENOTES PERMAVOID DIFFUSER UNITS
- (VC) DENOTES VENTED COVER

GENERAL NOTES

- DO NOT SCALE FROM THIS DRAWING WORK TO FIGURED DIMENSIONS ONLY.
- NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING IS ALLOWED WITHOUT PRIOR PERMISSION IN WRITING.
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
- THE CONTRACTOR SHALL INCORPORATE ALL THE REQUIREMENTS OF THE PRE-TENDER STAGE HEALTH AND SAFETY PLAN.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH WML DRAINAGE DETAIL DRAWINGS FOR DETAILS OF MATERIALS AND WORKMANSHIP REFER TO THE SPECIFICATION.
- THE CONTRACTOR IS RESPONSIBLE FOR CHECKING INVERT LEVELS AND POSITIONS OF ALL EXISTING DRAINS, SEWERS, INSPECTION CHAMBERS AND MANHOLES SHOWN ON THIS DRAWING IMMEDIATELY ON SITE ESTABLISHMENT. ANY DISCREPANCIES MUST BE REPORTED TO WML CONSULTING IMMEDIATELY.
- WHERE THE NEW SITE DRAINAGE CONNECTS IN TO EXISTING MANHOLES IN CARRIAGEWAYS AND/OR EXISTING ADOPTED SEWERS, THE CONTRACTOR IS RESPONSIBLE FOR ALL LIAISON WITH THE RELEVANT STATUTORY UNDERTAKER AND LOCAL AUTHORITY WITH REGARD TO ROAD CLOSURES, TRAFFIC MANAGEMENT, PERMITS TO WORK, SUBMISSION OF CONTRACTORS METHOD STATEMENTS AND RISK ASSESSMENTS AND OTHER DOCUMENTATION AND CORRESPONDENCE ASSOCIATED WITH THE SITE STAGE (PART 2) ELEMENT OF THE WORKS.
- ROCKER PIPES ARE TO BE PROVIDED AT ALL CONCRETE CASED INTERFACES.
- PROVIDE ADEQUATE PROTECTION TO MAINTAIN MINIMUM COVER TO DRAINS DURING THE CONSTRUCTION PERIOD.
- COVER LEVELS ON THIS DRAWING ARE FOR INFORMATION PURPOSES ONLY.
- THE LAYOUT OF DRAINAGE ON THIS DRAWING IS FOR INFORMATION PURPOSES ONLY.
- U.N.O SURFACE WATER DRAINAGE PIPES OVER Ø100mm TO BE TWIN WALLED STRUCTURED PLASTIC APPROVED BY THE ENGINEER.
- U.N.O FOUL WATER DRAINAGE PIPES TO BE SUPERSLEVE VITRIFIED CLAY PIPES OR SIMILAR.
- ALL COVERS AND RODDING ACCESS POINTS TO BE SEALED AND SCREWED TIGHT.
- ALL INTERNAL MANHOLE COVERS TO BE DOUBLE SEALED, LOOKABLE AND RECESSED TO ACCEPT FLOOR FINISHES WHERE APPLICABLE.
- SETTING OUT OF ALL INTERNAL GULLY/PLUMBING CONNECTIONS TO BE CO-ORDINATED BETWEEN THE SERVICE ENGINEERS AND THE ARCHITECT.
- ALL INTERNAL GULLIES, PLUMBING CONNECTIONS, SOIL STACKS, SVPS AND ALL OTHER CONNECTIONS OF FOUL AND SURFACE WATER DRAINS TO BELOW GROUND TO BE FITTED WITH ACCESSIBLE RODDING POINTS ABOVE SLAB LEVEL.
- ALL SURFACE WATER CONNECTIONS TO BE 100mm DIAMETER AT MINIMUM FALLS OF 1:80 UNLESS NOTED OTHERWISE.
- ALL FOUL WATER CONNECTIONS TO BE 100mm DIAMETER AT MINIMUM FALLS OF 1:40 UNLESS NOTED OTHERWISE.
- ALL CONNECTIONS TO BE MADE IN ACCORDANCE WITH STANDARD DETAIL DRAWINGS.
- ALL PIPEWORK TO BE INSTALLED WITH SOFFITS LEVEL (E.G. AT CHANGES IN PIPE SIZE) U.N.O.
- FOR DETAILS OF GREASE TRAP/MACERATOR REQUIREMENTS ASSOCIATED WITH KITCHENS REFER TO SERVICE ENGINEER.
- ON COMPLETION OF DRAINAGE WORKS, THE NEW DRAINAGE SYSTEM IS TO BE THOROUGHLY CLEANED AND A CCTV SURVEY CARRIED OUT TO CONFIRM NO CONSTRUCTION DEBRIS OR BLOCKAGES REMAIN.
- CONNECTIONS TO CARRIER DRAINS ARE TO BE 'Y' JUNCTIONS.
- ALL PRIVATE DRAINAGE IS TO COMPLY WITH BS EN 752 AND BUILDING REGS. PART H.
- PIPE GRADIENTS ARE INDICATIVE MINIMUMS.
- SURFACE CHANNEL DRAINS TO BE ACO MULTIDRAIN OR SIMILAR.

MANHOLES:

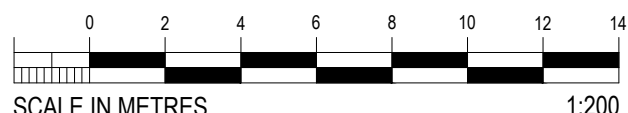
- ALL PROPOSED NEW MANHOLES TO BE PRECAST RING MANHOLES TYPE B UNLESS NOTED OTHERWISE. INTERNAL DIAMETERS OF MANHOLES TO BE 1000mm WHERE DEPTH TO PIPE SOFFIT IS LESS THAN 1.5m, AND 1200mm OTHERWISE UNLESS NOTED OTHERWISE. IC - DENOTES POLYPROPYLENE INSPECTION CHAMBER BY HEPUORTHY OR SIMILAR APPROVED INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

MANHOLE COVERS:

- CARRIAGEWAYS GENERAL - EN124 CLASS D400
- CARRIAGEWAYS WITHIN 0.5m OF KERB - EN124 CLASS C250
- SLOW MOVING HDV (38t) - EN 124 CLASS B125 SLOW MOVING
- SLV (10t) - EN 124 CLASS B125 SLOW MOVING PRIVATE CARS - EN124 CLASS B125
- INTERNAL - JONES OF OSWESTRY - SUPRASTEEL DOUBLE SEALED WITH NEOPRENE GASKET AND COVER GREASE OR SIMILAR APPROVED.
- REFER TO ARCHITECTS DRAWINGS FOR DETAILS OF ANY MANHOLE COVERS WHICH REQUIRE INSET PANELS.

SUBJECT TO APPROVAL FROM
LOCAL PLANNING AUTHORITY
UNITED UTILITIES

PRELIMINARY



Rev.	Amendment	Date	By	LoG
P01	FIRST ISSUE	26.04.23	DB	LoG
Project LORETO COLLEGE EXPANSION				
ARCHITECT LORETO COLLEGE				
Title PROPOSED DRAINAGE GA				
WML Job No. 10126	Drawn DB	Checked LoG	Date MARCH 23	Scale 1:200 @ A0
WML CONSULTING Civil, Structural & Geotechnical Engineers				
No. 5 Oak Green East Road Chislehurst Chislehurst S26 6DL Tel: 0181 486 9200 Fax: 0181 486 9210 e-mail: info@wmlconsulting.com www.wmlconsulting.com				
Drawing No. 10939 - WML - ZZ - XX - DR - C - 1001				
Project 10939 - WML - ZZ - XX - DR - C - 1001				
Originator Volume Level Type Role Number Rev				

**Surface Water Drainage Calculations
10939-WML-00-XX-CA-C-0001**

Surface Water Drainage Calculations

For a site referred to as

Loreto College Expansion Project

Undertaken on behalf of

Loreto College

Job No: 10939

Document No: 10939-WML-ZZ-XX-CA-C-0001

Date: April 2023

Project No. & Name:	10939 – Loreto College Expansion	Status:	Prepared by:	Rev:	Date:
Document Ref:	10939-WML-00-XX-CA-C-0001	Preliminary	Daniel Baker	P01	April 2023

General Notes

1. The calculations within this document have been undertaken using MicroDrainage Software version 2020.
2. This document is to be read in conjunction with the following documents;
 - a. 10939-WML-ZZ-XX-DR-C-1001 – Proposed Drainage GA
 - b. 10939-WML-00-XX-RP-C-9002 – Drainage Strategy Document

Summary of Results

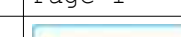
1. The following summary demonstrates that the outgoing flow rates for the new development works are less than or equal to those of the pre-development (Greenfield) site.

Greenfield Runoff Rate* (l/s)	Proposed Site Runoff Rate – Manhole S9 (l/s)
Q1: 1.4 Q30: 2.7 Q100: 3.3	1: 1.3 30: 2.1 100+40%: 3.0

Greenfield Runoff Calculation

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 16/03/2023 14:21 File	Designed by DBaker Checked by	
Innovyze		Source Control 2020.1.3
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 1 Soil 0.450 Area (ha) 0.283 Urban 0.000 SAAR (mm) 860 Region Number Region 10 Results 1/s QBAR Rural 1.6 QBAR Urban 1.6 Q1 year 1.4 Q1 year 1.4 Q30 years 2.7 Q100 years 3.3		
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Proposed Surface Water Network Calculation

WML Consulting Ltd		Page 1
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 26/04/2023 23:20 File 10939 - Surface Water -...	Designed by DBaker Checked by	
Innovyze	Network 2020.1.3	

STORM SEWER DESIGN by the Modified Rational Method

Pipe Sizes STANDARD Manhole Sizes STANDARD

Designed with Level Soffits

« - Indicates pipe capacity < flow

Network Results Table

WML Consulting Ltd		Page 3
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 26/04/2023 23:20 File 10939 - Surface Water -...	Designed by DBaker Checked by	
Innovyze	Network 2020.1.3	

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	32.930	1.290	Open Manhole	600	S3.000	31.640	225				
S2	32.930	1.400	Open Manhole	600	S3.001	31.530	225	S3.000	31.530	225	
S3	32.630	1.430	Open Manhole	600	S3.002	31.200	225	S3.001	31.200	225	
S4	32.630	1.630	Open Manhole	600	S3.003	31.000	225	S3.002	31.000	225	
S5	32.500	1.700	Open Manhole	600	S3.004	30.800	225	S3.003	30.800	225	
S6	31.750	1.030	Open Manhole	600	S4.000	30.720	225				
S7	32.500	1.980	Open Manhole	1200	S3.005	30.520	225	S3.004	30.520	225	
								S4.000	30.520	225	
S8	31.750	1.500	Open Manhole	1200	S3.006	30.250	225	S3.005	30.250	225	
S-EXMH2	32.000	1.790	Open Manhole	1200	S5.000	30.210	225				
S-TANK	32.000	1.800	Junction		S3.007	30.200	225	S3.006	30.200	225	
								S5.000	30.200	225	
S9	31.750	1.750	Open Manhole	1350	S3.008	30.000	225	S3.007	30.200	225	
S10	31.650	1.800	Open Manhole	1200	S3.009	30.000	150	S3.008	29.850	225	
S10	31.660	1.910	Open Manhole	1200		OUTFALL		S3.009	29.750	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	383323.046	395970.102	383323.046	395970.102	Required	
S2	383333.697	395972.852	383333.697	395972.852	Required	
S3	383336.863	396005.700	383336.863	396005.700	Required	
S4	383316.088	396007.748	383316.088	396007.748	Required	
S5	383314.166	395987.842	383314.166	395987.842	Required	
S6	383292.051	395961.471	383292.051	395961.471	Required	
S7	383287.046	395980.834	383287.046	395980.834	Required	

[illegible]

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No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL																																																										
Date 26/04/2023 23:20 File 10939 - Surface Water -...																																																										
Designed by DBaker Checked by																																																										
Innovyze Network 2020.1.3																																																										
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WML Consulting Ltd		Page 7
No. 8 Oak Green Stanley Green Business Park Earl Rd, Cheadle Hulme, SK8 6QL		
Date 26/04/2023 23:20 File 10939 - Surface Water -...	Designed by DBaker Checked by	
Innovyze Network 2020.1.3		
Online Controls for Storm Orifice Manhole: S9, DS/PN: S3.008, Volume (m³): 2.9 Diameter (m) 0.042 Discharge Coefficient 0.600 Invert Level (m) 30.200		
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Storage Structures for Storm Cellular Storage Manhole: S-TANK, DS/PN: S3.007 Invert Level (m) 30.200 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><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></thead><tbody><tr><td>0.000</td><td>150.0</td><td>150.0</td><td>2.600</td><td>0.0</td><td>194.1</td></tr><tr><td>0.200</td><td>150.0</td><td>159.8</td><td>2.800</td><td>0.0</td><td>194.1</td></tr><tr><td>0.400</td><td>150.0</td><td>169.6</td><td>3.000</td><td>0.0</td><td>194.1</td></tr><tr><td>0.600</td><td>150.0</td><td>179.4</td><td>3.200</td><td>0.0</td><td>194.1</td></tr><tr><td>0.800</td><td>150.0</td><td>189.2</td><td>3.400</td><td>0.0</td><td>194.1</td></tr><tr><td>1.000</td><td>0.0</td><td>194.1</td><td>3.600</td><td>0.0</td><td>194.1</td></tr><tr><td>1.200</td><td>0.0</td><td>194.1</td><td>3.800</td><td>0.0</td><td>194.1</td></tr><tr><td>1.400</td><td>0.0</td><td>194.1</td><td>4.000</td><td>0.0</td><td>194.1</td></tr><tr><td>1.600</td><td>0.0</td><td>194.1</td><td>4.200</td><td>0.0</td><td>194.1</td></tr><tr><td>1.800</td><td>0.0</td><td>194.1</td><td>4.400</td><td>0.0</td><td>194.1</td></tr><tr><td>2.000</td><td>0.0</td><td>194.1</td><td>4.600</td><td>0.0</td><td>194.1</td></tr><tr><td>2.200</td><td>0.0</td><td>194.1</td><td>4.800</td><td>0.0</td><td>194.1</td></tr><tr><td>2.400</td><td>0.0</td><td>194.1</td><td>5.000</td><td>0.0</td><td>194.1</td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	150.0	150.0	2.600	0.0	194.1	0.200	150.0	159.8	2.800	0.0	194.1	0.400	150.0	169.6	3.000	0.0	194.1	0.600	150.0	179.4	3.200	0.0	194.1	0.800	150.0	189.2	3.400	0.0	194.1	1.000	0.0	194.1	3.600	0.0	194.1	1.200	0.0	194.1	3.800	0.0	194.1	1.400	0.0	194.1	4.000	0.0	194.1	1.600	0.0	194.1	4.200	0.0	194.1	1.800	0.0	194.1	4.400	0.0	194.1	2.000	0.0	194.1	4.600	0.0	194.1	2.200	0.0	194.1	4.800	0.0	194.1	2.400	0.0	194.1	5.000	0.0	194.1
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Page 11

No. 8 Oak Green

Stanley Green Business Park

Earl Rd, Cheadle Hulme, SK8 6QL

Date 26/04/2023 23:20

File 10939 - Surface Water - ...

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Innovyze

Network 2020.1.3

Micro Drainage

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

for Storm

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 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 0.360

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status OFF

DVD Status ON

Inertia Status ON

Profile(s) Summer and Winter

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

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

Climate Change (%) 0, 0, 40

PN

US/MH Name

Storm

Return Period

Climate Change

First (X) Surge

First (Y) Flood

First (Z) Overflow

Overflow Act.

S3.000

S1

15 Winter

30

+0%

S3.001

S2

15 Winter

30

+0%

S3.002

S3

15 Winter

30

+0%

100/15 Summer

S3.003

S4

15 Winter

30

+0%

100/15 Summer

S3.004

S5

15 Winter

30

+0%

100/15 Summer

S4.000

S6

15 Winter

30

+0%

100/15 Summer

S3.005

S7

15 Winter

30

+0%

100/15 Summer

S3.006

S8

360 Winter

30

+0%

30/15 Summer

S5.000

S-EXMH2

360 Winter

30

+0%

30/60 Summer

S3.007

S-TANK

360 Winter

30

+0%

30/30 Winter

S3.008

S9

360 Winter

30

+0%

1/15 Summer

S3.009

S10

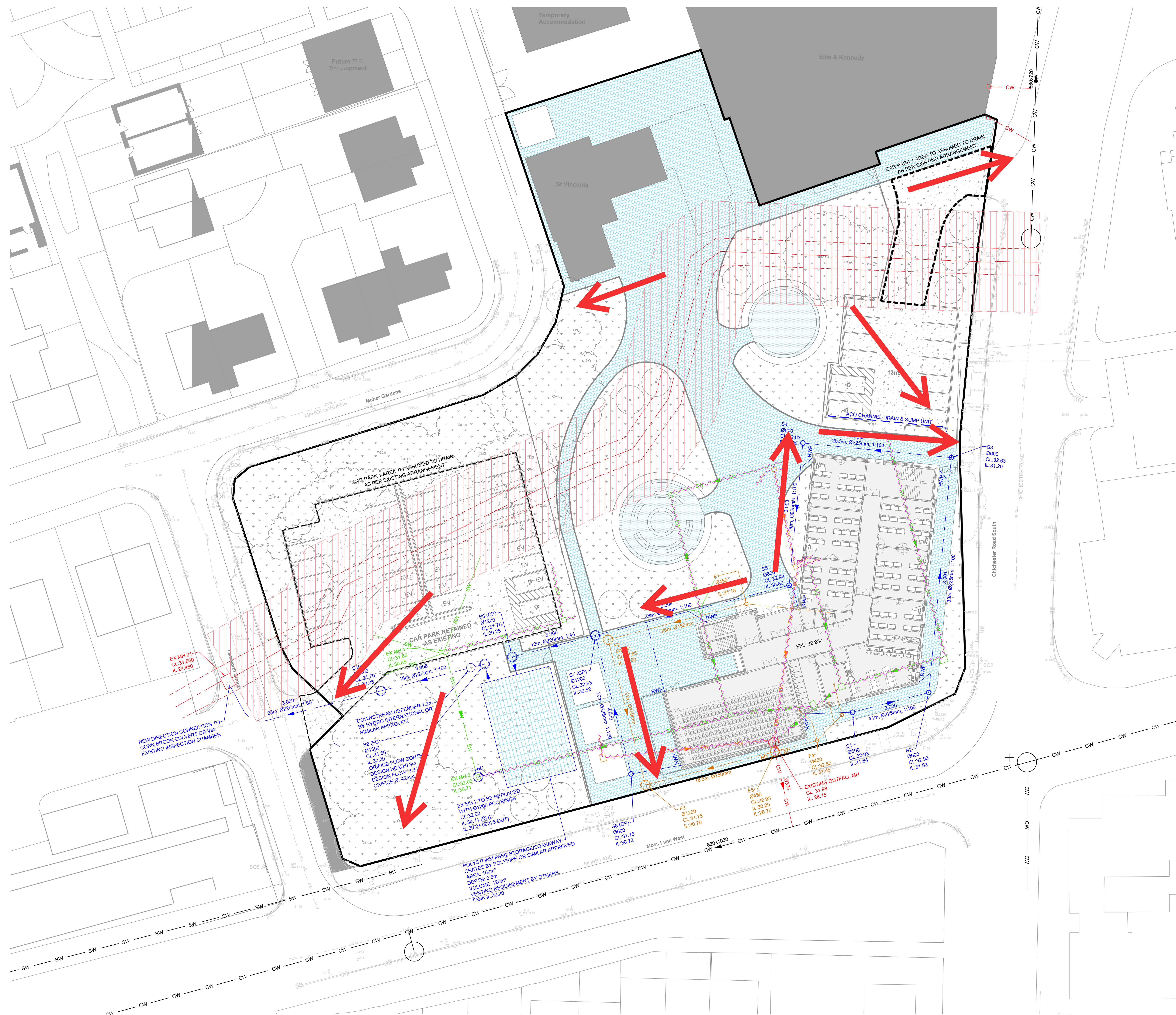
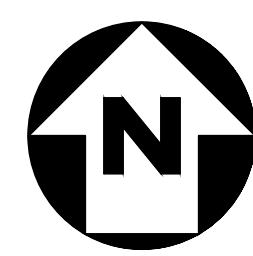
360 Winter

30

+0%

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Exceedance Flow Routes

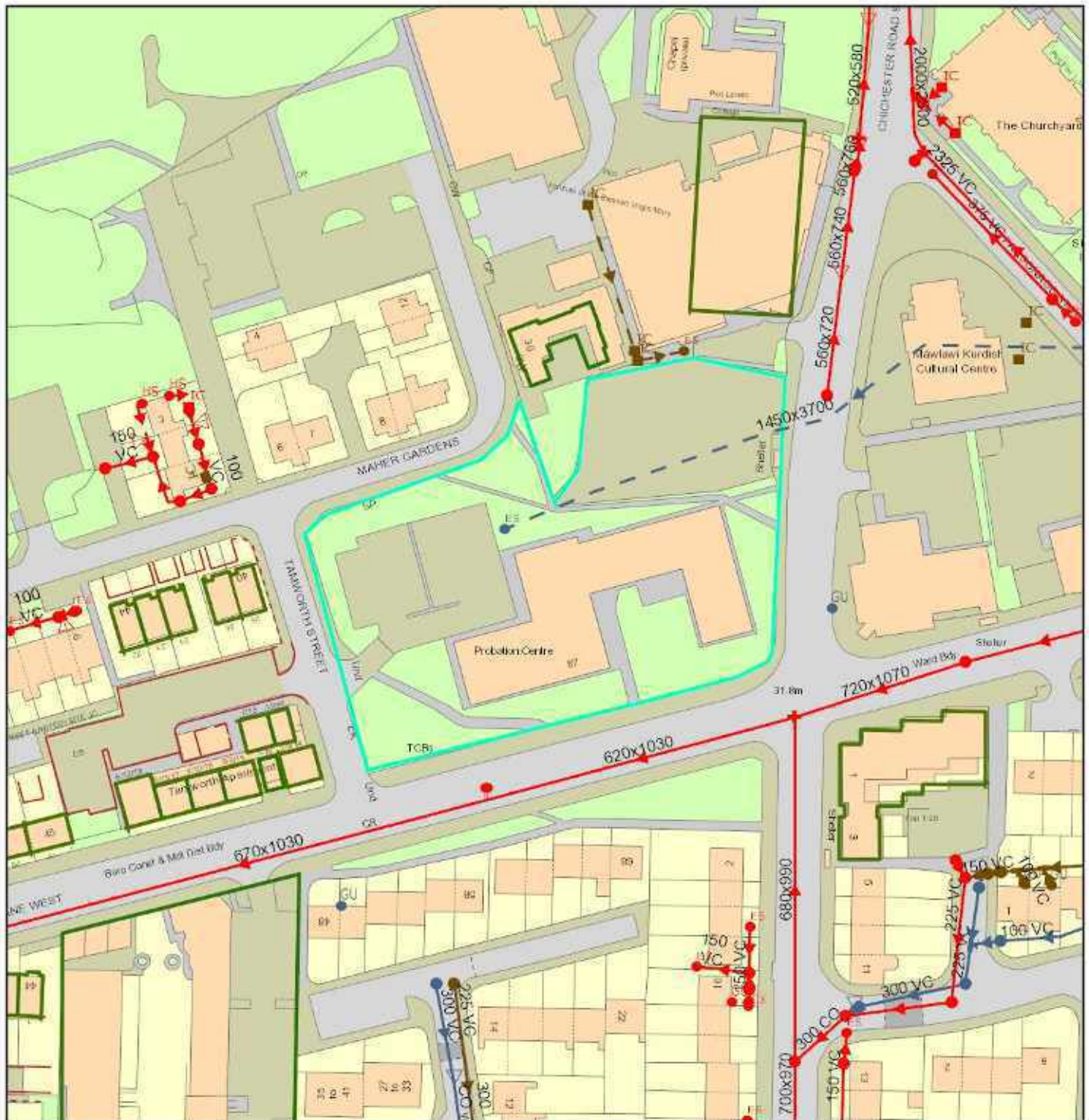


EXCEEDANCE FLOW ROUTES

United Utilities Sewer Records

SEWER RECORD

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



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

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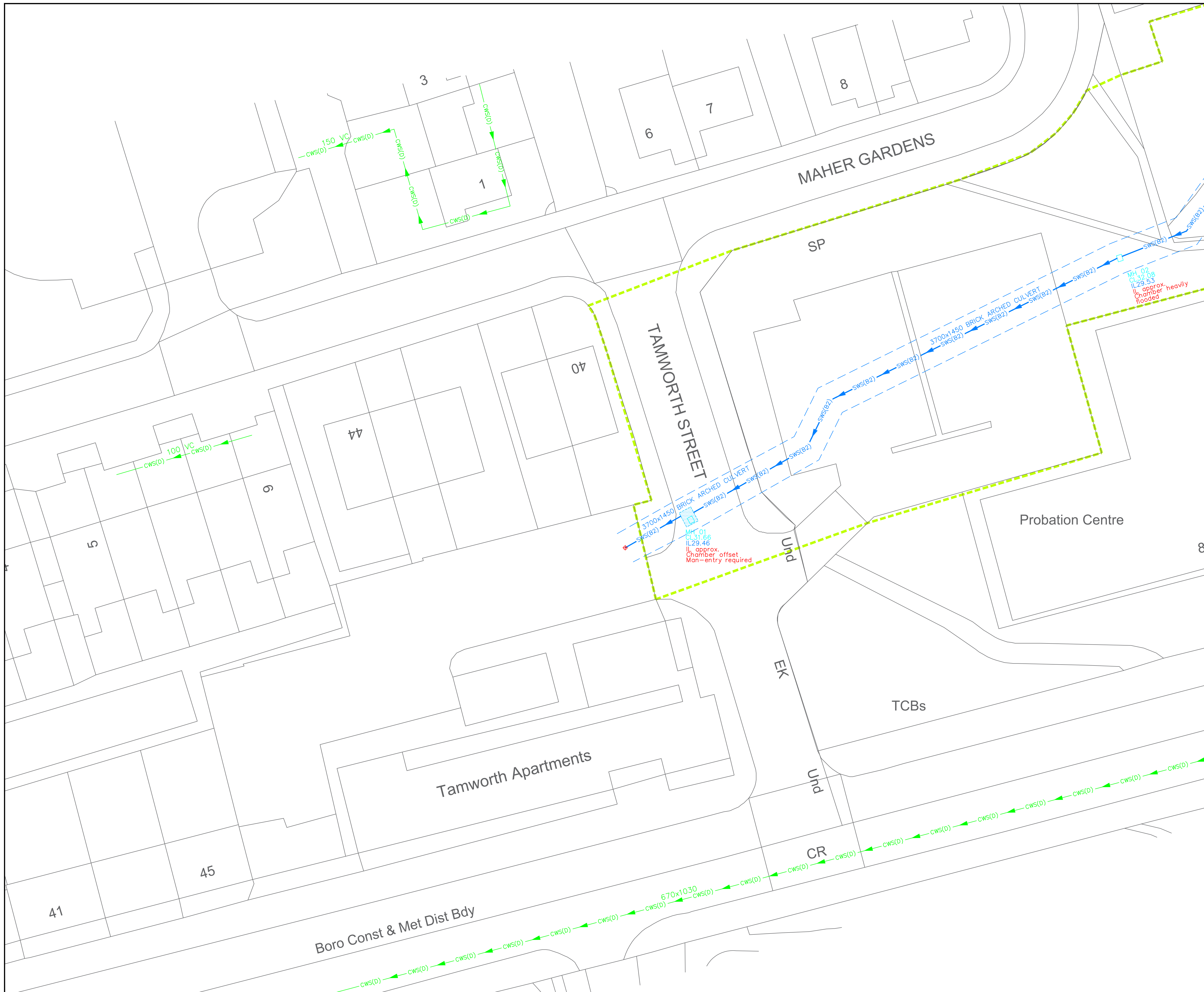
Wastewater Symbolology

Abandoned	Foul	Surface Water	Combined	
				Public Sewer
				Private Sewer
				Section 104
				Rising Main
				Sludge Main
				Overflow
				Water Course
				Highway Drain

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

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

Corn Brook Culvert Survey Drawings

[illegible]

