

The Manchester College

Phase 2
Proposed Drainage Strategy

Project number: 60594458

10.03.2023

Quality information

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Table of Contents

1.	Introduction.....	6
2.	Development Description and Location	7
2.1	Site Location	7
2.2	Topography	7
2.3	Below Ground Utilities	7
2.4	Masterplan (Phase 1 and 2)	8
2.5	Planned Phase 2 Development Area Existing Description.....	8
2.6	Development Proposals – Phase 2	8
3.	Outline Drainage Strategy	9
3.1	Phase 1 Masterplan Surface Water Runoff.....	9
3.2	Phase 2 Surface Water Runoff.....	9
3.3	Climate Change Allowances.....	10
3.4	Geology.....	10
3.5	Connection to a watercourse.....	10
3.6	Connection to a sewer.....	10
3.7	Sustainable Drainage Systems	11
3.8	Outline Surface Water Drainage Strategy.....	12
3.9	Pollution Control.....	13
3.10	Foul Water Strategy	13
4.	Drainage Management and Maintenance Plan.....	14
4.1	Introduction	14
4.2	Management & Maintenance Plan	14
	Appendix A Document copies.....	16
A.1	APPENDIX A – Site Layout and Location Plan	16
A.2	APPENDIX B – Topographical Survey	19
A.3	APPENDIX C – Utilities Plan	21
A.4	APPENDIX D – HR Wallingford Greenfield Discharge Rates	23
A.5	APPENDIX E – Proposed Drainage Design	26
A.6	APPENDIX F – InfoDrainage Report	28
A.7	APPENDIX G – UU Surface Water Discharge Approval	48
A.8	APPENDIX H – Foul Discharge Rate Approval.....	50
A.9	APPENDIX I – Soakaway Plan	51

Figures

Figure 1 - Proposed Phase 2 & Existing Phase 1 Building.....	6
Figure 2 - Site Location	7
Figure 3 - Masterplan showing Phase 1 and Phase 2.....	8
Figure 4 - Climate Change Allowance	10

Tables

Table 1 – Phase 1 Greenfield Runoff Rates (CC-SHD-00-ZZ-RP-C-0001 TMC FRA and Drainage Strategy).....	9
Table 2 – Phase 1 and 2 Combined Greenfield Runoff Rates (Appendix D)	9
Table 3 - Surface SuDS Methods	11
Table 4 - Sub-surface SuDS Methods	12
Table 5 - SuDS Hierarchal Approach.....	12
Table 6 - Piped Drainage, Channel Drains and Manhole Chambers Maintenance Schedule.....	14
Table 7 - Flow Control Device Maintenance Schedule	14
Table 8 - Geocellular Storage System Maintenance Schedule	15

1. Introduction

- 1.1.1 AECOM has been appointed by Manchester College to prepare this phase 2 drainage strategy report to support a planning submission for the phase 2 of the new City Centre Campus, providing facilities for film, performing arts and media studies students. The Manchester College is on the corner of Great Ducie Street and New Bridge Street.
- 1.1.2 This strategy has been developed to ensure a viable surface water and foul water system can be implemented across the whole application site, whilst maximising the sites potential for use of SuDS.
- 1.1.3 The Phase 2 design is heavily linked to that of the Phase 1 development and wider masterplan design. A thorough investigation into the as-built drawings status for the phase 1 design will be undertake due to the requirement for the phase 2 design to utilise in many areas the same system.
- 1.1.4 This drainage strategy has been created under the assumption that foul and surface water discharge approvals for the Manchester College phase 1 area will remain unchanged, or where changed statutory undertaker approvals permit this. Details regarding this point will be discussed further in this document.
- 1.1.5 The phase 2 building is defined as a Category 4 Structure with a design working life of 50 years within Table 2.1 of Eurocode 0 (BS EN 1990:2002). Due to this design life expiring before the year 2100, the central allowance for climate change for the 2070s epoch will be used.



Figure 1 - Proposed Phase 2 & Existing Phase 1 Building

Phase 1
Building

2. Development Description and Location

2.1 Site Location

- 2.1.1 The site is located to the north of Manchester college Phase 1 city centre campus, Manchester, Greater Manchester, M3 1PT. The centre of the site is positioned at approximately National Grid Reference (NGR) Easting: 383801, Northing: 399222. The phase 2 development area is approximately 0.3 hectares (0.71 acres) with the phase 1 and phase 2 site boundaries shown in Figure 2 below.

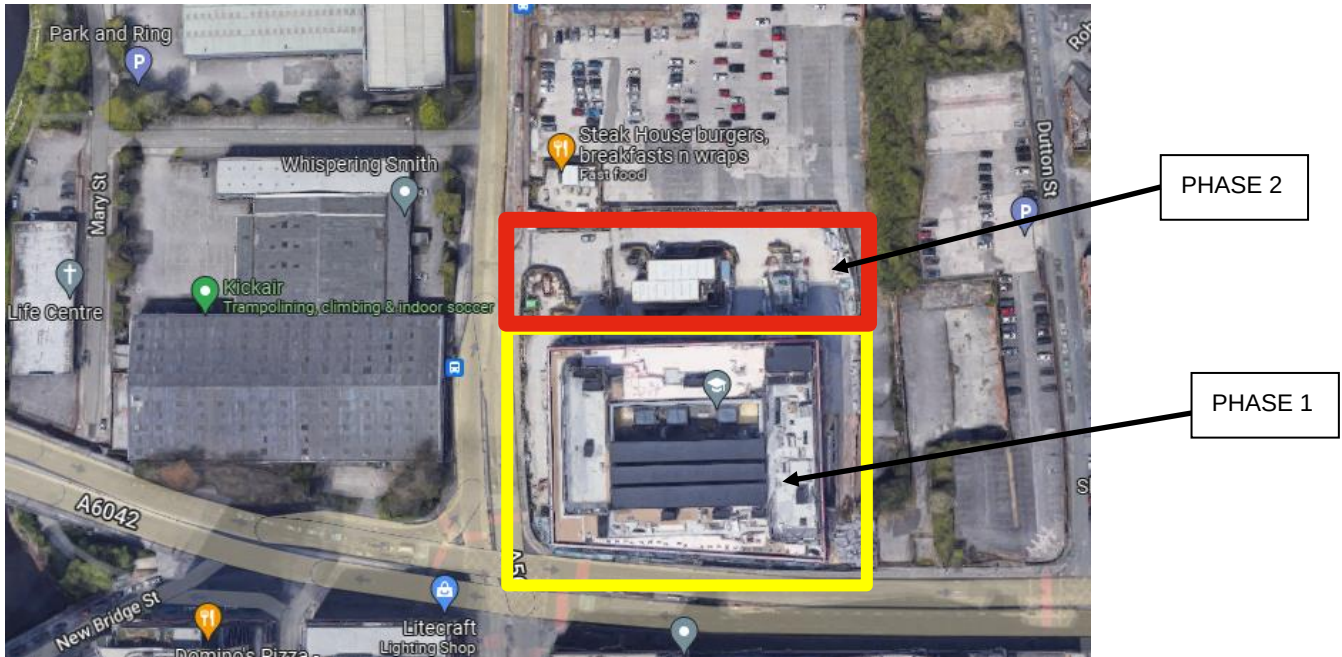


Figure 2 - Site Location

- 2.1.2 Phase 1 occupies the prominent corner of the site, bound by Great Ducie and New Bridge Street, opposite Manchester Arena. It is the intention for Phase 2 to abut the north facade of Phase 1 to complete the city block.

As can be seen from Figure 2, the completed Phase 1 structure (highlighted in yellow) which is adjacent to the proposed phase 2 building and existing access road (highlighted in red).

2.2 Topography

- 2.2.1 The latest topographical survey was produced by survey operation in January 2023 and can be seen in appendix B (CCPH2-ACM-00-XX-DR-C-0002)

2.3 Below Ground Utilities

- 2.3.1 The latest utilities survey was produced by survey operation in February 2023 and can be seen in appendix C (60594458-ACM-XXX-XX-DR-CE-0004)

2.4 Masterplan (Phase 1 and 2)

The proposed phase 2 scheme is shown in Figure 3.

The current programme target for delivery and handover of the project is 2025.



Figure 3 - Masterplan showing Phase 1 and Phase 2

2.5 Planned Phase 2 Development Area Existing Description

- 2.5.1 The site is currently used as a car park and is predominantly surfaced with tarmac.
- 2.5.2 The site is bound to the south by the Manchester college phase 1 development, beyond which is Trinity Way and Manchester Arena. Great Ducie Street is located to the west, with further car parking and Dutton Street situated to the east. There is also a large retaining wall to the east of the site. A Travelodge borders the site to the north.
- 2.5.3 The River Irwell lies approximately 175m to the west and flows in a southerly direction through Manchester City Centre, before turning west and merging with the River Mersey.
- 2.5.4 Figure 1 below identifies the overall site location details. Further details of the existing layout can be seen on the Topographical survey in Appendix B. Topographical information indicates that the site is predominantly flat with a slight slope down towards the west, there is an elevated area in the southeast of the site. The highest level at approximately 30.000m AOD is located in the elevated area in the southeast of the site and the lowest point at approximately 29.34m AOD is located in the southwest.

2.6 Development Proposals – Phase 2

- 2.6.1 The report was created to support a planning application for Manchester College's phase 2 construction of the City Centre Campus, which will include facilities just for students studying film, media, and performing arts.
- 2.6.2 The outline site layout and location plan is attached in Appendix A which provides details of the proposed development intent.
- 2.6.3 The finish floor level (FFL) of the building will be 30.0m

3. Outline Drainage Strategy

3.1 Phase 1 Masterplan Surface Water Runoff

- 3.1.1 Greenfield run-off rates for the whole site area were previously included in the masterplan FRA and Drainage strategy submission which can be seen in table 1.
- 3.1.2 After the production of the phase 1 masterplan FRA, separate consent was obtained directly with United Utilities (UU) for a discharge into the combined sewer network at 15l/s.
- 3.1.3 To achieve this discharge rate, a vortex flow control device has been fitted into the outfall manhole of the surface water network.
- 3.1.4 The drainage design for the masterplan was previously based on a climate change allowance of +20%

Table 1 – Phase 1 Greenfield Runoff Rates (CC-SHD-00-ZZ-RP-C-0001 TMC FRA and Drainage Strategy)

	Impermeable Area (m ²)	1 Year (l/s)	Qbar (l/s)	30 Years (l/s)	100 Years (l/s)
Phase 1	8840	4.4	5.1	8.6	10.6

3.2 Phase 2 Surface Water Runoff

- 3.2.1 A continuation from phase 1, the proposed surface water drainage system for phase 2 will be designed in accordance with all relevant drainage guidance and legislation documentation and with a +30% climate change allowance using IH124 method as well as InfoDrainage. Details of the rational of 30% climate change is available in section 3.3
- 3.2.2 The following criteria will be adopted for the design:
- FSR rainfall data (industry standard practice) will be used.
 - A volumetric runoff coefficient (cv) of 0.75 will be adopted in accordance with industry standard practice.
 - InfoDrainage design software has been used to verify the hydraulic design of the network. Storms for the 1 in 1 years, 1 in 30 years (+30% climate change) and 1 in 100 years (+30% climate change) have been modelled.

Table 2 – Phase 1 and 2 Combined Greenfield Runoff Rates (Appendix D)

	Impermeable Area (m ²)	1 Year (l/s)	Qbar (l/s)	30 Years (l/s)	100 Years (l/s)
Proposed Site	9020	5.08	5.84	9.92	12.14

- 3.2.3 As a result of the discharge agreement with United Utilities for the phase 1 and masterplan area of 15l/s, it is proposed that this will remain unaltered, and the whole site will continue to discharge at a maximum of 15l/s

3.3 Climate Change Allowances

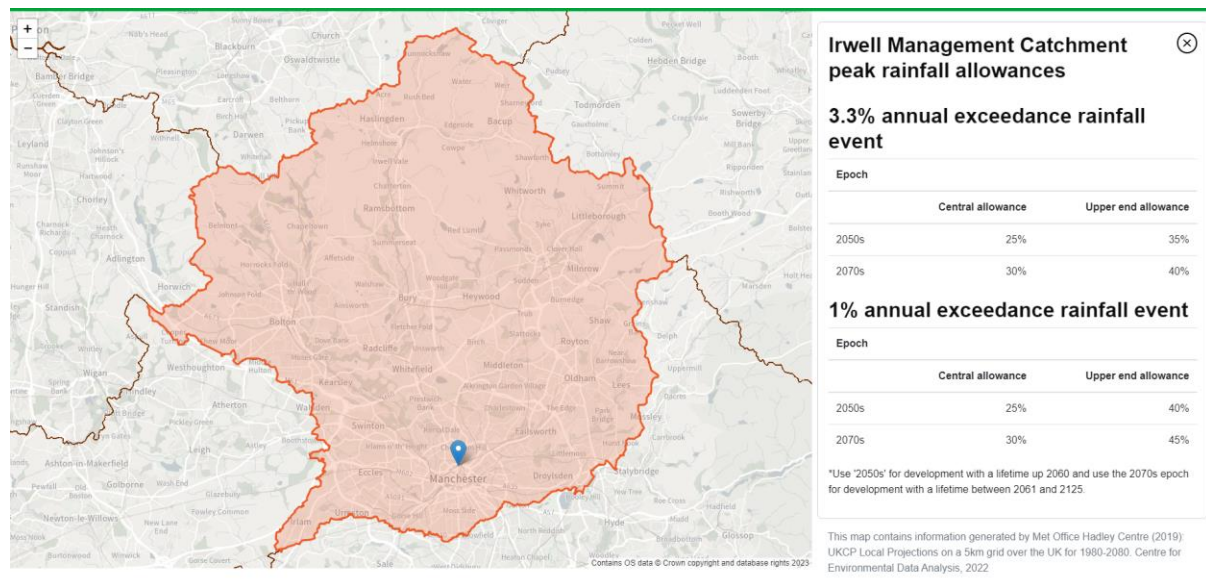


Figure 4 - Climate Change Allowance

During the phase 1 design stage, the climate change allowance used for design was 20%, however for phase 2 this has increased to 30%. The reason for this is due to the 'Department for Environment Food & Rural Affairs' website. The increase in rainfall has an impact on the risk of surface water flooding and how drainage systems must be designed. As a results, there is an allowance map that can be used for design (Figure 4) and can predict changes in peak rainfall intensity. According to the development lifetime standards, there are three categories of development:

- Development with a lifetime up to 2060
- Development with a lifetime of between 2061 and 2100
- And development with a lifetime beyond 2100

As was stated in the introduction, the design lifetime will fall between 2061 and 2100 since the durability and design life are intended to have a minimum working life of 50 years. Therefore, the central allowance for the 2070 epoch of 30% climate change allowance will be used.

3.4 Geology

- 3.4.1 According to British Geological Survey information, the superficial geology of the site is Glacial Till comprised of clay. The bedrock geology is the Chester Formation, comprised of sandstone and found at depths of between 8 and 10mbgl.
- 3.4.2 Upon analysis of the Phase 1 Ground Investigation Report, it would seem that from a geological perspective this site would be viable for Infiltration. Clayey soil is found to a depth of circa 4m, so any infiltration would have to be below this. Infiltration has been discounted though due to onsite spatial constraints and the city centre location of this project and intrinsic risks to nearby surrounding properties/buildings.

3.5 Connection to a watercourse

- 3.5.1 The River Irwell is located approximately 175m to the west of the development. All routes to the river would require passing through third party land or constructing new surface water drainage in the already extremely congested City Centre Highways. Therefore, this option is discounted for phase 2 as there is an existing connection within the phase 1 network south of the development that will be used.

3.6 Connection to a sewer

- 3.6.1 There are no surface water sewers in close proximity to the site. There are several combined sewers in the surrounding Highways, into which the phase 1 area currently discharges. Through utilising the spare capacity of the phase 1 attenuation tank, the phase 2 surface water is proposed to discharge through the existing phase 1 network and into the existing connection to the combined sewer.

3.7 Sustainable Drainage Systems

3.7.1 Sustainable Urban Drainage System (SuDS) Objective

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed both to manage the environmental risks resulting from the urban runoff and to contribute wherever possible to environmental enhancement. SuDS objectives are therefore to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

3.7.2 The SuDS Management Train

The 'Management Train Approach' should be central to the surface water drainage strategy of the proposed site. The main objective is treatment and control of runoff as near to the source as possible protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site.

3.7.3 SuDS Site Constraints

SuDS techniques are not suitable for all sites; therefore, an assessment of the existing site is required so that SuDS limitations can be determined.

- Land Use Characteristics: The type of the development plot restricts the range of source control and site control SuDS devices to be considered both above and below ground.
- Site Characteristics: Soakaways are unfeasible as detailed in appendix H.
- Environmental and Amenity Performance: Safety to all future users is paramount when including SuDS within the overall development and so best practice guidance will be incorporated so that these devices blend into the surrounding without the need for significant safety precautions. Maintenance plans will be prepared for all SuDS devices that are included.

3.7.4 SuDS Methods

Tables 3 and 4, below, provide an assessment of various above and below ground SuDS methods that can provide water quality treatment and management of flows to reduce runoff rates and volumes and whether they can be suitably incorporated at this development site. The purpose of this assessment is to set out options to be considered at the planning stage with consideration to viability and lifetime maintenance of the development.

Table 3 - Surface SuDS Methods

Method	Comment	Suitability for Development
Green Roofs	• Can be used on suitable low-rise buildings to provide retention, attenuation, and treatment of rainwater, and promotes evaporation and local biodiversity.	Not suitable • Architectural proposal for the development and maintenance issues deems this unsuitable. • Additional costs of installation would have severe effect on viability of the development.
Infiltration Options	• Reduced total runoff volume from the development.	Not suitable • Spatial constraints and the risk to neighbouring properties means infiltration is not a viable option
Permeable Surfacing (Infiltration)	• Reduced total runoff volume from the development. • Can be used to enhance water quality.	Not suitable • Spatial constraints and the risk to neighbouring properties means infiltration is not a viable option
Permeable Surfacing (Standard)	• Can be used to enhance quality of runoff water. • Sub-base provides 'source' storage and reduced the volume of storage downstream. • The storage can be created with selection of the stone fill or use of plastic box stems.	Not suitable • Not suitable due to access road remaining unchanged from phase 1

Swales, Basins and Ponds

- Proves area for above ground surface runoff storage.
- Swales also allow filtering of particular matter, improving water quality.

Not suitable

- Location and spatial constraint mean this is not a viable option.

Table 4 - Sub-surface SuDS Methods

Method	Comment	Suitability for Development
Geocellular Storage	• Suitable for sites with insufficient space for basins etc. • Suitable for sites where topography prevents the use of open basins etc.	Suitable • The use of geocellular attenuation may be possible to retain excess storm water
Rainwater Harvesting	• Suitable for sites with insufficient space for basins etc. • Provide a volume of below ground storage with high void ratio and good man entry provision to allow for future maintenance and cleaning. • Generally, suitable for adoption by the statutory water company (e.g. United Utilities)	Suitable - Discounted • Though suitable on this scheme, due to the phase 1 as-built attenuation tank is being used for phase 2, rainwater harvesting is deemed impractical due to the associated enabling works required.

3.7.5 SuDS Hierarchical Discharge Approach

Based on the SuDS assessment in Tables 3 and 4, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in greater detail below.

Table 5 - SuDS Hierarchal Approach

Method	Suitability	Suitability for Development
Infiltration to ground	NO	Spatial constraints and the risk to neighbouring properties means infiltration is not a viable option
Connection to watercourse	NO	The closest watercourse is the river Irwell, approximately 175m to the west, with no feasible means of access
Connection to surface water sewer	NO	There are no surface water sewers in close proximity
Connection to combined sewer	YES	The site benefits from an existing connection to the combined sewer system

3.7.6 SuDS Design Philosophy

The SuDS assessment and hierarchal approach discussed in Tables 4, 5 and 6 above has defined the overall SuDS strategy.

The following design philosophy is proposed:

- Discharge via phase 1 water network to the combined sewer in Great Ducie Street. The existing attenuation tank recently constructed was built with additional capacity to allow for the phase 2 area surface water runoff
- A geocellular storage tank will be used as a sub-surface SuDS method as this is the most appropriate and viable option based on the location and constraint issues.

3.8 Outline Surface Water Drainage Strategy

3.8.1 Any future drainage calculations carried out as part of a site-wide drainage strategy or for the

development layouts themselves must include the appropriate increase in rainfall to satisfy the future Climate Change allowances.

3.9 Pollution Control

- 3.9.1 Silt is to be prevented from entering the drainage system by the use of trapped gullies, channels with silt traps, or by the use of sustainable drainage techniques. If appropriate, oil separators in line with Pollution Prevention Guidance 3 (PPG 3) criteria will be provided (it is acknowledged that PPG 3 has been withdrawn, however as no replacement has been released it is still best practice guidance).
- 3.9.2 The existing surface water network for the site has an oil interceptor, where all surface water runoff from vehicular access areas is routed through. This oil interceptor will be utilised for the phase 2 vehicular areas.

3.10 Foul Water Strategy

- 3.10.1 The outline foul water drainage strategy is to connect into the combined sewer within Great Ducie Street to the west via an existing connection where possible. Increase in the foul water discharge rates generated by the new development.
- 3.10.2 The phase 2 foul network will connect into the phase 1 as-built network, therefore a new connection point to the UU combined sewer will not be required. The phase 2 additional flows for foul discharge all fall within the unrestricted outflow agreement for foul discharge from UU

4. Drainage Management and Maintenance Plan

4.1 Introduction

The following report has been prepared in response to Planning Condition 11.

The conditions stated the following:

"Prior to the first use of the development, details of the implementation, maintenance and management of sustainable drainage scheme shall be submitted for approval in writing by the City Council, as Local Planning Authority.

For the avoidance of doubt, this shall include:

- Management and maintenance plan for the lifetime of the development which shall include the arrangements adoption by any public body or statutory undertaker, or any other arrangements to secure the operation of the sustainable drainage scheme throughout its lifetime."

This condition is required in response to the Manchester Core Strategy (2012), specifically policies SP1, EN14 and DM1 which look to manage flooding and pollution as well as ensuring that a managing body is in place for sustainable drainage systems.

This report will summarise the management schedule and arrangements for the proposed drainage network.

4.2 Management & Maintenance Plan

All drainage proposed for the development is to remain privately owned and operated by the Manchester College maintenance team. Both the foul and surface water will discharge into the existing 600mm diameter combined sewer located in Great Ducie Street to the south of the development.

The ongoing management and maintenance of the proposed surface water drainage systems will fall under the responsibility of the site owner.

Piped Drainage and Manhole Chamber Maintenance

Table 6 - Piped Drainage. Channel Drains and Manhole Chambers Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Before Start Up	• Remove of any inappropriate material from within the chamber and dispose off-site.	At start
	• All pipelines to be flushed with water to remove silt and check for blockages.	At start
Regular Maintenance	• Removal of debris (which could include leaves, rubbish, branches) from areas served by drainage (where it may cause risk to performance)	Monthly
Remedial Actions	• For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock.	As required
	• For pipe blockages, rod between access points to unblock	As required
Monitoring	• Lift covers and inspect chambers, inspect covers, surrounding gullies and ACO channels for signs of damage and incorrect operation. If required, undertake remedial action.	As required

Flow Control Device

Table 7 - Flow Control Device Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Before Start Up	• Remove of any inappropriate material from within the chamber and dispose off-site.	At start
Regular Maintenance	• Removal of debris (which could include leaves, rubbish, branches) from areas served by drainage (where it may cause risk to performance)	Monthly
Remedial Actions	• For blockages resulting in flooded manhole chambers, drain down manhole chamber and unblock.	As required

Monitoring	Inspect unit and hose down is required	Monthly at the start for three months, then six monthly
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Geocellular Storage Systems

Table 8 - Geocellular Storage System Maintenance Schedule

Maintenance Schedule	Required Action	Frequency
Before Start Up	A pre-handover inspection should be carried out and the geocellular storage system cleaned prior to the final handover.	At start
Regular Maintenance (as per manufacturer's requirements)	- Remove litter and blockages as required; records of inspections and maintenance undertaken should be kept by the client. - Inspect all chambers for silt and oil build up; sweeping external surfaces.	As required Every 12 months
Remedial Actions	- A spillage kit appropriate to the size of the road surfaces should be kept by the site caretaker. This should include absorbent pads, socks, and rain seals - As soon as a spillage is identified, the drain inlets in that area should be covered to prevent pollution entering the system. The pollution should then be cleared from the road surface. The local channel system and/or separator receiving the spillage should be emptied of all pollution that has entered. - The Environment Agency should be informed of the spillage and the appropriate actions should be taken	As required
Monitoring	Inspection of channels, road/yard gullies for signs of blockage and oil spillage	3 monthly

Appendix A Document copies

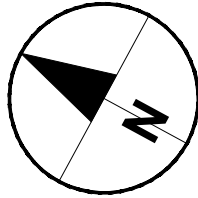
A.1 APPENDIX A – Site Layout and Location Plan

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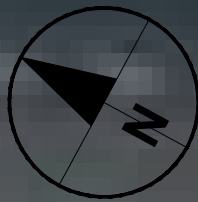
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KEY

PHASE 2 BOUNDARY

OWNERSHIP BOUNDARY

SCHEME EXTENTS



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THE MANCHESTER COLLEGE
PHASE 2
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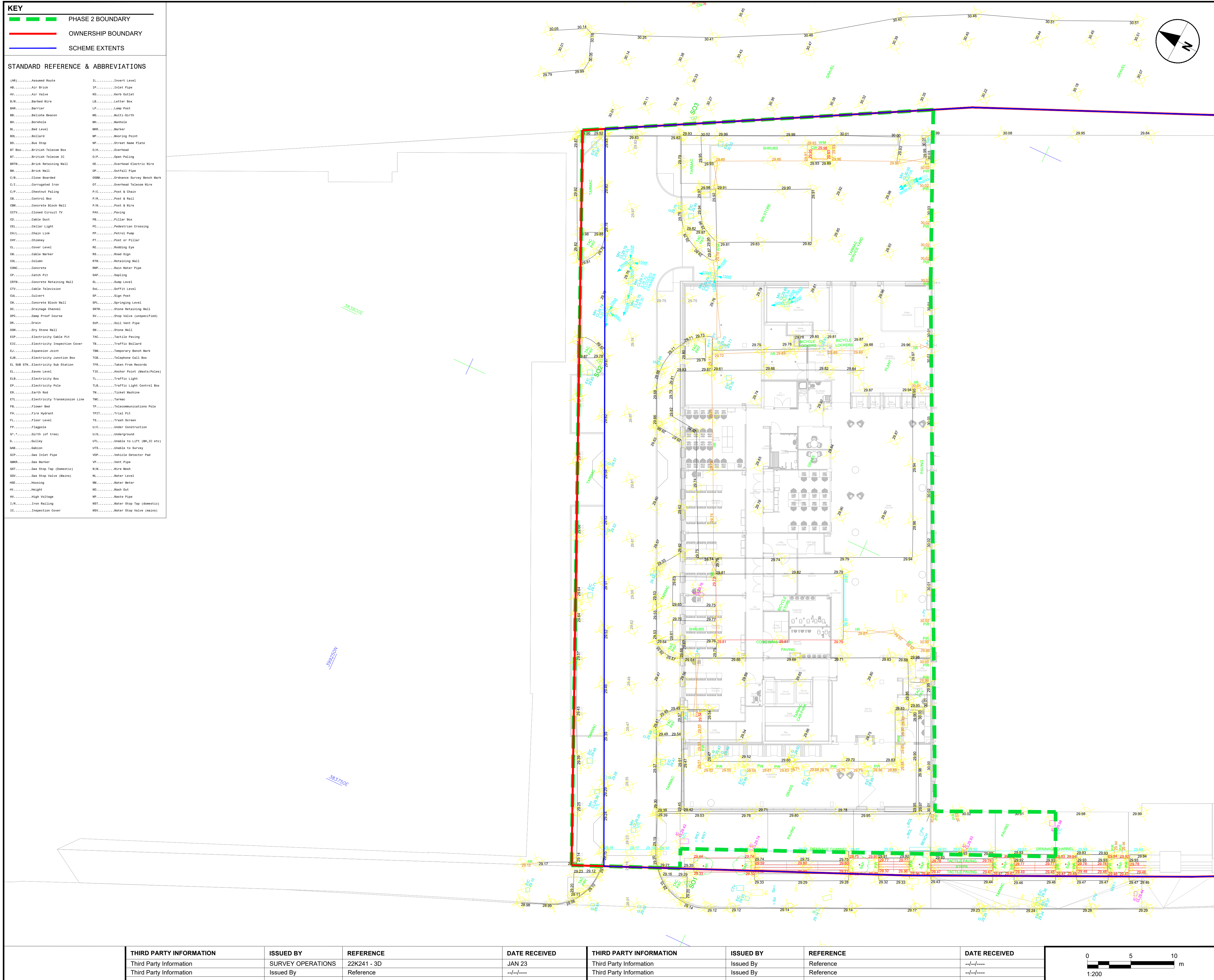
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A.2 APPENDIX B – Topographical Survey



A.3 APPENDIX C – Utilities Plan

KEY

PHASE 2 BOUNDARY

OWNERSHIP BOUNDARY

SCHEME EXTENTS

SW

FW

WM

GM

EL

DUCT

BT

CTV

CCTV

UA

UP

UC

UNPR

SW

FW

EXTENT OF SURVEY BY SURVEY OPERATIONS LTD.

CONNECTIVITY BETWEEN CHAMBERS FROM CCTV REPORT

COVER POSITION FROM CCTV REPORT - NOT SURVEYED ON TOPOGRAPHICAL SURVEY.

BURIED FEATURE FOUND USING RADAR

STORM WATER SEWERS

FOUL WATER SEWERS

WATER MAIN

GAS MAIN

ELECTRIC CABLES

CABLE DUCTING

BT (UNDERGROUND)

CABLE TV

CLOSED CIRCUIT TV

UNIDENTIFIED FEATURE

UNIDENTIFIED PIPE

UNIDENTIFIED CABLE

UNPROVEN FEATURE

END OF TRACE

LATERAL CONNECTIONS

EXTENT OF SURVEY BY SURVEY OPERATIONS LTD.

CONNECTIVITY BETWEEN CHAMBERS FROM CCTV REPORT

COVER POSITION FROM CCTV REPORT - NOT SURVEYED ON TOPOGRAPHICAL SURVEY.

BURIED FEATURE FOUND USING RADAR

UNDERGROUND UTILITIES SERVICES DISCLAIMER

Where indicated, no allowance has been made for sub-surface entry into manholes, other chambers or confined spaces below ground level. Therefore any details relating to depths, sizes etc, are taken from the surface and as such will be approximate.

We have endeavoured to supply you with the most accurate data possible by using methods and equipment that are at the forefront of our industry. We have taken great care in the detection of pipework and buried features, but as with all methods of detecting underground or buried utilities the information provided is based on results obtained from electromagnetic techniques, and as such may be liable to distortion or errors beyond the reasonable control of the operator or his instruments.

It is the responsibility of the user under Health & Safety (HS47) Guidelines to satisfy himself of the suspected location of any services prior to excavation of the services shown.

NOTE 1

This utility survey has been undertaken using:
A: Radiodetection RD4000 + RD4000 T10
B: Mala Geoscience Ground Probing Radar

NOTE 2

Power carrying features shown on this drawing are shown as an individual service line. This does not necessarily represent the number of cables actually present and it is possible that there could be multi numbers of cables including HV, LV and communications transmission cables following the same trace line. These could be at different depths, the trace signal from the deeper cables being masked by signal emitted from the shallower service above. Cable runs could also be present running parallel to the single line shown.

UNIDENTIFIED - A buried feature or utility that has been located, but we are unable to state what it is.
UNPROVEN - The assumed location of a reported feature or utility, usually taken from records, but not found during the utility trace (due to various conditions).
CAUTION - Electric pot ended cables, even when they are live, are unable to be detected or traced.

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PROJECT

MANCHESTER
COLLEGE
PHASE 2

CLIENT

THE MANCHESTER
COLLEGE

CONSULTANT

AECOM
1 New York Street
Manchester
M1 4HD
T: +44-161-601-1700
www.aecom.com

NOTES

- ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS NOTED OTHERWISE.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER SCHEME DRAWINGS AND DOCUMENTS.
- THIS DRAWING IS TO BE USED FOR THE STATED PURPOSE OF ISSUE ONLY AND MUST NOT BE USED FOR ANY OTHER PURPOSE THAN THAT INDICATED.
- ONLY WRITTEN DIMENSIONS SHALL BE USED. CRITICAL DIMENSIONS AND LEVELS SHALL BE VERIFIED ON SITE BY THE CONTRACTOR PRIOR TO WORK COMMENCEMENT.
- ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN THESE DRAWINGS SHALL BE DRAWN TO THE ATTENTION OF THE PROJECT MANAGER FOR CLARIFICATION.
- THE PHASE 2 DESIGN IS HEAVILY LINKED TO THAT OF THE PHASE 1 AND WIDER MASTERPLAN DESIGN. ASSUMPTIONS THAT THE PHASE 1 DESIGN HAS BEEN CONSTRUCTED AS PER THE DESIGNS. A THOROUGH INVESTIGATION INTO THE AS-BUILTS STATUS FOR THE PHASE 1 DESIGN WILL BE UNDERTAKEN DUE TO THE REQUIREMENT FOR THE PHASE 2 DESIGN TO UTILISE IN MANY AREAS THE SAME SYSTEM.

ISSUE/REVISION

P1	10/03/2023	FOR PLANNING	NM	WJQ	VB
I/R	DATE	DESCRIPTION	BY	CK	AP

SUITABILITY

S2 - Suitable for information

PROJECT NUMBER

60594458

SHEET TITLE

THE MANCHESTER COLLEGE
PHASE 2
UTILITIES PLAN

SHEET NUMBER

60594458-ACM-XXX-DR-CR-DE-0004

SCALE

1:200 @ A1

REVISION

P01

A.4 APPENDIX D – HR Wallingford Greenfield Discharge Rates

Greenfield runoff rate estimation for sites

www.uksubs.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Reference:

Date:

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	899	899
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

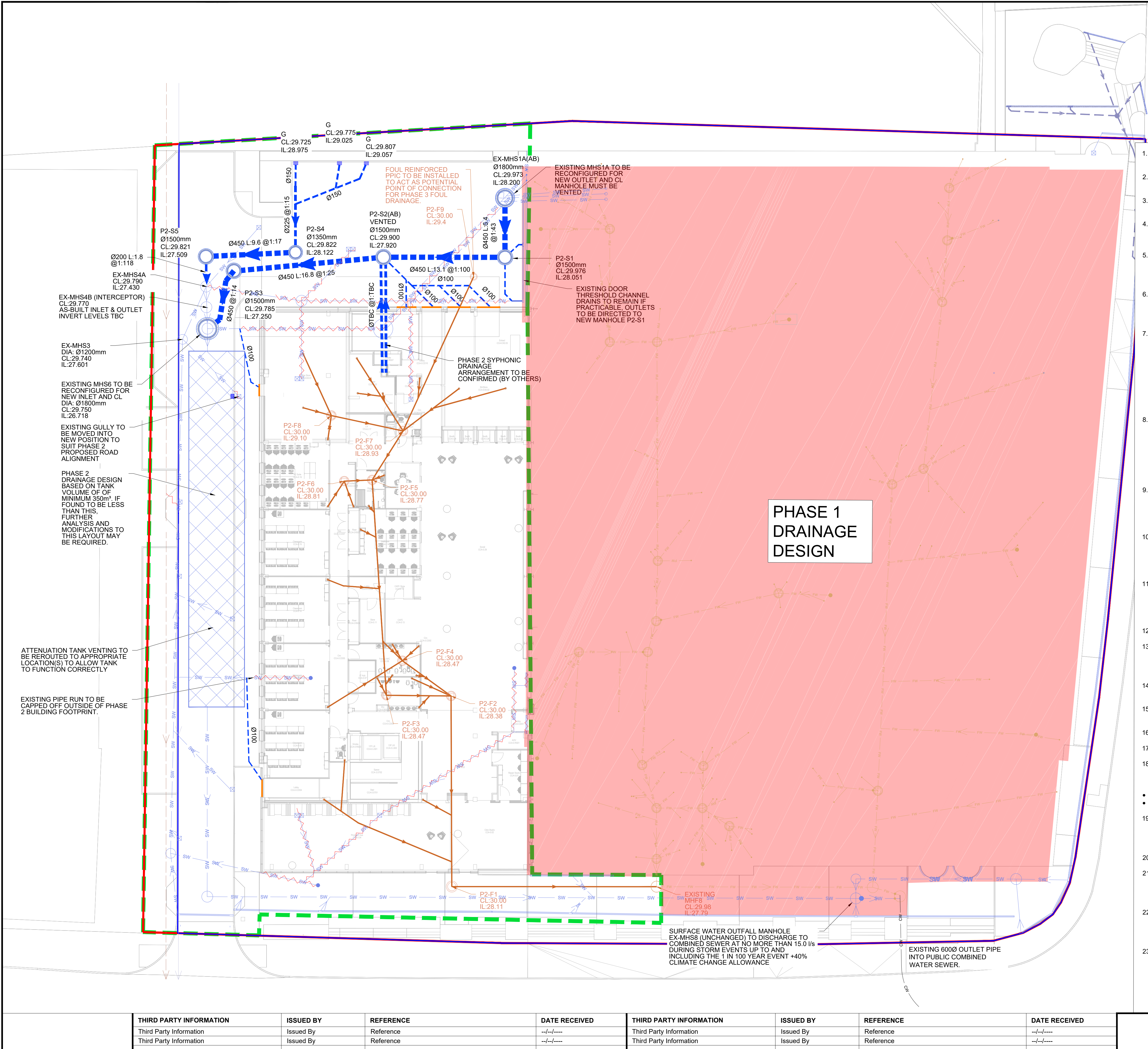
Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	5.84	5.84
1 in 1 year (l/s):	5.08	5.08
1 in 30 years (l/s):	9.92	9.92
1 in 100 year (l/s):	12.14	12.14
1 in 200 years (l/s):	13.83	13.83

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

A.5 APPENDIX E – Proposed Drainage Design



1. DO NOT SCALE FROM THIS DRAWING. ONLY STATED DIMENSIONS ARE TO BE USED.

2. ALL DIMENSIONS ARE IN METRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS NOTED OTHERWISE.

3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER SCHEME DRAWINGS AND DOCUMENTS.

4. THIS DRAWING IS TO BE USED FOR THE STATED PURPOSE OF ISSUE ONLY AND MUST NOT BE USED FOR ANY OTHER PURPOSE THAN THAT INDICATED.

5. ONLY WRITTEN DIMENSIONS SHALL BE USED. CRITICAL DIMENSIONS AND LEVELS SHALL BE VERIFIED ON SITE BY THE CONTRACTOR PRIOR TO WORK COMMENCEMENT.

6. ANY DISCREPANCIES IN DIMENSIONS OR DETAILS ON OR BETWEEN THESE DRAWINGS SHALL BE DRAWN TO THE ATTENTION OF THE PROJECT MANAGER FOR CLARIFICATION.

7. THE PHASE 2 DESIGN IS HEAVILY LINKED TO THAT OF THE PHASE 1 AND WIDER MASTERPLAN DESIGN. THUS IT IS ASSUMED THAT THE PHASE 1 DESIGN HAS BEEN CONSTRUCTED AS PER THE DESIGNS. A THOROUGH INVESTIGATION INTO THE AS-BUILTS STATUS FOR THE PHASE 1 DESIGN WILL BE UNDERTAKEN DUE TO THE REQUIREMENT FOR THE PHASE 2 DESIGN TO UTILISE IN MANY AREAS THE SAME SYSTEM.

8. GULLY POSITIONS ARE SHOWN AS PER PHASE 1 AS-BUILT SURVEY. IT IS NOTED THAT THEIR LOCATIONS DIFFER FROM THAT OF THE PHASE 1 DRAINAGE DESIGN. CHECKS AND HYDRAULIC CALCULATIONS INTO THEIR CURRENT PERFORMANCE TO BE CARRIED OUT AT DETAILED DESIGN STAGE. THIS MAY PRECLUDE TO FURTHER GULLIES BEING REQUIRED.

9. ATTENUATION TANK VENTING ARRANGEMENT WILL REQUIRE RE-ROUTING DUE TO PHASE 2 LAYOUT. IT IS ESSENTIAL THAT THE ATTENUATION TANK HAS 2 VENTS IN OPPOSITE CORNERS OF THE TANK.

10. COVER LEVELS SHOWN ARE BASED ON RIBA 3 AECOM LEVEL DESIGN FOR WHOLE ACCESS ROAD. LEVELS IN THE NORTH EAST OF THE SITE ARE SUBJECT TO ADJUSTMENT PENDING RIBA 4 LEVEL REDESIGN.

11. THE POSITION, SIZE AND LEVELS OF ALL EXISTING DRAINS ARE TO BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY DISCREPANCIES REPORTED IMMEDIATELY TO THE ENGINEER.

12. PIPEWORK TO BE OF THE FOLLOWING SPECIFICATION:

13. 100 / 150 / 225mm DIAMETER TO BE VITRIFIED CLAY TO BS EN 295-1 AND HAVE A MIN. CRUSHING STRENGTH OF 40kN/m OR UPVC/HDPE COMPLYING TO BS EN 13476-(1-3) AND WIS 4-35-01.

14. 300mm+ TO BE CONCRETE CLASS M. INSTALLED IN LINE WITH THE MANUFACTURER'S RECOMMENDATIONS.

15. ALL PIPEWORK TO BE INSTALLED IN LINE WITH MANUFACTURER'S RECOMMENDATIONS.

16. PIPE BED AND SURROUND TO BE CLASS S1 TO BS EN 1295-1.

17. ALL MANHOLES TO BE CIRCULAR PRE-CAST CONCRETE.

18. ALL COVERS ARE TO BE DUCTILE IRON TO BS EN 124. LOAD CLASSES SHALL BE AS FOLLOWS:

• NON-VEHICULAR AREAS - B125

• VEHICULAR AREAS - D400

19. PHASE 1 DRAINAGE SHOWN AS "TO BE ABANDONED" SHALL BE COMPLETELY REMOVED. PIPE ENDS AT THE CUT OFF POINTS ARE TO BE CONNECTED TO OR CAPPED/GROUTED IF NOT REQUIRED.

20. INVERT LEVELS SHOWN ARE FOR THE OUTGOING PIPE.

21. ALL SEWERS, MANHOLES AND ANCILLARIES ARE TO BE CONSTRUCTED IN LINE WITH THE SPECIFICATION AND DETAILS IN 'SEWERS FOR ADOPTION, 7TH EDITION'.

22. ALL COVERS ARE TO BE DUCTILE IRON TO BS EN 124. ALL INTERNAL MANHOLES SHALL BE DOUBLE SEALED AND RECESSED TO BE ABLE TO TAKE THE SURROUNDING FLOOR FINISH.

23. SYPHONIC MANHOLES TO BE AQUAVANTAGE (SAP CODE 241255) WITH A WATERWAY OF 5250CM2 OR THE SAINT GOBIAN WATERWAY 2400 (SAP CODE 211234) WITH A WATER WAY OF 2400CM2 OR EQUIVALENT APPROVED. MINIMUM VENTED AREA OF MANHOLE COVER IS 0.274m²
- AECOM

PROJECT

MANCHESTER COLLEGE PHASE 2

CLIENT

THE MANCHESTER COLLEGE

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KEY

PHASE 2 BOUNDARY

OWNERSHIP BOUNDARY

SCHEME EXTENTS

EXISTING SURFACE WATER

DRAINAGE TO BE ABANDONED/REMOVED

EXISTING SURFACE WATER MANHOLE

PROPOSED SURFACE WATER

PROPOSED SURFACE WATER MANHOLE

PROPOSED ROAD GULLY

PROPOSED THRESHOLD DRAIN

PHASE 1 PPIC

PHASE 1 FOUL WATER

PHASE 2 PROPOSED PPIC

PHASE 2 PROPOSED FOUL WATER

EXISTING COMBINED PIPE

ISSUE/REVISION

P1	10/03/2023	FOR PLANNING	NM	WJQ	VB
I/R	DATE	DESCRIPTION	BY	CK	AP

SUITABILITY

S2 - Suitable for information

PROJECT NUMBER

60594458

SHEET TITLE

THE MANCHESTER COLLEGE PHASE 2
PROPOSED SURFACE WATER DRAINAGE LAYOUT

SHEET NUMBER

60594458-ACM-XXX-DR-CE-5201

SCALE

1:200 @ A1

REVISION

P01
-
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A.6 APPENDIX F – InfoDrainage Report

NOTE:

THE MODELLING RESULTS SHOWN WITHIN THIS REPORT DETAIL THE WHOLE SYSTEM DUE TO THE REQUIREMENT FOR THE PHASE 2 AREA TO DRAIN AND BE ATTENUATED BY THE EXISTING TANK, AS SUCH, SOME INFORMATION IN HERE DOES NOT PERTAIN DIRECTLY TO THE PHASE 2 AREA.

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023			
	Designed by: WJO	Checked by: VB	Approved By: VB	
Report Details: Type: Junctions Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester			

Name	Junction Type	Easting (m)	Northing (m)	Sealed	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape
SRWP1	Simple Junction	383845.809	399203.306					
S1A	Manhole	383840.807	399212.992	☐	29.973	1.773	28.200	Circular
S6	Manhole	383814.624	399236.160	☐	29.852	3.134	26.718	Circular
G1	Manhole	383756.198	399212.673	☐	29.010	0.750	28.260	Circular
S2	Manhole	383761.643	399216.128	☐	29.210	1.490	27.720	Circular
DUMMY (2)	Manhole	383765.240	399217.678	☒	29.420	1.713	27.707	Circular
DUMMY (1)	Manhole	383775.399	399222.041	☒	29.456	1.786	27.670	Circular
G3	Manhole	383773.450	399220.374	☐	29.360	0.750	28.610	Circular
DUMMY	Manhole	383792.778	399229.587	☒	29.697	2.090	27.607	Circular
G5	Manhole	383791.653	399228.752	☐	29.623	0.750	28.873	Circular
S3	Manhole	383812.485	399238.125	☐	29.850	2.300	27.550	Circular
S4	Manhole	383818.715	399238.167	☐	29.844	2.626	27.218	Circular
G9	Manhole	383834.757	399235.049	☐	29.725	0.750	28.975	Circular
P2-S5	Manhole	383821.605	399239.567	☐	29.821	2.312	27.509	Circular
G10	Manhole	383826.843	399235.643	☐	29.701	0.750	28.951	Circular
S7	Manhole	383759.111	399210.577	☐	29.117	2.584	26.533	Circular
DUMMY (3)	Manhole	383776.448	399172.745	☒	29.920	3.472	26.448	Circular
G14	Manhole	383771.095	399173.961	☐	29.890	0.880	29.010	Circular
S8(FC)	Manhole	383787.849	399147.902	☐	29.936	3.545	26.391	Circular
G15	Manhole	383783.998	399145.386	☐	29.890	0.880	29.010	Circular
HEE-CH2	Manhole	383872.366	399168.134	☐	34.352	0.235	34.117	Circular
HEE-S1	Manhole	383876.436	399156.892	☐	34.417	0.605	33.812	Circular
HEE-CH1	Manhole	383883.175	399163.655	☐	35.050	0.700	34.350	Circular
HEE-S2	Manhole	383872.030	399152.250	☐	34.400	0.674	33.726	Circular
PH1-CH1	Manhole	383863.324	399148.543	☐	33.820	0.280	33.540	Circular
PH1-CH2	Manhole	383849.750	399143.310	☐	33.083	0.280	32.803	Circular
PH1-CH3	Manhole	383837.338	399139.054	☐	32.408	0.280	32.128	Circular
PH1-CH4	Manhole	383824.869	399134.864	☐	31.708	0.280	31.428	Circular
PH1-CH5	Manhole	383812.344	399131.004	☐	30.938	0.280	30.658	Circular
G16	Manhole	383799.600	399127.196	☐	30.152	0.880	29.272	Circular
S9	Manhole	383797.234	399132.673	☐	29.937	1.868	28.069	Circular
G17	Manhole	383792.009	399129.919	☐	29.880	0.880	29.000	Circular
S10	Manhole	383791.926	399148.407	☐	29.975	2.024	27.951	Circular
UU-C2	Manhole	383790.168	399142.807	☐	29.937	6.584	23.353	Circular
UU Outfall	Manhole	383775.580	399136.404	☐	29.600	6.293	23.307	Circular
P2-S1	Manhole	383835.012	399210.314	☐	29.976	1.925	28.051	Circular
P2-S2(AB)	Manhole	383829.536	399222.195	☐	29.900	1.980	27.920	Circular
P2-S3	Manhole	383821.098	399236.766	☐	29.785	2.535	27.250	Circular
SRWP2	Simple Junction	383820.383	399217.977					
P2-S4	Manhole	383826.048	399231.007	☐	29.822	1.700	28.122	Circular
G2	Manhole	383763.198	399215.657	☐	29.183	0.750	28.433	Circular

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
	Designed by: WJO	Checked by: VB	Approved By: VB
Report Details: Type: Junctions Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		

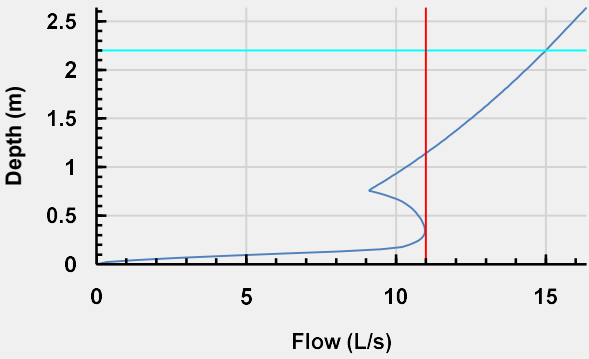
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Name	Diameter (m)	Access Required	Intersection Easting (m)	Intersection Northing (m)	
SRWP1					
S1A	1.800	☒	383840.807	399212.992	All
S6	1.800	☒	383814.624	399236.160	None
G1	0.450	☒	383756.198	399212.673	All
S2	1.200	☒	383761.643	399216.128	None
DUMMY (2)	0.150	☐			None
DUMMY (1)	0.150	☐			None
G3	0.450	☒	383773.450	399220.374	None
DUMMY	0.150	☐			None
G5	0.450	☒	383791.653	399228.752	All
S3	1.200	☒	383812.485	399238.125	None
S4	0.900	☒	383818.715	399238.167	None
G9	0.600	☒	383834.757	399235.049	All
P2-S5	1.500	☒	383821.605	399239.567	None
G10	0.450	☒	383826.843	399235.643	All
S7	2.100	☒	383759.111	399210.577	None
DUMMY (3)	0.600	☐			None
G14	0.450	☒	383771.095	399173.961	All
S8(FC)	2.100	☒	383787.849	399147.902	All
G15	0.450	☒	383783.998	399145.386	All
HEE-CH2	0.300	☒	383872.366	399168.134	All
HEE-S1	0.450	☒	383876.436	399156.892	All
HEE-CH1	0.300	☒	383883.175	399163.655	All
HEE-S2	0.450	☒	383872.030	399152.250	All
PH1-CH1	0.150	☒	383863.324	399148.543	All
PH1-CH2	0.150	☒	383849.750	399143.310	All
PH1-CH3	0.150	☒	383837.338	399139.054	All
PH1-CH4	0.150	☒	383824.869	399134.864	All
PH1-CH5	0.150	☒	383812.344	399131.004	All
G16	0.300	☒	383799.600	399127.196	All
S9	1.050	☒	383797.234	399132.673	All
G17	0.300	☒	383792.009	399129.919	All
S10	1.050	☒	383791.926	399148.407	All
UU-C2	1.500	☒	383790.168	399142.807	None
UU Outfall	1.200	☒	383775.580	399136.404	None
P2-S1	1.500	☒	383835.012	399210.314	None
P2-S2(AB)	1.500	☒	383829.536	399222.195	None
P2-S3	1.500	☒	383821.098	399236.766	None
SRWP2					
P2-S4	1.350	☒	383826.048	399231.007	None
G2	0.450	☒	383763.198	399215.657	None

Outlets

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
	Designed by: WJO	Checked by: VB	Approved By: VB
Report Details: Type: Junctions Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		

AECOM

Junction	Outlet Name	Outgoing Connection	Outlet Type
SRWP1	Outlet	4.000	Free Discharge
S1A	Outlet	4.001	Free Discharge
S6	Outlet	1.002	Free Discharge
G1	Outlet	2.000	Free Discharge
S2	Outlet	2.001	Free Discharge
DUMMY (2)	Outlet	2.002	Free Discharge
DUMMY (1)	Outlet	2.003	Free Discharge
G3	Outlet	7.000	Free Discharge
DUMMY	Outlet	2.004	Free Discharge
G5	Outlet	8.000	Free Discharge
S3	Outlet	2.006	Free Discharge
S4	Outlet	1.001	Free Discharge
G9	Outlet	3.000	Free Discharge
P2-S5	Outlet	1.000	Free Discharge
G10	Outlet	11.000	Free Discharge
S7	Outlet	1.004	Free Discharge
DUMMY (3)	Outlet	1.005	Free Discharge
G14	Outlet	12.000	Free Discharge
S8(FC)	Outlet	1.006	Hydro-Brake®
	Invert Level (m)	26.391	
	Design Depth (m)	2.200	
	Design Flow (L/s)	15.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☒	
	Flush Flow (L/s)	11.0	
	Unit Reference	SFF-0150-1500-2200-1100	
			
G15	Outlet	13.000	Free Discharge
HEE-CH2	Outlet	14.000	Free Discharge
HEE-S1	Outlet	14.001	Free Discharge
HEE-CH1	Outlet	15.000	Free Discharge
HEE-S2	Outlet	14.002	Free Discharge
PH1-CH1	Outlet	14.003	Free Discharge
PH1-CH2	Outlet	14.004	Free Discharge
PH1-CH3	Outlet	14.005	Free Discharge
PH1-CH4	Outlet	14.006	Free Discharge
PH1-CH5	Outlet	14.007	Free Discharge
G16	Outlet	14.008	Free Discharge
S9	Outlet	14.009	Free Discharge
G17	Outlet	16.000	Free Discharge
S10	Outlet	14.010	Free Discharge
UU-C2	Outlet	1.007	Free Discharge
P2-S1	Outlet	4.002	Free Discharge
P2-S2(AB)	Outlet	4.003	Free Discharge
P2-S3	Outlet	4.004	Free Discharge
SRWP2	Outlet	5.000	Free Discharge
P2-S4	Outlet	3.001	Free Discharge
G2	Outlet	6.000	Free Discharge

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
	Designed by: WJO	Checked by: VB	Approved By: VB
Report Details: Type: Stormwater Controls Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		





Tank

Type : Tank

Dimensions

Exceedance Level (m)	29.454
Depth (m)	2.829
Base Level (m)	26.625
Freeboard (mm)	50
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	-2.90
Total Volume (m³)	347.195

Depth (m)	Area (m²)	Volume (m³)
0.000	228.00	0.000
0.200	228.00	43.320
0.400	228.00	86.640
0.600	228.00	129.960
0.800	228.00	173.280
1.000	228.00	216.600
1.200	228.00	259.920
1.400	228.00	303.240
1.600	228.00	346.560
1.601	0.50	346.636
2.000	0.50	346.825
2.200	0.50	346.920
2.400	0.50	347.015
2.600	0.50	347.110
2.800	0.50	347.205

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	1.002
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.003
Outlet Type	Free Discharge

Advanced

Perimeter	Square
Length (m)	38.300

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
	Designed by: WJO	Checked by: VB	Approved By: VB
Report Details: Type: Connections Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		

AECOM

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Height (mm)	Upstream Cover Level (m)
4.000	10.900	Pipe	29.068		0.6	225		30.000
2.000	6.448	Pipe	11.933		0.6	150		29.010
2.001	3.916	Pipe	300.000		0.6	225		29.210
2.002	11.057	Pipe	300.000		0.6	225		29.420
7.000	2.565	Pipe	2.728		0.6	150		29.360
2.003	18.946	Pipe	300.000		0.6	225		29.456
8.000	1.400	Pipe	1.106		0.6	150		29.623
1.000	3.212	Pipe	11.037		0.6	200		29.821
1.001	4.557	Pipe	9.113		0.6	200		29.844
1.004	41.615	Pipe	489.590		0.6	525		29.117
12.000	5.489	Pipe	2.143		0.6	150		29.890
1.005	27.334	Pipe	479.551		0.6	525		29.920
13.000	4.600	Pipe	1.756		0.6	150		29.890
14.000	11.956	Pipe	39.199		0.6	100		34.352
15.000	9.547	Pipe	17.913		0.6	100		35.050
14.001	6.400	Pipe	70.000		0.6	100		34.417
14.002	9.462	Pipe	57.002		0.6	100		34.400
14.003	14.548	Custom	19.739		0.6	150	185	33.820
14.004	13.121	Custom	19.439		0.6	150	185	33.083
14.005	13.154	Custom	18.792		0.6	150	185	32.408
14.006	13.106	Custom	17.021		0.6	150	185	31.708
14.007	13.301	Custom	16.858		0.6	150	185	30.938
14.008	5.966	Pipe	5.289		0.6	150		30.152
16.000	5.906	Pipe	6.900		0.6	150		29.880
14.009	16.605	Pipe	140.720		0.6	225		29.937
14.010	4.108	Pipe	2.633		0.6	225		29.975
1.006	5.598	Pipe	1.843		0.6	225		29.936
1.007	15.931	Pipe	350.000		0.6	600		29.937
1.002	4.304	Pipe	46.284		0.6	525		29.852
1.003	22.007	Pipe	239.207		0.6	525		29.454
4.001	6.384	Pipe	42.750		0.6	450		29.973
4.002	13.082	Pipe	100.122		0.6	450		29.976
4.003	16.838	Pipe	25.131		0.6	450		29.900
4.004	6.502	Pipe	12.222		0.6	450		29.785
5.000	10.079	Pipe	15.387		0.6	225		30.000
3.000	9.601	Pipe	11.258		0.6	225		29.725
3.001	9.644	Pipe	15.726		0.6	450		29.822
2.006	9.234	Pipe	225.222		0.6	225		29.850
2.004	21.477	Pipe	377.214		0.6	225		29.697
6.000	2.872	Pipe	3.954		0.6	150		29.183
11.000	8.511	Pipe	4.911		0.6	150		29.701

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
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Report Details: Type: Connections Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		



Name	Upstream Invert Level (m)	Downstream m Cover Level (m)	Downstream m Invert Level (m)	Lock	Flow Restriction (L/s)
4.000	28.575	29.973	28.200	None	
2.000	28.260	29.210	27.720	None	
2.001	27.720	29.420	27.707	None	
2.002	27.707	29.456	27.670	None	
7.000	28.610	29.456	27.670	None	
2.003	27.670	29.697	27.607	None	
8.000	28.873	29.697	27.607	None	
1.000	27.509	29.844	27.218	None	
1.001	27.218	29.852	26.718	None	
1.004	26.533	29.920	26.448	None	
12.000	29.010	29.920	26.448	None	
1.005	26.448	29.936	26.391	None	
13.000	29.010	29.936	26.391	None	
14.000	34.117	34.417	33.812	None	
15.000	34.350	34.417	33.817	None	
14.001	33.817	34.400	33.726	None	
14.002	33.726	33.820	33.560	None	
14.003	33.540	33.083	32.803	None	
14.004	32.803	32.408	32.128	None	
14.005	32.128	31.708	31.428	None	
14.006	31.428	30.938	30.658	None	
14.007	30.658	30.152	29.869	None	
14.008	29.272	29.937	28.144	None	
16.000	29.000	29.937	28.144	None	
14.009	28.069	29.975	27.951	None	
14.010	27.951	29.936	26.391	None	
1.006	26.391	29.937	23.353	None	16.4
1.007	23.353	29.600	23.307	None	
1.002	26.718	29.454	26.625	None	
1.003	26.625	29.117	26.533	None	
4.001	28.200	29.976	28.051	None	
4.002	28.051	29.900	27.920	None	
4.003	27.920	29.785	27.250	None	
4.004	27.250	29.852	26.718	None	
5.000	28.575	29.900	27.920	None	
3.000	28.975	29.822	28.122	None	
3.001	28.122	29.821	27.509	None	
2.006	27.550	29.821	27.509	None	
2.004	27.607	29.850	27.550	None	
6.000	28.433	29.420	27.707	None	
11.000	28.951	29.844	27.218	None	

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
	Designed by: WJO	Checked by: VB	Approved By: VB
Report Title: Rainfall Analysis Criteria	Company Address: AECOM 1 New York Street Manchester		

AECOM

Runoff Type	Dynamic
Output Interval (mins)	2
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform First Flush Analysis	☐

Rainfall

Sim Criteria FSR Type: FSR

Region	England And Wales
M5-60 (mm)	18.1
Ratio R	0.357
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0.000
30.0	30.000
100.0	30.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
	Designed by: WJO	Checked by: VB	Approved By: VB
Report Details: Type: Junctions Summary Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		




Sim Criteria FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SRWP1	Sim Criteria FSR: 1 years: +0 %: 15 mins: Summer		28.575	28.646	0.071	61.7			61.5	24.066	OK
S1A	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.973	28.200	28.328	0.128	61.5	0.326	0.000	60.8	26.948	OK
S6	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.852	26.718	26.874	0.156	101.6	0.396	0.000	100.7	46.135	OK
G1	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.010	28.260	28.283	0.022	2.5	0.004	0.000	2.4	1.073	OK
S2	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.210	27.720	27.768	0.048	2.4	0.055	0.000	2.4	1.070	OK
DUMMY (2)	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.420	27.707	27.758	0.052	3.5	0.001	0.000	3.5	1.576	OK
DUMMY (1)	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.456	27.670	27.741	0.071	6.7	0.001	0.000	6.5	2.982	OK
G3	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.360	28.610	28.628	0.018	3.2	0.003	0.000	3.2	1.411	OK
DUMMY	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.697	27.607	27.709	0.102	11.7	0.002	0.000	11.3	5.244	OK
G5	Sim Criteria FSR: 1 years: +0 %: 15 mins: Summer	29.623	28.873	28.888	0.015	5.2	0.002	0.000	5.2	2.018	OK
S3	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.850	27.550	27.637	0.087	11.3	0.098	0.000	11.0	5.224	OK
S4	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.844	27.218	27.273	0.055	20.0	0.035	0.000	19.9	9.279	OK
G9	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.725	28.975	29.003	0.028	4.9	0.008	0.000	4.9	2.145	OK
P2-S5	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.821	27.509	27.566	0.057	15.9	0.100	0.000	15.6	7.361	OK
G10	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.701	28.951	28.975	0.024	4.4	0.004	0.000	4.4	1.922	OK
S7	Sim Criteria FSR: 1 years: +0 %: 120 mins: Winter	29.117	26.533	26.839	0.306	22.4	1.061	0.000	17.5	97.251	OK
DUMMY (3)	Sim Criteria FSR: 1 years: +0 %: 120 mins: Winter	29.920	26.448	26.839	0.391	18.2	0.111	0.000	12.5	99.546	OK
G14	Sim Criteria FSR: 1 years: +0 %: 15 mins: Summer	29.890	29.010	29.025	0.015	2.6	0.002	0.000	2.6	1.008	OK
S8(FC)	Sim Criteria FSR: 1 years: +0 %: 120 mins: Winter	29.936	26.391	26.839	0.448	14.4	1.551	0.000	11.0	105.532	Surcharged

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
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Report Details: Type: Junctions Summary Storm Phase: Storm		Company Address: AECOM 1 New York Street Manchester	



G15	Sim Criteria FSR: 1 years: +0 %: 15 mins: Summer	29.890	29.010	29.019	0.009	1.4	0.001	0.000	1.4	0.553	OK
HEE-CH2	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	34.352	34.117	34.146	0.029	1.8	0.002	0.000	1.8	0.789	Flood Risk
HEE-S1	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	34.417	33.812	33.856	0.044	2.2	0.007	0.000	2.1	0.950	OK
HEE-CH1	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	35.050	34.350	34.359	0.009	0.3	0.001	0.000	0.3	0.112	OK
HEE-S2	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	34.400	33.726	33.762	0.036	2.1	0.006	0.000	2.1	0.947	OK
PH1-CH1	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	33.820	33.540	33.567	0.027	2.5	0.000	0.000	2.5	1.114	Flood Risk
PH1-CH2	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	33.083	32.803	32.832	0.029	2.8	0.001	0.000	2.8	1.281	Flood Risk
PH1-CH3	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	32.408	32.128	32.158	0.030	3.1	0.001	0.000	3.1	1.393	Flood Risk
PH1-CH4	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	31.708	31.428	31.458	0.030	3.3	0.001	0.000	3.3	1.505	Flood Risk
PH1-CH5	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	30.938	30.658	30.690	0.032	3.5	0.001	0.000	3.5	1.617	Flood Risk
G16	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	30.152	29.272	29.295	0.023	3.7	0.002	0.000	3.7	1.727	OK
S9	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.937	28.069	28.124	0.055	4.9	0.048	0.000	4.8	2.229	OK
G17	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.880	29.000	29.014	0.014	1.2	0.001	0.000	1.2	0.508	OK
S10	Sim Criteria FSR: 1 years: +0 %: 15 mins: Summer	29.975	27.951	27.968	0.017	4.7	0.015	0.000	4.7	1.995	OK
UU-C2	Sim Criteria FSR: 1 years: +0 %: 30 mins: Summer	29.937	23.353	23.426	0.073	11.0	0.130	0.000	11.0	28.972	OK
UU Outfall	Sim Criteria FSR: 1 years: +0 %: 60 mins: Summer	29.600	23.307	23.378	0.070	11.0	0.000	0.000	11.0	61.685	OK
P2-S1	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.976	28.051	28.194	0.143	60.8	0.253	0.000	60.2	26.943	OK
P2-S2(AB)	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.900	27.920	28.037	0.117	83.1	0.207	0.000	82.2	36.939	OK
P2-S3	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.785	27.250	27.351	0.101	82.2	0.178	0.000	81.7	36.936	OK
SRWP2	Sim Criteria FSR: 1 years: +0 %: 15 mins: Summer		28.575	28.611	0.036	22.9			22.8	8.931	OK
P2-S4	Sim Criteria FSR: 1 years: +0 %: 15 mins: Winter	29.822	28.122	28.147	0.024	4.9	0.035	0.000	4.8	2.147	OK
G2	Sim Criteria FSR: 1 years: +0 %: 15 mins: Summer	29.183	28.433	28.445	0.012	1.2	0.002	0.000	1.2	0.455	OK

NOTE:

HEE-CH JUNCTIONS ARE CHANNEL DRAINS, THEREFORE DUE TO THE 0.3m FLOOD RISK WINDOW, FLOOD RISK IN THESE CHANNELS IS NOT REPRESENTATIVE OF TRUE FLOOD RISK.

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
	Designed by: WJO	Checked by: VB	Approved By: VB
Report Details: Type: Junctions Summary Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		

AECOM



Sim Criteria FSR: 30 years: Increase Rainfall (%): +30: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SRWP1	Sim Criteria FSR: 30 years: +30 %: 15 mins: Summer		28.575	28.729	0.154	196.3			196.2	76.529	OK
S1A	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.973	28.200	28.478	0.278	196.3	0.707	0.000	195.0	85.710	OK
S6	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.852	26.718	27.737	1.019	80.5	2.595	0.000	79.2	342.430	Surcharged
G1	Sim Criteria FSR: 30 years: +30 %: 15 mins: Summer	29.010	28.260	28.299	0.039	7.8	0.006	0.000	7.8	3.047	OK
S2	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.210	27.720	27.856	0.136	7.8	0.154	0.000	7.2	3.409	OK
DUMMY (2)	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.420	27.707	27.852	0.145	10.8	0.003	0.000	10.2	5.023	OK
DUMMY (1)	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.456	27.670	27.845	0.175	20.5	0.003	0.000	19.5	9.511	OK
G3	Sim Criteria FSR: 30 years: +30 %: 15 mins: Summer	29.360	28.610	28.640	0.030	10.3	0.005	0.000	10.3	4.009	OK
DUMMY	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.697	27.607	27.826	0.219	36.2	0.004	0.000	35.1	16.699	OK
G5	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.623	28.873	28.902	0.029	16.5	0.005	0.000	16.8	7.189	OK
S3	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.850	27.550	27.738	0.188	9.1	0.213	0.000	9.1	39.178	OK
S4	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.844	27.218	27.738	0.520	16.2	0.331	0.000	16.2	69.436	Surcharged
G9	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.725	28.975	29.026	0.051	15.6	0.015	0.000	15.6	6.829	OK
P2-S5	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.821	27.509	27.738	0.229	12.9	0.404	0.000	12.8	55.174	Surcharged
G10	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.701	28.951	28.993	0.042	14.0	0.007	0.000	14.0	6.107	OK
S7	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.117	26.533	27.737	1.204	16.3	4.171	0.000	14.3	201.143	Surcharged
DUMMY (3)	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.920	26.448	27.737	1.289	14.8	0.365	0.000	11.5	201.165	Surcharged
G14	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.890	29.010	29.034	0.024	8.2	0.004	0.000	8.2	3.593	OK
S8(FC)	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.936	26.391	27.737	1.346	12.9	4.661	0.000	11.8	216.205	Surcharged

Manchester College: Phase 2 SW Drainage	Date: 08/03/2023		
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Report Details: Type: Junctions Summary Storm Phase: Storm	Company Address: AECOM 1 New York Street Manchester		



G15	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.89 0	29.01 0	29.027	0.017	4.5	0.003	0.000	4.5	1.977	OK
HEE-CH2	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	34.35 2	34.11 7	34.172	0.055	5.8	0.004	0.000	5.7	2.516	Flood Risk
HEE-S1	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	34.41 7	33.81 2	33.904	0.092	6.9	0.015	0.000	6.8	3.043	OK
HEE-CH1	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	35.05 0	34.35 0	34.365	0.015	0.8	0.001	0.000	0.8	0.357	OK
HEE-S2	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	34.40 0	33.72 6	33.801	0.076	6.8	0.012	0.000	6.7	3.041	OK
PH1-CH1	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	33.82 0	33.54 0	33.591	0.051	7.9	0.001	0.000	7.9	3.580	Flood Risk
PH1-CH2	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	33.08 3	32.80 3	32.858	0.055	9.1	0.001	0.000	9.1	4.119	Flood Risk
PH1-CH3	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	32.40 8	32.12 8	32.185	0.057	9.9	0.001	0.000	9.8	4.475	Flood Risk
PH1-CH4	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	31.70 8	31.42 8	31.485	0.057	10.6	0.001	0.000	10.6	4.831	Flood Risk
PH1-CH5	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	30.93 8	30.65 8	30.718	0.060	11.4	0.001	0.000	11.3	5.187	Flood Risk
G16	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	30.15 2	29.27 2	29.315	0.043	12.1	0.003	0.000	12.0	5.542	OK
S9	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.93 7	28.06 9	28.168	0.099	15.7	0.086	0.000	15.5	7.152	OK
G17	Sim Criteria FSR: 30 years: +30 %: 15 mins: Summer	29.88 0	29.00 0	29.025	0.025	3.7	0.002	0.000	3.7	1.443	OK
S10	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.97 5	27.95 1	27.982	0.031	15.5	0.027	0.000	15.5	7.144	OK
UU-C2	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.93 7	23.35 3	23.429	0.076	11.8	0.134	0.000	11.8	215.891	OK
UU Outfall	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.60 0	23.30 7	23.380	0.073	11.8	0.000	0.000	11.8	215.891	OK
P2-S1	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.97 6	28.05 1	28.338	0.287	195.0	0.507	0.000	193.6	85.703	OK
P2-S2(AB)	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.90 0	27.92 0	28.153	0.233	266.3	0.411	0.000	264.3	117.497	OK
P2-S3	Sim Criteria FSR: 30 years: +30 %: 180 mins: Winter	29.78 5	27.25 0	27.738	0.488	64.3	0.862	0.000	64.3	275.534	Surcharged
SRWP2	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter		28.57 5	28.639	0.064	72.9			72.7	31.811	OK
P2-S4	Sim Criteria FSR: 30 years: +30 %: 15 mins: Winter	29.82 2	28.12 2	28.165	0.042	15.6	0.061	0.000	15.5	6.832	OK
G2	Sim Criteria FSR: 30 years: +30 %: 15 mins: Summer	29.18 3	28.43 3	28.452	0.019	3.7	0.003	0.000	3.7	1.443	OK

NOTE:
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THE 0.3m
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WINDOW,
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IS NOT
REPRESEN-
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TRUE
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RISK.