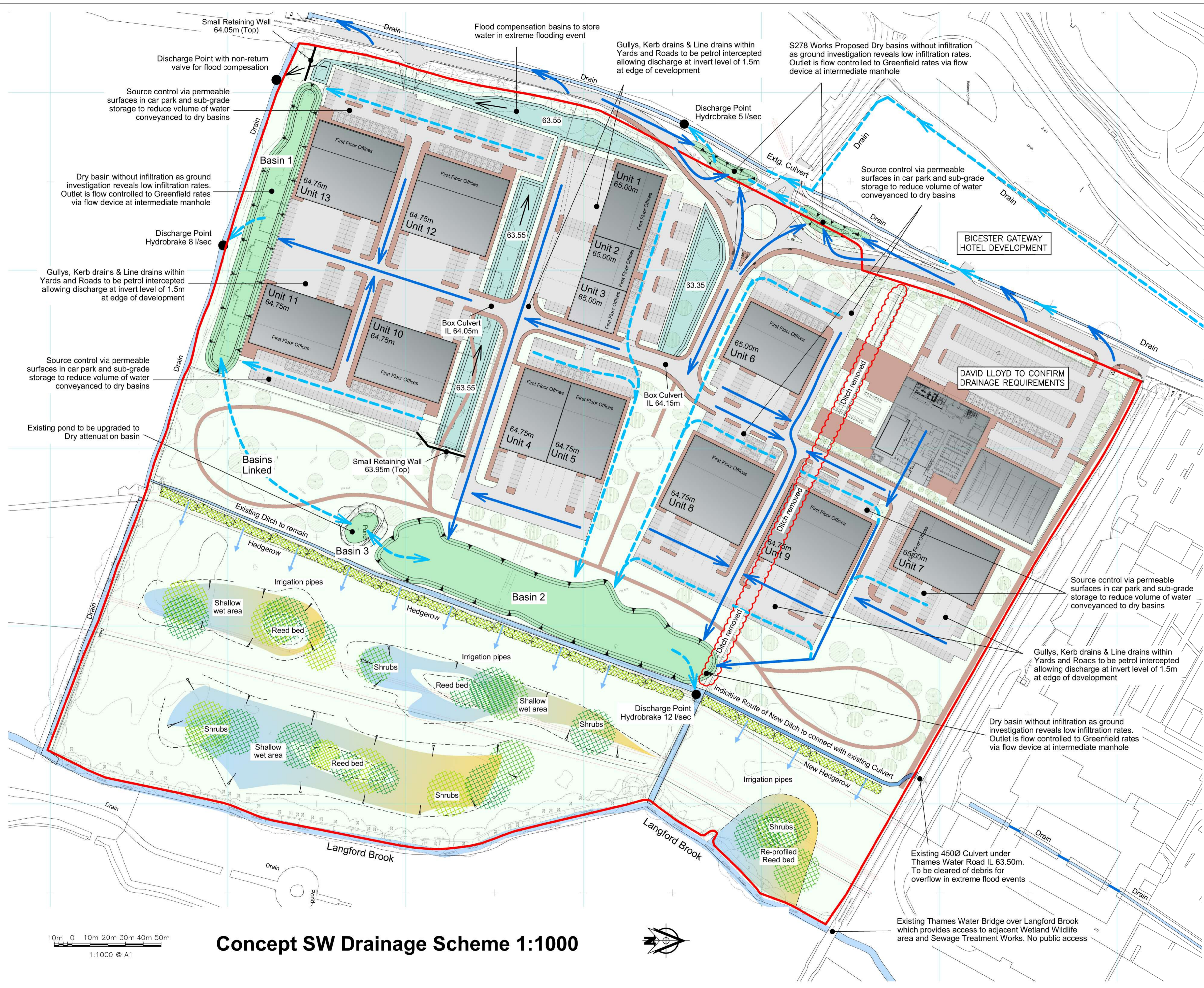


APPENDIX J

BAILEY JOHNSON HAYES SURFACE WATER DRAINAGE SCHEME & CALCULATIONS



- KEY:**
- Proposed Buildings
 - Existing Watercourse
 - Proposed Watercourse
 - Green Space
 - Proposed Wetland Shallow Reed beds
 - SuDS Dry Attenuation Basin without infiltration
 - Flood Compensation Zone holding basin
 - Main underground piped drainage route
 - SuDS Surface water flow route
 - Removed existing hedgerow/ditch
 - Site Boundary
 - Point of Discharge

PRELIMINARY

Rev	Date	Revision Description
A	27.01.20	Updated to include road/surrounding drains

Revision Schedule

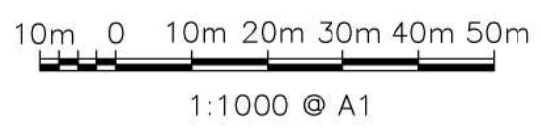
Catalyst Bicester
Wendlebury Road, Bicester

Client:
Albion Land Plc.

CONCEPT SW DRAINAGE SCHEME

BAILEY JOHNSON HAYES
Consulting Engineers
ST ALBANS: Suite 4, Phoenix House, 63 Campfield Rd, ST ALBANS, Herts AL1 5FL
MANCHESTER: Grange House, John Dalton Street, MANCHESTER, M2 6FW

Scale: 1:1000 @A1	S1358-Ext-46A
Date: 28.11.19	
Drawn: JNG	



Concept SW Drainage Scheme 1:1000





Bailey Johnson Hayes

Grange House, John Dalton Street

Manchester. M2 6FW

Tel: 0161 279 7777

Fax: 0161 236 3552

Web: www.bjh.co.uk

Project

Catalyst Bicester,
Wendlebury Rd, Bicester.
for Albion Land.

Project No.

S1358

Sheet No.

D1

Drawing No.

Rev.

2

Section

Surface Water Drainage Design

By

P.A.B.

Date

Jul 2019

Checked

Date

Calculations

PROPOSED DEVELOPMENT

CATALYST BICESTER

WENDLEBURY ROAD, BICESTER

FOR

ALBION LAND

SURFACE WATER DRAINAGE DESIGN

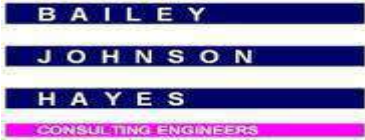
1.0 INTRODUCTION

The following calculations are prepared to justify the principles for design of below-ground surface water drainage systems for the above development.

The development plot has an area of 9.7 ha and exhibits a gentle gradient from west to east. With the exception of a chicken farm in the southwestern corner, the site is presently undeveloped and comprises of open fields used as arable land. The proposed scheme is to develop the site with new roads, buildings and external yard hardstanding areas for B1(c), B2, and B8 use classes, and a Leisure Club.

The site presently drains naturally in an easterly direction towards Langford Brook which forms the eastern site boundary. Ground levels within the site boundary shall be adjusted by local raising levels in the northern sector to create a plateau for building development, with associated lowering of levels within the western and southern sectors to provide flood compensation. Details of the flood compensation scheme are appended to the BJH site-specific flood risk assessment.

The surface water drainage strategy for the developed site is to maintain the existing outfall arrangements and limit flows to existing greenfield values by utilising substantial retention swales and/or below-ground

 <p>Bailey Johnson Hayes Grange House, John Dalton Street Manchester. M2 6FW Tel: 0161 279 7777 Fax: 0161 236 3552 Web: www.bjh.co.uk</p>	Project	Catalyst Bicester, Wendlebury Rd, Bicester. for Albion Land.	Project No. S1358	Sheet No. D2
			Drawing No.	Rev. 2
	Section	Surface Water Drainage Design	By P.A.B.	Date Jul 2019
			Checked	Date

Calculations

attenuation storage, and incorporating flow control devices to the drainage network. The design for the site drainage shall include an allowance for climate change.

2.0 GROUND CONDITIONS

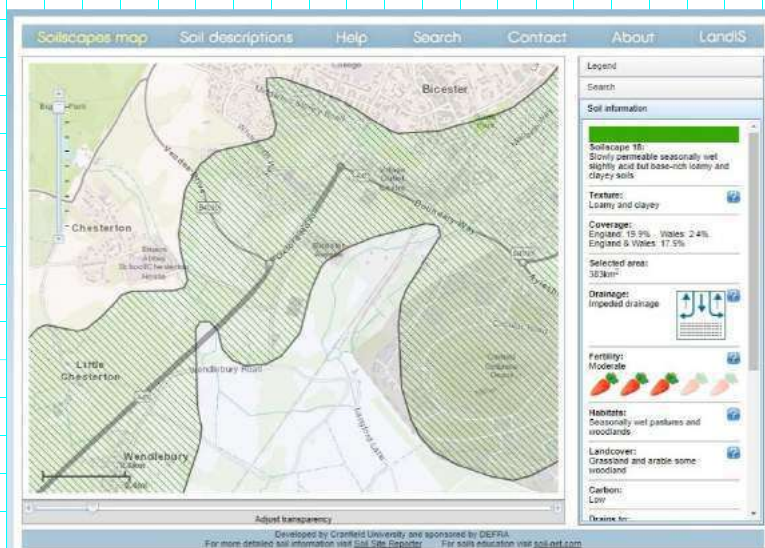
The published BGS geology map indicates Alluvium across the majority of the site. The Alluvium is absent in the northwest and the southwest of the site, where River Terrace deposits are shown. Solid geology of the Kellaways Formation is anticipated below, comprising interbedded sandstone and siltstone of the Kellaways Sand Member, underlain by mudstone interbedded with siltstone and sandstone of the Kellaways Clay Member. Kellaways Sand is shown to be absent in the north of the site. The Kellaways Formation is anticipated to be underlain by limestone of the Cornbrash Formation.

A series of 18 trial pits have been excavated by Applied Geology on behalf of Albion Land Ltd. Topsoil and subsoil was encountered at surface across the site and was underlain by Superficial Deposits comprising Alluvium and River Terrace Deposits, which in turn was underlain by the Kellaways Formation, predominantly comprising clay, with initial horizons of sand in the southeast of the site. This is broadly consistent with the published geological records. Groundwater was recorded as seepages in all trial pits, with the exception of TP12 (no River Terrace Deposits present) within the River Terrace Deposits at depths of between 0.5m and 1.3m bgl.

3.0 DESIGN

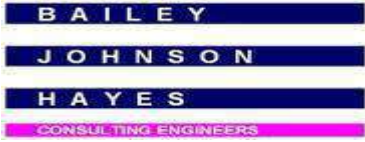
3.1 Greenfield Runoff Estimate

Greenfield runoff estimation is undertaken using the UK SuDS Tools Website using the Institute of Hydrology Report 124 methodology. Based upon soils information for the development site obtained from the Cranfield Soil and AgriFood Institute SoilsCapes Viewer



 <p>Bailey Johnson Hayes Grange House, John Dalton Street Manchester. M2 6FW Tel: 0161 279 7777 Fax: 0161 236 3552 Web: www.bjh.co.uk</p>	Project	Catalyst Bicester, Wendlebury Rd, Bicester. for Albion Land.	Project No. S1358	Sheet No. D3
	Section	Surface Water Drainage Design	Drawing No.	Rev. 2
			By P.A.B.	Date Jul 2019
			Checked	Date

Calculations
<p>and the ground conditions established during the trial pitting exercise undertaken by Applied Geology, the SOIL is conservatively considered to be type 3 for the purpose of greenfield runoff estimation. The default value of SOIL type 1 (sandy highly permeable material), allocated by the UK SuDS Tools Website for the subject site, is considered inappropriate and is therefore edited within the input data.</p> <p>Greenfield runoff is calculated using the Institute of Hydrology Report 124 methodology; the appended calculation sheet confirms the 1:1 greenfield runoff rate = 20.43 litres/sec</p> <h3>3.2 Quick Storage Estimate</h3> <p>For the purpose of initial sizing of flood storage requirements it shall be assumed that the outflow from the whole site shall be restricted to 20.4 l/sec for all rainfall events up to and including the 1 in 100 year event inclusive of an allowance of 40% for climate change in accordance with government guidance.</p> <p>Drainage design is undertaken using the Source Control module of Microdrainage Windes software. The surface water drainage shall be split into two systems; Units 10-13 shall drain into Swale 1, and Units 1-9 shall drain into Swale 2. Both swales shall discharge to existing field ditches which in turn outfall to Langford Brook to the east. The total permissible outflow rates are apportioned at 8 l/sec from Swale 1, and 12 l/sec from Swale 2. Input data and results of Quick Storage Estimates are presented on the following sheets nos 1 and 39. For 1 in 100 year +40% storm events (using FEH design rainfall) the software predicts storage volumes between 1869 m³ and 2553 m³ will be required for Swale 1, and between 5179 m³ and 6702 m³ will be required for Swale 2.</p> <h3>3.3 Drainage Layouts</h3> <p>The attached BJH drawings M1358-DD01, DD02 & DD03 illustrate the hard surfaced drained site areas, pipe design references and lengths, and the layout of principal below-ground drainage runs respectively. The Leisure Centre plot has dedicated surface water attenuation provisions by virtue of private below-ground storage and an hydrobrake flow control to restrict flows to 60 l/sec at the outfall manhole connecting to the shared system constructed through the industrial plot. This information is input to the Windes software and modelled in the Simulation module.</p> <h3>3.4 Units 10-13 – Swale 1</h3> <p>In order to establish the critical storm event a simple model is created within the Source Control module of Windes using a Swale fitted with an Hydrobrake flow control device to restrict outflows to 8 l/sec. Microdrainage pages 2-4 indicate that the critical storm is a 1440 minute winter event. Swale 1 dimensions are shown on the attached BJH drawing M1358-DD04.</p> <h4>3.4.1 Simulation 100yr+40%CC Winter Storms</h4> <p>Design storms from 2160minute duration to 15min duration are modelled in Simulation, to include the critical 1440 minute design storm.</p>

 <p>Bailey Johnson Hayes Grange House, John Dalton Street Manchester. M2 6FW Tel: 0161 279 7777 Fax: 0161 236 3552 Web: www.bjh.co.uk</p>	Project	Catalyst Bicester, Wendlebury Rd, Bicester. for Albion Land.	Project No. S1358	Sheet No. D4
	Section	Surface Water Drainage Design	Drawing No.	Rev. 2
			By P.A.B.	Date Jul 2019
			Checked	Date

Calculations
<p>Microdrainage pages 5-14 include complete details of the network i.e. online controls and storage provisions for a 2160 minute winter design storm. The water level in Swale 1 is 63.995; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 15-16 include simulation criteria and results for a 1440 minute winter design storm. The water level in Swale 1 is 64.004; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 17-18 include simulation criteria and results for a 960 minute winter design storm. The water level in Swale 1 is 63.995; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 19-20 include simulation criteria and results for a 720 minute winter design storm. The water level in Swale 1 is 63.980; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 21-22 include simulation criteria and results for a 600 minute winter design storm. The water level in Swale 1 is 63.967; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 23-24 include simulation criteria and results for a 480 minute winter design storm. The water level in Swale 1 is 63.947; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 25-26 include simulation criteria and results for a 360 minute winter design storm. The water level in Swale 1 is 63.918; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 27-28 include simulation criteria and results for a 240 minute winter design storm. The water level in Swale 1 is 63.871; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 29-30 include simulation criteria and results for a 180 minute winter design storm. The water level in Swale 1 is 63.839; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 31-32 include simulation criteria and results for a 120 minute winter design storm. The water level in Swale 1 is 63.795; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 33-34 include simulation criteria and results for a 60 minute winter design storm. The water level in Swale 1 is 63.722; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 35-36 include simulation criteria and results for a 30 minute winter design storm. The water level in Swale 1 is 63.657; discharge to outfall is 8 l/sec.</p>
<p>Microdrainage pages 37-38 include simulation criteria and results for a 15 minute winter design storm. The water level in Swale 1 is 63.599; discharge to outfall is 8 l/sec. In this extreme design case isolated surface flooding up to 2m3 is predicted to occur within the service yard between Units 10 and 12, and the access road between Units 10 and 11; the water not threaten the buildings and will be temporarily held as ponding on the pavement surface until the storm abates.</p>

 <p>Bailey Johnson Hayes Grange House, John Dalton Street Manchester. M2 6FW Tel: 0161 279 7777 Fax: 0161 236 3552 Web: www.bjh.co.uk</p>	Project	Catalyst Bicester, Wendlebury Rd, Bicester. for Albion Land.	Project No. S1358	Sheet No. D5
	Section	Surface Water Drainage Design	Drawing No.	Rev. 2
			By P.A.B.	Date Jul 2019
			Checked	Date

Calculations
<p>For 100yr+40%CC design storms the peak water level in Swale 1 is 64.004 (depth 0.804m) for an outflow restriction of 8 l/sec.</p> <p>3.5 Units 1-9 – Swale 2</p> <p>3.5.1 Simulation 100yr+40%CC Winter Storms</p> <p>The detailed calculations for the drainage network serving Units 1-9 -Swale 2 confirm that the 2880 minute winter storm is the critical design case. Design storms from 4320minute duration to 15min duration are modelled in Simulation, to include the critical 2880 minute design storm.</p> <p>Microdrainage pages 40-54 include complete details of the network i.e. online controls and storage provisions for a 4320 minute winter design storm. The water level in Swale 2 is 63.862; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 55-57 include simulation criteria and results for a 2880 minute winter design storm. The water level in Swale 2 is 63.904; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 58-60 include simulation criteria and results for a 2160 minute winter design storm. The water level in Swale 2 is 63.896; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 61-63 include simulation criteria and results for a 1440 minute winter design storm. The water level in Swale 2 is 63.867; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 64-66 include simulation criteria and results for a 960 minute winter design storm. The water level in Swale 2 is 63.822; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 67-69 include simulation criteria and results for a 720 minute winter design storm. The water level in Swale 2 is 63.783; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 70-72 include simulation criteria and results for a 600 minute winter design storm. The water level in Swale 2 is 63.756; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 73-75 include simulation criteria and results for a 480 minute winter design storm. The water level in Swale 2 is 63.723; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 76-78 include simulation criteria and results for a 360 minute winter design storm. The water level in Swale 2 is 63.681; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 79-81 include simulation criteria and results for a 240 minute winter design storm. The water level in Swale 2 is 63.623; discharge to outfall is 12 l/sec.</p> <p>Microdrainage pages 82-84 include simulation criteria and results for a 180 minute winter design storm. The water level in Swale 2 is 63.576; discharge to outfall is 12 l/sec.</p>



Bailey Johnson Hayes
Grange House, John Dalton Street
Manchester. M2 6FW
Tel: 0161 279 7777 Fax: 0161 236 3552
Web: www.bjh.co.uk

Project Catalyst Bicester, Wendlebury Rd, Bicester. for Albion Land.	Project No. S1358	Sheet No. D6
	Drawing No.	Rev. 2
Section Surface Water Drainage Design	By P.A.B.	Date Jul 2019
	Checked	Date

Calculations

Microdrainage pages 85-87 include simulation criteria and results for a 120 minute winter design storm. The water level in Swale 2 is 63.502; discharge to outfall is 12 l/sec.

Microdrainage pages 88-90 include simulation criteria and results for a 60 minute winter design storm. The water level in Swale 2 is 63.380; discharge to outfall is 12 l/sec.

Microdrainage pages 91-93 include simulation criteria and results for a 30 minute winter design storm. The water level in Swale 2 is 63.286; discharge to outfall is 12 l/sec.

Microdrainage pages 94-96 include simulation criteria and results for a 15 minute winter design storm. The water level in Swale 2 is 63.238; discharge to outfall is 8 l/sec. In this extreme design case isolated surface flooding up to 7.5m³ is predicted to occur within the service yard between Units 6 and 8; the water not threaten the buildings and will be temporarily held as ponding on the pavement surface until the storm abates.

For 100yr+40%CC design storms the peak water level in Swale 2 is 63.904 (depth 1.004m) for an outflow restriction of 12 l/sec.

4.0 EXCEEDANCE EVENTS

Site levels will be arranged to ensure that overland flow routes are created to encourage any build-up of surface water to flow in an easterly direction towards Langford Brook. Similarly the bunding to the Swale will be constructed to ensure that there is facility for overspill to occur in an easterly direction away from the development land.

GREENFIELD RUNOFF ESTIMATE

Calculated by: peter brooks
 Site name: Promised Land Farm
 Site location: Bicester

Site coordinates
 Latitude: 51.88559° N
 Longitude: 1.16552° W

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Reference: 6484523
 Date: 2018-10-25T08:25:55

Methodology	IH124
-------------	-------

Site characteristics

Total site area (ha)	9.7
----------------------	-----

Methodology

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
SOIL type	1	3
HOST class	---	---
SPR/SPRHOST	0.1	0.37

Hydrological characteristics

	Default	Edited
SAAR (mm)	617	617
Hydrological region	6	6
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

- (1) Is $Q_{BAR} < 2.0$ l/s/ha?
 Normally limiting discharge rates which are less than 2.0 l/s/ha 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 consents are usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be 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 may be a requirement for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	1.41	24.04
1 in 1 year (l/s)	1.19	20.43
1 in 30 years (l/s)	3.23	55.29
1 in 100 years (l/s)	4.48	76.69

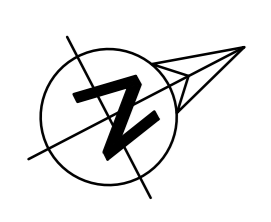
BAILEY JOHNSON HAYES DRAWINGS

S1358-DD01A – Drained Areas

S1358-DD02A – SW drainage design refs

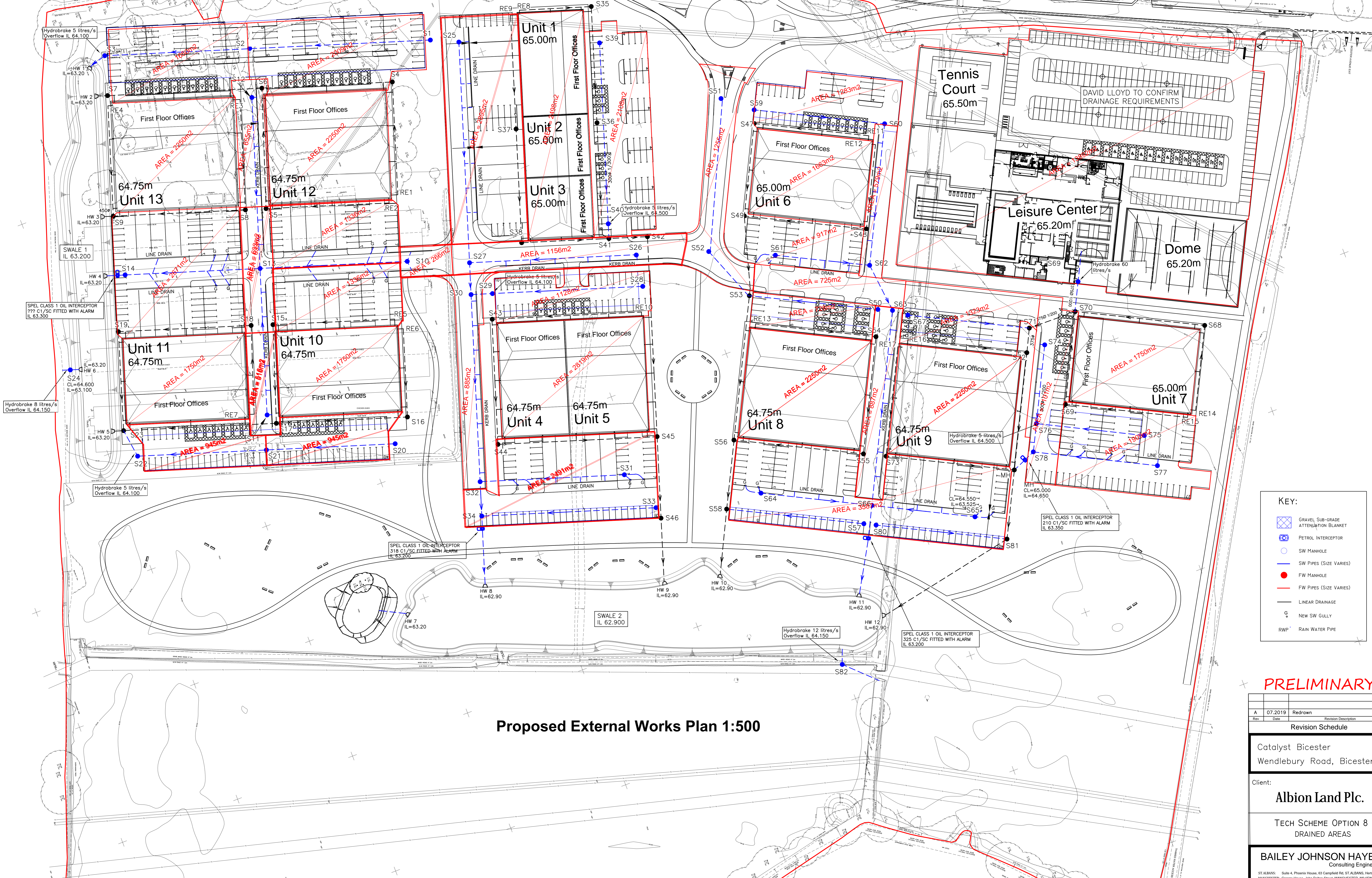
S1358-DD03A – Proposed SW Drainage

S1358-DD04A – Proposed Swales



10m 0 10m 20m 30m 40m 50m
1:500 @ A0

Wendlebury Road



Proposed External Works Plan 1:500

KEY:

- GRAVEL SUB-GRADE ATTENUATION BLANKET
- PETROL INTERCEPTOR
- SW MANHOLE
- SW PIPES (SIZE VARIES)
- FW MANHOLE
- FW PIPES (SIZE VARIES)
- LINEAR DRAINAGE
- NEW SW GULLY
- RWP RAIN WATER PIPE

PRELIMINARY

Rev	Date	By	Description
A	07.2019	Redrawn	

Revision Schedule
Catalyst Bicester
Wendlebury Road, Bicester

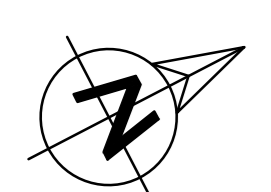
Client:
Albion Land Plc.

TECH SCHEME OPTION 8
DRAINED AREAS

BAILEY JOHNSON HAYES
Consulting Engineers

ST ALBANS: Suite 4, Phoenix House, 63 Campfield Rd, ST ALBANS, Herts AL1 5FL
MANCHESTER: Orange House, John Dalton Street, MANCHESTER, M2 6FW

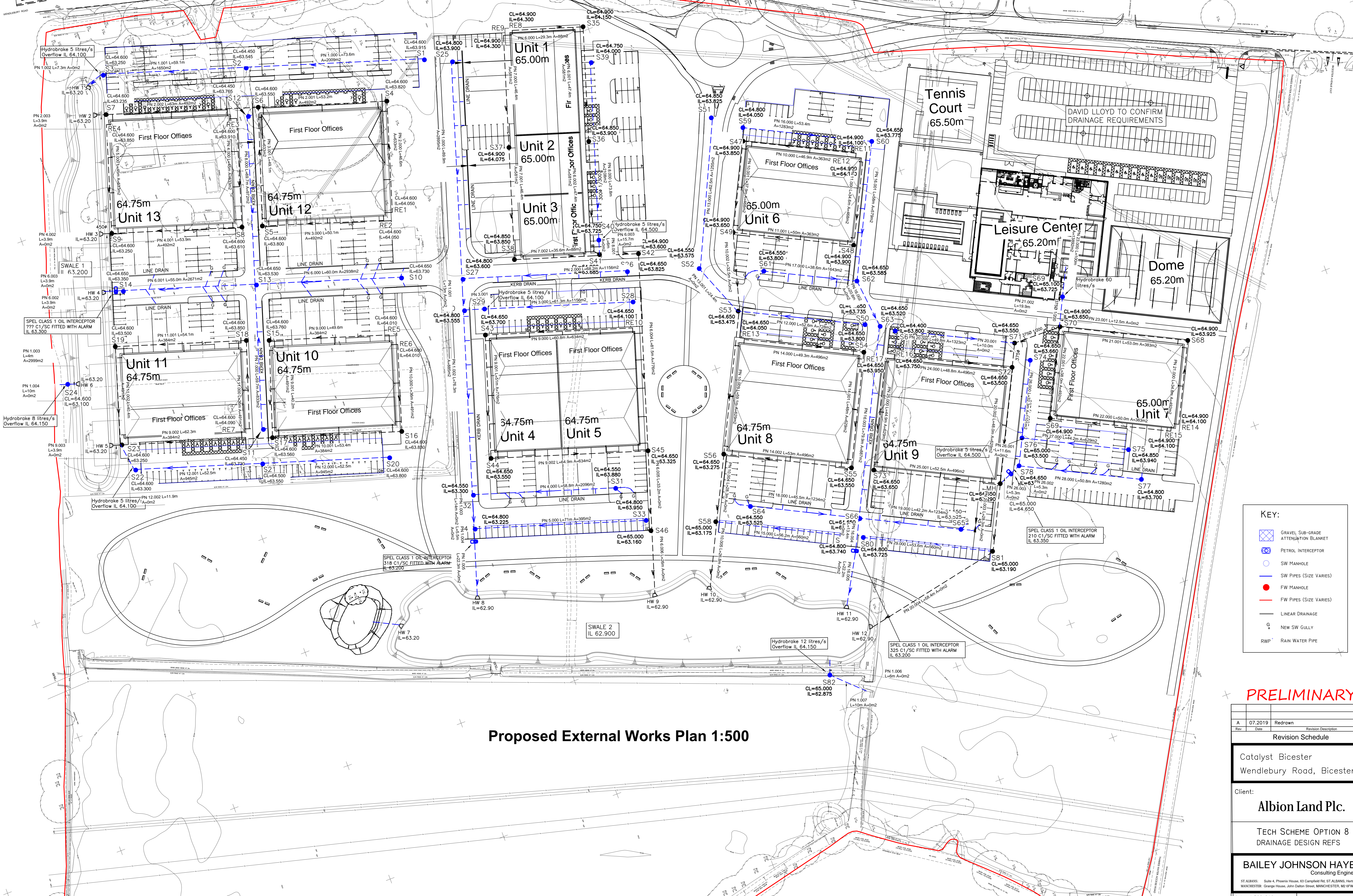
Scale: 1:500 @A0
Date: 07.19
Drawn: PAB
S1358-DD01



10m 0 10m 20m 30m 40m 50m

1:500 @ A0

Wendlebury Road



Proposed External Works Plan 1:500

KEY:

- GRAVEL SUB-GRADE ATTENUATION BLANKET
- PETROL INTERCEPTOR
- SW MANHOLE
- SW PIPES (SIZE VARIES)
- FW MANHOLE
- FW PIPES (SIZE VARIES)
- LINEAR DRAINAGE
- NEW SW GULLY
- RWP RAIN WATER PIPE

PRELIMINARY

Rev	Date	Redrawn	Revision Description
A	07.2019		

Revision Schedule

Catalyst Bicester
Wendlebury Road, Bicester

Client:
Albion Land Plc.

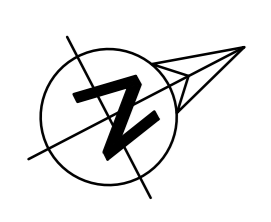
TECH SCHEME OPTION 8
DRAINAGE DESIGN REFS

BAILEY JOHNSON HAYES
Consulting Engineers

ST. ALBANS: Suite 4, Phoenix House, 63 Campfield Rd, ST. ALBANS, Herts AL1 5FL
MANCHESTER: Orange House, John Dalton Street, MANCHESTER, M2 6FW

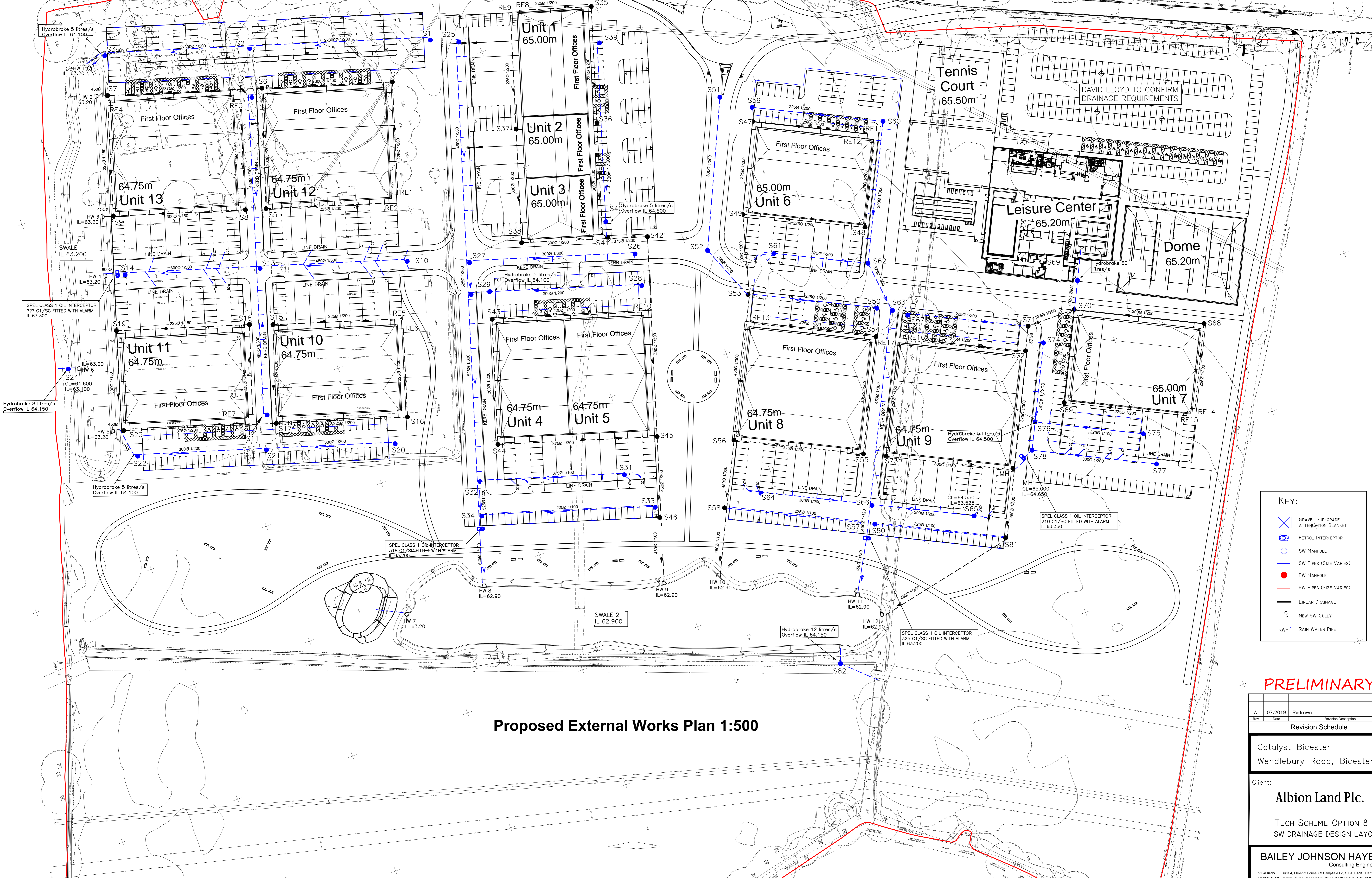
Scale: 1:500 @A0
Date: 07.19
Drawn: PAB

S1358-DD02



10m 0 10m 20m 30m 40m 50m
1:500 @ A0

Wendlebury Road



Proposed External Works Plan 1:500

KEY:

- GRAVEL SUB-GRADE ATTENUATION BLANKET
- PETROL INTERCEPTOR
- SW MANHOLE
- SW PIPES (SIZE VARIES)
- FW MANHOLE
- FW PIPES (SIZE VARIES)
- LINEAR DRAINAGE
- NEW SW GULLY
- RAIN WATER PIPE

PRELIMINARY

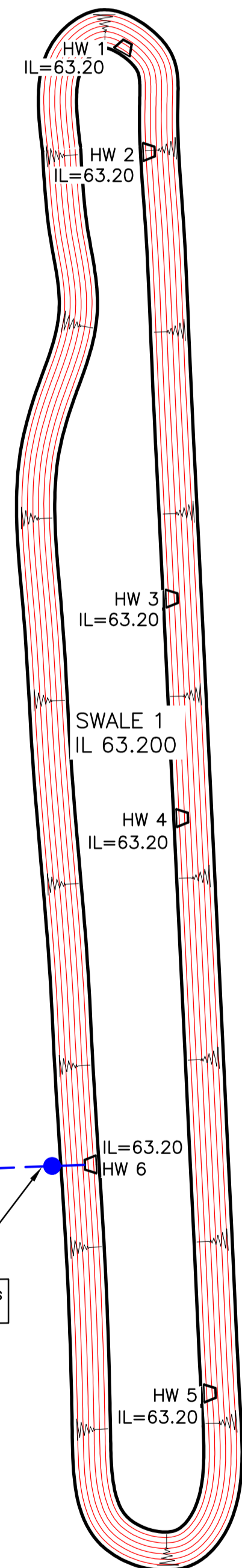
Rev	Date	By	Description
A	07.2019	Redrawn	

Revision Schedule
Catalyst Bicester
Wendlebury Road, Bicester

Client:
Albion Land Plc.
TECH SCHEME OPTION 8
SW DRAINAGE DESIGN LAYOUT

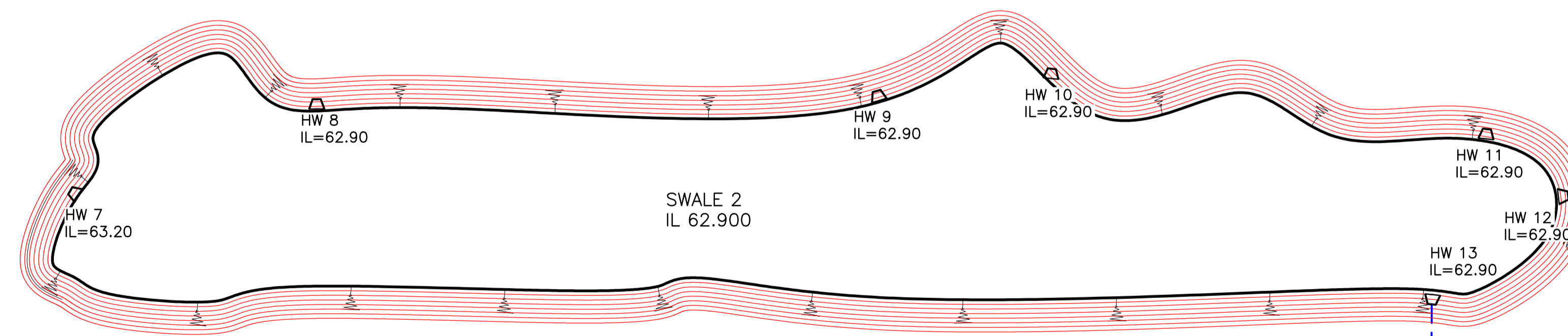
BAILEY JOHNSON HAYES
Consulting Engineers
ST ALBANS: Suite 4, Phoenix House, 63 Campfield Rd, ST ALBANS, Herts AL1 5FL
MANCHESTER: Orange House, John Dalton Street, MANCHESTER, M2 6FW

Scale: 1:500 @A0
Date: 07.19
Drawn: PAB
S1358-DD03



- D = 0m A = 1533m²
- D = 0.2m A = 1736m²
- D = 0.4m A = 1941m²
- D = 0.6m A = 2148m²
- D = 0.8m A = 2357m²
- D = 1.0m A = 2569m²
- D = 1.2m A = 2783m²
- D = 1.4m A = 2999m²

Hydrobrake 8 litres/s
Overflow IL 64.150



- D = 0m A = 4578m²
- D = 0.2m A = 4837m²
- D = 0.4m A = 5099m²
- D = 0.6m A = 5363m²
- D = 0.8m A = 5630m²
- D = 1.0m A = 5898m²
- D = 1.2m A = 6169m²
- D = 1.4m A = 6443m²

Hydrobrake 12 litres/s
Overflow IL 64.150

PRELIMINARY

Rev	Date	Revision Description
A	07.2019	Redrawn

Revision Schedule

Catalyst Bicester
Wendlebury Road, Bicester

Client:

Albion Land Plc.

TECH SCHEME OPTION 8
SWALE AREAS

BAILEY JOHNSON HAYES
Consulting Engineers

ST ALBANS: Suite 4, Phoenix House, 63 Campfield Rd, ST ALBANS, Herts AL1 5FL
MANCHESTER: Grange House, John Dalton Street, MANCHESTER, M2 6FW

Scale	1:500 @A0	A
Date	07.19	
Drawn	PAB	

S1358-DD04

MICRODRAINAGE CALCULATIONS

Quick Storage Estimate

Pages 1-4 – 100yr+40% Source Control

Pages 5-14 – 100yr+40% 2880min storm Sim

Pages 15-24 – 30yr 2880min storm Sim

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall		Cv (Summer)	0.750
Return Period (years)	100	Cv (Winter)	0.840
Version	1999	Impermeable Area (ha)	2.396
Site	457700 221050 SP 57700 21050	Maximum Allowable Discharge (l/s)	8.0
C (1km)	-0.022	D3 (1km)	0.251
D1 (1km)	0.321	E (1km)	0.288
D2 (1km)	0.324	F (1km)	2.477
		Infiltration Coefficient (m/hr)	0.00000
		Safety Factor	2.0
		Climate Change (%)	40

Analyse OK Cancel Help

Enter Return Period between 1 and 1000

Quick Storage Estimate

Micro Drainage


Results

Global Variables require approximate storage of between 1869 m³ and 2553 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Return Period between 1 and 1000


Bailey Johnson Hayes		Page 2
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:07 File 100yr+40% Source Contro...	Designed by P.A.B. Checked by	
Micro Drainage		Source Control 2017.1

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1963 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m ³)	Status
15 min Summer	63.740	0.540	0.0	8.0	8.0	821.1	O K
30 min Summer	63.826	0.626	0.0	8.0	8.0	952.1	O K
60 min Summer	63.923	0.723	0.0	8.0	8.0	1098.7	O K
120 min Summer	64.028	0.828	0.0	8.0	8.0	1257.9	O K
180 min Summer	64.090	0.890	0.0	8.0	8.0	1353.1	O K
240 min Summer	64.134	0.934	0.0	8.1	8.1	1419.4	O K
360 min Summer	64.191	0.991	0.0	8.3	8.3	1506.7	O K
480 min Summer	64.226	1.026	0.0	8.5	8.5	1560.1	O K
600 min Summer	64.249	1.049	0.0	8.5	8.5	1593.9	O K
720 min Summer	64.262	1.062	0.0	8.6	8.6	1614.8	O K
960 min Summer	64.274	1.074	0.0	8.6	8.6	1633.2	O K
1440 min Summer	64.262	1.062	0.0	8.6	8.6	1613.8	O K
2160 min Summer	64.222	1.022	0.0	8.4	8.4	1554.0	O K
2880 min Summer	64.186	0.986	0.0	8.3	8.3	1498.2	O K
4320 min Summer	64.084	0.884	0.0	8.0	8.0	1343.6	O K
5760 min Summer	63.999	0.799	0.0	8.0	8.0	1214.8	O K
7200 min Summer	63.923	0.723	0.0	8.0	8.0	1098.9	O K
8640 min Summer	63.850	0.650	0.0	8.0	8.0	988.6	O K
10080 min Summer	63.776	0.576	0.0	8.0	8.0	876.2	O K
15 min Winter	63.806	0.606	0.0	8.0	8.0	921.1	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	184.917	0.0	664.9	27
30 min Summer	107.674	0.0	640.7	42
60 min Summer	62.697	0.0	1127.6	72
120 min Summer	36.508	0.0	1284.9	130
180 min Summer	26.607	0.0	1294.4	190
240 min Summer	21.258	0.0	1295.3	250
360 min Summer	15.493	0.0	1296.3	368
480 min Summer	12.378	0.0	1298.4	486
600 min Summer	10.400	0.0	1301.0	606
720 min Summer	9.021	0.0	1303.8	724
960 min Summer	7.214	0.0	1310.4	964
1440 min Summer	5.264	0.0	1326.2	1430
2160 min Summer	3.841	0.0	2488.5	1772
2880 min Summer	3.071	0.0	2544.9	2144
4320 min Summer	2.176	0.0	2334.5	2948
5760 min Summer	1.704	0.0	2944.2	3800
7200 min Summer	1.409	0.0	3042.7	4616
8640 min Summer	1.207	0.0	3127.1	5448
10080 min Summer	1.059	0.0	3200.8	6264
15 min Winter	184.917	0.0	647.0	27

Bailey Johnson Hayes		Page 3
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:07 File 100yr+40% Source Contro...	Designed by P.A.B. Checked by	
Micro Drainage		Source Control 2017.1

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ (1/s)	Max Outflow (1/s)	Max Volume (m ³)	Status
30 min Winter	63.903	0.703	0.0	8.0	8.0	8.0	1068.3	O K
60 min Winter	64.012	0.812	0.0	8.0	8.0	8.0	1233.9	O K
120 min Winter	64.131	0.931	0.0	8.1	8.1	8.1	1415.6	O K
180 min Winter	64.204	1.004	0.0	8.4	8.4	8.4	1525.7	O K
240 min Winter	64.255	1.055	0.0	8.6	8.6	8.6	1603.2	O K
360 min Winter	64.323	1.123	0.0	8.8	8.8	8.8	1707.7	O K
480 min Winter	64.367	1.167	0.0	8.9	8.9	8.9	1774.2	Flood Risk
600 min Winter	64.396	1.196	0.0	9.0	9.0	9.0	1818.6	Flood Risk
720 min Winter	64.416	1.216	0.0	9.1	9.1	9.1	1848.4	Flood Risk
960 min Winter	64.438	1.238	0.0	9.2	9.2	9.2	1881.9	Flood Risk
1440 min Winter	64.441	1.241	0.0	9.2	9.2	9.2	1885.6	Flood Risk
2160 min Winter	64.398	1.198	0.0	9.0	9.0	9.0	1821.6	Flood Risk
2880 min Winter	64.353	1.153	0.0	8.9	8.9	8.9	1752.4	Flood Risk
4320 min Winter	64.219	1.019	0.0	8.4	8.4	8.4	1548.3	O K
5760 min Winter	64.100	0.900	0.0	8.0	8.0	8.0	1367.7	O K
7200 min Winter	63.990	0.790	0.0	8.0	8.0	8.0	1201.2	O K
8640 min Winter	63.885	0.685	0.0	8.0	8.0	8.0	1041.2	O K
10080 min Winter	63.774	0.574	0.0	8.0	8.0	8.0	872.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
30 min Winter	107.674	0.0	626.3	41
60 min Winter	62.697	0.0	1262.8	70
120 min Winter	36.508	0.0	1297.7	128
180 min Winter	26.607	0.0	1300.9	186
240 min Winter	21.258	0.0	1304.7	246
360 min Winter	15.493	0.0	1314.5	362
480 min Winter	12.378	0.0	1325.2	478
600 min Winter	10.400	0.0	1336.8	594
720 min Winter	9.021	0.0	1349.7	710
960 min Winter	7.214	0.0	1374.5	940
1440 min Winter	5.264	0.0	1391.5	1386
2160 min Winter	3.841	0.0	2668.7	1996
2880 min Winter	3.071	0.0	2618.0	2256
4320 min Winter	2.176	0.0	2444.4	3196
5760 min Winter	1.704	0.0	3296.5	4096
7200 min Winter	1.409	0.0	3408.9	4984
8640 min Winter	1.207	0.0	3503.8	5888
10080 min Winter	1.059	0.0	3585.4	6768

Bailey Johnson Hayes		Page 4
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:07 File 100yr+40% Source Contro...	Designed by P.A.B. Checked by	
Micro Drainage	Source Control 2017.1	

Model Details

Storage is Online Cover Level (m) 64.625

Dry Swale Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	160.0
Infiltration Coefficient Side (m/hr)	0.00000	Trench Infiltration Side (m/hr)	0.00000
Safety Factor	2.0	Trench Porosity	1.00
Porosity	1.00	Side Slope (1:X)	3.0
Invert Level (m)	63.200	Slope (1:X)	0.0
Trench Height (m)	1.400	Cap Volume Depth (m)	1.400
Trench Width (m)	9.5	Cap Infiltration Depth (m)	0.000


Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0132-8000-1000-8000
Design Head (m)	1.000
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	132
Invert Level (m)	63.100
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.0
Flush-Flo™	0.302	8.0
Kick-Flo®	0.664	6.6
Mean Flow over Head Range	-	6.9

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	1.200	8.7	3.000	13.4	7.000	20.1
0.200	7.8	1.400	9.4	3.500	14.5	7.500	20.8
0.300	8.0	1.600	10.0	4.000	15.4	8.000	21.5
0.400	7.9	1.800	10.5	4.500	16.3	8.500	22.1
0.500	7.7	2.000	11.1	5.000	17.1	9.000	22.7
0.600	7.2	2.200	11.6	5.500	17.9	9.500	23.3
0.800	7.2	2.400	12.1	6.000	18.7		
1.000	8.0	2.600	12.6	6.500	19.4		

Bailey Johnson Hayes		Page 5
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	73.600	0.370	198.9	0.201	5.00	0.600	oo	300	Double Pipe
1.001	59.100	0.295	200.3	0.165	0.00	0.600	oo	300	Double Pipe
1.002	7.300	0.050	146.0	0.000	0.00	0.600	o	450	Pipe/Conduit
2.000	46.600	0.230	202.6	0.063	5.00	0.600	o	225	Pipe/Conduit
* 2.001	53.200	0.270	197.0	0.049	0.00	0.600	o	300	Pipe/Conduit
3.000	50.100	0.250	200.4	0.049	5.00	0.600	o	225	Pipe/Conduit
* 3.001	49.100	0.250	196.4	0.063	0.00	0.600	o	300	Pipe/Conduit
* 2.002	63.000	0.315	200.0	0.049	0.00	0.600	o	375	Pipe/Conduit
2.003	3.900	0.035	111.4	0.000	0.00	0.600	o	450	Pipe/Conduit
4.000	45.000	0.300	150.0	0.063	5.00	0.600	o	225	Pipe/Conduit
* 4.001	53.900	0.360	149.7	0.049	0.00	0.600	o	300	Pipe/Conduit
5.000	45.000	0.600	75.0	0.063	5.00	0.600	o	225	Pipe/Conduit
4.002	3.900	0.050	78.0	0.000	0.00	0.600	o	450	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.000	S1	64.600	63.915	0.385	64.450	63.545	0.605		1500
1.001	S2	64.450	63.545	0.605	64.600	63.250	1.050		1500
1.002	S3	64.600	63.250	0.900	64.600	63.200	0.950	Hydro-Brake®	1500
2.000	RE1	64.600	64.050	0.325	64.600	63.820	0.555		1200
* 2.001	S4	64.600	63.820	0.480	64.600	63.550	0.750		1200
3.000	RE2	64.600	64.050	0.325	64.600	63.800	0.575		1200
* 3.001	S5	64.600	63.800	0.500	64.600	63.550	0.750		1200
* 2.002	S6	64.600	63.550	0.675	64.600	63.235	0.990		1200
2.003	S7	64.600	63.235	0.915	64.600	63.200	0.950		1350
4.000	RE3	64.600	63.910	0.465	64.600	63.610	0.765		1200
* 4.001	S8	64.600	63.610	0.690	64.600	63.250	1.050		1200
5.000	RE4	64.600	63.850	0.525	64.600	63.250	1.125		1200
4.002	S9	64.600	63.250	0.900	64.600	63.200	0.950		1350

Grange House
John Dalton St
Manchester M2 6FW

Catalyst Bicester
Units 10-13



Date 08/07/2019 11:13
File 100yr+40% 2160 min wint...


Designed by P.A.B.
Checked by

Micro Drainage Network 2017.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* 6.000	60.000	0.200	300.0	0.294	5.00	0.600	o	450	Pipe/Conduit
* 7.000	59.700	0.200	298.5	0.083	5.00	0.600	o	450	Pipe/Conduit
* 8.000	69.700	0.235	296.6	0.097	5.00	0.600	o	450	Pipe/Conduit
* 6.001	55.000	0.180	305.6	0.267	0.00	0.600	o	600	Pipe/Conduit
* 6.002	3.900	0.050	78.0	0.000	0.00	0.600	o	600	Pipe/Conduit
* 6.003	3.900	0.050	78.0	0.000	0.00	0.600	o	600	Pipe/Conduit
9.000	49.600	0.250	198.4	0.038	5.00	0.600	o	225	Pipe/Conduit
9.001	40.200	0.200	201.0	0.049	0.00	0.600	o	225	Pipe/Conduit
10.000	36.000	0.180	200.0	0.049	5.00	0.600	o	225	Pipe/Conduit
10.001	53.400	0.270	197.8	0.038	0.00	0.600	o	225	Pipe/Conduit
* 9.002	62.300	0.310	201.0	0.038	0.00	0.600	o	375	Pipe/Conduit
11.000	36.000	0.240	150.0	0.049	5.00	0.600	o	225	Pipe/Conduit
11.001	54.100	0.350	154.6	0.038	0.00	0.600	o	225	Pipe/Conduit
* 11.002	40.400	0.250	161.6	0.049	0.00	0.600	o	300	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 6.000	S10	64.650	63.730	0.470	64.650	63.530	0.670		1200
* 7.000	S11	64.450	63.730	0.270	64.650	63.530	0.670		1200
* 8.000	S12	64.450	63.765	0.235	64.650	63.530	0.670		1200
* 6.001	S13	64.650	63.530	0.520	64.650	63.350	0.700		1350
* 6.002	S14	64.650	63.350	0.700	64.650	63.300	0.750		1350
* 6.003	PI Unit 15	64.650	63.250	0.900	64.600	63.200	0.900		1350
9.000	RE5	64.600	64.010	0.365	64.600	63.760	0.615		1200
9.001	S15	64.600	63.760	0.615	64.600	63.560	0.815		1200
10.000	RE6	64.600	64.010	0.365	64.600	63.830	0.545		1200
10.001	S16	64.600	63.830	0.545	64.600	63.560	0.815		1200
* 9.002	S17	64.600	63.560	0.665	64.600	63.250	0.975		1200
11.000	RE7	64.600	64.090	0.285	64.600	63.850	0.525		1200
11.001	S18	64.600	63.850	0.525	64.600	63.500	0.875		1200
* 11.002	S19	64.600	63.500	0.800	64.600	63.250	1.050		1200

Bailey Johnson Hayes		Page 7
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
12.000	52.500	0.250	210.0	0.095	5.00	0.600	o	300	Pipe/Conduit
12.001	52.500	0.250	210.0	0.095	0.00	0.600	o	300	Pipe/Conduit
12.002	11.900	0.050	238.0	0.000	0.00	0.600	o	300	Pipe/Conduit
9.003	3.900	0.050	78.0	0.000	0.00	0.600	o	450	Pipe/Conduit
1.003	4.000	0.050	80.0	0.300	0.00	0.600	o	600	Pipe/Conduit
1.004	10.000	0.100	100.0	0.000	0.00	0.600	o	600	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
12.000	S20	64.600	63.800	0.500	64.500	63.550	0.650		1200
12.001	S21	64.500	63.550	0.650	64.600	63.300	1.000		1200
12.002	S22	64.600	63.300	1.000	64.600	63.250	1.050	Hydro-Brake®	1200
9.003	S23	64.600	63.250	0.900	64.600	63.200	0.950		1350
1.003	HW1-5	64.600	63.200	0.800	64.600	63.150	0.850		1500
1.004	S24	64.600	63.150	0.850	64.600	63.050	0.950	Hydro-Brake®	1500


Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.004	S24	64.600	63.050	0.000	0	0

Simulation Criteria for Storm


Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Bailey Johnson Hayes		Page 8
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	2160

Bailey Johnson Hayes		Page 9
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S3, DS/PN: 1.002, Volume (m³): 10.5

Unit Reference	MD-SHE-0111-5000-0600-5000
Design Head (m)	0.600
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	111
Invert Level (m)	63.250
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	5.0
Flush-Flo™	0.193	5.0
Kick-Flo®	0.428	4.3
Mean Flow over Head Range	-	4.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	6.9	3.000	10.6	7.000	15.9
0.200	5.0	1.400	7.4	3.500	11.4	7.500	16.5
0.300	4.9	1.600	7.9	4.000	12.2	8.000	17.0
0.400	4.5	1.800	8.4	4.500	12.9	8.500	17.6
0.500	4.6	2.000	8.8	5.000	13.6	9.000	18.1
0.600	5.0	2.200	9.2	5.500	14.2	9.500	18.6
0.800	5.7	2.400	9.6	6.000	14.8		
1.000	6.3	2.600	9.9	6.500	15.3		

Hydro-Brake® Optimum Manhole: S22, DS/PN: 12.002, Volume (m³): 5.1

Unit Reference	MD-SHE-0111-5000-0600-5000
Design Head (m)	0.600
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	111
Invert Level (m)	63.300
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Bailey Johnson Hayes		Page 10
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Hydro-Brake® Optimum Manhole: S22, DS/PN: 12.002, Volume (m³): 5.1

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	5.0
Flush-Flo™	0.193	5.0
Kick-Flo®	0.428	4.3
Mean Flow over Head Range	-	4.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	6.9	3.000	10.6	7.000	15.9
0.200	5.0	1.400	7.4	3.500	11.4	7.500	16.5
0.300	4.9	1.600	7.9	4.000	12.2	8.000	17.0
0.400	4.5	1.800	8.4	4.500	12.9	8.500	17.6
0.500	4.6	2.000	8.8	5.000	13.6	9.000	18.1
0.600	5.0	2.200	9.2	5.500	14.2	9.500	18.6
0.800	5.7	2.400	9.6	6.000	14.8		
1.000	6.3	2.600	9.9	6.500	15.3		


Hydro-Brake® Optimum Manhole: S24, DS/PN: 1.004, Volume (m³): 3.3

Unit Reference	MD-SHE-0132-8000-1000-8000
Design Head (m)	1.000
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	132
Invert Level (m)	63.150
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	8.0
Flush-Flo™	0.302	8.0
Kick-Flo®	0.664	6.6
Mean Flow over Head Range	-	6.9


The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.7	0.300	8.0	0.500	7.7	0.800	7.2
0.200	7.8	0.400	7.9	0.600	7.2	1.000	8.0

Bailey Johnson Hayes		Page 11
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Hydro-Brake® Optimum Manhole: S24, DS/PN: 1.004, Volume (m³): 3.3

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	8.7	2.400	12.1	5.000	17.1	8.000	21.5
1.400	9.4	2.600	12.6	5.500	17.9	8.500	22.1
1.600	10.0	3.000	13.4	6.000	18.7	9.000	22.7
1.800	10.5	3.500	14.5	6.500	19.4	9.500	23.3
2.000	11.1	4.000	15.4	7.000	20.1		
2.200	11.6	4.500	16.3	7.500	20.8		

Bailey Johnson Hayes		Page 12
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	


Offline Controls for Storm

Pipe Manhole: S3, DS/PN: 1.002, Loop to PN: 1.001

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	5.9	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	64.100

Pipe Manhole: S22, DS/PN: 12.002, Loop to PN: 12.001


Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	6.3	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	64.100

Bailey Johnson Hayes		Page 14
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:13 File 100yr+40% 2160 min wint...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 2160 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.018	-0.197	0.000	0.03		4.5	OK
1.001	S2	64.018	0.173	0.000	0.04		5.5	SURCHARGED
1.002	S3	64.035	0.335	0.000	0.03	0.0	5.0	SURCHARGED
2.000	RE1	64.079	-0.196	0.000	0.04		1.4	OK
2.001	S4	63.995	-0.125	0.000	0.03		2.5	OK
3.000	RE2	64.076	-0.199	0.000	0.03		1.1	OK
3.001	S5	63.995	-0.105	0.000	0.03		2.5	OK
2.002	S6	63.995	0.070	0.000	0.04		5.9	SURCHARGED
2.003	S7	63.995	0.310	0.000	0.04		5.6	SURCHARGED
4.000	RE3	63.995	-0.140	0.000	0.04		1.4	OK
4.001	S8	63.995	0.085	0.000	0.03		2.5	SURCHARGED
5.000	RE4	63.995	-0.080	0.000	0.02		1.4	OK
4.002	S9	63.995	0.295	0.000	0.02		3.7	SURCHARGED
6.000	S10	63.995	-0.185	0.000	0.04		6.6	OK
7.000	S11	63.995	-0.185	0.000	0.01		1.9	OK
8.000	S12	63.995	-0.220	0.000	0.01		2.2	OK
6.001	S13	63.995	-0.135	0.000	0.05		15.9	OK
6.002	S14	63.995	0.045	0.000	0.04		15.3	SURCHARGED
6.003	PI Unit 15	63.995	0.145	0.000	0.07		15.3	SURCHARGED
9.000	RE5	64.034	-0.201	0.000	0.02		0.9	OK
9.001	S15	63.996	0.011	0.000	0.06		2.0	SURCHARGED
10.000	RE6	64.036	-0.199	0.000	0.03		1.1	OK
10.001	S16	63.996	-0.059	0.000	0.06		2.0	OK
9.002	S17	63.995	0.060	0.000	0.03		4.6	SURCHARGED
11.000	RE7	64.115	-0.200	0.000	0.03		1.1	OK
11.001	S18	63.996	-0.079	0.000	0.05		2.0	OK
11.002	S19	63.995	0.195	0.000	0.04		2.9	SURCHARGED
12.000	S20	64.011	-0.089	0.000	0.03		2.1	OK
12.001	S21	64.011	0.161	0.000	0.05		3.8	SURCHARGED
12.002	S22	64.011	0.411	0.000	0.06	0.0	3.7	SURCHARGED
9.003	S23	63.995	0.295	0.000	0.06		10.8	SURCHARGED
1.003	HW1-5	63.995	0.195	0.000	0.02		8.2	SURCHARGED
1.004	S24	63.976	0.226	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 15
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:15 File 100yr+40% 1440 min wint...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	1440

Bailey Johnson Hayes		Page 16
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:15 File 100yr+40% 1440 min wint...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 1440 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.023	-0.192	0.000	0.04		6.2	OK
1.001	S2	64.023	0.178	0.000	0.04		6.0	SURCHARGED
1.002	S3	64.037	0.337	0.000	0.03	0.0	5.0	SURCHARGED
2.000	RE1	64.084	-0.191	0.000	0.06		1.9	OK
2.001	S4	64.004	-0.116	0.000	0.05		3.5	OK
3.000	RE2	64.080	-0.195	0.000	0.04		1.5	OK
3.001	S5	64.005	-0.095	0.000	0.05		3.5	OK
2.002	S6	64.004	0.079	0.000	0.06		8.0	SURCHARGED
2.003	S7	64.004	0.319	0.000	0.05		7.6	SURCHARGED
4.000	RE3	64.005	-0.130	0.000	0.05		1.9	OK
4.001	S8	64.004	0.094	0.000	0.04		3.4	SURCHARGED
5.000	RE4	64.004	-0.071	0.000	0.03		1.9	OK
4.002	S9	64.004	0.304	0.000	0.03		5.0	SURCHARGED
6.000	S10	64.005	-0.175	0.000	0.05		9.0	OK
7.000	S11	64.005	-0.175	0.000	0.01		2.5	OK
8.000	S12	64.005	-0.210	0.000	0.02		3.0	OK
6.001	S13	64.005	-0.125	0.000	0.06		21.8	OK
6.002	S14	64.005	0.055	0.000	0.06		21.0	SURCHARGED
6.003	PI Unit 15	64.005	0.155	0.000	0.10		20.9	SURCHARGED
9.000	RE5	64.037	-0.198	0.000	0.03		1.2	OK
9.001	S15	64.005	0.020	0.000	0.08		2.7	SURCHARGED
10.000	RE6	64.040	-0.195	0.000	0.04		1.5	OK
10.001	S16	64.005	-0.050	0.000	0.08		2.7	OK
9.002	S17	64.005	0.070	0.000	0.05		6.2	SURCHARGED
11.000	RE7	64.118	-0.197	0.000	0.04		1.5	OK
11.001	S18	64.006	-0.069	0.000	0.07		2.7	OK
11.002	S19	64.005	0.205	0.000	0.05		4.0	SURCHARGED
12.000	S20	64.016	-0.084	0.000	0.04		2.9	OK
12.001	S21	64.016	0.166	0.000	0.07		4.8	SURCHARGED
12.002	S22	64.016	0.416	0.000	0.08	0.0	4.6	SURCHARGED
9.003	S23	64.005	0.305	0.000	0.08		13.7	SURCHARGED
1.003	HW1-5	64.004	0.204	0.000	0.02		8.6	SURCHARGED
1.004	S24	64.080	0.330	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 17
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:16 File 100yr+40% 960 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	1920
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	16
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	960

Bailey Johnson Hayes		Page 18
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:16 File 100yr+40% 960 min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 960 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.017	-0.198	0.000	0.06		8.5	OK
1.001	S2	64.017	0.172	0.000	0.04		6.6	SURCHARGED
1.002	S3	64.047	0.347	0.000	0.03	0.0	5.0	SURCHARGED
2.000	RE1	64.091	-0.184	0.000	0.08		2.7	OK
2.001	S4	63.997	-0.123	0.000	0.06		4.7	OK
3.000	RE2	64.085	-0.190	0.000	0.06		2.1	OK
3.001	S5	63.997	-0.103	0.000	0.06		4.7	OK
2.002	S6	63.996	0.071	0.000	0.08		11.1	SURCHARGED
2.003	S7	63.996	0.311	0.000	0.07		10.5	SURCHARGED
4.000	RE3	63.996	-0.139	0.000	0.07		2.7	OK
4.001	S8	63.995	0.085	0.000	0.05		4.7	SURCHARGED
5.000	RE4	63.996	-0.079	0.000	0.05		2.7	OK
4.002	S9	63.996	0.296	0.000	0.04		6.9	SURCHARGED
6.000	S10	63.996	-0.184	0.000	0.07		12.4	OK
7.000	S11	63.996	-0.184	0.000	0.02		3.5	OK
8.000	S12	63.996	-0.219	0.000	0.02		4.1	OK
6.001	S13	63.996	-0.134	0.000	0.09		30.2	OK
6.002	S14	63.996	0.046	0.000	0.08		29.0	SURCHARGED
6.003	PI Unit 15	63.996	0.146	0.000	0.13		28.9	SURCHARGED
9.000	RE5	64.041	-0.194	0.000	0.05		1.6	OK
9.001	S15	63.997	0.012	0.000	0.11		3.7	SURCHARGED
10.000	RE6	64.045	-0.190	0.000	0.06		2.1	OK
10.001	S16	63.997	-0.058	0.000	0.10		3.7	OK
9.002	S17	63.996	0.061	0.000	0.07		8.6	SURCHARGED
11.000	RE7	64.123	-0.192	0.000	0.05		2.1	OK
11.001	S18	63.998	-0.077	0.000	0.09		3.7	OK
11.002	S19	63.996	0.196	0.000	0.07		5.5	SURCHARGED
12.000	S20	64.002	-0.098	0.000	0.06		4.0	OK
12.001	S21	64.002	0.152	0.000	0.08		5.5	SURCHARGED
12.002	S22	64.003	0.403	0.000	0.09	0.0	5.0	SURCHARGED
9.003	S23	63.996	0.296	0.000	0.10		17.7	SURCHARGED
1.003	HW1-5	63.995	0.195	0.000	0.03		9.3	SURCHARGED
1.004	S24	64.088	0.338	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 19
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:18 File 100yr+40% 720 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	1440
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	12
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	720

Bailey Johnson Hayes		Page 20
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:18 File 100yr+40% 720 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Summary of Results for 720 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.013	-0.202	0.000	0.07		10.6	OK
1.001	S2	64.013	0.168	0.000	0.05		7.1	SURCHARGED
1.002	S3	64.082	0.382	0.000	0.03	0.0	5.0	SURCHARGED
2.000	RE1	64.097	-0.178	0.000	0.10		3.3	OK
2.001	S4	63.982	-0.138	0.000	0.08		5.9	OK
3.000	RE2	64.090	-0.185	0.000	0.07		2.6	OK
3.001	S5	63.982	-0.118	0.000	0.08		5.9	OK
2.002	S6	63.981	0.056	0.000	0.11		14.0	SURCHARGED
2.003	S7	63.981	0.296	0.000	0.08		13.1	SURCHARGED
4.000	RE3	63.981	-0.154	0.000	0.08		3.3	OK
4.001	S8	63.980	0.070	0.000	0.07		5.9	SURCHARGED
5.000	RE4	63.981	-0.094	0.000	0.06		3.3	OK
4.002	S9	63.980	0.280	0.000	0.05		8.6	SURCHARGED
6.000	S10	63.981	-0.199	0.000	0.09		15.5	OK
7.000	S11	63.981	-0.199	0.000	0.03		4.4	OK
8.000	S12	63.981	-0.234	0.000	0.03		5.1	OK
6.001	S13	63.981	-0.149	0.000	0.11		38.0	OK
6.002	S14	63.981	0.031	0.000	0.11		36.5	SURCHARGED
6.003	PI Unit 15	63.981	0.131	0.000	0.17		36.4	SURCHARGED
9.000	RE5	64.045	-0.190	0.000	0.06		2.0	OK
9.001	S15	63.982	-0.003	0.000	0.13		4.6	OK
10.000	RE6	64.051	-0.184	0.000	0.08		2.6	OK
10.001	S16	63.982	-0.073	0.000	0.13		4.6	OK
9.002	S17	63.981	0.046	0.000	0.08		10.9	SURCHARGED
11.000	RE7	64.127	-0.188	0.000	0.06		2.6	OK
11.001	S18	63.982	-0.093	0.000	0.11		4.6	OK
11.002	S19	63.981	0.181	0.000	0.09		6.9	SURCHARGED
12.000	S20	63.987	-0.113	0.000	0.07		5.0	OK
12.001	S21	63.987	0.137	0.000	0.08		5.9	SURCHARGED
12.002	S22	63.988	0.388	0.000	0.09	0.0	5.0	SURCHARGED
9.003	S23	63.981	0.281	0.000	0.13		21.3	SURCHARGED
1.003	HW1-5	63.980	0.180	0.000	0.03		9.9	SURCHARGED
1.004	S24	64.257	0.507	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 21
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:19 File 100yr+40% 600 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	1200
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	10
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	600

Bailey Johnson Hayes		Page 22
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:19 File 100yr+40% 600 min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 600 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.014	-0.201	0.000	0.08		12.2	OK
1.001	S2	64.013	0.168	0.000	0.05		7.7	SURCHARGED
1.002	S3	64.097	0.397	0.000	0.03	0.1	5.0	SURCHARGED
2.000	RE1	64.100	-0.175	0.000	0.11		3.8	OK
2.001	S4	63.968	-0.152	0.000	0.09		6.8	OK
3.000	RE2	64.094	-0.181	0.000	0.09		3.0	OK
3.001	S5	63.968	-0.132	0.000	0.09		6.8	OK
2.002	S6	63.967	0.042	0.000	0.12		16.2	SURCHARGED
2.003	S7	63.967	0.282	0.000	0.10		15.3	SURCHARGED
4.000	RE3	63.968	-0.167	0.000	0.10		3.8	OK
4.001	S8	63.966	0.056	0.000	0.08		6.8	SURCHARGED
5.000	RE4	63.967	-0.108	0.000	0.07		3.8	OK
4.002	S9	63.966	0.266	0.000	0.06		9.9	SURCHARGED
6.000	S10	63.969	-0.211	0.000	0.10		17.9	OK
7.000	S11	63.967	-0.213	0.000	0.03		5.1	OK
8.000	S12	63.967	-0.248	0.000	0.03		5.9	OK
6.001	S13	63.967	-0.163	0.000	0.13		44.0	OK
6.002	S14	63.967	0.017	0.000	0.12		42.3	SURCHARGED
6.003	PI Unit 15	63.967	0.117	0.000	0.19		42.1	SURCHARGED
9.000	RE5	64.047	-0.188	0.000	0.07		2.3	OK
9.001	S15	63.969	-0.016	0.000	0.15		5.3	OK
10.000	RE6	64.054	-0.181	0.000	0.09		3.0	OK
10.001	S16	63.969	-0.086	0.000	0.15		5.3	OK
9.002	S17	63.967	0.032	0.000	0.10		12.7	SURCHARGED
11.000	RE7	64.130	-0.185	0.000	0.07		3.0	OK
11.001	S18	63.969	-0.106	0.000	0.13		5.3	OK
11.002	S19	63.967	0.167	0.000	0.10		8.0	SURCHARGED
12.000	S20	63.978	-0.122	0.000	0.08		5.8	OK
12.001	S21	63.978	0.128	0.000	0.09		6.2	SURCHARGED
12.002	S22	63.978	0.378	0.000	0.09	0.0	5.0	SURCHARGED
9.003	S23	63.967	0.267	0.000	0.14		24.1	SURCHARGED
1.003	HW1-5	63.967	0.167	0.000	0.03		9.8	SURCHARGED
1.004	S24	64.142	0.392	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 23
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:21 File 100yr+40% 480 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	960
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	8
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	480

Bailey Johnson Hayes		Page 24
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:21 File 100yr+40% 480 min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 480 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.014	-0.201	0.000	0.10		14.6	OK
1.001	S2	64.013	0.168	0.000	0.05		8.1	SURCHARGED
1.002	S3	64.100	0.400	0.000	0.03	0.2	5.0	SURCHARGED
2.000	RE1	64.104	-0.171	0.000	0.13		4.6	OK
2.001	S4	63.949	-0.171	0.000	0.11		8.1	OK
3.000	RE2	64.098	-0.177	0.000	0.10		3.6	OK
3.001	S5	63.949	-0.151	0.000	0.11		8.1	OK
2.002	S6	63.948	0.023	0.000	0.15		19.4	SURCHARGED
2.003	S7	63.947	0.262	0.000	0.12		18.2	SURCHARGED
4.000	RE3	63.960	-0.175	0.000	0.11		4.6	OK
4.001	S8	63.947	0.037	0.000	0.09		8.1	SURCHARGED
5.000	RE4	63.948	-0.127	0.000	0.08		4.6	OK
4.002	S9	63.947	0.247	0.000	0.07		11.7	SURCHARGED
6.000	S10	63.950	-0.230	0.000	0.12		21.4	OK
7.000	S11	63.949	-0.231	0.000	0.04		6.0	OK
8.000	S12	63.949	-0.266	0.000	0.04		7.0	OK
6.001	S13	63.949	-0.181	0.000	0.15		52.6	OK
6.002	S14	63.948	-0.002	0.000	0.15		50.7	OK
6.003	PI Unit 15	63.947	0.097	0.000	0.23		50.5	SURCHARGED
9.000	RE5	64.052	-0.183	0.000	0.08		2.8	OK
9.001	S15	63.949	-0.036	0.000	0.18		6.3	OK
10.000	RE6	64.058	-0.177	0.000	0.10		3.6	OK
10.001	S16	63.950	-0.105	0.000	0.18		6.3	OK
9.002	S17	63.947	0.012	0.000	0.11		15.1	SURCHARGED
11.000	RE7	64.135	-0.180	0.000	0.09		3.6	OK
11.001	S18	63.950	-0.125	0.000	0.16		6.3	OK
11.002	S19	63.948	0.148	0.000	0.12		9.5	SURCHARGED
12.000	S20	63.971	-0.129	0.000	0.09		6.9	OK
12.001	S21	63.970	0.120	0.000	0.09		6.6	SURCHARGED
12.002	S22	63.969	0.369	0.000	0.09	0.0	5.0	SURCHARGED
9.003	S23	63.947	0.247	0.000	0.16		27.6	SURCHARGED
1.003	HW1-5	63.947	0.147	0.000	0.03		10.9	SURCHARGED
1.004	S24	64.310	0.560	0.000	0.02		8.0	FLOOD RISK


Bailey Johnson Hayes		Page 25
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:22 File 100yr+40% 360 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	720
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	6
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	360

Bailey Johnson Hayes		Page 26
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:22 File 100yr+40% 360 min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.016	-0.199	0.000	0.12		18.3	OK
1.001	S2	64.014	0.169	0.000	0.05		7.9	SURCHARGED
1.002	S3	64.124	0.424	0.000	0.03	0.4	5.0	SURCHARGED
2.000	RE1	64.111	-0.164	0.000	0.16		5.7	OK
2.001	S4	63.921	-0.199	0.000	0.14		10.2	OK
3.000	RE2	64.103	-0.172	0.000	0.13		4.5	OK
3.001	S5	63.921	-0.179	0.000	0.14		10.2	OK
2.002	S6	63.919	-0.006	0.000	0.18		24.4	OK
2.003	S7	63.918	0.233	0.000	0.14		22.7	SURCHARGED
4.000	RE3	63.966	-0.169	0.000	0.14		5.7	OK
4.001	S8	63.919	0.009	0.000	0.12		10.1	SURCHARGED
5.000	RE4	63.919	-0.156	0.000	0.10		5.7	OK
4.002	S9	63.918	0.218	0.000	0.09		14.7	SURCHARGED
6.000	S10	63.921	-0.259	0.000	0.16		26.7	OK
7.000	S11	63.920	-0.260	0.000	0.04		7.5	OK
8.000	S12	63.920	-0.295	0.000	0.05		8.8	OK
6.001	S13	63.920	-0.210	0.000	0.19		66.1	OK
6.002	S14	63.918	-0.032	0.000	0.18		63.8	OK
6.003	PI Unit 15	63.918	0.068	0.000	0.29		63.5	SURCHARGED
9.000	RE5	64.057	-0.178	0.000	0.10		3.5	OK
9.001	S15	63.921	-0.064	0.000	0.23		7.9	OK
10.000	RE6	64.063	-0.172	0.000	0.13		4.5	OK
10.001	S16	63.921	-0.134	0.000	0.22		7.9	OK
9.002	S17	63.919	-0.016	0.000	0.14		18.9	OK
11.000	RE7	64.140	-0.175	0.000	0.11		4.5	OK
11.001	S18	63.921	-0.154	0.000	0.20		7.9	OK
11.002	S19	63.919	0.119	0.000	0.15		12.0	SURCHARGED
12.000	S20	63.967	-0.133	0.000	0.12		8.6	OK
12.001	S21	63.966	0.116	0.000	0.10		7.1	SURCHARGED
12.002	S22	63.988	0.388	0.000	0.09	0.0	5.0	SURCHARGED
9.003	S23	63.918	0.218	0.000	0.20		33.5	SURCHARGED
1.003	HW1-5	63.918	0.118	0.000	0.04		13.5	SURCHARGED
1.004	S24	64.207	0.457	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 27
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:24 File 100yr+40% 240 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	480
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	240

Bailey Johnson Hayes		Page 28
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:24 File 100yr+40% 240 min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe	Status
							Flow (l/s)	
1.000	S1	64.017	-0.198	0.000	0.17		25.0	OK
1.001	S2	64.015	0.170	0.000	0.05		8.1	SURCHARGED
1.002	S3	64.121	0.421	0.000	0.03	0.8	5.0	SURCHARGED
2.000	RE1	64.122	-0.153	0.000	0.23		7.8	OK
2.001	S4	63.907	-0.213	0.000	0.19		13.9	OK
3.000	RE2	64.113	-0.162	0.000	0.17		6.1	OK
3.001	S5	63.887	-0.213	0.000	0.19		14.0	OK
2.002	S6	63.873	-0.052	0.000	0.26		33.9	OK
2.003	S7	63.871	0.186	0.000	0.20		31.5	SURCHARGED
4.000	RE3	63.977	-0.158	0.000	0.19		7.8	OK
4.001	S8	63.872	-0.038	0.000	0.16		14.0	OK
5.000	RE4	63.905	-0.170	0.000	0.14		7.9	OK
4.002	S9	63.871	0.171	0.000	0.12		20.1	SURCHARGED
6.000	S10	63.875	-0.305	0.000	0.21		36.6	OK
7.000	S11	63.873	-0.307	0.000	0.06		10.3	OK
8.000	S12	63.874	-0.341	0.000	0.07		12.1	OK
6.001	S13	63.873	-0.257	0.000	0.26		91.9	OK
6.002	S14	63.872	-0.078	0.000	0.26		88.9	OK
6.003	PI Unit 15	63.872	0.022	0.000	0.40		88.5	SURCHARGED
9.000	RE5	64.065	-0.170	0.000	0.13		4.7	OK
9.001	S15	63.876	-0.109	0.000	0.31		10.8	OK
10.000	RE6	64.073	-0.162	0.000	0.18		6.1	OK
10.001	S16	63.915	-0.140	0.000	0.31		10.8	OK
9.002	S17	63.873	-0.062	0.000	0.20		26.3	OK
11.000	RE7	64.148	-0.167	0.000	0.15		6.1	OK
11.001	S18	63.929	-0.146	0.000	0.27		10.8	OK
11.002	S19	63.873	0.073	0.000	0.21		16.6	SURCHARGED
12.000	S20	63.975	-0.125	0.000	0.16		11.7	OK
12.001	S21	63.972	0.122	0.000	0.11		7.8	SURCHARGED
12.002	S22	64.045	0.445	0.000	0.09	0.0	5.0	SURCHARGED
9.003	S23	63.872	0.172	0.000	0.26		44.5	SURCHARGED
1.003	HW1-5	63.871	0.071	0.000	0.05		15.9	SURCHARGED
1.004	S24	64.161	0.411	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 29
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:25 File 100yr+40% 180 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	360
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	3
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	180

Bailey Johnson Hayes		Page 30
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:25 File 100yr+40% 180 min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	64.016	-0.199	0.000	0.21		31.2	OK
1.001	S2	64.014	0.169	0.000	0.07		10.0	SURCHARGED
1.002	S3	64.130	0.430	0.000	0.03	0.9	5.0	SURCHARGED
2.000	RE1	64.131	-0.144	0.000	0.28		9.8	OK
2.001	S4	63.918	-0.202	0.000	0.23		17.4	OK
3.000	RE2	64.121	-0.154	0.000	0.22		7.6	OK
3.001	S5	63.898	-0.202	0.000	0.23		17.4	OK
2.002	S6	63.839	-0.086	0.000	0.32		42.3	OK
2.003	S7	63.839	0.154	0.000	0.25		39.4	SURCHARGED
4.000	RE3	63.985	-0.150	0.000	0.24		9.8	OK
4.001	S8	63.839	-0.071	0.000	0.20		17.4	OK
5.000	RE4	63.912	-0.163	0.000	0.17		9.8	OK
4.002	S9	63.839	0.139	0.000	0.15		25.2	SURCHARGED
6.000	S10	63.888	-0.292	0.000	0.27		45.7	OK
7.000	S11	63.840	-0.340	0.000	0.08		12.9	OK
8.000	S12	63.859	-0.356	0.000	0.09		15.1	OK
6.001	S13	63.840	-0.290	0.000	0.33		114.7	OK
6.002	S14	63.839	-0.111	0.000	0.33		113.0	OK
6.003	PI Unit 15	63.839	-0.011	0.000	0.51		112.7	OK
9.000	RE5	64.072	-0.163	0.000	0.17		5.9	OK
9.001	S15	63.857	-0.128	0.000	0.39		13.5	OK
10.000	RE6	64.081	-0.154	0.000	0.22		7.6	OK
10.001	S16	63.926	-0.129	0.000	0.38		13.5	OK
9.002	S17	63.839	-0.096	0.000	0.25		32.9	OK
11.000	RE7	64.156	-0.159	0.000	0.19		7.6	OK
11.001	S18	63.940	-0.135	0.000	0.34		13.5	OK
11.002	S19	63.839	0.039	0.000	0.26		20.9	SURCHARGED
12.000	S20	63.986	-0.114	0.000	0.20		14.7	OK
12.001	S21	63.982	0.132	0.000	0.11		7.6	SURCHARGED
12.002	S22	64.076	0.476	0.000	0.09	0.0	5.0	SURCHARGED
9.003	S23	63.839	0.139	0.000	0.32		54.3	SURCHARGED
1.003	HW1-5	63.839	0.039	0.000	0.04		13.0	SURCHARGED
1.004	S24	64.119	0.369	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 31
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:26 File 100yr+40% 120 min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	240
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	120

Bailey Johnson Hayes		Page 32
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:26 File 100yr+40% 120 min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	64.023	-0.192	0.000	0.28		42.2	OK
1.001	S2	64.007	0.162	0.000	0.09		13.2	SURCHARGED
1.002	S3	64.129	0.429	0.000	0.03	1.0	4.9	SURCHARGED
2.000	RE1	64.146	-0.129	0.000	0.38		13.2	OK
2.001	S4	63.936	-0.184	0.000	0.32		23.5	OK
3.000	RE2	64.133	-0.142	0.000	0.29		10.3	OK
3.001	S5	63.916	-0.184	0.000	0.32		23.5	OK
2.002	S6	63.795	-0.130	0.000	0.43		57.1	OK
2.003	S7	63.795	0.110	0.000	0.34		53.6	SURCHARGED
4.000	RE3	63.999	-0.136	0.000	0.33		13.3	OK
4.001	S8	63.795	-0.115	0.000	0.27		23.6	OK
5.000	RE4	63.923	-0.152	0.000	0.23		13.3	OK
4.002	S9	63.795	0.095	0.000	0.20		34.1	SURCHARGED
6.000	S10	63.918	-0.262	0.000	0.36		61.8	OK
7.000	S11	63.852	-0.328	0.000	0.10		17.4	OK
8.000	S12	63.881	-0.334	0.000	0.12		20.4	OK
6.001	S13	63.811	-0.319	0.000	0.44		154.0	OK
6.002	S14	63.795	-0.155	0.000	0.44		153.4	OK
6.003	PI Unit 15	63.795	-0.055	0.000	0.70		153.7	OK
9.000	RE5	64.082	-0.153	0.000	0.23		8.0	OK
9.001	S15	63.876	-0.109	0.000	0.53		18.3	OK
10.000	RE6	64.094	-0.141	0.000	0.30		10.3	OK
10.001	S16	63.945	-0.110	0.000	0.52		18.3	OK
9.002	S17	63.795	-0.140	0.000	0.34		44.3	OK
11.000	RE7	64.167	-0.148	0.000	0.26		10.3	OK
11.001	S18	63.957	-0.118	0.000	0.46		18.3	OK
11.002	S19	63.795	-0.005	0.000	0.35		28.6	OK
12.000	S20	63.996	-0.104	0.000	0.27		19.8	OK
12.001	S21	63.992	0.142	0.000	0.10		7.3	SURCHARGED
12.002	S22	64.113	0.513	0.000	0.09	0.1	5.0	SURCHARGED
9.003	S23	63.795	0.095	0.000	0.43		71.9	SURCHARGED
1.003	HW1-5	63.795	-0.005	0.000	0.03		10.5	OK
1.004	S24	64.153	0.403	0.000	0.02		8.0	SURCHARGED

Grange House
 John Dalton St
 Manchester M2 6FW

Catalyst Bicester
 Units 10-13



Date 08/07/2019 11:27
 File 100yr+40% 60 min winter...

Designed by P.A.B.
 Checked by


Micro Drainage Network 2017.1

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	120
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	60

Bailey Johnson Hayes		Page 34
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:27 File 100yr+40% 60 min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	64.061	-0.154	0.000	0.47		70.7	OK
1.001	S2	63.988	0.143	0.000	0.15		22.1	SURCHARGED
1.002	S3	64.133	0.433	0.000	0.03	1.2	4.9	SURCHARGED
2.000	RE1	64.182	-0.093	0.000	0.64		22.2	OK
2.001	S4	63.976	-0.144	0.000	0.53		39.4	OK
3.000	RE2	64.162	-0.113	0.000	0.49		17.3	OK
3.001	S5	63.957	-0.143	0.000	0.53		39.5	OK
2.002	S6	63.787	-0.138	0.000	0.71		94.5	OK
2.003	S7	63.722	0.037	0.000	0.58		91.6	SURCHARGED
4.000	RE3	64.030	-0.105	0.000	0.55		22.2	OK
4.001	S8	63.754	-0.156	0.000	0.46		39.5	OK
5.000	RE4	63.947	-0.128	0.000	0.39		22.2	OK
4.002	S9	63.722	0.022	0.000	0.35		58.8	SURCHARGED
6.000	S10	64.019	-0.161	0.000	0.60		102.6	OK
7.000	S11	63.973	-0.207	0.000	0.17		28.4	OK
8.000	S12	63.977	-0.238	0.000	0.19		33.5	OK
6.001	S13	63.958	-0.172	0.000	0.69		238.1	OK
6.002	S14	63.872	-0.078	0.000	0.66		229.9	OK
6.003	PI Unit 15	63.850	0.000	0.000	1.05		230.8	OK
9.000	RE5	64.107	-0.128	0.000	0.38		13.4	OK
9.001	S15	63.926	-0.059	0.000	0.88		30.7	OK
10.000	RE6	64.123	-0.112	0.000	0.50		17.3	OK
10.001	S16	63.993	-0.062	0.000	0.86		30.6	OK
9.002	S17	63.761	-0.174	0.000	0.56		73.5	OK
11.000	RE7	64.194	-0.121	0.000	0.43		17.3	OK
11.001	S18	64.000	-0.075	0.000	0.76		30.7	OK
11.002	S19	63.723	-0.077	0.000	0.59		47.8	OK
12.000	S20	63.995	-0.105	0.000	0.46		33.2	OK
12.001	S21	63.989	0.139	0.000	0.16		11.6	SURCHARGED
12.002	S22	64.117	0.517	0.000	0.09	0.3	5.0	SURCHARGED
9.003	S23	63.723	0.023	0.000	0.74		125.1	SURCHARGED
1.003	HW1-5	63.722	-0.078	0.000	0.06		19.8	OK
1.004	S24	64.040	0.290	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 35
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:29 File 100yr+40% 30 min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Bailey Johnson Hayes		Page 36
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:29 File 100yr+40% 30 min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	64.115	-0.100	0.000	0.75		112.9	OK
1.001	S2	63.966	0.121	0.000	0.25		37.1	SURCHARGED
1.002	S3	64.136	0.436	0.000	0.03	1.1	5.0	SURCHARGED
2.000	RE1	64.299	0.024	0.000	0.99		34.3	SURCHARGED
2.001	S4	64.084	-0.036	0.000	0.78		58.1	OK
3.000	RE2	64.213	-0.062	0.000	0.78		27.5	OK
3.001	S5	64.075	-0.025	0.000	0.79		58.7	OK
2.002	S6	63.927	0.002	0.000	1.02		134.8	SURCHARGED
2.003	S7	63.656	-0.029	0.000	0.85		134.5	OK
4.000	RE3	64.077	-0.058	0.000	0.89		35.9	OK
4.001	S8	63.805	-0.105	0.000	0.74		63.3	OK
5.000	RE4	63.980	-0.095	0.000	0.63		36.3	OK
4.002	S9	63.656	-0.044	0.000	0.59		99.5	OK
6.000	S10	64.373	0.193	0.000	0.91		156.0	FLOOD RISK
7.000	S11	64.256	0.076	0.000	0.25		42.6	FLOOD RISK
8.000	S12	64.262	0.047	0.000	0.29		49.7	FLOOD RISK
6.001	S13	64.232	0.102	0.000	1.06		369.9	SURCHARGED
6.002	S14	64.041	0.091	0.000	1.04		360.6	SURCHARGED
6.003	PI Unit 15	63.909	0.059	0.000	1.65		362.3	SURCHARGED
9.000	RE5	64.237	0.002	0.000	0.57		20.1	SURCHARGED
9.001	S15	64.153	0.168	0.000	1.28		44.4	SURCHARGED
10.000	RE6	64.356	0.121	0.000	0.74		25.8	FLOOD RISK
10.001	S16	64.255	0.200	0.000	1.24		44.1	SURCHARGED
9.002	S17	63.821	-0.114	0.000	0.79		104.4	OK
11.000	RE7	64.314	-0.001	0.000	0.67		26.7	FLOOD RISK
11.001	S18	64.215	0.140	0.000	1.09		43.9	SURCHARGED
11.002	S19	63.791	-0.009	0.000	0.83		67.2	OK
12.000	S20	64.030	-0.070	0.000	0.73		52.9	OK
12.001	S21	63.974	0.124	0.000	0.27		19.1	SURCHARGED
12.002	S22	64.117	0.517	0.000	0.09	0.3	5.0	SURCHARGED
9.003	S23	63.657	-0.043	0.000	1.00		169.1	OK
1.003	HW1-5	63.657	-0.143	0.000	0.04		14.7	OK
1.004	S24	63.806	0.056	0.000	0.02		8.0	SURCHARGED


Bailey Johnson Hayes		Page 37
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:30 File 100yr+40% 15 min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	5.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	3
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	15

Bailey Johnson Hayes		Page 38
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 10-13	
Date 08/07/2019 11:30 File 100yr+40% 15 min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	64.266	0.051	0.000	0.99		149.1	SURCHARGED
1.001	S2	63.941	0.096	0.000	0.40		59.3	SURCHARGED
1.002	S3	64.132	0.432	0.000	0.03	3.5	5.2	SURCHARGED
2.000	RE1	64.596	0.321	0.000	1.15		39.8	FLOOD RISK
2.001	S4	64.299	0.179	0.000	0.89		66.6	SURCHARGED
3.000	RE2	64.490	0.215	0.000	0.91		32.0	FLOOD RISK
3.001	S5	64.295	0.195	0.000	0.93		69.0	SURCHARGED
2.002	S6	64.075	0.150	0.000	1.20		159.3	SURCHARGED
2.003	S7	63.599	-0.086	0.000	1.00		157.9	OK
4.000	RE3	64.291	0.156	0.000	1.16		46.7	SURCHARGED
4.001	S8	63.877	-0.033	0.000	0.94		80.7	OK
5.000	RE4	64.029	-0.046	0.000	0.89		51.1	OK
4.002	S9	63.599	-0.101	0.000	0.77		130.9	OK
6.000	S10	64.652	0.472	1.757	1.10		187.7	FLOOD
7.000	S11	64.452	0.272	1.946	0.36		61.3	FLOOD
8.000	S12	64.449	0.234	0.196	0.38		66.9	FLOOD
6.001	S13	64.458	0.328	0.000	1.23		428.7	FLOOD RISK
6.002	S14	64.155	0.205	0.000	1.24		431.2	SURCHARGED
6.003	PI Unit 15	63.966	0.116	0.000	1.97		431.8	SURCHARGED
9.000	RE5	64.521	0.286	0.000	0.70		24.6	FLOOD RISK
9.001	S15	64.402	0.417	0.000	1.52		52.7	FLOOD RISK
10.000	RE6	64.600	0.365	0.439	0.89		30.9	FLOOD
10.001	S16	64.489	0.434	0.000	1.41		49.9	FLOOD RISK
9.002	S17	63.982	0.047	0.000	0.87		114.4	SURCHARGED
11.000	RE7	64.600	0.285	0.177	0.76		30.6	FLOOD
11.001	S18	64.474	0.399	0.000	1.25		50.0	FLOOD RISK
11.002	S19	63.938	0.138	0.000	0.96		77.8	SURCHARGED
12.000	S20	64.148	0.048	0.000	0.99		71.7	SURCHARGED
12.001	S21	63.949	0.099	0.000	0.46		33.1	SURCHARGED
12.002	S22	64.110	0.510	0.000	0.09	0.1	5.0	SURCHARGED
9.003	S23	63.741	0.041	0.000	1.12		189.0	SURCHARGED
1.003	HW1-5	63.599	-0.201	0.000	0.04		13.1	OK
1.004	S24	63.702	-0.048	0.000	0.02		8.0	OK

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall	Cv (Summer)	0.750
Return Period (years) 100	Cv (Winter)	0.840
Version 1999	Impermeable Area (ha)	5.780
Site 457700 221050 SP 57700 21050	Maximum Allowable Discharge (l/s)	12.0
C (1km) -0.022 D3 (1km) 0.251	Infiltration Coefficient (m/hr)	0.00000
D1 (1km) 0.321 E (1km) 0.288	Safety Factor	2.0
D2 (1km) 0.324 F (1km) 2.477	Climate Change (%)	40

Analyse OK Cancel Help

Enter Area between 0.000 and 999.999

Quick Storage Estimate

Micro Drainage


Results

Global Variables require approximate storage of between 5179 m³ and 6702 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Area between 0.000 and 999.999

Bailey Johnson Hayes		Page 40
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
* 1.000	89.900	0.300	299.7	0.290	5.00	0.600	o	450	Pipe/Conduit
* 2.000	68.200	0.225	303.1	0.116	5.00	0.600	o	300	Pipe/Conduit
* 1.001	13.000	0.045	288.9	0.000	0.00	0.600	o	525	Pipe/Conduit
3.000	61.300	0.300	204.3	0.116	5.00	0.600	o	300	Pipe/Conduit
3.001	8.700	0.145	60.0	0.000	0.00	0.600	o	300	Pipe/Conduit
* 1.002	76.300	0.225	339.1	0.089	0.00	0.600	o	525	Pipe/Conduit
* 4.000	58.800	0.580	101.4	0.210	5.00	0.600	o	375	Pipe/Conduit
* 1.003	14.000	0.075	186.7	0.000	0.00	0.600	o	525	Pipe/Conduit
5.000	71.000	0.725	97.9	0.040	5.00	0.600	o	225	Pipe/Conduit
* 1.004	5.500	0.050	110.0	0.000	0.00	0.600	o	525	Pipe/Conduit
* 1.005	22.500	0.225	100.0	0.000	0.00	0.600	o	525	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 1.000	S25	64.800	63.900	0.450	64.800	63.600	0.750		1200
* 2.000	S26	64.650	63.825	0.525	64.800	63.600	0.900		1200
* 1.001	S27	64.800	63.600	0.675	64.800	63.555	0.720		1350
3.000	S28	64.650	64.000	0.350	64.650	63.700	0.650		1200
3.001	S29	64.650	63.700	0.650	64.800	63.555	0.945	Hydro-Brake®	1200
* 1.002	S30	64.800	63.555	0.720	64.550	63.330	0.695		1350
* 4.000	S31	64.550	63.880	0.295	64.550	63.300	0.875		1200
* 1.003	S32	64.550	63.300	0.725	64.800	63.225	1.050		1350
5.000	S33	64.800	63.950	0.625	64.800	63.225	1.350		1200
* 1.004	S34	64.800	63.225	1.050	65.000	63.175	1.300		1350
* 1.005	PI Unit 4	65.000	63.125	1.375	65.000	62.900	1.600		3540 x 1875

Grange House
John Dalton St
Manchester M2 6FW

Catalyst Bicester
Units 1-9



Date 08/07/2019 12:59
File 100yr+40% 4320min winte...


Designed by P.A.B.
Checked by

Micro Drainage Network 2017.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
6.000	29.300	0.150	195.3	0.009	5.00	0.600	o	225	Pipe/Conduit
6.001	47.400	0.250	189.6	0.058	0.00	0.600	o	225	Pipe/Conduit
6.002	47.400	0.215	220.5	0.058	0.00	0.600	o	300	Pipe/Conduit
7.000	46.400	0.225	206.2	0.058	5.00	0.600	o	225	Pipe/Conduit
* 7.001	46.400	0.225	206.2	0.058	0.00	0.600	o	300	Pipe/Conduit
* 7.002	35.600	0.165	215.8	0.009	0.00	0.600	o	300	Pipe/Conduit
8.000	73.800	0.275	268.4	0.210	5.00	0.600	o	300	Pipe/Conduit
8.001	6.000	0.040	150.0	0.000	0.00	0.600	o	300	Pipe/Conduit
6.003	15.700	0.085	184.7	0.000	0.00	0.600	o	375	Pipe/Conduit
6.004	81.500	0.225	362.2	0.078	0.00	0.600	o	450	Pipe/Conduit
9.000	60.800	0.300	202.7	0.063	5.00	0.600	o	225	Pipe/Conduit
9.001	51.000	0.250	204.0	0.078	0.00	0.600	o	300	Pipe/Conduit
* 9.002	64.900	0.225	288.4	0.063	0.00	0.600	o	375	Pipe/Conduit
6.005	33.200	0.165	201.2	0.000	0.00	0.600	o	450	Pipe/Conduit
6.006	26.000	0.260	100.0	0.000	0.00	0.600	o	450	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
6.000	RE8	64.900	64.300	0.375	64.900	64.150	0.525		1200
6.001	S35	64.900	64.150	0.525	64.850	63.900	0.725		1200
6.002	S36	64.850	63.900	0.650	64.900	63.685	0.915		1200
7.000	RE9	64.900	64.300	0.375	64.900	64.075	0.600		1200
* 7.001	S37	64.900	64.075	0.525	64.850	63.850	0.700		1200
* 7.002	S38	64.850	63.850	0.700	64.900	63.685	0.915		1200
8.000	S39	64.750	64.000	0.450	64.750	63.725	0.725		1200
8.001	S40	64.750	63.725	0.725	64.900	63.685	0.915	Hydro-Brake®	1200
6.003	S41	64.900	63.685	0.840	64.900	63.600	0.925		1350
6.004	S42	64.900	63.600	0.850	64.650	63.375	0.825		1350
9.000	RE10	64.650	64.100	0.325	64.650	63.800	0.625		1200
9.001	S43	64.650	63.800	0.550	64.650	63.550	0.800		1200
* 9.002	S44	64.650	63.550	0.725	64.650	63.325	0.950		1200
6.005	S45	64.650	63.325	0.875	65.000	63.160	1.390		1350
6.006	S46	65.000	63.160	1.390	65.000	62.900	1.650		1350

Bailey Johnson Hayes		Page 42
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
10.000	46.900	0.250	187.6	0.036	5.00	0.600	o	225	Pipe/Conduit
10.001	37.900	0.200	189.5	0.047	0.00	0.600	o	225	Pipe/Conduit
11.000	34.600	0.200	173.0	0.047	5.00	0.600	o	225	Pipe/Conduit
11.001	50.000	0.250	200.0	0.036	0.00	0.600	o	225	Pipe/Conduit
10.002	32.500	0.175	185.7	0.000	0.00	0.600	o	300	Pipe/Conduit
12.000	52.600	0.260	202.3	0.073	5.00	0.600	o	225	Pipe/Conduit
13.000	62.500	0.250	250.0	0.126	5.00	0.600	o	300	Pipe/Conduit
13.001	24.400	0.100	244.0	0.000	0.00	0.600	o	300	Pipe/Conduit
10.003	59.100	0.200	295.5	0.063	0.00	0.600	o	450	Pipe/Conduit
14.000	49.300	0.250	197.2	0.050	5.00	0.600	o	225	Pipe/Conduit
* 14.001	48.000	0.250	192.0	0.063	0.00	0.600	o	300	Pipe/Conduit
* 14.002	53.000	0.275	192.7	0.050	0.00	0.600	o	375	Pipe/Conduit
10.004	28.300	0.100	283.0	0.000	0.00	0.600	o	450	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
10.000	RE11	64.900	64.100	0.575	64.900	63.850	0.825		1200
10.001	S47	64.900	63.850	0.825	64.900	63.650	1.025		1200
11.000	RE12	64.900	64.100	0.575	64.900	63.900	0.775		1200
11.001	S48	64.900	63.900	0.775	64.900	63.650	1.025		1200
10.002	S49	64.900	63.650	0.950	64.650	63.475	0.875		1200
12.000	S50	64.650	63.735	0.690	64.650	63.475	0.950		1200
13.000	S51	64.850	63.825	0.725	64.550	63.575	0.675		1200
13.001	S52	64.550	63.575	0.675	64.650	63.475	0.875		1200
10.003	S53	64.650	63.475	0.725	64.650	63.275	0.925		1350
14.000	RE13	64.650	64.050	0.375	64.650	63.800	0.625		1200
* 14.001	S54	64.650	63.800	0.550	64.650	63.550	0.800		1200
* 14.002	S55	64.650	63.550	0.725	64.650	63.275	1.000		1200
10.004	S56	64.650	63.275	0.925	65.000	63.175	1.375		1350

Grange House
 John Dalton St
 Manchester M2 6FW

Catalyst Bicester
 Units 1-9



Date 08/07/2019 12:59
 File 100yr+40% 4320min winte...


Designed by P.A.B.
 Checked by

Micro Drainage Network 2017.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
15.000	56.200	0.565	99.5	0.056	5.00	0.600	o	225	Pipe/Conduit
10.005	26.800	0.275	97.5	0.000	0.00	0.600	o	450	Pipe/Conduit
16.000	53.400	0.275	194.2	0.128	5.00	0.600	o	225	Pipe/Conduit
16.001	58.000	0.190	305.3	0.058	0.00	0.600	o	300	Pipe/Conduit
* 17.000	38.600	0.215	179.5	0.164	5.00	0.600	o	375	Pipe/Conduit
* 16.002	20.600	0.065	316.9	0.000	0.00	0.600	o	375	Pipe/Conduit
16.003	79.900	0.270	295.9	0.089	0.00	0.600	o	375	Pipe/Conduit
18.000	45.500	0.275	165.5	0.123	5.00	0.600	o	300	Pipe/Conduit
19.000	42.200	0.275	153.5	0.123	5.00	0.600	o	300	Pipe/Conduit
16.004	13.400	0.115	116.5	0.000	0.00	0.600	o	450	Pipe/Conduit
16.005	22.200	0.185	120.0	0.000	0.00	0.600	o	450	Pipe/Conduit
20.000	49.800	0.250	199.2	0.132	5.00	0.600	o	225	Pipe/Conduit


PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
15.000	S57	64.800	63.740	0.835	65.000	63.175	1.600		1200
10.005	S58	65.000	63.175	1.375	65.000	62.900	1.650		1350
16.000	S59	64.800	64.050	0.525	64.650	63.775	0.650		1200
16.001	S60	64.650	63.775	0.575	64.900	63.585	1.015		1200
* 17.000	S61	64.550	63.800	0.375	64.900	63.585	0.940		1200
* 16.002	S62	64.900	63.585	0.940	64.650	63.520	0.755		1350
16.003	S63	64.650	63.520	0.755	64.650	63.250	1.025		1350
18.000	S64	64.550	63.525	0.725	64.650	63.250	1.100		1200
19.000	S65	64.550	63.525	0.725	64.650	63.250	1.100		1200
16.004	S66	64.650	63.250	0.950	65.000	63.135	1.415		1350
16.005	PI Unit 9	65.000	63.085	1.415	65.000	62.900	1.600	3200 x	1875
20.000	S67	64.400	63.800	0.375	64.650	63.550	0.875		1200

Bailey Johnson Hayes		Page 44
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
21.000	34.800	0.175	198.9	0.049	5.00	0.600	o	225	Pipe/Conduit
* 21.001	53.000	0.275	192.7	0.038	0.00	0.600	o	300	Pipe/Conduit
22.000	50.000	0.250	200.0	0.038	5.00	0.600	o	225	Pipe/Conduit
* 22.001	38.000	0.200	190.0	0.049	0.00	0.600	o	300	Pipe/Conduit
23.000	100.000	0.500	200.0	1.389	5.00	0.600	o	450	Pipe/Conduit
23.001	12.500	0.075	166.7	0.000	0.00	0.600	o	375	Pipe/Conduit
21.002	19.900	0.100	199.0	0.000	0.00	0.600	o	375	Pipe/Conduit
20.001	10.000	0.050	200.0	0.000	0.00	0.600	o	375	Pipe/Conduit
24.000	48.800	0.250	195.2	0.050	5.00	0.600	o	225	Pipe/Conduit
20.002	48.000	0.210	228.6	0.063	0.00	0.600	o	375	Pipe/Conduit
25.000	44.900	0.300	149.7	0.063	5.00	0.600	o	225	Pipe/Conduit
* 25.001	52.500	0.360	145.8	0.050	0.00	0.600	o	300	Pipe/Conduit
26.000	32.300	0.160	201.9	0.110	5.00	0.600	o	300	Pipe/Conduit


PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
21.000	RE14	64.900	64.100	0.575	64.900	63.925	0.750		1200
* 21.001	S68	64.900	63.925	0.675	64.900	63.650	0.950		1200
22.000	RE15	64.900	64.100	0.575	64.900	63.850	0.825		1200
* 22.001	S69	64.900	63.850	0.750	64.900	63.650	0.950		1200
23.000	David Lloyd	65.100	64.225	0.425	65.100	63.725	0.925		1350
23.001	S69	65.100	63.725	1.000	64.900	63.650	0.875	Hydro-Brake®	1350
21.002	S70	64.900	63.650	0.875	64.650	63.550	0.725		1350
20.001	S71	64.650	63.550	0.725	64.650	63.500	0.775		1350
24.000	RE16	64.650	63.750	0.675	64.650	63.500	0.925		1200
20.002	S72	64.650	63.500	0.775	64.650	63.290	0.985		1350
25.000	RE17	64.650	63.950	0.475	64.650	63.650	0.775		1200
* 25.001	S73	64.650	63.650	0.700	64.650	63.290	1.060		1200
26.000	S74	64.650	63.660	0.690	65.000	63.500	1.200		1200

Bailey Johnson Hayes		Page 45
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
27.000	44.200	0.440	100.5	0.063	5.00	0.600	o	225	Pipe/Conduit
26.001	11.600	0.060	193.3	0.000	0.00	0.600	o	375	Pipe/Conduit
28.000	50.800	0.260	195.4	0.128	5.00	0.600	o	300	Pipe/Conduit
26.002	5.300	0.050	106.0	0.000	0.00	0.600	o	375	Pipe/Conduit
26.003	5.300	0.050	106.0	0.000	0.00	0.600	o	375	Pipe/Conduit
20.003	28.300	0.100	283.0	0.000	0.00	0.600	o	450	Pipe/Conduit
29.000	53.600	0.535	100.2	0.056	5.00	0.600	o	225	Pipe/Conduit
20.004	58.400	0.290	201.4	0.000	0.00	0.600	o	450	Pipe/Conduit
1.006	6.000	0.025	240.0	0.590	0.00	0.600	o	450	Pipe/Conduit
1.007	10.000	0.050	200.0	0.000	0.00	0.600	o	300	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
27.000	S75	64.850	63.940	0.685	65.000	63.500	1.275		1200
26.001	S76	65.000	63.500	1.125	64.650	63.440	0.835		1350
28.000	S77	64.800	63.700	0.800	64.650	63.440	0.910		1200
26.002	S78	64.650	63.440	0.835	64.650	63.390	0.885		1350
26.003	PI Unit 7	64.650	63.340	0.885	64.650	63.290	0.935	2920 x	1220
20.003	S79	64.650	63.290	0.910	65.000	63.190	1.360		1350
29.000	S80	64.800	63.725	0.850	65.000	63.190	1.585		1200
20.004	S81	65.000	63.190	1.360	65.000	62.900	1.650		1350
1.006	HW 7-12	65.000	62.900	1.650	65.000	62.875	1.675		1350
1.007	S82	65.000	62.875	1.825	64.000	62.825	0.875	Hydro-Brake®	1350

Bailey Johnson Hayes		Page 46
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
------------------------	-----------------	-----------------	-----------------	------------------------	-------------	-----------


1.007	Outfall ditch	64.000	62.825	0.000	0	0
-------	---------------	--------	--------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	8640
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	4320

Bailey Johnson Hayes		Page 47
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S29, DS/PN: 3.001, Volume (m³): 5.3

Unit Reference	MD-SHE-0113-5000-0500-5000
Design Head (m)	0.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	113
Invert Level (m)	63.700
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.500	5.0
Flush-Flo™	0.179	5.0
Kick-Flo®	0.372	4.4
Mean Flow over Head Range	-	4.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.9	1.200	7.5	3.000	11.6	7.000	17.4
0.200	5.0	1.400	8.1	3.500	12.5	7.500	18.1
0.300	4.8	1.600	8.6	4.000	13.3	8.000	18.7
0.400	4.5	1.800	9.1	4.500	14.1	8.500	19.2
0.500	5.0	2.000	9.6	5.000	14.8	9.000	19.8
0.600	5.4	2.200	10.0	5.500	15.4	9.500	20.3
0.800	6.2	2.400	10.4	6.000	16.1		
1.000	6.9	2.600	10.8	6.500	16.8		

Hydro-Brake® Optimum Manhole: S40, DS/PN: 8.001, Volume (m³): 6.3

Unit Reference	MD-SHE-0109-5000-0775-5000
Design Head (m)	0.775
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	109
Invert Level (m)	63.725
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Bailey Johnson Hayes		Page 48
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Hydro-Brake® Optimum Manhole: S40, DS/PN: 8.001, Volume (m³): 6.3

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.775	5.0
Flush-Flo™	0.235	5.0
Kick-Flo®	0.523	4.2
Mean Flow over Head Range	-	4.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.7	1.200	6.1	3.000	9.4	7.000	14.1
0.200	5.0	1.400	6.6	3.500	10.1	7.500	14.6
0.300	4.9	1.600	7.0	4.000	10.8	8.000	15.0
0.400	4.8	1.800	7.4	4.500	11.4	8.500	15.5
0.500	4.4	2.000	7.8	5.000	12.0	9.000	15.9
0.600	4.4	2.200	8.1	5.500	12.6	9.500	16.3
0.800	5.1	2.400	8.5	6.000	13.1		
1.000	5.6	2.600	8.8	6.500	13.6		


Hydro-Brake® Optimum Manhole: S69, DS/PN: 23.001, Volume (m³): 17.7

Unit Reference	MD-SHE-0318-6000-1000-6000
Design Head (m)	1.000
Design Flow (l/s)	60.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	318
Invert Level (m)	63.725
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	60.0
Flush-Flo™	0.472	60.0
Kick-Flo®	0.801	53.9
Mean Flow over Head Range	-	47.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	9.5	0.300	57.0	0.500	59.9	0.800	54.0
0.200	32.6	0.400	59.6	0.600	59.1	1.000	60.0

Bailey Johnson Hayes		Page 49
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Hydro-Brake® Optimum Manhole: S69, DS/PN: 23.001, Volume (m³): 17.7

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	65.5	2.400	91.7	5.000	131.1	8.000	165.0
1.400	70.6	2.600	95.3	5.500	137.3	8.500	170.0
1.600	75.3	3.000	102.2	6.000	143.3	9.000	174.8
1.800	79.7	3.500	110.1	6.500	149.0	9.500	179.5
2.000	83.9	4.000	117.6	7.000	154.5		
2.200	87.9	4.500	124.5	7.500	159.9		


Hydro-Brake® Optimum Manhole: S82, DS/PN: 1.007, Volume (m³): 3.8

Unit Reference	MD-SHE-0158-1200-1025-1200
Design Head (m)	1.025
Design Flow (l/s)	12.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	158
Invert Level (m)	62.875
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.025	12.0
Flush-Flo™	0.317	12.0
Kick-Flo®	0.700	10.0
Mean Flow over Head Range	-	10.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.7	1.200	12.9	3.000	20.0	7.000	30.0
0.200	11.6	1.400	13.9	3.500	21.5	7.500	31.0
0.300	12.0	1.600	14.8	4.000	22.9	8.000	32.0
0.400	11.9	1.800	15.7	4.500	24.3	8.500	33.0
0.500	11.6	2.000	16.5	5.000	25.5	9.000	33.9
0.600	11.2	2.200	17.2	5.500	26.7	9.500	34.8
0.800	10.7	2.400	18.0	6.000	27.9		
1.000	11.9	2.600	18.7	6.500	29.0		

Bailey Johnson Hayes		Page 50
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	


Offline Controls for Storm

Pipe Manhole: S29, DS/PN: 3.001, Loop to PN: 3.000

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	12.5	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	64.100

Pipe Manhole: S40, DS/PN: 8.001, Loop to PN: 8.000

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	6.5	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	64.500

Bailey Johnson Hayes		Page 52
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Cellular Storage Manhole: David Lloyd, DS/PN: 23.000

Invert Level (m) 64.225 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	1600.0	1600.0	0.401	0.0	1664.0
0.400	1600.0	1664.0			

Infiltration Blanket Manhole: S75, DS/PN: 27.000

Infiltration Coefficient Base (m/hr) 0.00000 Diameter/Width (m) 36.0
 Safety Factor 2.0 Length (m) 13.0
 Porosity 0.30 Cap Volume Depth (m) 0.400
 Invert Level (m) 64.150


Infiltration Blanket Manhole: S80, DS/PN: 29.000

Infiltration Coefficient Base (m/hr) 0.00000 Diameter/Width (m) 5.0
 Safety Factor 2.0 Length (m) 50.0
 Porosity 0.30 Cap Volume Depth (m) 0.400
 Invert Level (m) 64.150

Tank or Pond Manhole: HW 7-12, DS/PN: 1.006

Invert Level (m) 62.900


Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	4578.0	0.400	5099.0	0.800	5630.0	1.200	6169.0
0.200	4837.0	0.600	5363.0	1.000	5898.0	1.400	6443.0

Bailey Johnson Hayes		Page 53
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 4320 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	63.945	-0.405	0.000	0.02		3.7	OK
2.000	S26	63.864	-0.261	0.000	0.02		1.5	OK
1.001	S27	63.863	-0.262	0.000	0.03		5.2	OK
3.000	S28	64.028	-0.272	0.000	0.02		1.5	OK
3.001	S29	63.870	-0.130	0.000	0.02	0.0	1.5	OK
1.002	S30	63.863	-0.217	0.000	0.03		7.8	OK
4.000	S31	63.906	-0.349	0.000	0.01		2.7	OK
1.003	S32	63.863	0.038	0.000	0.04		10.3	SURCHARGED
5.000	S33	63.961	-0.214	0.000	0.01		0.5	OK
1.004	S34	63.863	0.113	0.000	0.04		10.7	SURCHARGED
1.005	PI Unit 4	63.863	0.213	0.000	0.04		10.6	SURCHARGED
6.000	RE8	64.304	-0.221	0.000	0.00		0.1	OK
6.001	S35	64.173	-0.202	0.000	0.02		0.9	OK
6.002	S36	63.931	-0.269	0.000	0.02		1.6	OK
7.000	RE9	64.323	-0.202	0.000	0.02		0.7	OK
7.001	S37	64.104	-0.271	0.000	0.02		1.5	OK
7.002	S38	63.881	-0.269	0.000	0.02		1.6	OK
8.000	S39	64.039	-0.261	0.000	0.04		2.7	OK
8.001	S40	63.877	-0.148	0.000	0.04	0.0	2.7	OK
6.003	S41	63.864	-0.196	0.000	0.05		5.9	OK
6.004	S42	63.863	-0.187	0.000	0.04		6.9	OK
9.000	RE10	64.123	-0.202	0.000	0.02		0.8	OK
9.001	S43	63.863	-0.237	0.000	0.02		1.8	OK
9.002	S44	63.863	-0.062	0.000	0.02		2.6	OK
6.005	S45	63.863	0.088	0.000	0.05		9.3	SURCHARGED
6.006	S46	63.863	0.253	0.000	0.03		9.2	SURCHARGED
10.000	RE11	64.114	-0.211	0.000	0.01		0.5	OK
10.001	S47	63.875	-0.200	0.000	0.03		1.1	OK
11.000	RE12	64.117	-0.208	0.000	0.02		0.6	OK
11.001	S48	63.926	-0.199	0.000	0.03		1.1	OK
10.002	S49	63.863	-0.087	0.000	0.03		2.1	OK
12.000	S50	63.863	-0.097	0.000	0.03		0.9	OK
13.000	S51	63.863	-0.262	0.000	0.02		1.6	OK
13.001	S52	63.863	-0.012	0.000	0.03		1.6	OK
10.003	S53	63.863	-0.062	0.000	0.03		5.5	OK
14.000	RE13	64.069	-0.206	0.000	0.02		0.6	OK
14.001	S54	63.863	-0.237	0.000	0.02		1.5	OK
14.002	S55	63.862	-0.063	0.000	0.02		2.1	OK
10.004	S56	63.863	0.138	0.000	0.04		7.3	SURCHARGED
15.000	S57	63.862	-0.103	0.000	0.01		0.7	OK
10.005	S58	63.862	0.237	0.000	0.03		7.9	SURCHARGED
16.000	S59	64.081	-0.194	0.000	0.05		1.6	OK
16.001	S60	63.864	-0.211	0.000	0.04		2.4	OK

Bailey Johnson Hayes		Page 54
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 12:59 File 100yr+40% 4320min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 4320 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	63.864	-0.311	0.000	0.02		2.1	OK
16.002	S62	63.864	-0.096	0.000	0.05		4.5	OK
16.003	S63	63.863	-0.032	0.000	0.05		5.6	OK
18.000	S64	63.863	0.038	0.000	0.02		1.6	SURCHARGED
19.000	S65	63.863	0.038	0.000	0.02		1.6	SURCHARGED
16.004	S66	63.863	0.163	0.000	0.04		8.5	SURCHARGED
16.005	PI Unit 9	63.863	0.328	0.000	0.04		8.4	SURCHARGED
20.000	S67	63.877	-0.148	0.000	0.05		1.7	OK
21.000	RE14	64.119	-0.206	0.000	0.02		0.6	OK
21.001	S68	63.946	-0.279	0.000	0.01		1.1	OK
22.000	RE15	64.115	-0.210	0.000	0.01		0.5	OK
22.001	S69	63.881	-0.269	0.000	0.02		1.1	OK
23.000	David Lloyd	64.310	-0.365	0.000	0.08		17.6	OK
23.001	S69	63.940	-0.160	0.000	0.16		17.6	OK
21.002	S70	63.880	-0.145	0.000	0.17		19.8	OK
20.001	S71	63.877	-0.048	0.000	0.21		21.4	OK
24.000	RE16	63.875	-0.100	0.000	0.02		0.6	OK
20.002	S72	63.875	0.000	0.000	0.19		22.8	OK
25.000	RE17	63.971	-0.204	0.000	0.02		0.8	OK
25.001	S73	63.867	-0.083	0.000	0.02		1.5	OK
26.000	S74	63.867	-0.093	0.000	0.02		1.4	OK
27.000	S75	63.957	-0.208	0.000	0.02		0.8	OK
26.001	S76	63.867	-0.008	0.000	0.02		2.2	OK
28.000	S77	63.867	-0.133	0.000	0.02		1.6	OK
26.002	S78	63.867	0.052	0.000	0.04		3.8	SURCHARGED
26.003	PI Unit 7	63.867	0.152	0.000	0.05		3.8	SURCHARGED
20.003	S79	63.867	0.127	0.000	0.17		27.4	SURCHARGED
29.000	S80	63.865	-0.085	0.000	0.01		0.7	OK
20.004	S81	63.865	0.225	0.000	0.13		27.9	SURCHARGED
1.006	HW 7-12	63.862	0.512	0.000	0.10		12.0	SURCHARGED
1.007	S82	63.878	0.703	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 55
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:02 File 100yr+40% 2880min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	5760
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	2880

Bailey Johnson Hayes		Page 56
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:02 File 100yr+40% 2880min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 2880 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	63.951	-0.399	0.000	0.03		5.3	OK
2.000	S26	63.906	-0.219	0.000	0.03		2.1	OK
1.001	S27	63.906	-0.219	0.000	0.04		7.4	OK
3.000	S28	64.033	-0.267	0.000	0.03		2.1	OK
3.001	S29	63.914	-0.086	0.000	0.02	0.0	2.1	OK
1.002	S30	63.906	-0.174	0.000	0.05		11.1	OK
4.000	S31	63.916	-0.339	0.000	0.02		3.8	OK
1.003	S32	63.905	0.080	0.000	0.06		14.6	SURCHARGED
5.000	S33	63.965	-0.210	0.000	0.01		0.7	OK
1.004	S34	63.905	0.155	0.000	0.06		15.1	SURCHARGED
1.005	PI Unit 4	63.905	0.255	0.000	0.05		14.9	SURCHARGED
6.000	RE8	64.305	-0.220	0.000	0.00		0.2	OK
6.001	S35	64.177	-0.198	0.000	0.03		1.2	OK
6.002	S36	63.935	-0.265	0.000	0.03		2.3	OK
7.000	RE9	64.326	-0.199	0.000	0.03		1.1	OK
7.001	S37	64.109	-0.266	0.000	0.03		2.1	OK
7.002	S38	63.907	-0.243	0.000	0.03		2.3	OK
8.000	S39	64.046	-0.254	0.000	0.06		3.8	OK
8.001	S40	63.925	-0.100	0.000	0.06	0.0	3.8	OK
6.003	S41	63.906	-0.154	0.000	0.07		8.2	OK
6.004	S42	63.906	-0.144	0.000	0.06		9.7	OK
9.000	RE10	64.126	-0.199	0.000	0.03		1.1	OK
9.001	S43	63.906	-0.194	0.000	0.03		2.6	OK
9.002	S44	63.906	-0.019	0.000	0.03		3.7	OK
6.005	S45	63.906	0.131	0.000	0.07		13.0	SURCHARGED
6.006	S46	63.905	0.295	0.000	0.05		12.8	SURCHARGED
10.000	RE11	64.119	-0.206	0.000	0.02		0.7	OK
10.001	S47	63.906	-0.169	0.000	0.04		1.5	OK
11.000	RE12	64.123	-0.202	0.000	0.02		0.9	OK
11.001	S48	63.930	-0.195	0.000	0.04		1.5	OK
10.002	S49	63.905	-0.045	0.000	0.04		3.0	OK
12.000	S50	63.905	-0.055	0.000	0.04		1.3	OK
13.000	S51	63.906	-0.219	0.000	0.03		2.3	OK
13.001	S52	63.906	0.031	0.000	0.04		2.3	SURCHARGED
10.003	S53	63.905	-0.020	0.000	0.04		7.7	OK
14.000	RE13	64.074	-0.201	0.000	0.03		0.9	OK
14.001	S54	63.905	-0.195	0.000	0.03		2.0	OK
14.002	S55	63.905	-0.020	0.000	0.02		3.0	OK
10.004	S56	63.905	0.180	0.000	0.06		10.3	SURCHARGED
15.000	S57	63.905	-0.060	0.000	0.02		1.0	OK
10.005	S58	63.905	0.280	0.000	0.04		11.0	SURCHARGED
16.000	S59	64.087	-0.188	0.000	0.06		2.3	OK
16.001	S60	63.906	-0.169	0.000	0.06		3.3	OK

Bailey Johnson Hayes		Page 57
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:02 File 100yr+40% 2880min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 2880 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe (l/s)	Status
17.000	S61	63.906	-0.269	0.000	0.02		3.0	OK
16.002	S62	63.906	-0.054	0.000	0.07		6.3	OK
16.003	S63	63.905	0.010	0.000	0.07		7.9	SURCHARGED
18.000	S64	63.905	0.080	0.000	0.03		2.2	SURCHARGED
19.000	S65	63.905	0.080	0.000	0.03		2.2	SURCHARGED
16.004	S66	63.905	0.205	0.000	0.06		11.8	SURCHARGED
16.005	PI Unit 9	63.905	0.370	0.000	0.06		11.7	SURCHARGED
20.000	S67	64.032	0.007	0.000	0.11		3.8	SURCHARGED
21.000	RE14	64.124	-0.201	0.000	0.03		0.9	OK
21.001	S68	64.043	-0.182	0.000	0.02		1.6	OK
22.000	RE15	64.121	-0.204	0.000	0.02		0.7	OK
22.001	S69	64.042	-0.108	0.000	0.02		1.6	OK
23.000	David Lloyd	64.326	-0.349	0.000	0.11		24.8	OK
23.001	S69	64.191	0.091	0.000	0.23		24.8	SURCHARGED
21.002	S70	64.041	0.016	0.000	0.24		27.9	SURCHARGED
20.001	S71	64.028	0.103	0.000	0.29		30.2	SURCHARGED
24.000	RE16	64.000	0.025	0.000	0.03		0.9	SURCHARGED
20.002	S72	63.999	0.124	0.000	0.26		32.1	SURCHARGED
25.000	RE17	63.975	-0.200	0.000	0.03		1.1	OK
25.001	S73	63.937	-0.013	0.000	0.02		2.0	OK
26.000	S74	63.940	-0.020	0.000	0.03		2.0	OK
27.000	S75	63.963	-0.202	0.000	0.02		1.1	OK
26.001	S76	63.938	0.063	0.000	0.03		3.1	SURCHARGED
28.000	S77	63.939	-0.061	0.000	0.03		2.3	OK
26.002	S78	63.937	0.122	0.000	0.05		5.3	SURCHARGED
26.003	PI Unit 7	63.936	0.221	0.000	0.06		5.2	SURCHARGED
20.003	S79	63.935	0.195	0.000	0.23		38.3	SURCHARGED
29.000	S80	63.908	-0.042	0.000	0.02		1.0	OK
20.004	S81	63.908	0.268	0.000	0.19		38.9	SURCHARGED
1.006	HW 7-12	63.904	0.554	0.000	0.10		12.1	SURCHARGED
1.007	S82	63.919	0.744	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 58
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:05 File 100yr+40% 2160min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	4320
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	2160

Bailey Johnson Hayes		Page 59
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:05 File 100yr+40% 2160min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 2160 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	63.956	-0.394	0.000	0.04		6.6	OK
2.000	S26	63.898	-0.227	0.000	0.04		2.6	OK
1.001	S27	63.898	-0.227	0.000	0.05		9.2	OK
3.000	S28	64.036	-0.264	0.000	0.04		2.6	OK
3.001	S29	63.908	-0.092	0.000	0.03	0.0	2.6	OK
1.002	S30	63.898	-0.182	0.000	0.06		13.8	OK
4.000	S31	63.920	-0.335	0.000	0.03		4.8	OK
1.003	S32	63.898	0.073	0.000	0.07		18.2	SURCHARGED
5.000	S33	63.969	-0.206	0.000	0.02		0.9	OK
1.004	S34	63.897	0.147	0.000	0.08		18.8	SURCHARGED
1.005	PI Unit 4	63.897	0.247	0.000	0.06		18.7	SURCHARGED
6.000	RE8	64.306	-0.219	0.000	0.01		0.2	OK
6.001	S35	64.180	-0.195	0.000	0.04		1.5	OK
6.002	S36	63.939	-0.261	0.000	0.04		2.8	OK
7.000	RE9	64.328	-0.197	0.000	0.04		1.3	OK
7.001	S37	64.112	-0.263	0.000	0.04		2.6	OK
7.002	S38	63.899	-0.251	0.000	0.04		2.8	OK
8.000	S39	64.053	-0.247	0.000	0.07		4.7	OK
8.001	S40	63.939	-0.086	0.000	0.08	0.0	4.6	OK
6.003	S41	63.899	-0.161	0.000	0.09		10.2	OK
6.004	S42	63.898	-0.152	0.000	0.08		12.0	OK
9.000	RE10	64.129	-0.196	0.000	0.04		1.4	OK
9.001	S43	63.898	-0.202	0.000	0.04		3.2	OK
9.002	S44	63.898	-0.027	0.000	0.04		4.6	OK
6.005	S45	63.898	0.123	0.000	0.08		16.2	SURCHARGED
6.006	S46	63.897	0.287	0.000	0.06		15.9	SURCHARGED
10.000	RE11	64.123	-0.202	0.000	0.02		0.8	OK
10.001	S47	63.898	-0.177	0.000	0.05		1.9	OK
11.000	RE12	64.125	-0.200	0.000	0.03		1.1	OK
11.001	S48	63.933	-0.192	0.000	0.05		1.9	OK
10.002	S49	63.897	-0.053	0.000	0.05		3.8	OK
12.000	S50	63.897	-0.063	0.000	0.05		1.7	OK
13.000	S51	63.898	-0.227	0.000	0.04		2.9	OK
13.001	S52	63.897	0.022	0.000	0.05		2.9	SURCHARGED
10.003	S53	63.897	-0.028	0.000	0.06		9.7	OK
14.000	RE13	64.076	-0.199	0.000	0.03		1.1	OK
14.001	S54	63.897	-0.203	0.000	0.03		2.6	OK
14.002	S55	63.897	-0.028	0.000	0.03		3.7	OK
10.004	S56	63.897	0.172	0.000	0.08		12.9	SURCHARGED
15.000	S57	63.897	-0.068	0.000	0.03		1.3	OK
10.005	S58	63.897	0.272	0.000	0.05		13.8	SURCHARGED
16.000	S59	64.092	-0.183	0.000	0.08		2.8	OK
16.001	S60	63.898	-0.177	0.000	0.07		4.1	OK

Bailey Johnson Hayes		Page 60
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:05 File 100yr+40% 2160min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Summary of Results for 2160 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe (l/s)	Status
17.000	S61	63.898	-0.277	0.000	0.03		3.7	OK
16.002	S62	63.898	-0.062	0.000	0.08		7.8	OK
16.003	S63	63.898	0.003	0.000	0.09		9.8	SURCHARGED
18.000	S64	63.898	0.073	0.000	0.03		2.8	SURCHARGED
19.000	S65	63.898	0.073	0.000	0.03		2.8	SURCHARGED
16.004	S66	63.898	0.198	0.000	0.08		14.7	SURCHARGED
16.005	PI Unit 9	63.897	0.362	0.000	0.08		14.4	SURCHARGED
20.000	S67	64.105	0.080	0.000	0.14		5.1	FLOOD RISK
21.000	RE14	64.141	-0.184	0.000	0.03		1.1	OK
21.001	S68	64.137	-0.088	0.000	0.03		2.0	OK
22.000	RE15	64.140	-0.185	0.000	0.02		0.9	OK
22.001	S69	64.136	-0.014	0.000	0.03		2.0	OK
23.000	David Lloyd	64.343	-0.332	0.000	0.14		30.7	OK
23.001	S69	64.287	0.187	0.000	0.29		30.7	SURCHARGED
21.002	S70	64.135	0.110	0.000	0.29		34.6	SURCHARGED
20.001	S71	64.100	0.175	0.000	0.36		37.5	SURCHARGED
24.000	RE16	64.031	0.056	0.000	0.03		1.1	SURCHARGED
20.002	S72	64.029	0.154	0.000	0.33		39.9	SURCHARGED
25.000	RE17	63.977	-0.198	0.000	0.04		1.4	OK
25.001	S73	63.955	0.005	0.000	0.03		2.6	SURCHARGED
26.000	S74	63.959	-0.001	0.000	0.03		2.5	OK
27.000	S75	63.966	-0.199	0.000	0.03		1.4	OK
26.001	S76	63.956	0.081	0.000	0.04		3.9	SURCHARGED
28.000	S77	63.957	-0.043	0.000	0.04		2.9	OK
26.002	S78	63.955	0.140	0.000	0.06		6.7	SURCHARGED
26.003	PI Unit 7	63.955	0.240	0.000	0.08		6.6	SURCHARGED
20.003	S79	63.953	0.213	0.000	0.29		47.7	SURCHARGED
29.000	S80	63.900	-0.050	0.000	0.03		1.3	OK
20.004	S81	63.900	0.260	0.000	0.23		48.5	SURCHARGED
1.006	HW 7-12	63.896	0.546	0.000	0.10		12.1	SURCHARGED
1.007	S82	63.909	0.734	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 61
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:07 File 100yr+40% 1440min winte...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	2880
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	24
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	1440

Bailey Johnson Hayes		Page 62
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:07 File 100yr+40% 1440min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 1440 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	63.965	-0.385	0.000	0.05		9.0	OK
2.000	S26	63.872	-0.253	0.000	0.06		3.6	OK
1.001	S27	63.869	-0.256	0.000	0.06		12.5	OK
3.000	S28	64.042	-0.258	0.000	0.05		3.5	OK
3.001	S29	63.883	-0.117	0.000	0.04	0.0	3.5	OK
1.002	S30	63.869	-0.211	0.000	0.08		18.8	OK
4.000	S31	63.925	-0.330	0.000	0.03		6.5	OK
1.003	S32	63.868	0.043	0.000	0.10		24.8	SURCHARGED
5.000	S33	63.974	-0.201	0.000	0.02		1.2	OK
1.004	S34	63.868	0.118	0.000	0.10		25.8	SURCHARGED
1.005	PI Unit 4	63.868	0.218	0.000	0.09		25.5	SURCHARGED
6.000	RE8	64.309	-0.216	0.000	0.01		0.3	OK
6.001	S35	64.185	-0.190	0.000	0.06		2.1	OK
6.002	S36	63.945	-0.255	0.000	0.06		3.9	OK
7.000	RE9	64.333	-0.192	0.000	0.05		1.8	OK
7.001	S37	64.118	-0.257	0.000	0.05		3.6	OK
7.002	S38	63.895	-0.255	0.000	0.06		3.9	OK
8.000	S39	64.083	-0.217	0.000	0.08		5.2	OK
8.001	S40	64.065	0.040	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.870	-0.190	0.000	0.11		12.7	OK
6.004	S42	63.869	-0.181	0.000	0.09		15.1	OK
9.000	RE10	64.134	-0.191	0.000	0.06		1.9	OK
9.001	S43	63.869	-0.231	0.000	0.06		4.4	OK
9.002	S44	63.869	-0.056	0.000	0.06		6.3	OK
6.005	S45	63.869	0.094	0.000	0.11		21.1	SURCHARGED
6.006	S46	63.868	0.258	0.000	0.08		20.6	SURCHARGED
10.000	RE11	64.126	-0.199	0.000	0.03		1.1	OK
10.001	S47	63.889	-0.186	0.000	0.07		2.6	OK
11.000	RE12	64.129	-0.196	0.000	0.04		1.5	OK
11.001	S48	63.940	-0.185	0.000	0.07		2.6	OK
10.002	S49	63.868	-0.082	0.000	0.07		5.1	OK
12.000	S50	63.868	-0.092	0.000	0.06		2.3	OK
13.000	S51	63.872	-0.253	0.000	0.06		3.9	OK
13.001	S52	63.868	-0.007	0.000	0.06		3.9	OK
10.003	S53	63.868	-0.057	0.000	0.08		13.2	OK
14.000	RE13	64.080	-0.195	0.000	0.04		1.5	OK
14.001	S54	63.868	-0.232	0.000	0.05		3.5	OK
14.002	S55	63.868	-0.057	0.000	0.04		5.0	OK
10.004	S56	63.868	0.143	0.000	0.11		17.8	SURCHARGED
15.000	S57	63.868	-0.097	0.000	0.03		1.7	OK
10.005	S58	63.868	0.243	0.000	0.07		19.0	SURCHARGED
16.000	S59	64.099	-0.176	0.000	0.11		3.9	OK
16.001	S60	63.872	-0.203	0.000	0.09		5.6	OK

Bailey Johnson Hayes		Page 63
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:07 File 100yr+40% 1440min winte...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 1440 minute 100 year Winter (Storm)

PN	US/MH Name	Water Surcharged Flooded			Pipe		Status
		Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	
17.000	S61	63.870	-0.305	0.000	0.04	5.1	OK
16.002	S62	63.870	-0.090	0.000	0.11	10.7	OK
16.003	S63	63.870	-0.025	0.000	0.12	13.4	OK
18.000	S64	63.868	0.043	0.000	0.05	3.8	SURCHARGED
19.000	S65	63.869	0.044	0.000	0.05	3.8	SURCHARGED
16.004	S66	63.869	0.169	0.000	0.11	20.1	SURCHARGED
16.005	PI Unit 9	63.868	0.333	0.000	0.10	19.7	SURCHARGED
20.000	S67	64.124	0.099	0.000	0.16	5.6	FLOOD RISK
21.000	RE14	64.188	-0.137	0.000	0.04	1.5	OK
21.001	S68	64.186	-0.039	0.000	0.04	2.7	OK
22.000	RE15	64.188	-0.137	0.000	0.03	1.2	OK
22.001	S69	64.186	0.036	0.000	0.04	2.7	SURCHARGED
23.000	David Lloyd	64.370	-0.305	0.000	0.19	41.2	OK
23.001	S69	64.340	0.240	0.000	0.38	41.2	SURCHARGED
21.002	S70	64.184	0.159	0.000	0.39	46.4	SURCHARGED
20.001	S71	64.122	0.197	0.000	0.49	50.4	SURCHARGED
24.000	RE16	64.043	0.068	0.000	0.04	1.5	SURCHARGED
20.002	S72	64.041	0.166	0.000	0.44	53.7	SURCHARGED
25.000	RE17	63.982	-0.193	0.000	0.05	1.9	OK
25.001	S73	63.959	0.009	0.000	0.04	3.5	SURCHARGED
26.000	S74	63.961	0.001	0.000	0.05	3.4	SURCHARGED
27.000	S75	63.969	-0.196	0.000	0.04	1.9	OK
26.001	S76	63.960	0.085	0.000	0.05	5.3	SURCHARGED
28.000	S77	63.961	-0.039	0.000	0.05	4.0	OK
26.002	S78	63.959	0.144	0.000	0.09	9.2	SURCHARGED
26.003	PI Unit 7	63.959	0.244	0.000	0.11	9.2	SURCHARGED
20.003	S79	63.958	0.218	0.000	0.40	65.0	SURCHARGED
29.000	S80	63.872	-0.078	0.000	0.03	1.7	OK
20.004	S81	63.872	0.232	0.000	0.32	66.1	SURCHARGED
1.006	HW 7-12	63.867	0.517	0.000	0.10	12.8	SURCHARGED
1.007	S82	63.999	0.824	0.000	0.20	12.0	SURCHARGED


Bailey Johnson Hayes		Page 64
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:09 File 100yr+40% 960min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	1920
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	16
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	960

Bailey Johnson Hayes		Page 65
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:09 File 100yr+40% 960min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 960 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	63.978	-0.372	0.000	0.07		12.3	OK
2.000	S26	63.882	-0.243	0.000	0.08		4.9	OK
1.001	S27	63.826	-0.299	0.000	0.09		17.2	OK
3.000	S28	64.050	-0.250	0.000	0.07		4.8	OK
3.001	S29	63.854	-0.146	0.000	0.05	0.0	4.8	OK
1.002	S30	63.825	-0.255	0.000	0.11		25.6	OK
4.000	S31	63.932	-0.323	0.000	0.05		8.9	OK
1.003	S32	63.825	0.000	0.000	0.14		34.1	OK
5.000	S33	63.977	-0.198	0.000	0.03		1.7	OK
1.004	S34	63.822	0.072	0.000	0.14		35.4	SURCHARGED
1.005	PI Unit 4	63.822	0.172	0.000	0.12		35.0	SURCHARGED
6.000	RE8	64.312	-0.213	0.000	0.01		0.4	OK
6.001	S35	64.192	-0.183	0.000	0.08		2.8	OK
6.002	S36	63.954	-0.246	0.000	0.08		5.3	OK
7.000	RE9	64.339	-0.186	0.000	0.07		2.5	OK
7.001	S37	64.126	-0.249	0.000	0.07		4.9	OK
7.002	S38	63.905	-0.245	0.000	0.08		5.3	OK
8.000	S39	64.135	-0.165	0.000	0.09		5.5	OK
8.001	S40	64.126	0.101	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.824	-0.236	0.000	0.14		15.5	OK
6.004	S42	63.823	-0.227	0.000	0.12		18.8	OK
9.000	RE10	64.141	-0.184	0.000	0.08		2.7	OK
9.001	S43	63.857	-0.243	0.000	0.08		6.0	OK
9.002	S44	63.823	-0.102	0.000	0.08		8.6	OK
6.005	S45	63.823	0.048	0.000	0.14		27.1	SURCHARGED
6.006	S46	63.823	0.213	0.000	0.10		26.6	SURCHARGED
10.000	RE11	64.130	-0.195	0.000	0.04		1.5	OK
10.001	S47	63.897	-0.178	0.000	0.10		3.5	OK
11.000	RE12	64.133	-0.192	0.000	0.05		2.0	OK
11.001	S48	63.947	-0.178	0.000	0.10		3.5	OK
10.002	S49	63.822	-0.128	0.000	0.09		7.0	OK
12.000	S50	63.822	-0.138	0.000	0.09		3.1	OK
13.000	S51	63.881	-0.244	0.000	0.08		5.3	OK
13.001	S52	63.822	-0.053	0.000	0.08		5.3	OK
10.003	S53	63.822	-0.103	0.000	0.11		18.1	OK
14.000	RE13	64.085	-0.190	0.000	0.06		2.1	OK
14.001	S54	63.849	-0.251	0.000	0.06		4.8	OK
14.002	S55	63.822	-0.103	0.000	0.05		6.9	OK
10.004	S56	63.822	0.097	0.000	0.15		24.5	SURCHARGED
15.000	S57	63.822	-0.143	0.000	0.05		2.4	OK
10.005	S58	63.822	0.197	0.000	0.09		26.2	SURCHARGED
16.000	S59	64.107	-0.168	0.000	0.15		5.2	OK
16.001	S60	63.846	-0.229	0.000	0.13		7.6	OK

Bailey Johnson Hayes		Page 66
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:09 File 100yr+40% 960min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 960 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	63.854	-0.321	0.000	0.05		6.9	OK
16.002	S62	63.822	-0.138	0.000	0.15		14.5	OK
16.003	S63	63.822	-0.073	0.000	0.17		18.2	OK
18.000	S64	63.822	-0.003	0.000	0.06		5.2	OK
19.000	S65	63.822	-0.003	0.000	0.06		5.2	OK
16.004	S66	63.822	0.122	0.000	0.14		27.6	SURCHARGED
16.005	PI Unit 9	63.822	0.287	0.000	0.14		27.0	SURCHARGED
20.000	S67	64.110	0.085	0.000	0.16		5.5	FLOOD RISK
21.000	RE14	64.195	-0.130	0.000	0.06		2.1	OK
21.001	S68	64.193	-0.032	0.000	0.05		3.7	OK
22.000	RE15	64.194	-0.131	0.000	0.05		1.6	OK
22.001	S69	64.193	0.043	0.000	0.05		3.7	SURCHARGED
23.000	David Lloyd	64.381	-0.294	0.000	0.26		55.6	OK
23.001	S69	64.354	0.254	0.000	0.52		55.6	SURCHARGED
21.002	S70	64.191	0.166	0.000	0.53		62.5	SURCHARGED
20.001	S71	64.106	0.181	0.000	0.65		67.9	SURCHARGED
24.000	RE16	64.024	0.049	0.000	0.06		2.1	SURCHARGED
20.002	S72	64.023	0.148	0.000	0.60		72.4	SURCHARGED
25.000	RE17	63.987	-0.188	0.000	0.07		2.7	OK
25.001	S73	63.941	-0.009	0.000	0.06		4.8	OK
26.000	S74	63.943	-0.017	0.000	0.07		4.7	OK
27.000	S75	63.973	-0.192	0.000	0.05		2.7	OK
26.001	S76	63.942	0.067	0.000	0.07		7.3	SURCHARGED
28.000	S77	63.943	-0.057	0.000	0.07		5.4	OK
26.002	S78	63.941	0.126	0.000	0.12		12.7	SURCHARGED
26.003	PI Unit 7	63.941	0.226	0.000	0.16		12.6	SURCHARGED
20.003	S79	63.940	0.200	0.000	0.54		88.3	SURCHARGED
29.000	S80	63.844	-0.106	0.000	0.05		2.4	OK
20.004	S81	63.843	0.203	0.000	0.43		89.7	SURCHARGED
1.006	HW 7-12	63.822	0.472	0.000	0.11		13.3	SURCHARGED
1.007	S82	63.966	0.791	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 67
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:14 File 100yr+40% 720min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	1440
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	12
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	720

Bailey Johnson Hayes		Page 68
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:14 File 100yr+40% 720min winter...	Designed by P.A.B. Checked by	
Micro Drainage Network 2017.1		

Summary of Results for 720 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	63.989	-0.361	0.000	0.09		15.4	OK
2.000	S26	63.889	-0.236	0.000	0.10		6.1	OK
1.001	S27	63.783	-0.342	0.000	0.11		21.5	OK
3.000	S28	64.065	-0.235	0.000	0.08		5.8	OK
3.001	S29	64.038	0.038	0.000	0.05	0.0	5.0	SURCHARGED
1.002	S30	63.783	-0.297	0.000	0.13		31.1	OK
4.000	S31	63.939	-0.316	0.000	0.06		11.1	OK
1.003	S32	63.783	-0.042	0.000	0.17		42.2	OK
5.000	S33	63.979	-0.196	0.000	0.04		2.1	OK
1.004	S34	63.783	0.033	0.000	0.18		44.0	SURCHARGED
1.005	PI Unit 4	63.783	0.133	0.000	0.15		43.6	SURCHARGED
6.000	RE8	64.315	-0.210	0.000	0.01		0.5	OK
6.001	S35	64.197	-0.178	0.000	0.10		3.5	OK
6.002	S36	63.962	-0.238	0.000	0.09		6.6	OK
7.000	RE9	64.345	-0.180	0.000	0.09		3.1	OK
7.001	S37	64.133	-0.242	0.000	0.08		6.1	OK
7.002	S38	63.912	-0.238	0.000	0.10		6.6	OK
8.000	S39	64.168	-0.132	0.000	0.09		5.8	OK
8.001	S40	64.159	0.134	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.789	-0.271	0.000	0.16		18.2	OK
6.004	S42	63.787	-0.263	0.000	0.14		22.3	OK
9.000	RE10	64.146	-0.179	0.000	0.09		3.3	OK
9.001	S43	63.864	-0.236	0.000	0.10		7.5	OK
9.002	S44	63.785	-0.140	0.000	0.10		10.8	OK
6.005	S45	63.785	0.010	0.000	0.17		32.8	SURCHARGED
6.006	S46	63.784	0.174	0.000	0.12		32.2	SURCHARGED
10.000	RE11	64.133	-0.192	0.000	0.05		1.9	OK
10.001	S47	63.902	-0.173	0.000	0.12		4.4	OK
11.000	RE12	64.138	-0.187	0.000	0.07		2.5	OK
11.001	S48	63.953	-0.172	0.000	0.13		4.4	OK
10.002	S49	63.783	-0.167	0.000	0.12		8.8	OK
12.000	S50	63.785	-0.175	0.000	0.11		3.9	OK
13.000	S51	63.888	-0.237	0.000	0.10		6.7	OK
13.001	S52	63.783	-0.092	0.000	0.11		6.7	OK
10.003	S53	63.783	-0.142	0.000	0.13		22.7	OK
14.000	RE13	64.090	-0.185	0.000	0.07		2.6	OK
14.001	S54	63.856	-0.244	0.000	0.08		6.0	OK
14.002	S55	63.783	-0.142	0.000	0.06		8.6	OK
10.004	S56	63.783	0.058	0.000	0.19		30.8	SURCHARGED
15.000	S57	63.783	-0.182	0.000	0.06		3.0	OK
10.005	S58	63.783	0.158	0.000	0.12		33.0	SURCHARGED
16.000	S59	64.114	-0.161	0.000	0.18		6.4	OK
16.001	S60	63.854	-0.221	0.000	0.15		9.3	OK

Bailey Johnson Hayes		Page 69
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:14 File 100yr+40% 720min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 720 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe (l/s)	Status
17.000	S61	63.862	-0.313	0.000	0.06		8.7	OK
16.002	S62	63.783	-0.177	0.000	0.19		17.8	OK
16.003	S63	63.783	-0.112	0.000	0.20		22.5	OK
18.000	S64	63.783	-0.042	0.000	0.08		6.5	OK
19.000	S65	63.783	-0.042	0.000	0.08		6.5	OK
16.004	S66	63.783	0.083	0.000	0.18		34.6	SURCHARGED
16.005	PI Unit 9	63.783	0.248	0.000	0.18		33.9	SURCHARGED
20.000	S67	64.104	0.079	0.000	0.20		6.9	FLOOD RISK
21.000	RE14	64.193	-0.132	0.000	0.07		2.6	OK
21.001	S68	64.191	-0.034	0.000	0.06		4.6	OK
22.000	RE15	64.192	-0.133	0.000	0.06		2.0	OK
22.001	S69	64.190	0.040	0.000	0.06		4.6	SURCHARGED
23.000	David Lloyd	64.407	-0.268	0.000	0.28		61.2	OK
23.001	S69	64.359	0.259	0.000	0.56		59.7	SURCHARGED
21.002	S70	64.189	0.164	0.000	0.58		68.6	SURCHARGED
20.001	S71	64.100	0.175	0.000	0.73		75.5	SURCHARGED
24.000	RE16	64.022	0.047	0.000	0.07		2.6	SURCHARGED
20.002	S72	64.021	0.146	0.000	0.67		81.3	SURCHARGED
25.000	RE17	63.993	-0.182	0.000	0.08		3.3	OK
25.001	S73	63.940	-0.010	0.000	0.07		6.0	OK
26.000	S74	63.942	-0.018	0.000	0.08		5.8	OK
27.000	S75	63.978	-0.187	0.000	0.07		3.3	OK
26.001	S76	63.941	0.066	0.000	0.09		9.2	SURCHARGED
28.000	S77	63.942	-0.058	0.000	0.09		6.8	OK
26.002	S78	63.940	0.125	0.000	0.15		15.9	SURCHARGED
26.003	PI Unit 7	63.940	0.225	0.000	0.20		15.9	SURCHARGED
20.003	S79	63.939	0.199	0.000	0.63		102.9	SURCHARGED
29.000	S80	63.841	-0.109	0.000	0.06		3.0	OK
20.004	S81	63.840	0.200	0.000	0.50		105.3	SURCHARGED
1.006	HW 7-12	63.783	0.433	0.000	0.11		13.7	SURCHARGED
1.007	S82	63.904	0.729	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 70
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:12 File 100yr+40% 600min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	1200
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	10
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	600

Bailey Johnson Hayes		Page 71
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:12 File 100yr+40% 600min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 600 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	63.995	-0.355	0.000	0.10		17.7	OK
2.000	S26	63.893	-0.232	0.000	0.12		7.1	OK
1.001	S27	63.756	-0.369	0.000	0.12		24.8	OK
3.000	S28	64.090	-0.210	0.000	0.08		6.0	OK
3.001	S29	64.082	0.082	0.000	0.05	0.0	5.0	SURCHARGED
1.002	S30	63.756	-0.324	0.000	0.14		34.9	OK
4.000	S31	63.944	-0.311	0.000	0.07		12.8	OK
1.003	S32	63.756	-0.069	0.000	0.19		47.7	OK
5.000	S33	63.981	-0.194	0.000	0.05		2.4	OK
1.004	S34	63.756	0.006	0.000	0.20		50.2	SURCHARGED
1.005	PI Unit 4	63.756	0.106	0.000	0.17		49.7	SURCHARGED
6.000	RE8	64.317	-0.208	0.000	0.02		0.5	OK
6.001	S35	64.200	-0.175	0.000	0.11		4.1	OK
6.002	S36	63.966	-0.234	0.000	0.11		7.6	OK
7.000	RE9	64.348	-0.177	0.000	0.10		3.5	OK
7.001	S37	64.138	-0.237	0.000	0.10		7.1	OK
7.002	S38	63.916	-0.234	0.000	0.11		7.6	OK
8.000	S39	64.185	-0.115	0.000	0.09		6.1	OK
8.001	S40	64.176	0.151	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.791	-0.269	0.000	0.18		20.2	OK
6.004	S42	63.773	-0.277	0.000	0.16		25.0	OK
9.000	RE10	64.149	-0.176	0.000	0.11		3.8	OK
9.001	S43	63.868	-0.232	0.000	0.12		8.6	OK
9.002	S44	63.770	-0.155	0.000	0.11		12.5	OK
6.005	S45	63.770	-0.005	0.000	0.19		37.4	OK
6.006	S46	63.758	0.148	0.000	0.13		36.7	SURCHARGED
10.000	RE11	64.136	-0.189	0.000	0.06		2.2	OK
10.001	S47	63.906	-0.169	0.000	0.14		5.1	OK
11.000	RE12	64.141	-0.184	0.000	0.08		2.9	OK
11.001	S48	63.957	-0.168	0.000	0.14		5.1	OK
10.002	S49	63.756	-0.194	0.000	0.14		10.1	OK
12.000	S50	63.788	-0.172	0.000	0.13		4.5	OK
13.000	S51	63.892	-0.233	0.000	0.12		7.7	OK
13.001	S52	63.756	-0.119	0.000	0.12		7.7	OK
10.003	S53	63.756	-0.169	0.000	0.15		26.1	OK
14.000	RE13	64.094	-0.181	0.000	0.09		3.1	OK
14.001	S54	63.861	-0.239	0.000	0.09		6.9	OK
14.002	S55	63.756	-0.169	0.000	0.07		9.9	OK
10.004	S56	63.756	0.031	0.000	0.22		35.6	SURCHARGED
15.000	S57	63.778	-0.187	0.000	0.07		3.4	OK
10.005	S58	63.756	0.131	0.000	0.14		38.5	SURCHARGED
16.000	S59	64.118	-0.157	0.000	0.20		7.2	OK
16.001	S60	63.859	-0.216	0.000	0.18		10.5	OK

Bailey Johnson Hayes		Page 72
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:12 File 100yr+40% 600min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 600 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	63.867	-0.308	0.000	0.07		10.0	OK
16.002	S62	63.756	-0.204	0.000	0.22		20.3	OK
16.003	S63	63.756	-0.139	0.000	0.23		25.7	OK
18.000	S64	63.756	-0.069	0.000	0.09		7.5	OK
19.000	S65	63.756	-0.069	0.000	0.09		7.5	OK
16.004	S66	63.756	0.056	0.000	0.21		40.1	SURCHARGED
16.005	PI Unit 9	63.756	0.221	0.000	0.21		39.4	SURCHARGED
20.000	S67	64.103	0.078	0.000	0.23		8.2	FLOOD RISK
21.000	RE14	64.192	-0.133	0.000	0.09		3.0	OK
21.001	S68	64.191	-0.034	0.000	0.07		5.3	OK
22.000	RE15	64.192	-0.133	0.000	0.07		2.3	OK
22.001	S69	64.190	0.040	0.000	0.07		5.3	SURCHARGED
23.000	David Lloyd	64.438	-0.237	0.000	0.29		62.2	OK
23.001	S69	64.382	0.282	0.000	0.56		59.9	SURCHARGED
21.002	S70	64.189	0.164	0.000	0.59		70.3	SURCHARGED
20.001	S71	64.099	0.174	0.000	0.75		78.2	SURCHARGED
24.000	RE16	64.014	0.039	0.000	0.09		3.1	SURCHARGED
20.002	S72	64.013	0.138	0.000	0.70		85.0	SURCHARGED
25.000	RE17	63.996	-0.179	0.000	0.10		3.8	OK
25.001	S73	63.921	-0.029	0.000	0.08		6.9	OK
26.000	S74	63.923	-0.037	0.000	0.09		6.7	OK
27.000	S75	63.981	-0.184	0.000	0.08		3.8	OK
26.001	S76	63.922	0.047	0.000	0.10		10.6	SURCHARGED
28.000	S77	63.923	-0.077	0.000	0.10		7.8	OK
26.002	S78	63.921	0.106	0.000	0.17		18.4	SURCHARGED
26.003	PI Unit 7	63.921	0.206	0.000	0.23		18.4	SURCHARGED
20.003	S79	63.920	0.180	0.000	0.68		110.2	SURCHARGED
29.000	S80	63.823	-0.127	0.000	0.07		3.4	OK
20.004	S81	63.821	0.181	0.000	0.54		113.5	SURCHARGED
1.006	HW 7-12	63.756	0.406	0.000	0.11		13.6	SURCHARGED
1.007	S82	63.805	0.630	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 73
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:16 File 100yr+40% 480min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	960
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	8
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	480

Bailey Johnson Hayes		Page 74
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:16 File 100yr+40% 480min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 480 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.003	-0.347	0.000	0.12	21.1	OK
2.000	S26	63.899	-0.226	0.000	0.14	8.4	OK
1.001	S27	63.737	-0.388	0.000	0.15	29.5	OK
3.000	S28	64.115	-0.185	0.000	0.09	6.4	OK
3.001	S29	64.108	0.108	0.000	0.05	0.0 5.0	SURCHARGED
1.002	S30	63.723	-0.357	0.000	0.17	40.4	OK
4.000	S31	63.951	-0.304	0.000	0.08	15.3	OK
1.003	S32	63.723	-0.102	0.000	0.22	55.7	OK
5.000	S33	63.984	-0.191	0.000	0.06	2.9	OK
1.004	S34	63.723	-0.027	0.000	0.24	58.6	OK
1.005	PI Unit 4	63.723	0.073	0.000	0.20	58.3	SURCHARGED
6.000	RE8	64.320	-0.205	0.000	0.02	0.7	OK
6.001	S35	64.205	-0.170	0.000	0.14	4.9	OK
6.002	S36	63.971	-0.229	0.000	0.13	9.1	OK
7.000	RE9	64.352	-0.173	0.000	0.12	4.2	OK
7.001	S37	64.143	-0.232	0.000	0.12	8.4	OK
7.002	S38	63.922	-0.228	0.000	0.13	9.1	OK
8.000	S39	64.203	-0.097	0.000	0.10	6.3	OK
8.001	S40	64.194	0.169	0.000	0.08	0.0 5.0	SURCHARGED
6.003	S41	63.799	-0.261	0.000	0.20	23.1	OK
6.004	S42	63.733	-0.317	0.000	0.18	28.8	OK
9.000	RE10	64.154	-0.171	0.000	0.13	4.6	OK
9.001	S43	63.874	-0.226	0.000	0.14	10.2	OK
9.002	S44	63.730	-0.195	0.000	0.13	14.8	OK
6.005	S45	63.730	-0.045	0.000	0.22	43.6	OK
6.006	S46	63.725	0.115	0.000	0.16	42.8	SURCHARGED
10.000	RE11	64.140	-0.185	0.000	0.07	2.6	OK
10.001	S47	63.912	-0.163	0.000	0.17	6.0	OK
11.000	RE12	64.146	-0.179	0.000	0.09	3.4	OK
11.001	S48	63.962	-0.163	0.000	0.17	6.0	OK
10.002	S49	63.730	-0.220	0.000	0.16	12.1	OK
12.000	S50	63.793	-0.167	0.000	0.15	5.3	OK
13.000	S51	63.898	-0.227	0.000	0.14	9.2	OK
13.001	S52	63.723	-0.152	0.000	0.15	9.2	OK
10.003	S53	63.723	-0.202	0.000	0.18	31.1	OK
14.000	RE13	64.098	-0.177	0.000	0.10	3.6	OK
14.001	S54	63.866	-0.234	0.000	0.11	8.2	OK
14.002	S55	63.723	-0.202	0.000	0.09	11.8	OK
10.004	S56	63.723	-0.002	0.000	0.26	42.9	OK
15.000	S57	63.783	-0.182	0.000	0.08	4.1	OK
10.005	S58	63.723	0.098	0.000	0.17	46.3	SURCHARGED
16.000	S59	64.124	-0.151	0.000	0.24	8.4	OK
16.001	S60	63.867	-0.208	0.000	0.21	12.4	OK

Bailey Johnson Hayes		Page 75
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:16 File 100yr+40% 480min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 480 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	63.875	-0.300	0.000	0.09		11.9	OK
16.002	S62	63.723	-0.237	0.000	0.25		24.0	OK
16.003	S63	63.723	-0.172	0.000	0.28		30.3	OK
18.000	S64	63.723	-0.102	0.000	0.11		8.9	OK
19.000	S65	63.723	-0.102	0.000	0.11		8.9	OK
16.004	S66	63.723	0.023	0.000	0.25		48.0	SURCHARGED
16.005	PI Unit 9	63.723	0.188	0.000	0.25		47.2	SURCHARGED
20.000	S67	64.097	0.072	0.000	0.27		9.4	SURCHARGED
21.000	RE14	64.197	-0.128	0.000	0.10		3.6	OK
21.001	S68	64.196	-0.029	0.000	0.08		6.3	OK
22.000	RE15	64.197	-0.128	0.000	0.08		2.8	OK
22.001	S69	64.196	0.046	0.000	0.08		6.3	SURCHARGED
23.000	David Lloyd	64.477	-0.198	0.000	0.30		64.2	OK
23.001	S69	64.421	0.321	0.000	0.56		59.9	SURCHARGED
21.002	S70	64.194	0.169	0.000	0.61		72.4	SURCHARGED
20.001	S71	64.094	0.169	0.000	0.79		81.7	SURCHARGED
24.000	RE16	64.005	0.030	0.000	0.10		3.6	SURCHARGED
20.002	S72	64.004	0.129	0.000	0.74		89.9	SURCHARGED
25.000	RE17	64.000	-0.175	0.000	0.11		4.6	OK
25.001	S73	63.899	-0.051	0.000	0.09		8.2	OK
26.000	S74	63.902	-0.058	0.000	0.11		8.0	OK
27.000	S75	63.986	-0.179	0.000	0.09		4.6	OK
26.001	S76	63.900	0.025	0.000	0.12		12.6	SURCHARGED
28.000	S77	63.902	-0.098	0.000	0.12		9.3	OK
26.002	S78	63.900	0.085	0.000	0.20		21.8	SURCHARGED
26.003	PI Unit 7	63.899	0.184	0.000	0.27		21.8	SURCHARGED
20.003	S79	63.898	0.158	0.000	0.73		119.9	SURCHARGED
29.000	S80	63.801	-0.149	0.000	0.08		4.1	OK
20.004	S81	63.799	0.159	0.000	0.59		123.8	SURCHARGED
1.006	HW 7-12	63.723	0.373	0.000	0.12		14.6	SURCHARGED
1.007	S82	63.910	0.735	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 76
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:18 File 100yr+40% 360min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	720
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	6
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	360

Bailey Johnson Hayes		Page 77
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:18 File 100yr+40% 360min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 360 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.015	-0.335	0.000	0.15		26.4	OK
2.000	S26	63.909	-0.216	0.000	0.17		10.5	OK
1.001	S27	63.755	-0.370	0.000	0.18		36.9	OK
3.000	S28	64.139	-0.161	0.000	0.10		7.0	OK
3.001	S29	64.133	0.133	0.000	0.05	0.0	5.0	SURCHARGED
1.002	S30	63.716	-0.364	0.000	0.21		49.8	OK
4.000	S31	63.960	-0.295	0.000	0.10		19.1	OK
1.003	S32	63.681	-0.144	0.000	0.28		68.9	OK
5.000	S33	63.989	-0.186	0.000	0.07		3.6	OK
1.004	S34	63.681	-0.069	0.000	0.29		72.5	OK
1.005	PI Unit 4	63.681	0.031	0.000	0.25		72.2	SURCHARGED
6.000	RE8	64.323	-0.202	0.000	0.02		0.8	OK
6.001	S35	64.212	-0.163	0.000	0.17		6.1	OK
6.002	S36	63.980	-0.220	0.000	0.16		11.4	OK
7.000	RE9	64.358	-0.167	0.000	0.15		5.3	OK
7.001	S37	64.151	-0.224	0.000	0.15		10.5	OK
7.002	S38	63.931	-0.219	0.000	0.16		11.4	OK
8.000	S39	64.220	-0.080	0.000	0.10		6.8	OK
8.001	S40	64.211	0.186	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.810	-0.250	0.000	0.24		27.7	OK
6.004	S42	63.742	-0.308	0.000	0.22		34.8	OK
9.000	RE10	64.160	-0.165	0.000	0.16		5.7	OK
9.001	S43	63.884	-0.216	0.000	0.18		12.8	OK
9.002	S44	63.686	-0.239	0.000	0.17		18.5	OK
6.005	S45	63.686	-0.089	0.000	0.27		53.3	OK
6.006	S46	63.683	0.073	0.000	0.19		52.9	SURCHARGED
10.000	RE11	64.145	-0.180	0.000	0.09		3.3	OK
10.001	S47	63.920	-0.155	0.000	0.21		7.5	OK
11.000	RE12	64.151	-0.174	0.000	0.12		4.3	OK
11.001	S48	63.970	-0.155	0.000	0.21		7.5	OK
10.002	S49	63.741	-0.209	0.000	0.20		15.1	OK
12.000	S50	63.801	-0.159	0.000	0.19		6.6	OK
13.000	S51	63.908	-0.217	0.000	0.17		11.5	OK
13.001	S52	63.681	-0.194	0.000	0.18		11.5	OK
10.003	S53	63.681	-0.244	0.000	0.22		38.8	OK
14.000	RE13	64.103	-0.172	0.000	0.13		4.5	OK
14.001	S54	63.873	-0.227	0.000	0.14		10.3	OK
14.002	S55	63.681	-0.244	0.000	0.11		14.8	OK
10.004	S56	63.681	-0.044	0.000	0.33		53.6	OK
15.000	S57	63.788	-0.177	0.000	0.10		5.1	OK
10.005	S58	63.681	0.056	0.000	0.21		58.3	SURCHARGED
16.000	S59	64.131	-0.144	0.000	0.28		10.1	OK
16.001	S60	63.876	-0.199	0.000	0.25		14.9	OK

Bailey Johnson Hayes		Page 78
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:18 File 100yr+40% 360min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 360 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	63.883	-0.292	0.000	0.11		14.9	OK
16.002	S62	63.733	-0.227	0.000	0.31		29.3	OK
16.003	S63	63.681	-0.214	0.000	0.34		37.3	OK
18.000	S64	63.681	-0.144	0.000	0.14		11.2	OK
19.000	S65	63.681	-0.144	0.000	0.13		11.2	OK
16.004	S66	63.681	-0.019	0.000	0.31		59.3	OK
16.005	PI Unit 9	63.681	0.146	0.000	0.31		58.7	SURCHARGED
20.000	S67	64.052	0.027	0.000	0.33		11.6	SURCHARGED
21.000	RE14	64.158	-0.167	0.000	0.13		4.5	OK
21.001	S68	64.158	-0.067	0.000	0.10		7.9	OK
22.000	RE15	64.158	-0.167	0.000	0.10		3.5	OK
22.001	S69	64.158	0.008	0.000	0.11		7.9	SURCHARGED
23.000	David Lloyd	64.521	-0.154	0.000	0.31		67.5	OK
23.001	S69	64.462	0.362	0.000	0.56		59.9	SURCHARGED
21.002	S70	64.158	0.133	0.000	0.64		75.7	SURCHARGED
20.001	S71	64.055	0.130	0.000	0.84		87.1	SURCHARGED
24.000	RE16	63.965	-0.010	0.000	0.13		4.5	OK
20.002	S72	63.965	0.090	0.000	0.80		97.2	SURCHARGED
25.000	RE17	64.006	-0.169	0.000	0.14		5.7	OK
25.001	S73	63.859	-0.091	0.000	0.12		10.3	OK
26.000	S74	63.860	-0.100	0.000	0.14		10.0	OK
27.000	S75	63.991	-0.174	0.000	0.12		5.7	OK
26.001	S76	63.860	-0.015	0.000	0.15		15.7	OK
28.000	S77	63.860	-0.140	0.000	0.16		11.6	OK
26.002	S78	63.860	0.045	0.000	0.25		27.3	SURCHARGED
26.003	PI Unit 7	63.860	0.145	0.000	0.34		27.2	SURCHARGED
20.003	S79	63.859	0.119	0.000	0.82		134.6	SURCHARGED
29.000	S80	63.773	-0.177	0.000	0.10		5.1	OK
20.004	S81	63.761	0.121	0.000	0.67		139.6	SURCHARGED
1.006	HW 7-12	63.681	0.331	0.000	0.11		14.1	SURCHARGED
1.007	S82	63.852	0.677	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 79
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:20 File 100yr+40% 240min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	480
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	240

Bailey Johnson Hayes		Page 80
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:20 File 100yr+40% 240min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 240 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.038	-0.312	0.000	0.21		36.1	OK
2.000	S26	63.924	-0.201	0.000	0.24		14.4	OK
1.001	S27	63.781	-0.344	0.000	0.25		50.4	OK
3.000	S28	64.169	-0.131	0.000	0.11		8.4	OK
3.001	S29	64.163	0.163	0.000	0.05	0.0	5.0	SURCHARGED
1.002	S30	63.741	-0.339	0.000	0.27		66.1	OK
4.000	S31	63.973	-0.282	0.000	0.14		26.2	OK
1.003	S32	63.623	-0.202	0.000	0.37		92.1	OK
5.000	S33	63.997	-0.178	0.000	0.10		5.0	OK
1.004	S34	63.623	-0.127	0.000	0.39		97.1	OK
1.005	PI Unit 4	63.623	-0.027	0.000	0.33		97.2	OK
6.000	RE8	64.326	-0.199	0.000	0.03		1.1	OK
6.001	S35	64.223	-0.152	0.000	0.23		8.4	OK
6.002	S36	63.995	-0.205	0.000	0.22		15.6	OK
7.000	RE9	64.370	-0.155	0.000	0.21		7.2	OK
7.001	S37	64.166	-0.209	0.000	0.20		14.4	OK
7.002	S38	63.946	-0.204	0.000	0.22		15.6	OK
8.000	S39	64.233	-0.067	0.000	0.12		7.9	OK
8.001	S40	64.225	0.200	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.829	-0.231	0.000	0.32		36.1	OK
6.004	S42	63.764	-0.286	0.000	0.29		45.6	OK
9.000	RE10	64.172	-0.153	0.000	0.22		7.8	OK
9.001	S43	63.899	-0.201	0.000	0.24		17.6	OK
9.002	S44	63.671	-0.254	0.000	0.23		25.4	OK
6.005	S45	63.628	-0.147	0.000	0.36		70.9	OK
6.006	S46	63.625	0.015	0.000	0.26		70.8	SURCHARGED
10.000	RE11	64.152	-0.173	0.000	0.12		4.5	OK
10.001	S47	63.932	-0.143	0.000	0.29		10.3	OK
11.000	RE12	64.159	-0.166	0.000	0.16		5.9	OK
11.001	S48	63.983	-0.142	0.000	0.29		10.3	OK
10.002	S49	63.757	-0.193	0.000	0.28		20.7	OK
12.000	S50	63.811	-0.149	0.000	0.25		8.6	OK
13.000	S51	63.923	-0.202	0.000	0.24		15.7	OK
13.001	S52	63.687	-0.188	0.000	0.25		15.6	OK
10.003	S53	63.645	-0.280	0.000	0.30		52.5	OK
14.000	RE13	64.113	-0.162	0.000	0.18		6.2	OK
14.001	S54	63.887	-0.213	0.000	0.19		14.1	OK
14.002	S55	63.647	-0.278	0.000	0.15		20.3	OK
10.004	S56	63.623	-0.102	0.000	0.44		72.6	OK
15.000	S57	63.796	-0.169	0.000	0.14		7.0	OK
10.005	S58	63.623	-0.002	0.000	0.29		79.5	OK
16.000	S59	64.143	-0.132	0.000	0.36		12.8	OK
16.001	S60	63.890	-0.185	0.000	0.31		18.8	OK

Bailey Johnson Hayes		Page 81
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:20 File 100yr+40% 240min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 240 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe (l/s)	Status
17.000	S61	63.897	-0.278	0.000	0.15		20.4	OK
16.002	S62	63.756	-0.204	0.000	0.41		38.3	OK
16.003	S63	63.695	-0.200	0.000	0.44		49.0	OK
18.000	S64	63.623	-0.202	0.000	0.19		15.3	OK
19.000	S65	63.623	-0.202	0.000	0.18		15.3	OK
16.004	S66	63.623	-0.077	0.000	0.41		79.2	OK
16.005	PI Unit 9	63.623	0.088	0.000	0.42		78.8	SURCHARGED
20.000	S67	64.003	-0.022	0.000	0.44		15.6	OK
21.000	RE14	64.163	-0.162	0.000	0.18		6.1	OK
21.001	S68	64.112	-0.113	0.000	0.14		10.8	OK
22.000	RE15	64.155	-0.170	0.000	0.13		4.7	OK
22.001	S69	64.112	-0.038	0.000	0.15		10.8	OK
23.000	David Lloyd	64.566	-0.109	0.000	0.33		71.1	OK
23.001	S69	64.506	0.406	0.000	0.56		59.9	SURCHARGED
21.002	S70	64.112	0.087	0.000	0.68		81.0	SURCHARGED
20.001	S71	64.009	0.084	0.000	0.93		96.2	SURCHARGED
24.000	RE16	63.919	-0.056	0.000	0.17		6.2	OK
20.002	S72	63.919	0.044	0.000	0.90		109.5	SURCHARGED
25.000	RE17	64.017	-0.158	0.000	0.19		7.8	OK
25.001	S73	63.813	-0.137	0.000	0.16		14.1	OK
26.000	S74	63.812	-0.148	0.000	0.19		13.7	OK
27.000	S75	64.000	-0.165	0.000	0.16		7.9	OK
26.001	S76	63.812	-0.063	0.000	0.20		21.3	OK
28.000	S77	63.812	-0.188	0.000	0.21		15.9	OK
26.002	S78	63.812	-0.003	0.000	0.34		36.8	OK
26.003	PI Unit 7	63.812	0.097	0.000	0.45		36.8	SURCHARGED
20.003	S79	63.813	0.073	0.000	0.98		159.8	SURCHARGED
29.000	S80	63.781	-0.169	0.000	0.14		7.0	OK
20.004	S81	63.737	0.097	0.000	0.80		166.5	SURCHARGED
1.006	HW 7-12	63.623	0.273	0.000	0.12		15.2	SURCHARGED
1.007	S82	63.805	0.630	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 82
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:21 File 100yr+40% 180min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	360
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	3
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	180

Bailey Johnson Hayes		Page 83
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:21 File 100yr+40% 180min winter...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 180 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.054	-0.296	0.000	0.26		44.9	OK
2.000	S26	63.937	-0.188	0.000	0.30		18.0	OK
1.001	S27	63.805	-0.320	0.000	0.31		63.0	OK
3.000	S28	64.184	-0.116	0.000	0.13		9.3	OK
3.001	S29	64.177	0.177	0.000	0.05	0.0	5.0	SURCHARGED
1.002	S30	63.765	-0.315	0.000	0.34		81.5	OK
4.000	S31	63.985	-0.270	0.000	0.18		32.7	OK
1.003	S32	63.576	-0.249	0.000	0.46		113.9	OK
5.000	S33	64.002	-0.173	0.000	0.12		6.2	OK
1.004	S34	63.576	-0.174	0.000	0.48		120.0	OK
1.005	PI Unit 4	63.576	-0.074	0.000	0.41		120.0	OK
6.000	RE8	64.329	-0.196	0.000	0.04		1.4	OK
6.001	S35	64.232	-0.143	0.000	0.29		10.4	OK
6.002	S36	64.007	-0.193	0.000	0.28		19.4	OK
7.000	RE9	64.378	-0.147	0.000	0.26		9.0	OK
7.001	S37	64.176	-0.199	0.000	0.25		18.0	OK
7.002	S38	63.958	-0.192	0.000	0.28		19.4	OK
8.000	S39	64.240	-0.060	0.000	0.13		8.7	OK
8.001	S40	64.232	0.207	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.846	-0.214	0.000	0.38		43.8	OK
6.004	S42	63.784	-0.266	0.000	0.35		55.7	OK
9.000	RE10	64.181	-0.144	0.000	0.28		9.8	OK
9.001	S43	63.912	-0.188	0.000	0.30		21.9	OK
9.002	S44	63.687	-0.238	0.000	0.29		31.6	OK
6.005	S45	63.583	-0.192	0.000	0.44		87.2	OK
6.006	S46	63.581	-0.029	0.000	0.32		87.1	OK
10.000	RE11	64.159	-0.166	0.000	0.15		5.6	OK
10.001	S47	63.944	-0.131	0.000	0.36		12.9	OK
11.000	RE12	64.168	-0.157	0.000	0.20		7.3	OK
11.001	S48	63.994	-0.131	0.000	0.37		12.9	OK
10.002	S49	63.772	-0.178	0.000	0.35		25.8	OK
12.000	S50	63.819	-0.141	0.000	0.30		10.5	OK
13.000	S51	63.936	-0.189	0.000	0.29		19.6	OK
13.001	S52	63.705	-0.170	0.000	0.31		19.5	OK
10.003	S53	63.666	-0.259	0.000	0.38		65.0	OK
14.000	RE13	64.121	-0.154	0.000	0.22		7.8	OK
14.001	S54	63.898	-0.202	0.000	0.23		17.6	OK
14.002	S55	63.660	-0.265	0.000	0.19		25.3	OK
10.004	S56	63.576	-0.149	0.000	0.55		89.9	OK
15.000	S57	63.803	-0.162	0.000	0.17		8.7	OK
10.005	S58	63.576	-0.049	0.000	0.35		98.4	OK
16.000	S59	64.150	-0.125	0.000	0.41		14.7	OK
16.001	S60	63.901	-0.174	0.000	0.36		21.9	OK

Bailey Johnson Hayes		Page 84
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:21 File 100yr+40% 180min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Summary of Results for 180 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe (l/s)	Status
17.000	S61	63.910	-0.265	0.000	0.19		25.5	OK
16.002	S62	63.777	-0.183	0.000	0.49		46.0	OK
16.003	S63	63.716	-0.179	0.000	0.54		59.2	OK
18.000	S64	63.624	-0.201	0.000	0.24		19.1	OK
19.000	S65	63.622	-0.203	0.000	0.23		19.2	OK
16.004	S66	63.576	-0.124	0.000	0.50		96.5	OK
16.005	PI Unit 9	63.576	0.041	0.000	0.51		96.5	SURCHARGED
20.000	S67	64.001	-0.024	0.000	0.46		16.0	OK
21.000	RE14	64.171	-0.154	0.000	0.22		7.6	OK
21.001	S68	64.080	-0.145	0.000	0.18		13.3	OK
22.000	RE15	64.162	-0.163	0.000	0.17		5.9	OK
22.001	S69	64.078	-0.072	0.000	0.18		13.1	OK
23.000	David Lloyd	64.586	-0.089	0.000	0.36		77.2	OK
23.001	S69	64.527	0.427	0.000	0.56		59.8	SURCHARGED
21.002	S70	64.076	0.051	0.000	0.71		84.5	SURCHARGED
20.001	S71	63.973	0.048	0.000	0.93		96.5	SURCHARGED
24.000	RE16	63.882	-0.093	0.000	0.23		8.1	OK
20.002	S72	63.882	0.007	0.000	0.92		111.7	SURCHARGED
25.000	RE17	64.025	-0.150	0.000	0.24		9.8	OK
25.001	S73	63.777	-0.173	0.000	0.20		17.6	OK
26.000	S74	63.791	-0.169	0.000	0.24		17.0	OK
27.000	S75	64.008	-0.157	0.000	0.20		9.8	OK
26.001	S76	63.776	-0.099	0.000	0.25		27.3	OK
28.000	S77	63.808	-0.192	0.000	0.27		19.9	OK
26.002	S78	63.776	-0.039	0.000	0.45		48.0	OK
26.003	PI Unit 7	63.776	0.061	0.000	0.59		48.0	SURCHARGED
20.003	S79	63.777	0.037	0.000	1.00		163.3	SURCHARGED
29.000	S80	63.788	-0.162	0.000	0.17		8.7	OK
20.004	S81	63.680	0.040	0.000	0.82		172.0	SURCHARGED
1.006	HW 7-12	63.576	0.226	0.000	0.15		19.3	SURCHARGED
1.007	S82	63.776	0.601	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 85
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:24 File 100yr+40% 120min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	240
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	120

Bailey Johnson Hayes		Page 86
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:24 File 100yr+40% 120min winter...	Designed by P.A.B. Checked by	
Micro Drainage Network 2017.1		

Summary of Results for 120 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.083	-0.267	0.000	0.35		60.8	OK
2.000	S26	63.957	-0.168	0.000	0.40		24.3	OK
1.001	S27	63.842	-0.283	0.000	0.42		84.2	OK
3.000	S28	64.196	-0.104	0.000	0.14		10.6	OK
3.001	S29	64.189	0.189	0.000	0.05	0.0	5.0	SURCHARGED
1.002	S30	63.801	-0.279	0.000	0.44		107.2	OK
4.000	S31	64.004	-0.251	0.000	0.24		44.2	OK
1.003	S32	63.597	-0.228	0.000	0.60		150.3	OK
5.000	S33	64.011	-0.164	0.000	0.17		8.4	OK
1.004	S34	63.532	-0.218	0.000	0.64		158.8	OK
1.005	PI Unit 4	63.504	-0.146	0.000	0.54		159.1	OK
6.000	RE8	64.334	-0.191	0.000	0.05		1.9	OK
6.001	S35	64.248	-0.127	0.000	0.39		14.1	OK
6.002	S36	64.027	-0.173	0.000	0.38		26.4	OK
7.000	RE9	64.392	-0.133	0.000	0.35		12.2	OK
7.001	S37	64.195	-0.180	0.000	0.34		24.4	OK
7.002	S38	63.978	-0.172	0.000	0.38		26.2	OK
8.000	S39	64.241	-0.059	0.000	0.15		9.8	OK
8.001	S40	64.233	0.208	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.874	-0.186	0.000	0.50		57.3	OK
6.004	S42	63.816	-0.234	0.000	0.46		72.9	OK
9.000	RE10	64.196	-0.129	0.000	0.38		13.2	OK
9.001	S43	63.933	-0.167	0.000	0.40		29.6	OK
9.002	S44	63.712	-0.213	0.000	0.39		42.7	OK
6.005	S45	63.573	-0.202	0.000	0.58		115.5	OK
6.006	S46	63.504	-0.106	0.000	0.42		115.7	OK
10.000	RE11	64.170	-0.155	0.000	0.21		7.6	OK
10.001	S47	63.961	-0.114	0.000	0.49		17.5	OK
11.000	RE12	64.179	-0.146	0.000	0.27		9.9	OK
11.001	S48	64.012	-0.113	0.000	0.50		17.4	OK
10.002	S49	63.795	-0.155	0.000	0.47		34.8	OK
12.000	S50	63.832	-0.128	0.000	0.39		13.5	OK
13.000	S51	63.956	-0.169	0.000	0.40		26.5	OK
13.001	S52	63.737	-0.138	0.000	0.42		26.2	OK
10.003	S53	63.702	-0.223	0.000	0.50		86.5	OK
14.000	RE13	64.134	-0.141	0.000	0.30		10.5	OK
14.001	S54	63.916	-0.184	0.000	0.32		23.8	OK
14.002	S55	63.679	-0.246	0.000	0.26		34.2	OK
10.004	S56	63.563	-0.162	0.000	0.74		120.3	OK
15.000	S57	63.814	-0.151	0.000	0.23		11.8	OK
10.005	S58	63.502	-0.123	0.000	0.47		131.6	OK
16.000	S59	64.160	-0.115	0.000	0.48		17.2	OK
16.001	S60	63.914	-0.161	0.000	0.43		26.0	OK

Bailey Johnson Hayes		Page 87
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:24 File 100yr+40% 120min winter...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Summary of Results for 120 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	63.928	-0.247	0.000	0.26		34.5	OK
16.002	S62	63.810	-0.150	0.000	0.62		58.3	OK
16.003	S63	63.751	-0.144	0.000	0.69		75.8	OK
18.000	S64	63.642	-0.183	0.000	0.32		25.9	OK
19.000	S65	63.639	-0.186	0.000	0.31		25.9	OK
16.004	S66	63.518	-0.182	0.000	0.66		125.7	OK
16.005	PI Unit 9	63.502	-0.033	0.000	0.67		125.9	OK
20.000	S67	64.078	0.053	0.000	0.63		22.2	SURCHARGED
21.000	RE14	64.192	-0.133	0.000	0.30		10.3	OK
21.001	S68	64.161	-0.064	0.000	0.22		16.7	OK
22.000	RE15	64.184	-0.141	0.000	0.23		7.9	OK
22.001	S69	64.157	0.007	0.000	0.23		17.0	SURCHARGED
23.000	David Lloyd	64.601	-0.074	0.000	0.37		79.8	OK
23.001	S69	64.545	0.445	0.000	0.56		59.8	SURCHARGED
21.002	S70	64.137	0.112	0.000	0.75		89.5	SURCHARGED
20.001	S71	64.034	0.109	0.000	0.97		100.9	SURCHARGED
24.000	RE16	63.971	-0.004	0.000	0.28		9.9	OK
20.002	S72	63.943	0.068	0.000	0.96		116.2	SURCHARGED
25.000	RE17	64.039	-0.136	0.000	0.33		13.3	OK
25.001	S73	63.792	-0.158	0.000	0.27		23.4	OK
26.000	S74	64.042	0.082	0.000	0.31		22.0	SURCHARGED
27.000	S75	64.020	-0.145	0.000	0.27		13.3	OK
26.001	S76	63.971	0.096	0.000	0.32		34.6	SURCHARGED
28.000	S77	63.931	-0.069	0.000	0.35		25.9	OK
26.002	S78	63.878	0.063	0.000	0.56		60.3	SURCHARGED
26.003	PI Unit 7	63.784	0.069	0.000	0.74		60.3	SURCHARGED
20.003	S79	63.758	0.018	0.000	1.18		192.1	SURCHARGED
29.000	S80	63.799	-0.151	0.000	0.24		11.8	OK
20.004	S81	63.600	-0.040	0.000	0.97		202.7	OK
1.006	HW 7-12	63.502	0.152	0.000	0.11		13.6	SURCHARGED
1.007	S82	63.586	0.411	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 88
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:25 File 100yr+40% 60min winter ...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	120
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	2
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	60

Bailey Johnson Hayes		Page 89
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:25 File 100yr+40% 60min winter ...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 60 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.148	-0.202	0.000	0.58		101.6	OK
2.000	S26	64.029	-0.096	0.000	0.66		40.2	OK
1.001	S27	63.929	-0.196	0.000	0.70		140.6	OK
3.000	S28	64.204	-0.096	0.000	0.19		14.1	OK
3.001	S29	64.197	0.197	0.000	0.05	0.0	5.0	SURCHARGED
1.002	S30	63.888	-0.192	0.000	0.72		173.4	OK
4.000	S31	64.045	-0.210	0.000	0.40		74.1	OK
1.003	S32	63.731	-0.094	0.000	0.95		236.7	OK
5.000	S33	64.031	-0.144	0.000	0.28		14.1	OK
1.004	S34	63.667	-0.083	0.000	1.00		248.6	OK
1.005	PI Unit 4	63.496	-0.154	0.000	0.84		248.6	OK
6.000	RE8	64.346	-0.179	0.000	0.09		3.2	OK
6.001	S35	64.285	-0.090	0.000	0.66		23.8	OK
6.002	S36	64.075	-0.125	0.000	0.63		44.2	OK
7.000	RE9	64.426	-0.099	0.000	0.59		20.5	OK
7.001	S37	64.238	-0.137	0.000	0.56		40.9	OK
7.002	S38	64.023	-0.127	0.000	0.63		43.7	OK
8.000	S39	64.228	-0.072	0.000	0.21		13.8	OK
8.001	S40	64.219	0.194	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	63.944	-0.116	0.000	0.81		92.1	OK
6.004	S42	63.892	-0.158	0.000	0.73		116.8	OK
9.000	RE10	64.231	-0.094	0.000	0.63		22.1	OK
9.001	S43	63.983	-0.117	0.000	0.68		49.5	OK
9.002	S44	63.770	-0.155	0.000	0.64		70.6	OK
6.005	S45	63.668	-0.107	0.000	0.93		183.9	OK
6.006	S46	63.432	-0.178	0.000	0.68		184.5	OK
10.000	RE11	64.192	-0.133	0.000	0.35		12.7	OK
10.001	S47	64.025	-0.050	0.000	0.81		28.9	OK
11.000	RE12	64.206	-0.119	0.000	0.45		16.6	OK
11.001	S48	64.061	-0.064	0.000	0.83		29.2	OK
10.002	S49	63.917	-0.033	0.000	0.73		54.3	OK
12.000	S50	63.872	-0.088	0.000	0.60		21.0	OK
13.000	S51	64.006	-0.119	0.000	0.66		44.3	OK
13.001	S52	63.912	0.037	0.000	0.62		39.3	SURCHARGED
10.003	S53	63.828	-0.097	0.000	0.73		126.1	OK
14.000	RE13	64.163	-0.112	0.000	0.50		17.6	OK
14.001	S54	63.957	-0.143	0.000	0.53		39.8	OK
14.002	S55	63.777	-0.148	0.000	0.41		55.3	OK
10.004	S56	63.725	0.000	0.000	1.06		173.3	OK
15.000	S57	63.838	-0.127	0.000	0.39		19.8	OK
10.005	S58	63.452	-0.173	0.000	0.69		191.1	OK
16.000	S59	64.172	-0.103	0.000	0.57		20.2	OK
16.001	S60	64.002	-0.073	0.000	0.57		34.3	OK

Bailey Johnson Hayes		Page 90
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:25 File 100yr+40% 60min winter ...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 60 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	63.992	-0.183	0.000	0.42		57.3	OK
16.002	S62	63.945	-0.015	0.000	0.90		85.1	OK
16.003	S63	63.878	-0.017	0.000	0.99		109.2	OK
18.000	S64	63.687	-0.138	0.000	0.54		43.3	OK
19.000	S65	63.682	-0.143	0.000	0.52		43.3	OK
16.004	S66	63.609	-0.091	0.000	1.00		190.7	OK
16.005	PI Unit 9	63.461	-0.074	0.000	1.00		189.2	OK
20.000	S67	64.179	0.154	0.000	0.82		28.8	FLOOD RISK
21.000	RE14	64.400	0.075	0.000	0.49		17.0	SURCHARGED
21.001	S68	64.360	0.135	0.000	0.36		26.9	SURCHARGED
22.000	RE15	64.396	0.071	0.000	0.37		12.9	SURCHARGED
22.001	S69	64.360	0.210	0.000	0.35		26.0	SURCHARGED
23.000	David Lloyd	64.611	-0.064	0.000	0.35		76.7	OK
23.001	S69	64.555	0.455	0.000	0.56		59.8	SURCHARGED
21.002	S70	64.268	0.243	0.000	0.76		90.3	SURCHARGED
20.001	S71	64.164	0.239	0.000	1.05		109.0	SURCHARGED
24.000	RE16	64.119	0.144	0.000	0.45		16.1	SURCHARGED
20.002	S72	64.070	0.195	0.000	0.99		120.6	SURCHARGED
25.000	RE17	64.099	-0.076	0.000	0.55		22.2	OK
25.001	S73	64.022	0.072	0.000	0.42		36.8	SURCHARGED
26.000	S74	64.241	0.281	0.000	0.51		36.3	SURCHARGED
27.000	S75	64.174	0.009	0.000	0.46		22.6	SURCHARGED
26.001	S76	64.144	0.269	0.000	0.49		52.6	SURCHARGED
28.000	S77	64.151	0.151	0.000	0.57		42.3	SURCHARGED
26.002	S78	64.054	0.239	0.000	0.88		94.3	SURCHARGED
26.003	PI Unit 7	63.963	0.248	0.000	1.14		92.3	SURCHARGED
20.003	S79	63.905	0.165	0.000	1.37		224.0	SURCHARGED
29.000	S80	63.824	-0.126	0.000	0.40		19.8	OK
20.004	S81	63.714	0.074	0.000	1.15		241.3	SURCHARGED
1.006	HW 7-12	63.380	0.030	0.000	0.15		18.4	SURCHARGED
1.007	S82	63.488	0.313	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 91
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:26 File 100yr+40% 30min winter ...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Bailey Johnson Hayes		Page 92
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:26 File 100yr+40% 30min winter ...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 30 minute 100 year Winter (Storm)


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.453	0.103	0.000	0.88		154.5	SURCHARGED
2.000	S26	64.448	0.323	0.000	0.98		59.5	FLOOD RISK
1.001	S27	64.276	0.151	0.000	0.95		192.0	SURCHARGED
3.000	S28	64.204	-0.096	0.000	0.23		17.1	OK
3.001	S29	64.198	0.198	0.000	0.05	5.3	5.0	SURCHARGED
1.002	S30	64.235	0.155	0.000	0.90		219.0	SURCHARGED
4.000	S31	64.189	-0.066	0.000	0.65		120.2	OK
1.003	S32	64.047	0.222	0.000	1.25		311.1	SURCHARGED
5.000	S33	64.056	-0.119	0.000	0.44		22.6	OK
1.004	S34	63.882	0.132	0.000	1.33		329.8	SURCHARGED
1.005	PI Unit 4	63.688	0.038	0.000	1.13		331.8	SURCHARGED
6.000	RE8	64.461	-0.064	0.000	0.14		4.7	OK
6.001	S35	64.450	0.075	0.000	0.93		33.6	SURCHARGED
6.002	S36	64.242	0.042	0.000	0.88		62.0	SURCHARGED
7.000	RE9	64.524	-0.001	0.000	0.92		31.8	OK
7.001	S37	64.346	-0.029	0.000	0.85		61.8	OK
7.002	S38	64.223	0.073	0.000	0.87		60.2	SURCHARGED
8.000	S39	64.209	-0.091	0.000	0.27		17.6	OK
8.001	S40	64.201	0.176	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	64.109	0.049	0.000	1.04		118.6	SURCHARGED
6.004	S42	64.011	-0.039	0.000	0.94		148.7	OK
9.000	RE10	64.419	0.094	0.000	0.94		32.9	FLOOD RISK
9.001	S43	64.163	0.063	0.000	0.96		70.2	SURCHARGED
9.002	S44	63.965	0.040	0.000	0.88		96.6	SURCHARGED
6.005	S45	63.821	0.046	0.000	1.19		234.7	SURCHARGED
6.006	S46	63.483	-0.127	0.000	0.86		235.0	OK
10.000	RE11	64.458	0.133	0.000	0.53		19.0	SURCHARGED
10.001	S47	64.403	0.328	0.000	1.08		38.3	SURCHARGED
11.000	RE12	64.551	0.226	0.000	0.63		23.4	SURCHARGED
11.001	S48	64.478	0.353	0.000	1.11		38.9	SURCHARGED
10.002	S49	64.173	0.223	0.000	1.03		76.8	SURCHARGED
12.000	S50	63.957	-0.003	0.000	0.87		30.5	OK
13.000	S51	64.310	0.185	0.000	0.99		66.3	SURCHARGED
13.001	S52	64.088	0.213	0.000	1.01		63.8	SURCHARGED
10.003	S53	63.985	0.060	0.000	0.91		157.6	SURCHARGED
14.000	RE13	64.205	-0.070	0.000	0.80		28.3	OK
14.001	S54	64.050	-0.050	0.000	0.82		61.8	OK
14.002	S55	63.913	-0.012	0.000	0.61		81.1	OK
10.004	S56	63.812	0.087	0.000	1.44		235.3	SURCHARGED
15.000	S57	63.872	-0.093	0.000	0.64		32.0	OK
10.005	S58	63.519	-0.106	0.000	0.94		261.5	OK
16.000	S59	64.207	-0.068	0.000	0.78		27.7	OK
16.001	S60	64.403	0.328	0.000	0.66		39.7	FLOOD RISK

Bailey Johnson Hayes		Page 93
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:26 File 100yr+40% 30min winter ...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 30 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow Flow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	64.495	0.320	0.000	0.60		80.5	FLOOD RISK
16.002	S62	64.389	0.429	0.000	1.03		97.5	SURCHARGED
16.003	S63	64.309	0.414	0.000	1.23		135.1	SURCHARGED
18.000	S64	64.034	0.209	0.000	0.80		65.0	SURCHARGED
19.000	S65	64.024	0.199	0.000	0.78		65.2	SURCHARGED
16.004	S66	63.880	0.180	0.000	1.35		258.6	SURCHARGED
16.005	PI Unit 9	63.672	0.137	0.000	1.36		257.4	SURCHARGED
20.000	S67	64.366	0.341	0.000	0.85		29.9	FLOOD RISK
21.000	RE14	64.660	0.335	0.000	0.76		26.4	FLOOD RISK
21.001	S68	64.585	0.360	0.000	0.53		40.2	SURCHARGED
22.000	RE15	64.646	0.321	0.000	0.57		20.0	FLOOD RISK
22.001	S69	64.584	0.434	0.000	0.54		40.1	SURCHARGED
23.000	David Lloyd	64.593	-0.082	0.000	0.36		77.9	OK
23.001	S69	64.593	0.493	0.000	0.54		58.2	SURCHARGED
21.002	S70	64.483	0.458	0.000	0.76		90.0	SURCHARGED
20.001	S71	64.385	0.460	0.000	1.03		107.0	FLOOD RISK
24.000	RE16	64.383	0.408	0.000	0.69		24.7	FLOOD RISK
20.002	S72	64.293	0.418	0.000	0.98		119.8	SURCHARGED
25.000	RE17	64.430	0.255	0.000	0.79		31.8	FLOOD RISK
25.001	S73	64.244	0.294	0.000	0.62		54.2	SURCHARGED
26.000	S74	64.450	0.490	0.000	0.81		57.5	FLOOD RISK
27.000	S75	64.271	0.106	0.000	0.71		35.3	SURCHARGED
26.001	S76	64.355	0.480	0.000	0.60		63.9	SURCHARGED
28.000	S77	64.489	0.489	0.000	0.90		67.2	SURCHARGED
26.002	S78	64.267	0.452	0.000	1.11		119.3	SURCHARGED
26.003	PI Unit 7	64.177	0.462	0.000	1.36		109.9	SURCHARGED
20.003	S79	64.102	0.362	0.000	1.56		255.4	SURCHARGED
29.000	S80	64.043	0.093	0.000	0.60		30.1	SURCHARGED
20.004	S81	63.856	0.216	0.000	1.35		281.4	SURCHARGED
1.006	HW 7-12	63.286	-0.064	0.000	0.11		14.1	OK
1.007	S82	63.320	0.145	0.000	0.20		12.0	SURCHARGED


Bailey Johnson Hayes		Page 94
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:28 File 100yr+40% 15min winter ...	Designed by P.A.B. Checked by	
Micro Drainage	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	5.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details


Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	457700 221050 SP 57700 21050
C (1km)	-0.022
D1 (1km)	0.321
D2 (1km)	0.324
D3 (1km)	0.251
E (1km)	0.288
F (1km)	2.477
Summer Storms	No
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	15

Bailey Johnson Hayes		Page 95
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:28 File 100yr+40% 15min winter ...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S25	64.786	0.436	0.000	1.09		191.2	FLOOD RISK
2.000	S26	64.650	0.525	0.000	1.16		70.5	FLOOD RISK
1.001	S27	64.549	0.424	0.000	1.18		238.1	FLOOD RISK
3.000	S28	64.185	-0.115	0.000	0.26		19.0	OK
3.001	S29	64.180	0.180	0.000	0.05	9.6	5.0	SURCHARGED
1.002	S30	64.501	0.421	0.000	1.03		249.3	FLOOD RISK
4.000	S31	64.419	0.164	0.000	0.83		154.0	FLOOD RISK
1.003	S32	64.253	0.428	0.000	1.43		356.4	FLOOD RISK
5.000	S33	64.135	-0.040	0.000	0.62		31.6	OK
1.004	S34	64.022	0.272	0.000	1.52		378.5	SURCHARGED
1.005	PI Unit 4	63.779	0.129	0.000	1.29		379.0	SURCHARGED
6.000	RE8	64.796	0.271	0.000	0.21		7.4	FLOOD RISK
6.001	S35	64.786	0.411	0.000	1.09		39.3	FLOOD RISK
6.002	S36	64.489	0.289	0.000	1.07		74.6	SURCHARGED
7.000	RE9	64.849	0.324	0.000	1.05		36.2	FLOOD RISK
7.001	S37	64.608	0.233	0.000	0.96		69.5	FLOOD RISK
7.002	S38	64.423	0.273	0.000	1.01		70.3	SURCHARGED
8.000	S39	64.182	-0.118	0.000	0.29		18.6	OK
8.001	S40	64.255	0.230	0.000	0.08	0.0	5.0	SURCHARGED
6.003	S41	64.252	0.192	0.000	1.21		138.0	SURCHARGED
6.004	S42	64.135	0.085	0.000	1.07		169.4	SURCHARGED
9.000	RE10	64.651	0.326	1.008	1.07		37.7	FLOOD
9.001	S43	64.381	0.281	0.000	1.15		83.8	FLOOD RISK
9.002	S44	64.079	0.154	0.000	1.05		116.4	SURCHARGED
6.005	S45	63.897	0.122	0.000	1.35		268.1	SURCHARGED
6.006	S46	63.518	-0.092	0.000	0.98		268.3	OK
10.000	RE11	64.766	0.441	0.000	0.59		21.5	FLOOD RISK
10.001	S47	64.670	0.595	0.000	1.27		45.4	FLOOD RISK
11.000	RE12	64.878	0.553	0.000	0.74		27.6	FLOOD RISK
11.001	S48	64.762	0.637	0.000	1.26		44.2	FLOOD RISK
10.002	S49	64.353	0.403	0.000	1.19		88.7	SURCHARGED
12.000	S50	63.997	0.037	0.000	0.97		33.8	SURCHARGED
13.000	S51	64.625	0.500	0.000	1.21		80.9	FLOOD RISK
13.001	S52	64.263	0.388	0.000	1.26		79.5	FLOOD RISK
10.003	S53	64.108	0.183	0.000	1.02		176.5	SURCHARGED
14.000	RE13	64.438	0.163	0.000	0.95		33.5	FLOOD RISK
14.001	S54	64.219	0.119	0.000	0.97		72.9	SURCHARGED
14.002	S55	64.034	0.109	0.000	0.72		96.1	SURCHARGED
10.004	S56	63.912	0.187	0.000	1.63		265.9	SURCHARGED
15.000	S57	63.939	-0.026	0.000	0.88		44.2	OK
10.005	S58	63.661	0.036	0.000	1.07		296.6	SURCHARGED
16.000	S59	64.211	-0.064	0.000	0.75		26.8	OK
16.001	S60	64.570	0.495	0.000	0.58		34.8	FLOOD RISK

Bailey Johnson Hayes		Page 96
Grange House John Dalton St Manchester M2 6FW	Catalyst Bicester Units 1-9	
Date 08/07/2019 13:28 File 100yr+40% 15min winter ...	Designed by P.A.B. Checked by	
Micro Drainage		Network 2017.1

Summary of Results for 15 minute 100 year Winter (Storm)

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
17.000	S61	64.558	0.383	7.729	0.69		93.1	FLOOD
16.002	S62	64.549	0.589	0.000	1.00		93.8	SURCHARGED
16.003	S63	64.515	0.620	0.000	1.26		138.9	FLOOD RISK
18.000	S64	64.310	0.485	0.000	0.98		79.2	FLOOD RISK
19.000	S65	64.293	0.468	0.000	0.96		80.3	FLOOD RISK
16.004	S66	64.039	0.339	0.000	1.54		293.4	SURCHARGED
16.005	PI Unit 9	63.774	0.239	0.000	1.54		291.9	SURCHARGED
20.000	S67	64.269	0.244	0.000	0.85		30.0	FLOOD RISK
21.000	RE14	64.759	0.434	0.000	0.93		32.1	FLOOD RISK
21.001	S68	64.675	0.450	0.000	0.67		50.3	FLOOD RISK
22.000	RE15	64.743	0.418	0.000	0.71		24.9	FLOOD RISK
22.001	S69	64.676	0.526	0.000	0.72		53.4	FLOOD RISK
23.000	David Lloyd	64.546	-0.129	0.000	0.35		76.1	OK
23.001	S69	64.603	0.503	0.000	0.52		56.1	SURCHARGED
21.002	S70	64.560	0.535	0.000	0.76		90.6	SURCHARGED
20.001	S71	64.459	0.534	0.000	0.98		101.8	FLOOD RISK
24.000	RE16	64.538	0.563	0.000	0.85		30.1	FLOOD RISK
20.002	S72	64.384	0.509	0.000	0.90		110.0	FLOOD RISK
25.000	RE17	64.650	0.475	0.155	0.91		36.8	FLOOD
25.001	S73	64.409	0.459	0.000	0.72		62.5	FLOOD RISK
26.000	S74	64.638	0.678	0.000	0.99		70.5	FLOOD RISK
27.000	S75	64.303	0.138	0.000	0.79		38.9	SURCHARGED
26.001	S76	64.496	0.621	0.000	0.62		65.9	SURCHARGED
28.000	S77	64.743	0.743	0.000	1.09		81.2	FLOOD RISK
26.002	S78	64.413	0.598	0.000	1.20		128.2	FLOOD RISK
26.003	PI Unit 7	64.322	0.607	0.000	1.46		118.1	SURCHARGED
20.003	S79	64.217	0.477	0.000	1.66		270.9	SURCHARGED
29.000	S80	64.159	0.209	0.000	0.76		38.0	SURCHARGED
20.004	S81	63.940	0.300	0.000	1.44		301.6	SURCHARGED
1.006	HW 7-12	63.238	-0.112	0.000	0.11		14.0	OK
1.007	S82	63.258	0.083	0.000	0.20		12.0	SURCHARGED