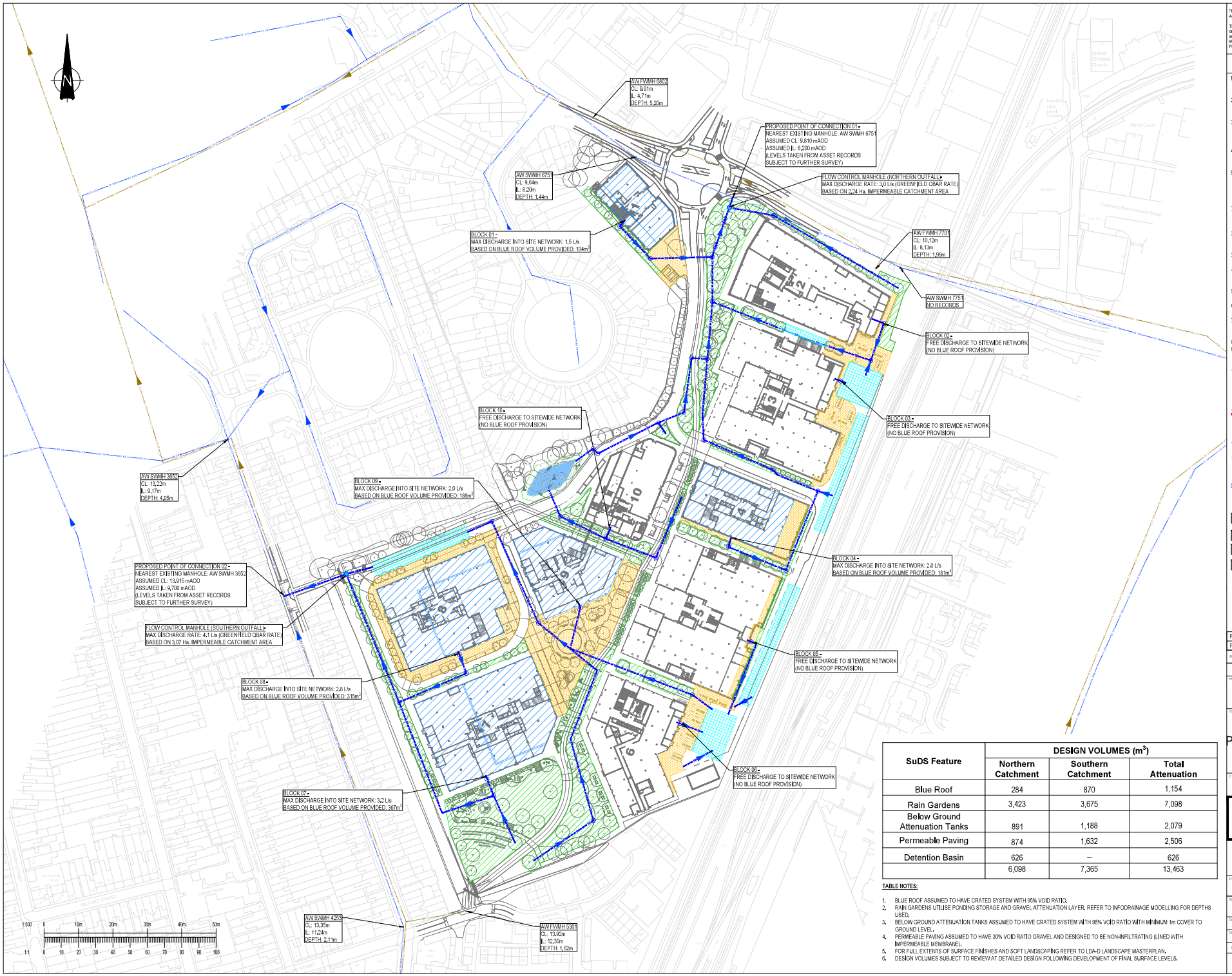

SuDS Feature	DESIGN VOLUMES (m^3)		
	Northern Catchment	Southern Catchment	Total Attenuation
Blue Roof	284	870	1,154
Rain Gardens	3,423	3,675	7,098
Below Ground Attenuation Tanks	891	1,188	2,079
Permeable Paving	874	1,632	2,506
Detention Basin	626	–	626
	6,098	7,365	13,463

TABLE NOTES:

1. BLUE ROOF ASSUMED TO HAVE CRATED SYSTEM WITH 95% VOID RATIO.
2. RAIN GARDENS UTILISE PONDING STORAGE AND GRAVEL ATTENUATION LAYER. REFER TO INFODRAINAGE MODELLING FOR DEPTHS USED.
3. BELOW GROUND ATTENUATION TANKS ASSUMED TO HAVE CRATED SYSTEM WITH 95% VOID RATIO WITH MINIMUM 1m COVER TO GROUND LEVEL.
4. PERMEABLE PAVING ASSUMED TO HAVE 30% VOID RATIO GRAVEL AND DESIGNED TO BE NON-INFILTRATING (LINED WITH IMPERMEABLE MEMBRANE).
5. FOR FULL EXTENTS OF SURFACE FINISHES AND SOFT LANDSCAPING REFER TO LDA-D LANDSCAPE MASTERPLAN.
6. DESIGN VOLUMES SUBJECT TO REVIEW AT DETAILED DESIGN FOLLOWING DEVELOPMENT OF FINAL SURFACE LEVELS.

This drawing should not be scaled. Dimensions to be verified on site.
Any discrepancies should be referred to the Engineer prior to work being put in hand.

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Pickfords Wharf, Clink Street, London SE1 9DG t 020 7928 7888 f 03333 444 501

GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ENGINEERS, ARCHITECT'S OR OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. ALL DIMENSIONS AND LEVELS ARE TO BE CHECKED ON SITE BY THE CONTRACTOR PRIOR TO PREPARING ANY WORKING DRAWINGS OR COMMENCING ON SITE.
3. THE CONTRACTOR MUST ENSURE AND WILL BE HELD RESPONSIBLE FOR THE OVERALL STABILITY OF THE BUILDING/STRUCTURE/EXCAVATION AT ALL STAGES OF THE WORK.
4. ALL WORK BY THE CONTRACTOR MUST BE CARRIED OUT IN SUCH A WAY THAT ALL REQUIREMENTS UNDER THE HEALTH AND SAFETY AT WORK ACT ARE SATISFIED.
5. ALL WORK IS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENTS OF THE RELEVANT STATUTORY AUTHORITIES AND REGULATIONS.

DRAINAGE NOTES:

1. REFER TO WATERMAN FLOOD RISK AND DRAINAGE STRATEGY REPORT FOR FULL DETAILS OF DRAINAGE RATIONALE AND DESIGN PARAMETERS SUMMARY.
2. EXISTING DRAINAGE AND UTILITIES WITHIN SITE BOUNDARY NOT SHOWN, TO BE ABANDONED AND DIVERTED BY OTHERS.
3. SUSTAINABLE URBAN DRAINAGE FEATURES DESIGNED USING AUTODESK INFODRAINAGE 2024.
4. DESIGN RAINFALL EVENTS ANALYSED INCL. 1-1 YEAR, 1-30 YEAR WITH 35% CLIMATE CHANGE AND 1-100 YEAR WITH 40% CLIMATE CHANGE, USING FEH 2022 RAINFALL DATA.
5. PROPOSED DISCHARGE RATES AT SITE OUTFALLS BASED ON GREENFIELD QBAR RATE OF 1.35 L/s/Ha
6. FOR PROPOSED SURFACE WATER CATCHMENT LAYOUT REFER TO 17469-WAT-OTT-XX-DR-C-920509.
7. FULL DRAINAGE NETWORK DESIGN (ROAD GULLYS, PERFORATED PIPES, INSPECTION CHAMBERS AND RODDING POINTS) SUBJECT TO DETAILED DESIGN.
8. FINAL LEVELS SUBJECT TO DETAILED DESIGN.
9. CONNECTION POINTS TO ANGLIAN WATER NETWORK SUBJECT TO PREDEVELOPMENT ENQUIRY APPROVAL AND SECTION 106 AGREEMENT BY CONTRACTOR.
10. ALL BLOCKS WITH BLUE ROOF TO BE RESTRICTED AS SHOWN ON PLAN. BEFORE DISCHARGING INTO SITEWIDE NETWORK, BLOCKS WITH NO BLUE ROOF TO HAVE FREE DISCHARGE INTO SITEWIDE DRAINAGE NETWORK.

LEGEND:

- APPLICATION BOUNDARY

EXISTING DRAINAGE (ANGLIAN WATER):

- EX SWI — SURFACE WATER SEWER
- EX FWI — FOUL SEWER

PROPOSED DRAINAGE:

- SW — SURFACE WATER SEWER AND MANHOLE
- FLOW CONTROL MANHOLE
- BLUE ROOF (100mm DEPTH OF STORAGE 95% VOID RATIO)
- RAIN GARDEN / BIORETENTION AREAS
- PERMEABLE PAVING
- BELOW GROUND GEOCELLULAR TANK
- DETENTION BASIN

Rev	Date	Description	By	Chk
P02	16.07.24	UPDATED FOLLOWING FINAL MASTERPLAN	GJ	CP
P01	20.06.24	FIRST ISSUE	GJ	CP

Amendments

Project: PROJECT OTTER

Title: PROPOSED DRAINAGE LAYOUT

Client: RAILPEN LTD

waterman

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mail@watermangroup.com www.watermangroup.com

Work Stage	STAGE 3 (Spatial coordination)	RIBA	
Suitability	COORDINATION	S1	
Designed By: GJ	Director: CP	Waterman Ref: WIE17469-110	
Drawn By: GJ	Date: 20.06.2024	Scale @ A1: 1:1000	
Project / Originator / Functional / Spatial / Form / Discipline / Number		Revision	
17469-WAT-OTT-XX-DR-C-920510		P02	

N:\Projects\WIE17469\05 Project Otter\7_CAD\02_Drainage\

240522 - Asset Records (Anglian Water), 240626 - Proposed SuDS Layout, 240710 - Landscape GA (LDA-D), A1-Wat-ISO-S-2023, OS (Cropped by LDA)

G. Proposed Drainage Modelling Summary

Proposed Development Runoff Calculations

Block 1 Roof
Block 1 Public Realm
Block 1 RG
EL: 10.300m
BIL: 8.500m
Block 1 PP
Northern Highway
Block 2 Roof
Block 2 RG
EL: 10.400m
Highways RG (2)
EL: 10.000m
BIL: 8.245m
Block 2 RG.1
EL: 10.000m
BIL: 8.350m
Block 2 PP
EL: 10.500m
Block 3 Tank
Block 3 Roof
Bioretention (10)
EL: 10.361m
Highways RG (1)
Block 3 RG
EL: 11.071m
BIL: 8.771m
Block 3 Public Realm
Block 3/5 4 Highway
Block 4 Tank
Site Pond
EL: 10.000m
Depth: 1.250m
Block 10 Roof
Northern Highway (1)
Highways RG
EL: 11.423m
BIL: 9.123m
Block 4 Roof
Block 10 Public Realm
Block 10 RG
EL: 11.552m
BIL: 9.052m
Block 4 PP
Block 4 RG
EL: 11.238m
BIL: 8.935m

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 546583 258531 TL 46583 58531
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	35.000
100.0	40.000

Storm Durations

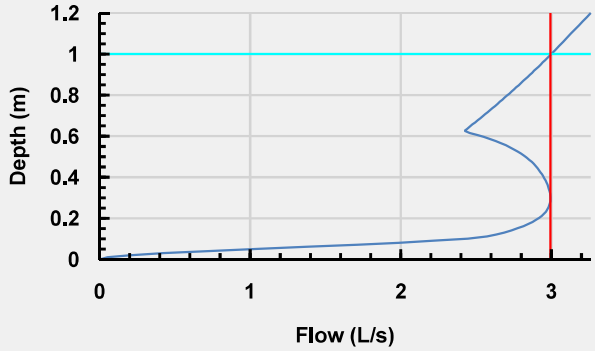
Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880
10080	20160

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by:	Checked by:	Approved By:
	GJ	CP	CP
Report Details: Type: Inflow Summary Storm Phase: Phase	Company Address: Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Block 1 Public Realm	Block 1 PP		Time of Concentration	0.048	100	0	100	0.048
Block 1 Roof	Block 1 RG		Time of Concentration	0.119	100	0	100	0.119
Block 2 Public Realm	Block 2 PP		Time of Concentration	0.109	100	0	100	0.109
Block 2 Public Realm (1)	Block 2 RG		Time of Concentration	0.043	100	0	100	0.043
Block 2 Roof	Block 2 RG		Time of Concentration	0.358	100	0	100	0.358
Block 3 & 4 Highway	Block 4 Tank		Time of Concentration	0.166	100	0	100	0.166
Block 3 Public Realm	Block 3 RG		Time of Concentration	0.138	100	0	100	0.138
Block 3 Roof	Block 3 Tank		Time of Concentration	0.476	100	0	100	0.476
Block 4 Public Realm	Block 4 PP		Time of Concentration	0.046	100	0	100	0.046
Block 4 Roof	Block 4 RG		Time of Concentration	0.203	100	0	100	0.203
Block 10 Public Realm	Block 10 RG		Time of Concentration	0.012	100	0	100	0.012
Block 10 Public Realm (1)	Highways RG (1)		Time of Concentration	0.005	100	0	100	0.005
Block 10 Roof	Block 10 RG		Time of Concentration	0.182	100	0	100	0.182
Northern Highway	Highways RG (2)		Time of Concentration	0.207	100	0	100	0.207
Northern Highway (1)	Block 10 RG		Time of Concentration	0.121	100	0	100	0.121
Northern Highway (2)	Bioretention (10)		Time of Concentration	0.010	100	0	100	0.010
TOTAL		**0.0**		**2.244**				**2.244**

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by:	Checked by:	Approved By:
	GJ	CP	CP
Report Details: Type: Junctions Storm Phase: Phase	Company Address: Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
MH5	Outlet	SW1.005	Hydro-Brake®
	Invert Level (m)	8.240	
	Design Depth (m)	1.000	
	Design Flow (L/s)	3.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☑	
	Unit Reference	SHE-0082-3000-1000-3000	
			
MH1	Outlet	SW1.001	Free Discharge
MH2	Outlet	SW1.003	Free Discharge
MH3	Outlet	SW6.003	Free Discharge
MH4	Outlet	SW6.004	Free Discharge

Block 3 RG

Type : Bioretention

Ponding Area

Exceedance Level (m)	11.071
Depth (m)	0.300
Base Level (m)	10.771
Top Area (m²)	149.02
Side Slope (1:X)	0.00
Base Area (m²)	149.02
Freeboard (mm)	100
Porosity (%)	100
Length (m)	38.408
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	128.571

Filter Area

Base Level (m)	8.771

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	1000	35	50.0	Soil Type
	Storage	1000	30	500.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Block 3 Public Realm
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	SW1.001
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Outlets

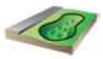
Outlet

Outgoing Connection	SW1.002
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	84.577
Top Perimeter (m)	84.577



Block 2 RG.1

Type : Bioretention

Ponding Area

Exceedance Level (m)	10.000
Depth (m)	0.200
Base Level (m)	9.800
Top Area (m²)	174.001
Side Slope (1:X)	0.00
Base Area (m²)	174.001
Freeboard (mm)	100
Porosity (%)	100
Length (m)	40.674
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	103.368

Filter Area

Base Level (m)	8.350

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	950	35	50.0	Soil Type
	Storage	500	30	500.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	SW4.002
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

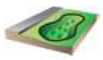
Outlet

Outgoing Connection	SW4.003
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	89.904
Top Perimeter (m)	89.904



Block 2 RG

Type : Bioretention

Ponding Area

Exceedance Level (m)	10.400
Depth (m)	0.200
Base Level (m)	10.200
Top Area (m²)	467.17
Side Slope (1:X)	0.00
Base Area (m²)	467.17
Freeboard (mm)	100
Porosity (%)	100
Length (m)	109.384
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	341.776

Filter Area

Base Level (m)	8.300

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	1000	35	50.0	Soil Type
	Storage	900	30	500.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Block 2 Public Realm (1)
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Block 2 Roof
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Outlets

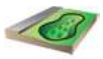
Outlet

Outgoing Connection	SW5.000
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	227.311
Top Perimeter (m)	227.311



Highways RG (1)

Type : Bioretention

Ponding Area

Exceedance Level (m)	11.162
Depth (m)	0.200
Base Level (m)	10.962
Top Area (m²)	80.07
Side Slope (1:X)	0.00
Base Area (m²)	80.07
Freeboard (mm)	100
Porosity (%)	100
Length (m)	17.683
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	72.134

Filter Area

Base Level (m)	8.562

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	1400	35	35.0	Soil Type
	Storage	1000	30	30.0	

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	Block 10 Public Realm (1)
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW7.000
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	44.421
Top Perimeter (m)	44.421

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by:	Checked by:	Approved By:
	GJ	CP	CP
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

Ponding Area

Exceedance Level (m)	11.562
Depth (m)	0.300
Base Level (m)	11.262
Top Area (m²)	668.72
Side Slope (1:X)	0.00
Base Area (m²)	668.72
Freeboard (mm)	100
Porosity (%)	100
Length (m)	67.751
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	618.579

Filter Area

Base Level (m)	9.062

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	1200	35	50.0	Soil Type
	Storage	1000	30	500.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Block 10 Public Realm
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Block 10 Roof
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	SW6.000
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	Northern Highway (1)
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW6.001
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	155.242
Top Perimeter (m)	155.242

Highways RG Type : Bioretention

Ponding Area

Exceedance Level (m)	11.423
Depth (m)	0.400
Base Level (m)	11.023
Top Area (m²)	176.74
Side Slope (1:X)	0.00
Base Area (m²)	176.74
Freeboard (mm)	100
Porosity (%)	100
Length (m)	53.249
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	165.234

Filter Area

Base Level (m)	9.123

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	1000	35	50.0	Soil Type
	Storage	900	30	500.0	

Inlets

Outlets

Outlet

Outgoing Connection	SW6.000
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	113.137
Top Perimeter (m)	113.137

Block 1 RG Type : Bioretention

Ponding Area

Exceedance Level (m)	10.500
Depth (m)	0.300
Base Level (m)	10.200
Top Area (m²)	321.23
Side Slope (1:X)	0.00
Base Area (m²)	321.23
Freeboard (mm)	100
Porosity (%)	100
Length (m)	65.078
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	245.752

Filter Area

Base Level (m)	8.500

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	900	35	50.0	Soil Type
	Storage	800	30	500.0	

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Block 1 Roof
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW3.000
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	140.029
Top Perimeter (m)	140.029

Bioretention (10)

Type : Bioretention

Ponding Area

Exceedance Level (m)	10.361
Depth (m)	0.100
Base Level (m)	10.261
Top Area (m²)	246.15
Side Slope (1:X)	0.00
Base Area (m²)	246.15
Freeboard (mm)	100
Porosity (%)	100
Length (m)	48.242
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	156.231

Filter Area

Base Level (m)	8.361

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	1100	35	50.0	Soil Type
	Storage	800	30	500.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Northern Highway (2)
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	SW6.004
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Outlets

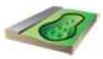
Outlet

Outgoing Connection	SW6.005
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	106.688
Top Perimeter (m)	106.688



Block 4 RG

Type : Bioretention

Ponding Area

Exceedance Level (m)	11.235
Depth (m)	0.400
Base Level (m)	10.835
Top Area (m²)	550.52
Side Slope (1:X)	0.00
Base Area (m²)	550.52
Freeboard (mm)	100
Porosity (%)	100
Length (m)	81.829
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	507.776

Filter Area

Base Level (m)	8.935

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	900	35	50.0	Soil Type
	Storage	1000	30	500.0	

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Block 4 Roof
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Outlets

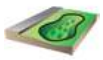
Outlet

Outgoing Connection	SW1.000
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	177.113
Top Perimeter (m)	177.113



Highways RG (2)

Type : Bioretention

Ponding Area

Exceedance Level (m)	10.000
Depth (m)	0.255
Base Level (m)	9.745
Top Area (m²)	1869.13
Side Slope (1:X)	0.00
Base Area (m²)	1869.13
Freeboard (mm)	100
Porosity (%)	100
Length (m)	136.150
Long. Slope (1:X)	500.00
Filtration Rate (m/hr)	50.0
Friction Scheme	Manning's n
n	0.03
Total Volume (m³)	1250.679

Filter Area

Base Level (m)	8.245

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	4
Friction Scheme	Manning's n
n	0.015
Release Height (m)	0.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	1000	35	50.0	Soil Type
	Storage	500	30	500.0	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Northern Highway
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (2)

Inlet Type	Point Inflow
Incoming Item(s)	SW1.003
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	SW3.001
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	SW4.003
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (4)

Inlet Type	Point Inflow
Incoming Item(s)	SW5.000
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Inlet (5)

Inlet Type	Point Inflow
Incoming Item(s)	SW6.005
Bypass Destination	(None)
Inlet Destination	Subsurface Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW1.004
Outlet Type	Under Drain

Advanced

Ponding Area

Base Perimeter (m)	299.756
Top Perimeter (m)	299.756

Site Pond

Type : Pond

Dimensions

Exceedance Level (m)	10.000
Depth (m)	1.250
Base Level (m)	8.750
Freeboard (mm)	300
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	4.612
Total Volume (m³)	431.881

Depth (m)	Area (m²)	Volume (m³)
0.000	300.00	0.000
1.000	650.00	463.863

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	SW6.001
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW6.002
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	42.935
Friction Scheme	Manning's n
n	0.03

Block 1 PP

Type : Porous Paving

Dimensions

Exceedance Level (m)	9.900
Depth (m)	1.500
Base Level (m)	8.400
Paving Layer Depth (mm)	400
Membrane Percolation (m/hr)	30.0
Porosity (%)	30
Length (m)	36.945
Long. Slope (1:X)	200.00
Width (m)	12.811
Total Volume (m³)	158.015

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Block 1 Public Realm
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	SW3.000
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW3.001
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	30.0

Block 4 PP

Type : Porous Paving

Dimensions

Exceedance Level (m)	11.307
Depth (m)	1.800
Base Level (m)	9.507
Paving Layer Depth (mm)	300
Membrane Percolation (m/hr)	30.0
Porosity (%)	30
Length (m)	75.692
Long. Slope (1:X)	200.00
Width (m)	6.821
Total Volume (m³)	236.095

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Block 4 Public Realm
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW2.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	30.0

Block 2 PP

Type : Porous Paving

Dimensions

Exceedance Level (m)	10.500
Depth (m)	2.100
Base Level (m)	8.400
Paving Layer Depth (mm)	400
Membrane Percolation (m/hr)	30.0
Porosity (%)	30
Length (m)	122.649
Long. Slope (1:X)	200.00
Width (m)	9.524
Total Volume (m³)	620.028

Under Drain

Height Above Base (m)	0.000
Diameter (mm)	300
No. of Barrels	4
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	Block 2 Public Realm
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (3)

Inlet Type	Point Inflow
Incoming Item(s)	SW4.000
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW4.001
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	50.0

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by: GJ	Checked by: CP	Approved By: CP
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

Block 3 Tank

Type : Cellular Storage

Dimensions

Exceedance Level (m)	10.000
Depth (m)	0.600
Base Level (m)	8.450
Number of Crates Long	63
Number of Crates Wide	48
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	0.4
Crate Width (m)	0.4
Crate Height (m)	0.6
Total Volume (m³)	276.739

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Block 3 Roof
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW4.000
Outlet Type	Free Discharge

Block 4 Tank

Type : Cellular Storage

Dimensions

Exceedance Level (m)	11.000
Depth (m)	1.000
Base Level (m)	8.900
Number of Crates Long	60
Number of Crates Wide	35
Number of Crates High	2
Porosity (%)	95
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	0.5
Total Volume (m³)	499.850

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	SW2.000 Block 3 & 4 Highway
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW2.001
Outlet Type	Free Discharge

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by:	Checked by:	Approved By:
	GJ	CP	CP
Report Details:	Company Address:		
Type: Stormwater Controls Storm Phase: Phase	Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

Block 2 Tank

Type : Cellular Storage

Dimensions

Exceedance Level (m)	10.000
Depth (m)	0.600
Base Level (m)	8.380
Number of Crates Long	22
Number of Crates Wide	22
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	0.6
Total Volume (m³)	69.990

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	SW4.001
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	SW4.002
Outlet Type	Free Discharge

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by:	Checked by:	Approved By:
	GJ	CP	CP
Report Details:	Company Address:		
Type: Junctions Summary Storm Phase: Phase	Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH6	FEH: 2 years: +0 %: 10080 mins: Summer	9.810	8.200	8.211	0.011	0.5	0.000	0.000	0.5	200.475	OK
MH5	FEH: 2 years: +0 %: 10080 mins: Summer	9.860	8.240	8.284	0.044	0.6	0.078	0.000	0.5	200.491	OK
MH1	FEH: 2 years: +0 %: 10080 mins: Summer	10.521	8.800	9.421	0.621	2.3	1.098	0.000	0.0	259.768	Surcharged
MH2	FEH: 2 years: +0 %: 10080 mins: Summer	11.076	8.700	9.022	0.322	4.0	0.569	0.000	3.5	914.573	OK
MH3	FEH: 2 years: +0 %: 10080 mins: Summer	12.487	8.600	9.258	0.658	2.5	1.163	0.000	1.0	260.241	Surcharged
MH4	FEH: 2 years: +0 %: 10080 mins: Summer	11.298	8.400	9.259	0.859	4.0	1.518	0.000	1.9	305.808	Surcharged

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by:	Checked by:	Approved By:
	GJ	CP	CP
Report Details:	Company Address:		
Type: Junctions Summary Storm Phase: Phase	Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH6	FEH: 30 years: +35 %: 30 mins: Summer	9.810	8.200	8.226	0.026	3.0	0.000	0.000	3.0	4.207	OK
MH5	FEH: 30 years: +35 %: 60 mins: Summer	9.860	8.240	8.643	0.403	4.9	0.711	0.000	3.0	12.880	Surcharged
MH1	FEH: 30 years: +35 %: 10080 mins: Summer	10.521	8.800	9.851	1.051	2.4	1.856	0.000	2.4	389.039	Surcharged
MH2	FEH: 30 years: +35 %: 30 mins: Summer	11.076	8.700	9.143	0.443	57.1	0.782	0.000	56.4	45.370	Surcharged
MH3	FEH: 30 years: +35 %: 10080 mins: Summer	12.487	8.600	9.258	0.658	2.3	1.163	0.000	1.1	304.143	Surcharged
MH4	FEH: 30 years: +35 %: 10080 mins: Winter	11.298	8.400	9.259	0.859	3.7	1.518	0.000	1.9	433.647	Surcharged

FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
MH6	FEH: 100 years: +40 %: 30 mins: Summer	9.810	8.200	8.226	0.026	3.0	0.000	0.000	3.0	5.622	OK
MH5	FEH: 100 years: +40 %: 60 mins: Summer	9.860	8.240	8.746	0.506	4.5	0.893	0.000	3.0	13.201	Surcharged
MH1	FEH: 100 years: +40 %: 10080 mins: Winter	10.521	8.800	9.851	1.051	2.7	1.858	0.000	2.6	418.424	Surcharged
MH2	FEH: 100 years: +40 %: 30 mins: Summer	11.076	8.700	9.157	0.457	70.1	0.807	0.000	69.7	59.600	Surcharged
MH3	FEH: 100 years: +40 %: 10080 mins: Winter	12.487	8.600	9.258	0.658	2.3	1.163	0.000	1.2	311.040	Surcharged
MH4	FEH: 100 years: +40 %: 10080 mins: Winter	11.298	8.400	9.259	0.859	3.2	1.518	0.000	1.9	456.949	Surcharged

Project:	Date:		
Project Otter Beehive Centre Cambridge	23/10/2024		
	Designed by:	Checked by:	Approved By:
	GJ	CP	CP
Report Details:	Company Address:		
Type: Stormwater Controls Summary Storm Phase: Phase	Waterman Group Pickfords Wharf, Clink Street, London SE1 9DG		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Block 3 Tank	FEH: 2 years: +0 %: 10080 mins: Summer	9.026	9.026	0.576	0.576	2.2	264.433	0.000	0.000	0.6	65.530	4.447	OK
Block 4 Tank	FEH: 2 years: +0 %: 10080 mins: Summer	9.421	9.421	0.521	0.521	2.2	259.905	0.000	0.000	1.5	57.778	48.003	OK
Block 3 RG	FEH: 2 years: +0 %: 30 mins: Winter	9.851	9.019	1.004	0.248	15.9	14.114	0.000	0.000	8.1	3.677	89.022	OK
Block 2 RG.1	FEH: 2 years: +0 %: 120 mins: Summer	8.431	8.350	0.000	0.000	0.0	3.968	0.000	0.000	0.0	0.000	96.161	OK
Block 2 RG	FEH: 2 years: +0 %: 15 mins: Summer	9.423	8.567	0.905	0.267	78.9	41.936	0.000	0.000	5.9	1.469	87.730	OK
Highways RG (1)	FEH: 2 years: +0 %: 10080 mins: Summer	9.260	9.259	0.663	0.697	11.9	21.293	0.000	0.000	12.0	688.262	70.481	OK
Block 10 RG	FEH: 2 years: +0 %: 15 mins: Summer	10.203	9.073	1.005	0.011	62.0	41.479	0.000	0.000	0.3	0.126	93.295	OK
Highways RG	FEH: 2 years: +0 %: 120 mins: Summer	9.229	9.132	0.000	0.009	0.1	4.332	0.000	0.000	0.0	0.115	97.378	OK
Block 1 RG	FEH: 2 years: +0 %: 15 mins: Summer	9.434	8.626	0.804	0.126	28.9	19.038	0.000	0.000	3.9	1.207	92.253	OK
Bioretention (10)	FEH: 2 years: +0 %: 10080 mins: Summer	9.257	9.018	0.800	0.658	5.8	53.567	0.000	0.000	11.9	598.095	65.713	OK
Block 4 RG	FEH: 2 years: +0 %: 15 mins: Summer	10.099	8.941	1.000	0.006	39.9	26.125	0.000	0.000	0.1	0.020	94.855	OK
Block 1 PP	FEH: 2 years: +0 %: 10080 mins: Winter	9.019	9.019	0.435	0.619	7.4	74.702	0.000	0.000	11.1	507.058	52.725	OK
Block 4 PP	FEH: 2 years: +0 %: 120 mins: Summer	9.941	9.510	0.055	0.002	4.5	3.272	0.000	0.000	0.0	0.203	98.614	OK
Site Pond	FEH: 2 years: +0 %: 10080 mins: Summer	9.258	9.258	0.508	0.508	2.7	191.676	0.000	0.000	1.3	76.515	55.618	OK
Highways RG (2)	FEH: 2 years: +0 %: 120 mins: Summer	9.018	8.249	0.500	0.004	20.6	69.966	0.000	0.000	0.0	0.072	94.406	OK
Block 2 PP	FEH: 2 years: +0 %: 10080 mins: Summer	9.026	8.722	0.013	0.322	6.7	35.482	0.000	0.000	11.1	280.349	94.277	OK
Block 2 Tank	FEH: 2 years: +0 %: 10080 mins: Summer	8.722	8.722	0.342	0.342	2.9	39.292	0.000	0.000	0.0	20.071	43.860	OK

FEH: 30 years: Increase Rainfall (%): +35: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Block 3 Tank	FEH: 30 years: +35 %: 10080 mins: Summer	9.882	9.882	1.432	1.432	4.4	276.477	0.000	0.000	4.5	455.732	0.095	OK
Block 4 Tank	FEH: 30 years: +35 %: 10080 mins: Summer	9.849	9.849	0.949	0.949	3.7	473.179	0.000	0.000	2.0	163.620	5.336	OK
Block 3 RG	FEH: 30 years: +35 %: 15 mins: Winter	9.852	9.170	1.004	0.399	77.0	22.768	0.000	0.000	40.3	20.806	82.291	OK
Block 2 RG.1	FEH: 30 years: +35 %: 10080 mins: Summer	8.932	9.395	0.500	1.045	5.3	37.201	0.000	0.000	5.9	32.728	64.011	OK
Block 2 RG	FEH: 30 years: +35 %: 30 mins: Summer	10.473	9.101	1.954	0.801	255.7	153.298	0.000	0.000	45.4	64.118	55.147	OK
Highways RG (1)	FEH: 30 years: +35 %: 480 mins: Summer	9.597	9.562	1.000	1.000	4.8	11.548	0.000	0.000	6.0	24.981	83.991	OK
Block 10 RG	FEH: 30 years: +35 %: 15 mins: Summer	10.210	9.303	1.013	0.241	223.4	106.020	0.000	0.000	42.5	32.896	82.861	OK
Highways RG	FEH: 30 years: +35 %: 240 mins: Summer	9.347	9.347	0.118	0.224	2.2	13.270	0.000	0.000	1.5	4.313	91.969	OK
Block 1 RG	FEH: 30 years: +35 %: 15 mins: Summer	9.440	8.819	0.810	0.319	92.0	40.195	0.000	0.000	39.6	18.882	83.644	OK
Bioretention (10)	FEH: 30 years: +35 %: 30 mins: Summer	9.257	8.374	0.800	0.013	6.3	9.659	0.000	0.000	0.0	0.016	93.817	OK
Block 4 RG	FEH: 30 years: +35 %: 30 mins: Summer	10.107	9.208	1.008	0.273	128.7	70.912	0.000	0.000	45.2	52.351	86.035	OK
Block 1 PP	FEH: 30 years: +35 %: 10080 mins: Winter	9.019	9.019	0.434	0.619	6.5	74.694	0.000	0.000	10.7	741.318	52.730	OK
Block 4 PP	FEH: 30 years: +35 %: 10080 mins: Summer	9.905	9.850	0.019	0.342	7.7	24.779	0.000	0.000	10.2	532.882	89.505	OK
Site Pond	FEH: 30 years: +35 %: 10080 mins: Winter	9.258	9.258	0.508	0.508	2.6	191.700	0.000	0.000	1.2	147.586	55.613	OK
Highways RG (2)	FEH: 30 years: +35 %: 30 mins: Summer	9.019	8.571	0.502	0.326	170.7	165.841	0.000	0.000	4.4	5.293	86.740	OK
Block 2 PP	FEH: 30 years: +35 %: 10080 mins: Summer	9.883	9.882	0.869	1.482	8.1	411.874	0.000	0.000	9.2	722.495	33.572	OK
Block 2 Tank	FEH: 30 years: +35 %: 10080 mins: Summer	9.883	9.883	1.503	1.503	3.5	69.869	0.000	0.000	1.5	103.412	0.173	OK

FEH: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Avg. Depth