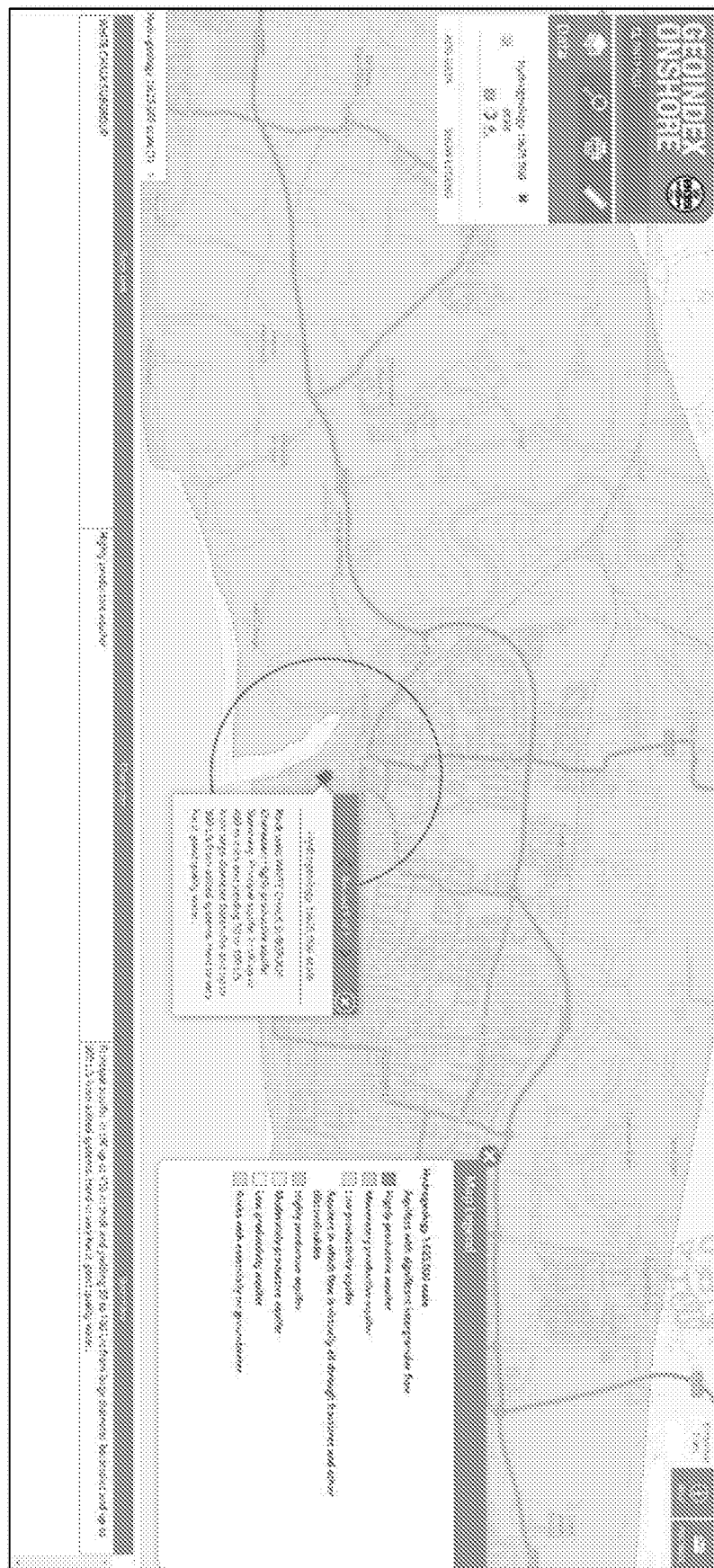


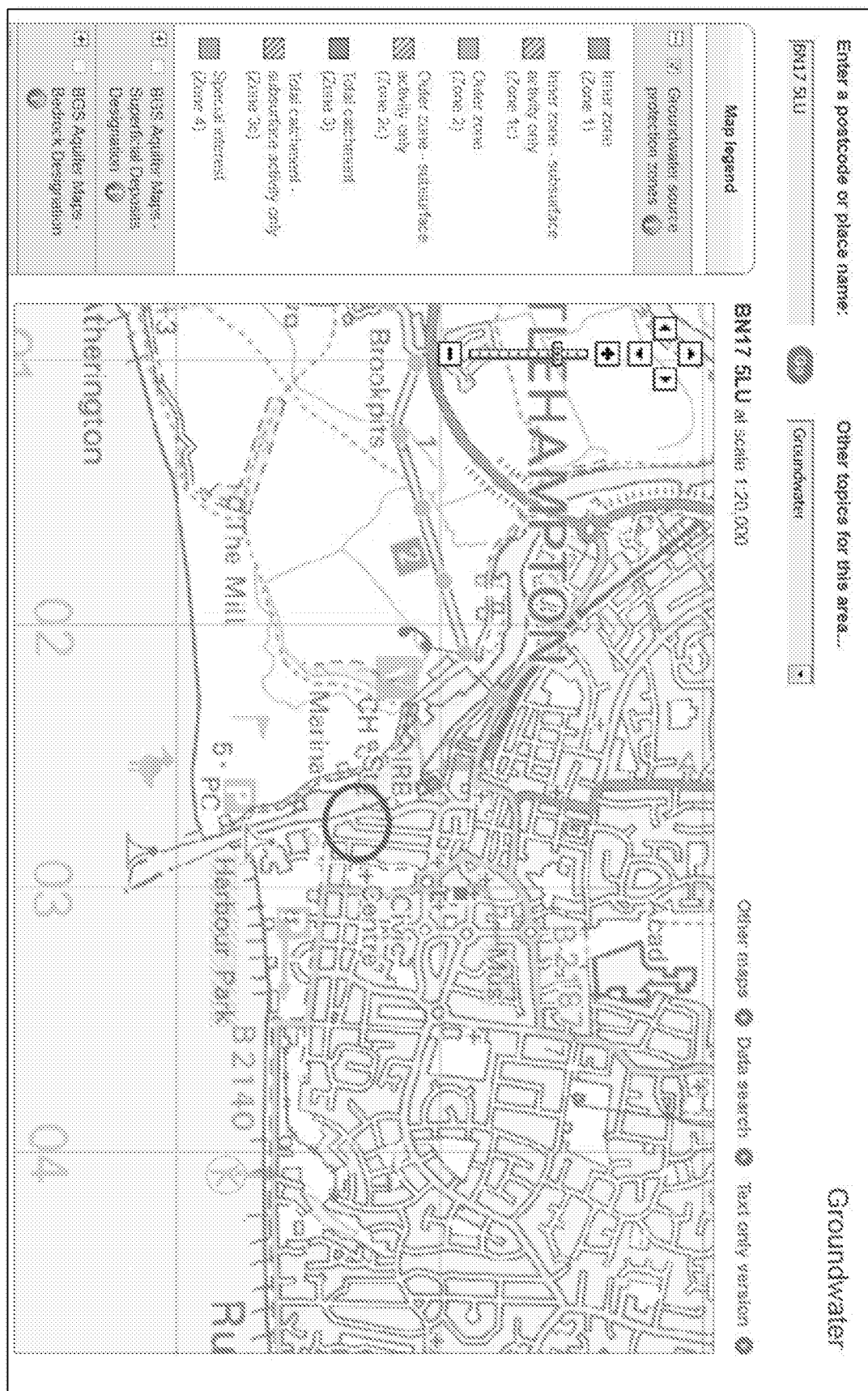
Appendix 2, Figure 5.8 -- Borehole 19952384, Page 7 of 8

[illegible]

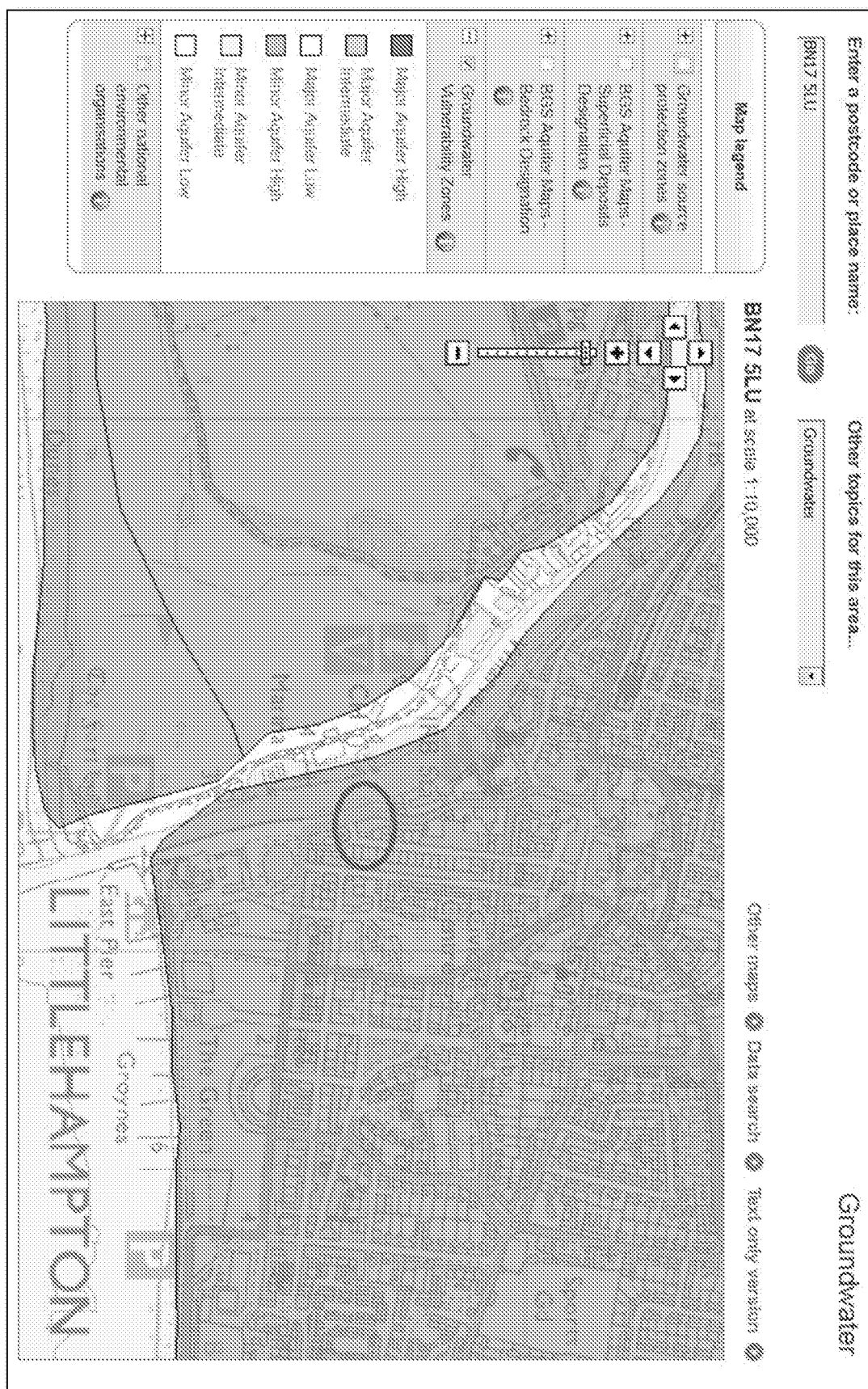
Appendix 2, Figure 5.9 -- Borehole 19952384, Page 8 of 8



Appendix 2, Figure 6 -- Hydrogeology



Appendix 2, Figure 7 – Groundwater Source Protection Zones



Appendix 2, Figure 8 -- Groundwater Vulnerability Zones

Appendix 3 – Calculations

- ✱ *Table 1 – Greenfield Runoff Rates Calculation Summary*
- ✱ *Existing Runoff Rates Simulation*
- ✱ *Summary Results*

Greenfield Runoff Rates Calculation Summary

GREENFIELD RUNOFF RATES CALCULATION SUMMARY		
PARAMETERS		
Catchment Area	609.38 m ²	0.06 ha
Open Public Space	0.00 m ²	0.00 ha
Area Positively Drained	609.38 m ²	0.06 ha
SAAR (mm)	720 mm	
SOIL	3	
SPR	0.37	
QBAR_{rural} (l/s) for 50 Ha	148.45 l/s	
Hydrological Region	7	
Growth Curve Factor 1 year	0.85	
Growth Curve Factor 30 year	2.46	
Growth Curve Factor 100 year	3.19	
Return Period	Greenfield Runoff per Hectare (l/s/ha)	
QBAR	2.97	
1	2.52	
30	7.30	
100	9.47	
Return Period	Greenfield Runoff (l/s)	
QBAR	0.18	
1	0.15	
30	0.45	
100	0.58	

Appendix 3, Table 1 -- Greenfield Runoff Rates Calculation Summary

Existing Runoff Rates Simulation

Residential		Page 1
Science Park Square	EXISTING Storm Sewer Design	
Brighton	Plex Road	
BN1 9GB	Contract No 3153	
Date 18/07/2017 10:42	Designed by John Tenekar	
File EXISTING RUNOFF RATES.dwg	Checked by Mark Neumann	
XP Solutions	Network 2017.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

Rain (mm/hr) Model - England and Wales

Return Period (years): 100

MS-40 (mm): 19.000

Ratio R: 0.350

Maximum Rainfall (mm/hr): 50

Maximum Time of Concentration (mins): 30

Foul Sewage (l/s/ha): 0.000

Volumetric Runoff Coeff.: 0.750

WMP (mm): 100

Add Flow / Climate Change (mm): 0

Minimum Backdrop Height (mm): 0.000

Maximum Backdrop Height (mm): 1.000

SD Man Design Depth for Optimisation (mm): 1.000

Min Vel for Auto Design only (m/s): 1.00

Min Slope for Optimisation (1/X): 100

Designed with Level Offsets

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.000

Area: Area Contributing (ha) = 0.000

Total Pipe Volume (m³) = 0.750

Network Design Table for Storm

HW	Length (m)	Fall (m)	Slope (1/X)	I.Area (ha)	F.E. (mins)	Base Flow (l/s)	K (mm)	HYD SECT (mm)	DIA (mm)	Section Type	Auto Design
01.000	10.000	0.125	80.0	0.001	0.00	0.0	0.000	0	225	Pipe/Conduit	✓
01.001	10.000	0.125	80.0	0.001	0.00	0.0	0.000	0	225	Pipe/Conduit	✓

Network Results Table

HW	Rain (mm/hr)	F.E. (mins)	W/IL (m)	I.Area (ha)	E Base Flow (l/s)	Foul Flow (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
01.000	50.00	4.11	0.000	0.001	0.0	0.0	0.0	1.46	0.0	0.0
01.001	50.00	4.11	0.000	0.001	0.0	0.0	0.0	1.46	0.0	0.0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	F. Level (m)	Min L. Level (m)	B.D. (mm)	N (mm)
01.001	0	1.000	0.000	0.000	0	0

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Ambiental		Page 2
Science Park Square	Existing Storm Sewer Design	
Brighton	Pier Road	
BN1 9BB	Contract No 3153	
Date 18/07/2017 10:42	Designed by Jane Tomador	
File EXISTING RUNOFF RATES#3...	Checked by Mark Neumann	
XP Solutions	Network 2017.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow = % of Total Flow 0.000
Areal Reduction factor 1.000 MASH Factor * 10m³/ha Storage 2.000
not start (mins) 0 Inlet Coefficients 0.800
Rot Start Level (mm) 0 Flow per Person per Day (l/person/day) 9.000
Manhole Headloss Coeff (m/min): 0.500 Run Time (mins) 60
Sewer Storage per Sewer (l/s) 0.000 Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Inflow Controls 0 Number of Time/area Diagrams 0
Number of Outflow Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FFA Profile Type Summer
Return Period (years) 100 Cv (Summer) 0.750
Region England and Wales Cv (Winter) 0.800
M5-60 (mm) 10.000 Storm Duration (mins) 30
Ratio R 0.350

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Ambiental		Page 3
Science Park Square	Existing Storm Sewer Design	
Brighton	Pier Road	
EN1 9BB	Contract No 3153	
Date 18/07/2017 10:42	Designed by Jane Teneader	
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1 year Return Period Summary of Critical Results by Maximum Outflow (Bank 1) for SS000

Simulation Statistics

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Not Start (min): 0 HADU Exceed % (m³/s) Storage 2.000
 Not Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Needle Coeff (rational) 0.300 Flow per Person per Day (l/person/day) 0.000
 Pool Storage per hectare (l/s) 0.000

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

Cymchenu Rainfall Details

Rainfall Model PER Ratio 8 0.150
 Region England and Wales CV (Summer) 0.750
 10-60 mm 19.000 CV (Winter) 0.840

Margin for Flood Risk Warning (m) 200.0 SUD Status OFF
 Analysis Threshold Flow Inertia Status OFF
 PBS Status ON

Profile(s): Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 840, 1440, 2160, 2880, 4320, 5760,
 7200, 8640, 10080
 Return Period(s) (years) 1, 20, 50, 100
 Climate Change (%) 0, 0, 0, 0

PN	US/ADR	Storm	Return Period	Climate Change	First (K) Burcharge	First (Y) Flood	First (Z) Overflow	Water Level
	Name						Act.	(m)
01.000	01 15 Winter		1	+0%				0.927
01.001	01 15 Summer		1	+0%				0.807

PN	US/ADR	Name	Surcharged		Flooded		Pipe		Level
			Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status Exceeded	
01.000	01		+0.163	0.000	0.17		0.17	OK	
01.001	02		+0.163	0.000	0.17		0.17	OK	

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Ambiental		Page 4
Science Park Square	Existing Storm Sewer Design	
Brighton	Pier Road	
BN1 9SA	Contract No. 3153	
Date 18/07/2017 10:42	Designed by Jane Tomador	
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XP Solutions	Network 2017.1	

30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for SS000

Simulation Statistics

Areal Reduction Factor 1.000 Additional Flow = 0 of Total Flow 0.000
 Not Start (min): 0 HADU Factor = 1000/ha Storage 2.000
 Not Start Level (mm): 0 Inlet Coefficient 0.800
 Manhole Weirless Coeff (rational): 0.300 Flow per Person per Day (l/person/day) 0.000
 Pool Storage per hectare (l/s): 0.000

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

Cymchennu Rainfall Details

Rainfall Model PER Ratio 8 0.100
 Region England and Wales CV (Summer): 0.750
 10-60 mm 19.000 CV (Winter): 0.840

Margin for Flood Risk Warning (m): 200.0 SUD Status OFF
 Analysis Threshold Flow Inertia Status OFF
 PBS Status ON

Profile(s): Summer and Winter
 Duration(s) (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 840, 1440, 2160, 2880, 4320, 5760,
 7200, 8640, 10080
 Return Period(s) (years): 1, 20, 50, 100
 Climate Change (%): 0, 0, 0, 0

RN	US/HR	Storm	Return Period	Climate Change	First (K) Burcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
01.000	01 15 Winter	00	+0%						0.961
01.001	01 15 Summer	20	+0%						0.837

RN	US/HR	Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow Flow (l/s)	Pipe Status	Level Exceeded
01.000	01		+0.120	0.000	0.30	18.5	OK	
01.001	02		+0.120	0.000	0.30	18.6	OK	

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Ambiental		Page 5
Science Park Square	Existing Storm Sewer Design	
Brighton	Pier Road	
BN1 9BB	Contract No. 3153	
Date 18/07/2017 10:42	Designed by Jane Tomador	
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XP Solutions	Network 2017.1	

10 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for SS000

Simulation Statistics

Areal Reduction Factor 1.000 Additional Flow = 0 of Total Flow 0.000
 Not Start (min): 0 HADU Factor = 1.000/s Storage 2.000
 Not Start Level (mm): 0 Inlet Coefficient 0.800
 Manhole Weirless Coeff (rational): 0.300 Flow per Person per Day (l/s/person/day) 0.000
 Pool Storage per hectare (l/s): 0.000

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

Cymchenu Rainfall Details

Rainfall Model PER Ratio 8 0.100
 Region England and Wales CV (Summer): 0.750
 10-60 mm 19.000 CV (Winter): 0.840

Margin for Flood Risk Warning (m): 200.0 SUD Status OFF
 Analysis Threshold Flow Inertia Status OFF
 PBS Status ON

Profile(s): Summer and Winter
 Duration(s) (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 840, 1440, 2160, 2880, 4320, 5760,
 7200, 8640, 10080
 Return Period(s) (years): 1, 20, 50, 100
 Climate Change (%): 0, 0, 0, 0

PN	US/ADR	Storm	Return Period	Climate Change	First (K) Burcharge	First (Y) Flood	First (Z) Overflow	Water Level
	Name						Act.	(m)
01.000	01 10 Winter		30	+0%				0.966
01.001	01 10 Summer		30	+0%				0.847

PN	US/ADR	Name	Surcharged		Flooded		Pipe		Level
			Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Flow / OverFlow (l/s)	Flow (l/s)	Status Exceeded	
01.000	01		+0.124	0.000	0.42		20.7	OK	
01.001	02		+0.123	0.000	0.42		20.3	OK	

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Ambiental		Page 6
Science Park Square	Existing Storm Sewer Design	
Brighton	Pier Road	
BN1 9SA	Contract No. 3153	
Date 18/07/2017 10:42	Designed by Jane Teneader	
File EXISTING RUNOFF RATES#3...	Checked by Mark Neumann	
XP Solutions	Network 2017.1	

100 year Return Period Summary of Critical Results by Maximum Outflow (bank to bank)

Simulation Statistics

Areal Reduction Factor 1.000 Additional Flow = 0 of Total Flow 0.000
 Not Start (min): 0 HADU Factor = 1000/ha Storage 2.000
 Not Start Level (mm): 0 Inlet Coefficient 0.800
 Manhole Weirless Coeff (rational): 0.300 Flow per Person per Day (l/person/day) 0.000
 Pool Storage per hectare (l/s): 0.000

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

Cymchennu Rainfall Details

Rainfall Model PER Ratio 8 0.100
 Region England and Wales CV (Summer): 0.750
 10-60 mm 10.000 CV (Winter): 0.840

Margin for Flood Risk Warning (m): 200.0 SUD Status OFF
 Analysis Threshold Flow Inertia Status OFF
 PBS Status ON

Profile(s): Summer and Winter
 Duration(s) (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 840, 1440, 2160, 2880, 4320, 5760,
 7200, 8640, 10080
 Return Period(s) (years): 1, 20, 50, 100
 Climate Change (%): 0, 0, 0, 0

PN	US/ADR	Storm	Return Period	Climate Change	First (K) Burcharge	First (Y) Flood	First (Z) Overflow	Water Level
	Name						Act.	(m)
01.000	01 10 Winter		100	+0%				0.985
01.001	01 10 Summer		100	+0%				0.889

PN	US/ADR	Name	Surcharged		Flooded		Pipe		Level
			Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Flow / OverFlow (l/s)	Flow (l/s)	Status Exceeded	
01.000	01		+0.100	0.000	0.56		25.1	OK	
01.001	02		+0.100	0.000	0.54		25.2	OK	

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Summary of Results

Ambiental		Page 1
Solenne Park Square		Proposed SuDS
Brighton		Permeable Paving - Green Roof
BN1 3JH		Pier 84 - Contract No 3153
Date 04/04/2017 17:10		Designed by Jose Teseador
File PP-GP_Tinlyr+40+cc_Vols...		Checked by Mark Naumann
KP Solutions		Source Control 2017.1

Summary of Results for 1 Year Return Period (40%ile)

Half Drain Time = 11 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max D Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	1.887	0.027	0.0	0.4	0.4	1.0	O K
30 min Summer	1.882	0.042	0.0	1.0	1.0	1.9	O K
60 min Summer	1.874	0.054	0.0	1.1	1.1	2.4	O K
115 min Summer	1.867	0.062	0.0	1.5	1.5	2.8	O K
180 min Summer	1.864	0.064	0.0	2.0	2.0	2.9	O K
240 min Summer	1.864	0.064	0.0	2.0	2.0	2.9	O K
360 min Summer	1.861	0.061	0.0	1.9	1.9	2.7	O K
480 min Summer	1.857	0.057	0.0	1.7	1.7	2.6	O K
600 min Summer	1.854	0.054	0.0	1.5	1.5	2.4	O K
720 min Summer	1.851	0.051	0.0	1.4	1.4	2.3	O K
840 min Summer	1.847	0.047	0.0	1.2	1.2	2.1	O K
1440 min Summer	1.841	0.041	0.0	0.9	0.9	1.8	O K
2160 min Summer	1.838	0.038	0.0	0.7	0.7	1.6	O K
3600 min Summer	1.832	0.032	0.0	0.6	0.6	1.5	O K
4320 min Summer	1.848	0.038	0.0	0.2	0.5	1.7	O K
5760 min Summer	1.840	0.025	0.0	0.4	0.6	1.1	O K
7200 min Summer	1.849	0.028	0.0	0.5	0.9	1.0	O K
8640 min Summer	1.842	0.022	0.0	0.3	0.3	1.0	O K
10080 min Summer	1.841	0.021	0.0	0.3	0.3	0.9	O K
15 min Winter	1.851	0.031	0.0	0.5	0.6	1.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	39.354	0.0	0.0	20
30 min Summer	36.103	0.0	0.0	36
60 min Summer	16.918	0.0	0.0	54
115 min Summer	10.767	0.0	7.8	87
180 min Summer	8.213	0.0	8.8	110
240 min Summer	6.900	0.0	9.9	142
360 min Summer	5.159	0.0	11.0	202
480 min Summer	4.159	0.0	17.6	260
600 min Summer	3.624	0.0	13.9	320
720 min Summer	3.196	0.0	14.8	384
840 min Summer	2.600	0.0	16.0	502
1440 min Summer	1.982	0.0	18.8	748
2160 min Summer	1.899	0.0	21.1	1108
3600 min Summer	1.328	0.0	20.3	1473
4320 min Summer	0.409	0.0	25.9	2196
5760 min Summer	0.743	0.0	28.1	2836
7200 min Summer	0.853	0.0	29.7	3670
8640 min Summer	0.577	0.0	31.0	4608
10080 min Summer	0.818	0.0	32.0	5032
15 min Winter	39.354	0.0	0.0	20

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Ambiental		Page 2
Science Park Square	Proposed SuDS	
Brighton	Permeable Paving - Green Roof	
BS1 988	Dier Rd - Contract No 3153	
Date 04/04/2017 17:10	Designed by Jess Teneader	
File IP-SR finalr+4000c Vaio...	Checked by Mark Neumann	
XP Solutions	Source Control 2017.1	

Summary of Results for 1 year Return Period (c40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control % (l/s)	Max % Outflow Volume (l/s)	Max Status
30 min Winter	1.859	0.049	0.0	1.3	1.3	0 X
60 min Winter	1.862	0.052	0.0	1.3	1.3	0 X
120 min Winter	1.867	0.057	0.0	2.2	2.2	0 F
180 min Winter	1.866	0.066	0.0	2.1	2.1	0 F
240 min Winter	1.863	0.063	0.0	2.0	2.0	0 X
300 min Winter	1.877	0.057	0.0	1.7	1.7	0 X
360 min Winter	1.872	0.052	0.0	1.4	1.4	0 F
600 min Winter	1.866	0.066	0.0	1.2	1.2	0 F
720 min Winter	1.863	0.063	0.0	1.1	1.1	0 X
840 min Winter	1.861	0.061	0.0	0.9	0.9	0 X
1440 min Winter	1.855	0.055	0.0	0.7	0.7	0 X
2160 min Winter	1.855	0.055	0.0	0.5	0.5	0 F
2880 min Winter	1.847	0.027	0.0	0.4	0.4	0 X
4320 min Winter	1.844	0.024	0.0	0.3	0.3	0 X
5760 min Winter	1.841	0.021	0.0	0.3	0.3	0 F
7200 min Winter	1.840	0.020	0.0	0.2	0.2	0 F
8640 min Winter	1.838	0.018	0.0	0.2	0.2	0 X
10080 min Winter	1.837	0.017	0.0	0.2	0.2	0 X

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	26.103	0.0	4.0	37
60 min Winter	16.318	0.0	8.0	64
120 min Winter	10.767	0.0	8.6	84
180 min Winter	8.213	0.0	10.1	110
240 min Winter	6.800	0.0	11.4	146
300 min Winter	5.159	0.0	13.0	206
360 min Winter	4.225	0.0	14.7	256
600 min Winter	1.624	0.0	15.9	324
720 min Winter	3.196	0.0	16.0	344
840 min Winter	2.420	0.0	18.8	608
1440 min Winter	1.962	0.0	21.3	720
2160 min Winter	1.420	0.0	24.1	1108
2880 min Winter	1.122	0.0	26.3	1506
4320 min Winter	0.508	0.0	26.0	2160
5760 min Winter	0.763	0.0	27.1	2844
7200 min Winter	0.655	0.0	24.1	1640
8640 min Winter	0.577	0.0	16.6	4616
10080 min Winter	0.518	0.0	16.9	5144

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Ambiental

Science Park Square

Exington

SN1 9BB

Date 04/04/2017 17:10

File C:\P-04_11hlyr+40hcc_Valu...

XP solutions

Proposed SuDS

Permeable Paving - Green Roof

Pier Rd - Contract No 3153

Designed by Josh Tennant

Checked by Mark Neumann

Source Control 2017.1

Page 3



Rainfall Details

Rainfall Model: FFA

Winter Storms: Yes

Return Period (years): 1

Cy (Summer): 0.750

Region: England and Wales

Cy (Winter): 0.800

xi=40 (mm)

18,000 Shortest Storm (mins): 18

Ratio R: 0.750

Longest Storm (mins): 6000

Summer Storms: Yes

Climate Change %: +40

Green Roof

Area (m²): 120

Evaporation (mm/day): 1

Deposited Storage (mm): 1

Density Coefficient: 0.950

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	
From:	To:	From:	To:	From:	To:	From:	To:	
0	4	0.001815	32	36	0.001178	64	68	0.000237
4	8	0.004761	36	40	0.003961	68	72	0.000194
8	12	0.007608	40	44	0.006787	72	76	0.000158
12	16	0.001197	44	48	0.005344	76	80	0.000139
16	20	0.002619	48	52	0.004079	80	84	0.000107
20	24	0.001138	52	56	0.003430	84	88	0.000087
24	28	0.001701	56	60	0.002254	88	92	0.000071
28	32	0.001634	60	64	0.000209	92	96	0.000030

Time Area Diagram

Total Area (ha): 0.020

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:
4	4	0.010	4	8	0.016
8	8	0.020	8	12	0.020

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Ambiental	Page 4
Science Park Square	Proposed SuDS
Brighton	Permeable Paving - Green Roof
BN1 9SA	Dier Rd - Contract No 3153
Date 04/04/2017 17:10	Designed by Jane Teneader
File SP-SR Linlithgow Vaid...	Checked by Mark Neumann
XP Solutions	Source Control 2017.1

Model Details

Storage is Online Green Level (at 2.400)

Permeable Pavement Structure

Infiltration Coefficient base (m/s)	0.0000	Width (m)	6.0
Maximum Permeation (mm/hr)	1000	Length (m)	25.0
Max Permeation (l/s)	41.7	Slope (l/s)	0.0
Safety Factor	1.0	Depression Storage (mm)	0
Porosity	0.10	Evaporation (mm/day)	0
Invert Level (m)	1.870	Bedrock Depth (m)	130

Hydro-Brake Optimised Outfall Control

Unit Reference	HD-SBS-0117-0000-0450-0000
Design Head (m)	0.450
Design Flow (l/s)	5.0
Flush-Flow*	Calculated
Objective	Minimise upstream storage
Application	Surface
Prop. Available	Yes
Diameter (mm)	111
Invert Level (m)	1.870
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.450	5.0
Flush-Flow*	0.173	5.0
Kick-Flow	0.341	3.4
Head Flow over Head Range	-	4.1

The hydrological calculations have been based on the Head/Discharge relationship for the hydro-brake Optimised as specified. Should another type of control device other than a Hydro-brake Optimised 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	5.9	1.200	7.9	2.300	12.7	3.400	18.4
0.200	5.9	1.400	8.0	2.500	13.1	3.600	19.0
0.300	4.7	1.600	9.0	2.600	14.6	3.800	19.7
0.400	4.7	1.800	9.6	2.800	14.8	4.000	20.3
0.500	5.2	2.000	10.1	3.000	15.3	4.200	20.9
0.600	5.7	2.200	10.5	3.200	16.0	4.400	21.4
0.800	6.5	2.400	11.0	3.400	17.0		
1.000	7.3	2.600	11.4	3.600	17.7		

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Ambiental		Page 1
Science Park Square	Proposed SuDS	
Brighton	Permeable Paving - Green Roof	
BN1 9BB	Dier Rd - Contract No 3153	
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File: SP-SR Lin30yr+40lca_Vol... XP Solutions	Checked by Mark Neumann Source Control 2017.1	

Summary of Results for 10 year Return Period (+200)

Half Rain Time = 71 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (L/s)	Max Control E (l/s)	Max Outflow (L/s)	Max Volume (m ³)	Status
15 min Summer	3.914	0.094	0.0	3.6	3.6	4.2	O F
30 min Summer	3.943	0.123	0.0	4.9	4.9	6.5	O F
60 min Summer	3.965	0.145	0.0	5.6	5.6	8.5	O F
120 min Summer	3.971	0.151	0.0	5.0	5.0	6.8	O F
180 min Summer	3.958	0.138	0.0	5.0	5.0	6.2	O F
240 min Summer	3.944	0.124	0.0	4.9	4.9	5.6	O F
300 min Summer	3.927	0.107	0.0	4.3	4.3	4.8	O F
360 min Summer	3.915	0.095	0.0	3.7	3.7	4.3	O F
420 min Summer	3.907	0.087	0.0	3.3	3.3	3.9	O F
480 min Summer	3.901	0.081	0.0	2.9	2.9	3.6	O F
540 min Summer	3.895	0.075	0.0	2.5	2.5	3.2	O F
600 min Summer	3.881	0.061	0.0	1.9	1.9	2.8	O F
660 min Summer	3.872	0.052	0.0	1.4	1.4	1.9	O F
720 min Summer	3.866	0.046	0.0	1.1	1.1	2.1	O F
780 min Summer	3.859	0.039	0.0	0.8	0.8	1.8	O F
840 min Summer	3.855	0.035	0.0	0.7	0.7	1.6	O F
900 min Summer	3.852	0.032	0.0	0.6	0.6	1.4	O F
960 min Summer	3.850	0.030	0.0	0.5	0.5	1.3	O F
1020 min Summer	3.848	0.028	0.0	0.4	0.4	1.2	O F
15 min Winter	3.927	0.127	0.0	4.3	4.3	4.8	O F

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	96.371	0.0	4.6	22
30 min Summer	64.180	0.0	12.0	31
60 min Summer	40.933	0.0	14.3	48
120 min Summer	25.357	0.0	20.7	90
180 min Summer	16.848	0.0	23.5	112
240 min Summer	15.333	0.0	25.5	140
300 min Summer	13.948	0.0	28.5	200
360 min Summer	9.161	0.0	30.4	280
420 min Summer	7.755	0.0	32.7	320
480 min Summer	6.765	0.0	34.3	360
540 min Summer	5.448	0.0	37.0	500
600 min Summer	4.813	0.0	40.3	742
660 min Summer	3.891	0.0	45.0	1104
720 min Summer	2.370	0.0	48.1	1412
780 min Summer	1.738	0.0	57.6	2004
840 min Summer	1.394	0.0	58.8	2512
900 min Summer	1.175	0.0	58.2	2672
960 min Summer	1.021	0.0	56.2	4328
1020 min Summer	0.908	0.0	62.9	5188
15 min Winter	86.371	0.0	9.6	20

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Ambiental		Page 2
Science Park Square	Proposed SuDS	
Brighton	Permeable Paving - Green Roof	
BN1 9BB	Dier Rd - Contract No 3153	
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SUMMARY OF RESULTS FOR 10 year return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Z (l/s)	Max Outflow Volume (m³)	Status
30 min Winter	1.963	0.143	0.0	5.0	5.0	OK
60 min Winter	1.967	0.147	0.0	5.0	5.0	OK
120 min Winter	1.978	0.159	0.0	5.0	5.0	OK
180 min Winter	1.991	0.193	0.0	6.0	6.0	OK
240 min Winter	1.995	0.115	0.0	6.0	6.0	OK
300 min Winter	1.995	0.095	0.0	3.7	3.7	OK
360 min Winter	1.993	0.043	0.0	3.1	3.1	OK
600 min Winter	1.896	0.036	0.0	2.7	2.7	OK
720 min Winter	1.890	0.070	0.0	2.3	2.3	OK
840 min Winter	1.882	0.092	0.0	1.9	1.9	OK
1440 min Winter	1.873	0.032	0.0	1.4	1.4	OK
2160 min Winter	1.864	0.044	0.0	1.1	1.1	OK
2880 min Winter	1.859	0.039	0.0	0.9	0.9	OK
4320 min Winter	1.853	0.033	0.0	0.6	0.6	OK
5760 min Winter	1.850	0.030	0.0	0.5	0.5	OK
7200 min Winter	1.847	0.027	0.0	0.4	0.4	OK
8640 min Winter	1.845	0.025	0.0	0.4	0.4	OK
10080 min Winter	1.844	0.024	0.0	0.3	0.3	OK

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	44.160	0.0	14.0	32
60 min Winter	40.030	0.0	18.1	62
120 min Winter	21.957	0.0	23.5	94
180 min Winter	15.948	0.0	28.6	112
240 min Winter	15.323	0.0	29.9	144
300 min Winter	14.348	0.0	32.0	204
360 min Winter	9.161	0.0	34.3	264
600 min Winter	7.733	0.0	37.0	322
720 min Winter	6.745	0.0	38.8	360
840 min Winter	5.449	0.0	41.8	604
1440 min Winter	4.013	0.0	46.3	742
2160 min Winter	0.881	0.0	50.9	1116
2880 min Winter	2.270	0.0	54.4	1664
4320 min Winter	1.738	0.0	56.5	2368
5760 min Winter	1.704	0.0	57.2	2826
7200 min Winter	1.175	0.0	58.0	3680
8640 min Winter	1.021	0.0	58.4	4368
10080 min Winter	0.808	0.0	58.4	5152

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Science Park Square

Exington

SN1 9BB

Date 04/04/2017 17:12

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Proposed SuDS

Permeable Paving - Green Roof

Pier Rd - Contract No 3153

Designed by Josh Tennant

Checked by Mark Neumann

Source Control 2017.1

Page 3



Rainfall Details

Rainfall Model: FRA

Winter Storms: Yes

Return Period (years): 30

Cy (Summer): 0.750

Region: England and Wales

Cy (Winter): 0.800

xi=40 (mm)

18,000 Shortest Storm (mins): 18

Wetted A

0.750

Longest Storm (mins): 6000

Summer Storms

Yes

Climate Change %

+40

Green Roof

Area (m²): 120

Evaporation (mm/day): 1

Deposited Storage (mm): 1

Density Coefficient: 0.950

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.000815	32 36	0.001178	64 68	0.000237	96 100	0.000048
4 8	0.004761	36 40	0.003961	68 72	0.000194	100 104	0.000018
8 12	0.007688	40 44	0.003787	72 76	0.000158	104 108	0.000012
12 16	0.001197	44 48	0.000344	76 80	0.000139	108 112	0.000014
16 20	0.002619	48 52	0.000179	80 84	0.000107	112 116	0.000002
20 24	0.000138	52 56	0.000480	84 88	0.000087	116 120	0.000018
24 28	0.001701	56 60	0.000254	88 92	0.000071		
28 32	0.001634	60 64	0.000209	92 96	0.000030		

Time Area Diagram

Total Area (ha): 0.020

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
4 8	0.010	4 8	0.010	8 12	0.010

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Ambiental	Page 4
Science Park Square	Proposed SuDS
Brighton	Permeable Paving - Green Roof
BN1 9SA	Pier Rd - Contract No 3153
Date 04/04/2017 17:12	Designed by Jane Teneader
File IP-BK Lin30yr+40%ca_Vol...	Checked by Mark Neumann
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Model Details

Storage is Online Green Level (at 2.400)

Permeable Pavement Structure

Infiltration Coefficient base (m/s):	0.00009	Width (m):	6.0
Maximum Permeation (mm/hr):	1000	Length (m):	25.0
Max Permeation (l/s):	41.7	Slope (l/s):	0.0
Safety Factor:	1.0	Depression Storage (mm):	5
Porosity:	0.10	Evaporation (mm/day):	1
Invert Level (m):	1.870	Bedstone Depth (m):	130

Hydro-Brake Optimised Outfall Control

Unit Reference:	HD-SBS-0117-0000-0450-0000
Design Head (m):	0.450
Design Flow (l/s):	5.0
Flush-Flow:	Calculated
Objective:	Minimise upstream storage
Application:	Surface
Prop. Available:	Yes
Diameter (mm):	111
Invert Level (m):	1.870
Minimum Outlet Pipe Diameter (mm):	100
Suggested Manhole Diameter (mm):	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated):	0.450	5.0
Flush-Flow:	0.173	5.0
Kick-Flow:	0.341	3.4
Head Flow over Head Range:	-	4.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimised as specified. Should another type of control device other than a Hydro-Brake Optimised 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	5.9	1.200	7.9	2.300	12.7	7.000	19.4
0.200	5.9	1.400	8.0	2.500	13.1	7.500	19.0
0.300	4.7	1.600	9.0	2.600	14.0	8.000	18.7
0.400	4.7	1.800	9.6	2.800	14.8	8.500	18.3
0.500	5.2	2.000	10.1	3.000	15.5	9.000	18.0
0.600	5.7	2.200	10.9	3.500	16.3	9.500	17.4
0.800	6.5	2.400	11.5	4.000	17.0		
1.000	7.3	2.600	11.4	4.500	17.7		

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Ambiental		Page 1
Science Park Square	Proposed SuDS	
Brighton	Permeable Paving - Green Roof	
BN1 9BB	Dier Rd - Contract No 3153	
Date 04/04/2017 17:08	Designed by Jane Tomador	
File IP-SR AttenuationVolume...	Checked by Mark Neumann	
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Summary of Results for 100 year Return Period (40%)

Half Rain Time = 73 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (L/s)	Max Control E (l/s)	Max Outflow Volume (m ³)	Max Status
15 min Summer	0.948	0.188	0.0	8.0	8.0	OK
30 min Summer	0.908	0.186	0.0	8.0	8.0	OK
60 min Summer	0.843	0.213	0.0	8.0	8.0	OK
120 min Summer	0.655	0.235	0.0	8.0	8.0	OK
180 min Summer	0.635	0.215	0.0	8.0	8.0	OK
240 min Summer	0.607	0.187	0.0	8.0	8.0	OK
360 min Summer	1.861	0.141	0.0	8.0	8.0	OK
480 min Summer	1.928	0.118	0.0	8.7	8.7	OK
600 min Summer	1.920	0.190	0.0	8.2	8.2	OK
720 min Summer	1.917	0.097	0.0	8.8	8.8	OK
960 min Summer	1.805	0.085	0.0	8.3	8.3	OK
1440 min Summer	1.891	0.073	0.0	7.4	7.4	OK
2160 min Summer	1.878	0.058	0.0	1.8	1.8	OK
2880 min Summer	1.873	0.053	0.0	1.3	1.3	OK
4320 min Summer	1.864	0.044	0.0	1.1	1.1	OK
6780 min Summer	1.859	0.039	0.0	0.8	0.8	OK
9200 min Summer	1.856	0.036	0.0	0.7	0.7	OK
9640 min Summer	1.852	0.033	0.0	0.6	0.6	OK
10080 min Summer	1.851	0.031	0.0	0.5	0.5	OK
15 min Winter	1.869	0.169	0.0	8.0	8.0	OK

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	174.673	0.0	11.8	21
30 min Summer	88.789	0.0	16.7	33
60 min Summer	43.776	0.0	27.1	54
120 min Summer	15.337	0.0	38.0	90
180 min Summer	24.830	0.0	31.5	118
240 min Summer	20.004	0.0	34.1	148
360 min Summer	14.764	0.0	37.8	206
480 min Summer	13.818	0.0	40.4	280
600 min Summer	9.868	0.0	42.9	322
720 min Summer	8.695	0.0	44.8	360
960 min Summer	6.943	0.0	47.5	500
1440 min Summer	5.071	0.0	50.5	740
2160 min Summer	3.684	0.0	53.3	1104
2880 min Summer	2.849	0.0	60.8	1468
4320 min Summer	2.142	0.0	65.8	2180
6780 min Summer	1.765	0.0	69.4	2928
9200 min Summer	1.427	0.0	72.1	3670
9640 min Summer	1.235	0.0	74.4	4606
10080 min Summer	1.093	0.0	76.0	5088
15 min Winter	134.653	0.0	18.5	20

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Ambiental		Page 2
Science Park Square	Proposed SuDS	
Brighton	Permeable Paving - Green Roof	
BN1 9SA	Dier Rd - Contract No 3153	
Date 04/04/2017 17:08	Designed by Joas Tenador	
File IP-SK AttenuationVolume...	Checked by Mark Neumann	
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Summary of Results for 100 year Return Period (40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Z (l/s)	Max Outflow Volume (m³)	Status
30 min Winter	2.034	0.214	0.0	5.0	5.0	O K
60 min Winter	2.065	0.245	0.0	5.0	5.0	O K
120 min Winter	2.092	0.262	0.0	5.0	5.0	O K
180 min Winter	2.048	0.226	0.0	5.0	5.0	O K
240 min Winter	1.993	0.173	0.0	5.0	5.0	O K
300 min Winter	1.929	0.119	0.0	4.7	4.7	O K
360 min Winter	1.921	0.101	0.0	4.0	4.0	O K
600 min Winter	1.915	0.096	0.0	1.4	3.4	O K
720 min Winter	1.901	0.082	0.0	3.0	3.0	O K
840 min Winter	1.892	0.072	0.0	0.5	1.8	O K
1440 min Winter	1.890	0.069	0.0	1.4	1.9	O K
2160 min Winter	1.879	0.056	0.0	1.3	1.3	O K
2880 min Winter	1.864	0.044	0.0	1.1	1.1	O K
4320 min Winter	1.857	0.037	0.0	0.8	0.8	O K
5760 min Winter	1.853	0.033	0.0	0.4	0.4	O K
7200 min Winter	1.850	0.030	0.0	0.3	0.3	O K
8640 min Winter	1.848	0.028	0.0	0.4	1.0	O K
10080 min Winter	1.848	0.028	0.0	0.4	1.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	83.789	0.0	18.0	30
60 min Winter	83.779	0.0	23.1	60
120 min Winter	82.387	0.0	31.7	90
180 min Winter	84.830	0.0	38.7	120
240 min Winter	79.006	0.0	39.0	150
300 min Winter	84.798	0.0	42.8	200
360 min Winter	83.815	0.0	45.8	250
600 min Winter	8.366	0.0	48.3	300
720 min Winter	8.665	0.0	50.0	360
840 min Winter	8.343	0.0	54.0	600
1440 min Winter	5.071	0.0	59.3	740
2160 min Winter	5.086	0.0	64.4	1110
2880 min Winter	2.843	0.0	66.6	1660
4320 min Winter	2.142	0.0	74.0	2700
5760 min Winter	1.790	0.0	78.4	3830
7200 min Winter	1.827	0.0	81.5	4500
8640 min Winter	1.235	0.0	84.0	4990
10080 min Winter	1.093	0.0	86.4	5160

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Ambiental	Page 4
Science Park Square	Proposed SuDS
Brighton	Permeable Paving - Green Roof
BN1 9SA	Pier Rd - Contract No 3153
Date 04/04/2017 17:08	Designed by Jane Teneader
File IP-BK AttenuationVolume...	Checked by Mark Neumann
XP Solutions	Source Control 2017.1

Model Details

Storage is Online Green Level (at 2.400)

Permeable Pavement Structure

Infiltration Coefficient base (m/s):	0.0000	Width (m):	6.0
Maximum Percolation (mm/hr):	1000	Length (m):	25.0
Max Percolation (l/s):	41.7	Slope (l/s):	0.0
Safety Factor:	1.0	Depression Storage (mm):	5
Porosity:	0.10	Evaporation (mm/day):	1
Invert Level (m):	1.870	Bedstone Depth (m):	130

Hydro-Brake Optimised Outfall Control

Unit Reference:	HD-SBS-0117-0000-0450-0000
Design Head (m):	0.450
Design Flow (l/s):	5.0
Flush-Flow:	Calculated
Objective:	Minimise upstream storage
Application:	Surface
Prop. Available:	Yes
Diameter (mm):	111
Invert Level (m):	1.870
Minimum Outlet Pipe Diameter (mm):	100
Suggested Manhole Diameter (mm):	1250

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated):	0.450	5.0
Flush-Flow:	0.173	5.0
Kick-Flow:	0.341	3.4
Head Flow over Head Range:	-	4.1

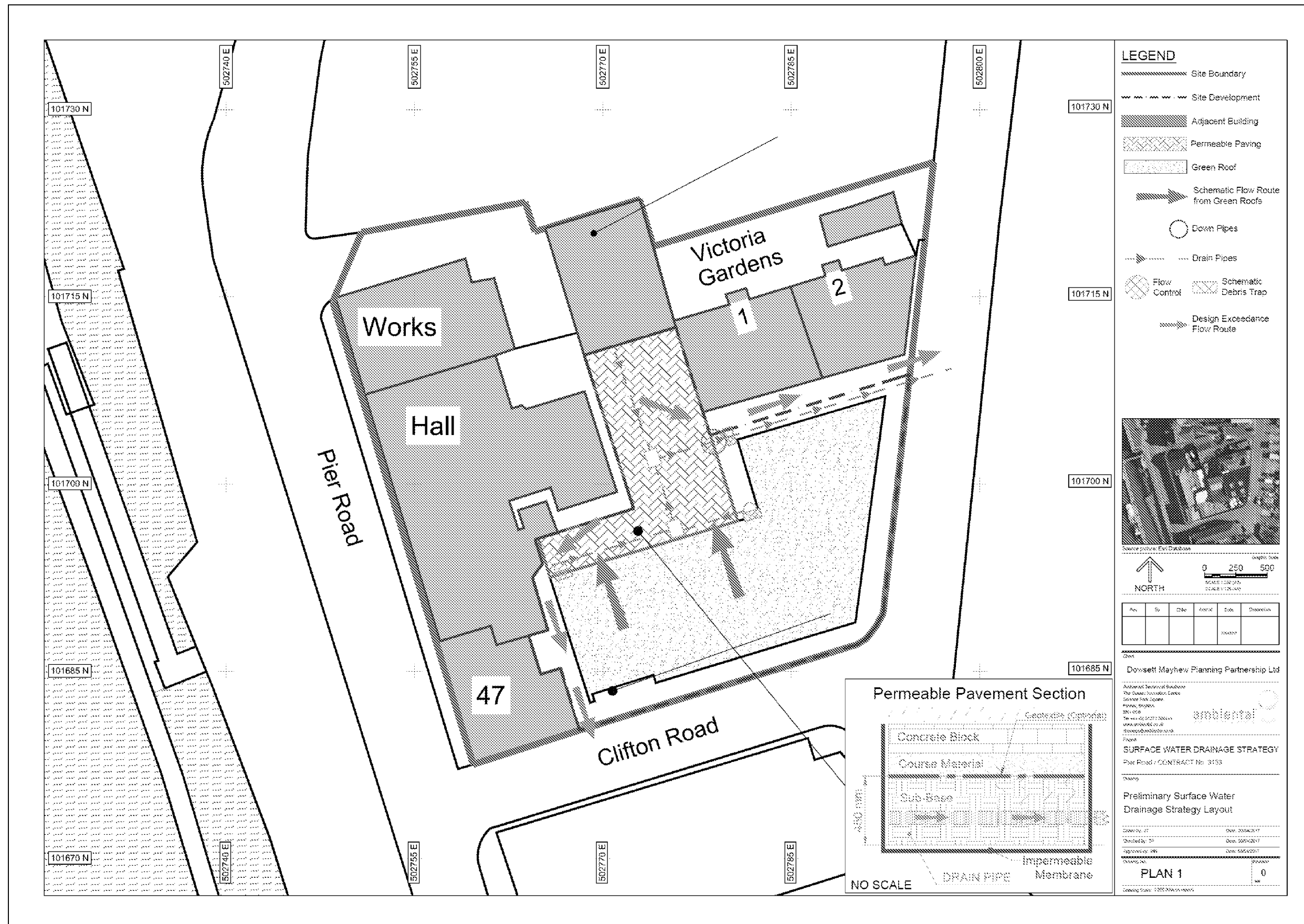
The hydrological calculations have been based on the Head/Discharge relationship for the hydro-brake optimised as specified. Should another type of control device other than a hydro-brake optimised be utilized then these storage routing calculations will be invalidated.

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.9	1.200	7.9	2.300	12.7	7.000	19.4
0.200	5.9	1.400	8.0	2.500	13.1	7.500	19.0
0.300	4.7	1.600	9.0	2.600	14.0	8.000	18.7
0.400	4.7	1.800	9.6	2.800	14.8	8.500	18.3
0.500	5.2	2.000	10.1	3.000	15.5	9.000	18.0
0.600	5.7	2.200	10.9	3.500	16.3	9.500	17.4
0.800	6.5	2.400	11.6	4.000	17.0		
1.000	7.3	2.600	11.4	4.500	17.7		

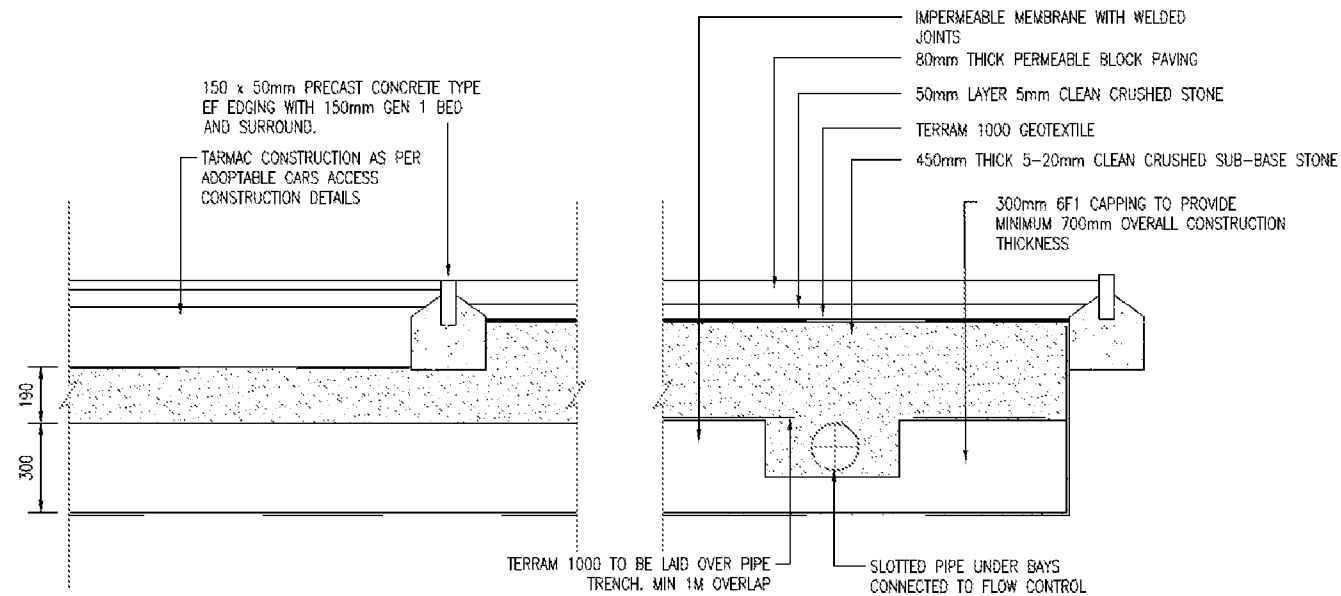
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Appendix 4 – Proposed Drainage Strategy

- ✧ *Plan 1 – Preliminary Surface Water Drainage Strategy Layout*
- ✧ *Plan 2 – Preliminary Permeable Pavement / Flow Control Drainage Details*

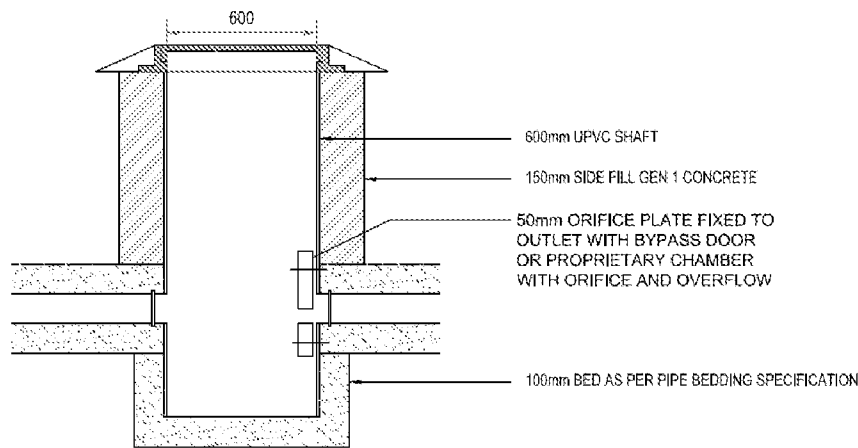


Appendix 4, Plan 1 – Preliminary Surface Water Drainage Strategy Layout



**FRONT PARKING BAY
SECTION**

(1:20)



ORIFICE PLATE FLOW CONTROL MANHOLE

(1:20)

1. GENERAL
- (1) THIS DRAWING IS NOT TO BE SCALED. WORK TO FIGURED DIMENSIONS ONLY CONFERRED ON SITE.
- (2) THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL DRAWINGS, DETAILED SPECIFICATIONS WHERE APPLICABLE AND ALL ASSOCIATED DRAWINGS IN THIS SERIES.
- (3) ANY DISCREPANCY ON THIS DRAWING IS TO BE REPORTED IMMEDIATELY TO THE PARTNERSHIP FOR CLARIFICATION.
- (4) THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKING AND FOR THE STABILITY OF THE WORKS IN PROGRESS.
2. DRAINAGE GENERAL
- (1) ALL SURFACE WATER DRAINS WHICH ARE NOT TO BE ADOPTED AS PUBLIC SEWERS UNDER A SECTION 106 AGREEMENT MUST BE CONSTRUCTED IN ACCORDANCE WITH THE BUILDING REGULATIONS, BS EN 752 AND WHERE APPROPRIATE THE RELEVANT AGREEMENT CERTIFICATES.
- (2) MAN-HOLES, GULLIES, GULLY CONNECTIONS, SEWERS AND OTHER SEWERAGE STRUCTURES INTENDED TO CONVEY SURFACE WATER ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE WATER AUTHORITIES ASSOCIATION SPECIFICATION SEWERS FOR ADOPTION 8TH EDITION AND RELEVANT DRAINAGE DESIGN GUIDE.
- (3) ALL CONCRETE USED IN DRAINAGE WORKS TO COMPLY WITH BRE LATEST SSS FOR CLASS 2 SULPHATE CONDITIONS.
3. MANHOLE COVERS AND FRAMES
- (1) MANHOLE COVERS TO BE CLASS D400 IN HIGHWAYS CLASS B125 IN FOOTWAYS AND VERGES CLASS A15 IN NON-TRAFFICKED AREAS.
- (2) MANHOLE COVER AND FRAME TO BE BEDDED AND SURROUNDED IN 1:3 SAND/40%.
4. MANHOLE RINGS, COVER SLABS & TAPES
- (1) PRECAST CONCRETE MANHOLE UNITS SHALL COMPLY WITH THE REQUIREMENTS OF BS 5911. THE RELEVANT ACCEPTATION TESTS REQUIRED SHALL BE CARRIED OUT ON A SAMPLE OF THOSE RINGS AND SLABS USED UNLESS A CERTIFICATE OF TESTING IS SUPPLIED BY THE MANUFACTURER. COVER SLABS SITUATED UNDER CARPARKWAYS OR TRAFFICKED AREAS SHALL BE HEAVY DUTY AND THOSE ELSEWHERE SHALL BE LIGHT DUTY. MANHOLE UNITS SHALL BE COMPLETE WITH STEP RINGS IF REQUIRED.
5. PIPES
- (1) PLASTIC PIPES SHALL BE OF UNPLASTICISED POLYPROPYLENE (PP) OR POLYETHYLENE (PE) COMPLYING WITH THE REQUIREMENTS OF BS EN 1401.
- (2) CONCRETE PIPES SHALL BE SPUN BY A CENTRIFUGAL PROCESS OR BE VERTICALLY PRESSED. THEY SHALL POSSESS SELF-PROTECTING SOCKETS AND SHALL COMPLY WITH THE REQUIREMENTS OF AND BE TESTED IN ACCORDANCE WITH BS 5911.
- (3) SOLID WALL CONCENTRIC EXTERNAL RIB-REINFORCED UNPLASTICISED PVC PIPE SHALL COMPLY WITH ASTM A200.
- (4) ALL VITRIFIED CLAY PIPES TO BE IN ACCORDANCE WITH BS EN 300.
- (5) ALL PIPE CONNECTIONS TO MANHOLE AND DATCH FITS TO HAVE MIN 500MM SLOTTED PIPE AS CLOSE AS PRACTICABLE TO CHAMBER WALL.
6. GULLY GRATES AND FRAMES
- (1) GULLY GRATES AND FRAMES FOR CARPARKWAYS GULLIES SHALL COMPLY WITH BS EN 142. GULLIES SHALL BE PATTERN GS1-S25 FOR ROADS BELOW 50 DV AND PATTERN GS4-S25 FOR ROADS ABOVE 50 DV. GULLY GRATES AND FRAMES FOR KERB SIDE GULLIES SHALL BE PATTERN GK-115 FOR ROADS BELOW 30 DV AND GK-115 FOR ROADS ABOVE 30 DV. CURVED BAR GULLY GRATES SHALL BE USED ON ROADS WHERE THE GRADIENT EXCEEDS 4%.



Rev	By	Check	Issue	Date	Description

Issue

Dowsett Mayhew Planning Partnership Ltd

ambiental

SURFACE WATER DRAINAGE STRATEGY

Plot Road / CONTRACT No. 3153

Location

Preliminary Permeable Pavement /
Flow Control Drainage Details

Drawn by: JT	Date: 27/04/2017
Checked by: TP	Date: 28/04/2017
Approved by: NH	Date: 03/05/2017
Drawing No:	Sheet:
PLAN 2	0
Drawing Scale: 1:20 (A1) on A3	Scale:

Appendix 5 – Information

Surface Water Runoff Calculation Method

Rainfall data has been extracted from the FEH CD-ROM for several storm duration events for a number of return periods, including 1:1.01 year, 1:10 year and 1:100 year storm events. These return periods are industry standard, however it is important to be aware that return periods less than 1:2 years are not considered reliable and should not be used in detailed design calculations.

The 1:100 year with an allowance for climate change has been based on a 40% increase to the 1:100 year rainfall intensity and not the rainfall depth. This is to provide the most conservative runoff rates for the site possible.

Greenfield runoff rates have been calculated using The Institute of Hydrology Report 124 Marshall and Bayliss, 1994 method, as recommended in the SuDS Manual CIRIA (C753). In keeping with standard practice, the calculations are based on calculating the Greenfield runoff rates for a 50 Ha site and then factored to account for the actual site size.

Southern Water Ltd Information



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Developer Services
Southern Water
Sparrowgrove House
Sparrowgrove
Otterbourne
Hampshire
SO21 2SW

Your Ref:

Our Ref:

SWS-SUSXW-CC-003381

Date:

26 May 2017

F.A.O: Mr. Powell,

Site: 46A to 47, Pier Road, Littlehampton, West Sussex, BN17 5LW.

Dear Mr. Powell,

We have completed the capacity check for the above development site and the results are as follows:-

Foul capacity check:

Following initial investigations, there is currently adequate capacity in the local sewerage network to accommodate a foul flow for the above development at/downstream of manhole references TQ02017601. Please note that no surface water flows (existing or proposed) can be accommodated within the existing foul sewerage system.

Surface water capacity check:

There is currently inadequate capacity within the local surface network to accommodate a flow for the above development at manhole reference TQ02017651.

Surface water should be disposed of by alternative means such as,

- a. Discharge the surface water into soakaways if effective at this location or to any local drainage water courses, subject to all interested parties approval.

Southern Water Sparrowgrove House Otterbourne Winchester Hampshire SO21 2SW www.southernwater.co.uk

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- b. The nearest point where capacity is currently available is at manhole reference TQ02016954 located approximately 220 m North of the proposed development site.

Please note that if the excess surface water flows are to be attenuated on site, it could have a significant effect on any proposed Section 104 Agreements. Any attenuation proposals should be agreed before any works are implemented on site. Where capacity is limited/restricted, agreement should be sought if you are to include any highway drainage within your proposals as Southern Water is not obligated to accept highway flows.

Section 98 of the Water Industry Act 1991 provides a legal mechanism through which the appropriate infrastructure can be requested (by the developer) and provided to drain a specific location.

Unfortunately, it may be several years before adequate infrastructure is provided via a prioritised capital expenditure programme. Therefore, this proposed development would be considered premature until such time adequate sewerage infrastructure could be provided.

It should be noted that Southern Water has recently undertaken a review of their modelling criteria, processes and solutions for Level 2 capacity assessments (sewerage and surface water). This review has indicated concerns with inconsistencies moving through the various processes. Southern Water are not satisfied that we are fully delivering a service that meets the expectations and needs of our Customers and hence the Foul and Surface Water Level 2 capacity assessments will not be available for the foreseeable future.

Southern Water are currently developing a new process/application, which will aim to deliver a more comprehensive and robust solution in providing capacity for your proposed development site. This will appear on Southern Water's website on completion of the review process.

Southern Water will still accept **Fresh Water** Level 2 capacity assessment applications.

Before any connections are made to foul and surface sewerage network, an application form needs to be completed and approved by Southern Water Services.

Should you require any further information, please contact us at the above mentioned phone number or address.

Yours faithfully



Developer services

Please note: -

The information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

