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CIVIL AND STRUCTURAL ENGINEERING CONSULTANTS

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Job No: 2460E

17th July 2024

Land adjacent to 1A Barker Close, Northwood, HA6 1TN
Proposed Re-Development of the above site with 1 Detached House

Surface Water Drainage

Existing Situation

The existing site is an undeveloped parcel of land adjacent to house numbers 1A, the site appears to be overgrown, with a small area of concrete hardstanding.

Proposed (A single detached house and driveway/parking)

Ap_1 roof	= 0.009 ha
Ap2 drive/parking	= 0.004 ha
Total Ap	= 0.013ha (post development)

It has been established that the sub-soil is predominantly clay and not suitable for a soakaway system of drainage, and that there are no ditches/watercourses in the vicinity of the site.

It is therefore proposed to discharge surface water run-off from the developed site to the existing public surface water sewer with a flow restriction of 2.5 litres/second.

The flow will be restricted using an orifice flow control the flow restriction will be set to 3 litres per second, which gives an orifice size of 39mm. (It is not possible to use a vortex flow control due to how shallow the system is).

From the attached hydraulic modelling it can be seen that the volume provided within the flow control manhole, and pipework is sufficient storage to accommodate a 1 in 100 year + 40% climate change storm event with a flow restriction of 3 litres per second.

Maintenance Management Plan

The maintenance requirements for each proposed SuDS component is given below, based on the CIRIA report C753 "The SuDS Manual".

The maintenance of the drainage system will be the responsibility of the property owner.

Drainage Pipes and Inspection Chambers

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Remove sediment and debris from inspection chambers, channel drainage and flow control chamber.	Annually
	Cleaning of gutters and any filters on downpipes.	Annually
	Remove any root ingress	As required
Occasional Maintenance	CCTV Survey of drains to check for cracking, misalignment, blockage.	10 year interval

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
S5	0.002	4.00	70.500		0.615
S4	0.002	4.00	70.500	450	0.908
S3	0.002	4.00	70.300	450	1.188
S2	0.007	4.00	70.050	450	1.138
S1			70.000	450	1.125
EX_S2			69.410	450	1.060

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S5	S4	8.800	0.600	69.885	69.592	0.293	30.0	100	4.10	50.0
1.001	S4	S3	12.000	0.600	69.592	69.112	0.480	25.0	100	4.23	50.0
1.002	S3	S2	8.400	0.600	69.112	68.912	0.200	42.0	100	4.35	50.0
1.003	S2	S1	2.600	0.600	68.912	68.875	0.037	70.3	100	4.40	50.0
1.004	S1	EX_S2	42.000	0.600	68.875	68.350	0.525	80.0	100	5.21	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.413	11.1	0.3	0.515	0.808	0.002	0.0	11	0.573
1.001	1.550	12.2	0.5	0.808	1.088	0.004	0.0	14	0.774
1.002	1.193	9.4	0.8	1.088	1.038	0.006	0.0	20	0.728
1.003	0.919	7.2	1.8	1.038	1.025	0.013	0.0	34	0.763
1.004	0.861	6.8	1.8	1.025	0.960	0.013	0.0	35	0.723

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
30	0	0	0	100	40	0	0

Node S2 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.880	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	3.0		
Invert Level (m)	68.912	Diameter (m)	0.039		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 15 minute summer	268.706	76.035	100 year +40% CC 15 minute summer	488.233	138.153
30 year 15 minute winter	188.566	76.035	100 year +40% CC 15 minute winter	342.620	138.153
30 year 30 minute summer	174.929	49.499	100 year +40% CC 30 minute summer	320.551	90.705
30 year 30 minute winter	122.757	49.499	100 year +40% CC 30 minute winter	224.948	90.705
30 year 60 minute summer	116.589	30.811	100 year +40% CC 60 minute summer	214.603	56.713
30 year 60 minute winter	77.459	30.811	100 year +40% CC 60 minute winter	142.577	56.713
30 year 120 minute summer	70.438	18.615	100 year +40% CC 120 minute summer	129.587	34.246
30 year 120 minute winter	46.797	18.615	100 year +40% CC 120 minute winter	86.094	34.246
30 year 180 minute summer	53.298	13.715	100 year +40% CC 180 minute summer	97.729	25.149
30 year 180 minute winter	34.645	13.715	100 year +40% CC 180 minute winter	63.526	25.149
30 year 240 minute summer	41.604	10.995	100 year +40% CC 240 minute summer	75.977	20.078
30 year 240 minute winter	27.641	10.995	100 year +40% CC 240 minute winter	50.477	20.078
30 year 360 minute summer	31.221	8.034	100 year +40% CC 360 minute summer	56.677	14.585
30 year 360 minute winter	20.295	8.034	100 year +40% CC 360 minute winter	36.841	14.585
30 year 480 minute summer	24.324	6.428	100 year +40% CC 480 minute summer	43.979	11.622
30 year 480 minute winter	16.160	6.428	100 year +40% CC 480 minute winter	29.219	11.622
30 year 600 minute summer	19.756	5.404	100 year +40% CC 600 minute summer	35.604	9.738
30 year 600 minute winter	13.498	5.404	100 year +40% CC 600 minute winter	24.327	9.738
30 year 720 minute summer	17.490	4.687	100 year +40% CC 720 minute summer	31.433	8.424
30 year 720 minute winter	11.754	4.687	100 year +40% CC 720 minute winter	21.125	8.424
30 year 960 minute summer	14.215	3.743	100 year +40% CC 960 minute summer	25.432	6.697
30 year 960 minute winter	9.416	3.743	100 year +40% CC 960 minute winter	16.847	6.697
30 year 1440 minute summer	10.161	2.723	100 year +40% CC 1440 minute summer	18.055	4.839
30 year 1440 minute winter	6.829	2.723	100 year +40% CC 1440 minute winter	12.134	4.839

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

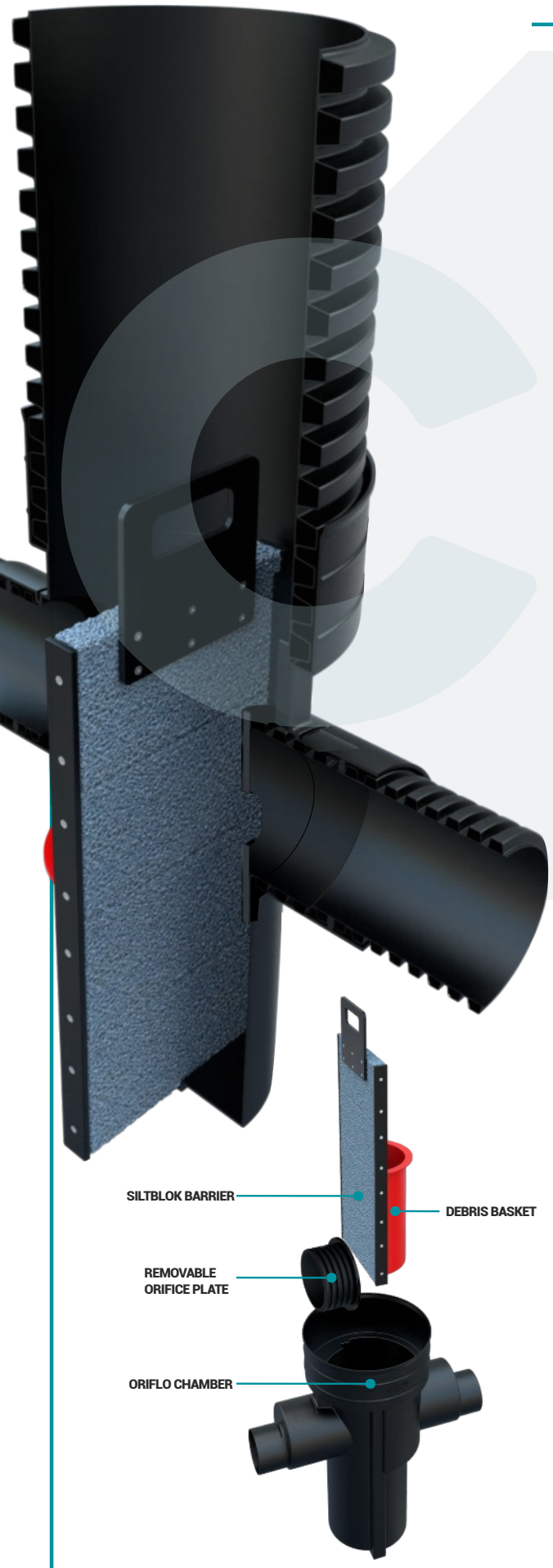
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	S5	10	69.902	0.017	0.7	0.0011	0.0000	OK
15 minute winter	S4	10	69.615	0.023	1.4	0.0047	0.0000	OK
15 minute winter	S3	13	69.405	0.293	2.1	0.0565	0.0000	SURCHARGED
15 minute winter	S2	13	69.402	0.490	2.8	0.1381	0.0000	SURCHARGED
15 minute winter	S1	14	68.914	0.039	2.1	0.0062	0.0000	OK
15 minute winter	EX_S2	14	68.388	0.038	2.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	S5	1.000	S4	0.7	0.628	0.063	0.0099	
15 minute winter	S4	1.001	S3	1.4	0.697	0.115	0.0551	
15 minute summer	S3	1.002	S2	1.4	0.249	0.151	0.0657	
15 minute winter	S2	1.003	S1	2.1	0.730	0.294	0.0076	
15 minute winter	S1	1.004	EX_S2	2.1	0.760	0.313	0.1170	2.1

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S5	10	69.908	0.023	1.3	0.0015	0.0000	OK
30 minute winter	S4	23	69.807	0.215	2.4	0.0436	0.0000	SURCHARGED
30 minute winter	S3	23	69.803	0.691	3.0	0.1335	0.0000	SURCHARGED
30 minute winter	S2	23	69.797	0.885	4.2	0.2497	0.0000	FLOOD RISK
30 minute winter	S1	23	68.921	0.046	2.9	0.0074	0.0000	OK
30 minute winter	EX_S2	23	68.396	0.046	2.9	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S5	1.000	S4	1.3	0.751	0.117	0.0387	
15 minute summer	S4	1.001	S3	2.6	0.765	0.213	0.0939	
15 minute winter	S3	1.002	S2	2.0	0.255	0.213	0.0657	
30 minute winter	S2	1.003	S1	2.9	0.783	0.402	0.0097	
30 minute winter	S1	1.004	EX_S2	2.9	0.826	0.429	0.1476	5.0



ORIFLO®
FLOW CONTROL CHAMBERS

C SERIES - PROTECTED PLATE

OVERVIEW

The ORIFLO OFCC450 is classed as a protected orifice plate - flow control chamber. Designed to support SuDS management and the sewer infrastructure, as part of a designed attenuation system, helping prevent flooding by controlling the flow into the main sewer.

APPLICATION

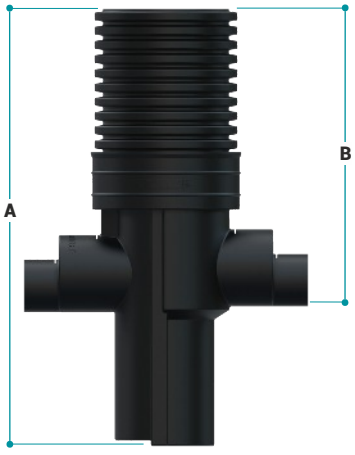
Designed to be installed downstream of larger attenuation systems, ie. tank and oversized pipe systems, forming the final part of the SuDS chain.

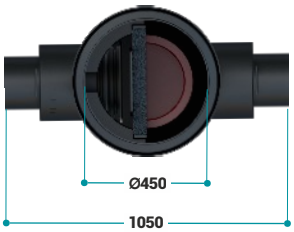
DESCRIPTION

Single piece - factory built units, delivered to site ready to install. Integrally, all of our OFCC models are fitted with our unique SILTBLOK barrier, this barrier protects the orifice plate from any potential blockages from silt or debris, as well as protecting the downstream watercourse. The SILTBLOK barrier has a debris basket attached to the inlet side, which collects any silt and debris. The barrier with basket attachment can be simply removed for emptying and maintenance. This model comes with a choice of two inlet pipe diameters- either 150mm or 225mm twinwall, however other pipework can be accommodated using adaptors -110/160mm EN 1401 and 150mm/225mm UltraRib, Quantum or Polysewer .

COMPLIANCE

- Design & Construction Guidance - April 2020. Section C7.12 - Flow Control Device
- Building Regulations - Part H1
- New DCG (Design and Construction Guidance) states; In Adoptable applications, this type of flow control device, is designed with a minimum 50mm orifice diameter





Product Code	Pipework Options Ø mm	Depth A mm	Invert B mm	Approx. Weight (kg)	Pallet Qty
OFCC450/1.5	150 - 225	1480	965	34	2
OFCC450/2	150 - 225	1990	1475	39	2
OFCC450/2.4	150 - 225	2400	1885	44	N/A
OFCC450/3	150 - 225	3000	2485	50	N/A

To calculate the specific orifice diameter from a prescribed restricted flow rate, you can use the flow rate calculator on our website: **www.turtleenviro.co.uk/oriflo**

60 YEAR Design Life

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DATA SHEET
May 22