

# 7 APPENDIX 2 – DRAINAGE CALCULATIONS

- Surface Water System 1 Residential
- Surface Water System 2 Stadium
- Surface Water System 3 Stadium Carpark
- Surface Water System 4 Southern Access Road



# 7.1 – Micro Drainage Calculations - Surface Water System 1 - Residential

Peter Dann Ltd					Pa	age 1					
Newton House	Cheshunt Foc	tball Cl	Lub			ر 					
Barton											
Cambridge CB23 7WJ	10-6561					- Ch					
$a_{10} = 25/05/2017 - 11.49$	Designed by	MD			I	NICLO					
File SW SYSTEM 1 - RESIDENTIA Checked by JDH											
diene Dreinere	Natural 2016					J					
	Network 2016	• • • • •									
STORM SEWER DESIGN by	y the Modif	ied Rati	onal M	lethoo	1						
Design C	Criteria for	Storm									
Pipe Sizes STAN	IDARD Manhole S	Sizes STAN	IDARD								
FEH	I Rainfall Mode	el									
Return Period	d (years)				1						
FEH Rainfall	l Version	05050 011	050		1999						
Site	Location GB 5	35350 201	250 TL	35350	01250						
	D1 (1km)				0.295						
D2 (1km) 0.262											
D3 (1km) 0.265											
E (1km) 0.330											
Maximum Rainfall (mm/hr) 50											
Maximum Time of Concentration (mins) 30											
Foul Sewage	(l/s/ha)				0.000						
Volumetric Runof	ti Coeti. PIMP (%)				100						
Add Flow / Climate Ch	hange (%)				001						
Minimum Backdrop He	eight (m)				0.200						
Maximum Backdrop He	eight (m)				1.500						
Min Design Depth for Optimisa	ation (m)				1.200						
Min Vel for Auto Design on Min Slope for Optimisati	nly (m/s) ion (1:X)				500						
	d with Level S	offits									
Network Dea	sign Table :	for Stor	<u>m</u>								
PN Length Fall Slope I.Area T.E	. Base	k HY	D DIA	Secti	on Typ	e Auto					
(m) (m) (1:X) (ha) (mins	s) Flow (l/s)	(mm) SEO	CT (mm)			Design					
s2.000 86.000 0.215 400.0 0.258 4.0	0.0	0.600	[] -10	Pipe/	'Condui	t 🔒					
\$2.001 10.000 0.985 10.2 0.000 0.0	00 0.0	0.600	o <u>300</u>	Pipe/	(Condui	t 🧬					
S2.002 37.069 0.153 242.3 0.000 0.0	00 0.0	0.600	0 300	Pipe/	Condui	t 🔐					
52.003 37.069 0.478 77.6 0.000 0.0	0.0	0.600	0 300	гіре/	condui	u 😈					
Networ	rk Results I	able									
	rea Σ Base	Foul Ad	d Flow	Vel	Cap	Flow					
(mm/hr) (mins) (m) (ha)	rea ΣBase ) Flow (l/s)	Foul Ad (1/s)	d Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)					

0.258

0.258

S2.001 50.00 6.36 27.150 0.258

7.32 26.012

S2.002 50.00 6.98 26.165

S2.003 50.00

2 ZOIO AI DOIU

0.0 0.0

0.0

0.0

0.0

0.0

0.0 4.96 350.8 34.9

0.0 1.01 71.1 34.9

0.0 1.79 126.3 34.9

Peter Da	ınn Ltd									Pa	ge 2
Newton H	louse				Che	shunt Foo	tball	Club			
Barton					Che	eshunt				4	
Cambridg	je CB23	3 7WJ			10-	-6561				N	licco
Date 25/	05/201	7 11:4	19		Des	signed by	MD				
File SW	SYSTEM	1 – F	RESIDE	INTIA	. Che	ecked by J	PH				Idiilaye
Micro Dr	ainage				Net	work 2016	.1.1				
			1	Vetwork	Desi	gn Table 1	for St	corm			
PN	Length	Fall	Slope	I.Area	T.E.	Base	k	HYD D	IA Sect	ion Type	a Auto
	(m)	(m)	(1:X)	(ha)	(mins)	Flow (1/s)	(mm)	SECT (n	m)		Design
S3.000	72.500	0.180	402.8	0.200	4.00	0.0	0.600	[] -	11 Pipe	e/Condui	t 👲
S3.001	10.000	1.711	5.8	0.000	0.00	0.0	0.600	03	00 Pipe	e/Condui	t 💣
S2.004	35.794	0.119	300.8	0.000	0.00	0.0	0.600	o 3	00 Pipe	e/Condui	t 🔐
S2.005	35.794	0.089	402.2	0.000	0.00	0.0	0.600	o 3	75 Pipe	e/Condui	ະ <b>č</b>
~				0 110					10 -	100	
S4.000	68.000	0.170	400.0	0.110	4.00	0.0	0.600		12 Pipe	e/Conduit	t 🗂
54.001	10.000	1.405	0.0	0.000	0.00	0.0	0.000	0 0	oo ripe	e/ condui	- U
S5.000	142.000	0.355	400.0	0.328	4.00	0.0	0.600	[] -	13 Pipe	e/Condui	t 🖰
S5.001	10.000	2.549	3.9	0.000	0.00	0.0	0.600	o 4	50 Pipe	e/Conduit	t 🦀
S2 006	12 975	0 032	401 4	0 000	0 00	0 0	0 600	0 4	50 Pipe	/Conduit	- <b>.</b>
S2.007	27.500	0.069	401.4	0.000	0.00	0.0	0.600	0 4	50 Pipe	e/Condui	ະ <u>ທີ່</u>
S2.008	27.500	0.063	436.5	0.000	0.00	0.0	0.600	o 4	50 Pipe	e/Condui	t 🗗
S2.009	5.376	0.012	448.0	0.000	0.00	0.0	0.600	o 4	50 Pipe	e/Conduit	t 💣
				No		Deculte T	abla				
				Ne	LWOIK	Results I	abie				
PN	Rain	nТ.	C. U	S/IL E	I.Area	Σ Base	Foul	Add Flow	v Vel	Cap	Flow
	(mm/h	r) (mi	ns)	(m)	(ha)	Flow (l/s)	(1/s)	(l/s)	(m/s)	(l/s)	(1/s)
S3.0	00 50.	00 5	.97 27	.620	0.200	0.0	0.0	0.0	0.61	870.8	27.1
S3.0	01 50.	00 5	.99 27	.245	0.200	0.0	0.0	0.0	6.54	462.6	27.1
c2 0	0.4 4.0	70 7	00 25	624	0 459	0.0	0 0	0 (		62 7	61 6
S2.0	04 49. 05 46.	97 8	.90 23	.340	0.458	0.0	0.0	0.0	0.90	99.1	61.6
S4.0	00 50.	00 5	.84 27	.160	0.110	0.0	0.0	0.0	0.62	613.8	14.9
S4.0	01 50.	00 5	.87 26	.795	0.110	0.0	0.0	0.0	0 6.06	428.5	14.9
S5.0	00 50.	00 7	.85 28	.080	0.328	0.0	0.0	0.0	0.61	600.8	44.4
S5.0	01 50.	00 7	.86 27	.725	0.328	0.0	0.0	0.0	10.32	1640.9	44.4
				4.5.6						1.00	110.0
S2.0	06 46. 07 44	1/ 8 57 9	.86 25	.1/6	0.896	0.0	0.0	0.0	) 1.01	160.4 160.4	112.0
S2.0	08 43.	04 9	.79 25	.075	0.896	0.0	0.0	0.0	0.97	153.7	112.0
S2.0	09 42.	75 9	.89 25	.012	0.896	0.0	0.0	0.0	0.95	151.7	112.0
				©19	82-201	.6 XP Solu	tions				

Peter Dann Ltd		Page 3
Newton House	Cheshunt Football Club	
Barton	Cheshunt	<u> </u>
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 11:49	Designed by MD	
File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	Diamacje
Micro Drainage	Network 2016.1.1	

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S9	28.010	0.450	Open Manhole	1800	s2.000	27.560	-10				
SHB1	28.335	1.185	Open Manhole	1800	s2.001	27.150	300	s2.000	27.345	-10	
S2	28.530	2.365	Open Manhole	1350	S2.002	26.165	300	S2.001	26.165	300	
S3	28.465	2.453	Open Manhole	1350	S2.003	26.012	300	S2.002	26.012	300	
S11	28.070	0.450	Open Manhole	1800	S3.000	27.620	-11				
SHB2	28.200	0.955	Open Manhole	1800	S3.001	27.245	300	S3.000	27.440	-11	
S4	28.400	2.866	Open Manhole	1350	S2.004	25.534	300	S2.003	25.534	300	
								S3.001	25.534	300	
S5	28.335	2.995	Open Manhole	1800	S2.005	25.340	375	S2.004	25.415	300	
S13	27.610	0.450	Open Manhole	1200	S4.000	27.160	-12				
SHB3	27.800	1.005	Open Manhole	1200	S4.001	26.795	300	S4.000	26.990	-12	
S100	28.530	0.450	Open Manhole	1800	S5.000	28.080	-13				
SHB4	28.265	0.540	Open Manhole	1800	S5.001	27.725	450	S5.000	27.725	-13	
S6	28.265	3.089	Open Manhole	1350	S2.006	25.176	450	S2.005	25.251	375	
								S4.001	25.326	300	
								S5.001	25.176	450	
s7	28.000	2.856	Open Manhole	1350	S2.007	25.144	450	S2.006	25.144	450	
SAT	28.000	2.925	Open Manhole	1350	S2.008	25.075	450	S2.007	25.075	450	
S8	25.900	0.888	Open Manhole	1200	S2.009	25.012	450	S2.008	25.012	450	
S	25.800	0.800	Open Manhole	0		OUTFALL		S2.009	25.000	450	
			1								

## Manhole Schedules for Storm

Peter Dann Ltd		Page 4
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
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Micro Drainage	Network 2016.1.1	

# PIPELINE SCHEDULES for Storm

# Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
		()		()	()	()		()
S2.000	[]	-10	S9	28.010	27.560	0.345	Open Manhole	1800
S2.001	0	300	SHB1	28.335	27.150	0.885	Open Manhole	1800
S2.002	0	300	S2	28.530	26.165	2.065	Open Manhole	1350
S2.003	0	300	S3	28.465	26.012	2.153	Open Manhole	1350
S3.000	[]	-11	S11	28.070	27.620	0.345	Open Manhole	1800
S3.001	0	300	SHB2	28.200	27.245	0.655	Open Manhole	1800
S2.004	0	300	S4	28.400	25.534	2.566	Open Manhole	1350
S2.005	0	375	S5	28.335	25.340	2.620	Open Manhole	1800
							-	
S4.000	[]	-12	S13	27.610	27.160	0.345	Open Manhole	1200
S4.001	0	300	SHB3	27.800	26.795	0.705	Open Manhole	1200
							-	
S5.000	[]	-13	S100	28.530	28.080	0.345	Open Manhole	1800
S5.001	0	450	SHB4	28.265	27.725	0.090	Open Manhole	1800
							-	
S2.006	0	450	S6	28.265	25.176	2.639	Open Manhole	1350
							-	

## Downstream Manhole

PN	Length	Slope	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	(mm)
S2.000	86.000	400.0	SHB1	28.335	27.345	0.885	Open Manhole	1800
S2.001	10.000	10.2	S2	28.530	26.165	2.065	Open Manhole	1350
S2.002	37.069	242.3	S3	28.465	26.012	2.153	Open Manhole	1350
S2.003	37.069	77.6	S4	28.400	25.534	2.566	Open Manhole	1350
S3.000	72.500	402.8	SHB2	28.200	27.440	0.655	Open Manhole	1800
S3.001	10.000	5.8	S4	28.400	25.534	2.566	Open Manhole	1350
S2.004	35.794	300.8	S5	28.335	25.415	2.620	Open Manhole	1800
S2.005	35.794	402.2	S6	28.265	25.251	2.639	Open Manhole	1350
S4.000	68.000	400.0	SHB3	27.800	26.990	0.705	Open Manhole	1200
S4.001	10.000	6.8	S6	28.265	25.326	2.639	Open Manhole	1350
S5.000	142.000	400.0	SHB4	28.265	27.725	0.435	Open Manhole	1800
S5.001	10.000	3.9	S6	28.265	25.176	2.639	Open Manhole	1350
S2.006	12.975	401.4	s7	28.000	25.144	2.406	Open Manhole	1350
			C	1982-20	16 XP S	Solution	ns	

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Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 11:49	Designed by MD	
File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	•

# PIPELINE SCHEDULES for Storm

# Upstream Manhole

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
S2.007	0	450	s7	28.000	25.144	2.406	Open Manhole	1350
S2.008	0	450	SAT	28.000	25.075	2.475	Open Manhole	1350
S2.009	0	450	S8	25.900	25.012	0.438	Open Manhole	1200

# Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S2.007	27.500	401.4	SAT	28.000	25.075	2.475	Open Manhole	1350
S2.008	27.500	436.5	S8	25.900	25.012	0.438	Open Manhole	1200
S2.009	5.376	448.0	S	25.800	25.000	0.350	Open Manhole	0

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Newton House	Cheshunt Football Club										
Barton	Cheshunt										
Cambridge CB23 7WJ	10-6561										
Date 25/05/2017 11.49	Designed by MD										
$F_{10} \in \mathbb{N}$ System 1 - DESTDENTIA	Checked by IP										
Miene Dreipege											
	Network 2016.1.1										
Area Cummary for Storm											
Pipe PIMP PIMP PI	MP Gross Imp. Pipe Total										
Number Type Name (%	) Area (ha) Area (ha) (ha)										
2.000 1	00 0.258 0.258 0.258										
2.001 1											
2.002 - 1											
3.000 1	00 0.200 0.200 0.200										
3.001 1	0.000 0.000 0.000										
2.004 1	0.000 0.000 0.000										
2.005 1	0.000 0.000 0.000										
4.000 1	00 0.110 0.110 0.110										
4.001 1											
5.000 1											
2.006 1	0.000 0.000 0.000										
2.007 1	0.000 0.000 0.000										
2.008 1	0.000 0.000 0.000										
2.009 1	0.000 0.000 0.000										
	Total Total Total										
	0.896 0.896 0.896										
Cimulatio	n Critoria for Storm										
	n criteria for Storm										
Volumetric Bunoff Coeff (	.750 Additional Flow - % of Total Flow 0.000										
Areal Reduction Factor 1	.000 MADD Factor * 10m <sup>3</sup> /ha Storage 2.000										
Hot Start (mins)	0 Inlet Coefficcient 0.800										
Hot Start Level (mm)	0 Flow per Person per Day (l/per/day) 0.000										
Manhole Headloss Coeff (Global) (	.500 Run Time (mins) 60										
Foul Sewage per hectare (1/s) (	.000 Output Interval (mins) 1										
Number of Input Hydrographs 0 Number	of Offline Controls () Number of Time/Area Diagrams ()										
Number of Online Controls 5 Number of	Storage Structures 1 Number of Real Time Controls 0										
Synthet	ic Rainfall Details										
Rainfall Mode	l FEH										
Return Period (years	) 1										
FEH Rainfall Versio	n 1999										
Site Locatio	N										
D1 (1km	.) 0.295										
D2 (1km	0.262										
D3 (1km	0.265										
E (1km	0.330										
F (1km	2.484										
Summer Storm	.s Yes										
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Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
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File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	

Synthetic Rainfall Details

Winter Storms Yes Cv (Summer) 0.750 Cv (Winter) 0.840 Storm Duration (mins) 30

Peter Dann Ltd				Page	8
Newton House	Cheshunt	Football	Club		
Barton	Cheshunt	-		4	
Cambridge CB23 7WJ	10-6561				Jun
Date 25/05/2017 11:49	Designed	d by MD			U
File SW SYSTEM 1 - RESIDENTIA	Checked	by JPH		Draii	nage
Micro Draipage	Network	2016 1 1			
	neework	2010.1.1			
Online	Controls	s for Storm			
Orifice Manhole: SHB1,	DS/PN:	S2.001, Vol	Lume (m³)	: 104.7	
Diameter (m) 0.150 Discharge	e Coefficie	ent 0.600 Inv	vert Level	(m) 27.150	
Orifice Manhole: SHB2,	DS/PN:	S3.001, Vol	Lume (m³)	: 102.7	
Diameter (m) 0.150 Discharge	e Coefficie	ent 0.600 Inv	vert Level	(m) 27.245	
Orifice Manhole: SHB3	, DS/PN:	S4.001, Vo	lume (m³)	: 67.8	
Diameter (m) 0.150 Discharge	e Coefficie	ent 0.600 Inv	vert Level	(m) 26.795	
Orifice Manhole: SHB4,	DS/PN:	S5.001, Vol	Lume (m³)	138.3	
Diameter (m) 0.200 Discharge	e Coefficie	ent 0.600 Inv	ert Level	(m) 27.725	
Hydro-Brake® Optimum Manhol	e: SAT,	DS/PN: S2.0	)08, Volur	ne (m³): 8.3	
			0500 0400	0.5.0.0	
Unit	: Reference m Head (m)	e MD-SHE-00/3	-3500-2400-	-3500	
Design	Flow (l/s)	)	2	3.5	
	Flush-Flo <sup>T</sup>	М	Calcul	ated	
	Objective	e Minimise u	pstream sto	orage	
	Application	1	Sui	face	
Sum	AVALIADIE	9		73	
Invert	Level (m)	)	25	5.075	
Minimum Outlet Pipe Dia	ameter (mm)	)		100	
Suggested Manhole Dia	ameter (mm)	)		1200	
Control Points Head (m) Flo	w (l/s)	Control P	oints	Head (m) Flow	(1/s)
Design Point (Calculated) 2.400 Flush-Flo™ 0.316	3.5 2.4 Me	an Flow over	Kick-Flo® Head Range	0.651	1.9 2.6
	1				-
The hydrological calculations have be Hydro-Brake® Optimum as specified. S	en based o hould anot	n the Head/Di her type of c	scharge re control dev	lationship for ice other than	the a
Hydro-Brake Optimum® be utilised then	these sto	rage routing	calculatio	ns will be inva	lidated
Depth (m) Flow (l/s) Depth (m) Flo	w (l/s) De	pth (m) Flow	(1/s) Dept	h (m) Flow (1/	s)
0.100 2.0 0.500	2.3	1.200	2.5	2.000 3	.2
0.200 2.3 0.600	2.1	1.400	2.7	2.200 3	.4
0.300 2.4 0.800	2.1	1.600	2.9	2.400 3	.5
0.400 2.4 1.000	2.3	1.800	3.1	2.600 3	.6
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Peter Dann Ltd						Page 9
Newton House		Chesh	unt Footba	all Club		
Barton		Chesh	unt	L.		
Cambridge CB23	7WJ	10-65	61			Micco
Date 25/05/2017	11:49	Desig	ned by MD			
File SW SYSTEM 1	- RESIDENTI	A Check	ed by JPH			Digiliga
Micro Drainage		Netwo	ork 2016.1.	.1		
Hydro-Brak	e® Optimum M	anhole: SA	T, DS/PN:	S2.008, V	olume (m³	): 8.3
Donth (m) Elou	(1/a) Depth (	$\Sigma$ Eleve (1/a)	Donth (m)	$\mathbb{E}$ [over (1/a)]	Donth (m)	$\mathbb{E}$ low (1/a)
Depth (m) Flow	(1/S) Depth (h	1) FIOW (1/S)	Depth (m)	FIOW (I/S)	Depth (m)	FIOW (1/S)
3.000	3.9 5.00	4.9	7.000	5.8	9.000	6.5
3.500	4.2 5.50	10 5.2 10 5.4	8 000	6.0	9.500	6.7
4.500	4.7 6.50	0 5.6	8.500	6.3		

Peter Dann Ltd		Page 1
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:06	Designed by MD	
File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	urainage
Micro Drainage	Network 2016.1.1	
1 year Return Period Summary of C	ritical Results by Maximum Level (	Rank 1) for
	Storm	
Sir	mulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	v 0.000
Hot Start (mins)	0 MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0 Inlet Coefficient	. 0.800
Manhole Headloss Coeff (Global) ( Foul Sewage per hectare (1/s) (	).500 Flow per Person per Day (l/per/day) ) 000	0.000
four bewage per neccare (1, 5, 5		
Number of Input Hydrographs 0 Number	of Offline Controls 0 Number of Time/Are	ea Diagrams O
Number of Online Controls 5 Number of	f Storage Structures 1 Number of Real Tir	ne Controls O
Synthe	tic Rainfall Details	
Rainfall Mode	l FEH	
FEH Rainfall Versio	n 1999	
C. (1km	n GB 535350 201250 1L 35350 01250 $-0.025$	
D1 (1km	0.295	
D2 (1km	0.262	
D3 (1km	0.265	
E (1km E (1km	0.330	
r (IKH Cv (Summer	) 0.750	
Cv (Winter	) 0.840	
Margin for Flood Risk Warn	ing (mm) 150.0 Timester 2 5 Second Increment (Extended)	
DT	S Status ON	
DV	D Status OFF	
Inerti	a Status OFF	
Profile(s)	Summer and Wint	ter
Duration(s) (mins) 15,	30, 60, 120, 180, 240, 360, 480, 600, 72	20,
960	, 1440, 2160, 2880, 4320, 5760, 7200, 864	40,
Poturn Poriod(s) (voors)	100	J80 100
Climate Change (%)	0, 0,	20
		Matar
US/MH Beturn Climate	First (X) First (Y) First (Z) Over	water flow Level
PN Name Storm Period Change	Surcharge Flood Overflow Ac	st. (m)
		07 574
S2.000 Sy IS WINTER I +0%	30/15 Summer	27.374
S2.002 S2 15 Winter 1 +0%	100/180 Winter	26.272
S2.003 S3 15 Winter 1 +0%	100/120 Winter	26.090
S3.000 S11 15 Winter 1 +0%		27.631
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Peter Dann Ltd		Page 2
Newton House	Cheshunt Football Club	
Barton	Cheshunt	L'
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:06	Designed by MD	
File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	

<u>1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for</u> Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S9	-0.091	0.000	0.05		37.3	OK	
S2.001	SHB1	-0.076	0.000	0.07		18.1	OK	
S2.002	S2	-0.193	0.000	0.28		18.1	OK	
S2.003	S3	-0.222	0.000	0.16		18.1	OK	
S3.000	S11	-0.094	0.000	0.04		29.7	OK	

Peter D	ann L	td								Page	3
Newton House Cheshunt Football Clu						b					
Barton				(	Cheshunt				4	~	
Cambrid	ge C	в23	7WJ			10-6561					J
Date 25	/05/2	017	12:06		1	Designe	d by M	D			
File SW	SYST	EM 1	1 – RE	SIDENTI	A 0	Checked	bv JP	Н		Ula	iinage
Micro D	raina	qe				Network	2016.	1.1			
		<u> </u>						-			
1 year	Retur	n P	eriod	Summary	/ of Cr	itical	Result	s by Max	kimum Lev	vel (Rank	1) for
				-		Stor	n	-		·	
							_				
											Water
	US/MH			Return	Climate	First	(X)	First (Y)	First (Z)	Overflow	Level
PN	Name	S	torm	Period	Change	Surch	arge	Flood	Overflow	Act.	(m)
S3.001	SHB2	15	Winter	1	+0%	100/15	Summer				27.459
S2.004	S4	15	Winter	1	+0%	30/180	Winter				25.702
S2.005	S5	15	Winter	1	+0%	30/120	Winter				25.504
S4.000	S13	15	Winter	1	+0%	100/480	Winter				27.169
S4.001	SHB3	15	Summer	1	+0%	100/15	Summer				26.997
S5.000	S100	15	Winter	1	+0%						28.098
S5.001	SHB4	60	Winter	1	+0%						27.836
S2.006	S6	15	Winter	1	+0%	30/60	Summer				25.399
S2.007	S7	480	Winter	1	+0%	30/60	Summer				25.387
S2.008	SAT	480	Winter	1	+0%	30/15	Winter				25.385
S2.009	S8	240	Winter	1	+0%						25.059
				Surcharg	ed Flood	ied ma Filau	1 0	Pipe		T	
	т	N	Name	(m)	vo1u (m <sup>3</sup>	) Can	/ Over:	's) (1/e)	Status E	rever	
	-		Manie	()	(111-	, cap.	(1)	5, (1/5)	Status E.	REGERER	
	S3.	.001	SHB2	-0.0	86 0.0	0.0	5	17.5	OK		

S3.001	SHB2	-0.086	0.000	0.05	17.5	OK	
S2.004	S4	-0.132	0.000	0.60	35.4	OK	
S2.005	S5	-0.211	0.000	0.40	35.4	OK	
S4.000	S13	-0.096	0.000	0.03	16.9	OK	
S4.001	SHB3	-0.098	0.000	0.05	16.1	OK	
S5.000	S100	-0.087	0.000	0.06	38.5	OK	
S5.001	SHB4	-0.339	0.000	0.01	8.4	OK	
S2.006	S6	-0.227	0.000	0.49	50.0	OK	
S2.007	s7	-0.207	0.000	0.10	13.5	OK	
S2.008	SAT	-0.140	0.000	0.02	2.4	OK	
S2.009	S8	-0.403	0.000	0.02	2.4	OK	

Peter Dann Ltd		Page 4
Newton House	Cheshunt Football Club	
Barton	Cheshunt	<b>Y</b>
Cambridge CB23 7WJ	10-6561	- Com
Date $25/05/2017$ 12.06	Designed by MD	- Micro
File SW SYSTEM 1 - DESIDENTIA	Checked by JPH	Drainage
Migro Drainago	Network 2016 1 1	
	Network 2010.1.1	
30 year Return Period Summary of	F Critical Results by Maximum Leve	(Rank 1)
<u> </u>	for Storm	
Sir	mulation Criteria	
Areal Reduction Factor 1	1.000 Additional Flow - % of Total Flo	w 0.000
Hot Start Level (mm)	0 Inlet Coefficien	t 0.800
Manhole Headloss Coeff (Global) (	0.500 Flow per Person per Day (l/per/day	) 0.000
Foul Sewage per hectare (l/s) (	0.000	
Number of Input Budrographs O	of Offling Controls ( Number of Time / )	on Dingrama O
Number of Online Controls 5 Number of	f Storage Structures 1 Number of Real Ti	me Controls 0
Synthe	tic Rainfall Details	
Rainfall Mode	I FEH	
Site Locatio	m GB 535350 201250 TL 35350 01250	
C (1km	-0.025	
D1 (1km	0.295	
D2 (1km	0.262	
D3 (1km	a) 0.265	
E (1Km F (1km	a) 2.484	
Cv (Summer	0.750	
Cv (Winter	0.840	
		<u>_</u>
Margin for Flood Risk Warn Analysis	ling (mm) 150.0 Timestep 2 5 Second Increment (Extended)	)
DT	'S Status Ol	N
DV	D Status OFF	2
Inerti	a Status OFF	7
Profile(s)	Summer and Win	iter
Duration(s) (mins) 15,	30, 60, 120, 180, 240, 360, 480, 600, 7	<sup>1</sup> 20,
960	, 1440, 2160, 2880, 4320, 5760, 7200, 86	<i>40</i> ,
Deturn Devied(a) (users)	10	100
Climate Change (%)	1, 30,	20
	., .,	
		<b>.</b>
	First (V) First (V) First (F) Ora	Water
DS/MH Return Climate	Surcharge Flood Overflow A	rilow Level
In name broth relied change	Salendrye Filled Overfillw A	
S2.000 S9 15 Winter 30 +0%		27.589
S2.001 SHB1 15 Winter 30 +0%	30/15 Summer	27.484
52.002 52 15 Winter 30 +0%	100/120 Winter	20.290
S3.000 S11 15 Winter 30 +0%	100, 120 Windol	27.642
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Newton House	Cheshunt Football Club				
Barton	Cheshunt	<u> </u>			
Cambridge CB23 7WJ	10-6561	Micco			
Date 25/05/2017 12:06	Designed by MD				
File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	Diamaye			
Micro Drainage	Network 2016.1.1	•			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S9	-0.076	0.000	0.16		118.0	OK	
S2.001	SHB1	0.034	0.000	0.10		23.9	SURCHARGED	
S2.002	S2	-0.175	0.000	0.36		23.9	OK	
S2.003	S3	-0.208	0.000	0.20		23.9	OK	
S3.000	S11	-0.083	0.000	0.11		94.3	OK	

Peter 1	Dann Lto	d							Page	e 6
Newton	House			С	heshunt	- Footb	all Cl	ub		
Barton				С	heshunt	E .			4	
Cambridge CB23 7WJ					10-6561					m
Date 2	5/05/20	17 12:06		D	esigned	d by MD				-ro
File SI	W SYSTE	м 1 — вр	SIDENTI	A C	hecked	by JPH			Dſa	inage
Micro	Drainag		OIDDNII	N	otwork	2016 1	1			
	Diainay	-		IN	etwork	2010.1	• 1			
30 ve	ear Reti	ırn Peri	od Summa	arv of	Critica	al Resu	lts bv	Maximum	Level (Ra	ank 1)
<u> </u>			ou oumm	<u></u>	for Sto	orm	100 27	manifiant		<u> </u>
										Water
	US/MH	-	Return	Climate	Firs	t (X)	First (	Y) First (2	Z) Overflo	w Level
PN	Name	Storm	Period	Change	Surc	harge	Flood	l Overilo	w Act.	(m)
S3.001	SHB2	15 Winte	r 30	+0%	100/15	Summer				27.545
S2.004	S4	720 Winte	r 30	+0%	30/180	Winter				25.977
S2.005	S5	720 Winte	r 30	+0%	30/120	Winter				25.976
S4.000	S13	15 Winte	r 30	+0%	100/480	) Winter				27.179
S4.001	SHB3 S100	15 Winte	r 30 r 30	+0% ±0%	100/15	Summer				27.052 28.118
S5.000	SHB4	30 Winte	r 30	+0%						27.946
S2.006	S6	720 Winte	r 30	+0%	30/60	Summer				25.975
S2.007	S7	720 Winte	r 30	+0%	30/60	) Summer				25.974
S2.008	SAT	720 Winte	r 30	+0%	30/15	Winter				25.973
S2.009	S8 10	080 Summe	r 30	+0%						25.059
		Su	rcharged	Flooded			Pipe			
		US/MH	Depth	Volume	Flow /	Overflow	v Flow		Level	
	PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)	Status	Exceeded	
	\$3.001	SHB2	0.000	0.000	0.07		22.3	OK		
	S2.004	S4	0.143	0.000	0.24		13.9	SURCHARGED		
	S2.005	S5	0.261	0.000	0.15		13.5	SURCHARGED		
	S4.000	S13	-0.086	0.000	0.09		53.1	OK		
	S4.001	SHB3	-0.043	0.000	0.07		20.0	OK		
	\$5.000	SI00	-0.067	0.000	0.22		129.8	OK		
	S2.001	S6	0.349	0.000	0.25		2.5.7	SURCHARGED		
	S2.007	S7	0.381	0.000	0.19		25.7	SURCHARGED		
	S2.008	SAT	0.448	0.000	0.02		2.4	SURCHARGED		
	S2.009	S8	-0.403	0.000	0.02		2.4	OK		

Peter Dann Ltd		Page 7
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Misso
Date 25/05/2017 12:06	Designed by MD	
File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	urainage
Micro Drainage	Network 2016.1.1	
100 year Return Period Summary o	f Critical Results by Maximum Leve	el (Rank 1)
	for Storm	
Sin	mulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	v 0.000
Hot Start (mins)	0 MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
HOT START LEVEL (MM) Manhole Headloss Coeff (Global)	U Inlet Coefficient 0.500 Flow per Person per Day (1/per/day)	0.000
Foul Sewage per hectare (1/s)	0.000	
Nuclear of Transfer Understander O. Nuclear		Diaman
Number of Input Hydrographs 0 Number Number of Online Controls 5 Number of	of Offline Controls O Number of Time/Are f Storage Structures 1 Number of Real Tim	ea Diagrams O me Controls O
Synthe	tic Rainfall Details	
Rainfall Mode FEH Rainfall Versic	n 1999	
Site Locatio	n GB 535350 201250 TL 35350 01250	
C (1km	-0.025	
D1 (lkm D2 (lkm	0.295	
D3 (1km	a) 0.265	
E (1km	0.330	
F (1km Cu (Summer	a) 2.484	
Cv (Winter	0.840	
Margin for Flood Risk Warn Analysis	ing (mm) 150.0 Timestep 2 5 Second Increment (Extended)	
DT	'S Status ON	
DV	'D Status OFF	
Inerti	a Status OFF	
Profile(s)	Summer and Wint	ter
Duration(s) (mins) 15, 960	. 1440. 2160. 2880. 4320. 5760. 7200. 86	20, 40.
	100	080
Return Period(s) (years)	1, 30, 1	100
Climate Change (%)	Ο, Ο,	20
		Water
US/MH Return Climate	e First (X) First (Y) First (Z) Ove	rflow Level
FA Mame Storm Ferrou Change	Surcharge F1000 Over110W A	
S2.000 S9 15 Winter 100 +209		27.602
S2.001 SHB1 15 Winter 100 +209	<pre>% 30/15 Summer % 100/180 Winter</pre>	27.598
S2.003 S3 720 Winter 100 +20	% 100/120 Winter	27.459
S3.000 S11 15 Winter 100 +20	2	27.653
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Peter Dann Ltd		Page 8
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:06	Designed by MD	
File SW SYSTEM 1 - RESIDENTIA	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S9	-0.063	0.000	0.30		219.7	OK	
S2.001	SHB1	0.148	0.000	0.12		28.7	SURCHARGED	
S2.002	S2	0.994	0.000	0.20		13.0	SURCHARGED	
S2.003	S3	1.147	0.000	0.11		13.0	SURCHARGED	
S3.000	S11	-0.072	0.000	0.21		175.6	OK	

Peter D	ann Lt	td										Page	9
Newton	House					Cheshun	t Foot	ball	Clu	Jb			
Barton						Chechun	+					4	
Darcon			_				L						~ m
Cambrid	ge CI	323	7WJ			10-6561						Mic	
Date 25	/05/20	017	12:06			Designe	d by M	D					
File SW	CVCTI	тм 1		STDENTT	л	Checked	hv.TD	ч				DIC	Inage
TILE SW		- 1-1			A	CHECKEU	Dy UI	11					<u> </u>
Micro D	raina	ge				Network	2016.	1.1					
100 ve	ar Re	tur	n Peri	od Summ	narv of	Critic	al Res	sults	s bv	Maximum	Leve	l (R	ank 1)
			-		- 4 -	for St	orm		- 1			,	/
						101 50	<u>OT III</u>						
													Water
	US/MH			Return	Climate	First	(X)	Firs	t (Y	) First (Z)	0ve	rflow	Level
PN	Name	S	torm	Period	Change	Surch	arge	Fl	ood	Overflow	A	ct.	(m)
S3.001	SHB2	15	Winter	100	+20%	100/15	Summer						27.613
S2.004	S4	720	Winter	100	+20%	30/180	Winter						27.459
S2.005	S5	720	Winter	100	+20%	30/120	Winter						27.460
S4.000	S13	720	Winter	100	+20%	100/480	Winter						27.463
S4.001	SHB3	720	Winter	100	+20%	100/15	Summer						27.464
S5.000	S100	15	Winter	100	+20%								28.135
S5.001	SHB4	30	Winter	100	+20%								28.087
S2.006	S6	720	Winter	100	+20%	30/60	Summer						27.460
S2.007	s7	720	Winter	100	+20%	30/60	Summer						27.458
S2.008	SAT	720	Winter	100	+20%	30/15	Winter						27.457
S2.009	S8	720	Winter	100	+20%								25.064
			Su	rcharged	Floode	d		Pi	lpe				
		US	S/MH	Depth	Volume	Flow /	Overflo	ow Fl	Low		Lev	<i>r</i> el	
	PN	N	ame	- (m)	(m³)	Cap.	(1/s)	(1	/s)	Status	Exce	eded	
						-							
	S3.00	1 5	SHB2	0.068	0.00	0.08		2	5.4	SURCHARGED			
	S2.00	4	S4	1.625	0.00	0.38		2	2.5	SURCHARGED			
	S2.00	5	S5	1.745	0.00	0 0.25		2	2.2	SURCHARGED			
	S4.00	0	S13	0.198	0.00	0 0.01			5.6	FLOOD RISK			
	S4.00	1 5	БНВЗ	0.369	0.00	0 0.02			5.6	SURCHARGED			
	S5.00	0 5	5100	-0.050	0.00	0 0.41		24	1.8	OK			
	S5.00	1 5	SHB4	-0.088	0.00	0 0.05		4	2.7	OK			
	S2.00	6	S6	1.834	0.00	0 0.40		4	1.5	SURCHARGED			
	S2.00	7	S7	1.865	0.00	0.30		4	1.4	SURCHARGED			
	S2.00	8	SAT	1.932	0.00	0.03			3.5	SURCHARGED			
	S2.00	9	S8	-0.399	0.00	0.03			3.5	OK			
1													

Peter Dann Ltd		Page 1
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:10	Designed by MD	
File SW System 1 - Residentia	Checked by JPH	Diamada
Micro Drainage	Network 2016.1.1	
100 year Return Period Summary o	f Critical Results by Maximum Leve	el (Rank 1)
	for Storm	
Sir	mulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	w 0.000
Hot Start (mins)	0 MADD Factor * 10m <sup>3</sup> /ha Storage	e 2.000
Hot Start Level (mm)	0 Inlet Coefficient	t 0.800
Manhole Headloss Coeff (Global) ( Foul Sewage per bectare (1/s) (	0.500 Flow per Person per Day (l/per/day 0.000	) 0.000
Four Sewage per neccare (1/S)		
Number of Input Hydrographs 0 Number	of Offline Controls 0 Number of Time/Ar	ea Diagrams O
Number of Online Controls 5 Number of	f Storage Structures 1 Number of Real Ti	me Controls O
Synthe	etic Rainfall Details	
Rainfall Mode	el FEH	
FEH Rainfall Versio	on 1999	
Site Locatio	on GB 535350 201250 TL 35350 01250	
C (lkm D1 (lkm	-0.025	
DI (IKII D2 (1km	0.255	
D3 (1km	0.265	
E (1km	n) 0.330	
F (1km	2.484	
Cv (Summer	·) 0.750	
CV (WINCEL	) 0.040	
Margin for Flood Risk Warn	ling (mm) 150.0	)
Analysis	Timestep 2.5 Second Increment (Extended)	
זע	D Status OR	۱ ۲
Inerti	a Status OFF	7
Profile(s)	Summor and Min	tor
Duration(s) (mins) 15,	30, 60, 120, 180, 240, 360, 480, 600, 7	20,
960	, 1440, 2160, 2880, 4320, 5760, 7200, 86	40,
	10	080
Return Period(s) (years)		100
Climate Change (%)		40
		Water
US/MH Return Climate	e First (X) First (Y) First (Z) Ove	erflow Level
PN Name Storm Period Change	e Surcharge Flood Overflow A	ACC. (M)
S2.000 S9 30 Winter 100 +405	<u>0</u>	27.665
S2.001 SHB1 15 Winter 100 +409	% 100/15 Summer	27.656
S2.002 S2 960 Winter 100 +40 <sup>5</sup>	% 100/120 Summer	27.613
S3.000 S11 15 Winter 100 +403	8 9 TONAAA MTUFEL	27.656
		27.000
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Peter Dann Ltd		Page 2
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:10	Designed by MD	
File SW System 1 - Residentia	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	•

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S2.000	S9	0.000	0.000	0.24		177.9	OK	
S2.001	SHB1	0.206	0.000	0.12		30.8	SURCHARGED	
S2.002	S2	1.148	0.000	0.18		11.9	SURCHARGED	
S2.003	S3	1.300	0.000	0.10		11.9	SURCHARGED	
S3.000	S11	-0.069	0.000	0.24		204.8	OK	

Peter D	ann I	.t d								Page 3
Nouton					Choo	hunt Easth	211 C	lub		ruge 5
Newlon .	House	-			Ches	nunt Foott	Dall C	dul		
Barton					Ches	hunt				
Cambrid	ge (	СВ23	7WJ		10-6	561				Mirco
Date 25	/05/2	2017	12:10		Desi	gned by ME	)			
File SW	Syst	em 1	- Res	identia	. Chec	ked by JPH	I			Digiliada
Micro D	raina	ae			Netw	ork 2016.1	.1			
		2-					-			
100 ve	ar Re	≥turr	) Perio	d Summary	of Cri	tical Res	ults k	ov Ma	ximum Lev	rel (Rank 1)
<u>100 yc</u>	ar in	JUULI	1 10110	a bannar y	for	Storm	areo x	<i>y</i> 110		
					101	DCOLI				
	US/M	н		Return Cli	imate	First (X)	Fir	st (Y	) First	(Z) Overflow
PN	Name	e :	Storm	Period Ch	ange	Surcharge	F	'lood	Overfl	Low Act.
S3.001	SHB	2 15	Winter	100	+40% 10	0/15 Summer				
S2.004	S	4 960 5 060	Winter	100	+40% 10	0/15 Summer				
S4 000	د 12	3 960	Winter	100	+40% 10	)/180 Winter	100/48	80 Wii	nter	
S4.001	SHB	3 960	Winter	100	+40% 10	0/15 Summer	100/10	00 111	1001	
s5.000	S10	0 30	Winter	100	+40% 10	0/30 Winter				
S5.001	SHB	4 30	Winter	100	+40% 10	0/30 Winter				
S2.006	S	6 960	Winter	100	+40% 10	00/15 Summer				
S2.007	S	7 960	Winter	100	+40% 10	0/15 Summer				
S2.008	SA	T 960	Winter	100	+40% 10	0/15 Summer				
52.009	5	8 960	winter	100	+408					
			Water	Surcharged	Flooded					
				Durchardea	r rooueu			Pipe		
	τ	JS/MH	Level	Depth	Volume	Flow / Over	flow 1	Flow		Level
1	T PN	JS/MH Name	Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Over Cap. (1	flow 1 /s) (	Flow (l/s)	Status	Level Exceeded
1	ז איז 0.01	JS/MH Name	Level (m)	Depth (m)	Volume (m <sup>3</sup> )	Flow / Over Cap. (1	flow 1 /s) (	Flow (1/s)	Status	Level Exceeded
S3	001	JS/MH Name SHB2	Level (m) 27.638	Depth (m) 0.093	Volume (m <sup>3</sup> )	Flow / Over Cap. (1	flow 1 /s) (	<b>Flow</b> (1/s)	Status SURCHARGED	Level Exceeded
3 53 52 52	001 .004 .005	JS/MH Name SHB2 S4	Level (m) 27.638 27.611 27.611	Depth (m) 0.093 1.777	Volume (m <sup>3</sup> ) 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23	flow 1 /s) (	<b>Flow</b> (1/s) 26.5 20.5	Status SURCHARGED SURCHARGED	Level Exceeded
1 53 52 52 54	001 .004 .005 .000	JS/MH Name SHB2 S4 S5 S13	Level (m) 27.638 27.611 27.611 27.612	Depth (m) 0.093 1.777 1.896 0.347	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 2.052	Flow / Over Cap. (1 0.08 0.35 0.23 0.01	flow 1 /s) (	<b>Flow</b> (1/s) 26.5 20.5 20.3 5.1	Status SURCHARGED SURCHARGED SURCHARGED FLOOD	Level Exceeded
3 52 52 54 54	001 .004 .005 .000 .001	JS/MH Name SHB2 S4 S5 S13 SHB3	Level (m) 27.638 27.611 27.611 27.612 27.657	Depth (m) 0.093 1.777 1.896 0.347 0.562	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02	flow 1 /s) (	26.5 20.5 20.3 5.1 5.1	Status SURCHARGED SURCHARGED SURCHARGED FLOOD FLOOD RISK	Level Exceeded
3 52 52 54 54 55	.001 .004 .005 .000 .001 .000	SHB2 SHB2 S4 S5 S13 SHB3 S100	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 2.052 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35	flow 1 /s) (	Flow (1/s) 26.5 20.5 20.3 5.1 5.1 208.4	Status SURCHARGED SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED	Level Exceeded
3 52 52 54 54 55 55	0001 0004 0005 0000 0001 0000	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190 28.182	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 2.052 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06	22	Pipe           Flow           (1/s)           26.5           20.5           20.3           5.1           5.1           208.4           49.9	Status SURCHARGED SURCHARGED SURCHARGED FLOOD RISK SURCHARGED FLOOD RISK	Level Exceeded
1 53 52 52 54 54 55 55 55 52	2PN .001 .004 .005 .000 .001 .000 .001 .006	JS/MH Name SHB2 S4 S13 SHB3 S100 SHB4 S6	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190 28.182 27.611	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37	22	26.5 20.5 20.3 5.1 5.1 208.4 49.9 38.5	Status SURCHARGED SURCHARGED SURCHARGED FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED	Level Exceeded
3 52 52 54 54 55 55 55 52 52 52	2N .001 .004 .005 .000 .001 .000 .001 .006 .007	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190 28.182 27.611 27.609	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28	2 (12 (12 (12 (12 (12 (12 (12 (12 (12 (1	Flow (1/s) 26.5 20.5 20.3 5.1 5.1 208.4 49.9 38.5 38.4	Status SURCHARGED SURCHARGED SURCHARGED FLOOD RISK SURCHARGED SURCHARGED	Level Exceeded
3 53 52 54 55 55 52 52 52 52	2 N .001 .004 .005 .000 .001 .000 .001 .006 .007 .008	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 2.052 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	2 2	Flow (1/s) 26.5 20.5 20.3 5.1 5.1 208.4 49.9 38.5 38.4 3.6 2.6	Status SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED SURCHARGED SURCHARGED	Level Exceeded
3 S2 S2 S4 S4 S5 S5 S2 S2 S2 S2 S2	<pre></pre>	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	2 (12 (12 (12 (12 (12 (12 (12 (12 (12 (1	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD FLOOD RISK SURCHARGED SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 52 52 54 55 55 52 52 52 52 52 52 52	2 N . 001 . 004 . 005 . 000 . 001 . 000 . 001 . 006 . 007 . 008 . 009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	22	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 S2 S2 S4 S4 S5 S5 S2 S2 S2 S2 S2	2 N . 001 . 004 . 005 . 000 . 001 . 000 . 001 . 006 . 007 . 008 . 009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03 0.03	rflow I /s) (	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 52 52 54 55 55 52 52 52 52 52 52	2 N . 001 . 004 . 005 . 000 . 001 . 000 . 001 . 006 . 007 . 008 . 009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03 0.03	rflow 1 /s) (	Flow (1/s) 26.5 20.5 20.3 5.1 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 52 52 54 55 55 52 52 52 52 52 52	2 N .001 .004 .005 .000 .001 .000 .001 .006 .007 .008 .009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03 0.03	22	Flow (1/s) 26.5 20.5 20.3 5.1 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 52 52 54 55 55 52 52 52 52 52 52	2 N .001 .004 .005 .000 .001 .000 .001 .006 .007 .008 .009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	22	Flow (1/s) 26.5 20.5 20.3 5.1 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 52 52 54 55 55 52 52 52 52 52 52 52	PN       .001       .004       .005       .000       .001       .000       .001       .000       .001       .000       .001       .000       .001       .000       .001       .000       .001       .000       .001       .000       .001       .003       .004       .005	JS/MH Name SHB2 S4 S5 S13 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	22	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD FLOOD RISK SURCHARGED SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
1 53 52 52 54 55 55 52 52 52 52 52 52 52	2 001 0001 0005 0000 0001 0000 0001 0006 0007 0008 0009	JS/MH Name SHB2 S4 S5 S13 S100 SHB4 S100 SHB4 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	2	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 52 52 54 55 55 52 52 52 52 52 52	2 PN .001 .004 .005 .000 .001 .000 .001 .006 .007 .008 .009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	2	Flow (1/s) 26.5 20.5 20.3 5.1 508.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
3 52 52 54 55 55 52 52 52 52 52 52 52	2 N . 001 . 004 . 005 . 000 . 001 . 000 . 001 . 006 . 007 . 008 . 009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03	22	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded 2
3 52 52 54 55 55 52 52 52 52 52 52	2 PN .001 .004 .005 .000 .001 .000 .001 .006 .007 .008 .009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03 0.03	cflow I /s) ( 2	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
1 S3 S2 S2 S4 S4 S5 S5 S2 S2 S2 S2 S2 S2	2 PN .001 .004 .005 .000 .001 .000 .001 .006 .007 .008 .009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03 0.03	cflow I /s) ( 2	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
1 S3 S2 S2 S4 S4 S5 S5 S2 S2 S2 S2 S2 S2	2 PN .001 .004 .005 .000 .001 .000 .001 .006 .007 .008 .009	JS/MH Name SHB2 S4 S5 S13 SHB3 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1	rflow I /s) ( 2	Flow (1/s) 26.5 20.5 20.3 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded
1 S3 S2 S2 S4 S4 S5 S5 S2 S2 S2 S2 S2 S2	2 PN .001 .004 .005 .000 .001 .006 .007 .008 .009	JS/MH Name SHB2 S4 S5 S13 S100 SHB4 S6 S7 SAT S8	Level (m) 27.638 27.611 27.612 27.657 28.190 28.182 27.611 27.609 27.607 25.064	Depth (m) 0.093 1.777 1.896 0.347 0.562 0.005 0.007 1.985 2.016 2.082 -0.398	Volume (m <sup>3</sup> ) 0.000 0.000 2.052 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Over Cap. (1 0.08 0.35 0.23 0.01 0.02 0.35 0.06 0.37 0.28 0.03 0.03 0.03	2 2	Flow (1/s) 26.5 20.3 5.1 5.1 208.4 49.9 38.5 38.4 3.6 3.6	Status SURCHARGED SURCHARGED FLOOD RISK SURCHARGED FLOOD RISK SURCHARGED SURCHARGED SURCHARGED OK	Level Exceeded



# 7.2 – Micro Drainage Calculations - Surface Water System 2 - Stadium

Peter Dann Ltd						
Newton House	Cheshunt Football Club					
Barton	Cheshunt	<u> </u>				
Cambridge CB23 7WJ	10-6561	Micco				
Date 1	Designed by MD					
File SW SYSTEM 2 - STADIUM	Checked by JPH	Diamaye				
Micro Drainage	Network 2016.1					

## STORM SEWER DESIGN by the Modified Rational Method

## Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall	Model		
Return Period (years)			1
Site Location	GB 535350	201250 TL	35350 01250
C (1km)			-0.025
D1 (1km)			0.295
D2 (1km)			0.262
D3 (1km)			0.265
E (1km)			0.330
F (1km)			2.484
Maximum Rainfall (mm/hr)			50
Maximum Time of Concentration (mins)			30
Foul Sewage (l/s/ha)			0.000
Volumetric Runoff Coeff.			0.750
Add Flow / Climate Change (%)			0
Minimum Backdrop Height (m)			0.200
Maximum Backdrop Height (m)			1.500
Min Design Depth for Optimisation (m)			1.200
Min Vel for Auto Design only (m/s)			1.00
Min Slope for Optimisation (1:X)			500

Designed with Level Soffits

## Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Ba Flow	ase (1/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	29.689	0.150	197.9	0.037	4.00		0.0	0.600	[]	-9	Pipe/Conduit	8
S2.000 S2.001	23.500 23.500	0.120 0.120	195.8 195.8	0.079 0.079	4.00 0.00		0.0	0.600	0	<mark>450</mark> 450	Pipe/Conduit Pipe/Conduit	C C
S3.000	18.936	0.095	199.3	0.037	4.00		0.0	0.600	0	450	Pipe/Conduit	ð

# Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (1/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
S1.000	50.00	4.26	27.620	0.037	0.0	0.0	0.0	1.88	931.0	5.0
S2.000 S2.001	50.00 50.00	4.27 4.54	<b>27.710</b> 27.590	0.079 0.158	0.0	0.0	0.0	1.45 1.45	230.5 230.5	10.7 21.4
S3.000	50.00	4.22	27.565	0.037	0.0	0.0	0.0	1.44	228.4	5.0

Peter Dann Ltd		Page 2
Newton House	Cheshunt Football Club	
Barton	Cheshunt	<u> </u>
Cambridge CB23 7WJ	10-6561	Micco
Date 1	Designed by MD	
File SW SYSTEM 2 - STADIUM	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1	

# Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.001 S1.002	34.587 34.674	0.175 0.315	197.6 110.1	0.089 0.089	0.00 0.00	0.0	0.600 0.600	[]	-9 -9	Pipe/Conduit Pipe/Conduit	ٹ ٹ
S4.000 S4.001	23.500 23.500	0.120 0.305	195.8 77.0	0.073 0.073	4.00 0.00	0.0	0.600 0.600	0	<mark>450</mark> 450	Pipe/Conduit Pipe/Conduit	e d
S5.000	19.169	0.100	191.7	0.037	4.00	0.0	0.600	0	300	Pipe/Conduit	ð
S1.003 S1.004 S1.005	31.295 45.407 75.000	0.160 0.240 0.115	195.6 189.2 652.2	0.000 0.000 0.000	0.00 0.00 0.00	0.0 0.0 0.0	0.600 0.600 0.600	0 0 40	450 450 -10	Pipe/Conduit Pipe/Conduit Pipe/Conduit	ඒ ඒ ඒ
S6.000	27.332	0.140	195.2	0.083	4.00	0.0	0.600	[]	-9	Pipe/Conduit	•
S7.000 S7.001	23.500 23.500	0.120 0.120	195.8 195.8	0.079 0.079	4.00 0.00	0.0	0.600 0.600	0	<mark>450</mark> 450	Pipe/Conduit Pipe/Conduit	<del>0</del> ď
S6.001 S6.002	34.506 34.755	0.175 0.425	197.2 81.8	0.083 0.083	0.00 0.00	0.0	0.600	[]	- <mark>9</mark> -9	Pipe/Conduit Pipe/Conduit	ď ď
S8.000 S8.001	23.500 23.500	0.120 0.420	195.8 56.0	0.073 0.073	4.00	0.0	0.600 0.600	0	<mark>450</mark> 450	Pipe/Conduit Pipe/Conduit	<del>0</del> ď
S6.003	30.009	0.150	200.1	0.083	0.00	0.0	0.600	0	450	Pipe/Conduit	æ

# Network Results Table

PN	Rain	T.C.	US/IL	Σ I.Area	ΣΕ	ase	Foul	Add Flow	Vel	Cap	Flow
	(mm/hr)	(mins)	(m)	(ha)	Flow	(l/s)	(1/s)	(1/s)	(m/s)	(1/s)	(l/s)
S1.001	50.00	4.85	27.420	0.321		0.0	0.0	0.0	1.88	931.6	43.5
S1.002	50.00	5.08	27.245	0.410		0.0	0.0	0.0	2.52	1250.5	55.5
S4.000	50.00	4.27	27.355	0.073		0.0	0.0	0.0	1.45	230.5	9.9
S4.001	50.00	4.44	27.235	0.146		0.0	0.0	0.0	2.32	368.7	19.8
S5.000	50.00	4.28	27.180	0.037		0.0	0.0	0.0	1.13	80.0	5.0
S1.003	50.00	5.44	26.930	0.593		0.0	0.0	0.0	1.45	230.6	80.3
S1.004	50.00	5.95	26.770	0.593		0.0	0.0	0.0	1.47	234.5	80.3
S1.005	50.00	6.56	24.880	0.593		0.0	0.0	0.0	2.05	28459.5	80.3
S6.000	50.00	4.24	27.390	0.083		0.0	0.0	0.0	1.89	937.4	11.2
S7.000	50.00	4.27	27.490	0.079		0.0	0.0	0.0	1.45	230.5	10.7
S7.001	50.00	4.54	27.370	0.158		0.0	0.0	0.0	1.45	230.5	21.4
S6.001	50.00	4.85	27.200	0.324		0.0	0.0	0.0	1.88	932.7	43.9
S6.002	50.00	5.04	27.025	0.407		0.0	0.0	0.0	2.93	1451.9	55.1
S8.000	50.00	4.27	27.140	0.073		0.0	0.0	0.0	1.45	230.5	9.9
S8.001	50.00	4.41	27.020	0.146		0.0	0.0	0.0	2.72	433.0	19.8
S6.003	50.00	5.39	26.600	0.636		0.0	0.0	0.0	1.43	228.0	86.1
			(	ລ1982-20	16 XF	Soli	itions	3			

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Barton	Cheshunt	<u> </u>					
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File SW SYSTEM 2 - STADIUM	Checked by JPH	Diamaye					
Micro Drainage	Network 2016.1						

## Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Ba Flow	ise (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S6.004	33.500	0.155	216.1	0.000	0.00		0.0	0.600	0	450	Pipe/Conduit	ď
S1.006 S1.007 S1.008	26.961 18.632 9.099	0.135 0.095 0.050	199.7 196.1 182.0	0.000 0.000 0.000	0.00 0.00 0.00		0.0 0.0 0.0	0.600 0.600 0.600	0 0 0	225 225 225	Pipe/Conduit Pipe/Conduit Pipe/Conduit	<b>*</b>

#### Network Results Table

PN	Rain	T.C.	US/IL	Σ I.Area	Σ Base	Foul	Add Flow	Vel	Cap	Flow
	(mm/hr)	(mins)	(m)	(ha)	Flow (l/s)	(1/s)	(1/s)	(m/s)	(1/s)	(1/s)
S6.004	50.00	5.80	26.450	0.636	0.0	0.0	0.0	1.38	219.3	86.1
S1.006	50.00	7.05	26.280	1.229	0.0	0.0	0.0	0.92	36.6«	166.4
S1.007	50.00	7.38	26.145	1.229	0.0	0.0	0.0	0.93	37.0«	166.4
S1.008	50.00	7.54	26.050	1.229	0.0	0.0	0.0	0.97	38.4«	166.4

#### Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, 0 egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m²)
-9	[]	1000	500	90.0	45	0.685	0.496
-10	40	8400	2100			2.100	13.854

Pete	er Dann	Ltd									Page	4
Newt	on Hou	se				Ches	shunt Foot					
Bart	ion					Ches	shunt	14				
Camb	oridge	CB23	7WJ			10-6	5561	Mic				
Date	e 1					Desi	Igned by 1					
File	e SW SY	STEM	2 – S	TADIUM		Chec	cked by JI	DIG	nage			
Micr	o Drai	nage				Netv	vork 2016					
					Manho	le Sch	edules fo	or Storm				
мн	мн	МН	;	MH	МН		Pipe Out	Pipes In				
Name	CL (m)	Depth (m)	Conn	ection	Diam.,L*W (mm)	PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	28,620	1.000	Open	Manhole	3000	S1.000	27,620	-9				
S11	29.100	1.390	Open	Manhole	1350	s2.000	27.710	450				
S11a	29.100	1.510	Open	Manhole	1350	s2.001	27.590	450	s2.000	27.590	450	
S12	28.775	1.210	Open	Manhole	1350	s3.000	27.565	450				
S2	29.100	1.680	Open 1	Manhole	3000	S1.001	27.420	-9	S1.000	27.470	-9	50
			-						S2.001	27.470	450	
									s3.000	27.470	450	
S3	29.200	1.955	Open 1	Manhole	3000	S1.002	27.245	-9	S1.001	27.245	-9	
S14	29.300	1.945	Open	Manhole	1350	S4.000	27.355	450				
S14a	29.300	2.065	Open 1	Manhole	1350	S4.001	27.235	450	S4.000	27.235	450	
S15	29.235	2.055	Open 1	Manhole	1200	S5.000	27.180	300				
S4	29.300	2.370	Open 1	Manhole	3000	S1.003	26.930	450	S1.002	26.930	-9	
									S4.001	26.930	450	
									S5.000	27.080	300	
S6	28.900	2.130	Open 1	Manhole	1350	S1.004	26.770	450	S1.003	26.770	450	
S7	29.340	4.460	Open 1	Manhole	3000	S1.005	24.880	-10	S1.004	26.530	450	
S16	28.635	1.245	Open 1	Manhole	3000	S6.000	27.390	-9				
S21	29.100	1.610	Open	Manhole	1350	\$7.000	27.490	450				
S21a	29.100	1.730	Open 1	Manhole	1350	S7.001	27.370	450	S7.000	27.370	450	
S17	29.100	1.900	Open	Manhole	3000	S6.001	27.200	-9	S6.000	27.250	-9	50
									S7.001	27.250	450	
S18	29.200	2.175	Open (	Manhole	3000	S6.002	27.025	-9	S6.001	27.025	-9	
S22	29.300	2.160	Open (	Manhole	1350	S8.000	27.140	450				
S22a	29.300	2.280	Open 1	Manhole	1350	S8.001	27.020	450	S8.000	27.020	450	
S19	29.300	2.700	Open (	Manhole	3000	S6.003	26.600	450	S6.002	26.600	-9	
									S8.001	26.600	450	
S20	28.900	2.450	Open	Manhole	1350	S6.004	26.450	450	S6.003	26.450	450	
SAT	29.215	4.450	Open	Manhole	3000	S1.006	26.280	225	S1.005	24.765	-10	_
									S6.004	26.295	450	240
S9	28.125	1.980	Open	Manhole	1200	S1.007	26.145	225	S1.006	26.145	225	
S10	28.125	2.075	Open	Manhole	1200	S1.008	26.050	225	S1.007	26.050	225	
S	27.000	1.000	Open (	Manhole	0		OUTFALL		S1.008	26.000	225	

Peter Dann Ltd				Page 5
Newton House		Cheshunt Footba	all Club	
Barton		Cheshunt		4
Cambridge CB23 7WJ		10-6561		- Com
Date 1		Designed by MD		
File SW SYSTEM 2 - STADII	IIM	Checked by JPH		Drainage
Migro Drainago	011	Notwork 2016 1		
MICIO DIAINAGE		Network 2010.1		
	סדספיו דאפ	CUEDINES for	Storm	
	FIFULIND	SCHEDULES IOL	Storm	
	Up	stream Manhole		
Sect (m	am MH C.Level m) Name (m)	(m) (m)	Connection (mm)	w
51 000 []	0 91 29 620	27 620 0 500	Open Marhele 300	0
51.000 []	-9 51 20.020	27.020 0.300	open mannore 500	0
S2.000 o 4	50 S11 29.100	27.710 0.940	Open Manhole 135	0
S2.001 o 4	50 S11a 29.100	27.590 1.060	Open Manhole 135	0
S3.000 o 4	50 \$12 28.775	5 27.565 0.760	Open Manhole 135	0
		27.303 0.700		0
S1.001 []	-9 S2 29.100	27.420 1.180	Open Manhole 300	0
S1.002 []	-9 S3 29.200	27.245 1.455	Open Manhole 300	0
S4 000 0 4	F0 C14 20 200	27 255 1 405	Open Marbolo 125	0
S4.000 0 4 S4.001 0 4	50 S14 29.300	27.235 1.495 27.235 1.615	Open Manhole 135	0
				-
S5.000 o 3	00 S15 29.235	27.180 1.755	Open Manhole 120	0
S1.003 o 4	50 S4 29.300	26.930 1.920	Open Manhole 300	0
S1.004 o 4	50 S6 28.900	26.770 1.680	Open Manhole 135	0
S1.005 40 -	10 S7 29.340	24.880 2.360	Open Manhole 300	0
S6.000 []	-9 S16 28.635	5 27.390 0.745	Open Manhole 300	0
S7 000 0 4	50 \$21 29 100	27 490 1 160	Open Manhole 135	0
s7.001 o 4	50 S21a 29.100	27.370 1.280	Open Manhole 135	0
	Deer	Marken Markel	_	
		IISCIEAM MAIIIOI		
PN Length Sl (m) (1	lope MH C.Lev 1:X) Name (m)	el I.Level D.Dept (m) (m)	h MH MH DIAM., ] Connection (mm)	L*W
	· · ·	· · · ·		
S1.000 29.689 19	97.9 S2 29.1	00 27.470 1.13	0 Open Manhole 30	000
S2.000 23.500 19	95.8 S11a 29.1	00 27.590 1.06	0 Open Manhole 13	350
S2.001 23.500 19	95.8 S2 29.1	00 27.470 1.18	0 Open Manhole 30	000
\$3.000 18.936 19	99.3 S2 29.1	00 27.470 1.18	0 Open Manhole 30	000
S1 001 31 587 10	976 97 97 97 97 97 97 97 97 97 97 97 97 97	00 27 245 1 45	5 Open Marhole	000
S1.002 34.674 11	10.1 S4 29.3	00 26.930 1.87	0 Open Manhole 30	000
			-	
S4.000 23.500 19	95.8 S14a 29.3	00 27.235 1.61	5 Open Manhole 13	350
S4.001 23.500 7	1/1.0 S4 29.3	00 26.930 1.92	0 Open Manhole 30	000
\$5.000 19.169 19	91.7 S4 29.3	00 27.080 1.92	0 Open Manhole 30	000
S1.003 31.295 19	95.6 S6 28.9	00 26.770 1.68	0 Open Manhole 13	350
S1.004 45.407 18	89.2 S7 29.3	40 26.530 2.36	U Open Manhole 30	000
31.003 /3.000 63	JZ.Z JAI 29.2	10 24.100 2.00	o open mannore 30	
\$6.000 27.332 19	95.2 S17 29.1	00 27.250 1.35	0 Open Manhole 30	000

S7.00023.500195.8S21a29.10027.3701.280OpenManholeS7.00123.500195.8S1729.10027.2501.400OpenManhole

1350 3000

Peter Dann Ltd									Page 6
Newton House				C	heshunt	Footb	all Club		
Barton					heshunt				4
Cambridge CB23 70	١J			1	.0-6561				- Com
Date 1				E	esigned	l by MD			
File SW SYSTEM 2 -	- STAI	DIUM		C	hecked	by JPH			Urainage
Micro Drainage				N	letwork	2016.1			
			PIP	PELINE	SCHEDUL	ES for	Storm		
				Ups	tream M	lanhole			
DN	Und	Diam	ми		T Townl	D Donth	MH		T +W
PN	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)	TM.
		. ,		. ,		. ,			
56 001	[]	_9	S17	29 100	27 200	1 400	Open Manhole	, · · · · · · · · · · · · · · · · · · ·	3000
S6.002	[]	-9	S18	29.200	27.025	1.675	Open Manhole		3000
S8.000 S8.001	0	450 450	S22 S22a	29.300	27.140	1.710	Open Manhole		1350 1350
00.001	0	100	OZZU	23.300	27.020	1.000		· -	
S6.003	0	450	S19	29.300	26.600	2.250	Open Manhole		3000
S6.004	0	450	S20	28.900	26.450	2.000	Open Manhole	-	1350
S1.006	0	225	SAT	29.215	26.280	2.710	Open Manhole	. 3	3000
S1.007	0	225	S9	28.125	26.145	1.755	Open Manhole	) <u>-</u>	1200
51.008	0	223	510	28.125	26.050	1.850	open Mannoie	-	1200
				Down	stream	Manhol	e		
PN 1	Length	Slope	e MH	C.Leve	l I.Level	L D.Dept	h MH	MH DIAM.	, L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	n (mm)	)
S6.001 3	34.506	197.2	2 S18	29.20	0 27.025	5 1.67	5 Open Manho	le	3000
S6.002 3	34.755	81.8	8 S19	29.30	0 26.600	2.20	0 Open Manho	le	3000
S8.000 2	23.500	195.8	8 S22a	29.30	0 27.020	) 1.83	0 Open Manho	le	1350
S8.001 2	23.500	56.0	) S19	29.30	0 26.600	2.25	0 Open Manho	le	3000
SE 003	30 000	200 1	c20	28 90	0 26 450		0 Open Manhe	10	1350
s6.004	33.500	216.1	SAT	28.90	5 26.29	5 2.00 5 2.47	0 Open Manhol	le	3000
S1.006	26.961	199.7	7 S9	28.12	5 26.14	5 1.75	5 Open Manho	le	1200
S1.007	9.099	182.0	) SIO	27.00	0 26.000	) 0.77	5 Open Manho	le	0
							-		

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Newton House	Cheshunt Football Club	
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Cambridge CB23 7WJ	10-6561	Micco
Date 1	Designed by MD	
File SW SYSTEM 2 - STADIUM	Checked by JPH	Diamacje
Micro Drainage	Network 2016.1	

#### Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
						. ,
1.000	-	-	100	0.037	0.037	0.037
2.000	-	-	100	0.079	0.079	0.079
2.001	-	-	100	0.079	0.079	0.079
3.000	-	-	100	0.037	0.037	0.037
1.001	-	-	100	0.089	0.089	0.089
1.002	-	-	100	0.089	0.089	0.089
4.000	-	-	100	0.073	0.073	0.073
4.001	-	-	100	0.073	0.073	0.073
5.000	-	-	100	0.037	0.037	0.037
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
6.000	-	-	100	0.083	0.083	0.083
7.000	-	-	100	0.079	0.079	0.079
7.001	-	-	100	0.079	0.079	0.079
6.001	-	-	100	0.083	0.083	0.083
6.002	-	-	100	0.083	0.083	0.083
8.000	-	-	100	0.073	0.073	0.073
8.001	-	-	100	0.073	0.073	0.073
6.003	-	-	100	0.083	0.083	0.083
6.004	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				1.229	1.229	1.229

#### Free Flowing Outfall Details for Storm

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

S1.008 S 27.000 26.000 0 0

#### Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow 0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage 2.000
Hot Start (mins)	0	Inlet Coeffiecient 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 (1/s)	0.000	Output Interval (mins) 1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 1 Number of Storage Structures 0 Number of Real Time Controls 0

## Synthetic Rainfall Details

Rainfall Model FEH Return Period (years) 1 Site Location GB 535350 201250 TL 35350 01250

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Newton House	Cheshunt Football Club	
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Cambridge CB23 7WJ	10-6561	Micco
Date 1	Designed by MD	
File SW SYSTEM 2 - STADIUM	Checked by JPH	Dialitacje
Micro Drainage	Network 2016.1	

# Synthetic Rainfall Details

	С	(1km)	-0.025
	D1	(1km)	0.295
	D2	(1km)	0.262
	D3	(1km)	0.265
	Е	(1km)	0.330
	F	(1km)	2.484
Summ	ner S	Storms	Yes
Wint	er S	Storms	Yes
Cv	7 (St	ummer)	0.750
Cv	/ (Wi	nter)	0.840
Storm Durati	on	(mins)	30

Peter Dann Ltd					
Newton House	Cheshunt Football Club				
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Micro Drainage	Network 2016.1				

# Online Controls for Storm

# Pump Manhole: SAT, DS/PN: S1.006, Volume (m<sup>3</sup>): 1023.2

Invert Level (m) 26.280

Depth (m)	Flow (l/s)						
0.200	4.8000	1.800	4.8000	3.400	4.8000	5.000	4.8000
0.400	4.8000	2.000	4.8000	3.600	4.8000	5.200	4.8000
0.600	4.8000	2.200	4.8000	3.800	4.8000	5.400	4.8000
0.800	4.8000	2.400	4.8000	4.000	4.8000	5.600	4.8000
1.000	4.8000	2.600	4.8000	4.200	4.8000	5.800	4.8000
1.200	4.8000	2.800	4.8000	4.400	4.8000	6.000	4.8000
1.400	4.8000	3.000	4.8000	4.600	4.8000		
1.600	4.8000	3.200	4.8000	4.800	4.8000		

Peter Dann	Ltd							Pa	age 1
Newton Hou	ise			Ch	eshunt Footk	all Club			
Barton				Ch	eshunt				L.
Cambridge	CB23	7WJ		10	-6561				Micco
Date 1				De	signed by MD	)			
File SW SY	STEM	2 - STADIUM	1	Ch	ecked by JPH	I			Jialliada
Micro Drai	nage			Ne					
<u>1 year Re</u>	eturn	Period Summ	ary of	Critic	al Results k	oy Maximur	n Level (	Rank 1)	for Storm
Number	Manhol Foul of Inj	Areal Redu Hot Hot Star e Headloss Co Sewage per h out Hydrograp	ction Fa Start (n t Level eff (Glo ectare ( hs 0 1	actor 1.0 nins) (mm) obal) 0.5 (1/s) 0.0	00 Additiona 0 MADD 0 Flow per Pe 00 0 Offline Contr	Al Flow - % Factor * 1 Inle erson per D cols 0 Numb	of Total 1 Om <sup>3</sup> /ha Sto: t Coeffiec: ay (l/per/o per of Time	Flow 0.00 rage 2.00 ient 0.80 day) 0.00 /Area Dia	0 0 0 grams 0
Numb	er of (	Online Contro	ls 1 Nur	nber of S	torage Structu	res 0 Numb	er of Real	Time Con	trols 0
				Syntheti	c Rainfall Det	ails			
		Rainfall Moc Site Locati C (1) D1 (1) D2 (1)	del Lon GB 5 xm) xm) xm)	35350 20	1250 TL 35350 _	FEH D3 01250 H 0.025 H 0.295 CV (\$ 0.262 CV (\$	3 (1km) 0.2 E (1km) 0.3 F (1km) 2.4 Summer) 0.7 Winter) 0.8	265 330 184 750 340	
		Margin for F	lood Ris	k Warnin	r (mm)		15	0.0	
		1101 9111 101 11	Ana	lysis Ti	mestep 2.5 Sec	ond Increme	ent (Extend	led)	
				DTS	Status			ON	
				DVD .	Status			OFF	
				Inercia	Status			OFF	
		Pro	file(s)	1 -	20 60 100	100 040 7	Summer an	d Winter	
		Duration(s)	(mins)	15, 960	30, 60, 120, . 1440. 2160.	180, 240, 3 2880. 4320.	360, 480, 6 . 5760. 720	00, 720,	
				500	, 1110, 2100,	2000, 1020,	0100, 120	10080	
	Retu	rn Period(s)	(years)				1,	30, 100	
		Climate Char	nge (%)					0, 0, 40	
									Water
	US/MH		Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level
PN	Name	Storm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)
S1.000	S1	15 Winter	1	+0%	100/15 Summer	:			27.628
S2.000	S11	15 Winter	1	+0%	100/15 Summer				27.783
S2.001	S11a	15 Winter	1	+0%	100/15 Summer				27.691
S3.000	S12	15 Winter	1	+0%	100/15 Summer				27.618
S1.001	SZ C2	15 Winter	1	+0%	100/15 Summer				27.476
S1.002	53 C14	15 Winter	1	+03	100/15 Summer				27.298
S4.000	C14-	15 Winter	1	+0%	100/15 Summer				27.425
S4.001	014a 015	15 Winter	1	10%	100/15 Summor				27.310
S1.000	CTC VD	15 Winter	1	+0% +0%	30/15 Summer				27.237
S1.005	56	15 Winter	1	108 108	30/15 Summer				26 956
S1 004	20	10080 Winter	⊥ 1	+0% +0%	100/360 Winter				26.026
SE 000	S16	15 Winter	⊥ 1	+0%	100/15 Summer				27.407
57 000	S21	15 Winter	- 1	+0%	100/15 Summer				27.563
\$7.001	\$21a	15 Winter	1	+0%	100/15 Summer				27.471
s6.001	S17	15 Winter	- 1	+0%	100/15 Summer				27.256
\$6.002	S18	15 Winter	1	+0%	100/15 Summer				27.072
S8.000	S22	15 Winter	1	+0%	100/15 Summer				27.210
S8.001	S22a	15 Winter	1	+0%	100/15 Summer	:			27.088
s6.003	s19	15 Winter	1	+0%	30/15 Summer				26.803
S6.004	S20	15 Winter	1	+0%	30/15 Summer	-			26.654
					/				

Peter Dann Ltd									Page 2
Newton House			Che	shunt l					
Barton			Che	shunt					4
Cambridge CB23 7WJ			10-	6561					- Com
				igned	hu MD				MICro
		T T N 4		i gilea i	oy MD				Drainage
File SW SYSTEM 2 - STADIUM Checked by JPH								Brainage	
Micro Drainage Network 2016.1									
<u>1 year Return Peri</u>	od Su	mmary of C.	ritica	l Resu	lts by M	aximu	m Leve	l (Rank	1) for Storm
	119 /MU	Surcharged	Flooded	Flow /	Overflow	Pipe		Level	
DN	Namo	(m)	(m <sup>3</sup> )	Can	(1/a)	(1/g)	Status	Even	
EN	Name	(111)	(	Cap.	(1/5)	(1/5)	Status	Exceeded	
S1.000	S1	-0.492	0.000	0.01		5.7	OK		
S2.000	S11	-0.377	0.000	0.06		12.1	OK		
S2.001	S11a	-0.349	0.000	0.11		21.4	OK		
\$3.000	S12	-0.397	0.000	0.03		5.7	OK		
S1.001	S2	-0.444	0.000	0.06		43.4	OK		
S1.002	S3	-0.447	0.000	0.05		54.0	OK		
S4.000	S14	-0.380	0.000	0.06		11.2	OK		
S4.001	S14a	-0.375	0.000	0.07		20.0	OK		
\$5.000	S15	-0.243	0.000	0.08		5.7	OK		
S1.003	S4	-0.256	0.000	0.38		76.3	OK		
S1.004	S6	-0.264	0.000	0.36		75.8	OK		
S1.005	S7	-0.954	0.000	0.00		1.3	OK		
S6.000	S16	-0.483	0.000	0.02		12.7	OK		
s7.000	S21	-0.377	0.000	0.06		12.1	OK		
s7.001	S21a	-0.349	0.000	0.11		21.4	OK		
S6.001	S17	-0.444	0.000	0.06		44.4	OK		
\$6.002	S18	-0.453	0.000	0.05		54.3	OK		
S8.000	S22	-0.380	0.000	0.06		11.2	OK		
S8.001	S22a	-0.382	0.000	0.06		20.0	OK		
S6.003	S19	-0.247	0.000	0.42		81.6	OK		
S6.004	S20	-0.246	0.000	0.42		80.6	OK		
1									

Peter Dann Ltd					
Newton House	Cheshunt Football Club				
Barton	Cheshunt	<u> </u>			
Cambridge CB23 7WJ	10-6561	Micco			
Date 1	Designed by MD				
File SW SYSTEM 2 - STADIUM	Checked by JPH	Diamaye			
Micro Drainage	Network 2016.1	•			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.006 S1.007 S1.008	SAT S9 S10	10080 Winter 60 Summer 30 Winter	1 1 1	+0% +0% +0%	100/120 Winter				26.026 26.145 26.050

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded				
S1.006 S1.007	SAT S9	-0.479 -0.225	0.000 0.000	0.00		0.0	OK OK					
S1.008	S10	-0.225	0.000	0.00		0.0	OK					
Peter	Dann	Ltd									Pag	e 4
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Newton	n Hous	se				Ches	hunt	Football	Club			
Barton	ı					Ches	hunt				4	
Cambri	dge	CB23	7WJ			10-6	10-6561					licco
Date 1	-					Desi	gned	by MD				
File S	SW SYS	STEM 2	2 – ST	ADIUM		Chec	ked b	y JPH				Idinage
Micro	Drair	nage				Netw	ork 2	016.1				
<u>30 ye</u> a	ar Re	turn 1	Perio	d Summa	ary of (	Critical	l Resu	ults by Ma	aximum Le	evel (Rar	nk 1) 1	for Storm
N	M umber ( Numbe:	anhole Foul of Inpu r of On	Area. Ho Headlo Sewage ut Hydi nline ( Rainfa Site	l Reduct Hot St t Start per hec cographs Controls Ll Mode Locatio C (1km D1 (1km D2 (1km	tion Fact tart (min Level (m ff (Globa ttare (1/ s 0 Num tare (1/ s 0 Num	Simulat       cor 1.000       us)     0       um)     0       ul)     0.500       's)     0.000       mber of O     0       or of Sto     0       nthetic F     350	ion Cr Add Flow ffline rage S Rainfal	iteria itional Flo MADD Facto per Person Controls ( tructures ( <u>1 Details</u> FEH 5350 01250 -0.025 0.295 0.262	ow - % of ' or * 10m³/: Inlet Co per Day ( ) Number o ) Number o D3 (1k E (1k F (1k Cv (Summe Cv (Winte	Total Flow ha Storage effiecient l/per/day) f Time/Are f Real Tim m) 0.265 m) 0.330 m) 2.484 er) 0.750 er) 0.840	7 0.000 2.000 0.800 0.000 ea Diagr ne Contr	rams O rols O
		N Return	Margin Durati n Peric Climat	<pre>for Flo Profi Don(s) ( d(s) (y ce Chang</pre>	od Risk Analy In le(s) mins) rears) re (%)	Warning ( sis Times DTS Sta DVD Sta ertia Sta 15, 30 960, 1	(mm) step 2. atus atus atus 0, 60, 1440, 2	5 Second I 120, 180, 160, 2880,	ncrement ( Sum 240, 360, 4320, 576	150.0 Extended) OFF OFF mer and W 480, 600, 0, 7200, 3 1, 30, 0, 0	inter 720, 8640, 10080, 100 0, 40	
	US/MH			Return	Climate	First	(X)	First (Y)	First (Z)	Overflow	Water Level	Surcharged Depth
PN	Name	Sto	orm	Period	Change	Surcha	arge	Flood	Overflow	Act.	(m)	(m)
S1.000	S1	15 V	Winter	30	+0%	100/15	Summer				27.647	-0.473
S2.000	S11	15 V	Winter	30	+0%	100/15	Summer				27.860	-0.300
S2.001	S11a	15 V	Winter	30	+0%	100/15	Summer				27.797	-0.243
S3.000	S12 S2	15 N 15 T	Winter	30	+0% +0%	100/15	Summer				27.556	-0.350
S1.001	52 S3	15 1	Winter	30	+0%	100/15	Summer				27.463	-0.282
S4.000	S14	15 V	Winter	30	+0%	100/15	Summer				27.500	-0.305
S4.001	S14a	15 V	Winter	30	+0%	100/15	Summer				27.463	-0.222
S5.000	S15	15 V	Winter	30	+0%	100/15	Summer				27.456	-0.024
S1.003	S4	15 V	Winter	30	+0%	30/15	Summer				27.443	0.063
S1.004	S6	15 V	Winter	30	+0%	30/15	Summer				27.240	0.020
S1.005	S7	5760 1	Winter	30	+0%	100/360	Winter				26.388	-0.592
S6.000	S16	15 V	Winter	30	+0%	100/15	Summer				27.446	-0.444
S7.000	S21	15 V	Winter	30	+0%	100/15	Summer				27.640	-0.300
S7.001	S21a	15 1	Winter	30	+0%	100/15	Summer				27.577	-0.243
56.001	S17	15 1	winter	30	+0%	100/15	Summer				27.337	-0.363
50.002	518 600	15 V 15 T	Winter	30 20	+Uš , n@	100/15	Summor				21.230	-0.285
S8 001	322 522=	15 N	Winter	20 20	+U5 +N2	100/15	Summer				27 236	-0.308
s6.003	522a S19	15	Winter	30	+0%	30/15	Summer				27.216	0.166
S6.004	S20	15 V	Winter	30	+0%	30/15	Summer				26.980	0.080
					@10	982-2016	6 XP 9	olutions				

Peter Dann Ltd								Page 5
Newton House			Che	shunt Fc	otball	Club		
Barton			Che	shunt				Ma I
Cambridge CB23 7WJ			10-	6561	Micco			
Date 1	Des	igned by	MD					
File SW SYSTEM 2 - STA	DIUM		Che	cked by	JPH			Digitige
Micro Drainage			Net	work 201	6.1			
30 year Return Period	Summa US/MH	ry of ( Flooded Volume	Critica Flow /	al Resul <sup>.</sup> Overflow	Pipe Flow	Maximum I	Level (Rank	1) for Storm
PN	Name	(m <sup>3</sup> )	Cap.	(1/s)	(1/s)	Status	Exceeded	
S1.000	S1	0.000	0.03		19.3	OK		
S2.000	S11	0.000	0.22		41.5	OK		

81.8

19.5

162.8

185.6

38.4

71.6

17.6

43.6

41.5

81.9

164.9

178.2

38.4

73.0

233.6 SURCHARGED

3.4 OK

246.2 SURCHARGED

246.1 SURCHARGED

228.4 SURCHARGED

OK

0.000 0.43

0.000 0.11

0.000 0.22

0.000 0.19

0.000 0.00

0.000 0.07

0.000 0.22

0.000 0.20

0.000 0.20

0.000 1.26

0.000 1.29

0.20

0.23

0.25

1.17

1.08

0.000

0.000

0.000

0.000

0.000

S18 0.000 0.16

S2.001 S11a

S3.000 S12

S1.001

S1.002

S4.000

S4.001

S5.000

S1.003

S1.004

S1.005

S6.000

S7.000

S6.002

S8.000

S6.003

S6.004

S8.001 S22a

S2

S14

S14a

S15

S4

S6

S7

S16

S21

S22

S19

S20

S7.001 S21a 0.000 0.43

S6.001 S17 0.000 0.22

S3

Peter Dann Ltd		Page 6
Newton House	Cheshunt Football Club	
Barton	Cheshunt	<u> </u>
Cambridge CB23 7WJ	10-6561	Micco
Date 1	Designed by MD	
File SW SYSTEM 2 - STADIUM	Checked by JPH	Dialitaye
Micro Drainage	Network 2016.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
S1.006	SAT	5760 Winter	30	+0%	100/120 Winter				26.388	-0.117
S1.007	S9	5760 Winter	30	+0%					26.186	-0.184
S1.008	S10	5760 Winter	30	+0%					26.093	-0.182

		Flooded			Pipe		
	US/MH	Volume	Flow /	Overflow	Flow		Level
PN	Name	(m³)	Cap.	(1/s)	(l/s)	Status	Exceeded
S1.006	SAT	0.000	0.08		2.6	OK	
S1.007	S9	0.000	0.08		2.6	OK	
S1.008	S10	0.000	0.08		2.6	OK	

Peter	Dann	Ltd									Pag	e 7
Newtor	n Hous	se				Chesh	unt H	Tootball	Club			
Bartor	ı					Chesh	unt	4				
Cambri	ldge	CB23	7WJ			10-65	10-6561					licco
Date 1	L					Desig	ned k	by MD				
File S	SW SYS	STEM	2 – ST	ADIUM		Check	ed by	/ JPH				alhaye
Micro	Drain	nage				Netwo	rk 20	)16.1				
<u>100 y</u> e	ear Re	eturn	Peric	d Summ	ary of	Critical	Resi	ilts by M	aximum L	evel (Ra	nk 1)	for Storm
N	M umber ( Numbe:	anhol Foul of Inp r of (	Area Ho e Headl Sewage put Hyd: Online ( Rainfa Site	l Reduct Hot St t Start oss Coef per heo rographs Controls all Mode Locatio C (1km	cion Fact cart (mir Level (n f (Globa ctare (1/ s 0 Nur s 1 Numbe <u>Sy</u> 1 n GB 535 )	Simulatic cor 1.000 ns) 0 m) 0 al) 0.500 h (s) 0.000 mber of Off er of Store nthetic Ra 350 201250	on Cri Addi Flow p fline age St ainfal	teria tional Flo MADD Facto per Person Controls ( ructures ( <u>1 Details</u> FEH 5350 01250 -0.025	Dw - % of pr * 10m <sup>3</sup> / Inlet Co per Day ( Number o Number o D3 (1k E (1k F (1k	Fotal Flow ha Storage efficcient l/per/day) f Time/Are f Real Tim m) 0.265 m) 0.330 m) 2.484 r) 0.750	7 0.000 2.000 0.800 0.000 ea Diagr me Contr	ams O ols O
				D1 (1km D2 (1km	)			0.295	Cv (Summe	(r) 0.750		
		Retur	Durat: rn Perio Climat	Profi ion(s) ( od(s) (y te Chang	Inaly In le(s) mins) eears) re (%)	DTS Stat DVD Stat ertia Stat 15, 30, 960, 14	60, 140, 2	120, 180, 1 160, 2880,	Sum 240, 360, 4320, 576	Mer and W: 480, 600, 0, 7200, 8 1, 30, 0, 0	inter 720, 8640, 10080 , 100 0, 40	
PN	US/MH Name	51	torm	Return	Climate	First ( Surchar	(X)	First (Y)	First (Z)	Overflow	Water Level	Surcharged Depth (m)
		5			90		5-	- 2004			、 <i>/</i>	、 <i>/</i>
S1.000	S1	15	Winter	100	+40%	100/15 St	ummer				28.357	0.237
S2.000	511 511a	15 15	Winter	100	+40% +40%	100/15 St	ummer				28.398	U.260 0 358
S3.000	S12	15	Winter	100	+40%	100/15 St	ummer				28.364	0.349
S1.001	S2	15	Winter	100	+40%	100/15 St	ummer				28.354	0.434
S1.002	S3	15	Winter	100	+40%	100/15 St	ummer				28.329	0.584
S4.000	S14	15	Winter	100	+40%	100/15 Sı	ummer				28.357	0.552
S4.001	S14a	15	Winter	100	+40%	100/15 Si	ummer				28.337	0.652
\$5.000	S15	15	Winter	100	+40%	100/15 St	ummer				28.322	0.842
S1.003	54 cr	15 15	Winter	100	+4U% ±10%	30/15 St 30/15 C	ummer				28.296 27 717	0.916
S1 005	30 97	1440	Winter	100	+408 +408	100/360 W-	inter				27 636	0.49/
s6.000	S16	15	Winter	100	+40%	100/15 Si	ummer				28.313	0.423
s7.000	S21	15	Winter	100	+40%	100/15 Si	ummer				28.374	0.434
S7.001	S21a	15	Winter	100	+40%	100/15 St	ummer				28.352	0.532
S6.001	S17	15	Winter	100	+40%	100/15 St	ummer				28.307	0.607
S6.002	S18	15	Winter	100	+40%	100/15 Sı	ummer				28.280	0.755
S8.000	S22	15	Winter	100	+40%	100/15 Sı	ummer				28.308	0.718
S8.001	S22a	15	Winter	100	+40%	100/15 St	ummer				28.287	0.817
S6.003	S19	15	Winter	100	+40%	30/15 Si	ummer				28.246	1.196
50.004	520	1440	winter	TOO	+40%	3U/15 St	uumer				21.030	0./36
					©1	982-2016	XP S	olutions				

Peter Dann Ltd								Pa	ge 8		
Newton House			Che	shunt Fc	otbal	l Club					
Barton		Che	shunt					1.	.		
Cambridge CB23 7WJ			10-	10-6561					Aicco	Jun	
Date 1		Des	igned by	MD							
File SW SYSTEM 2 - STADIUM Checked by JPH									Dialnage		
Micro Drainage			Net	work 201	6.1						
100 year Return Period	Summ	ary of Flooded	Critic	al Resul	ts by Pipe	Maximum	Level (R	ank 1)	for	Storm	
	US/MH	Volume	Flow /	Overflow	Flow		Level				
PN	Name	(m³)	Cap.	(1/s)	(1/s)	Status	Exceeded				
S1.000	S1	0.000	0.05		33.7	SURCHARGED					
S2.000	S11	0.000	0.45		87.0	SURCHARGED					
S2.001	S11a	0.000	0.85		162.8	SURCHARGED					
\$3.000	S12	0.000	0.22		39.1	SURCHARGED					
S1.001	S2	0.000	0.32		233.0	SURCHARGED					
S1.002	S3	0.000	0.26		255.6	SURCHARGED					
S4.000	S14	0.000	0.39		73.9	SURCHARGED					
S4.001	S14a	0.000	0.48		146.9	SURCHARGED					

36.3 SURCHARGED

374.1 SURCHARGED

374.9 SURCHARGED

18.9 SURCHARGED

78.1 SURCHARGED

84.9 SURCHARGED

158.1 SURCHARGED

220.8 SURCHARGED

275.8 SURCHARGED

72.2 SURCHARGED

144.4 SURCHARGED

428.5 SURCHARGED

20.7 SURCHARGED

0.000 0.52

0.000 1.88

0.000 1.78

0.000 0.00

0.000 0.12

0.000 0.44

0.000 0.38

0.000 0.40

0.000 2.19

0.000 0.11

S5.000

S1.003

S1.004

S1.005

S8.000

S6.004

S6.000 S16

S7.000 S21

S8.001 S22a

S6.003 S19

S15

S4

S6

S7

S22

S20

S7.001 S21a 0.000 0.83

S6.001 S17 0.000 0.30

S6.002 S18 0.000 0.24

Peter Dann Ltd		Page 9
Newton House	Cheshunt Football Club	
Barton	Cheshunt	<u> </u>
Cambridge CB23 7WJ	10-6561	Micco
Date 1	Designed by MD	
File SW SYSTEM 2 - STADIUM	Checked by JPH	Dialitaye
Micro Drainage	Network 2016.1	·

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

									Water	Surcharged
US/MH			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Level	Depth
Name	St	orm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)	(m)
SAT	1440	Winter	100	+40%	100/120 Winter				27.636	1.131
S9	240	Summer	100	+40%					26.202	-0.168
S10	240	Summer	100	+40%					26.108	-0.167
	US/MH Name SAT S9 S10	US/MH Name St SAT 1440 S9 240 S10 240	US/MH Name Storm SAT 1440 Winter S9 240 Summer S10 240 Summer	US/MH     Return Str       Name     Str       1440     Winter       240     Summer       100     100       100     100	US/MH     Image: Name     1440     Winter     Period     Climate Change       SAT     1440     Winter     100     +40%       S9     240     Summer     100     +40%       S10     240     Summer     100     +40%	US/MH NameImage: Same state1440Winter SupportClimate ChangeFirst (X) SupportSAT1440Winter100+40%100/120WinterS9240Summer100+40%100/120WinterS10240Summer100+40%100/120Winter	US/MH NameReturnClimate PeriodFirst (X) SurchargeFirst (Y) FloodSAT1440Winter100+40%100/120 WinterS9240Summer100+40%100/120 WinterS10240Summer100+40%100/120 Winter	US/MH NameReturn StormClimate PeriodFirst (X) SurchargeFirst (Y) FloodFirst (Z) OverflowSAT1440 Winter 240 Summer100+40% 100100/120 WinterS10240 Summer100+40% 100100/120 Winter	US/MH NameReturnClimateFirst (X)First (Y)First (Z)OverflowSAT1440Winter100+40%100/120WinterS9240Summer100+40%S10240Summer100+40%	WaterUS/MHReturnClimateFirst (X)First (Y)First (Z)OverflowLevelNameStormPeriodChangeSurchargeFloodOverflowAct.LevelSAT1440 Winter100+40%100/120 Winter27.636S9240 Summer100+40%26.20226.108S10240 Summer100+40%26.108

	Flooded			Pipe		
US/MH	Volume	Flow /	Overflow	Flow		Level
Name	(m³)	Cap.	(1/s)	(l/s)	Status	Exceeded
SAT	0.000	0.14		4.8	SURCHARGED	
S9	0.000	0.14		4.8	OK	
S10	0.000	0.15		4.8	OK	
	US/MH Name SAT S9 S10	Flooded       US/MH     Volume       Name     (m³)       SAT     0.000       S9     0.000       S10     0.000	Flooded       US/MH     Volume     Flow /       Name     (m³)     Cap.       SAT     0.000     0.14       S9     0.000     0.14       S10     0.000     0.15	Flooded       US/MH     Volume     Flow     Overflow       Name     (m³)     Cap.     (l/s)       SAT     0.000     0.14        S9     0.000     0.14        S10     0.000     0.15	Flooded     Pipe       US/MH     Volume     Flow / Overflow     Flow       Name     (m³)     Cap.     (l/s)     (l/s)       SAT     0.000     0.14     4.8       S9     0.000     0.14     4.8       S10     0.000     0.15     4.8	FloodedPipeUS/MHVolumeFlow / OverflowFlowName(m³)Cap.(1/s)(1/s)SAT0.0000.144.8SURCHARGEDS90.0000.144.8OKS100.0000.154.8OK



# 7.3 – Micro Drainage Calculations - Surface Water System 3 – Stadium Car Park

Peter Dann Ltd		Page 1
Newton House	Cheshunt Football Club	
Barton	Cheshunt	L'
Cambridge CB23 7WJ	10-6561	Micco
Date 1	Designed by MD	
File SW System 3 - Stadium Carp	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1	·

#### STORM SEWER DESIGN by the Modified Rational Method

#### <u>Design Criteria for Storm</u>

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall	Model		
Return Period (years)			1
Site Location	GB 535350	201250 т	L 35350 01250
C (1km)			-0.025
D1 (1km)			0.295
D2 (1km)			0.262
D3 (1km)			0.265
E (1km)			0.330
F (1km)			2.484
Maximum Rainfall (mm/hr)			50
Maximum Time of Concentration (mins)			30
Foul Sewage (l/s/ha)			0.000
Volumetric Runoff Coeff.			0.750
Add Flow / Climate Change (%)			0
Minimum Backdrop Height (m)			0.200
Maximum Backdrop Height (m)			1.500
Min Design Depth for Optimisation (m)			1.200
Min Vel for Auto Design only (m/s)			1.00
Min Slope for Optimisation (1:X)			500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.493	8-12	0.285	12-16	0.074
	Total	Area C	Contrib	uting (	ha) = (	0.852	
	Tot	al Pipe	Volum	.e (m³)	= 855.0	039	

#### Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length	Fall	Slope	I.Area	T.E.	Ba	ase	k	HYD	DIA	Section Type	Auto
	(m)	(m)	(1:X)	(ha)	(mins)	Flow	(l/s)	(mm)	SECT	(mm)		Design
S1.000	119.000	0.160	743.8	0.204	4.00		0.0	0.600	[]	-11	Pipe/Conduit	۵
S1.001	43.884	0.060	731.4	0.000	0.00		0.0	0.600	0	450	Pipe/Conduit	Ä
S1.002	157.000	0.210	747.6	0.648	0.00		0.0	0.600	[]	-12	Pipe/Conduit	Ä
S1.003	18.301	1.405	13.0	0.000	0.00		0.0	0.600	0	150	Pipe/Conduit	ě

#### Network Results Table

PN	Rain	T.C.	US/IL	Σ I.Area	ΣΕ	Base	Foul	Add Flow	Vel	Cap	Flow	
	(mm/hr)	(mins)	(m)	(ha)	Flow	(l/s)	(l/s)	(l/s)	(m/s)	(l/s)	(l/s)	
S1.000	50.00	7.51	27.880	0.204		0.0	0.0	0.0	0.57	1229.2	27.6	
S1.001	47.58	8.49	27.720	0.204		0.0	0.0	0.0	0.74	118.3	27.6	
S1.002	35.01	13.12	27.660	0.852		0.0	0.0	0.0	0.57	2119.5	80.8	
S1.003	34.81	13.23	27.450	0.852		0.0	0.0	0.0	2.81	49.6«	80.8	
			C	01982-201	L6 XP	Solu	tions					-

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Newton House	Cheshunt Football Club	
Barton	Cheshunt	L'
Cambridge CB23 7WJ	10-6561	Micco
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File SW System 3 - Stadium Carp	Checked by JPH	Dialitacje
Micro Drainage	Network 2016.1	1

#### Network Design Table for Storm

PNLengthFallSlopeI.AreaT.E.BasekHYDDIASectionTypeAuto(m)(m)(1:X)(ha)(mins)Flow (1/s)(mm)SECT (mm)Design

s1.004 9.099 0.045 202.2 0.000 0.00 0.0 0.600 o 150 Pipe/Conduit 🔒

#### <u>Network Results Table</u>

PN	Rain	T.C.	US/IL	Σ I.Area	Σ Base	Foul	Add Flow	Vel	Cap	Flow
	(mm/hr)	(mins)	(m)	(ha)	Flow (l/s)	(l/s)	(l/s)	(m/s)	(l/s)	(l/s)
S1.004	34.41	13.45	26.045	0.852	0.0	0.0	0.0	0.70	12.4«	80.8

#### Conduit Sections for Storm

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \/ open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section	Conduit	Major	Minor	Side	Corner	4*Hyd	XSect
Number	Туре	Dimn.	Dimn.	Slope	Splay	Radius	Area
		(mm)	(mm)	(Deg)	(mm)	(m)	(m²)
-11	[]	14500	150	90.0		0.297	2.175
-12	[]	25000	150	90.0		0.298	3.750

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Newton House	Cheshunt Football Club	
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Micro Drainage	Network 2016.1	

## Manhole Schedules for Storm

MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Back (n	drop m)
28,430	0.550	Open Manhole	3000	S1.000	27.880	-11					
28.270	0.550	Open Manhole	3000	s1.001	27.720	450	s1.000	27.720	-11		
28.210	0.550	Open Manhole	3000	S1.002	27.660	-12	S1.001	27.660	450		
28.000	0.550	Open Manhole	3000	S1.003	27.450	150	S1.002	27.450	-12		
28.125	2.080	Open Manhole	1200	S1.004	26.045	150	S1.003	26.045	150		
27.000	1.000	Open Manhole	0		OUTFALL		S1.004	26.000	150		
	MH CL (m) 28.430 28.270 28.210 28.000 28.125 27.000	MH     MH       CL (m)     MH       Depth     MH       28.430     0.550       28.270     0.550       28.210     0.550       28.210     0.550       28.210     0.550       28.210     0.550       28.210     0.550       28.125     2.080       27.000     1.000	MH CL (m)MH Depth (m)MH Connection28.4300.550Open Manhole28.2700.550Open Manhole28.2100.550Open Manhole28.0000.550Open Manhole28.1252.080Open Manhole27.0001.000Open Manhole	MH CL (m)MH Depth (m)MH ConnectionMH Diam.,L*W (mm)28.4300.550Open Manhole300028.2700.550Open Manhole300028.2100.550Open Manhole300028.0000.550Open Manhole300028.1252.080Open Manhole120027.0001.000Open Manhole0	MH CL (m)MH Depth Depth (m)MH ConnectionMH Diam.,L*W (mm)PN28.4300.550Open Manhole3000\$1.00028.2700.550Open Manhole3000\$1.00128.2100.550Open Manhole3000\$1.00228.0000.550Open Manhole3000\$1.00328.1252.080Open Manhole1200\$1.00427.0001.000Open Manhole0\$1.004	MH CL (m)MH Depth (m)MH ConnectionMH Diam.,L*W (mm)Pipe Out Invert Level (m)28.4300.550Open Manhole3000\$1.00027.88028.2700.550Open Manhole3000\$1.00127.72028.2100.550Open Manhole3000\$1.00227.66028.0000.550Open Manhole3000\$1.00327.45028.1252.080Open Manhole1200\$1.00426.04527.0001.000Open Manhole0UUTFALL	MH CL (m)MH Depth (m)MH ConnectionMH Diam.,L*W (mm)Pipe Out FNPipe Out Invert Level (m)Diameter Diameter28.4300.550Open Manhole3000\$1.00027.880-1128.2700.550Open Manhole3000\$1.00127.72045028.2100.550Open Manhole3000\$1.00227.660-1228.0000.550Open Manhole3000\$1.00327.45015028.1252.080Open Manhole1200\$1.00426.04515027.0001.000Open Manhole0OUTFALL	MH CL (m)MH Depth (m)MH ConnectionMH Diam.,L*W (mm)Pipe Out Invert (m)Diameter (mm)PN28.4300.550Open Manhole3000\$1.00027.880-1128.2700.550Open Manhole3000\$1.00127.720450\$1.00028.2100.550Open Manhole3000\$1.00227.660-12\$1.00128.2000.550Open Manhole3000\$1.00327.450150\$1.00228.1252.080Open Manhole1200\$1.00426.045150\$1.00327.0001.000Open Manhole00UTFALLV\$1.004	MH CL (m)MH Depth (m)MH COnnectionMH Diam.,L*W (mm)Pipe Out PNPipe Out Invert Level (m)Pipes In Finvert Level (m)28.4300.550Open Manhole3000\$1.00027.880-1128.2700.550Open Manhole3000\$1.00127.720450\$1.00128.2100.550Open Manhole3000\$1.00227.660-12\$1.00127.72028.2100.550Open Manhole3000\$1.00227.660-12\$1.00127.66028.0000.550Open Manhole3000\$1.00327.450150\$1.00227.45028.1252.080Open Manhole1200\$1.00426.045150\$1.00326.04527.0001.000Open Manhole0OUTFALL\$1.00426.004	MH CL (m)MH Depth (m)MH Diam., 1*W (m)MH PNPipe Out Invert Level (m)Diameter PNPipes In Level (m)28.4300.550Open Manhole3000\$1.00027.880-1128.2700.550Open Manhole3000\$1.00127.720450\$1.00027.72028.2100.550Open Manhole3000\$1.00227.660-12\$1.00127.72045028.2100.550Open Manhole3000\$1.00227.660-12\$1.00127.66045028.0200.550Open Manhole3000\$1.00327.450150\$1.00227.450-1228.1252.080Open Manhole1200\$1.00426.045150\$1.00326.04515027.0001.000Open Manhole00UTFALL\$1.00426.000150	MH C1 (m)MH Depth (m)MH Diam., 1*w (mm)MH PNPipe Out Invert (mw)Pipes In Invert (mm)Pipes In PNPipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert (mm)Pipes In Invert Invert (mm)Pipes In Invert Invert (mm)Pipes In Invert Invert (mm)Pipes In Invert Invert (mm)Pipes In Invert Invert (mm)Pipes In Invert 

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File SW System 3 - Stadium Carp	Checked by JPH	Dialiaye
Micro Drainage	Network 2016.1	

## PIPELINE SCHEDULES for Storm

## <u>Upstream Manhole</u>

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
S1.000	[]	-11	S1	28.430	27.880	0.400	Open Manhole	3000
S1.001	0	450	S2	28.270	27.720	0.100	Open Manhole	3000
S1.002	[]	-12	S3	28.210	27.660	0.400	Open Manhole	3000
S1.003	0	150	S6	28.000	27.450	0.400	Open Manhole	3000
S1.004	0	150	S7	28.125	26.045	1.930	Open Manhole	1200

#### Downstream Manhole

PN	Length	Slope	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	(m)	(1:X)	Name	(m)	(m)	(m)	Connection	(mm)
S1.000	119.000	743.8	s2	28.270	27.720	0.400	Open Manhole	3000
S1.001	43.884	731.4	s3	28.210	27.660	0.100	Open Manhole	3000
S1.002	157.000	747.6	S6	28.000	27.450	0.400	Open Manhole	3000
S1.003	18.301	13.0	s7	28.125	26.045	1.930	Open Manhole	1200
S1.004	9.099	202.2	S	27.000	26.000	0.850	Open Manhole	0

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Micro Drainage	Network 2016.1	

#### Area Summary for Storm

Pipe Number	РІМР Туре	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.204	0.204	0.204
1.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.648	0.648	0.648
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.852	0.852	0.852

#### Free Flowing Outfall Details for Storm

Outfall	Outfall	c.	Level	I.	Level		Min	D,L	W
Pipe Numbe	r Name		(m)		(m)	I.	Level	(mm)	(mm)
						(m)			

S1.004 S 27.000 26.000 26.000 0 0

#### <u>Simulation Criteria for Storm</u>

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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 Offline Controls 0 Number of Time/Area Diagrams 0 Number of Online Controls 1 Number of Storage Structures 0 Number of Real Time Controls 0

#### Synthetic Rainfall Details

Rainfall Model			FEH
Return Period (years)			1
Site Location	GB 535350	201250 TL	35350 01250
C (1km)			-0.025
D1 (1km)			0.295
D2 (1km)			0.262
D3 (1km)			0.265
E (1km)			0.330
F (1km)			2.484
Summer Storms			Yes
Winter Storms			Yes
Cv (Summer)			0.750
Cv (Winter)			0.840
Storm Duration (mins)			30

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Barton	Cheshunt								
Cambridge CB23 7WJ	10-6561								
Date 1	Designed by MD								
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Micro Drainage	Network 2016.1								
Online Controls for Storm									
<u>Hydro-Brake Optimum® Manho</u>	<u>le: S6, DS/PN: S1.003, Volume (m³): 581.4</u>								
Unit Reference MD-SHE-0083-2500-0430-2500 Design Head (m) 0.430 Design Flow (1/s) 2.5 Flush-Flo <sup>TM</sup> Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 83 Invert Level (m) 27.450 Minimum Outlet Pipe Diameter (mm) 100 Suggested Manhole Diameter (mm) 1200 Control Points Head (m) Flow (1/s) Design Point (Calculated) 0.430 2.5 Flush-Flo <sup>TM</sup> 0.137 2.5 Kick-Flo® 0.310 2.2 Mean Flow over Head Range - 2.1									
The hydrological calculations have been Brake Optimum® as specified. Should an Optimum® be utilised then these storage	en based on the Head/Discharge relationship for the Hydro- unother type of control device other than a Hydro-Brake ge routing calculations will be invalidated								
Depth (m) Flow (l/s) Depth (m) Fl	low (l/s) Depth (m) Flow (l/s) Depth (m) Flow (l/s)								
0.1002.51.2000.2002.41.4000.3002.21.6000.4002.41.8000.5002.72.0000.6002.92.2000.8003.32.4001.0003.72.600	4.03.0006.17.0009.34.33.5006.67.5009.64.64.0007.08.0009.94.84.5007.48.50010.25.15.0007.89.00010.55.35.5008.29.50010.85.56.0008.65.76.5008.9								

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Newton Ho	use			Che	Cheshunt Football Club					
Barton				Che	shunt		The mail			
Cambridge	CB23 7	WJ		10-	6561					Micro
Date 1		Q		Des	igned k	DY MD				Drainage
File SW S	ystem 3	- Stadi	um Carp.	Che	cked by	7 JPH				
<u>1 year</u>	Return B	Period	Summary c	of Crit:	ical Re	esults	by Max	imum Le	evel (Rar	n <u>k 1) for</u>
M	Ar anhole Hea Foul Sewa of Input H	eal Redu Hot Hot Star dloss Co ge per h ydrograp	action Fact Start (min ct Level (m beff (Globa hectare (1/ phs 0 Num	<u>Simulat</u> or 1.000 s) ( m) ( l) 0.500 s) 0.000	tion Cri D Addi D D D Flow p D Dffline	teria tional MADD F per Per Contro	Flow - % actor * 1 Inle son per I ls 0 Numb	s of Tot .Om³/ha et Coeff Day (l/p	al Flow 0 Storage 2 iecient 0 er/day) 0 ime/Area	.000 .000 .800 .000
Numbe	r or Unlin	e contro	IS I NUMDE	er of Sto	brage St	ructur	es U Numr	ber of R	eal Time	LONTFOLS U
	Rain Sit	nfall Mo te Locat C (1 D1 (1 D2 (1 in for F	Sy del ion GB 535. km) km) Plood Risk M Analy. Ind	nthetic 350 2012 Warning sis Time DTS St DVD St ertia St	Rainfal. 50 TL 3 (mm) step 2. atus atus atus	<u>1 Detai</u> 5350 01 -0. 0. 0. 5 Secor	<u>1s</u> FEH D 250 295 Cv ( 262 Cv ( ad Increm	3 (1km) E (1km) F (1km) Summer) Winter) ent (Ext	0.265 0.330 2.484 0.750 0.840 150.0 cended) OFF ON ON	
	Du Return P Cl	Pr ration(s eriod(s) imate Ch	cofile(s) s) (mins) (years) aange (%)	15, 30 960, 1	, 60, 12 440, 210	20, 180 50, 288	, 240, 30 0, 4320,	Summer 50, 480, 5760, 7	and Winte 600, 720 200, 8640 1008 1, 30, 10 0, 0, 4	r , 0 0 0
PN	US/MH Name S	Storm	Return Cli Period Cha	.mate ange	First () Surchard	X) F ge	irst (Y) Flood	First ( Overflo	Z) Overfl ow Act.	Water ow Level (m)
S1.000 S1.001 S1.002 S1.003 S1.004	S1 15 S2 180 S3 15 S6 960 S7 480	Winter Winter Winter Winter Winter	1 1 1 1	+0% +0% +0% 10 +0%	0/180 Wi 30/60 Wi	nter nter				27.891 27.760 27.675 27.563 26.093
		S	Surcharged	Flooded			Pipe			
	PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overfl (1/s)	ow Flow (l/s)	Status	Level Exceeded	
	S1.000 S1.001 S1.002 S1.003 S1.004	S1 S2 S3 S6 S7	-0.139 -0.410 -0.135 -0.037 -0.102	0.000 0.000 0.000 0.000 0.000	0.02 0.02 0.03 0.05 0.23		28.2 2.0 70.6 2.5 2.5	OK OK OK		

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Newton Ho	ouse			C	heshunt	: Footba	ll Clu	C		
Barton				C	heshunt	5				<u>u</u>
Cambridge	e CB23	7WJ		1	0-6561					Micco
Date 1				D	esigned	d by MD				
File SW S	System 3	8 - Stadi	um Car	p  Ci	hecked	by JPH				Digilight
Micro Dra	ainage			N	etwork	2016.1				
<u>30 year</u>	<u>r Returr</u>	n Period	Summar	<u>y of Cr</u>	itical	Results	<u>by Ma</u>	ximum Lev	vel (Rá	ank 1) for
					<u>Stor</u>	<u>m</u>				
				Simu	lation (	Criteria				
		Areal Redu	ction F	actor 1.	000 Ad	ditional	Flow -	% of Total	Flow C	.000
		Hot	Start (	mins)	0	MADD Fa	actor *	10m³/ha St	corage 2	.000
	Manhole H	HOT STAI eadloss Co	eff (Gl	(mm) obal) O.	0 500 Flox	v per Per	ini son per	Dav (1/per	c/dav) (	0.000
	Foul Se	wage per h	lectare	(l/s) 0.	000	. F			,, , .	
	с. т		1		c. o c c l .	<u> </u>	0.17		13	5.
Number Numbe	of input er of Onl	нуагодгар ine Contro	ns U ls 1 Nu	Number o mber of	i Offlir Storage	e Contro. Structure	ls O Num es O Num	uber of Tir uber of Rea	ne/Area al Time	Diagrams U Controls O
					j-					
	D		-1 - 7	<u>Syntheti</u>	.c Rainf	all Detai	<u>ls</u>	D2 (11) 0	0.05	
	Rā	siniall Mo Site Locat	aei ion GB 5	535350 20	1250 TL	35350 01	250	D3 (1km) 0 E (1km) 0	.265	
	~	C (1	km)		1000 12	-0.	025	F (1km) 2	.484	
		D1 (1	km)			0.	295 Cv	(Summer) 0	.750	
		D2 (1	km)			0.	262 Cv	(Winter) 0	.840	
	Маз	rgin for F	lood Ris	sk Warnir	ıg (mm)				150.0	
			Ana	alysis Ti	mestep	2.5 Secon	d Increi	ment (Exte	nded)	
				DTS	Status				OFF	
				Inertia	Status				ON	
		Pr	ofile(s)	)				Summer a	nd Winte	er
	:	Duration(s	) (mins)	) 15,	30, 60,	120, 180	, 240, 3	360, 480,	600, 720	),
				960,	1440,	2160, 288	0, 4320,	5760, 72	00, 8640	) <b>,</b>
	Return	Period(s)	(years)	)				1	, 30, 10	0
	(	Climate Ch	ange (%)	)					0, 0, 4	łO
										Water
	US/MH		Return	Climate	First	t (X) B	first (Y	) First (Z	) Overf	low Level
PN	Name	Storm	Period	Change	Surcl	harge	Flood	Overflow	w Act	. (m)
S1.000	S1	15 Winter	30	+0%						27.906
S1.001	S2	60 Winter	30	+0%						27.813
S1.002	S3	15 Winter	30	+0%	100/180	Winter				27.693
s1.003	S0 S S7 21	.60 Winter	30	+0% +0%	30700	WILLCEL				26.093
		S117	charged	Flooded			Pipe			
		US/MH	Depth	Volume	Flow /	Overflow	Flow		Level	
	PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)	Status	Exceed	ed
	S1 000	S1	-0.124	0 000	0 0.8		90 G	OK		
	S1.001	S2	-0.357	0.000	0.10		10.1	OK		
	S1.002	S3	-0.117	0.000	0.11		223.7	OK		
	S1.003	S6	0.059	0.000	0.05		2.5 \$	SURCHARGED		
1	51.004	57	-0.102	0.000	0.23		2.J	0K		

Peter Dan	ın Ltd								Pa	age 3
Newton Hc	ouse			C	heshun	t Footba	all Clu	b		
Barton				C	heshun	t				L.
Cambridge	e CB23	7WJ		1	0-6561					Micco
Date 1				D	esigne	d by MD				
File SW S	ystem 3	3 - Stad	ium Car	p  Cl	hecked	by JPH				Jialilaye
Micro Dra	inage			N	etwork	2016.1			I	
<u>100 yea</u> M Number Numbe	anhole H Foul Se of Input r of Onl Ra	n Period Areal Red Hot Sta eadloss Co wage per 1 Hydrograp ine Contro Site Locat C (1 D1 (1 D2 (1	Summa: uction F Start ( rt Level beff (Gl hectare bhs 0 bls 1 Nu odel .ion GB .km) .km) .km)	ry of Ci Simu Sactor 1. mins) (mm) .obal) 0. (1/s) 0. Number of Syntheti 535350 20	ritica Stor Stor 000 A 0 500 Flo 000 f Offli Storage ic Rainf	L Result m Criteria dditiona: MADD 1 w per Pe: ne Contro Structur Gall Deta , 35350 0 -0 0 0	L Flow - Factor * Inl rson per ols 0 Nur res 0 Nur <u>ils</u> FEH 1250 .025 .295 Cv .262 Cv	<pre>% of Total 10m³/ha St .et Coeffie Day (1/per nber of Tim nber of Rea D3 (1km) 0 E (1km) 0 F (1km) 2 (Summer) 0 (Winter) 0.</pre>	Flow 0. orage 2. cient 0. /day) 0. e/Area D: 1 Time Co 265 .330 .484 .750 .840	nk 1) for 000 000 800 000 iagrams 0 ontrols 0
	Return	P Duration(: Period(s) Climate C	An rofile(s s) (mins ) (years hange (%	alysis Ti DTS DVD Inertia ) 15, 960, )	30, 60, 1440,	2.5 Seco 120, 18 2160, 28	nd Incre 0, 240, 3 80, 4320	ment (Exter Summer an 360, 480, 6 , 5760, 720 1,	dded) OFF ON ON d Winter 00, 720, 0, 8640, 10080 30, 100 0, 0, 40	
זארו	US/MH	Stown	Return	Climate	First	: (X)	First (Y)	) First (Z)	Overflo	Water w Level
PN	Name	STORM	reriod	change	Surch	arge	F.TOOQ	Overflow	Act.	(m)
S1.000 S1.001 S1.002 S1.003 S1.004	S1 S2 9 S3 9 S6 9 S7 9	15 Winter 60 Winter 60 Winter 60 Winter 60 Winter	100 100 100 100 100	+40% +40% +40% +40% +40%	100/180 30/60	Winter Winter				27.922 27.921 27.921 27.921 26.094
		Su	rcharged	Flooded			Pipe			
		US/MH	Depth	Volume	Flow /	Overflo	w Flow		Level	
	PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)	Status	Exceeded	
	S1.000	S1	-0.108	0.000	0.16		189.5	OK		
	S1.001	S2	-0.249	0.000	-0.13		-13.3	OK		
	S1.002	S3	0.111	0.000	0.02		37.7	SURCHARGED		
	S1.003	S6 S7	0.321	0.000	0.06		2.6	FLOOD RISK		
	51.004	16	0.101	0.000	0.24		2.0	UK		



# 7.3 – Micro Drainage Calculations - Surface Water System 4 – Southern Access Road

Peter Dann Ltd		Page 1							
Newton House	Cheshunt Football Club								
Barton	Cheshunt	4							
Cambridge CB23 7WJ	10-6561	Misso							
Date 25/05/2017 12:17	Designed by MD								
File SW System 4 - Southern A.	. Checked by JPH	Urainage							
Micro Drainage	Network 2016.1.1								
STORM SEWER DESI Desi Pipe Sizes	GN by the Modified Rational Metho gn Criteria for Storm STANDARD Manhole Sizes STANDARD	<u>id</u>							
	FEH Rainfall Model								
Return F	eriod (years)	1							
FEH Rai	nfall Version	1999							
	C (1km)	-0.025							
	D1 (1km)	0.295							
	D2 (1km)	0.262							
	D3 (1km)	0.265							
E (1 km) 0.330 E (1 km) 2.484									
Maximum Rainfall (mm/hr) 50									
Maximum Time of Concent	cation (mins)	30							
Foul Se	wage (l/s/ha)	0.000							
Volumetic	PIMP (%)	100							
Add Flow / Clima	ce Change (%)	0							
Minimum Backdr	op Height (m)	0.200							
Maximum Backdr	op Height (m)	1.500							
Min Design Depth for Opt Min Vel for Auto Desi	an only (m/s)	1.00							
Min Slope for Optim	isation (1:X)	500							
Des <u>Networ</u>	igned with Level Soffits C Design Table for Storm								
PN Length Fall Slope I.Area (m) (m) (1:X) (ha)	T.E. Base k HYD DIA Sect (mins) Flow (1/s) (mm) SECT (mm)	tion Type Auto Design							
S1.000 110.000 0.275 400.0 0.130 S1 001 23 494 0 117 200 8 0 000	4.00 0.0 0.600 [] -11 Pipe	e/Conduit 💾							
s1.002 9.099 0.045 202.2 0.000	0.00 0.0 0.600 o 225 Pipe	e/Conduit 🔒							
Ne	twork Results Table	-							
PN Rain T.C. US/IL Σ (mm/hr) (mins) (m)	I.Area Σ Base Foul Add Flow Vel (ha) Flow (l/s) (l/s) (l/s) (m/s)	Cap Flow (1/s) (1/s)							
S1 000 50 00 6 88 28 100		2 6 2 6 8 1 7 6							
s1.001 50.00 7.41 27.795	0.130 0.0 0.0 0.0 0.0 0.02	2 36.5 17.6							
s1.002 50.00 7.57 26.045	0.130 0.0 0.0 0.0 0.92	2 36.4 17.6							

Peter Dann Ltd	Page 2	
Newton House	Cheshunt Football Club	
Barton	Cheshunt	L.
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:17	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	

#### Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connectic	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S1	28.640	0.450	Open Manho	le 3000	S1.000	28.190	-11				
S3	28.640	0.845	Open Manho	le 3000	S1.001	27.795	225	S1.000	27.915	-11	
S4	28.125	2.080	Open Manho	le 1200	S1.002	26.045	225	S1.001	27.678	225	1633
S	27.000	1.000	Open Manho	le 0		OUTFALL		S1.002	26.000	225	
	I		1	ļ	1			1			ļ

Peter Dann Ltd		Page 3
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:17	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	•

## PIPELINE SCHEDULES for Storm

## Upstream Manhole

PN	Hyd	Diam	MH	C.Level	I.Level	D.Depth	MH	MH DIAM., L*W
	Sect	(mm)	Name	(m)	(m)	(m)	Connection	(mm)
S1.000	[]	-11	S1	28.640	28.190	0.345	Open Manhole	3000
S1.001	0	225	S3	28.640	27.795	0.620	Open Manhole	3000
S1.002	0	225	S4	28.125	26.045	1.855	Open Manhole	1200

## Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000 S1.001	110.000	400.0	S3 S4	28.640 28.125	27.915 27.678	0.620	Open Manhole Open Manhole	3000 1200
S1.002	9.099	202.2	S	27.000	26.000	0.775	Open Manhole	0

Peter Dann Ltd		Page 4
Newton House	Cheshunt Football Club	
Barton	Cheshunt	1 La
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:17	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	Diamage
Micro Drainage	Network 2016.1.1	
Area S	ummary for Storm	
Pipe PIMP PIM	IP Gross Imp. Pipe Total	
Number Type Name (*)	) Area (ha) Area (ha) (ha)	
1.000 10	0.130 0.130 0.130	
1.001 10	0 0.000 0.000 0.000	
1.002 10	0 0.000 0.000 0.000	
	10tal 10tal 10tal 0.130 0.130 0.130	
	0.130 0.130 0.130	
Simulation	n Criteria for Storm	
Volumetric Runoff Coeff 0.	.750 Additional Flow - % of Total Flo	w 0.000
Areal Reduction Factor 1.	.000 MADD Factor * 10m <sup>3</sup> /ha Storage	e 2.000
Hot Start (mins)	U Inlet Coefficien	t 0.800
Manhole Headloss Coeff (Global) 0.	.500 Run Time (mins	) 60
Foul Sewage per hectare (1/s) 0.	.000 Output Interval (mins	) 1
Number of Input Hydrographs 0 Number of Number of Online Controls 1 Number of	of Offline Controls O Number of Time/Ar Storage Structures O Number of Real Ti	ea Diagrams O me Controls O
Syntheti	c Rainfall Details	
Rainfall Model	l FEH	
Return Period (years)	) 1	
FEH Rainfall Versior	n 1999	
Site Location	n GB 535350 201250 TL 35350 01250	
C (1KM)	0.295	
D2 (1km)	0.262	
D3 (1km)	0.265	
E (1km)	0.330	
F (1km)	) 2.484	
Summer Storms Winter Storms	s Yes	
Cv (Summer)	0.750	
Cv (Winter)	0.840	
Storm Duration (mins)	30	
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Peter Dann Ltd	Page 5							
Newton House	Cheshunt Football Club							
Barton	Cheshunt							
Cambridge CB23 7WJ	10-6561							
Date 25/05/2017 12:17	Designed by MD							
File SW System 4 - Southern A	Checked by JPH Drainage							
Micro Drainage	Network 2016 1 1							
Online	Controls for Storm							
Hydro-Brake® Optimum Manhole	e: S3, DS/PN: S1.001, Volume (m³): 115.0							
Unit Desig	Reference MD-SHE-0045-1000-1200-1000 n Head (m) 1.200							
Design 1	Flow (1/s) 1.0							
	Plush-Flom Calculated Objective Minimise upstream storage							
A	pplication Surface							
Sump	Available Yes							
Diar	meter (mm) 45							
Invert Minimum Outlet Pipe Dia	Level (m) 27.795 meter (mm) 75							
Suggested Manhole Diar	meter (mm) 1200							
Control Points Head (m) Flow	(1/s) Control Points Head (m) Flow (1/s)							
Design Point (Calculated) 1.200 Flush-Flo™ 0.196	1.0     Kick-Flo®     0.398     0.6       0.7     Mean Flow over Head Range     -     0.8							
The hydrological calculations have bee Hydro-Brake® Optimum as specified. Sh Hydro-Brake Optimum® be utilised then	en based on the Head/Discharge relationship for the nould another type of control device other than a these storage routing calculations will be invalidated							
Depth (m) Flow (1/s) Depth (m) Flow	v (l/s) Depth (m) Flow (l/s) Depth (m) Flow (l/s)							
0.100 0.7 1.200	1.0 3.000 1.5 7.000 2.2							
0.200 0.7 1.400	1.1 3.500 1.6 7.500 2.3							
0.300 0.7 1.600	1.1     4.000     1.7     8.000     2.4							
	1.2 4.500 1.8 8.500 2.4   1.3 5.000 1.8 9.000 2.5							
0.600 0.7 2.200	1.3							
0.800 0.8 2.400	1.4 6.000 2.1							
1.000 0.9 2.600	1.4 6.500 2.2							
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Peter Dann Ltd		Page 1
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:19	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	nguga
Micro Drainage	Network 2016.1.1	1
<u>1 year Return Period Summary of C</u>	ritical Results by Maximum Level (	Rank 1) for
	Storm	
Sir	mulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	v 0.000
Hot Start (mins)	0 MADD Factor * 10m <sup>3</sup> /ha Storage	≥ 2.000 - 0.800
Manhole Headloss Coeff (Global)	0.500 Flow per Person per Day (1/per/day)	0.000
Foul Sewage per hectare (l/s) (	0.000	
Number of Input Hudrographs () Number	of Offline Controls ( Number of Time/Ar	on Dingrama (
Number of Online Controls 1 Number of	f Storage Structures 0 Number of Real Time	me Controls 0
	-	
Synthe Rainfall Mode	tic Rainfall Details	
FEH Rainfall Versio	n 1999	
Site Locatio	n GB 535350 201250 TL 35350 01250	
C (1km D1 (1km	-0.025 0.295	
D2 (1km	a) 0.262	
D3 (1km	0.265	
E (1km E (1km	0.330	
Cv (Summer	·) 0.750	
Cv (Winter	0.840	
Margin for Flood Rick Warn	ing (mm) 150.0	
Analysis	Timestep 2.5 Second Increment (Extended)	
DT	'S Status OFF	
DV	D Status ON	
INCLU	a Status Off	
Profile(s) Duration(s) (mins) 15.	Summer and Win 30, 60, 120, 180, 240, 360, 480, 600, 7	ter 20.
960	, 1440, 2160, 2880, 4320, 5760, 7200, 86	40,
	10	080
Climate Change (%)	1, 30, 1	40
		<b>1</b> 7 - 4
US/MH Return Climat	te First (X) First (Y) First (Z) Over	flow Level
PN Name Storm Period Chang	e Surcharge Flood Overflow Ac	t. (m)
S1 000 S1 15 Winter 1	<u>၂</u> န	28 200
S1.001 S3 120 Winter 1 +0	0% 30/15 Summer	27.983
S1.002 S4 240 Winter 1 +0	0%	26.069
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Peter Dann Ltd		Page 2
Newton House	Cheshunt Football Club	
Barton	Cheshunt	L'
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:19	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	Diamage
Micro Drainage	Network 2016.1.1	•

 $\frac{1 \ {\rm year} \ {\rm Return} \ {\rm Period} \ {\rm Summary} \ {\rm of} \ {\rm Critical} \ {\rm Results} \ {\rm by} \ {\rm Maximum} \ {\rm Level}$  (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.095	0.000	0.03		18.5	OK	
S1.001	S3	-0.037	0.000	0.02		0.7	OK	
S1.002	S4	-0.201	0.000	0.02		0.7	OK	

Peter Dann Ltd		Page 3
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:19	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	Digiligh
Micro Drainage	Network 2016.1.1	1
30 year Return Period Summary of	Critical Results by Maximum Leve	1 (Rank 1)
	for Storm	
Sir	mulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	v 0.000
Hot Start (mins)	0 MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Manhole Headloss Coeff (Global) (	0.500 Flow per Person per Day (1/per/day)	0.000
Foul Sewage per hectare (1/s) (	0.000	
Number of Transfer Harles and by O. Number		Diaman
Number of Input Hydrographs 0 Number Number of Online Controls 1 Number of	of Offline Controls O Number of Time/Are f Storage Structures O Number of Real Tim	e Controls 0
Synthe	tic Rainfall Details	
Rainfall Mode FEH Rainfall Versio	L FEH	
Site Locatio	n GB 535350 201250 TL 35350 01250	
C (1km	-0.025	
D1 (1km	0.295	
D2 (1km D3 (1km	0.265	
E (1km	0.330	
F (1km	2.484	
Cv (Summer Cv (Winter	) 0.750	
	,	
Margin for Flood Risk Warn	ing (mm) 150.0	
Analysis	Timestep 2.5 Second Increment (Extended)	
DV	D Status ON	
Inerti	a Status OFF	
Profile(s)	Summer and Wint	ter
Duration(s) (mins) 15,	30, 60, 120, 180, 240, 360, 480, 600, 72	20,
960	, 1440, 2160, 2880, 4320, 5760, 7200, 864	10, 080
Return Period(s) (years)	1, 30, 3	100
Climate Change (%)	0, 0,	40
		Water
US/MH Return Clima	te First (X) First (Y) First (Z) Over	flow Level
PN Name Storm Period Chang	ge Surcharge Flood Overflow Ac	:t. (m)
S1.000 S1 15 Winter 30 +	0%	28.211
S1.001 S3 360 Winter 30 +	0% 30/15 Summer	28.078
S1.002 S4 1440 Winter 30 +	0%	26.069
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Peter Dann Ltd		Page 4
Newton House	Cheshunt Football Club	
Barton	Cheshunt	<u> </u>
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:19	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	•

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.084	0.000	0.10		59.3	OK	
S1.001	S3	0.058	0.000	0.02		0.7	SURCHARGED	
S1.002	S4	-0.201	0.000	0.02		0.7	OK	

Peter Dann Ltd		Page 5
Newton House	Cheshunt Football Club	
Barton	Cheshunt	4
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:19	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	nguga
Micro Drainage	Network 2016.1.1	1
100 year Return Period Summary o	f Critical Results by Maximum Leve	el (Rank 1)
	for Storm	
Sir	mulation Criteria	
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	N 0.000
Hot Start (mins)	0 MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0 Inlet Coefficient	: 0.800
Foul Sewage per hectare (1/s)	0.000 Flow per Ferson per Day (1/per/day)	0.000
Number of Input Hydrographs 0 Number	of Offline Controls 0 Number of Time/Are	ea Diagrams O
Number of Online Controls i Number of	L Storage Structures 0 Number of Real iff	le controis u
Synthe	tic Rainfall Details	
Rainfall Mode	1 FEH	
FEH Rainfall Versio	n GB 535350 201250 TI 35350 01250	
C (1km	-0.025	
D1 (1km	0.295	
D2 (1km	0.262	
E (1km	0.265	
F (1km	2.484	
Cv (Summer	) 0.750	
Cv (Winter	) 0.840	
Margin for Flood Risk Warn	ing (mm) 150.0	
Analysis	Timestep 2.5 Second Increment (Extended)	
DT	S Status OFF	
Inerti	a Status OFF	
Profile(s)	Summer and Wini	tor
Duration(s) (mins) 15,	30, 60, 120, 180, 240, 360, 480, 600, 72	20,
960	, 1440, 2160, 2880, 4320, 5760, 7200, 864	40,
Deturn Deried(a) (waara)	100	080 100
Climate Change (%)	0, 0,	40
US/MH Return Clima	te First (X) First (Y) First (7) Over	water rflow Level
PN Name Storm Period Chang	ge Surcharge Flood Overflow Ac	et. (m)
	0%	20 240
S1.000 S1 600 Winter 100 +4 S1.001 S3 600 Winter 100 +4	0% 30/15 Summer	28.248
S1.002 S4 4320 Summer 100 +4	0%	26.069
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Newton House	Cheshunt Football Club	
Barton	Cheshunt	<u> </u>
Cambridge CB23 7WJ	10-6561	Micco
Date 25/05/2017 12:19	Designed by MD	
File SW System 4 - Southern A	Checked by JPH	Diamaye
Micro Drainage	Network 2016.1.1	•

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m <sup>3</sup> )	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.047	0.000	0.01		8.9	OK	
S1.001	S3	0.228	0.000	0.02		0.7	SURCHARGED	
S1.002	S4	-0.201	0.000	0.02		0.7	OK	



#### 8 APPENDIX 3 – TOPOGRAPHIC SURVEY

E:\10\6\5\6\1\10-6551 - Cheshunt Football Club, Cheshunt - Desk Top Study\Correspondence\Drainage Strategy Report\REPORT-2017-02-Drainage Strategy-JB.docx





## 9 APPENDIX 4 – THAMES WATER UTILITY PLAN

E:\10\6\5\6\1\10-6551 - Cheshunt Football Club, Cheshunt - Desk Top Study\Correspondence\Drainage Strategy Report\REPORT-2017-02-Drainage Strategy-JB.docx



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Manhole Reference	Manhole Cover Level	Manhole Invert Level
9553	22.23	19.58
951F 9552	22.0 22.35	21.20 19.93
961D	n/a	n/a
951D	n/a	n/a
951C	n/a n/o	n/a
961C 961E	n/a	n/a
961F	n/a	n/a
86CF	n/a	n/a
8601	22.68	20.52
9603	22.54	21.15
9652	22.54	21.41
9651	22.74	20.74
9601	22.52	20.54
961B	n/a	n/a
961A	n/a	n/a
9701 971∆	22.68 n/a	20.25 n/a
971B	n/a	n/a
971D	n/a	n/a
971C	n/a n/o	n/a n/a
9702	22.82	20.46
9750	22.72	21.64
9703	n/a	n/a 24.75
9652 8850	22.83	21.75 21.96
881B	n/a	n/a
9850	22.82	21.72
9851	22.85	21.79
86DI	n/a	n/a
86DJ	n/a	n/a
86EA	n/a	n/a
76EE 86EB	n/a n/a	n/a n/a
76CG	n/a	n/a
86EC	n/a	n/a
76ED	n/a	n/a
8602	n/a 22.93	n/a 21.28
7650	23.07	21.83
86AI	n/a	n/a
76BB 86AG	n/a n/a	n/a n/a
86AH	n/a	n/a
76AJ	n/a	n/a
871C	n/a n/o	n/a n/a
871A	n/a	n/a
771B	n/a	n/a
771A	n/a	n/a
7750	17a 23.17	1va 22.25
7701	23.09	21.57
8801	22.84	21.11
/801 7850	23.04	21.49 22.10
681A	n/a	n/a
781A	n/a	n/a
7952	25.42 23.21	23.99 21 70
7851	23.35	22.37
7951	25.45	24.06
8901	25.57	23.17
8903	20.09 25.52	23.29 23.62
8904	25.57	23.68
881A	n/a	n/a
8906 8905	n/a n/a	23.65 23.54
9801	22.96	20.61
9950	23.74	22.5
9953	24.04	22.61
981B	∠+.∠ n/a	23.23 n/a
981A	n/a	n/a
6501	24.35	21.96
7501 951F	23.79 n/a	21.0 n/a
86CE	n/a	n/a
76EC	n/a	n/a
76EB	n/a	n/a
	n/a n/a	n/a n/a
76DI	n/a	n/a
76DG	n/a	n/a
86CG	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level			
86DG	n/a	n/a			
86DH	n/a	n/a			
76CF	n/a	n/a			
76CH	n/a	n/a			
5953	25.9	24.25			
6754	n/a	n/a			
6755	n/a	n/a			
6753	n/a	n/a			
6751	24.72	23.86			
6703	24.74	23.23			
6702	26.05	24.44			
6850	25.79	25.16			
6851	25.6	25.15			
5802	26.24	24.65			
681B	n/a	n/a			
6803	24.83	23.55			
6802	24.46	23.02			
6801	24.37	22.86			
6854	24.34	23.26			
6855	24.86	23.85			
6852	24.85	24.03			
6853	24.5	23.57			
681D	n/a	n/a			
5801	26.58	24.78			
681C	n/a	n/a			
5951	25.26	24.48			
5950	25.41	24.69			
5901	26.7	24.91			
5954	26.07	24.83			
5952	25.64	24.57			
66BF	n/a	n/a			
66BG	n/a	n/a			
66BE	n/a	n/a			
76FE	n/a	n/a			
76FD	n/a	n/a			
76FC	n/a	n/a			
76DH	n/a	n/a			
76FG	n/a	n/a			
76FF	n/a	n/a			
6602	n/a	n/a			
7601	23.61	21.9			
6601	25.54	23.65			
7602	23.84	21.84			
6650	25.5	23.85			
6651	26.23	24.64			
7651	23.95	22.75			
5602	27.75	26.13			
661C	n/a	n/a			
5601	28.76	26.6			
661B	n/a	n/a			
661A	n/a	n/a			
/6AI	n/a	n/a			
6/01	26.59	24.18			
6/5U	26.43	24.99			
0/00	n/a	n/a			
6950	25.75	24.96			
7950	25./5	25.01			
STR	n/a	n/a			
1					
The position of the approximation on this plan is given without abligation and warranty and the approximation are the supervised. One is the second					
shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position					
of mains and services must be verified and established on site before any works are undertaken.					

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The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

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Manhole Reference	Manhole Cover Level	Manhole Invert Level
8409	23.37	21.53
9460	22.52	21.55
8405	23.02	21.42
7403	23.51	21.7
8404	23.02	21.47
8403	23.37	21.53
7401	23.5	21.39
8402	23.01	20.67
6405	24.27	22.34
8401 7402	23.38 23.7	21 21 72
9401	22.32	19.17
9458	22.63	20.2
9402	22.13	19.05
9451	22.13	20.88
931A	n/a	n/a
93BF	n/a	n/a
941A 93Al	n/a n/a	n/a n/a
941C	n/a	n/a
941B	n/a	n/a
9453	22.06	20.79
9403	22.1	19.4
731D	n/a	n/a
731E	n/a	n/a
/351 7253	23.37	22.23 22 57
7350	23.25	22.37
7352	23.28	22.47
7308	23.22	21.61
721A 7301	n/a 23.2	n/a 21 55
7302	n/a	n/a
7303	23.07	21.32
7304	n/a	n/a n/a
7353	22.86	21.91
7256	22.92	21.51
7305	23.05	21.1
7306	23	20.98 n/a
7203	22.69	20.64
7307	22.8	20.95
7254	22.57	21.44
7204	22.50 22.59	20.38 20.46
7259	22.66	21.73
7355	22.53	21.19
7255	22.7 22.51	n/a 20.5
92CA	n/a	20.5 n/a
9201	21.84	18.59
9202	21.44	19.24
921A 9302	1va 21.96	18.79
9352	22	20.74
93CJ	n/a	n/a
93CI 93CH	n/a n/a	n/a n/a
93CG	n/a	n/a
9351	22.12	21.18
9301	22.13	20.27
92DE 8254	17/a 22.03	1//a 21.17
92BD	n/a	n/a
8202	22.15	20.15
8203	22.11	19.99 20.32
8251	22.22	20.99
8204	22.29	19.75
8250	22.39	21.29
0202 8253	22.33	1//a 20.89
8205	22.29	19.53
8301	22.5	21.28
8350	22.48	21.95 21 77
9350	22.04	21.25
8354	22.3	21.58
8302	22.51	21.06
8303 8351	22.43	20.91 21 6
8407	22.8	21.7
9459	22.71	21.39
8406	23.09	21.87
9457	22.65	20.34

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Manhole Reference	Manhole Cover Level	Manhole Invert Level
9456	22.89	20.44
8410	23.23	21.9
9461	22.64	21.41
811C	22.00 n/a	n/a
8104	22.76	19.48
8152	22.79	21.1
8153	22.81	20.98
91AD	21.04 n/a	n/a
8105	22.42	19.06
91AE	n/a	n/a
91AF 91CA	n/a n/a	n/a n/a
9102	n/a	n/a
91AG	n/a	n/a
91BJ	n/a	n/a n/a
8159	22.42	20.95
91BI	n/a	n/a
92CC	n/a	n/a
92BI 92BH	n/a n/a	n/a n/a
92AD	n/a	n/a
92BG	n/a	n/a
92BF	n/a	n/a
921B	n/a	n/a
92CB	n/a	n/a
6101	24.56	23.46
6215 6213	23.99 23.82	23.24 23.11
6214	23.02	23.22
6150	23.71	22.18
6151	23.8	22.21
7252	23.43	22.46
7150	23.61	22.44
711A	n/a	n/a
7101	23.51	20.81
7102	n/a	n/a
711B	n/a	n/a
7257	22.03	21.55
7207	22.76	20.94
711D	n/a	n/a
7208	22.9	21.11
8206	22.79	20.97 21 36
811D	n/a	n/a
811A	n/a	n/a
811B	n/a	n/a
8156	22.58	21.63
8106	22.56	20.62
601A	n/a	n/a
701A	22.58 n/a	20.82 n/a
801G	22.9	20.97
601B	n/a	n/a
801E 7054	n/a 23 52	n/a 22
701G	n/a	n/a
7053	23.44	21.93
/01H 6050	n/a 23.62	n/a 22.85
701F	n/a	n/a
7052	23.54	21.85
7011	n/a	n/a n/a
701E	n/a	n/a
701B	n/a	n/a
7050	23.83	22.46
6001	23.30 24.07	21.55 21.58
7001	23.68	21.43
701C	n/a	n/a
7002 8150	23.43 23.09	21.05 21.47
711C	n/a	n/a
6102	24.06	21.82
801F 801B	22.79 22 77	20.72
9001	21.33	17.95
911B	21.54	19.66
911F	n/a	n/a
911C	1va 21.51	19.11
911E	21.54	17.76
8103	22.46	20.01
6350	22.09 24.39	23.09

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Manhole Reference	Manhole Cover Level	Manhole Invert Level	
6201	24.41	22.94	
6251	23.99	22.99	
6202	24.31	22.84	
6406	n/a	n/a	
6203	24.13	22.66	
6351	23.81	22.61	
6204	24.13	22.76	
6403	24.22	22.9	
6205	23.95	22.55	
6206	23.94	22.5	
6354	24.22	22.78	
6402	24.32	23.01	
6211	23.94	22.88	
6212	23.92	23.03	
6401	24.17	22.21	
6207	24.06	22.25	
6404	24.1	22.75	
6208	23.84	22.24	
6209	23.82	22.1	
6352	23.53	22.51	
6252	23.75	22.26	
7209	23.68	21.99	
731A	n/a	n/a	
731C	n/a	n/a	
721B	n/a	n/a	
7201	23.5	21.84	
621A	n/a	n/a	
631A	n/a	n/a	
631B	n/a	n/a	
631C	n/a	n/a	
The position of the apparatus shown on this plan	a given without obligation and warranty and the ass	oursey econot be guaranteed. Service pince are not	
shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position			
of mains and services must be verified and establish	ed on site before any works are undertaken.	,	

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## **Sewer Fittings**

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

- Air Valve Dam Chase
- Fitting Σ Meter

0 Vent Column

### **Operational Controls**

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve Drop Pipe Ancillary

Outfall

Inlet

Undefined End

Weir

### End Items

X

4

Ξ

 $\sim$ 

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

## Other Symbols

Symbols used on maps which do not fall under other general categories

- **A** / **A** Public/Private Pumping Station
- \* Change of characteristic indicator (C.O.C.I.)
- Ø Invert Level
- <1Summit

#### Areas

Lines denoting areas of underground surveys, etc.



### Other Sewer Types (Not Operated or Maintained by Thames Water)



#### Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

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the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

6) The text appearing alongside a sewer line indicates the internal diameter of



## **10 APPENDIX 5 – ENVIRONMENT AGENCY CORRESPONDENCE**

E:\10\6\5\6\1\10-6551 - Cheshunt Football Club, Cheshunt - Desk Top Study\Correspondence\Drainage Strategy Report\REPORT-2017-02-Drainage Strategy-JB.docx

## Lucy Newell

From: Sent: To: Cc: Subject: John Bowstead <j.bowstead@peterdann.com> 13 September 2016 02:18 PM Ian Sargent Mark Dockerill; Jonathan Hubert FW: surface water

lan,

Please see below for your information. Note we will still need to make an application to the EA for the proposed works on the river.

Kind regards,

John

John Bowstead Associate Director j.bowstead@peterdann.com

01223 264688 | 07738 958 633

newton house | cambridge road | barton | cambridge | CB23 7WJ



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Please consider the environment before printing this email.

From: Hughes, Katherine [mailto:Katherine.Hughes@environment-agency.gov.uk] Sent: 13 September 2016 12:49 To: John Bowstead Subject: surface water

Good afternoon John,

Regarding our earlier conversation.

A permit or exemption is not required for the discharge of clean surface run off water, for example from a roof, path or clean hardstanding area.

If surface water was contaminated the customer may need to apply for an environmental permit.

https://www.gov.uk/guidance/check-if-you-need-an-environmental-permit

Kind Regards

**Katherine Hughes** 

National Customer Contact Centre Part of National Operations Tel: 03708 506 506 Web Site: www.gov.uk/environment-agency Tel: 03708 506 506 Web Site: www.gov.uk/environment-agency

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http://www.smartsurvey.co.uk/s/NCCCcustomer/

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## 11 APPENDIX 6 – RESPONSE TO HERTFORDSHIRE COUNTY COUNCIL LETTER DATED 30 DEC 2016

Environment Director & Chief Executive: John Wood



Peter Quaile Borough of Broxbourne Borough Offices Bishops College Churchgate Cheshunt Herts EN8 9XB Post Point CHN 215 Hertfordshire County Council County Hall, Pegs Lane HERTFORD SG13 8DN

Contact Sana Ahmed Tel 01992 556279 Email <u>FRMConsultations@hertfordshire.gov.uk</u>

Date 30 December 2016

# RE: 07/16/1369/F - Cheshunt Football Club, Theobald Lane, EN8 8RU

Dear Peter,

Thank you for consulting us on the above application for Area 1 - New stadium with up to 5,192 seats, 66 no. 1 bedroom apartments, 70 no. 2 bedroom apartments, 22 no. 3 bedroom houses and 28 no. 4 bedroom houses, highway access works, internal roads and supporting infrastructure. Area 2 - Northern block - New facilities for Cheshunt Football Club in use classes D1, D2 and sui generis - matters relating to internal layout and appearance reserved. Area 3 - Western block - New sports, community, leisure and commercial uses in use classes A1, A3, A4, A5, B1, D1 and D2 - matters relating to internal layout reserved.

In the absence of an acceptable FRA we object to the grant of planning permission and recommend refusal on this basis for the following reasons:

The FRA carried out by Hydrologic Services reference K0753/1 dated September 2016 and the Drainage Strategy carried out by Peter Dann Consulting reference 106561 submitted with this application does not comply with the requirements set out in the Planning Practice Guide (as revised 6 April 2015) to the National Planning Policy Framework. The submitted FRA does not therefore provide a suitable basis for assessment to be made of the flood risks arising from the proposed development.

In order for the Lead Local Flood Authority to advise the relevant local planning authority that the site will not increase flood risk to the site and elsewhere and can provide appropriate sustainable drainage techniques, the following information is required as part of the flood risk assessment;

- 1. Drainage plan demonstrating a SuDS management treatment train and above ground features for residential development.
- 2. Update climate change allowance for surface water calculations for the residential development

3. Details of any Informal flooding for the full application.

## Overcoming our objection

To address the above points, please see the below comments;

The drainage strategy for the whole site is based upon attenuation and discharge into Theobalds Brook at Greenfield rates. We note two connections are proposed and the Environment Agency has been consulted.

1. As this is a Greenfield site, for the residential development we would expect all features to be above ground. An attenuation tank has been provided to provide some underground storage, however this should be technically justified within the FRA/surface water strategy.

Above ground measures such as permeable paving, swales etc. could be used on impermeable sites and utilised within green space and areas of landscaping. Prioritising above ground methods and providing source control measures can ensure that surface water run-off can be treated in a sustainable manner and reduce the requirement for maintenance of underground features.

- 2. The national climate change allowances have been updated for all applications validated on/or after 19 February 2016 and we now require all SuDS component to cater for all rainfall events upto and including the 1 in 100 plus 40% for climate change event. The drainage strategy for the residential development and calculations should be updated accordingly.
- 3. We note that the micro drainage calculations currently show flooded volumes for 1:100 plus 20% climate change in the residential area and it is proposed it to retain the 1:100 plus 40% event within the kerb lines. If there will be informal flooding within the site, these areas need to be identified on a development layout plan, showing the extent and depth of the flooding and under what rainfall event the flooding will occur. No flooding should occur at and below the 1 in 30 year rainfall event. It should be demonstrated that any flooding above this can be managed within the site without increasing flood risk to the proposed properties and the surrounding area. the 1 in 100 year + 40% climate change extents, depths and volumes should be established.

For further guidance on HCC's policies on SuDS, HCC Developers Guide and Checklist and links to national policy and industry best practice guidance please refer to our surface water drainage webpage

http://www.hertsdirect.org/services/envplan/water/floods/surfacewaterdrainage/

Informative to the LPA

The LPA will need to be satisfied that the proposed drainage strategy will be maintained and managed for the lifetime of the development.

The applicant can overcome our objection by submitting an FRA which covers the deficiencies highlighted above and demonstrates that the development will not increase risk elsewhere and where possible reduces flood risk overall. If this cannot be achieved we are likely to maintain our objection to the application. Production of an FRA will not in itself result in the removal of an objection.

We ask to be re-consulted with the results of the FRA. We will provide you with bespoke comments within 21 days of receiving formal re-consultation. Our objection will be maintained until an adequate FRA has been submitted.

Yours sincerely,

Sana Ahmed

Hertfordshire County Council

01992 556279 FRMConsultations@hertfordshire.gov.uk



Further to your letter dated 30 December 2016 we write in response to the objections contained therein regarding the surface water drainage strategy provided as part of the planning application for the development at Cheshunt Football Club. Planning application number 07/16/1369/F refers.

We would address the points raised in your letter as follows:

The drainage strategy for the whole site is based upon attenuation and discharge into Theobalds Brook at Greenfield rates. We note two connections are proposed and the Environment Agency has been consulted.

1. As this is a Greenfield site, for the residential development we would expect all features to be above ground. An attenuation tank has been provided to provide some underground storage, however this should be technically justified within the FRA/surface water strategy.

Above ground measures such as permeable paving, swales etc. could be used on impermeable sites and utilised within green space and areas of landscaping. Prioritising above ground methods and providing source control measures can ensure that surface water run-off can be treated in a sustainable manner and reduce the requirement for maintenance of underground features.

The infiltration testing undertaken as part of the site geo-environmental investigation confirmed that prevailing ground conditions are not suitable for the use of shallow infiltration methods due the historic site use as a landfill, hence voided sub-base incorporated as part of the attenuation systems is to be tanked with an impermeable membrane. Section 3, paragraphs 4 and 5 of the submitted Drainage Strategy address this point as follows;

"Infiltration testing undertaken as part of the EPS Phase I & II Geo-Environmental Assessment proved infiltration rates that would be feasible for the use of infiltration methods for surface water disposal.

The historic site use as a landfill will however inhibit the use of shallow infiltration methods due to the potential for concentration of water in the fill materials. As the fill material is not natural and is unlikely to have been subject to any form of compaction and / or treatment this could potentially lead to further settlement and / or deterioration of this material possibly leading to consolidation."

The FRA prepared by Hydrologic ref Report K0753/1 dated September, 2016 and also part of the planning application submission further supports the recommendations of the geo-environmental assessment. Section 3.2 paragraph 4 states as follows;

"A geotechnical investigation has been carried out by Environmental Protection Strategies Ltd. (EPS 2016). The findings were as follows. Typically, the granular fill extended down to the clay at around 7m although, in places dense sands and gravels were found below the fill materials. Groundwater levels were between 2.150m and 3.796m below ground. Although infiltration testing indicated that the soils may be suitable for the use of soakaways, given



the nature and extent of the fill material, the use of shallow infiltration methods is not recommended."

Therefore the SW drainage strategy has to be based around attenuated systems discharging at greenfield run-off rates to Theobalds Brook to the south of the development site. The development provides extensive attenuation of surface water using a variety of techniques selected to compliment the site layout whilst maintaining viability of the development. The forms of attenuation and supporting calculations are provided in full within the Drainage Strategy Report already submitted. Please refer to Appendix 1, Drawings and Appendix 2, Drainage Calculations for details.

Whilst we would ideally like to provide more above ground features for the sustainable treatment of surface water, run-off geo-environmental concerns and the nature and layout of this development reduce the opportunity for above ground features to be utilised. This is a matter we have discussed with Broxbourne Council, both in pre-application discussions and following your representation. The site is highly constrained, due to the need to make the most efficient possible use of the land available. As the land is used as playing pitches, Sport England (who are also a statutory consultee with the power to issue a holding objection on the application) require the maximum possible provision of pitch space in the new development. Additionally, as the land is within the Green Belt, it is necessary to demonstrate that the smallest possible area would be used for development, to minimise the effect on the openness of the Green Belt. These are matters which are required by planning policy, and they are key principles in relation to the acceptability of the proposed development. In discussion with Broxbourne Council, we were also referred to a recent planning application at Broxbourne School (ref. 07/14/1119/F), for which space was also highly limited, and underground tanked attenuation was accepted. However, notwithstanding the necessity to use underground attenuation, opportunity for source control of surface water has been adopted wherever reasonably possible to do so.

The football stadium leg of the system utilises permeable paving in its entirety to filter and attenuate surface water run-off. Approximately 7,900m<sup>2</sup> of permeable paving and tanked voided sub-base are provided. Treatment of surface water will be through the capture of surface water run-off and filtration through the permeable pavement with sub surface microbial action providing further treatment.

The football pitch itself will be provided with a specialist land drainage system which will capture and filter surface water run-off prior to discharge to attenuation tanks. The stadium roofs will be attenuated in tanks beneath the permeable paved car parking but unfortunately the significant volumes of water to be attenuated cannot be accommodated with surface features due to space constraints around the existing football club footprint.

New roads serving the development will be adoptable and as such need to be drained via a traditional piped network. Housing similarly has to discharge through a piped network. Infiltration techniques as previously mentioned are not available and whilst this development is not of high density, green space has been utilised in the provision of private gardens to enhance the local environment and provide high quality living space.

Consideration was given to providing above ground drainage features along the eastern and southern boundaries. However, these areas are precluded as options due to a combination of the



significant volumes to be attenuated and the need to either establish a semi mature landscaped boundary to the east adjacent to the existing housing estate and to protect the mature landscaped boundary to the south against Theobalds Brook.

It should be noted that in addressing the upstream catchment the land to be used for training pitches will be levelled to direct overland flows to an open swale on the eastern boundary where conditions are conducive to the feature. Again, this is demonstrated in the submitted strategy documents.

2. The national climate change allowances have been updated for all applications validated on/or after 19 February 2016 and we now require all SuDS component to cater for all rainfall events upto and including the 1 in 100 plus 40% for climate change event. The drainage strategy for the residential development and calculations should be updated accordingly.

No branch of the developments SW drainage system will flood during a 1:30 year rainfall event.

System 1 providing surface water drainage for the residential development to the east of the football stadium has been designed not to flood for all rainfall events up to the 1 in 100 year return period plus 20% allowance for climate change. Surface flood volumes for rainfall events for the 1 in 100 year return period plus 40% allowance for climate change are to be contained within the kerb lines of the estate roads. The extent and depth of the flooding is annotated on the attached plans.

System 2 providing surface water drainage for the football stadium and pitch has been designed to ensure no flooding for all rainfall events up to and including the 1 in 100 plus 40% for climate change event.

System 3 providing surface water drainage for the car park area serving the football stadium and commercial buildings has been designed to ensure no flooding for all rainfall events up to and including the 1 in 100 plus 40% for climate change event.

System 4 providing surface water drainage for the car parking and estate road to the south of the football stadium has been designed to ensure no flooding for all rainfall events up to and including the 1 in 100 plus 40% for climate change event.

3. We note that the micro drainage calculations currently show flooded volumes for 1:100 plus 20% climate change in the residential area and it is proposed it to retain the 1:100 plus 40% event within the kerb lines. If there will be informal flooding within the site, these areas need to be identified on a development layout plan, showing the extent and depth of the flooding and under what rainfall event the flooding will occur. No flooding should occur at and below the 1 in 30 year rainfall event. It should be demonstrated that any flooding above this can be managed within the site without increasing flood risk to the proposed properties and the surrounding area. the 1 in 100 year + 40% climate change extents, depths and volumes should be established.

Please refer to item 2 above and the following;



The Proposed Site Drainage Strategy drawing number 10-6561\_XX-DR-D201 rev (PL4) contained within Appendix 1 herein has been updated to show the areas allocated for informal flooding in the relevant 1:100 year + 40% climate change events and to note the anticipated flood volumes and depths.

Following are the Summary of Critical Results by Maximum level (Rank 1, 2 and 3) for System 1 (the residential leg of the drainage system) in support of the aforementioned drawing updates to show anticipated informal flooding information.



## 12 APPENDIX 7 – RESPONSE TO HERTFORDSHIRE COUNTY COUNCIL LETTER DATED 25 APR 2017

Environment Director & Chief Executive: John Wood



Peter Quaile Borough of Broxbourne Borough Offices Bishops College Churchgate Cheshunt Herts EN8 9XB Post Point CHN 215 Hertfordshire County Council County Hall, Pegs Lane HERTFORD SG13 8DN

Contact Sana Ahmed Tel 01992 556279 Email <u>FRMConsultations@hertfordshire.gov.uk</u>

Date 25 April 2017

# RE: 07/16/1369/F - Cheshunt Football Club, Theobald Lane, EN8 8RU - Add info

Dear Peter,

Thank you for re-consulting us on the above application for Area 1 - New stadium with up to 5,192 seats, 66 no. 1 bedroom apartments, 70 no. 2 bedroom apartments, 22 no. 3 bedroom houses and 28 no. 4 bedroom houses, highway access works, internal roads and supporting infrastructure. Area 2 - Northern block - New facilities for Cheshunt Football Club in use classes D1, D2 and sui generis - matters relating to internal layout and appearance reserved. Area 3 - Western block - New sports, community, leisure and commercial uses in use classes A1, A3, A4, A5, B1, D1 and D2 - matters relating to internal layout reserved.

In response to the additional information submitted by Peter Dann Consulting reference 10-6561 dated Feburary 2017, we can confirm that there is still point that has not been adequately addressed. We therefore maintain our objection to the grant of planning permission until our concerns have been satisfied. The evidence we require to satisfy our remaining concerns are detailed below;

1. Drainage plan demonstrating a SuDS management train and above ground features for residential development.

## Overcoming our objection

The drainage strategy for the whole site is based upon attenuation and discharge into Theobalds Brook at Greenfield rates. We note two surface water systems have been proposed with separate outfalls to Theobalds Brook. The first system caters for residential area and the sports pitch and the second catering for the new stadium and supporting infrastructure. However as this is a Greenfield site and discharging into Main River, for the residential development we would expect all features to be above ground. This is to ensure that a suitable level of management train is provided. An attenuation tank has been provided to provide underground storage however this lies at the bottom of the SuDS hierarchy and does not provide any level of treatment. The selection of SuDS should be justified with technical evidence.

Above ground measures such as permeable paving could be used on impermeable sites and utilised within access roads and driveways. Prioritising above ground methods and providing source control measures can ensure that surface water run-off can be treated in a sustainable manner and reduce the requirement for maintenance of underground features.

For further guidance on HCC's policies on SuDS, HCC Developers Guide and Checklist and links to national policy and industry best practice guidance please refer to our surface water drainage webpage

# http://www.hertfordshire.gov.uk/services/envplan/water/floods/surfacewaterdrainage/

## Informative to the LPA

Please note it is proposed to discharge to Main River and we would recommend SuDS treatment stages should be provided to manage any potential contaminants from surface water run-off from car parking areas and access roads. The LPA needs to be satisfied that the proposed development will not have a detrimental impact to the water quality with regards to the Water Framework Directive. The LPA will need to be satisfied that the proposed drainage strategy will be maintained and managed for the lifetime of the development.

The applicant can overcome our objection by submitting an FRA which covers the deficiencies highlighted above and demonstrates that the development will not increase risk elsewhere and where possible reduces flood risk overall. If this cannot be achieved we are likely to maintain our objection to the application. Production of an FRA will not in itself result in the removal of an objection.

We ask to be re-consulted with the results of the FRA. We will provide you with bespoke comments within 21 days of receiving formal re-consultation. Our objection will be maintained until an adequate FRA has been submitted.

Yours sincerely,

Sana Ahmed

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Further to your letter dated 25 April 2017 we write in response to the objection contained therein regarding the surface water drainage strategy provided as part of the planning application for the development at Cheshunt Football Club. Planning application number 07/16/1369/F refers.

We would address the points raised in your letter as follows:

1. Drainage plan demonstrating a SuDS management train and above ground features for residential development.

### **Overcoming our objection**

The drainage strategy for the whole site is based upon attenuation and discharge into Theobalds Brook at Greenfield rates. We note two surface water systems have been proposed with separate outfalls to Theobalds Brook. The first system caters for residential area and the sports pitch and the second catering for the new stadium and supporting infrastructure. However as this is a Greenfield site and discharging into Main River, for the residential development we would expect all features to be above ground. This is to ensure that a suitable level of management train is provided. An attenuation tank has been provided to provide underground storage however this lies at the bottom of the SuDS hierarchy and does not provide any level of treatment. The selection of SuDS should be justified with technical evidence.

Above ground measures such as permeable paving could be used on impermeable sites and utilised within access roads and driveways. Prioritising above ground methods and providing source control measures can ensure that surface water run-off can be treated in a sustainable manner and reduce the requirement for maintenance of underground features.

As detailed in our response to your queries dated 30 December 2016 space remains a constraint when looking to provide particularly open above ground features for this development. However, we note your comments regarding permeable paving a significant area of which, is proposed by the original strategy as part of the drainage system for the Stadium car parking. We have therefore looked to expand the use of permeable paving.

Permeable paving is a SuDS technique that is appropriate for use at most developments including the proposed development and provides both a flood reduction benefit due to the attenuation provided in the sub-base and also a pollution reduction benefit due to the filtration of water as is passes through the permeable surfacing.

We have contacted HCC Highways Department regarding the use of permeable paving for the estate roads to the development. They advise that the internal access roads for this development would not be adopted by The Council and as such permeable paved roads are an acceptable solution to provide attenuation of surface water run-off. We have therefore amended our strategy to incorporate permeable paved roads with tanked sub-base of 30% void ratio to all access roads within the development site. This will provide 4,864m<sup>2</sup> of permeable paved area in addition to the 7,900m<sup>2</sup> already proposed to the west and north car parking for the stadium.



In addition to the filtration and attenuation of run-off provided by the use of permeable paving, its use has also all but removed the need for informal flooding in the 1:100 year plus 40% climate change event for the 3 residential access roads to the east of the development. The nominal amount remaining in the current design would hopefully be removed during the final construction stage design work.

In expanding the provision of permeable surfacing to the 3 eastern residential access roads we will also drain the roofs of the buildings themselves through the sub-base of the permeable paving. Again, this will provide filtration prior to attenuation and controlled discharge to the main drainage network.

The Proposed Site Drainage Strategy drawing number 10-6561\_XX-DR-D201 rev (PL5) contained within Appendix 1 herein is updated to show the additional areas of permeable paved access roads. The informal flooding previously required by the 1:100 year plus 40% climate change condition is now all but removed and again the drawing is updated to reflect this. Micro Drainage calculations for System 1 and System 4 which benefit from the provision of the additional permeable paving have been updated in Appendix 2. The body of the main report text is also updated where relevant to be consistent with the revised proposals.