REDEVELOPMENT OF THE ROYAL OAK, BRECK ROAD, POULTON-LE-FYLDE.

DRAINAGE STRATEGY REPORT HAMILTON TECHNICAL SERVICES 1 CHILTERN AVE, EUXTON, CHORLEY, LANCS, PR7 6NU

ISSUE 1 12/18/2019 C-0912

Document Control Sheet

Redevelopment of the Royal Oak, Breck Road, Poulton-le-Fylde, Lancs. Drainage Strategy Report

Job	Date	Issue	
C0912	18 th Dec 2019	1	
Originator	G Hamilton		
Checker	G Hamilton		
Approver	G Hamilton		

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- 1.0 Introduction
- 2.0 Description of existing site
- 3.0 Proposals for Development
- 4.0 Maintenance
- 5.0 Conclusions

Figures and Plans

1. Introduction

- 1.1. Hamilton Technical Services have been commissioned by Carter Zub Architecture, to prepare a Drainage Strategy Report, in support of a planning application for new residential properties at the former Royal Oak Public House, Breck Road, to replace former buildings with apartments with associated parking, access and landscaping.
- 1.2. The site comprises an area of land on the southeast side of Breck Road at its junction with Station Road. The location of the site is illustrated in **Figure 1** appended to this report.
- 1.3. The national grid reference for the site is 335079E, 439833N.
- 1.4. It is understood that permission is being sought to build a block of apartments along with associated parking, access and landscaping. A development sketch plan is attached to this report as **Figure 2.**

2. Description of the existing site.

- 2.1. The site is bounded to the northwest by Breck Road and local government offices. To the northeast the site is bounded by Station Road and residential properties. To the south the site is bounded by residential properties.
- 2.2. Consultation of Environment Agency Flood maps, through their website, shows that the site lies in Flood Zone 1 and well outside Flood Zones 2 + 3. This places the site at no significant risk of flooding from rivers or the sea.
- 2.3. Further consultation of the Environment Agency maps showing the risks of flooding from Surface Water or reservoir failure, shows that the site is not at risk of flooding from these sources.
- 2.4. The site is presently occupied by a main building, front parking area and rear landscaped garden and patio areas. The site is presently served by a network of combined drains carrying both foul effluent and rainwater to the public combined sewer in Breck Road.
- 2.5. Consideration has been given to the suitability of the ground for the employment of soak-aways to disperse surface water run-off from the development. However the site is restricted by adjacent buildings and retaining walls and there is insufficient space to locate soak-aways a minimum of 5 meters from nearby structures. Consultation of the British Geological Society maps shows the site to be on "Till, Devensian-Diamicton", overlying Mudstone. Consultation of the Cranfield Institute Soilscapes maps shows the area to have a topsoil layer that is "slowly permeable, seasonally wet, loamy clayey soils with impeded drainage".
- 2.6. For these reasons the use of soak-aways has been excluded. There are no watercourses or surface water drains within or adjacent to the site, to which surface water could be discharged. There is a public combined water sewer located in Station Road to the northeast of the site to which it is proposed foul and surface water run-off will be discharged.
- 2.7. The site was occupied by the former Royal Oak hostelry for many decades and the buildings and car park were serviced by a system of combined drains, carrying both foul and surface water run-off to the public combined sewer in Station Road. A plan showing the main collector drains is attached as **Figure 3** of this report.

2.8. A series of calculations have been completed to ascertain the existing rates of surface water discharge from the site. A sample of these calculations is contained in **Appendix 1** of this report. A plan showing the surface water catchment areas used in these simulations is attached as **Figure 4** of this report. These calculations show the rate of discharge during a 1 in 2 Yr storm to be 18.7 l/s, rising to 32.9 l/s during a 1 in 30 Yr event and to 39.4 l/s during a 1 in 100 Yr event.

3. Proposals for Redevelopment

- 3.1. The redevelopment of the site will consist of the initial demolition of the existing buildings and hard standings on site. The construction of the new apartments, a revised access leading from Station Road close to the eastern edge of the site, along with provision of parking to the rear of the buildings and landscaped areas along the site frontages.
- 3.2. The site is not, as discussed in 2.5, 2.6 and 2.7 above, suitable for the use of soak-aways and with no watercourses or surface water drainage systems on or adjacent to the site, the surface water run-off from the site will have to be discharged to the public combined sewer network as presently occurs.
- 3.3. In line with best SUDS practice the rate of off-site discharges will be limited to as close to brownfield run-off rates as possible. The simulation calculations shown in **Appendix 1** indicate the site area indicates that the existing site will have a rate of run-off of at least 18.7 l/s and based on this figure it has been decided to limit future discharge rates to a maximum of 10.0 l/s in all storm scenarios, by means of a controlling Hydro-brake unit, placed in the last surface water chamber on the site.
- 3.4. A new separate drainage system will be installed for both foul and surface water run-off from the new dwellings. Foul drainage will be discharge to the public combined sewer located in Station Road. Surface water flows will be controlled and attenuated before being combined with the foul discharge and discharged to the public combined water sewer.
- 3.5. A plan showing the proposed drainage systems is attached as **Figure 5** of this report. A series of run-off simulation calculations have been completed for the surface water drainage system and a selection of these calculations are appended to this report as **Appendix 2**. A plan showing the contributing catchment areas is attached as **Figure 6** of this report.
- 3.6. The calculations show that the flows generated by storms of up to a 1 in 100 Yr event, of 600 minutes duration and inclusive of a climate changes allowance of 35% will be contained within the chambers, attenuation tank and pipework of the proposed drainage system. There will be no surface flooding from the new drainage during these events and therefore no on site or off site flooding will be caused by the new development.
- 3.7. The designed surface water drainage system will discharge a maximum flow of 7.7 l/s during a 1 in 2 Yr event, 9.8 l/s during a 1 in 30 Yr event and 9.8 l/s during a 1 in 100 Yr event. These figures represent a reduction in discharge rates of 59%, 70% and 75% respectively.

4. Maintenance

4.1 The drainage serving the new development will remain in private ownership of the site and all future owners or occupants. On completion of the development a suitably qualified maintenance company will be contracted to carry out all site inspections and maintenance of the drainage systems.

The foul and surface drains and chambers will be inspected at six month intervals and all deleterious materials will be removed and any repairs or maintenance required will be carried out by a suitably qualified contractor.

The maintenance inspections and repairs or cleaning of the drainage systems will be funded through an annual maintenance fee levied on each apartment and collected by the owners of the properties.

5. Conclusions

Based on the above principals and proposals it will be possible to design and construct suitable systems of foul and surface water drainage that are sustainable and that will prevent any increased risk of flooding on or out with the development site.

Figures;

Figure 1 – Site Location Plan Figure 2 – Site Development Plan Figure 3 – Existing Drainage Plan Figure 4 _ Existing SW Catchment Plan Figure 5 – Proposed Site Drainage Plan Figure 6 – Proposed SW Catchments Plan

Appendix 1 – Existing SW Run-off Simulation Calculations Appendix 2 _ Proposed SW Run-off Simulation Calculations

project	drawing title	
Royal Oak	Site Location Plan	
location	dwg purpose	
The Royal Oak, Breck Road, Poulton	PLANNING	
		CARTER-ZUB
client		BUILDING CONSULTANCY
Royal Oak		



Site Location Plan

1











Land at Royal Oak, Breck Road, Poulton le Fylde.

Appendix 1

Existing Site SW Run-off Simulation Calculations

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Poulton le Fylde	
Euxton	Existing run-off Estimation	4
Chorley PR7 6NU	1 in 2 Yr - 1 in 100 Yr Storms	Micro
Date 12.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK EX.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time	Area	Time	Area
(mins)	(ha)	(mins)	(ha)
0-4	0.109	4-8	0.008

Total Area Contributing (ha) = 0.117

Total Pipe Volume $(m^3) = 0.770$

Hamilton	Techn	ical Se	ervice	S							Pa	age 2
1 Chiltern Ave Royal Oak, Poulton le Fylde												
Euxton					Exis	ting r	un-of	f Est	imat	ion	2	1.
Chorley	PR7 61	UN			1 in	2 Yr -	- 1 i	n 100) Yr S	Storm	s	Airco
Date 12.1	2.201	9			Desi	gned by	y Geo	ff Ha	amilto	on		
File ROYA	L OAK	EX.MDX	<u> </u>		Chec	ked by						lamada
Micro Dra	inage				Netw	ork 201	14.1					
	SI	FORM SE	WER D	ESIGN	by th	e Modi	fied	Rati	onal 1	Metho	d	
			Net	work 1	Design	Table	for	Stor	<u>m</u>			
	PN	Length	Fall	Slope	I.Area	T.E.	Ba	se	k	HYD	DIA	
		(m)	(m)	(1:X)	(ha)	(mins)	Flow	(1/s)	(mm)	SECT	(mm)	
	1.000	20.600	0.650	31.7	0.057	4.00		0.0	0.600	0	150	
	2.000	11.000	0.150	73.3	0.040	4.00		0.0	0.600	0	150	
	1.001	12.000	0.300	40.0	0.020	0.00		0.0	0.600	0	150	
				Netw	ork Re	esults	Tabl	<u>e</u>				
PN	Rain (mm/hr	T.C.) (mins)	US/II) (m)	ΣI.Z (ha	Area 2 A) Flo	Σ Base ow (l/s)	Foul (1/s	L Add) (1	Flow /s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
1.000	0.0	0 4.19	9 7.000) 0.	.057	0.0	0.	0	0.0	1.79	31.7	0.0
2.000	0.0	0 4.10	6.500) 0.	.040	0.0) 0.	0	0.0	1.18	20.8	0.0
1.001	0.0	0 4.32	2 6.350) 0.	.117	0.0	0.	0	0.0	1.60	28.2	0.0
		Fr	ee Fl	owing	Outfa	ll Det	ails	for	Storm			
		Outfal	l Ou	tfall	C. Leve	l I. Le	vel	Min	D,L	W		
	1	Pipe Num	ber M	lame	(m)	(m)	I	. Leve	1 (mm)	(mm)		
		1.	001	SEWER	7.40	0 6.	050	6.05	0 1200) 0		
			Sin	nulati	on Cr	itoria	for	Storm	1			
			<u>011</u>	laracı			101	SCOLI	-			
	Vol	Lumetric	Runoff	E Coeff	0.840	Foi	ıl Sew	age pe	er hect	tare (l/s) (0.000
	Ar	real Red [.]	uction Start	Factor	1.000	Additio	onal F	low - tor *	% of /	Total ba Sto	Flow (2 000
		Hot Sta	rt Leve	el (mm)	0	1 11 11	JD IUC	COL	Run T	ime (m	ins)	1440
Manh	ole Hea	adloss C	oeff (C	Global)	0.500		0	utput	Inter	val (m	ins)	1
	Nu	mber of	Input	Hydrog	raphs 0	Number	of St	corage	Struc	tures	0	
	N	umber of	f Offli	ne Con	trols 0	Tranibel	UL 11	Lang / AL	Cu Did	.g. alls	U	
			S	ynthe [.]	tic Ra	infall	Deta	ils				
		Rainfal	.l Mode	1		FSR		Pr	ofile	Type 1	Winter	
	Return	Period	(years)		2		С	v (Sum	mer)	0.750	
		245	Regio	n Engl	and and	Wales	Ch a ····	C	v (Win	ter)	0.840	
		M9-	-ou (mm Ratio	, R		0.350	SLORM	Jurat	⊥on (ñ	ı⊥11S)	15	
			-									

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Poulton le Fylde	
Euxton	Existing run-off Estimation	<u> </u>
Chorley PR7 6NU	1 in 2 Yr - 1 in 100 Yr Storms	Micco
Date 12.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK EX.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	·

Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	7.058	-0.092	0.000	0.32	0.0	9.4	OK
2.000	2	6.562	-0.088	0.000	0.35	0.0	6.6	OK
1.001	3	6.446	-0.054	0.000	0.73	0.0	18.7	OK

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Poulton le Fylde	
Euxton	Existing run-off Estimation	4
Chorley PR7 6NU	1 in 2 Yr - 1 in 100 Yr Storms	Micro
Date 12.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK EX.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time	Area	Time	Area
(mins)	(ha)	(mins)	(ha)
0-4	0.109	4-8	0.008

Total Area Contributing (ha) = 0.117

Total Pipe Volume $(m^3) = 0.770$

Hamilton Techni	lcal Serv	vices							Pa	ige 2
1 Chiltern Ave Royal Oak, Poulton le Fylde										
Euxton			Exist	ing ru	n-off	Est	imat	Lon	2	
Chorley PR7 6N	U		1 in	2 Yr -	1 in	100	Yr S	Storm	s	licco
Date 12.12.2019)		Desig	gned by	Geof	f Ha	milto	on		
File ROYAL OAK	EX.MDX		Check	ked by						rainage
Micro Drainage			Netwo	ork 201	4.1					
ST	ORM SEWE	R DESIGN	by the	e Modif	fied H	Ratio	onal I	Metho	d	
		Network	Design	Table	for S	Storn	n			
PN	Length Fa	all Slope	I.Area	Т.Е.	Bas	e	k	HYD	DIA	
	(m) ((1:X)	(ha)	(mins)	Flow (1/s)	(mm)	SECT	(mm)	
1.000	20.600 0.	650 31.7	0.057	4.00		0.0	0.600	0	150	
2.000	11.000 0.	150 73.3	0.040	4.00		0.0	0.600	0	150	
1.001	12.000 0.	300 40.0	0.020	0.00		0.0	0.600	0	150	
		Netw	work Re	sults	Table					
PN Rain (mm/hr)	T.C. U) (mins)	JS/ILΣI (m) (h	Area Σ a) Flo	Base w (1/s)	Foul (1/s)	Add (1	Flow /s)	Vel (m/s)	Cap (1/s)	Flow (l/s)
1.000 0.00	0 4.19 7	0000 0	.057	0.0	0.0		0.0	1.79	31.7	0.0
2.000 0.00	0 4.16 6	6.500 0	.040	0.0	0.0		0.0	1.18	20.8	0.0
1.001 0.00	0 4.32 6	6.350 0	.117	0.0	0.0		0.0	1.60	28.2	0.0
	Free	Flowing	Outfa	ll Deta	ails f	For S	Storm			
	Outfall	Outfall	C. Leve	l I. Lev	7el	Min	D,L	W		
P	Pipe Number	r Name	(m)	(m)	I.	Leve (m)	1 (mm)	(mm)		
	1.001	1 SEWER	7.40	0 6.0)50	6.05	0 1200	0 0		
		Simulat	ion Cri	teria	for S	torm				
Vol Ar Manhole Hea	umetric Ru eal Reduct Hot St Hot Start dloss Coef	noff Coef: tion Facto: tart (mins Level (mm ff (Global	f 0.840 r 1.000) 0) 0.500	Fou Additio MAD	l Sewa nal Fl D Fact Ou	ge pe ow - or * tput	er hect % of 7 10m³/1 Run T: Interv	care (Total na Sto ime (m val (m	l/s) 0 Flow 0 rage 2 ins) ins)	.000 .000 .000 1440 1
Nur 1 Nu	nber of Ing Number of umber of O	put Hydrog Online Con ffline Con	trols 0 trols 0 trols 0	Number Number	of Sto of Tir	orage ne/Ar	Struc ea Dia	tures grams	0 0	
		Synthe	tic Ra	infall	Detai	lls				
Return	Rainfall Period (y R M5-60 Ra	Model ears) egion Engl (mm) tio R	and and	FSR 30 Wales 18.000 \$ 0.350	Storm I	Pro C C	ofile v (Sum v (Win ion (m	Type W mer) ter) ins)	Vinter 0.750 0.840 15	

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Poulton le Fylde	
Euxton	Existing run-off Estimation	L'
Chorley PR7 6NU	1 in 2 Yr - 1 in 100 Yr Storms	Micco
Date 12.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK EX.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	7.084	-0.066	0.000	0.60	0.0	17.8	OK
2.000	2	6.744	0.094	0.000	0.62	0.0	11.6	SURCHARGED
1.001	3	6.697	0.197	0.000	1.29	0.0	32.9	SURCHARGED

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Poulton le Fylde	
Euxton	Existing run-off Estimation	4
Chorley PR7 6NU	1 in 2 Yr - 1 in 100 Yr Storms	Micro
Date 12.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK EX.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time	Area	Time	Area
(mins)	(ha)	(mins)	(ha)
0-4	0.109	4-8	0.008

Total Area Contributing (ha) = 0.117

Total Pipe Volume $(m^3) = 0.770$

Hamilton	Techn	ical Se	ervice	S							Pa	age 2
1 Chilter	n Ave				Roya	l Oak,	Poul	ton i	le Fy	lde		
Euxton					Exis	ting ru	un-of:	f Est	cimat:	ion		
Chorley	PR7 61	UV			1 in	2 Yr -	- 1 in	n 100) Yr S	Storm	s 💦	Aicco
Date 12.1	2.2019	9			Desi	gned by	y Geo	ff Ha	amilt	on		
File ROYA	L OAK	EX.MDX			Chec	ked by						lallaye
Micro Dra	inage				Netw	ork 201	14.1					
	SI	FORM SE	WER D	ESIGN	by th	e Modi	fied	Rati	onal	Metho	d	
			Net	work I	Design	Table	for	Stor	<u>m</u>			
	PN	Length	Fall	Slope	I.Area	T.E.	Ba	se (1/s)	k (mm)	HYD	DIA (mm)	
	1 000	20 600	0.650	31 7	0 057	4 00	FIOW	0.0	0.600	SECI	150	
	2.000	11 000	0.150	72 2	0.040	4.00		0.0	0.000	0	150	
	2.000	10.000	0.130	13.5	0.040	4.00		0.0	0.000	0	150	
	1.001	12.000	0.300	40.0	0.020	0.00		0.0	0.600	0	150	
				Netw	ork Re	esults	Table	5				
PN	Rain (mm/hr	T.C.) (mins)	US/II (m)	ΣI.A (ha	irea 2 1) Flo	Σ Base ow (l/s)	Foul (1/s)	. Add) (]	Flow /s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.0	0 4.19	9 7.000	0.	057	0.0	0.0	0	0.0	1.79	31.7	0.0
2.000	0.0	0 4.16	6.500	0.	040	0.0	0.0	0	0.0	1.18	20.8	0.0
1.001	0.0	0 4.32	2 6.350	0.	117	0.0	0.0	0	0.0	1.60	28.2	0.0
		Fr	ee Fl	owing	Outfa	ll Det	ails	for	Storm			
			1									
	I	Outfal Pipe Num	l Ou ber N	tfall (Name	C. Leve (m)	1 I. Le (m)	vel I.	Min Leve	D,L 1 (mm)) (mm)		
								(m)				
		1.	001	SEWER	7.40	0 6.	050	6.05	0 1200	0 0		
			~ '		~		_	~ .				
			Sin	nulati	on Cri	iteria	for S	storn	1			
	Vol	umetric	Runoff	E Coeff	0.840	Foi	ıl Sewa	age pe	er hec	tare (1/s) 0	.000
	Ar	real Red	uction	Factor	1.000	Additio	onal Fi	low -	% of	Total	Flow 0	0.000
		Hot	Start	(mins)	0	MAI	DD Fact	tor *	10m ³ /1	ha Sto	rage 2	2.000
Manho	ole Hea	dloss C	rt Leve oeff (0	el (mm) Global)	0.500		01	utput	Inter	ıme (m val (m	ins)	1440
			()				5.	-1		- (11	- /	
	Nu	mber of	Input	Hydrogi	raphs 0	Number	of St	orage	Struc	tures	0	
	N	umber of	Offli	ne Cont	trols 0	Number	OI TI	me/Ar	ea Dia	igrams	U	
			S	ynthet	cic Ra	infall	Deta	ils				
		Rainfal	l Mode	1		FSR		Pr	ofile	Type I	Winter	
	Return	Period	(years)		100		C	v (Sum	mer)	0.750	
			Regio	n Engl	and and	Wales		С	v (Wir	nter)	0.840	
		M5-	60 (mm) R		18.000	Storm	Durat	ion (m	nins)	15	
			Nacio .	17		0.300						

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Poulton le Fylde	
Euxton	Existing run-off Estimation	<u> </u>
Chorley PR7 6NU	1 in 2 Yr - 1 in 100 Yr Storms	Micco
Date 12.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK EX.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

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

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	7.202	0.052	0.000	0.72	0.0	21.4	SURCHARGED
2.000	2	6.995	0.345	0.000	0.75	0.0	13.9	SURCHARGED
1.001	3	6.917	0.417	0.000	1.54	0.0	39.4	SURCHARGED

Land at Royal Oak, Breck Road, Poulton le Fylde.

Appendix 2

Proposed SW Run-off Simulation Calculations

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L'
Chorley PR7 6NU	1 in 2 Yr Storms	Micro
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Time Area Diagram for Storm

Time	Area	Time	Area
(mins)	(ha)	(mins)	(ha)
0-4	0.078	4-8	0.014

Total Area Contributing (ha) = 0.092

Total Pipe Volume (m³) = 1.614

Hamilton Technic	cal Services							Page 2
1 Chiltern Ave		Roy	al Oak,	Breck Ro	d, Pou	ulton		
Euxton		Pro	posed SW	/ Simulat	cions			Le l
Chorley PR7 6NU	J	1 i	n 2 Yr S	torms				Micco
Date 17.12.2019		Des	igned by	Geoff H	lamilt	on		
File ROYAL OAK N	NEW SW.MDX	Che	cked by					Dialijada
Micro Drainage		Net	work 201	4.1				
STOP	RM SEWER DESI	IGN by t	he Modif	ied Rat	ional	Meth	od	
	Networ	ck Desig	n Table	for Sto	rm			
PN	Length Fall Sl	ope I.Are	a T.E.	Base	k (mm)	HYD	DIA	
	(m) (m) (1	(na)	(mins)	210W (1/S)	(mm)	SECT	(11111)	
1.000	7.330 0.100 7	3.3 0.00	3 4.00	0.0	0.600	0	100	
1.001	8.350 0.100 8	3.5 0.00	3 0.00	0.0	0.600	0	100	
1.002	8.460 0.100 8	4.6 0.00	9 0.00	0.0	0.600	0	100	
1.003	14.690 0.100 14	0.9 0.00	0.00	0.0	0.600	0	150	
1.004	17.400 0.170 10	2.4 0.00	0.00	0.0	0.000	0	100	
2.000	13.560 0.200 6	7.8 0.00	9 4.00	0.0	0.600	0	100	
3.000	7.990 0.030 26	6.3 0.01	5 4.00	0.0	0.600	0	150	
1 005	11 410 0 040 28	5 3 0 0 2	3 0 00	0 0	0 600	0	150	
1.005	11.110 0.010 20	0.02	0.00	0.0	0.000	0	100	
4.000	10.620 0.130 8	1.7 0.00	3 4.00	0.0	0.600	0	100	
4.001	10.240 0.120 8	5.3 0.00	7 0.00	0.0	0.600	0	100	
5,000	10 500 0 150 0	0 5 0 01	0 4 00	0.0	0 600		100	
5.000	13.580 0.150 9 7 770 0 100 7		0 4.00	0.0	0.600	0	100	
5.001	/.//0 0.100 /	1.1 0.00	0.00	0.0	0.000	0	100	
1.006	1.640 0.020 8	2.0 0.00	0 0.00	0.0	0.600	0	150	
1.007	2.660 0.020 13	3.0 0.00	0 0.00	0.0	0.600	0	150	
			_					
	N	etwork 1	Results	Table				
DN Pain		T Area	T Bago	Foul Add	Flow	Vol	Can	Flow
(mm/hr)	(mins) (m)	(ha) F	low (1/s)	(1/s) (1	l/s)	(m/s)	(1/s)	(1/s)
							_	
1.000 0.00	4.14 7.000	0.003	0.0	0.0	0.0	0.90	7.1	L 0.0
1 002 0 00	4.30 0.900 1 17 6 000	0.000	0.0	0.0	0.0	0.04	0.1 6 /	
1 003 0 00	4 77 5 500	0.010	0.0	0.0	0.0	0.83	14 6	5 0.0
1.004 0.00	5.06 5.400	0.020	0.0	0.0	0.0	0.99	17.	5 0.0
2.000 0.00	4.24 7.000	0.009	0.0	0.0	0.0	0.94	7.4	4 0.0
2 000 0 00		0 015	0.0	0 0	0 0	0 (1	10.0	
3.000 0.00	4.22 5.260	0.015	0.0	0.0	0.0	0.61	10.8	8 0.0
1.005 0.00	5.38 5.230	0.067	0.0	0.0	0.0	0.59	10.4	4 0.0
4.000 0.00	4.21 7.000	0.003	0.0	0.0	0.0	0.85	6.	7 0.0
4.001 0.00	4.41 6.870	0.010	0.0	0.0	0.0	0.83	6.5	5 0.0
5 000 0 00	4 28 7 000	0 010	0 0	0 0	0 0	0 81	6	4 0 0
5.001 0.00	4.43 6.850	0.015	0.0	0.0	0.0	0.87	6.9	9 0.0
	· · · · ·			-		-		
1.006 0.00	5.40 5.190	0.092	0.0	0.0	0.0	1.11	19.0	6 0.0
1.007 0.00	5.46 5.170	0.092	0.0	0.0	0.0	0.87	15.4	4 0.0

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 2 Yr Storms	Micro
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Free Flowing Outfall Details for Storm

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

1.007 SEWER 7.510 5.150 5.150 1000 0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage pe	er hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow -	% of Total Flow	0.000
Hot Start (mins)	0	MADD Factor *	10m³/ha Storage	2.000
Hot Start Level (mm)	0		Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output	Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Hamillon le	chnical S	ervice	5							Page	4
1 Chiltern	Ave			Royal	Oak, B	reck	Rd, Po	oulton			
Euxton				Propo	sed SW	Simu	lation	5		4	
Chorley PR	7 6NU			1 in	2 Yr St	orms	5			Micco	J
Date 17.12.	2019			Desig	ned by	Geof	f Hami	lton			
File ROYAL	OAK NEW S	W.MDX		Check	ed bv					Urair	lage
Micro Drain	age			Netwo	rk 2014	.1					
						-					
		Or	line (Contro	ols for	Sto	rm				
					/			_			
Hydro-	Brake Opt	imum®	Manhol	.e: 13	, DS/PN	1: 1.	.006, V	olume	(m³)	: 2.9	
			Unit	Refere	ence MD-Si	HE-01	31-1000-2	2000-100	0		
			Desigr	n Head	(m)			2.00	0		
		Ι	esign E	rlow (1	/s)			10.	0		
			E	Object	'lo™ ive Min	imise	Ca	alculate n storag	d a		
			Dian	neter (mm)	LINILOC	upsercu	13 13	1		
			Invert	Level	(m)			5.19	0		
	Minimum C	utlet Pi	pe Dian	neter (mm)			15	0		
	Suggest	ed Manno	le Diam	neter (mm)			150	0		
Control	Points	Head (1	n) Flow	(1/s)	Co	ntrol	Points	Hea	ad (1	n) Flow	(l/s)
Design Point	(Calculated)	2.0	0	10.0			Kick-	Flo®	1.10	57	7.8
	Flush-Flo TM	0.5	59	9.8	Mean Flo	w ove	er Head R	ange		-	8.7
Usedasa Dasalaa										cr chan	
Depth (m)	Optimum® be	Depth (1	ed then n) Flow	these (1/s)	storage i	coutin	ng calcul ow (l/s)	Depth (will m) F	be	s)
Depth (m)	Optimum® be Flow (1/s) 4.7	Depth (1	ed then n) Flow	these (1/s) 7.9	storage i Depth (m 3.00	routin () Flo	ng calcul ow (l/s) 12.1	Depth (will m) F 00	be 10w (1/	/s)
Depth (m) 0.100 0.200	Optimum® be Flow (1/s) 4.7 8.3	Depth (r 1.20 1.41	ed then n) Flow 00	these (1/s) 7.9 8.5	storage 1 Depth (m 3.00 3.50	n) Fl ()	ng calcul bw (1/s) 12.1 13.0	Depth (7.0 7.5	will m) F 00 00	be Clow (1/ 18 18	's) 8.1 8.7
Depth (m) 0.100 0.200 0.300	Optimum® be Flow (1/s) 4.7 8.3 9.2 0.6	Depth (1 1.2 1.4 1.6	ed then n) Flow 00 00 00 00	these (1/s) 7.9 8.5 9.0	storage 1 Depth (m 3.00 3.50 4.00	() Fl (ng calcul bw (1/s) 12.1 13.0 13.9 14.7	Depth (7.0 7.5 8.0	will m) F 00 00 00	be 'low (l/ 18 18 19	(s) 3.1 3.7 0.3
Depth (m) 0.100 0.200 0.300 0.400 0.500	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8	Depth (1 1.2) 1.4) 1.6) 1.8 2.0)	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0	Depth (m 3.00 3.50 4.00 4.50 5.00	 a) Flc b b c c<!--</td--><td>ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4</td><td>Depth (7.0 7.5 8.0 8.5 9.0</td><td>will m) F 00 00 00 00 00</td><td>be Plow (1/ 18 18 19 19 20</td><td>(s) (s.1) (s.7) (s.3) (s.9) (s.5)</td>	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4	Depth (7.0 7.5 8.0 8.5 9.0	will m) F 00 00 00 00 00	be Plow (1/ 18 18 19 19 20	(s) (s.1) (s.7) (s.3) (s.9) (s.5)
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5	storage 1 Depth (m 3.00 3.50 4.00 4.50 5.00 5.50	 a) Flood b) Flood c) b) b)	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00	210w (1/ 18 18 19 20 21	3.1 3.7 9.3 9.9 9.5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9	storage 1 Depth (m 3.00 3.50 4.00 4.50 5.50 6.00	 a) Flood b) Flood c) 00 c) 00	ng calcul 5w (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00 00	be 210w (1/ 18 19 19 20 21	7s) 3.1 3.7 0.3 0.9 0.5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 3 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	 Fl Fl 0 0 	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00 00	be 'low (l/ 18 19 19 20 21	(s) .1 .7 .3 .9 .5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6 9.0	Depth (1 1.21 1.41 1.61 1.81 2.01 2.22 2.41 2.61	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 3 Depth (m 3.00 3.50 4.00 4.50 5.50 6.00 6.50	 a) Flc b) 60 c) 60 <lic) 60<="" li=""> c) 60 <lic) 60<="" li=""> <lic) 60<="" li=""> <lic)< td=""><td>ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</td><td>Depth (7.0 7.5 8.0 8.5 9.0 9.5</td><td>will m) F 00 00 00 00 00 00 00 00</td><td>be Plow (1/ 18 19 20 21</td><td>(s) 3.1 3.7 9.3 9.9 9.5 0</td></lic)<></lic)></lic)></lic)>	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00 00	be Plow (1/ 18 19 20 21	(s) 3.1 3.7 9.3 9.9 9.5 0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	<pre>these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3</pre>	storage 3 Depth (m 3.00 3.50 4.00 4.50 5.50 6.00 6.50	 a) Flood b) Flood c) c) c	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00	be Plow (1/ 18 18 19 20 21	s. 1 3.7 9.3 9.9 9.5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	<pre>these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3</pre>	storage 1 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flo 10 10 10 10 10 10 10 10 10 10 10 10 10	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will 600 600 600 600 600 600 600 6	be 'low (1/ 18 19 19 20 21	3. 1 3.7 3.3 3.9 5.5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (m 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flo	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will 600 600 600 600 600 600 600 6	be 'low (l/ 18 18 19 20 21	(s) 3.1 3.7 3.9 3.9 5.5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 2 Depth (m 3.00 3.50 4.00 4.50 5.50 6.00 6.50	 a) Flc b) 60 c) 60 <li< td=""><td>ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</td><td>Depth (7.0 7.5 8.0 8.5 9.0 9.5</td><td>will m) F 00 00 00 00 00 00 00 00 00</td><td>be *low (1/ 18 19 19 20 21</td><td>(s) 3.1 3.7 3.3 9 .5 .0</td></li<>	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00 00 00	be *low (1/ 18 19 19 20 21	(s) 3.1 3.7 3.3 9 .5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then a) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	 a) Flood b) Flood c) c) c	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will 600 600 600 600 600 600 600 6	be Plow (1/ 18 19 19 20 21	(s) 3.1 3.7 0.3 0.9 0.5 .0
нуdro-вгаке invalidated Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flo 10 10 10 10 10 10 10 10 10 10 10 10 10	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will 600 600 600 600 600 600 600 6	be 'low (l/ 18 19 19 20 21	(3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (6) (5) (6) (5) (6) (5) (6) (5) (6) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	<pre>Pepth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6 </pre>	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flo b) Flo b) b) b) b) b) b) b) b) b) b) b) b) b)	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will F 00 00 00 00 00 00 00 00 00 0	be 'low (l/ 18 18 19 20 21	(s) 3.1 3.7 9.3 9.5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 3 Depth (m 3.00 3.50 4.00 4.00 5.50 6.00 6.50	a) Flc	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will 600 600 600 600 600 600 600 6	be Plow (1/ 18 19 19 20 21	(s) 3.1 3.7 3.3 3.9 3.5 .0
нуdro-вгаке invalidated Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flo b) Flo b) b) b) b) b) b) b) b) b) b) b) b) b)	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00	be Plow (1/ 18 18 19 20 21	(s) 3.1 3.7 0.3 0.9 0.5 .0
нуdro-вгаке invalidated Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	e utilise Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then () Flow () () () () () () () () () () () () () (these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flo (0) (0) (0) (0) (0) (0) (0) (0) (0) (0)	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will (00 (00 (00 (00 (00 (00 (00 (be 'low (l/ 18 18 19 20 21	(s) 3.1 3.7 9.3 9.5 .0
Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	e utilise Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then n) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 3 Depth (m 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flc	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00 00	be 'low (l/ 18 19 20 21	(s) 3.1 3.7 3.3 9 3.5 0
нуdro-вгаке invalidated Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then a) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 3	a) Flo b) Flo b) b) b) b) b) b) b) b) b) b) b) b) b)	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00	be Plow (1/ 18 18 19 20 21	(s) 3.1 3.7 3.3 9.9 3.5 .0
нуdro-вгаке invalidated Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be Flow (1/s) 4.7 8.3 9.2 9.6 9.8 9.8 9.6 9.0	E utilise Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then () Flow () () () () () () () () () () () () () (these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (n 3.00 4.00 4.50 5.50 6.00 6.50	a) Flo (0) (0) (0) (0) (0) (0) (0) (0) (0) (0)	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00 00	be Plow (1/ 18 18 19 20 21	(3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3) (5) (5) (3) (5) (5) (3) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5) (6) (5) (6) (5) (6) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6) (
нуdro-вгаке invalidated Depth (m) 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be	e utilise Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then a) Flow 00 00 00 00 00 00 00 00 00 0	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	storage 1 Depth (n 3.00 3.50 4.00 4.50 5.50 6.00 6.50	a) Flo 10 10 10 10 10 10 10 10 10 10 10 10 10	ng calcul bw (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00 00 00 0	be 'low (l/ 18 18 19 20 21	(s) 3.1 3.7 3.3 9.9 9.5 0
нуdro-Brake invalidated Depth (m) 0.100 0.200 0.300 0.400 0.500 0.600 0.800 1.000	Optimum® be	e utilise Depth (1 1.2 1.4 1.6 1.8 2.0 2.2 2.4 2.6	ed then	these (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	Storage 1 Depth (m 3.00 3.50 4.00 4.00 5.50 6.00 6.50 6.50	A) Flo 10 10 10 10 10 10 10 10 10 10	ng calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth (7.0 7.5 8.0 8.5 9.0 9.5	will m) F 00 00 00 00 00 00 00	be 'low (l/ 18 19 19 20 21	(s) (.1 (.7 (.3 (.9 (.5 (.0)

Hamilton Technical Services		Page 5
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 2 Yr Storms	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Storage Structures for Storm

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	.000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	.801		0.0			0.0

Hamilton Technical Services		Page 6
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 2 Yr Storms	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Dialitage
Micro Drainage	Network 2014.1	

Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

	US/MH	Water Level	Surcharged Depth	Flooded Volume	Flow /	Overflow	Pipe Flow	
PN	Name	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Status
1.000	1	7.018	-0.082	0.000	0.08	0.0	0.5	OK
1.001	2	6.925	-0.075	0.000	0.14	0.0	0.9	OK
1.002	3	6.840	-0.060	0.000	0.34	0.0	2.1	OK
1.003	4	5.546	-0.104	0.000	0.20	0.0	2.7	OK
1.004	5	5.481	-0.069	0.000	0.15	0.0	2.4	OK
2.000	6	7.031	-0.069	0.000	0.21	0.0	1.5	OK
3.000	7	5.474	0.064	0.000	0.18	0.0	1.7	SURCHARGED
1.005	8	5.472	0.092	0.000	0.67	0.0	6.3	SURCHARGED
4.000	9	7.019	-0.081	0.000	0.08	0.0	0.5	OK
4.001	10	6.903	-0.067	0.000	0.23	0.0	1.4	OK
5.000	11	7.036	-0.064	0.000	0.27	0.0	1.6	OK
5.001	12	6.892	-0.058	0.000	0.36	0.0	2.3	OK
1.006	13	5.450	0.110	0.000	0.72	0.0	7.8	SURCHARGED
1.007	14	5.264	-0.056	0.000	0.71	0.0	7.7	OK

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	<u> </u>
Chorley PR7 6NU	1 in 2 Yr Storms	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Dialitatju
Micro Drainage	Network 2014.1	
<u>Time Are</u> Time (mins)	Area Time Area (mins) (ha)	
Total Area	Contributing (ha) = 0.092	
Total Pi	ipe Volume $(m^3) = 1.614$	
Free Flowing	OUTTAIL DETAILS FOR STORM	
Outfall Outfall C Pipe Number Name	C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)	
1.007 SEWER	7.510 5.150 5.150 1000 0	
Simulatic	on Criteria for Storm	
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogr	0.840 Foul Sewage per hectare (1/s) 1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m ³ /ha Storage 0 Run Time (mins) 0.500 Output Interval (mins) caphs 0 Number of Storage Structures 1	0.000 0.000 2.000 1440 1
Number of Online Cont Number of Offline Cont	crols 1 Number of Time/Area Diagrams 0 crols 0	
Synthet	ic Rainfall Details	
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Winte 2 Cv (Summer) 0.75 and and Wales Cv (Winter) 0.84 18.000 Storm Duration (mins) 3 0.350	r 0 0 0

Hamilton Technical Se	ervices									Pa	.ge 2	
1 Chiltern Ave		R	oyal	Oak,	Bre	ck l	Rd, Po	oulto	n			
Euxton		P	ropo	sed S	W Si	mul	ations	5		4		
Chorley PR7 6NU		1	in	2 Yr	Stor	ms						Jun
Date 17.12.2019		D	esiq	ned b	y Ge	off	Hami	lton				
File ROYAL OAK NEW SW	.MDX	C	heck	ed bv	-						rain	age
Micro Drainage		N	etwo	rk 20	14.1							
						·						
	Onli	ne Co	ontro	ols fo	or St	torm	<u>1</u>					
Hydro-Brake Opti	imum® Ma	nhole	: 13	. DS/	PN:	1.0	06. V	ວ]ເມກ∉	⇒ (m	³):	2.9	
			. 10	/ 20/		1.0		<u>o 1 ann</u>		, •	2.0	
		Unit R	lefere	nce MD	-SHE-	0131	-1000-2	2000-1	000			
	D	esign ign Fl	Head	(m)				2.	000			
	Des	IGII EI Fl	ush-F	/s) 'lo™			Ca	ı alcula	it.ed			
		0	bject	ive M	linimi	.se u	pstrear	n stor	age			
		Diame	ter (mm)					131			
	In	vert L	evel	(m)				5.	190			
Minimum Ou	utlet Pipe	Diame	ter (mm)				1	150 500			
Suggeste	ed Mailliote	Diame	iter (1	500			
Control Points	Head (m)	Flow	(1/s)		Contr	ol P	oints		Head	(m)	Flow	(l/s)
Design Point (Calculated)	2.000		10.0		- 1		Kick-	Flo®	1.	167		7.8
Flush-Flom	0.569		9.8	Mean B	TOM (over	Head R	ange		-		8./
Hydro-Brake Optimum® as	spectited	. Sho	ould a	nother	type	of	control	. devi	ce ot	her	than	a
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I	utilised	then t	ould a hese (1/s)	nother storag Depth	type e rou (m)	of ting Flow	control calcul (1/s)	devi ation Depth	ce ot s wil (m)	ther 11 be Flor	than • (1/s	a 5)
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s)	utilised Depth (m) 1.200	. Sho then t Flow	ould a hese (1/s) 7.9	Depth	type e rou (m) :	of ting Flow	control calcul (1/s)	devi.ation	ce ot .s wil (m)	ther Il be Flo	than • (1/s 18.	a 5)
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3	utilised Depth (m) 1.200 1.400	. Sho then t Flow	uld a hese (1/s) 7.9 8.5	Depth	type e rou (m) : .000 .500	of ting Flow	control calcul (1/s) 12.1 13.0	devi ation Depth	ce ot s wil (m) 7.000 7.500	ther Il be Flo	than (1/s 18. 18.	a 5) . 1 . 7
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2	utilised Depth (m) 1.200 1.400 1.600	. Sho then t Flow	uld a hese (1/s) 7.9 8.5 9.0	Depth	type e rou (m) : .000 .500 .000	of ting Flow	<pre>control calcul (1/s) 12.1 13.0 13.9</pre>	Depth	ce ot s wil (m) 7.000 7.500 8.000	ther Il be Flo	than (1/s 18. 18. 19.	a 5) .1 .7 .3
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6	Depth (m) 1.200 1.400 1.600 1.800	. Sho then t	(1/s) (1/s) 7.9 8.5 9.0 9.5	Depth	type e rou (m) 1 .000 .500 .500	of ting Flow	<pre>control calcul (l/s) 12.1 13.0 13.9 14.7 </pre>	devi ation Depth	ce ot s wil (m) 7.000 7.500 8.000 8.500	ther Il be Flo	than (1/s 18. 18. 19. 19.	a 5) .1 .7 .3 .9
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200	. Sho then t	(1/s) (1/s) 7.9 8.5 9.0 9.5 10.0	nother storag Depth 3. 3. 4. 4. 5.	type e rou (m) : .000 .500 .000 .500 .000	f of thing	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2</pre>	Depth	ce ot s wil (m) 7.500 8.000 8.500 9.000	ther Il be	than (1/s 18. 19. 19. 20. 21	a 3) .1 .3 .9 .5 0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6	<pre>specified utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400</pre>	. Sho then t Flow	(1/s) (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9	nother storag Depth 3. 3. 4. 4. 5. 5. 6.	type e rou (m) : .000 .500 .000 .500 .000 .500 .000	f of the second se	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8</pre>	Depth	ce ot s wi . (m) 7.000 7.500 8.000 8.500 9.500	ther 11 be	than (1/s 18. 19. 19. 20. 21.	a .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t Flow ((1/s) (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4. 4. 5. 5. 6. 6.	type e rou (m) .500 .500 .500 .500 .500 .500 .500	f of	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</pre>	Depth	ce ot s wil (m) 7.000 7.500 8.000 8.500 9.000 9.500	ther Il be	than (1/s 18. 19. 19. 20. 21.	a 5) .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .000 .500 .500	f of	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</pre>	Depth	ce ot s wil 7.000 7.500 8.500 9.500 9.500	Ther Il be	than (1/s 18, 18, 19, 20, 21,	a 1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .000 .500 .500	f of	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</pre>	. devi ation Depth	ce ot s wil 7.000 7.500 7.500 8.000 8.500 9.000 9.500	Ther Il be	than (1/s 18. 19. 19. 20. 21.	a 1 .1 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .000 .500 .500	f of	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</pre>	devi ation Depth	ce ot s wi 2.000 2.500 3.000 3.500 3.500 9.500	Ther	than (1/s 18. 19. 19. 20. 21.	a .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	<pre>utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600</pre>	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .500	of ting	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</pre>	devi ation	ce ot s wi 2.000 2.500 3.000 3.500 3.500 9.500	cher 11 be	than (1/s 18, 19, 19, 20, 21,	a .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .500 .500 .500	of ting	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth	ce ot s wil (m) 7.000 7.500 8.000 8.500 9.500	cher 11 be	<pre>than (1/s 18. 18. 19. 20. 21.</pre>	a 1.1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3 3 4 4 5 5 6 6 6	type e rou (m) : .000 .500 .000 .500 .500	of ting	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	devi ation	ce ot s wil (m) 7.000 7.000 8.000 8.000 8.500 9.500	cher 11 be	than (1/s 18, 19, 19, 20, 21,	a 1.7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	<pre>specified utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600</pre>	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4 4 5. 5. 6. 6.	type e rou (m) : .000 .500 .500 .500 .500 .500	e of ting Flow	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	devi ation Depth	ce ot s wi (m) 7.000 7.500 8.000 8.500 9.500	Lher Il be	than (1/s 18. 19. 19. 20. 21.	a 5) .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .500 .500	e of ting Flow	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</pre>	devi ation	ce ot s wil (m) 7.000 7.500 8.500 8.500 9.500	Lher Flor	than (1/s 18. 19. 19. 20. 21.	a .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .000 .500	of ting	<pre>control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5</pre>	devi ation Depth	ce ot s wil , (m) , 500 , 500 , 500 , 500 , 500	cher ll be	<pre>than (1/s 18. 18. 19. 20. 21.</pre>	a s) .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .500 .500 .500	of ting	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth	ce ot s wil (m) 7.000 7.500 8.000 8.500 9.500	cher Il be	<pre>than (1/s 18 18 19 20 21 </pre>	a 1.1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	<pre>specified utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600</pre>	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3 3 4 4 5 5 6 6 6	type e rou (m) : .000 .500 .000 .500 .500	of ting	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	. devi ation Depth	ce ot s wil . (m) .000 .500 .500 .500 .500	cher 11 be	than (1/s 18, 19, 19, 20, 21,	a 1.1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	<pre>specified utilised Depth (m) 1.200 1.400 1.600 1.800 2.200 2.400 2.600</pre>	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4 4 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .500	e of ting Flow	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth	ce ot s wi (m) 7.000 7.500 8.000 8.500 9.500	ther Il be	than (1/s 18. 19. 19. 20. 21.	a 1 .1 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4. 4. 5. 5. 6. 6.	type e rou (m) : .000 .500 .000 .500 .500	e of ting Flow	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth	ce ot s wil (m) 7.000 7.500 8.500 9.500 9.500	ther Flor	than (1/s 18. 19. 19. 20. 21.	a s) .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 4. 4. 5. 6. 6. 6.	type e rou (m) : .000 .500 .500 .500 .500	of ting	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth	ce ot s wil . (m) . 500 . 500 . 500 . 500 . 500	ther Il be	<pre>than (1/s 18. 18. 19. 20. 21.</pre>	a s) .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600	. Sho then t	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag 3 3 4 4 5 5 6 6 6	type e rou (m) : .000 .500 .000 .500 .500	of ting	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth	ce ot s wil . (m) .000 .500 .500 .500 .500	ther Il be	than (1/s 18. 19. 19. 20. 21.	a 1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	<pre>specified utilised Depth (m) 1.200 1.400 1.600 1.800 2.000 2.200 2.400 2.600</pre>	. Sho then t	uld a hese (1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag	type e rou (m) : .000 .500 .000 .500 .500	e of ting Flow	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	. devi ation Depth	ce ot s wil . (m) .000 .500 .500 .500 .500	ther Il be	than (1/s 18. 19. 19. 20. 21.	a 5) .1 .7 .3 .9 .5 .0
Hydro-Brake Optimum® as Hydro-Brake Optimum® be invalidated Depth (m) Flow (1/s) I 0.100 4.7 0.200 8.3 0.300 9.2 0.400 9.6 0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	<pre>specified utilised Depth (m) 1.200 1.400 1.600 1.800 2.200 2.400 2.600</pre>	. Sho then t Flow	(1/s) 7.9 8.5 9.0 9.5 10.0 10.5 10.9 11.3	nother storag Depth 3. 3. 4 4 5. 5. 6. 6.	type e rou (m) .000 .500 .000 .500 .500	of ting	control calcul (1/s) 12.1 13.0 13.9 14.7 15.4 16.2 16.8 17.5	Depth	ce ot s wi (m) 7.000 7.500 8.000 8.500 9.500	ther Il be	than (1/s 18. 19. 19. 20. 21.	a 5) .1 .7 .3 .9 .5 .0

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 2 Yr Storms	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Storage Structures for Storm

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	.000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	.801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 2 Yr Storms	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Dialitage
Micro Drainage	Network 2014.1	

Summary of Results for 30 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (1/s)	Pipe Flow (l/s)	Status
1.000	1	7.016	-0.084	0.000	0.06	0.0	0.4	OK
1.001	2	6.923	-0.077	0.000	0.12	0.0	0.7	OK
1.002	3	6.836	-0.064	0.000	0.28	0.0	1.7	OK
1.003	4	5.541	-0.109	0.000	0.17	0.0	2.3	OK
1.004	5	5.474	-0.076	0.000	0.13	0.0	2.1	OK
2.000	6	7.027	-0.073	0.000	0.16	0.0	1.1	OK
3.000	7	5.469	0.059	0.000	0.14	0.0	1.3	SURCHARGED
1.005	8	5.465	0.085	0.000	0.62	0.0	5.8	SURCHARGED
4.000	9	7.016	-0.084	0.000	0.06	0.0	0.4	OK
4.001	10	6.899	-0.071	0.000	0.19	0.0	1.2	OK
5.000	11	7.031	-0.069	0.000	0.21	0.0	1.2	OK
5.001	12	6.886	-0.064	0.000	0.29	0.0	1.8	OK
1.006	13	5.445	0.105	0.000	0.70	0.0	7.6	SURCHARGED
1.007	14	5.263	-0.057	0.000	0.70	0.0	7.6	OK

Hamilton Technical Services		Page 1												
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton													
Euxton	Proposed SW Simulations	M.												
Chorley PR7 6NU	1 in 2 Yr Storms	Micco												
Date 17.12.2019	Designed by Geoff Hamilton													
File ROYAL OAK NEW SW.MDX	Checked by	Diamay												
Micro Drainage	Network 2014.1													
<u>Time Are</u> Time (mins)	ea Diagram for Storm Area Time Area) (ha) (mins) (ha)													
0-4	4 0.078 4-8 0.014													
Total Area	Contributing (ha) = 0.092													
Total Pi	ipe Volume (m³) = 1.614													
Free Flowing	Outfall Details for Storm													
Outfall Outfall C Pipe Number Name	C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)													
1.007 SEWER	7.510 5.150 5.150 1000 0													
Simulatio	on Criteria for Storm													
Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogr Number of Online Cont	1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m ³ /ha Storage 0 Run Time (mins) 0.500 Output Interval (mins) caphs 0 Number of Storage Structures 1 crols 1 Number of Time/Area Diagrams 0 crols 0	v 0.000 2.000 1440 1												
Sunthat	ic Rainfall Details													
bynenee														
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Wint 2 Cv (Summer) 0.7 and and Wales Cv (Winter) 0.8 18.000 Storm Duration (mins) 0.350	er 50 40 60												
Hamilton Te	chnical S	ervic	es									Pa	ige 2	
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1 Chiltern	Ave			I	Royal	Oak,	Bre	eck	Rd, Po	oulto	on			
Euxton				I	Proposed SW Simulations						4			
Chorley PR	.7 6NU				1 in 2 Yr Storms							Jun		
Date 17.12.	I	Desig	ned b	y Ge	eoff	Hami	lton							
File ROYAL	OAK NEW S	W.MDX			Check	ed bv	-						rain	age
Micro Drain	age	-		1	Vetwo	rk 20	14.1	L						
	-) -					-								
		<u>C</u>	nli	lne C	ontro	ols fo	or S	tor	m					
Hydro-	Brake Ont	່າຫາງພ	Мэ	nhol	 13	ng /	DN.	1 (106 V	مررات		3).	2 9	
<u>IIyur 0-</u>	blake opt		Mа	IIIIOI	e. IJ	, 037	E IN .	1 • V	JUO, V	ULUIII	= (111	•)•	2.9	
				Unit	Refere	nce MD	-SHE-	-013	1-1000-2	2000-1	000			
			D	esign	Head	(m)				2.	000			
			Des	ign F	low (l	/s)			-	1	0.0			
				F	lush-F Object	lom ive M	inim	ico	Ca unstrear	alcula n stor	ited			
				Diam	eter (mm)	±11±111.	136	upscrear		131			
			In	vert	Level	(m)				5.	190			
	Minimum (Dutlet 1	Pipe	Diam	eter (mm)					150			
	Suggest	ed Manl	hole	Diam	eter (mm)				1	500			
Control	Points	Head	(m)	Flow	(l/s)		Cont	rol	Points		Head	(m)	Flow	(l/s)
Design Point	(Calculated)	2.	000		10.0				Kick-	Flo®	1.	167		7.8
	Flush-Flo ^r	м О.	569		9.8	Mean H	Flow	over	Head R	ange		-		8.7
Hydro-Brake invalidated Depth (m)	Optimum® be	Depth	sed (m)	then Flow	these (1/s)	storag Depth	e rou (m)	utino Flor	g calcul w (l/s)	Depth	ns wil	ll be Flor	w (1/s	5)
0.100	4.7	1.	200		7.9	3.	.000		12.1	-	7.000		18.	.1
0.200	8.3	1.	400		8.5	3.	.500		13.0	-	7.500		18.	. 7
0.300	9.2	1.	600		9.0	4.	.000		13.9	8	3.000		19.	.3
0.400	9.8	1.	000		9.5	4.5	.000		14.7	c (9.000		20	.9
0.600	9.8	2.	200		10.5	5.	.500		16.2	9	.500		21.	.0
0.800	9.6	2.	400		10.9	6.	.000		16.8					
1.000	9.0	2.	600		11.3	6.	.500		17.5					
			<u>@1</u>	982-2	014	{P < \	111+ 1	000						

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 2 Yr Storms	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	.000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	.801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L'
Chorley PR7 6NU	1 in 2 Yr Storms	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Summary of Results for 60 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (1/s)	Pipe Flow (l/s)	Status
1 000	1	7 010	0 007	0 000	0 0 1	0.0	0 0	07
1.000	T	1.013	-0.08/	0.000	0.04	0.0	0.3	OK
1.001	2	6.919	-0.081	0.000	0.08	0.0	0.5	OK
1.002	3	6.830	-0.070	0.000	0.20	0.0	1.2	OK
1.003	4	5.534	-0.116	0.000	0.12	0.0	1.6	OK
1.004	5	5.433	-0.117	0.000	0.10	0.0	1.6	OK
2.000	6	7.022	-0.078	0.000	0.11	0.0	0.8	OK
3.000	7	5.416	0.006	0.000	0.11	0.0	1.0	SURCHARGED
1.005	8	5.413	0.033	0.000	0.50	0.0	4.7	SURCHARGED
4.000	9	7.013	-0.087	0.000	0.04	0.0	0.3	OK
4.001	10	6.894	-0.076	0.000	0.13	0.0	0.8	OK
5.000	11	7.025	-0.075	0.000	0.14	0.0	0.8	OK
5.001	12	6.880	-0.070	0.000	0.20	0.0	1.2	OK
1.006	13	5.396	0.056	0.000	0.58	0.0	6.3	SURCHARGED
1.007	14	5.252	-0.068	0.000	0.58	0.0	6.3	OK

Hamilton Technical Services	Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton
Euxton	Proposed SW Simulations
Chorley PR7 6NU	1 in 30 Yr Storms + CC
Date 17.12.2019	Designed by Geoff Hamilton
File ROYAL OAK NEW SW.MDX	Checked by
Micro Drainage	Network 2014.1
<u>Time Are</u>	ea Diagram for Storm
Time (mins)	Area Time Area) (ha) (mins) (ha)
0-4	4 0.078 4-8 0.014
Total Area	Contributing (ha) = 0.092
Total Pi	ipe Volume (m³) = 1.614
Free Flowing	Outfall Details for Storm
Outfall Outfall C Pipe Number Name	C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)
1.007 SEWER	7.510 5.150 5.150 1000 0
Simulatio	on Criteria for Storm
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogr Number of Online Cont	0.840 Foul Sewage per hectare (1/s) 0.000 1.000 Additional Flow - % of Total Flow 35.000 0 MADD Factor * 10m ³ /ha Storage 2.000 0 Run Time (mins) 1440 0.500 Output Interval (mins) 1 Taphs 0 Number of Storage Structures 1 rols 1 Number of Time/Area Diagrams 0
Number of Offline Cont	rols 0
Synthet	ic Rainfall Details
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Winter 30 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 15 0.350

Hamilton Technical Services	Page 2
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton
Euxton	Proposed SW Simulations
Chorley PR7 6NU	1 in 30 Yr Storms + CC
Date 17.12.2019	Designed by Geoff Hamilton
File ROYAL OAK NEW SW.MDX	Checked by
Micro Drainage	Network 2014.1
Online	Controls for Storm
Hydro-Brake Optimum® Manho	ole: 13, DS/PN: 1.006, Volume (m³): 2.9
Unit	- Defense MD CHE 0121 1000 2000 1000
Desia	gn Head (m) 2.000
Design	Flow (1/s) 10.0
	Flush-Flo™ Calculated
,	Objective Minimise upstream storage ameter (mm) 131
Invert	t Level (m) 5.190
Minimum Outlet Pipe Dia	ameter (mm) 150
Suggested Manhole Dia	ameter (mm) 1500
Control Points Head (m) Flow	ow (l/s) Control Points Head (m) Flow (l/s)
Design Reint (Calculated) 2 000	10.0 Kick Flog 1.167 7.9
Flush-Flo™ 0.569	9.8 Mean Flow over Head Range – 8.7
invalidated Depth (m) Flow (1/s) Depth (m) Flow 0.100 4.7 1.200 0.200 8.3 1.400 0.300 9.2 1.600 0.400 9.6 1.800 0.500 9.8 2.000 0.600 9.8 2.200 0.800 9.6 2.400 1.000 9.0 2.600	Depth (m) Flow (1/s) Depth (m) Flow (1/s) 7.9 3.000 12.1 7.000 18.1 8.5 3.500 13.0 7.500 18.7 9.0 4.000 13.9 8.000 19.3 9.5 4.500 14.7 8.500 19.9 10.0 5.000 15.4 9.000 20.5 10.5 5.500 16.2 9.500 21.0 10.9 6.000 16.8 11.3 6.500 17.5
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Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 30 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 30 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Dialitage
Micro Drainage	Network 2014.1	
Summary of Results for	15 minute 30 year Winter (Storm	n)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

	US/MH	Water Level	Surcharged Depth	Flooded Volume	Flow /	Overflow	Pipe Flow	
PN	Name	(m)	(m)	(m³)	Cap.	(1/s)	(l/s)	Status
1.000	1	7.030	-0.070	0.000	0.20	0.0	1.3	OK
1.001	2	6.945	-0.055	0.000	0.42	0.0	2.5	OK
1.002	3	6.897	-0.003	0.000	1.00	0.0	6.0	OK
1.003	4	6.322	0.672	0.000	0.40	0.0	5.4	SURCHARGED
1.004	5	6.313	0.763	0.000	0.22	0.0	3.6	SURCHARGED
2.000	6	7.053	-0.047	0.000	0.55	0.0	3.8	OK
3.000	7	6.308	0.898	0.000	0.31	0.0	2.9	SURCHARGED
1.005	8	6.304	0.924	0.000	1.50	0.0	14.1	SURCHARGED
4.000	9	7.030	-0.070	0.000	0.20	0.0	1.3	OK
4.001	10	6.932	-0.038	0.000	0.69	0.0	4.2	OK
5.000	11	7.062	-0.038	0.000	0.70	0.0	4.2	OK
5.001	12	6.933	-0.017	0.000	1.00	0.0	6.2	OK
1.006	13	6.280	0.940	0.000	0.90	0.0	9.8	SURCHARGED
1.007	14	5.281	-0.039	0.000	0.90	0.0	9.8	OK

Hamilton Technical Services	Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton
Euxton	Proposed SW Simulations
Chorley PR7 6NU	1 in 30 Yr Storms + CC
Date 17.12.2019	Designed by Geoff Hamilton
File ROYAL OAK NEW SW.MDX	Checked by
Micro Drainage	Network 2014.1
<u>Time Are</u>	ea Diagram for Storm
Time (mins)	Area Time Area) (ha) (mins) (ha)
0-4	4 0.078 4-8 0.014
Total Area	Contributing (ha) = 0.092
Total Pi	ipe Volume (m³) = 1.614
Free Flowing	Outfall Details for Storm
Outfall Outfall C Pipe Number Name	C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)
1.007 SEWER	7.510 5.150 5.150 1000 0
Simulatio	on Criteria for Storm
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogr	0.840 Foul Sewage per hectare (1/s) 0.000 1.000 Additional Flow - % of Total Flow 35.000 0 MADD Factor * 10m ³ /ha Storage 2.000 0 Run Time (mins) 1440 0.500 Output Interval (mins) 1 raphs 0 Number of Storage Structures 1
Number of Online Cont Number of Offline Cont	rols 1 Number of Time/Area Diagrams 0 rols 0
Synthet	ic Rainfall Details
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Winter 30 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 30 0.350

Hamilton Technical Services	Page 2
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton
Euxton	Proposed SW Simulations
Chorley PR7 6NU	1 in 30 Yr Storms + CC
Date 17.12.2019	Designed by Geoff Hamilton
File ROYAL OAK NEW SW.MDX	Checked by
Micro Drainage	Network 2014.1
Online	Controls for Storm
Hydro-Brake Optimum® Manho	ole: 13, DS/PN: 1.006, Volume (m³): 2.9
Unit	- Defense MD CHE 0121 1000 2000 1000
Desia	gn Head (m) 2.000
Design	Flow (1/s) 10.0
	Flush-Flo™ Calculated
,	Objective Minimise upstream storage ameter (mm) 131
Invert	t Level (m) 5.190
Minimum Outlet Pipe Dia	ameter (mm) 150
Suggested Manhole Dia	ameter (mm) 1500
Control Points Head (m) Flow	ow (l/s) Control Points Head (m) Flow (l/s)
Design Reint (Calculated) 2 000	10.0 Kick Flog 1.167 7.9
Flush-Flo™ 0.569	9.8 Mean Flow over Head Range - 8.7
invalidated Depth (m) Flow (1/s) Depth (m) Flow 0.100 4.7 1.200 0.200 8.3 1.400 0.300 9.2 1.600 0.400 9.6 1.800 0.500 9.8 2.000 0.600 9.8 2.200 0.800 9.6 2.400 1.000 9.0 2.600	Depth (m) Flow (1/s) Depth (m) Flow (1/s) 7.9 3.000 12.1 7.000 18.1 8.5 3.500 13.0 7.500 18.7 9.0 4.000 13.9 8.000 19.3 9.5 4.500 14.7 8.500 19.9 10.0 5.000 15.4 9.000 20.5 10.5 5.500 16.2 9.500 21.0 10.9 6.000 16.8 11.3 6.500 17.5
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Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 30 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 30 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

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

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (1/s)	Pipe Flow (l/s)	Status
1.000	1	7.026	-0.074	0.000	0.15	0.0	1.0	OK
1.001	2	6.939	-0.061	0.000	0.32	0.0	1.9	OK
1.002	3	6.868	-0.032	0.000	0.79	0.0	4.8	OK
1.003	4	6.466	0.816	0.000	0.32	0.0	4.3	SURCHARGED
1.004	5	6.458	0.908	0.000	0.22	0.0	3.6	SURCHARGED
2.000	6	7.045	-0.055	0.000	0.41	0.0	2.9	OK
3.000	7	6.454	1.044	0.000	0.26	0.0	2.5	SURCHARGED
1.005	8	6.450	1.070	0.000	1.30	0.0	12.3	SURCHARGED
4.000	9	7.026	-0.074	0.000	0.15	0.0	1.0	OK
4.001	10	6.922	-0.048	0.000	0.52	0.0	3.2	OK
5.000	11	7.052	-0.048	0.000	0.53	0.0	3.2	OK
5.001	12	6.916	-0.034	0.000	0.77	0.0	4.8	OK
1.006	13	6.428	1.088	0.000	0.90	0.0	9.8	SURCHARGED
1.007	14	5.281	-0.039	0.000	0.90	0.0	9.8	OK

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd. Poulton	
	Proposed SW Simulations	4
Chorley PR7 6NII	1 in 30 Yr Storms + CC	m
Date 17 12 2019	Designed by Gooff Mamilton	MICro
Date 17.12.2019	Charlach by Georg Hamilton	Drainage
FILE ROYAL OAK NEW SW.MDX	Checked by	
Micro Drainage	Network 2014.1	
Time Are	ea Diagram for Storm	
Time (mins)	Area Time Area) (ha) (mins) (ha)	
0-4	4 0.078 4-8 0.014	
Total Area	Contributing (ha) = 0.092	
Total Pi	ipe Volume (m³) = 1.614	
Free Flowing	Outfall Details for Storm	
Outfall Outfall C Pipe Number Name	C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)	
1.007 SEWER	7.510 5.150 5.150 1000 0	
Simulatio	on Criteria for Storm	
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global)	0.840 Foul Sewage per hectare (1/s) 1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m ³ /ha Storage 0 Run Time (mins) 0.500 Output Interval (mins)	0.000 35.000 2.000 1440 1
Number of Input Hydrogr Number of Online Cont Number of Offline Cont	aphs 0 Number of Storage Structures 1 rols 1 Number of Time/Area Diagrams 0 rols 0	
Synthet	ic Rainfall Details	
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Wint 30 Cv (Summer) 0.7 and and Wales Cv (Winter) 0.8 18.000 Storm Duration (mins) 0.350	er 50 40 60

Hamilton Technical Services	Page 2
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton
Euxton	Proposed SW Simulations
Chorley PR7 6NU	1 in 30 Yr Storms + CC
Date 17.12.2019	Designed by Geoff Hamilton
File ROYAL OAK NEW SW.MDX	Checked by
Micro Drainage	Network 2014.1
Online	Controls for Storm
Hydro-Brake Optimum® Manho	ole: 13, DS/PN: 1.006, Volume (m³): 2.9
Unit	- Defense MD CHE 0121 1000 2000 1000
Desia	gn Head (m) 2.000
Design	Flow (1/s) 10.0
	Flush-Flo™ Calculated
,	Objective Minimise upstream storage ameter (mm) 131
Invert	t Level (m) 5.190
Minimum Outlet Pipe Dia	ameter (mm) 150
Suggested Manhole Dia	ameter (mm) 1500
Control Points Head (m) Flow	ow (l/s) Control Points Head (m) Flow (l/s)
Design Reint (Calculated) 2 000	10.0 Kick Flog 1.167 7.9
Flush-Flo™ 0.569	9.8 Mean Flow over Head Range – 8.7
invalidated Depth (m) Flow (1/s) Depth (m) Flow 0.100 4.7 1.200 0.200 8.3 1.400 0.300 9.2 1.600 0.400 9.6 1.800 0.500 9.8 2.000 0.600 9.8 2.200 0.800 9.6 2.400 1.000 9.0 2.600	Depth (m) Flow (1/s) Depth (m) Flow (1/s) 7.9 3.000 12.1 7.000 18.1 8.5 3.500 13.0 7.500 18.7 9.0 4.000 13.9 8.000 19.3 9.5 4.500 14.7 8.500 19.9 10.0 5.000 15.4 9.000 20.5 10.5 5.500 16.2 9.500 21.0 10.9 6.000 16.8 11.3 6.500 17.5
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Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 30 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 30 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	
Summary of Results for	60 minute 30 year Winter (Storm	n)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

	US/MH	Water Level	Surcharged Depth	Flooded Volume	Flow /	Overflow	Pipe Flow	
PN	Name	(m)	(m)	(m³)	Cap.	(1/s)	(l/s)	Status
1.000	1	7.021	-0.079	0.000	0.10	0.0	0.6	OK
1.001	2	6.931	-0.069	0.000	0.21	0.0	1.3	OK
1.002	3	6.852	-0.048	0.000	0.53	0.0	3.2	OK
1.003	4	6.161	0.511	0.000	0.24	0.0	3.2	SURCHARGED
1.004	5	6.153	0.603	0.000	0.17	0.0	2.8	SURCHARGED
2.000	6	7.036	-0.064	0.000	0.28	0.0	1.9	OK
3.000	7	6.147	0.737	0.000	0.22	0.0	2.0	SURCHARGED
1.005	8	6.143	0.763	0.000	1.03	0.0	9.7	SURCHARGED
4.000	9	7.021	-0.079	0.000	0.10	0.0	0.6	OK
4.001	10	6.911	-0.059	0.000	0.35	0.0	2.1	OK
5.000	11	7.041	-0.059	0.000	0.36	0.0	2.1	OK
5.001	12	6.901	-0.049	0.000	0.51	0.0	3.2	OK
1.006	13	6.116	0.776	0.000	0.90	0.0	9.8	SURCHARGED
1.007	14	5.281	-0.039	0.000	0.90	0.0	9.8	OK

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	Y a
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Dialitacje
Micro Drainage	Network 2014.1	
<u>Time Are</u> Time (mins) 0-4 Total Area	Area Time Area (ha) (mins) (ha) 4 0.078 4-8 0.014	
Total Pi Free Flowing	Outfall Details for Storm	
Outfall Outfall C Pipe Number Name	C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)	
1.007 SEWER	7.510 5.150 5.150 1000 0	
Simulatio	on Criteria for Storm	
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogr Number of Online Cont	0.840 Foul Sewage per hectare (l/s) 1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m ³ /ha Storage 0 Run Time (mins) 0.500 Output Interval (mins) caphs 0 Number of Storage Structures 1 rols 1 Number of Time/Area Diagrams 0	0.000 35.000 2.000 1440 1
Number of Offline Cont	ic Rainfall Details	
<u>oynenee</u>	io naimair becario	
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Wint 100 Cv (Summer) 0.7 and and Wales Cv (Winter) 0.8 18.000 Storm Duration (mins) 0.350	er 50 40 15

I manite com recommendation	Services					Page 2			
1 Chiltern Ave		Royal	Oak, Breck	k Rd, Po	ulton	<u>(</u>			
Euxton		Propo	sed SW Simu	ulations		4			
Chorley PR7 6NU		1 in 1	100 Yr Stor	rms + CC		Micco			
Date 17.12.2019		Desig	ned by Geof	f Hamil	ton				
File BOYAL OAK NEW S	SW.MDX	Check	ed by			Urainage			
Micro Drainage		Netwo	rk 2014.1						
	Onli	ne Contro	ols for Sto	rm					
Hydro-Brake Op	cimum® Mai	nhole: 13	, DS/PN: 1	.006, Vo	lume (m³): 2.9			
	1	Unit Refere	nce MD-SHE-01	31-1000-20	000-1000				
	Dea	esign Head	(m)		2.000				
Design Flow (1/s) 10.0 Flush-Flo™ Calculated									
		Object	ive Minimise	upstream	storage				
		Diameter (mm)	-	131				
	In	vert Level	(m)		5.190				
Minimum	Outlet Pipe	Diameter (mm)		150 1500				
Sugges			autoria di contra di	Deinte	1300	··· ·· · · · · · · · · · · · · · · · ·			
Control Points	Head (m)	FIOW (1/S)	Control	Points	Head (m) FIOW (I/S)			
Design Point (Calculated Flush-Flo) 2.000 ™ 0.569	10.0 9.8	Mean Flow ove	Kıck-F er Head Ra	lo® 1.1 nge	.6/ /.8			
Hydro-Brake Optimum® b invalidated Depth (m) Flow (1/s)	e utilised (m)	then these	storage routi Depth (m) Fl	ng calcula ow (l/s)	ations will Depth (m) 1	be Flow (l/s)			
0.100 4.7	1.200	7.9	3.000	12.1	7.000	18.1			
0.200 8.3	1.400	8.5	3.500	13.0	7.500	18.7			
0.300 9.2	1.600	9.0	4.000	13.9	8.000				
0.500 9.8	1.000	5.5		14 / 1	8 500	19.3			
0 000 0 0	2.000	10.0	5.000	14.7	8.500 9.000	19.3 19.9 20.5			
0.600 9.8	2.000 2.200	10.0 10.5	5.000	14.7 15.4 16.2	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8	2.000 2.200 2.400	10.0 10.5 10.9	5.000 5.500 6.000	14.7 15.4 16.2 16.8	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

	Hamilton Technical Services										
1 Chiltern Av	e			Royal C)ak, Br	eck Rd,	Poul	ton 🔽			
Euxton				Propose	ed SW S	imulati	ons		1		
Chorley PR7	6NU			1 in 100 Yr Storms + CC					Airco		
Date 17.12.20	19			Designe	ed by G	eoff Ha	miltc	on A			
File ROYAL OA	K NEW	SW.MI	X	Checked	l by				Janage		
Micro Drainag	e			Network	2014.	1					
Summary of Results for 15 minute 100 year Winter (Storm)											
Commany of Rebuilds for 15 minute 100 year winteer (btolm)											
Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF											
	5		Analys	is Timest	ep Fine	e Inertia	Statu	IS OFF			
			-	DTS Stat	us Ol	N					
		Water	Surcharged	Flooded	,		Pipe				
		T orro 1	Donth	TTo lumo	T 1 /	A C 1	F1				
DN	Nome	Tever	Depcii	vorume (m3)	FIOW /	Overiiow	F10W	Chatwa			
PN	Name	(m)	(m)	(m ³)	Cap.	(1/s)	(1/s)	Status			
PN 1.000	Name	(m)	(m) -0.066	(m ³)	Cap.	(1/s)	(1/s)	Status OK			
PN 1.000 1.001	Name 1	(m) 7.034 6.980	(m) -0.066 -0.020	(m ³) 0.000 0.000	Cap. 0.25 0.51	(1/s) 0.0 0.0	(1/s) 1.6 3.1	Status OK OK			
PN 1.000 1.001 1.002	Name 1 2 3	(m) 7.034 6.980 6.971	(m) -0.066 -0.020 0.071	(m ³) 0.000 0.000 0.000	Cap. 0.25 0.51 1.25	(1/s) 0.0 0.0 0.0	(1/s) 1.6 3.1 7.5	Status OK OK SURCHARGED			
PN 1.000 1.001 1.002 1.003	Name 1 2 3 4	(m) 7.034 6.980 6.971 6.961	(m) -0.066 -0.020 0.071 1.311	(m ³) 0.000 0.000 0.000 0.000	Cap. 0.25 0.51 1.25 0.42	(1/s) 0.0 0.0 0.0 0.0	(1/s) 1.6 3.1 7.5 5.6	Status OK OK SURCHARGED SURCHARGED			
PN 1.000 1.001 1.002 1.003 1.004	Name 1 2 3 4 5	(m) 7.034 6.980 6.971 6.961 6.953	(m) -0.066 -0.020 0.071 1.311 1.403	(m ³) 0.000 0.000 0.000 0.000 0.000	Cap. 0.25 0.51 1.25 0.42 0.27	(1/s) 0.0 0.0 0.0 0.0 0.0	(1/s) 1.6 3.1 7.5 5.6 4.5	Status OK SURCHARGED SURCHARGED SURCHARGED			
PN 1.000 1.001 1.002 1.003 1.004 2.000	Name 1 2 3 4 5 6	(m) 7.034 6.980 6.971 6.961 6.953 7.062	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000	Cap . 0.25 0.51 1.25 0.42 0.27 0.70	(1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(1/s) 1.6 3.1 7.5 5.6 4.5 4.9	Status OK SURCHARGED SURCHARGED SURCHARGED OK			
PN 1.000 1.001 1.002 1.003 1.004 2.000 3.000	Name 1 2 3 4 5 6 7	(m) 7.034 6.980 6.971 6.961 6.953 7.062 6.951	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038 1.541	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Cap. 0.25 0.51 1.25 0.42 0.27 0.70 0.38	(1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(1/s) 1.6 3.1 7.5 5.6 4.5 4.9 3.6	Status OK SURCHARGED SURCHARGED SURCHARGED OK SURCHARGED			
PN 1.000 1.001 1.002 1.003 1.004 2.000 3.000 1.005	Name 1 2 3 4 5 6 7 8	(m) 7.034 6.980 6.971 6.961 6.953 7.062 6.951 6.951 6.946	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038 1.541 1.566	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Cap. 0.25 0.51 1.25 0.42 0.27 0.70 0.38 1.82	(1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(1/s) 1.6 3.1 7.5 5.6 4.5 4.9 3.6 17.2	Status OK SURCHARGED SURCHARGED SURCHARGED OK SURCHARGED SURCHARGED			
PN 1.000 1.001 1.002 1.003 1.004 2.000 3.000 1.005 4.000	Name 1 2 3 4 5 6 7 8 9	(m) 7.034 6.980 6.971 6.961 6.953 7.062 6.951 6.946 7.035	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038 1.541 1.566 -0.065	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Cap. 0.25 0.51 1.25 0.42 0.27 0.70 0.38 1.82 0.26	(1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(1/s) 1.6 3.1 7.5 5.6 4.5 4.9 3.6 17.2 1.6	Status OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED SURCHARGED OK			
PN 1.000 1.001 1.002 1.003 1.004 2.000 3.000 1.005 4.000 4.001	1 2 3 4 5 6 7 8 9 10	(m) 7.034 6.980 6.971 6.961 6.953 7.062 6.951 6.946 7.035 6.944	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038 1.541 1.566 -0.065 -0.026	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 0.25 0.51 1.25 0.42 0.27 0.70 0.38 1.82 0.26 0.89	(1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(1/s) 1.6 3.1 7.5 5.6 4.5 4.9 3.6 17.2 1.6 5.5	Status OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED SURCHARGED OK OK			
PN 1.000 1.001 1.002 1.003 1.004 2.000 3.000 1.005 4.000 4.001 5.000	Name 1 2 3 4 5 6 7 8 9 10 11	(m) 7.034 6.980 6.971 6.961 6.953 7.062 6.951 6.946 7.035 6.944 7.100	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038 1.541 1.566 -0.065 -0.026 0.000	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 0.25 0.51 1.25 0.42 0.27 0.70 0.38 1.82 0.26 0.89 0.84	(1/s) (1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(1/s) 1.6 3.1 7.5 5.6 4.5 4.9 3.6 17.2 1.6 5.5 5.0	Status OK SURCHARGED SURCHARGED SURCHARGED SURCHARGED OK SURCHARGED OK SURCHARGED			
PN 1.000 1.001 1.002 1.003 1.004 2.000 3.000 1.005 4.000 4.001 5.000 5.001	Name 1 2 3 4 5 6 7 8 9 10 11 12 2	(m) 7.034 6.980 6.971 6.961 6.953 7.062 6.951 6.946 7.035 6.944 7.100 6.992	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038 1.541 1.566 -0.065 -0.026 0.000 0.042	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap . 0.25 0.51 1.25 0.42 0.27 0.70 0.38 1.82 0.26 0.89 0.84 1.20	(1/s) (1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(1/s) 1.6 3.1 7.5 5.6 4.5 3.6 17.2 1.6 5.5 5.0 7.5	Status OK OK SURCHARGED SURCHARGED OK SURCHARGED OK SURCHARGED SURCHARGED			
PN 1.000 1.001 1.002 1.003 1.004 2.000 3.000 1.005 4.000 4.001 5.000 5.001 1.006	Name 1 2 3 4 5 6 7 8 9 10 11 12 13 3	(m) 7.034 6.980 6.971 6.961 6.953 7.062 6.951 6.946 7.035 6.944 7.100 6.992 6.921	(m) -0.066 -0.020 0.071 1.311 1.403 -0.038 1.541 1.566 -0.065 -0.026 0.000 0.042 1.581	(m ³) 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	Flow / Cap. 0.25 0.51 1.25 0.42 0.27 0.70 0.38 1.82 0.26 0.89 0.84 1.20 0.90	(1/s) (1/s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	(1/s) 1.6 3.1 7.5 5.6 4.5 4.9 3.6 17.2 1.6 5.5 5.0 7.5 9.8	Status OK OK SURCHARGED SURCHARGED OK SURCHARGED OK SURCHARGED SURCHARGED SURCHARGED			

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	M.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	
<u>Time Are</u> Time (mins) 0-4	Area Time Area (mins) (ha) 4 0.078 4-8 0.014	
Total Area Total Pi	Contributing (ha) = 0.092 ipe Volume (m ³) = 1.614	
Outfall Outfall C Pipe Number Name	C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)	
1.007 SEWER	7.510 5.150 5.150 1000 0	
Simulatic	on Criteria for Storm	
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global)	0.840 Foul Sewage per hectare (l/s) 1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m ³ /ha Storage 0 Run Time (mins) 0.500 Output Interval (mins)	0.000 35.000 2.000 1440 1
Number of Input Hydrogr Number of Online Cont Number of Offline Cont	aphs 0 Number of Storage Structures 1 crols 1 Number of Time/Area Diagrams 0 crols 0	
Synthet	ic Rainfall Details	
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Wint 100 Cv (Summer) 0.7 and and Wales Cv (Winter) 0.8 18.000 Storm Duration (mins) 0.350	er 50 40 30

I manite com recommendation	Services					Page 2			
1 Chiltern Ave		Royal	Oak, Breck	k Rd, Po	ulton	[
Euxton		Propo	sed SW Simu	ulations		4			
Chorley PR7 6NU		1 in 1	100 Yr Stor	rms + CC		Micco			
Date 17.12.2019		Desig	ned by Geof	f Hamil	ton				
File BOYAL OAK NEW S	SW.MDX	Check	ed by			Urainage			
Micro Drainage		Netwo	rk 2014.1						
	Onli	ne Contro	ols for Sto	rm					
Hydro-Brake Op	cimum® Mai	nhole: 13	, DS/PN: 1	.006, Vo	lume (m³): 2.9			
	1	Unit Refere	nce MD-SHE-01	31-1000-20	000-1000				
	Dea	esign Head	(m)		2.000				
Design Flow (1/s) 10.0 Flush-Flo™ Calculated									
		Object	ive Minimise	upstream	storage				
		Diameter (mm)	-	131				
	In	vert Level	(m)		5.190				
Minimum	Outlet Pipe	Diameter (mm)		150 1500				
Sugges			autoria di contra di	Deinte	1300	··· ·· · · · · · · · · · · · · · · · ·			
Control Points	Head (m)	FIOW (1/S)	Control	Points	Head (m) FIOW (I/S)			
Design Point (Calculated Flush-Flo) 2.000 ™ 0.569	10.0 9.8	Mean Flow ove	Kıck-F er Head Ra	lo® 1.1 nge	.6/ /.8			
Hydro-Brake Optimum® b invalidated Depth (m) Flow (1/s)	e utilised (m)	then these	storage routi Depth (m) Fl	ng calcula ow (l/s)	ations will Depth (m) 1	be Flow (l/s)			
0.100 4.7	1.200	7.9	3.000	12.1	7.000	18.1			
0.200 8.3	1.400	8.5	3.500	13.0	7.500	18.7			
0.300 9.2	1.600	9.0	4.000	13.9	8.000				
0.500 9.8	1.000	5.5		14 / 1	8 500	19.3			
0 000 0 0	2.000	10.0	5.000	14.7	8.500 9.000	19.3 19.9 20.5			
0.600 9.8	2.000 2.200	10.0 10.5	5.000	14.7 15.4 16.2	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8	2.000 2.200 2.400	10.0 10.5 10.9	5.000 5.500 6.000	14.7 15.4 16.2 16.8	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Tech	P	age 4							
1 Chiltern Av	e			Royal C	ak, Br	eck Rd,	Poul	.ton 🔽	
Euxton				Proposed SW Simulations					1
Chorley PR7	6NU			1 in 100 Yr Storms + CC					Aicco
Date 17.12.20	19			Designe	ed by G	eoff Ha	milto	n	
File ROYAL OA	K NEW	SW.M	DX	Checked	l bv				Jrainage
Micro Drainag	e			Network	2014	1			
MICLO DIALMAGE NELWOIK 2014.1									
Summ	ary o	f Res	ults for	30 minu	ite 100	year W	inter	(Storm)	
	Margin	for F1	Lood Risk Wa	arning (m	m) 200.0	0 DVD	Statu	s OFF	
			Analys	is Timest	ep Fine	e Inertia	Statu	s OFF	
				DTS Stat	us Ol	N			
		Wator	Surcharged	Flooded			Pipe		
	US/MH	Level	Depth	Volume	Flow /	Overflow	Flow		
PN	Name	(m)	(m)	(m ³)	Cap.	(1/s)	(1/s)	Status	
1.000	1	7.104	0.004	0.000	0.20	0.0	1.3	SURCHARGET)
1.001	2	7.102	0.102	0.000	0.41	0.0	2.5	SURCHARGEI)
1.002	3	7.098	0.198	0.000	1.00	0.0	6.0	SURCHARGEI)
1.003	4	7.087	1.437	0.000	0.37	0.0	4.9	SURCHARGEI)
1.004	5	7.079	1.529	0.000	0.28	0.0	4.7	SURCHARGEI)
2.000	6	7.082	-0.018	0.000	0.54	0.0	3.8	OF	t
3.000	7	7.078	1.668	0.000	0.30	0.0	2.8	SURCHARGEI)
1.005	8	7.072	1.692	0.000	1.47	0.0	13.9	FLOOD RISK	ţ
4.000	9	7.057	-0.043	0.000	0.20	0.0	1.3	OF	C
4.001	10	7.054	0.084	0.000	0.68	0.0	4.2	SURCHARGEI)
5.000	11	7.069	-0.031	0.000	0.69	0.0	4.2	OF	C
5.001	12	7.058	0.108	0.000	1.00	0.0	6.3	SURCHARGEI)
1.006	13	7.046	1.706	0.000	0.90	0.0	9.8	SURCHARGEI)
1.007	14	5.281	-0.039	0.000	0.90	0.0	9.8	OF	,

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	Y a
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Digitigh
Micro Drainage	Network 2014.1	
Time Are	ea Diagram for Storm	
Time	Area Time Area) (ha) (mins) (ha)	
	, (, , (, , (, ,	
0	4 0.078 4-8 0.014	
Total Area	Contributing (ha) = 0.092	
Total P:	ipe Volume (m³) = 1.614	
Free Flowing	Outfall Details for Storm	
	oderari becarib ior beorm	
Outfall Outfall C	C. Level I. Level Min D,L W	
Pipe Number Name	(m) (m) I. Level (mm) (mm)	
	(m)	
1.007 SEWER	7.510 5.150 5.150 1000 0	
Simulatio	on Criteria for Storm	
Volumetric Runoff Coeff	0.840 Foul Sewage per hectare (1/s)	0.000
Areal Reduction Factor	1.000 Additional Flow - % of Total Flow	35.000
Hot Start (mins)	0 MADD Factor * 10m ³ /ha Storage	2.000
Manhole Headloss Coeff (Global)	0.500 Output Interval (mins)	1440
Number of Input Hydrogr Number of Online Cont	caphs 0 Number of Storage Structures 1	
Number of Offline Cont	crols 0	
Synthet	ic Rainfall Details	
Return Period (vears)	100 Cv (Summer) 0.7	750
Region Engla	and and Wales Cv (Winter) 0.8	340
M5-60 (mm)	18.000 Storm Duration (mins)	60
Katio K	0.330	

I manite com recommendation	Services					Page 2			
1 Chiltern Ave		Royal	Oak, Breck	k Rd, Po	ulton	[
Euxton		Propo	sed SW Simu	ulations		4			
Chorley PR7 6NU		1 in 1	100 Yr Stor	rms + CC		Micco			
Date 17.12.2019		Desig	ned by Geof	f Hamil	ton				
File BOYAL OAK NEW S	SW.MDX	Check	ed by			Urainage			
Micro Drainage		Netwo	rk 2014.1						
	Onli	ne Contro	ols for Sto	rm					
Hydro-Brake Op	cimum® Mai	nhole: 13	, DS/PN: 1	.006, Vo	lume (m³): 2.9			
	1	Unit Refere	nce MD-SHE-01	31-1000-20	000-1000				
	Dea	esign Head	(m)		2.000				
Design Flow (1/s) 10.0 Flush-Flo™ Calculated									
		Object	ive Minimise	upstream	storage				
		Diameter (mm)	-	131				
	In	vert Level	(m)		5.190				
Minimum	Outlet Pipe	Diameter (mm)		150 1500				
Sugges			autoria di contra di	Deinte	1300	··· ·· · · · · · · · · · · · · · · · ·			
Control Points	Head (m)	FIOW (1/S)	Control	Points	Head (m) FIOW (I/S)			
Design Point (Calculated Flush-Flo) 2.000 ™ 0.569	10.0 9.8	Mean Flow ove	Kıck-F er Head Ra	lo® 1.1 nge	.6/ /.8			
Hydro-Brake Optimum® b invalidated Depth (m) Flow (1/s)	e utilised (m)	then these	storage routi Depth (m) Fl	ng calcula ow (l/s)	ations will Depth (m) 1	be Flow (l/s)			
0.100 4.7	1.200	7.9	3.000	12.1	7.000	18.1			
0.200 8.3	1.400	8.5	3.500	13.0	7.500	18.7			
0.300 9.2	1.600	9.0	4.000	13.9	8.000				
0.500 9.8	1.000	5.5		14 / 1	8 500	19.3			
0 000 0 0	2.000	10.0	5.000	14.7	8.500 9.000	19.3 19.9 20.5			
0.600 9.8	2.000 2.200	10.0 10.5	5.000	14.7 15.4 16.2	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8	2.000 2.200 2.400	10.0 10.5 10.9	5.000 5.500 6.000	14.7 15.4 16.2 16.8	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0			

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Tech	nical	Serv	ices					Pa	age 4			
1 Chiltern Av	е			Royal C	ak, Br	eck Rd,	Poul	ton 🔽				
Euxton				Propose	ed SW S	imulati	ons		1.			
Chorley PR7	6NU			1 in 10	N	Aicco						
Date 17.12.20	19			Designe	n P							
File ROYAL OA	K NEW	SW.M	DX	Checked by								
Micro Drainag	e			Network	2014.	1						
Summary of Results for 60 minute 100 year Winter (Storm)												
Summary of Results for 60 minute 100 year winter (Storm)												
Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF												
Analysis Timestep Fine Inertia Status OFF												
				DTS Stat	us Ol	N						
		Water	Surcharged	Flooded	1	061	Pipe					
PN	Name	(m)	Deptn (m)	(m ³)	FIOW /	(1/s)	F10W	Status				
	manie	(,	(,	()	oup.	(1)0)	(1,0)	beacab				
1.000	1	7.052	-0.048	0.000	0.13	0.0	0.8	OK				
1.001	2	7.050	0.050	0.000	0.28	0.0	1.7	SURCHARGED				
1.002	3	7.046	0.146	0.000	0.70	0.0	4.2	SURCHARGED				
1.003	4	7.035	1.385	0.000	0.28	0.0	3.8	SURCHARGED				
1.004	5	7.027	1.4//	0.000	0.23	0.0	3./	SURCHARGED				
2.000	6 7	7.042	-0.058	0.000	0.30	0.0	2.5	CUDCUADCED				
1 005	/ 8	7.024	1 639	0.000	1 20	0.0	11 3	FLOOD PICK				
4 000	9	7 024	-0.076	0.000	0 14	0.0	0.8	OK OK				
4.001	10	7.002	0.032	0.000	0.46	0,0	2.8	SURCHARGED				
5.000	11	7.048	-0.052	0.000	0.47	0.0	2.8	OK				
5.001	12	7.005	0.055	0.000	0.68	0.0	4.2	SURCHARGED				
1.006	13	6.993	1.653	0.000	0.90	0.0	9.8	SURCHARGED				
1.007	14	5.281	-0.039	0.000	0.90	0.0	9.8	OK				

Hamilton Technical Services		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	Y
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	1
<u>Time Are</u> Time (mins) 0-4	Area Time Area (ha) (ha) 4-8 0.014	
Total Area Total Pi	Contributing (ha) = 0.092 upe Volume (m ³) = 1.614	
<u>Free Flowing</u> Outfall Outfall C Pipe Number Name	Outfall Details for Storm : Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m)	
1.007 SEWER	7.510 5.150 5.150 1000 0	
Simulatic	on Criteria for Storm	
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogr Number of Online Cont Number of Offline Cont	0.840 Foul Sewage per hectare (l/s) 1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m ³ /ha Storage 0 Run Time (mins) 0.500 Output Interval (mins) aphs 0 Number of Storage Structures 1 rols 1 Number of Time/Area Diagrams 0 rols 0	0.000 35.000 2.000 1440 1
Synthet	ic Rainfall Details	
Rainfall Model Return Period (years) Region Engla M5-60 (mm) Ratio R	FSR Profile Type Wint. 100 Cv (Summer) 0.7 and and Wales Cv (Winter) 0.8 18.000 Storm Duration (mins) 1 0.350	er 50 40 20

I manite com recommendation	Services					Page 2					
1 Chiltern Ave		Royal	Royal Oak, Breck Rd, Poulton								
Euxton		Propo	sed SW Simu	ulations		4					
Chorley PR7 6NU		1 in 1	100 Yr Stor	rms + CC		Micco					
Date 17.12.2019		Desig	ned by Geof	f Hamil	ton						
File BOYAL OAK NEW S	SW.MDX	Check	ed by			Urainage					
Micro Drainage		Netwo	rk 2014.1								
	Onli	ne Contro	ols for Sto	rm							
Hydro-Brake Optimum® Manhole: 13, DS/PN: 1.006, Volume (m³): 2.9											
Unit Reference MD-SHE-0131-1000-2000-1000											
Design Head (m) 2.000											
	Des	ign flow (1 Flush-F	/s) lo™	Ca	IU.U						
		Object	ive Minimise	upstream	storage						
		Diameter (mm)	-	131						
	In	vert Level	(m)		5.190						
Minimum	Outlet Pipe	Diameter (mm)		150 1500						
Sugges			autoria di contra di	Deinte	1300	··· ·· · · · · · · · · · · · · · · · ·					
Control Points	Head (m)	FIOW (1/S)	Control	Points	Head (m) FIOW (I/S)					
Design Point (Calculated Flush-Flo) 2.000 ™ 0.569	10.0 9.8	Mean Flow ove	Kıck-F er Head Ra	lo® 1.1 nge	.6/ /.8					
Hydro-Brake Optimum® b invalidated Depth (m) Flow (1/s)	e utilised (m)	then these	storage routi Depth (m) Fl	ng calcula ow (l/s)	ations will Depth (m) 1	be Flow (l/s)					
0.100 4.7	1.200	7.9	3.000	12.1	7.000	18.1					
0.200 8.3	1.400	8.5	3.500	13.0	7.500	18.7					
0.300 9.2	1.600	9.0	4.000	13.9	8.000						
0.500 9.8	1.000	5.5		14 / 1	8 500	19.3					
0 000 0 0	2.000	10.0	5.000	14.7	8.500 9.000	19.3 19.9 20.5					
0.600 9.8	2.000 2.200	10.0 10.5	5.000	14.7 15.4 16.2	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8	2.000 2.200 2.400	10.0 10.5 10.9	5.000 5.500 6.000	14.7 15.4 16.2 16.8	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L'
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

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

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

		Water	Surcharged	Flooded	Flow /	Overflow	Pipe Flow	
PN	Name	(m)	(m)	(m ³)	Cap.	(1/s)	(1/s)	Status
1.000	1	7.019	-0.081	0.000	0.08	0.0	0.5	OK
1.001	2	6.928	-0.072	0.000	0.18	0.0	1.1	OK
1.002	3	6.847	-0.053	0.000	0.44	0.0	2.7	OK
1.003	4	6.399	0.749	0.000	0.21	0.0	2.8	SURCHARGED
1.004	5	6.391	0.841	0.000	0.18	0.0	3.0	SURCHARGED
2.000	6	7.032	-0.068	0.000	0.23	0.0	1.6	OK
3.000	7	6.387	0.977	0.000	0.20	0.0	1.9	SURCHARGED
1.005	8	6.382	1.002	0.000	0.95	0.0	8.9	SURCHARGED
4.000	9	7.020	-0.080	0.000	0.09	0.0	0.5	OK
4.001	10	6.907	-0.063	0.000	0.29	0.0	1.8	OK
5.000	11	7.037	-0.063	0.000	0.30	0.0	1.8	OK
5.001	12	6.896	-0.054	0.000	0.43	0.0	2.7	OK
1.006	13	6.358	1.018	0.000	0.90	0.0	9.8	SURCHARGED
1.007	14	5.281	-0.039	0.000	0.90	0.0	9.8	OK

Hamilton Technical Services	Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton
Euxton	Proposed SW Simulations
Chorley PR7 6NU	1 in 100 Yr Storms + CC
Date 17.12.2019	Designed by Geoff Hamilton
File ROYAL OAK NEW SW.MDX	Checked by
Micro Drainage	Network 2014.1
<u>Time Ar</u> Time (mins 0- Total Area	ea Diagram for Storm Area Time Area (mins) (ha) 4-8 0.014 Contributing (ha) = 0.092
Total P <u>Free Flowing</u> Outfall Outfall Pipe Number Name	<pre>Pripe Volume (m³) = 1.614 Outfall Details for Storm C. Level I. Level Min D,L W (m) (m) I. Level (mm) (mm)</pre>
	(m)
1.007 SEWER	7.510 5.150 5.150 1000 0
Simulati	on Criteria for Storm
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrog Number of Online Con	0.840 Foul Sewage per hectare (1/s) 0.000 1.000 Additional Flow - % of Total Flow 35.000 0 MADD Factor * 10m ³ /ha Storage 2.000 0 Run Time (mins) 1440 0.500 Output Interval (mins) 1 raphs 0 Number of Storage Structures 1 trols 1 Number of Time/Area Diagrams 0
Number of Offline Con	trols 0
Synthet	ic Rainfall Details
bynenec	
Rainfall Model	FSR Profile Type Winter
Region Engl M5-60 (mm) Ratio R	100 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 240 0.350
Region Engl M5-60 (mm) Ratio R	100 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 240 0.350
Region Engl M5-60 (mm) Ratio R	100 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 240 0.350
Region Engl M5-60 (mm) Ratio R	100 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 240 0.350
Region Engl M5-60 (mm) Ratio R	100 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 240 0.350
Region Engl M5-60 (mm) Ratio R	100 Cv (Summer) 0.750 and and Wales Cv (Winter) 0.840 18.000 Storm Duration (mins) 240 0.350

I manite com recommendation	Services					Page 2					
1 Chiltern Ave		Royal	Royal Oak, Breck Rd, Poulton								
Euxton		Propo	sed SW Simu	ulations		4					
Chorley PR7 6NU		1 in 1	100 Yr Stor	rms + CC		Micco					
Date 17.12.2019		Desig	ned by Geof	f Hamil	ton						
File BOYAL OAK NEW S	SW.MDX	Check	ed by			Urainage					
Micro Drainage		Netwo	rk 2014.1								
	Onli	ne Contro	ols for Sto	rm							
Hydro-Brake Optimum® Manhole: 13, DS/PN: 1.006, Volume (m³): 2.9											
Unit Reference MD-SHE-0131-1000-2000-1000											
Design Head (m) 2.000											
	Des	ign flow (1 Flush-F	/s) lo™	Ca	IU.U						
		Object	ive Minimise	upstream	storage						
		Diameter (mm)	-	131						
	In	vert Level	(m)		5.190						
Minimum	Outlet Pipe	Diameter (mm)		150 1500						
Sugges			autoria di contra di	Deinte	1300	··· ·· · · · · · · · · · · · · · · · ·					
Control Points	Head (m)	FIOW (1/S)	Control	Points	Head (m) FIOW (I/S)					
Design Point (Calculated Flush-Flo) 2.000 ™ 0.569	10.0 9.8	Mean Flow ove	Kıck-F er Head Ra	lo® 1.1 nge	.6/ /.8					
Hydro-Brake Optimum® b invalidated Depth (m) Flow (1/s)	e utilised (m)	then these	storage routi Depth (m) Fl	ng calcula ow (l/s)	ations will Depth (m) 1	be Flow (l/s)					
0.100 4.7	1.200	7.9	3.000	12.1	7.000	18.1					
0.200 8.3	1.400	8.5	3.500	13.0	7.500	18.7					
0.300 9.2	1.600	9.0	4.000	13.9	8.000						
0.500 9.8	1.000	5.5		14 / 1	8 500	19.3					
0 000 0 0	2.000	10.0	5.000	14.7	8.500 9.000	19.3 19.9 20.5					
0.600 9.8	2.000 2.200	10.0 10.5	5.000	14.7 15.4 16.2	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8	2.000 2.200 2.400	10.0 10.5 10.9	5.000 5.500 6.000	14.7 15.4 16.2 16.8	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					
0.800 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0					

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L'
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micro
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

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

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

	US/MH	Water Level	Surcharged Depth	Flooded Volume	Flow /	Overflow	Pipe Flow	
PN	Name	(m)	(m)	(m³)	Cap.	(1/s)	(1/s)	Status
1.000	1	7.014	-0.086	0.000	0.05	0.0	0.3	OK
1.001	2	6.922	-0.078	0.000	0.11	0.0	0.7	OK
1.002	3	6.835	-0.065	0.000	0.27	0.0	1.6	OK
1.003	4	5.606	-0.044	0.000	0.15	0.0	2.1	OK
1.004	5	5.598	0.048	0.000	0.12	0.0	2.0	SURCHARGED
2.000	6	7.025	-0.075	0.000	0.14	0.0	1.0	OK
3.000	7	5.593	0.183	0.000	0.16	0.0	1.5	SURCHARGED
1.005	8	5.589	0.209	0.000	0.71	0.0	6.7	SURCHARGED
4.000	9	7.015	-0.085	0.000	0.05	0.0	0.3	OK
4.001	10	6.898	-0.072	0.000	0.18	0.0	1.1	OK
5.000	11	7.028	-0.072	0.000	0.18	0.0	1.1	OK
5.001	12	6.884	-0.066	0.000	0.26	0.0	1.6	OK
1.006	13	5.564	0.224	0.000	0.83	0.0	9.1	SURCHARGED
1.007	14	5.275	-0.045	0.000	0.83	0.0	9.1	OK

Hamilton Technical Services		Page 1					
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton						
Euxton	Proposed SW Simulations						
Chorley PR7 6NU	Micco						
Date 17.12.2019	Designed by Geoff Hamilton						
File ROYAL OAK NEW SW.MDX	Checked by	Dialitaye					
Micro Drainage	Network 2014.1						
Time Area Diagram for Storm							
Time (mins)	Area Time Area) (ha) (mins) (ha)						
	4 0 078 4 8 0 014						
0	4 0.070 4-0 0.014						
Total Area Contributing (ha) = 0.092							
Total Pipe Volume (m³) = 1.614							
Free Flowing	Free Flowing Outfall Details for Storm						
Outfall Outfall C	. Level I. Level Min D,L W						
Pipe Number Name	(m) (m) I. Level (mm) (mm)						
	(m)						
1.007 SEWER	7.510 5.150 5.150 1000 0						
Simulatic	on Criteria for Storm						
Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogr Number of Online Cont	<pre>0.840 Foul Sewage per hectare (1/s) 1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m³/ha Storage 0 Run Time (mins) 0.500 Output Interval (mins) aphs 0 Number of Storage Structures 1 rols 1 Number of Time/Area Diagrams 0 rols 0</pre>	0.000 35.000 2.000 1440 1					
Synthet	ic Rainfall Details						
<u></u>							
Rainfall Model	FSR Profile Type Wint	er					
Return Period (years) Region Engla	100 Cv (Summer) 0.7 and and Wales Cv (Winter) 0.8	50 40					
M5-60 (mm)	18.000 Storm Duration (mins) 4	00					
Ratio R	0.350						
	Services					Page 2	
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1 Chiltern Ave		Royal	Oak, Breck	Rd, Pou	ilton		
Euxton		Propos	ed SW Simu	lations		4	
Chorley PR7 6NU		1 in 1	.00 Yr Stor	ms + CC		Micco	
Date 17.12.2019		Design	ed by Geof	f Hamilt	on		
File ROYAL OAK NEW S	SW.MDX	Checke	d by			Urainag	
Micro Drainage		Networ	k 2014.1				
	Onli	ne Contro	ls for Sto	rm			
Hydro-Brake Opt	cimum® Mar	hole: 13,	DS/PN: 1.	006, Vo	Lume (m³): 2.9	
	τ	Jnit Referen	ce MD-SHE-01	31-1000-20	00-1000		
	De	esign Head (m)		2.000		
	Desi	.gn Flow (1/ Flush-Fl	S)	Cal	culated		
		Objecti	ve Minimise	upstream	storage		
		Diameter (m	im)		131		
	Inv	vert Level (m)		5.190		
Minimum	Outlet Pipe	Diameter (m	um)		150 1500		
Sugges			() ()	Deinte	1500		
Control Points	Head (m)	E'IOW (I/S)	Control	Points	Head (m) FIOW (1/5	
Design Point (Calculated Flush-Flo) 2.000 ™ 0.569	10.0 9.8 1	Mean Flow ove	Kick-F. er Head Ram	lo® 1.1 nge	- 8	
Hydro-Brake Optimum® b invalidated Depth (m) Flow (1/s)	e utilised t	Then these s	torage routin Depth (m) Flo	ng calcula	tions will epth (m) 1	. be Flow (l/s)	
0.100 4.7	1.200	7.9	3.000	12.1	7.000	18.1	
0.200 8.3	1.400	8.5	3.500	13.0	7.500	10 7	
0.300 9.2	1.600	9.0	4.000	13.9	8.000	18.7	
0.400 0.0	1 800	(- · · /	4 5000	14 7	8 500	18.7 19.3 19.9	
0.500 9.8	2.000	10.0	4.500 5.000	14.7 15.4	8.500 9.000	19.7 19.3 19.9 20.5	
0.600 9.8	2.000 2.200	10.0 10.5	4.500 5.000 5.500	14.7 15.4 16.2	8.500 9.000 9.500	19.7 19.3 19.9 20.5 21.0	
0.500 9.8	2.000 2.200 2.400	10.0 10.5 10.9	4.500 5.000 5.500 6.000	14.7 15.4 16.2 16.8	8.500 9.000 9.500	19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0	

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Storage Structures for Storm

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L'
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micro
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamaye
Micro Drainage	Network 2014.1	

Summary of Results for 400 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	7.012	-0.088	0.000	0.03	0.0	0.2	OK
1.001	2	6.918	-0.082	0.000	0.07	0.0	0.4	OK
1.002	3	6.829	-0.071	0.000	0.18	0.0	1.1	OK
1.003	4	5.533	-0.117	0.000	0.11	0.0	1.5	OK
1.004	5	5.439	-0.111	0.000	0.09	0.0	1.5	OK
2.000	6	7.021	-0.079	0.000	0.10	0.0	0.7	OK
3.000	7	5.432	0.022	0.000	0.12	0.0	1.1	SURCHARGED
1.005	8	5.429	0.049	0.000	0.52	0.0	4.9	SURCHARGED
4.000	9	7.012	-0.088	0.000	0.04	0.0	0.2	OK
4.001	10	6.893	-0.077	0.000	0.12	0.0	0.7	OK
5.000	11	7.023	-0.077	0.000	0.12	0.0	0.7	OK
5.001	12	6.878	-0.072	0.000	0.18	0.0	1.1	OK
1.006	13	5.411	0.071	0.000	0.62	0.0	6.7	SURCHARGED
1.007	14	5.255	-0.065	0.000	0.62	0.0	6.7	OK

		Page 1
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	4
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Digiliga
Micro Drainage	Network 2014.1	
Chorley PR7 6NU Date 17.12.2019 File ROYAL OAK NEW SW.MDX Micro Drainage Time Are (mins) 0-4 Total Area Total Pig Free Flowing (Outfall Outfall C. Pipe Number Name 1.007 SEWER Simulatio Volumetric Runoff Coeff Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Number of Input Hydrogra Number of Online Contr Number of Offline Contr Number of Contr Number Offline Contr Number Offline Contr Number Of Number Offline Contr Number Offline Co	1 in 100 Yr Storms + CC Designed by Geoff Hamilton Checked by Network 2014.1 a Diagram for Storm Area Time Area (ha) (mins) (ha) a 0.078 4-8 0.014 Contributing (ha) = 0.092 pe Volume (m ³) = 1.614 Dutfall Details for Storm . Level I. Level Min D,L W (m) (m) I. Level (mm) (mm) (m) 7.510 5.150 5.150 1000 0 an Criteria for Storm 0.840 Foul Sewage per hectare (1/s) 1.000 Additional Flow - % of Total Flow 0 MADD Factor * 10m ³ /ha Storage 0 Run Time (mins) 0.500 Output Interval (mins) aphs 0 Number of Storage Structures 1 rols 1 Number of Time/Area Diagrams 0 rols 0 ic Rainfall Details FSR Profile Type Winter 100 Cv (Summer) 0.79 nd and Wales Cv (Winter) 0.84 18.000 Storm Duration (mins) 60 0.350	0.000 35.000 2.000 1440 1

	Services					Page 2
1 Chiltern Ave		Royal	Oak, Breck	Rd, Pou	ilton	
Euxton		Propos	ed SW Simu	lations		4
Chorley PR7 6NU		1 in 1	.00 Yr Stor	ms + CC		Micco
Date 17.12.2019		Design	ed by Geof	f Hamilt	on	
File ROYAL OAK NEW S	SW.MDX	Checke	d by			Urainag
Micro Drainage		Networ	k 2014.1			
	Onli	ne Contro	ls for Sto	rm		
Hydro-Brake Opt	cimum® Mar	hole: 13,	DS/PN: 1.	006, Vo	Lume (m³): 2.9
	τ	Jnit Referen	ce MD-SHE-01	31-1000-20	00-1000	
	De	esign Head (m)		2.000	
	Desi	.gn Flow (1/ Flush-Fl	S)	Cal	culated	
		Objecti	ve Minimise	upstream	storage	
		Diameter (m	im)		131	
	Inv	vert Level (m)		5.190	
Minimum	Outlet Pipe	Diameter (m	um)		150 1500	
Sugges			() ()	Deinte	1500	
Control Points	Head (m)	E'IOW (I/S)	Control	Points	Head (m) FIOW (1/5
Design Point (Calculated Flush-Flo) 2.000 ™ 0.569	10.0 9.8 1	Mean Flow ove	Kick-F. er Head Ram	lo® 1.1 nge	- 8
Hydro-Brake Optimum® b invalidated Depth (m) Flow (1/s)	e utilised t	Then these s	torage routin Depth (m) Flo	ng calcula	tions will epth (m) 1	. be Flow (l/s)
0.100 4.7	1.200	7.9	3.000	12.1	7.000	18.1
0.200 8.3	1.400	8.5	3.500	13.0	7.500	10 7
0.300 9.2	1.600	9.0	4.000	13.9	8.000	18.7
0.400 0.0	1 800	(- · · /	4 5000	14 7	8 500	18.7 19.3 19.9
0.500 9.8	2.000	10.0	4.500 5.000	14.7 15.4	8.500 9.000	19.7 19.3 19.9 20.5
0.600 9.8	2.000 2.200	10.0 10.5	4.500 5.000 5.500	14.7 15.4 16.2	8.500 9.000 9.500	19.7 19.3 19.9 20.5 21.0
0.500 9.8	2.000 2.200 2.400	10.0 10.5 10.9	4.500 5.000 5.500 6.000	14.7 15.4 16.2 16.8	8.500 9.000 9.500	19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.500 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0
0.500 9.8 0.600 9.8 0.800 9.6 1.000 9.0	1.800 2.000 2.200 2.400 2.600	10.0 10.5 10.9 11.3	4.300 5.000 5.500 6.000 6.500	14.7 15.4 16.2 16.8 17.5	8.500 9.000 9.500	18.7 19.3 19.9 20.5 21.0

Hamilton Technical Services		Page 3
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L.
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micco
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

Storage Structures for Storm

Cellular Storage Manhole: 13, DS/PN: 1.006

Invert Level (m) 5.190 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

Depth	(m)	Area	(m²)	Inf.	Area	(m²)	Depth	(m)	Area	(m²)	Inf.	Area	(m²)
0.	000		5.0			0.0	0	.800		5.0			0.0
Ο.	400		5.0			0.0	0	801		0.0			0.0

Hamilton Technical Services		Page 4
1 Chiltern Ave	Royal Oak, Breck Rd, Poulton	
Euxton	Proposed SW Simulations	L'
Chorley PR7 6NU	1 in 100 Yr Storms + CC	Micro
Date 17.12.2019	Designed by Geoff Hamilton	
File ROYAL OAK NEW SW.MDX	Checked by	Diamage
Micro Drainage	Network 2014.1	

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

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	1	7.011	-0.089	0.000	0.03	0.0	0.2	OK
1.001	2	6.915	-0.085	0.000	0.05	0.0	0.3	OK
1.002	3	6.824	-0.076	0.000	0.13	0.0	0.8	OK
1.003	4	5.528	-0.122	0.000	0.08	0.0	1.1	OK
1.004	5	5.425	-0.125	0.000	0.07	0.0	1.1	OK
2.000	6	7.017	-0.083	0.000	0.07	0.0	0.5	OK
3.000	7	5.364	-0.046	0.000	0.09	0.0	0.8	OK
1.005	8	5.361	-0.019	0.000	0.38	0.0	3.6	OK
4.000	9	7.011	-0.089	0.000	0.03	0.0	0.2	OK
4.001	10	6.890	-0.080	0.000	0.09	0.0	0.5	OK
5.000	11	7.020	-0.080	0.000	0.09	0.0	0.5	OK
5.001	12	6.874	-0.076	0.000	0.13	0.0	0.8	OK
1.006	13	5.348	0.008	0.000	0.46	0.0	4.9	SURCHARGED
1.007	14	5.241	-0.079	0.000	0.46	0.0	4.9	OK