

FLOSH MEADOWS, CLEATOR, SR12A AND TOP MEADOWS

Drainage Strategy

Issue Date:

19 September 2023

Report Number:

1842-DS11

Client:

Lakeland Associates (Cleator) Ltd Revision:

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Contents

1.	Introduction 1	
2.	Site location, Existing Topography, Geology and Proposals 2	
3.	Surface and foul Water Disposal 6	
4.	References 11	

- Appendix A Topographical Survey
- Appendix B Proposed Site Layout
- Appendix C Existing Drainage Layout
- Appendix D Greenfield Runoff Calculations
- Appendix E Drainage Strategy and Calculations

Executive Summary

Site Location	The site is located off A5086, Cleator, CA23 3EP (nearest) at NGR 301752E 514082N. The
	overall development footprint measures approximately 3.30 Ha, entirely greenfield.
Site Proposals	The site is proposed to be developed with residential units.
Ground Conditions	The site is located in an area underlain by drift deposits consisting of soft - stiff clays.
	Surface water cannot be discharged utilising infiltration techniques.
Nearest Watercourse	The River Ehen is located 300m to the south of the overall site boundary beyond third
	party land. It is not possible to make a direct connection to a water course to dispose of surface water.
Nearest water feature	Within the development site, an historic man-made culverted mill race flows from north to south and outfalls via a culvert below the public highway located to the south. The mill race conveys flows from agricultural land located to the north of the development site.
	Surface water should discharge to the surface water feature. Surface water discharge should restricted to a greenfield rate matching Qbar for the development, in this case 32 litres/sec.
Nearest Surface Water	Adjacent to proposed site entrance, discharging within 40m of the head of the run to a
Sewer.	UU combined sewer at A5086. Another surface water sewer is located within Howthorne
	Fields to the south of Flosh Meadows. Neither sewer is suitable for disposal of surface
	water. The reasons are covered in greater detail within section 3.0.
Nearest Combined	On site adjacent to southern boundary
Sewer	
Nearest Foul Water	Adjacent to proposed site entrance, discharging within 40m to a UU combined sewer at
Sewer	A5086
SUDS	Pipes, flow control

The above summary should not be used in isolation and reference should be made the full report which provides a detailed assessment of the risks affecting the development.



1. Introduction

Coast Consulting Engineers have been commissioned by Lakeland Associates (Cleator) Ltd to produce a drainage strategy to accompany a planning application for a proposed development at Flosh Meadows, Cleator. This strategy is produced only for the phases known as SR12A Mid Meadows (4/17/2214) and Top Meadows (4/17/2390), although the strategy also references the wider site, as the drainage from SR12A and Top Meadows discharges into the phase known as SR12, The Meadows. This Assessment is reviewed in accordance with the National Planning Policy Framework (NPPF) for Development and Flood Risk.

A flood risk assessment has previously been completed by RWO Associates reference RO/14016.200 Version 3, dated October 2017 and has subsequently been approved. As such, this report does not assess flood risk to the proposed development.

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2. Site location, Existing Topography, Geology and Proposals

2.1 Site Location

The site is located off A5086, Cleator, CA23 3EP (nearest) at NGR 301752E 514082N. The entire development footprint measures approximately 3.30 Ha, entirely greenfield.

The site location is indicated in Figure 2.11 and the proposed phasing in Figure 2.12 below.

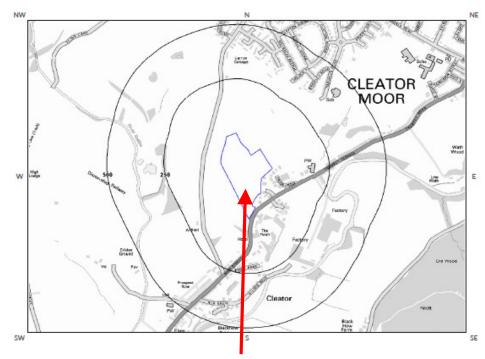


Figure 2.11 – Site Location



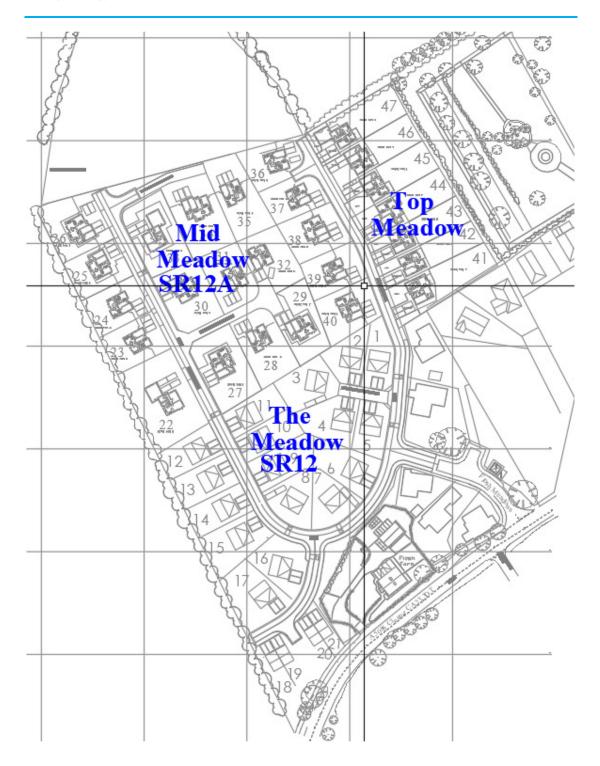


Figure 2.12 – Proposed Phasing



2.2 Existing Topography

A topographical survey of the site has been undertaken and is included in Appendix A. The overall development site generally falls in a southerly direction. Site levels range from approximately 67.50m AOD at the north of SR12A to 63.00m AOD at the southern extents of SR12.

The surrounding area is developed as follows:

North:Agricultural LandEast:Agricultural Land and residential propertiesSouth:Residential propertiesWest:Agricultural Land

Figure 2.21 below extracted from Google maps shows the existing site.



Figure 2.21 – Satellite image of the existing site.

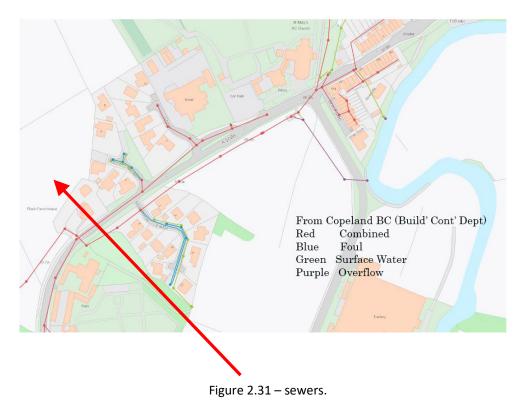


2.3 Existing sewers and watercourses

A combined sewer is located within the development land, adjacent to the southern boundary line of SR12. Adopted foul and surface water sewers are located within Flosh Meadows, adjacent to the proposed site entrance, the head of each run is located at the proposed site entrance. The adopted surface water and foul sewers outfall into a combined sewer approximately 40m downstream of the head of each run. All sewers are owned and maintained by United Utilities Ltd (UU). Figure 2.31 below shows the location of the existing public sewers within the vicinity of the site.

Within the overall development site, an historic man-made culverted mill race flows from north to south and outfalls via a culvert below the public highway located to the south of SR12. The mill race conveys flows from agricultural land located to the north of SR12A. Figure 2.32 overleaf shows the location of the natural watercourses within the vicinity of the site. Please also refer to Appendix C for further information on the existing drainage regime.

The River Ehen is located approximately 300m to the south of the site boundary, beyond third party land.





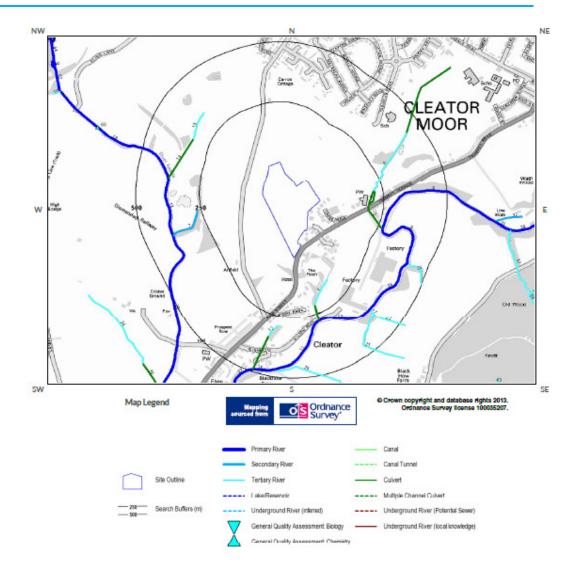


Figure 2.32 – watercourses.

2.4 Geology

A phase 2 intrusive investigation of ground conditions has been completed by Geo Environmental Engineering Ltd, reference 2018-3167 dated 09.08.2018. The report states that the site is underlain by varying ground conditions, largely comprising soft to stiff clays. Ground water was encountered across the site at depths of between 1.50m to 2.90m.

2.5 Development Proposals

The site is proposed to be developed with residential units. A copy of the proposed architectural site layout can be found in Appendix B.



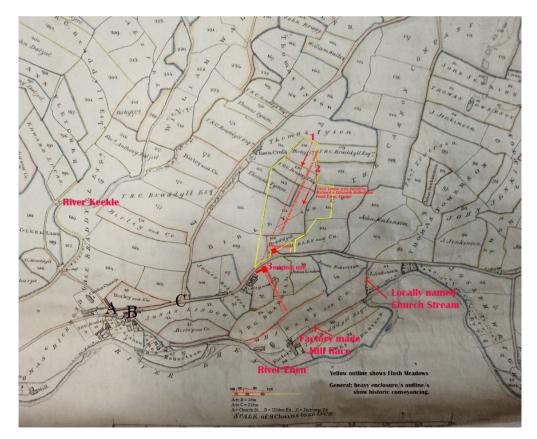
3. Surface Water Disposal

3.1 Existing Surface Water Drainage

There are no existing sewers serving the greenfield site.

An existing historic, man-made, culverted, mill race flows through the site from north to south. The race outfalls from the development via a culvert below the public highway located to the south of SR12. The race is not a natural watercourse and is not identified on GroundSure plans (ref figure 2.32) above or historic Pre 1800's mining plans (ref figure 3.11) below.

Please also refer to Appendix C for further information on the existing drainage regime.





3.2 Proposed Surface Water Drainage

In line with national standards, consideration has been given to the preferred hierarchy for disposal of surface water from the development, as contained in Part H of the Building Regulations. The hierarchy is as follows:

- 1. By infiltration
- 2. To watercourse
- 3. To sewer

As noted earlier, superficial deposits comprise of soft - stiff clays with a low permeability. It is considered that utilisation of infiltration techniques will not be applicable for the proposed development.

The nearest watercourse to the development is located approximately 300m to the south of the site boundary, beyond third party land. As such, it will not be possible to make a direct connection to a watercourse.

Following discussions between the developer and the LLFA, it has been agreed to discharge surface water to the Mill Race located within the site boundary.

3.3 SUDS Techniques

In line with National Planning Policy, SUDS techniques will be utilised as part of the design of the surface water network. The applicable techniques and the benefits that they bring to the development are outlined below.

- Flow control: A vortex flow control device will be utilised to restrict flows to the equivalent of existing site greenfield rate (Qbar)
- Surface water conveyance: Surface water will be conveyed through the development utilising below ground pipes.
- Surface water treatment: Attenuated surface water flows will be stored in a piped network.

3.4 SuDS Maintenance

Regular inspection and maintenance is key to the effective operation of SuDS features. Maintenance responsibility for SuDS features proposed as part of the development is to be placed with a responsible organisation and in this case a nominated management and maintenance company.

Removal of debris and any settled silt from SuDS features is the key maintenance requirement for the continued effective operation of the SuDS features. Most of the maintenance activities can be undertaken as part of regular landscape maintenance activities.

3.5 Post Development Discharge Rate

Proposed surface water discharge rates will be limited from the development to the equivalent of the pre-development Qbar green field run off rate, for all storms up to and including 1 in 100 year return period rainfall event + 40% increase in rainfall intensity to account for the predicted effects of climate change.

In line with national and local standards the greenfield run off rate for 3.30 Ha of developed land has been calculated using the Institute of Hydrology (IH) Report 124 Flood Estimation for Small Catchments (1994) method, with flow rate linearly interpolated due to site being smaller than 50Ha. HR Wallingford Greenfield runoff rate estimation for sites tool, available at <u>https://www.uksuds.com</u> has been used to calculate Qbar run off rate at 32.02 l/sec. An assessment of the allowable discharge rate is outlined below in figure 3.51.

Greenfield runoff rates	Default	Edited
Q _{BAR} (I/s):	32.02	32.02
1 in 1 year (l/s):	27.85	27.85
1 in 30 years (I/s):	54.43	54.43
1 in 100 year (I/s):	66.59	66.59
1 in 200 years (I/s):	75.88	75.88

licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.



Please refer to Appendix D for further information on green field run off rates. Note – the 'developed land' includes for all phases of the proposed development.

3.6 Surface Water Attenuation

Surface water will be restricted for all events up to an including the 100 year event with a 50% allowance for climate change and a 10% allowance for urban creep. Attenuated flows will be contained on site within a designated storage system. Please refer to the calculations and drainage strategy contained within Appendix E. Note – the allowable discharge rate and drainage calculations include for all phases of the

development.

By restricting the peak rate of discharge from the site Qbar to the watercourse for all

events up to and including the 100-year event, the proposed development will provide

betterment from the existing regime in line with the table below.



Return period	greenfield rate	Proposed	Betterment
Qbar	32.02 l/s	32.0 l/s	0%
30	54.43 l/s	32.0 l/s	31%
100	66.59 l/s	32.0 l/s	52%
100+50%	99.85 l/s	32.0 l/s	68%

3.7 Proposed Foul Drainage

It is proposed to discharge a portion of the foul water to the adjacent UU combined sewer and a portion to the existing foul sewer in Flosh Meadows, both via gravity connections.

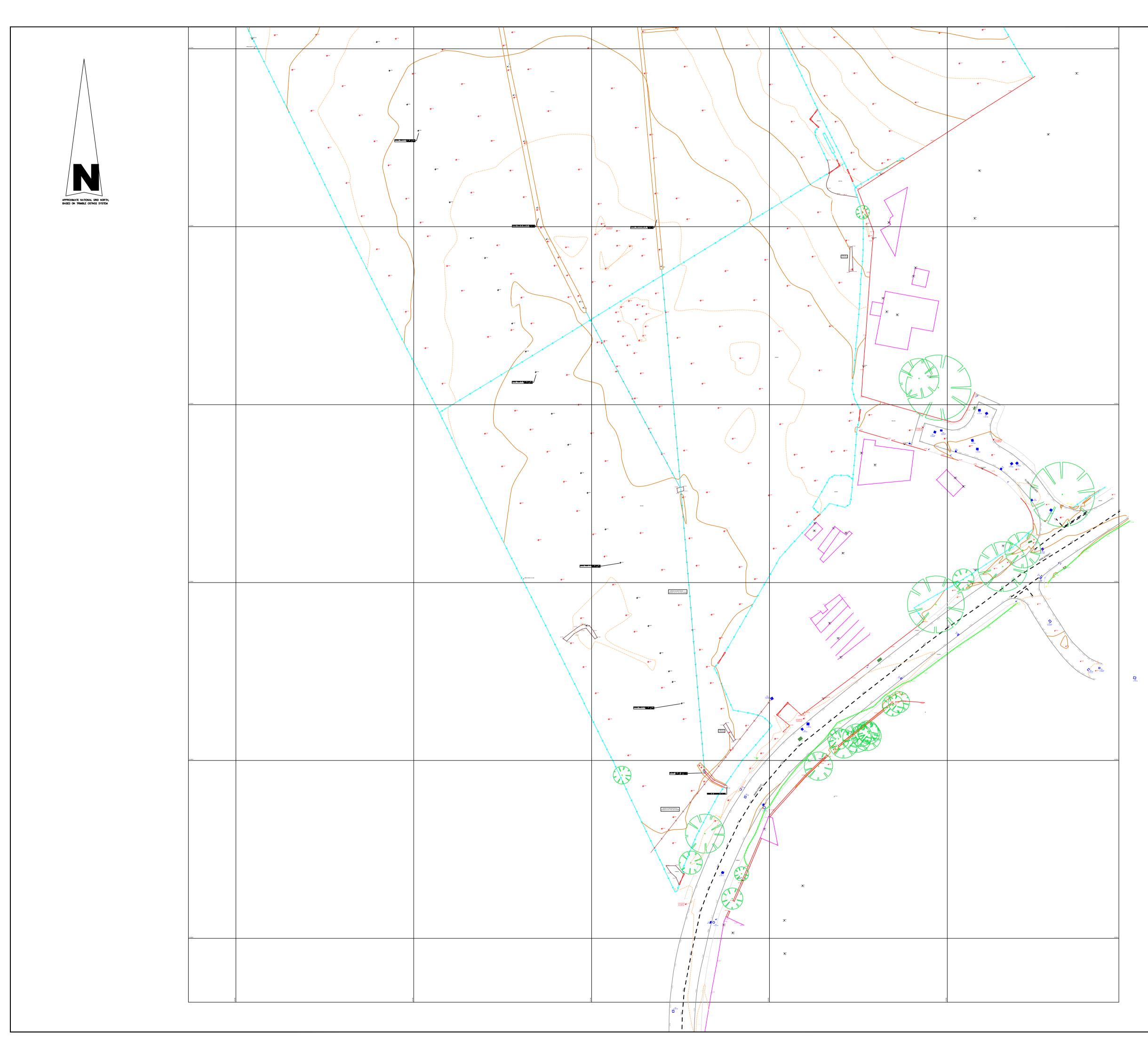
4. References

The following reference documents have been used in the preparation of this report.

- National Planning Policy Framework 2021.
- PPG 2021.
- Environment Agency online flood maps.
- Sewers for Adoption 6th Edition WRC plc, April 2006.
- Building Regulations Document H 2010.
- Improving the Flood Performance of New Buildings Defra.
- Rainfall runoff management for developments SC030219 Defra.
- Susdrain.org
- The SuDS Manual CIRIA C753.

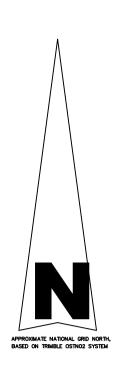
Appendices

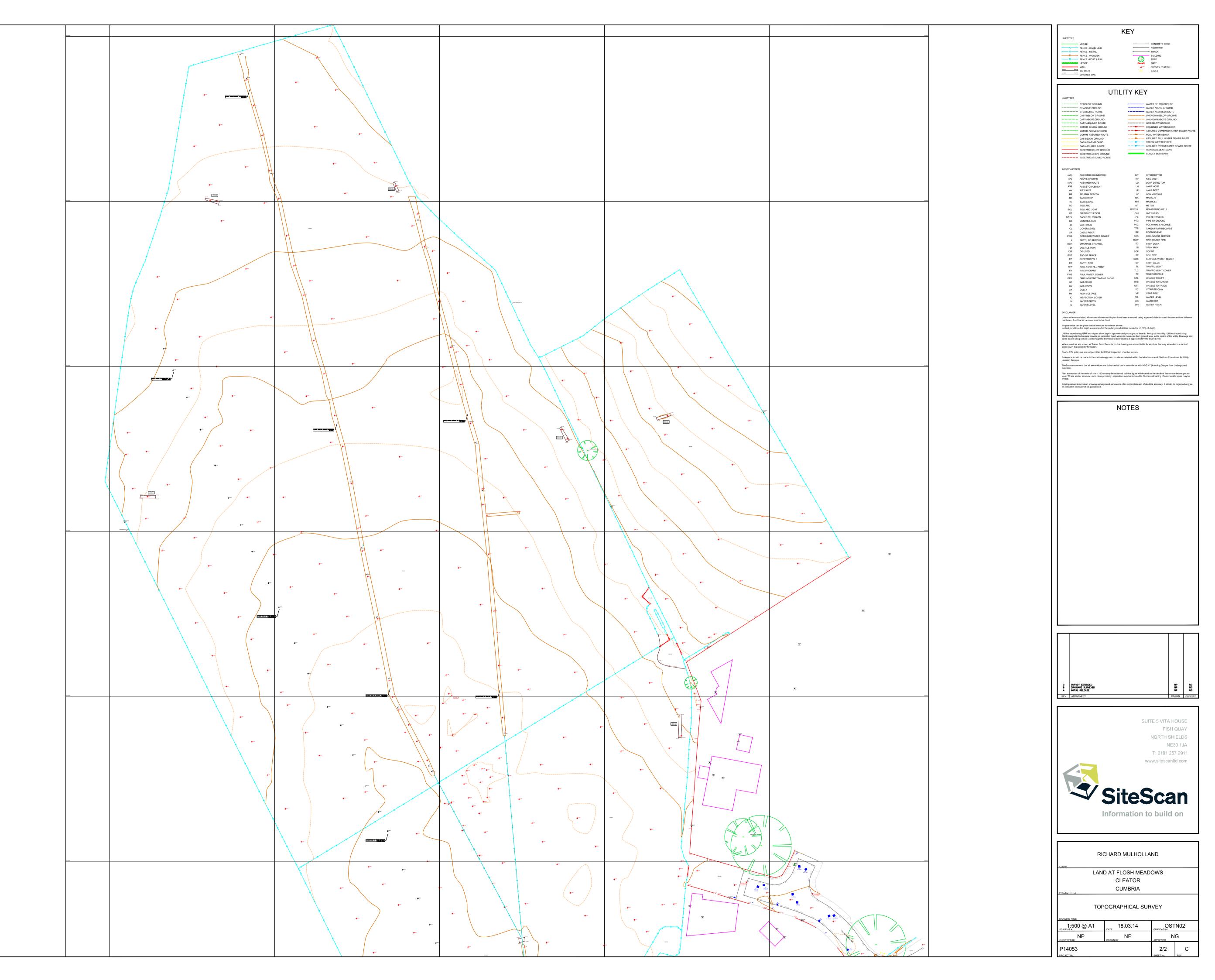
Appendix A



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	COMMS BELOW GROU COMMS ABOVE GROU COMMS ASSUMED RO GAS BELOW GROUND	IND		FOUL WA	ED WATER SE D COMBINED ATER SEWER	WATER SEV	
	GAS ABOVE GROUND GAS ASSUMED ROUTE ELECTRIC BELOW GROUTE ELECTRIC ABOVE GROUTE	E OUND DUND		ASSUME REINSTA	WATER SEWE D STORM WA ATEMENT SCA BOUNDARY	ATER SEWER	ROUTE
ABBREVIA	ELECTRIC ASSUMED F	ROUTE					
(AC) A/G (AR) ASB	ABOVE GROUND ASSUMED ROUTE	NC	INT KV LD LH	INTERCE KILO VOI LOOP DE LAMP HO	LT		
AV BB BD BL	BELISHA BEACON BACK DROP		LP LV MK MH	LAMP PC LOW VOI MARKER MANHOL	LTAGE		
BO BOL BT CATV	BOLLARD BOLLARD LIGHT BRITISH TELECOM		MT M/WELL O/H PE	METER	RING WELL		
CATV CB CI CL	CONTROL BOX CAST IRON		PE PTG PVC TFR	PIPE TO POLYVIN	GROUND IYL CHLORIDI ROM RECOR		
CR CWS d DCH	COMBINED WATER SE DEPTH OF SERVICE	WER	RE RED RWP SC		ANT SERVICE	E	
DI DIS EOT	DUCTILE IRON DISUSED		SI SOF SP	SPUN IR SOFFIT SOIL PIP	ON E		
EP ER FFP FH	EARTH ROD FUEL TANK FILL POINT	т	SWS SV TL TLC	STOP VA			
FWS GPR GR	FOUL WATER SEWER GROUND PENETRATIN GAS RISER		TP UTL UTS	TELECO UNABLE UNABLE	M POLE TO LIFT TO SURVEY		
GV GY HV IC	GULLY HIGH VOLTAGE		UTT VC VP WL	UNABLE VITRIFIE VENT PIF WATER L	PE		
IC Id IL DISCLAIM	INVERT DEPTH INVERT LEVEL		WO WR	WATER I WASH O	UT		
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Appendix B



Appendix C



Appendix D



richard hall

Cleator

Runoff estimation approach

Flosh Meadows

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and

the basis for setting consents for the drainage of surface water runoff from sites.

the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may

Calculated by:

Site name:

be

Site location:

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Site Details

Latitude:	54.51164° N
Longitude:	3.51942° W
Reference:	2032601581
Date:	May 28 2021 13:23

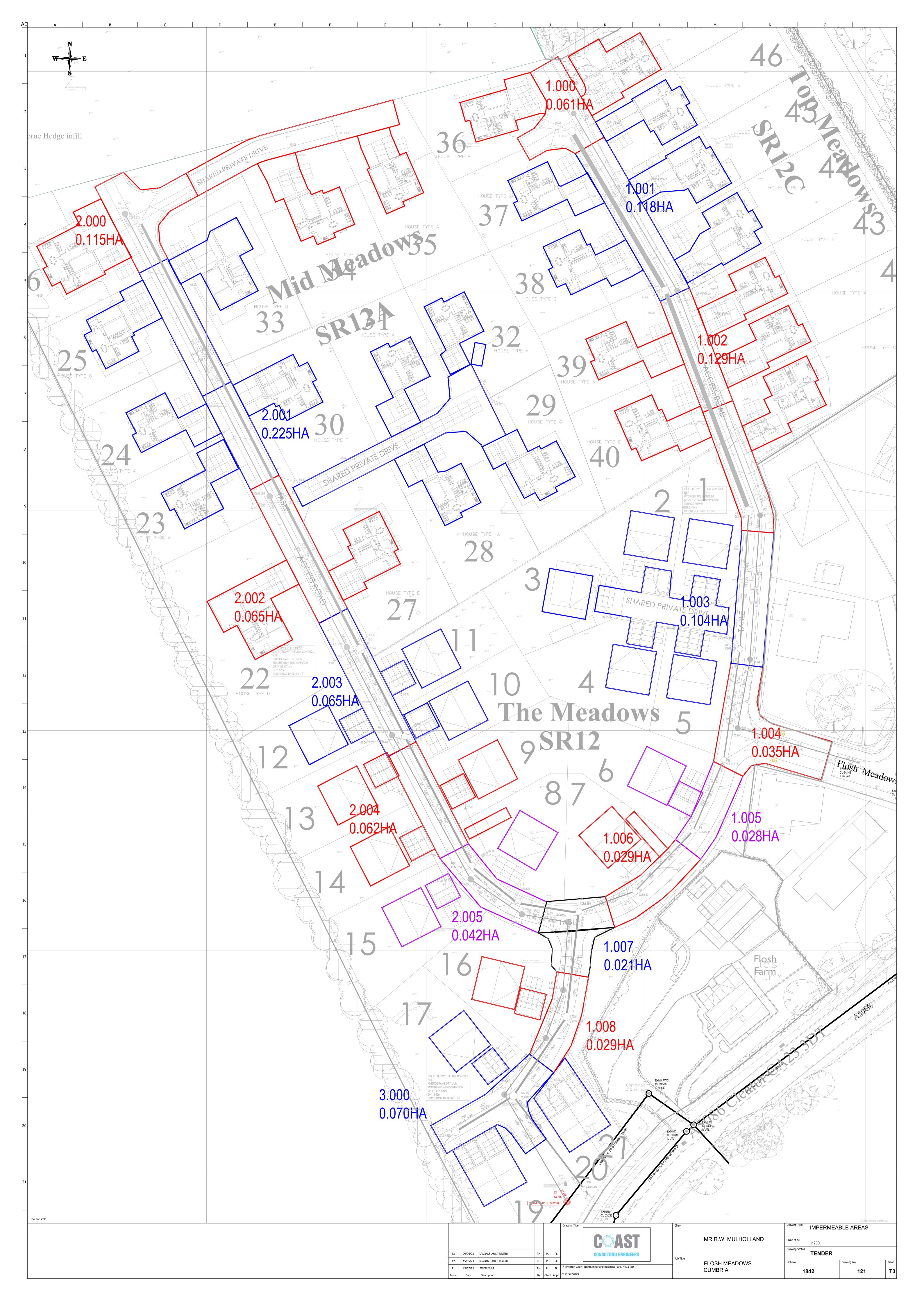
Runoff estimation app	IH124			
Site characteristics				Notes
Total site area (ha):		3.30		(1) Is Q _{BAR} < 2.0 I/s/ha?
Methodology				
Q _{BAR} estimation method:	Calculate f	rom SPR and	ISAAR	When Q _{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.
SPR estimation method:	Calculate f	rom SOIL typ	е	
Soil characteristics		Default	Edited	
SOIL type:		4	4	(2) Are flow rates < 5.0 l/s?
HOST class:		N/A	N/A	Where flow rates are less than 5.0 l/s consent for discharge is
SPR/SPRHOST:		0.47	0.47	usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where
Hydrological characte	ristics	Default	Edited	the blockage risk is addressed by using appropriate drainage elements.
SAAR (mm):		1271	1271	(3) Is SPR/SPRHOST ≤ 0.3?
Hydrological region:		10	10	
Growth curve factor 1 year:		0.87	0.87	Where groundwater levels are low enough the use of soakaways
Growth curve factor 30 year	rs:	1.7	1.7	to avoid discharge offsite would normally be preferred for disposal of surface water runoff.
Growth curve factor 100 year	ars:	2.08 2.0) ·
Growth curve factor 200 year	ars:	2.37	2.37	ĵ [

Greenfield runoff rates

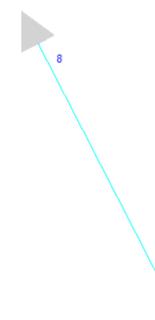
	Default	Edited
Q _{BAR} (I/s):	32.02	32.02
1 in 1 year (l/s):	27.85	27.85
1 in 30 years (I/s):	54.43	54.43
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1 in 200 years (l/s):	75.88	75.88

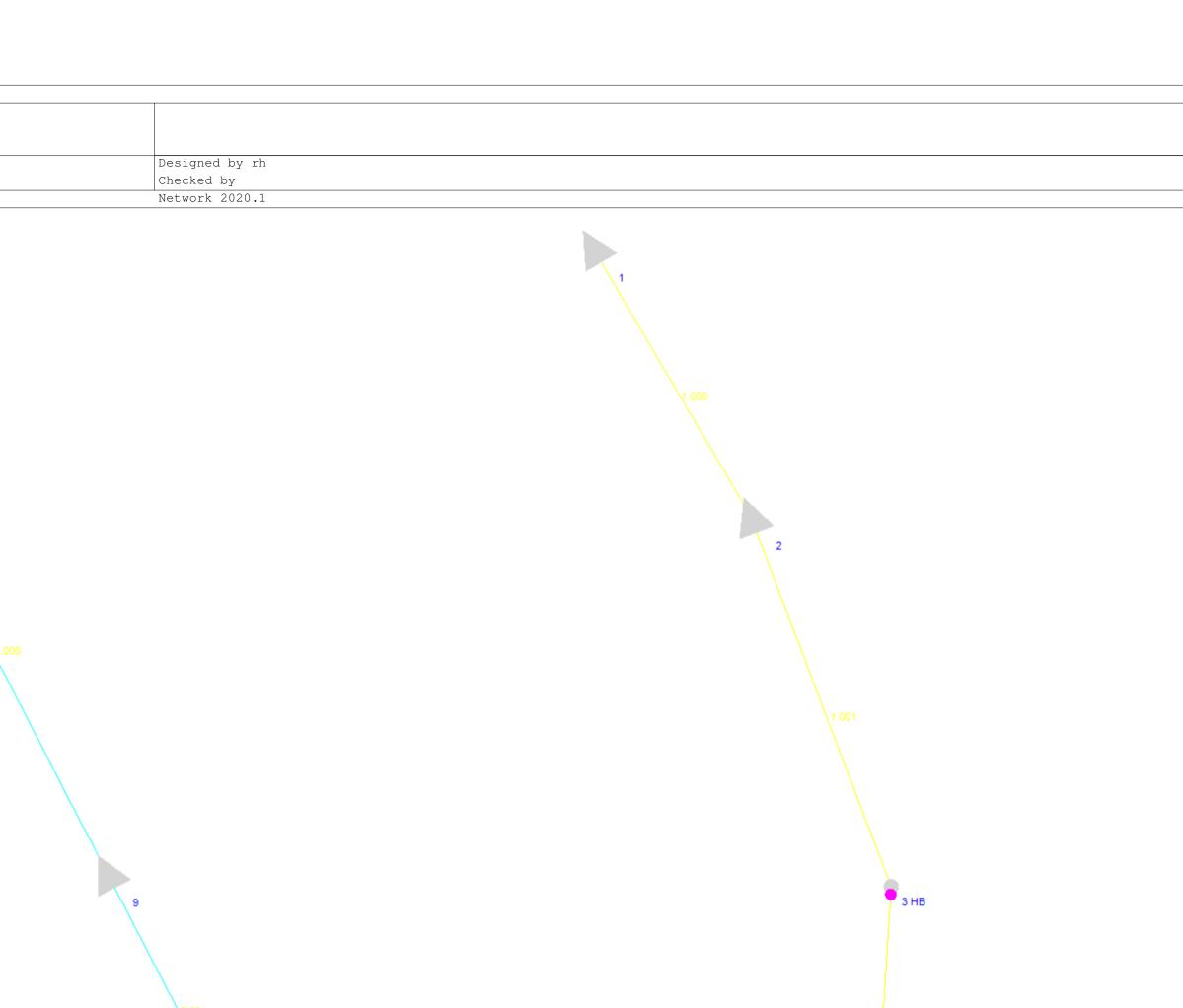
This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

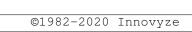
Appendix E



Innovyze







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Micro Drainage	Page 1
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Network Results Table

 1.007
 24.092
 0.074
 325.6
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 o
 375
 Pipe/Conduit
 #

 1.008
 21.726
 0.067
 324.3
 0.029
 0.00
 0.0
 0.600
 o
 375
 Pipe/Conduit
 #

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (1/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)	
1.000	0.00	5.43	63.013	0.061	0.0	0.0	0.0	1.64	1225.0	0.0	
1.001	0.00	5.97	62.908	0.179	0.0	0.0	0.0	1.64	1223.9	0.0	
1.002	0.00	6.50	62.774	0.308	0.0	0.0	0.0	1.00	39.7	0.0	
1.003	0.00	6.92	62.589	0.412	0.0	0.0	0.0	1.00	39.8	0.0	
1.004	0.00	7.22	62.439	0.447	0.0	0.0	0.0	1.00	39.8	0.0	
1.005	0.00	7.53	62.335	0.475	0.0	0.0	0.0	1.00	39.8	0.0	
1.006	0.00	7.76	62.223	0.504	0.0	0.0	0.0	1.00	39.7	0.0	
2.000	0.00	5.97	62.586	0.115	0.0	0.0	0.0	1.24	268.0	0.0	
2.001	0.00	6.47	62.365	0.340	0.0	0.0	0.0	1.24	267.7	0.0	
2.002	0.00	6.85	62.249	0.405	0.0	0.0	0.0	1.00	110.4	0.0	
2.003	0.00	7.40	62.181	0.470	0.0	0.0	0.0	1.00	110.3	0.0	
2.004	0.00	7.62	62.079	0.532	0.0	0.0	0.0	1.00	110.7	0.0	
2.005	0.00	7.86	62.038	0.574	0.0	0.0	0.0	0.99	109.9	0.0	
1.007	0.00	8.26	61.993	1.099	0.0	0.0	0.0	1.00	110.3	0.0	
1.008	0.00	8.62	61.919	1.128	0.0	0.0	0.0	1.00	110.5	0.0	
				©1982-	2020 Innov	vyze					

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novyze					Ne	etwor	k 2020	0.1					
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		01010			on by	CIIC	110011	100 10		iar i	10 0110	<u>u</u>	
			Netw	ork Des	sign T	able	for 1	180518	3 SW1	.SWS			
						_							
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)			ase (1/s)	k (mm)	HYD SECT	DIA (mm)	Secti	lon Typ	e Auto Design
													-
3.000	15.459	0.048	322.1	0.070	5.00		0.0	0.600	0	375	Pipe/	/Condui	.t 🦰
1.009	26.775	0.109	245.6	0.000	0.00		0.0	0.600	0	300	Pipe/	/Condui	t 💣
1.010	3.900	0.016	243.8	0.000	0.00		0.0	0.600	0	300	Pipe/	/Condui	t 💣
				Ne	at work	Pos	ults 1	Tablo					
				110	LCWOIN	. 1(05	uito i						
Pl	N Ra	in 1	r.c. 1	JS/IL Σ	I.Area		Base		Add	Flow		Cap	Flow
	(mm/	/hr) (n	nins)	(m)	(ha)	Flow	/ (1/s)	(l/s)	(1,	/s)	(m/s)	(l/s)	(1/s)
3.0	00 (0.00	5.26 6	1.900	0.070)	0.0	0.0		0.0	1.00	110.9	0.0
1.0	0.0	0.00	9 07 6	1.852	1.198	,	0.0	0.0		0.0	1.00	70.6	0.0
1.0			9.13 6		1.198		0.0			0.0			
		Fre	ee Flo	wing Ou	ıtfall	Det	ails f	for 18	30518	SW1	.SWS		
		01	ıtfall	Outfal	1 с. т	evel	I. Lev	el M	lin	D,L	W		
			e Numbe			m)	(m)		Level				
									(m)				
			1.01	0 0	C1 63	8.006	61.7	27 6	1.727	1350	0		
			Simu	lation	Crite	eria	for 1	80518	SW1	.SWS			
	7	/olumet	ric Ru	noff Coe	ff 0.7	50	Additic	onal Fl	Low -	% of	Total	Flow	0.000
				ion Fact			MAD	DD Fact				orage	
				art (min Level (m	- /	0 0 Fl	ow per	Person				cient (day)	
Ma	nhole H			f (Globa			ow ber	101301	i per	-	'ime (-	60
	Foul Se	wage p	per hec	tare (l/	s) 0.0	00		Οι	utput	Inter	val (mins)	1
			of To	out Hydr	ographs	s 0 N	umber c	of Stor	rage S	Struct	ures	13	
		Number	\cdot OI ID			0 0 1			-			0	
				Online C	ontrols	s 3 N	umber c				-		
		Numb	per of	Online C ffline C					L Time	e Cont	rols	0	
		Numb	per of	ffline C	ontrols	s O N	umber c	of Real		e Cont	rols	0	
		Numb	per of	ffline C	ontrols	s O N		of Real		e Cont	rols	0	
		Numb Numbe	per of o er of O Rain	ffline C <u>Synt</u> fall Mod	ontrols <u>hetic</u> el	s O N	umber c	of Real <u>Detai</u> 'SR M	<u>ls</u> 45-60	(mm)	19.60	0	
		Numb Numbe	per of o er of O Rain	ffline C <u>Synt</u> fall Mod od (year	ontrol: hetic el s)	s O N Rain	umber c	of Real Detai SR M 2	<u>ls</u> 45-60 Rat	(mm) Lio R	19.60 0.22	0 3	

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Coast Consulting Engineers Ltd		Page 2
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:2	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

Synthetic Rainfall Details

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

Coast Consulting	g Engineers 1	Ltd				Page 3
Suite 6, Vita Ho			H MEADOWS			
Fish Quay	Jube	CLEA				
North Shields 1	1 2 0 1 7 3	1:2				
	NESU IJA	-		-		– Micro
Date 09/06/2023			gned by RI	1		Drainage
File 230609 REV	ISED SURFACE	W Chec	ked by PL			brainage
Innovyze		Netw	ork 2020.2	1		
Hudro-Brak	<u>Onlin</u> :e® Optimum M	e Controls			olume (m ³)• 45 9
<u>ilydro brak</u>			11D, D5/11	. 1.002, V		7. 43.5
		Unit Refe	rence MD-SHI	E-0107-7000-	2119-7000	
		Design Hea			2.119	
		Design Flow			7.0	
			-Flo™ ctive Minir		alculated	
		Applic		mase ubstred	Surface	
		Sump Avai			Yes	
		Diameter	(mm)		107	
		Invert Leve	l (m)		62.774	
Mi	nimum Outlet P	-			150	
	Suggested Manh	ole Diameter	(mm)		1200	
Control Poin	ts Head	(m) Flow (l/s	s) Cont	crol Points	Head	(m) Flow (l/s)
Design Point (Calc Flu		.19 7 169 6	.0 .1 Mean Flow			957 4.8 - 5.6
The hydrological Hydro-Brake® Opt Hydro-Brake Opti:	imum as specif	ied. Should ed then these	another typ storage ro	e of control uting calcul	device ot: ations wil	her than a l be invalidate
	(1/s) Depch ((III) FIOW (I/3	s) Depth (m)	FIOW (1/S)	Depcii (iii)	FIOW (1/S)
0.100	3.7 1.2					12.3
0.200 0.300	5.4 1.4 5.9 1.6		.8 3.500 .1 4.000			12.7 13.1
0.400	6.0 1.8		.5 4.500			13.1
0.500	6.1 2.0				9.000	13.9
0.600	6.0 2.2				9.500	14.3
0.800	5.6 2.4		.4 6.000	11.4		
1.000	4.9 2.6	500 7	.7 6.500	11.9		
<u>Hydro-Brak</u>	e® Optimum M	anhole: 10	HB, DS/PN	: 2.002, \	Volume (m	³): 13.2
		Unit Dofo	rence MD-SHI	2 0107 6000	1575 6000	
		Design Hea		_ <u></u>	1.575	
		Design Flow			6.0	
		Flush		C	alculated	
		-		mise upstrea	2	
		Applic			Surface	
		Sump Avai			Yes	
		Diameter			106	
Mi	.nimum Outlet P	Invert Leve			62.249 150	
P13		The promoter	(11011)		100	
		@1000 00	20 Tom	7.0		
		@1987-20	20 Innovy:	2e		

a 11 a		meero	Ltd					Ρa	age 4	
Suite 6, Vi	ta House			FLOSH	MEADOWS					
ish Quay				CLEATO	DR					
North Shield	ds NE30 1	JA		1:2				Ν	/icro	
Date 09/06/2	2023			Desigr	ned by RH					
File 230609	REVISED S	SURFACE	Ξ ₩	. Checke	ed by PL)rain	aye
Innovyze				Networ	ck 2020.1					
<u>Hydro-</u>	Brake® Opt	zimum 1	Manho	ole: 10 H	B, DS/PN:	2.002, 1	/olume (m	³):	13.2	
		-	-		Diameter (m					
Control	Points	Head	(m) I	Flow (l/s)	Conti	col Points	Head	(m)	Flow	(1/s)
Design Point	(Calculated) Flush-Flo		.575 .468	6.0 5.9	Mean Flow			.952 -		4.7 5.2
The hydrolo	gical calcul	lations	have	been based	l on the He	ad/Dischard	ge relation	ship	for t	he
Hydro-Brake	-							-		
Hydro-Brake	Optimum® be	e utili:	sed tł	nen these s	torage rou	ting calcu	lations wil	l be	inval	idate
Depth (m)	Flow (l/s)	Depth	(m) I	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow	v (1/s))
0.100) 3.6	1	.200	5.3	3.000	8.1	7.000		12.	1
0.200			.400	5.7	3.500	8.7			12.	
0.300			.600	6.0	4.000	9.3			12.	
0.400			.800	6.4	4.500	9.8			13.3	
0.500			.000	6.7	5.000	10.3			13.	
0.600			.200	7.0	5.500	10.8			14.0	
0.800				1.0	5.500	10.0	1 2.000		T	5
) 55	2	400	7 3	6 000	11 3				
1.000			.400 .600	7.3 7.6	6.000 6.500	11.3 11.7				
1.000		2.	.600	7.6	6.500	11.7		n³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u>	7.6 ole: 17 H	6.500	11.7 : 1.009,	 Volume (n	n ³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U	7.6 ole: 17 H	6.500 HB, DS/PN nce MD-SHE-	11.7 : 1.009,	 Volume (n	n³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U De	7.6 ole: 17 F Mnit Refere	6.500 HB, DS/PN nce MD-SHE- (m)	11.7 : 1.009,	 <u>Volume (n</u> 1642-3200	n ³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U De	7.6 ole: 17 H Unit Refere ssign Head	6.500 HB, DS/PN nce MD-SHE- (m) /s)	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642	n ³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U De	7.6 ole: 17 H Init Refere sign Head gn Flow (1 Flush-F	6.500 HB, DS/PN nce MD-SHE- (m) /s)	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated	n ³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U De	7.6 ole: 17 H Init Refere sign Head gn Flow (1 Flush-F	6.500 <u>HB, DS/PN</u> nce MD-SHE- (m) /s) lo™ ive Minimi	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated	n ³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U Desi	7.6 ole: 17 H Init Refere sign Head gn Flow (1 Flush-F Object	6.500 HB, DS/PN nce MD-SHE- (m) /s) lo™ ive Minimi ion	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated m storage	n ³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U Desi S	7.6 ole: 17 H Unit Refere sign Head gn Flow (1 Flush-F Object Applicat	6.500 <u>HB, DS/PN</u> nce MD-SHE- (m) /s) lo™ ive Minimi ion ble	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface	n ³):	9.6	
1.000	4.9	2.	.600 <u>Manh</u> U Desi S	7.6 ole: 17 H Init Refere sign Head gn Flow (1 Flush-F Object Applicat Sump Availa	6.500 HB, DS/PN nce MD-SHE- (m) /s) lo™ ive Minimi ion ble mm)	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes	n ³):	9.6	
1.000) 4.9 -Brake® Op) 2.	.600 <u>Manh</u> U Desi S Inv	7.6 ole: 17 H Init Refere sign Head gn Flow (1 Flush-F Object Applicat Sump Availa Diameter (1	6.500 HB, DS/PN INCE MD-SHE- (m) /s) lo™ ive Minimi ion ble mm) (m)	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes 235	n ³):	9.6	
1.000) 4.9 -Brake® Op Minimum	0 2. timum Outlet	.600 <u>Manh</u> U Desi S Inv Pipe	7.6 ole: 17 H Init Refere sign Head gn Flow (1 Flush-F Object Applicat Sump Availa Diameter (1 rert Level	6.500 HB, DS/PN INCE MD-SHE- (m) /s) lo™ ive Minimi ion ble mm) (m) mm)	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes 235 61.852	a ³):	9.6	
1.000) 4.9 -Brake® Op Minimum Sugges	0 2. timum Outlet ted Mar	.600 <u>Manh</u> U Desi S Inv Pipe	7.6 ole: 17 H Init Refere sign Head gn Flow (1 Flush-F Object Applicat Sump Availa Diameter (1 rert Level Diameter (1	6.500 HB, DS/PN Ince MD-SHE- (m) /s) lo™ ive Minimi ion ble mm) (m) mm) mm)	11.7 : 1.009, -0235-3200-	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes 235 61.852 300 1800		<u>9.6</u>	(1/s)
1.000 <u>Hydro-</u>) 4.9 -Brake® Op Minimum Sugges Points	Outlet ted Mar Head	.600 <u>Manh</u> U Desi S Inv Pipe	7.6 ole: 17 F Init Refere sign Head gn Flow (1 Flush-F Object Applicat Diameter (1 Diameter (1 Diameter (1 Diameter (1 Diameter (1) S100 (1/s) 32.0	6.500 HB, DS/PN Ince MD-SHE- (m) /s) lo™ ive Minimi ion ble mm) (m) mm) mm)	11.7 11.009, -0235-3200- Colse upstrea	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes 235 61.852 300 1800 Head			26.4
1.000 <u>Hydro-</u> Control) 4.9 -Brake® Op Minimum Sugges Points (Calculated Flush-Flo gical calcul ® Optimum as	0 2. timum Outlet ted Man Head 1) 1. ™ 0. lations s speci:	.600 <u>Manh</u> U Desi Desi S Inv Pipe hole (m) I .642 .503 have fied.	7.6 ole: 17 F Init Refere sign Head gn Flow (1 Flush-F Object Applicat Diameter (1 Diameter (1 Diameter (1 Flow (1/s) 32.0 32.0 been based Should ar	6.500 HB, DS/PN INCE MD-SHE- (m) /s) lo™ ive Minimi ion ble mm) (m) mm) Conti Mean Flow i on the Head iother type	11.7 11.009, -0235-3200- Cole State of Cole State of Co	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes 235 61.852 300 1800 Head -Flo® 1 Range ge relation I device ot	(m) .101 	flow for the form	26.4 27.5 he
1.000 <u>Hydro-</u> Control Design Point The hydrolo Hydro-Brake Hydro-Brake) 4.9 -Brake® Op Minimum Sugges Points (Calculated Flush-Flo gical calcul ® Optimum as	0 2. timum Outlet ted Mar Head 1) 1. ,™ 0. lations s speci: e utilis	.600 <u>Manh</u> U De Desi S Inv Pipe thole (m) I .642 .503 have fied. sed th	7.6 ole: 17 F Init Refere sign Head gn Flow (1 Flush-F Object Diameter (1 Piameter (1 Flow (1/s) 32.0 32.0 been based Should ar nen these s	6.500 HB, DS/PN Ince MD-SHE- (m) /s) lo™ ive Minimi ion ble mm) (m) mm) Cont: Mean Flow a on the Heat other type storage rou	11.7 11.009, -0235-3200- Contemposities upstread col Points Kick over Head is ad/Discharg of control ting calcul	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes 235 61.852 300 1800 Head -Flo® 1. Range ge relation I device ot Lations wil	(m) .101 - ship her t 1 be	flow of the fort for the fort fort fort fort fort fort fort fort	26.4 27.5 he idate
1.000 <u>Hydro-</u> Control Design Point The hydrolo Hydro-Brake Hydro-Brake) 4.9 -Brake® Op Minimum Sugges Points (Calculated Flush-Flo gical calcul ® Optimum as Optimum® be Flow (1/s)	0 2. timum Outlet ted Man Head 1) 1. MM 0. lations s speci: e utili: Depth	.600 <u>Manh</u> U De Desi S Inv Pipe thole (m) I .642 .503 have fied. sed th	7.6 ole: 17 F Init Refere sign Head gn Flow (1 Flush-F Object Applicat Diameter (1 orert Level Diameter (1 Flow (1/s) 32.0 32.0 been based Should ar hen these s Flow (1/s)	6.500 HB, DS/PN Ince MD-SHE- (m) /s) lo™ ive Minimi ion ble mm) (m) mm) Cont: Mean Flow a on the Heat other type storage rou	11.7 11.009, -0235-3200- Contemposities upstread col Points Kick over Head is ad/Discharg of control ting calcul	Volume (n 1642-3200 1.642 32.0 Calculated m storage Surface Yes 235 61.852 300 1800 Head -Flo® 1 Range ge relation device ot Lations wil Depth (m)	(m) .101 - ship her t 1 be	flow of the fort for the fort fort fort fort fort fort fort fort	26.4 27.5 he idate

Coast Consulti	ng Engineers Ltd					Pa	ge 5
Suite 6, Vita B	House	FLOSH MEAD	OWS				
Fish Quay		CLEATOR					
North Shields	NE30 1JA	1:2				N	licro
Date 09/06/2023	3	Designed by RH					
File 230609 RE	VISED SURFACE W	. Checked by	PL				rainag
Innovyze		Network 20	20.1				
<u> </u>	ake® Optimum Manho	<u> </u>					
Depth (m) Flo	ow (l/s) Depth (m) F	low (l/s) Depth	n (m) Flow	(1/s)	Depth (m)	Flow	(1/s)
Depth (m) Fl 0.500	ow (1/s) Depth (m) F 32.0 1.800	low (1/s) Depth 33.4	n (m) Flow	(1/s) 49.1	Depth (m)	Flow	(1/s) 66.6
Depth (m) Fl 0.500 0.600	ow (1/s) Depth (m) F 32.0 1.800 31.8 2.000	low (1/s) Depth 33.4 35.2 4	n (m) Flow 1.000 1.500	(1/s) 49.1 52.0	Depth (m) 7.500 8.000	Flow	(1/s) 66.6 68.8
Depth (m) Fl 0.500 0.600 0.800	ow (1/s) Depth (m) F 32.0 1.800 31.8 2.000 31.0 2.200	low (1/s) Depth 33.4 4 35.2 4 36.8 5	n (m) Flow 4.000 4.500 5.000	(1/s) 49.1 52.0 54.7	Depth (m) 7.500 8.000 8.500	Flow	(1/s) 66.6 68.8 70.8
Depth (m) Fl 0.500 0.600 0.800 1.000	ow (1/s) Depth (m) F 32.0 1.800 31.8 2.000 31.0 2.200 28.8 2.400	low (1/s) Depth 33.4 35.2 36.8 38.4	n (m) Flow 1.000 1.500 5.000 5.500	(1/s) 49.1 52.0 54.7 57.3	Depth (m) 7.500 8.000 8.500 9.000	Flow	(1/s) 66.6 68.8 70.8 72.8
Depth (m) Flo 0.500 0.600 0.800 1.000 1.200	ow (1/s) Depth (m) F 32.0 1.800 31.8 2.000 31.0 2.200 28.8 2.400 27.5 2.600	low (1/s) Depth 33.4 35.2 36.8 38.4 39.9 6	h (m) Flow 4.000 4.500 5.000 5.500 5.000	(1/s) 49.1 52.0 54.7 57.3 59.8	Depth (m) 7.500 8.000 8.500	Flow	(1/s) 66.6 68.8 70.8
Depth (m) Fl 0.500 0.600 0.800 1.000	ow (1/s) Depth (m) F 32.0 1.800 31.8 2.000 31.0 2.200 28.8 2.400	low (1/s) Depth 33.4 35.2 36.8 38.4 39.9 42.8	n (m) Flow 1.000 1.500 5.000 5.500	(1/s) 49.1 52.0 54.7 57.3	Depth (m) 7.500 8.000 8.500 9.000	Flow	(1/s) 66.6 68.8 70.8 72.8

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Coast Consulting Engineers	Ltd	Page 6
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:2	Micro
Date 09/06/2023	Designed by RH	
File 230609 REVISED SURFACE	W Checked by PL	Drainage
Innovyze	Network 2020.1	
Storage	e Structures for 180518 SW1.SWS	
Cellular	Storage Manhole: 1, DS/PN: 1.000	
	Invert Level (m) 63.585 Safety Fact ficient Base (m/hr) 0.00000 Porosi ficient Side (m/hr) 0.00000	or 2.0 ty 0.95
Depth (m) Area (m²)	Inf. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m²)
0.000 51.8 0.520 51.8		0.0
Cellular	Storage Manhole: 2, DS/PN: 1.001	
Infiltration Coef	Invert Level (m) 63.015 Safety Fact ficient Base (m/hr) 0.00000 Porosi ficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf.	ty 0.95
0.000 220.0 0.520 220.0	0.0 0.0	0.0
Cellular	Storage Manhole: 4, DS/PN: 1.003	
	Invert Level (m) 62.589 Safety Fact ficient Base (m/hr) 0.00000 Porosi ficient Side (m/hr) 0.00000	or 2.0 ty 0.95
Depth (m) Area (m²)	Inf. Area (m²) Depth (m) Area (m²) Inf.	Area (m²)
0.000 129.5 0.520 129.5	0.0 0.0	0.0
Cellular	Storage Manhole: 6, DS/PN: 1.005	
	Invert Level (m) 62.335 Safety Fact ficient Base (m/hr) 0.00000 Porosi ficient Side (m/hr) 0.00000	or 2.0 ty 0.95
Depth (m) Area (m²)	Inf. Area (m²) Depth (m) Area (m²) Inf.	Area (m²)
0.000 25.9	0.0 0.521 0.0	0.0
0.520 25.9	I	

Coast Consulting Engineers Lto	£	Page 7
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:2	— Micro
Date 09/06/2023	Designed by RH	Drainago
Tile 230609 REVISED SURFACE W	-	brainage
Innovyze	Network 2020.1	
<u>Cellular St</u>	corage Manhole: 7, DS/PN: 1.006	
	Invert Level (m) 62.224 Safety Factor eient Base (m/hr) 0.00000 Porosity (eient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf. Ar	ea (m²)
0.000 25.9 0.520 25.9	0.0 0.0	0.0
<u>Cellular St</u>	corage Manhole: 8, DS/PN: 2.000	
Infiltration Coeffic	Invert Level (m) 63.413 Safety Factor Sient Base (m/hr) 0.00000 Porosity (Sient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	E. Area (m ²) Depth (m) Area (m ²) Inf. Ar	ea (m²)
0.000 77.7 0.520 77.7	0.0 0.0	0.0
<u>Cellular St</u>	corage Manhole: 9, DS/PN: 2.001	
Infiltration Coeffic	Invert Level (m) 62.621 Safety Factor Sient Base (m/hr) 0.00000 Porosity (Sient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf. Ar	ea (m²)
0.000 388.5 0.520 388.5	0.0 0.0	0.0
<u>Cellular Stor</u>	cage Manhole: 10 HB, DS/PN: 2.002	
Infiltration Coeffic	Invert Level (m) 62.249 Safety Factor ient Base (m/hr) 0.00000 Porosity (ient Side (m/hr) 0.00000	0.95
Depth (m) Area (m²) Inf	5. Area (m ²) Depth (m) Area (m ²) Inf. Ar	ea (m²)
0.000 170.0 0.520 170.0	0.0 0.0	0.0
	orage Manhole: 11, DS/PN: 2.003	

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Coast Consulting Engineers Ltd		Page 8
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:2	— Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W.	-	Diginique
Innovyze	Network 2020.1	
Cellular Sto	rage Manhole: 11, DS/PN: 2.003	
	Porosity 0.95	
Depth (m) Area (m²) Inf.	Area (m²) Depth (m) Area (m²) Inf. An	rea (m²)
0.000 200.0	0.0 0.521 0.0	0.0
0.520 200.0		
Collular Sto	r_{2} and M_{2} model of 12 DC (DN, 2 004	
Cellular Sto	prage Manhole: 12, DS/PN: 2.004	
Infiltration Coeffici	envert Level (m) 62.079 Safety Factor ent Base (m/hr) 0.00000 Porosity ent Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf.	Area (m ²) Depth (m) Area (m ²) Inf. An	rea (m²)
0.000 129.5	0.0 0.521 0.0	0.0
0.520 129.5	0.0	
Cellular Sto	prage Manhole: 15, DS/PN: 1.008	
	rage Mannote. 13, 25/14. 1.000	
	invert Level (m) 61.919 Safety Factor	
	ent Base (m/hr) 0.00000 Porosity ent Side (m/hr) 0.00000	0.95
Depth (m) Area (m²) Inf.	Area (m ²) Depth (m) Area (m ²) Inf. An	rea (m²)
0.000 30.0	0.0 0.521 0.0	0.0
0.520 30.0	0.0	
Cellular Sto	prage Manhole: 16, DS/PN: 3.000	
	invert Level (m) 61.900 Safety Factor ent Base (m/hr) 0.00000 Porosity	
	ent Side (m/hr) 0.00000	0.93
Donth (m) Amon (m ²) Inf	Area (m^2) Depth (m) Area (m^2) Inf. And	noo (m²)
Depth (m) Area (m ²) INI.	Area (m ²) Depth (m) Area (m ²) Inf. A	rea (m²)
0.000 51.8	0.0 0.521 0.0	0.0
0.520 51.8	0.0	
<u>Cellular Stora</u>	age Manhole: 17 HB, DS/PN: 1.009	
	<pre>invert Level (m) 61.852 Safety Factor ent Base (m/hr) 0.00000 Porosity</pre>	
	ent Side (m/hr) 0.00000 Folosity	
(01982-2020 Innovyze	

Coast Consulting E	Ingineers	Ltd							Pag	ge 9
Suite 6, Vita Hous	e		FLOSH	MEADOWS	;					
Fish Quay			CLEAT	OR						
North Shields NE3	80 1JA		1:2						M	icro
Date 09/06/2023			Desig	ned by R	сH					icro rainage
File 230609 REVISE	D SURFAC	E W								allaye
Innovyze			Netwo	rk 2020.	1				I	
<u>C</u>	ellular :	Storage	Manho	le: 17 H	B, DS/	'PN:	1.00)9		
Depth (m)	Area (m²)	Inf. Are	a (m²)	Depth (m) Area	(m²)	Inf.	Area	(m²)	
0.000	77.7		0.0	0.52	1	0.0			0.0	
0.520			0.0	0.02	-	0.0			0.0	
		©198	2-202) Innovy	ze					

	onsu	lt	ing 1	Engin	eers Lt	zd				Pa	age 10
uite 6,	Vi	ta	Hou	se		F	LOSH MEADO	WS			
ish Qua	ay					C	LEATOR				
~ orth Sh	-	ds	NE	30 1.T	Д	1	:2				licco
ate 09/	-						esigned by	RH			Aicro
)rainaq
ile 230		RI	- 121	ED SU	RFACE N		hecked by				
nnovyze						N	etwork 202	J.1			
Summa	ary	of	Cri	tical	Resul	ts by M	laximum Lev	el (Rank	1) for 1	.80518 S	W1.SWS
		e H Se	Hot leadlo ewage Numbe Nur	Hot : t Star oss Coo per ho er of : mber o: ber of	Start (m t Level eff (Glc ectare (Input Hy f Online Offline	actor 1.(hins) (mm) obal) 0.5 (1/s) 0.(actorgraph act	500 Flow per 000 .s 0 Number .s 3 Number .s 0 Number c Rainfall D	Donal Flow DD Factor I Person pe of Storage of Time/Ar of Real Ti etails	* 10m³/ha S nlet Coeff: r Day (l/po Structure: ea Diagram: me Controls	Storage 2 iecient 0 er/day) 0 s 13 s 0	.000 .800
						on Engla	FSR nd and Wales 18.600				
						DTS	mestep 2.5 S Status Status Status	econd Inc	rement (Ext	ended) OFF OFF OFF	
			Dura		rofile(s s) (mins	,	0, 60, 120,	180, 240,	360, 480,	nd Winter 600, 720, 960, 1440	
	Re	tur) (years nange (%					2 C	
	us/I	мн			Return	Climate	First (X)	First (Y)	First (Z)	Overflow	Water V Level
	Nam	ne	St	orm	Period	Change	Surcharge	Flood	Overflow	Act.	(m)
PN				Summer	2	+0%					63.117
		1	240 0		Z						00.11/
1.000			240 S		2	+0%					63,117
1.000 1.001		2	240 \$	Summer	2 2	+0% +0%	2/15 Summer				63.117 63.116
1.000 1.001 1.002	3 1	2 HB	240 s 240 s	Summer Summer			2/15 Summer				63.116
1.000 1.001 1.002 1.003	3 1	2 HB	240 s 240 s 120 s	Summer	2	+0%	2/15 Summer				63.116 62.684
1.000 1.001 1.002 1.003 1.004	3 1	2 HB 4	240 s 240 s 120 s 60 s	Summer Summer Summer	2 2 2	+0% +0% +0%	2/15 Summer				63.116 62.684 62.547
1.000 1.001 1.002 1.003 1.004 1.005	3 1	2 HB 4 5	240 s 240 s 120 s 60 s	Summer Summer Summer Summer	2 2	+0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451
1.000 1.001 1.002 1.003 1.004 1.005 1.006	3 1	2 HB 4 5 6 7	240 s 240 s 120 s 60 s 60 s	Summer Summer Summer Summer Summer	2 2 2 2 2	+0% +0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451 62.349
1.000 1.001 1.003 1.004 1.005 1.006 2.000	3 1	2 HB 5 6 7 8	240 s 240 s 120 s 60 s 60 s 15 s	Summer Summer Summer Summer Summer Summer	2 2 2 2 2 2 2	+0% +0% +0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451 62.349 62.686
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001	3 1	2 HB 5 6 7 8 9	240 s 240 s 120 s 60 s 60 s 15 s 480 s	Summer Summer Summer Summer Summer Summer Summer	2 2 2 2 2 2 2 2 2	+0% +0% +0% +0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451 62.349 62.686 62.618
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002	3 1	2 HB 5 6 7 8 9 HB	240 \$ 240 \$ 120 \$ 60 \$ 60 \$ 15 \$ 480 \$	Summer Summer Summer Summer Summer Summer Summer Summer	2 2 2 2 2 2 2 2 2 2	+0% +0% +0% +0% +0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451 62.349 62.686 62.618 62.617
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003	3 1	2 HB 5 6 7 8 9 HB	240 2 240 2 120 2 60 2 60 2 15 2 480 2 360 2	Summer Summer Summer Summer Summer Summer Summer Summer Summer	2 2 2 2 2 2 2 2 2 2 2 2	+0% +0% +0% +0% +0% +0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451 62.349 62.686 62.618 62.617 62.256
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003 2.004	3 1	2 HB 5 6 7 8 9 HB 11	240 2 240 2 120 2 60 2 60 2 15 2 480 2 360 2 360 2	Summer Summer Summer Summer Summer Summer Summer Summer Summer Summer	2 2 2 2 2 2 2 2 2 2 2 2 2 2	+0% +0% +0% +0% +0% +0% +0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451 62.349 62.686 62.618 62.617 62.256 62.194
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003	3 1	2 HB 5 6 7 8 9 HB 11 12 13	240 2 240 2 120 2 60 2 60 2 15 2 480 2 360 2 360 2 360 2	Summer Summer Summer Summer Summer Summer Summer Summer Summer	2 2 2 2 2 2 2 2 2 2 2 2	+0% +0% +0% +0% +0% +0% +0% +0%	2/15 Summer				63.116 62.684 62.547 62.451 62.349 62.686 62.618 62.617 62.256

Coast Consulting Engineers Ltd		Page 11
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:2	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

PN	US/MH Name	Surcharged Depth (m)			Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.871	0.000	0.00		80	4.4	OK	
1.001	2	-0.766	0.000	0.01		83	6.1	OK	
1.002	3 HB	0.117	0.000	0.16			6.0	SURCHARGED	
1.003	4	-0.130	0.000	0.37		140	13.7	OK	
1.004	5	-0.117	0.000	0.46			16.5	OK	
1.005	6	-0.109	0.000	0.52			18.8	OK	
1.006	7	-0.099	0.000	0.60		51	20.8	OK	
2.000	8	-0.425	0.000	0.08		6	19.1	OK	
2.001	9	-0.272	0.000	0.07		102	15.9	OK	
2.002	10 HB	-0.007	0.000	0.06		192	5.8	OK	
2.003	11	-0.300	0.000	0.08		315	7.8	OK	
2.004	12	-0.260	0.000	0.11		248	9.5	OK	
2.005	13	-0.231	0.000	0.13			10.8	OK	
1.007	14	-0.194	0.000	0.29			27.8	OK	

Coast Consulting Engineers Ltd		Page 12
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:2	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

PN	US/MH Name	S	torm			First (X) Surcharge	 First (Z) Overflow	Overflow Act.	Water Level (m)
1.008	15	360	Summer	2	+0%				62.152
3.000	16	360	Summer	2	+0%				62.138
1.009	17 HB	360	Summer	2	+0%				62.137
1.010	18	360	Summer	2	+0%				61.897

PN	US/MH Name	Surcharged Depth (m)		Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Flow	Status	Level Exceeded
1.008	15	-0.142	0.000	0.29		126	27.7	OK	
3.000	16	-0.137	0.000	0.02		115	2.0	OK	
1.009	17 HB	-0.015	0.000	0.40		154	25.4	OK	
1.010	18	-0.146	0.000	0.52			25.4	OK	

	onsulti	ng En	ginee	rs Ltd							Pa	ge O
Suite 6,	Vita	House	:		F	LOSH MEADO	WS					
Fish Qua	ıy				C	LEATOR						
North Sh	ields	NE30	1JA		1	:30						licco
Date 09/						esigned by	DЦ					licro
			QUDE			5 1						rainage
File 230		VISED	SURE	ACE W.		hecked by I						
Innovyze	3				N	etwork 2020	0.1					
		STORM	1 SEWE	R DESI	GN by	the Modif	ied R	atior	nal N	lethod	<u>l</u>	
			Netwo	ork Des	sign	Table for 1	180518	3 SW1	.SWS			
PN	Length	Fall	Slope	I.Area	T.E.	Base	k	HYD	DIA	Sectio	on Type	Auto
	(m)	(m)	(1:X)	(ha)	(mins)) Flow (l/s)	(mm)	SECT	(mm)			Design
1.000	(m) 41.957			(ha) 0.061	(mins)		(mm) 0.600	SECT		Pipe/0	Conduit	2
	. ,	0.105	399.6			0.0			975	-	Conduit Conduit	0
1.001	41.957	0.105 0.134	399.6 400.3	0.061	5.00	0.0	0.600	0	975 975	Pipe/0		۔ ۳
1.001 1.002	41.957 53.639	0.105 0.134 0.185	399.6 400.3 170.3	0.061	5.00	0 0.0 0 0.0 0 0.0 0 0.0	0.600	0	975 975 225	Pipe/0 Pipe/0	Conduit	۔ ٹ ٹ
1.001 1.002 1.003	41.957 53.639 31.512	0.105 0.134 0.185 0.150	399.6 400.3 170.3 169.9	0.061 0.118 0.129	5.00	0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.600 0.600 0.600	0 0 0	975 975 225 225	Pipe/0 Pipe/0 Pipe/0	Conduit Conduit	- ሆ ሆ
1.001 1.002 1.003 1.004	41.957 53.639 31.512 25.483	0.105 0.134 0.185 0.150 0.104	399.6 400.3 170.3 169.9 169.7	0.061 0.118 0.129 0.104	5.00 0.00 0.00	0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.600 0.600 0.600 0.600	0 0 0	975 975 225 225 225	Pipe/0 Pipe/0 Pipe/0 Pipe/0	Conduit Conduit Conduit	۔ ٹ ٹ ٹ
1.001 1.002 1.003 1.004 1.005	41.957 53.639 31.512 25.483 17.652	0.105 0.134 0.185 0.150 0.104 0.112	399.6 400.3 170.3 169.9 169.7 169.5	0.061 0.118 0.129 0.104 0.035	5.00 0.00 0.00 0.00	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.600 0.600 0.600 0.600 0.600		975 975 225 225 225 225 225	Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0	Conduit Conduit Conduit Conduit	8 6 6 6 6 6 6 6
1.001 1.002 1.003 1.004 1.005 1.006	41.957 53.639 31.512 25.483 17.652 18.982	0.105 0.134 0.185 0.150 0.104 0.112 0.080	399.6 400.3 170.3 169.9 169.7 169.5 170.7	0.061 0.118 0.129 0.104 0.035 0.028	5.00 0.00 0.00 0.00 0.00	0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.600 0.600 0.600 0.600 0.600 0.600		975 975 225 225 225 225 225 225	Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0	Conduit Conduit Conduit Conduit Conduit	6 5 5 5 5 5 6 6 6
1.001 1.002 1.003 1.004 1.005 1.006 2.000	41.957 53.639 31.512 25.483 17.652 18.982 13.655	0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221	399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5	0.061 0.118 0.129 0.104 0.035 0.028 0.029	5.00 0.00 0.00 0.00 0.00 0.00	0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.600 0.600 0.600 0.600 0.600 0.600 0.600		975 975 225 225 225 225 225 225 225	Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0	Conduit Conduit Conduit Conduit Conduit Conduit	6 5 5 5 5 5 5 5 6
1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001	41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706	0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221 0.116	399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5 325.3	0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115	5.00 0.00 0.00 0.00 0.00 0.00 0.00	0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.600 0.600 0.600 0.600 0.600 0.600 0.600		975 975 225 225 225 225 225 225 225 525	Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0	Conduit Conduit Conduit Conduit Conduit Conduit	- 6 6 6 6 6 6 6 6
1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.001 2.002	41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706 37.730	0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221 0.221 0.116 0.068	399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5 325.3 325.0	0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115 0.225	5.00 0.00 0.00 0.00 0.00 0.00 0.00 5.00	0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.600 0.600 0.600 0.600 0.600 0.600 0.600 0.600		975 975 225 225 225 225 225 225 225 525 525 5	Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0	Conduit Conduit Conduit Conduit Conduit Conduit Conduit	- 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003	41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706 37.730 22.253	0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221 0.116 0.068 0.102	399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5 325.3 325.0 325.7	0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115 0.225 0.065	5.00 0.00 0.00 0.00 0.00 0.00 5.00 0.00	0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	0.600 0.600 0.600 0.600 0.600 0.600 0.600 0.600 0.600		975 975 225 225 225 225 225 225 225 525 525 375 375	Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0 Pipe/0	Conduit Conduit Conduit Conduit Conduit Conduit Conduit Conduit	* * * * * *

Network Results Table

 1.007
 24.092
 0.074
 325.6
 0.021
 0.00
 0.0
 0.600
 o
 375
 Pipe/Conduit
 #

 1.008
 21.726
 0.067
 324.3
 0.029
 0.00
 0.0
 0.600
 o
 375
 Pipe/Conduit
 #

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (1/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (1/s)	
1.000	0.00	5.43	63.013	0.061	0.0	0.0	0.0	1.64	1225.0	0.0	
1.001	0.00	5.97	62.908	0.179	0.0	0.0	0.0	1.64	1223.9	0.0	
1.002	0.00	6.50	62.774	0.308	0.0	0.0	0.0	1.00	39.7	0.0	
1.003	0.00	6.92	62.589	0.412	0.0	0.0	0.0	1.00	39.8	0.0	
1.004	0.00	7.22	62.439	0.447	0.0	0.0	0.0	1.00	39.8	0.0	
1.005	0.00	7.53	62.335	0.475	0.0	0.0	0.0	1.00	39.8	0.0	
1.006	0.00	7.76	62.223	0.504	0.0	0.0	0.0	1.00	39.7	0.0	
2.000	0.00	5.97	62.586	0.115	0.0	0.0	0.0	1.24	268.0	0.0	
2.001	0.00	6.47	62.365	0.340	0.0	0.0	0.0	1.24	267.7	0.0	
2.002	0.00	6.85	62.249	0.405	0.0	0.0	0.0	1.00	110.4	0.0	
2.003	0.00	7.40	62.181	0.470	0.0	0.0	0.0	1.00	110.3	0.0	
2.004	0.00	7.62	62.079	0.532	0.0	0.0	0.0	1.00	110.7	0.0	
2.005	0.00	7.86	62.038	0.574	0.0	0.0	0.0	0.99	109.9	0.0	
1.007	0.00	8.26	61.993	1.099	0.0	0.0	0.0	1.00	110.3	0.0	
1.008	0.00	8.62	61.919	1.128	0.0	0.0	0.0	1.00	110.5	0.0	
				©1982-	2020 Innov	vyze					

ito ƙ			-	ers Ltd								Pa	age 1
	Vita	House	÷				MEADOV	1S					
sh Qua	-					LEATO	R						
	ields) 1JA			:30						N	<i>licro</i>
	06/202					2	ed by)rainag
		EVISED) SURF	ACE W.			d by E						
novyze					Ne	etwor	k 2020).1					
		STOR	M SEWF	ER DESI	GN bv	the	Modif	ied R	ation	nal N	1etho	d	
			Netw	ork Des	sign 1	ſable	for 1	80518	3 SW1	.SWS			
DM	Tonoth	W-11	01 em e	TAmon				1-		DTA			
PN	(m)	raii (m)	(1:X)	I.Area (ha)			ase (1/s)	k (mm)	HYD SECT	(mm)	Secti	оп туре	e Auto Design
2	1 5 4 5 0	0.040	200 1	0.070									_
3.000	15.459	0.048	322.1	0.070	5.00)	0.0	0.600	0	375	Pipe/	Conduit	t 🖰
				0.000	0.00			0.600			-	Conduit	<u> </u>
1.010	3.900	0.016	243.8	0.000	0.00	1	0.0	0.600	0	300	Pipe/	Conduit	t 🗗
				Ne	etworł	< Res	ults 1	Table					
Pl				US/IL Σ			Base		Add			Cap	Flow
	(11111)	'hr) (m	iins)	(m)	(ha)	FION	w (l/s)	(1/5)	(1)	s)	(m/s)	(1/s)	(1/5)
3.0	00 0	0.00	5.26 6	51.900	0.07	C	0.0	0.0		0.0	1.00	110.9	0.0
1.0	09 C	0.00	9.07 6	51.852	1.19	8	0.0	0.0		0.0	1.00	70.6	0.0
1.0	10 C	0.00	9.13 6	1.743	1.19	8	0.0	0.0		0.0	1.00	70.9	0.0
		Fro	o Flo	wing Ou	1+ f - 1]		sile f	For 19	20510	CW1	CMC		
		<u>116</u>	e rio	wing ou	iciai.	L Det	<u>aiis i</u>		00010	SWI	.505		
			tfall				I. Lev		lin	D,L	W		
		Pipe	e Numbe	r Name	((m)	(m)		Level (m)	(mm)	(mm)		
		-											
		-											
		-	1.01	0 0	C1 63	3.006	61.7		1.727	1350	0		
		-		0 (ulation				27 6	1.727		0		
		-						27 6	1.727		0		
		Volumet	<u>Simu</u> ric Run	ulation noff Coe	Crit ff 0.7	<u>eria</u> 750	for 1 Additic	27 6 80518 201 Fl	1.727 SW1	.SWS % of	Total		
		Volumet Areal	<u>Simu</u> ric Run Reduct:	ulation	<u>Crit</u> ff 0.7 or 1.0	<u>eria</u> 750	for 1 Additic	27 6 80518 201 Fl	1.727 SW1 Low -	<u>.SWS</u> % of 10m³/	Total ha Sto	Flow 0 prage 2 cient 0	.000
		Volumet Areal	<u>Simu</u> ric Run Reduct: Hot Sta	lation noff Coe ion Fact	<u>Crit</u> ff 0.7 or 1.0 s)	<u>eria</u> 750 000 0	for 1 Additic	27 6 80518 Dnal FJ DD Fact	1.727 SW1 low - cor * Inl n per	.SWS % of 10m³/ .et Cc Day (Total ha Sto effico l/per,	orage 2 cient 0 /day) 0	.000 .800
	nhole H	Volumet Areal Hot Meadlos	<u>Simu</u> ric Run Reduct: Hot Sta Start 1 s Coef:	ulation noff Coe ion Fact art (min Level (m f (Globa	Crit ff 0.7 or 1.0 s) m) 1) 0.5	eria 750 000 0 Fl 500	for 1 Additic MAE	27 6 80518 Dnal Fl DD Fact Persor	SW1 SW1 low - cor * Inl n per	.SWS % of 10m ³ / .et Cc Day (Run I	Total ha Sto effico l/per, cime (r	orage 2 cient 0 /day) 0 mins)	.000 .800 .000 60
	nhole H	Volumet Areal Hot Meadlos	<u>Simu</u> ric Run Reduct: Hot Sta Start 1 s Coef:	lation noff Coe ion Fact art (min Level (m	Crit ff 0.7 or 1.0 s) m) 1) 0.5	eria 750 000 0 Fl 500	for 1 Additic MAE	27 6 80518 Dnal Fl DD Fact Persor	SW1 SW1 low - cor * Inl n per	.SWS % of 10m ³ / .et Cc Day (Run I	Total ha Sto effico l/per,	orage 2 cient 0 /day) 0 mins)	.000 .800 .000
	nhole H Foul Se	Volumet Areal Hot Wage p Number	Simu ric Run Reduct: Hot Sta Start I s Coef: er hect of Inp	ulation noff Coe ion Fact art (min Level (m f (Globa tare (l/ put Hydr	Crit ff 0.7 or 1.0 s) m) 1) 0.5 s) 0.0 ograph	eria 750 000 0 Fl 500 000 15 0 N	for 1 Additic MAE ow per	27 6 80518 Donal FJ DD Fact Persor Ou Of Stor	SW1 SW1 low - cor * Inl per itput cage S	.SWS % of 10m ³ / et Cc Day (Run I Inter Struct	Total ha Sto effice l/per, ime (r val (r ures	orage 2 cient 0 /day) 0 nins) nins) 13	.000 .800 .000 60
	nhole H Foul Se	Volumet Areal Hot leadlos wage p Number Numb	Simu ric Run Reduct: Hot Start 1 s Coeff er hect of Inp er of (ulation noff Coe ion Fact art (min Level (m f (Globa tare (l/	Crit ff 0.7 or 1.0 s) m) 1) 0.5 s) 0.0 ograph ontrol	eria 750 000 0 F1 500 000 15 0 N .s 3 N	for 1 Additic MAE ow per	27 6 80518 Donal FJ DD Fact Persor Ou Of Stor	SW1 SW1 SW1 Cow - cor * Inl per itput cage S c/Area	.SWS % of 10m ³ / et Cc Day (Run I Inter Struct	Total ha Sto effice l/per, ime (r val (r ures rrams	orage 2 cient 0 /day) 0 nins) nins)	.000 .800 .000 60
	nhole H Foul Se	Volumet Areal Hot leadlos wage p Number Numb	Simu ric Run Reduct: Hot Start 1 s Coeff er hect of Inp er of (ulation noff Coe ion Fact art (min Level (m f (Globa tare (l/ put Hydr Online C	Crit ff 0.7 or 1.0 s) m) 1) 0.5 s) 0.0 ograph ontrol	eria 750 000 0 F1 500 000 15 0 N .s 3 N	for 1 Additic MAE ow per	27 6 80518 Donal FJ DD Fact Persor Ou Of Stor	SW1 SW1 SW1 Cow - cor * Inl per itput cage S c/Area	.SWS % of 10m ³ / et Cc Day (Run I Inter Struct	Total ha Sto effice l/per, ime (r val (r ures rrams	orage 2 cient 0 /day) 0 nins) nins) 13 0	.000 .800 .000 60
	nhole H Foul Se	Volumet Areal Hot leadlos wage p Number Numb	Simu ric Run Reduct: Hot Start 1 s Coeff er hect of Inp er of (ulation noff Coe ion Fact art (min Level (m f (Globa tare (l/ put Hydr Online C ffline C	Crit ff 0.7 or 1.0 s) m) 1) 0.5 s) 0.0 ograph ontrol ontrol	eria 750 0 0 0 Fl 500 000 4s 0 N .s 3 N .s 0 N	for 1 Additic MAE ow per	27 6 80518 Donal FJ DD Fact Persor Ou Of Stor of Stor of Real	1.727 SW1 Low - cor * Inl per atput cage S e/Area Time	.SWS % of 10m ³ / et Cc Day (Run I Inter Struct	Total ha Sto effice l/per, ime (r val (r ures rrams	orage 2 cient 0 /day) 0 nins) nins) 13 0	.000 .800 .000 60
	nhole H Foul Se	Volumet Areal Hot leadlos wage p Number Numb	Simu ric Run Reduct: Hot Start I s Coef: er hect of Inn er of (r of O:	noff Coe ion Fact art (min Level (m f (Globa tare (l/ put Hydr Online C ffline C <u>Synt</u>	Crit ff 0.7 or 1.0 s) m) 1) 0.5 s) 0.0 ograph ontrol ontrol hetic	eria 750 0 0 0 Fl 500 000 4s 0 N .s 3 N .s 0 N	for 1 Additic MAD ow per fumber c fumber c fumber c fumber c	27 6 80518 onal F1 DD Fact Persor Ou of Stor of Stor of Time of Real Detai	SW1 SW1 Low - Cor * Inl per atput cage S c/Area L Time	.SWS % of 10m ³ / .et Cc Day (Run I Inter Struct Cont	Total ha Sto effice l/per, ime (r val (r ures i rams rols	orage 2 cient 0 /day) 0 nins) nins) 13 0 0	.000 .800 .000 60
	nhole H Foul Se	Yolumet Areal Hot Leadlos wage p Number Numb Numbe	Simu ric Run Reduct: Hot Sta Start I s Coef: er hect of Inn er of O r of O Rain:	ulation noff Coe ion Fact art (min Level (m f (Globa tare (l/ put Hydr Online C ffline C	Crit ff 0.7 or 1.0 s) m) 1) 0.5 s) 0.0 ograph ontrol ontrol <u>hetic</u> el	eria 750 0 0 0 Fl 500 000 4s 0 N .s 3 N .s 0 N	for 1 Additic MAD ow per fumber c fumber c fumber c fumber c	27 6 80518 onal F1 DD Fact Persor Ou of Stor of Stor of Time of Real Detai	1.727 SW1 Low - cor * Inl per atput cage S e/Area L Time <u>ls</u> 15-60	.SWS % of 10m ³ / .et Cc Day (Run I Inter Struct Cont (mm)	Total ha Sto effice l/per, ime (r val (r ures rrams	orage 2 cient 0 /day) 0 nins) nins) 13 0 0	.000 .800 .000 60

Coast Consulting Engineers Ltd		Page 2
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:30	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

Synthetic Rainfall Details

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

Coast Consulting Engineers Ltd Suite 6, Vita House Fish Quay North Shields NE30 1JA Date 09/06/2023 File 230609 REVISED SURFACE W Innovyze	FLOSH MEADO CLEATOR 1:30 Designed by		Page 3				
Fish Quay North Shields NE30 1JA Date 09/06/2023 File 230609 REVISED SURFACE W	CLEATOR 1:30 Designed by		Micco				
North Shields NE30 1JA Date 09/06/2023 File 230609 REVISED SURFACE W	1:30 Designed by		Micco				
Date 09/06/2023 File 230609 REVISED SURFACE W	Designed by						
File 230609 REVISED SURFACE W							
		Draina					
Innovyze	Checked by 1	Didiridi					
	Network 202	0.1					
<u>Online Con</u> Hydro-Brake® Optimum Manhoi	ntrols for 180		11me (m ³) • 45 9				
iyaro brakeo opermam namio.	<u>10. 3 IID, 00, 1</u>	11. 1.0027 001					
Uni	it Reference MD-	SHE-0107-7000-211	19-7000				
	ign Head (m)		2.119				
Design	n Flow (l/s)	~ 1	7.0				
	Flush-Flo™ Objective Mi	Calc nimise upstream s	culated				
	Application	-	storage Surface				
Sur	mp Available		Yes				
	iameter (mm)		107				
Inve	rt Level (m)		62.774				
Minimum Outlet Pipe Di	iameter (mm)		150				
Suggested Manhole Di	Lameter (mm)		1200				
Control Points Head (m) Fl	ow (l/s) C	Control Points	Head (m) Flow (l,				
Design Point (Calculated) 2.119	7.0	Kick-Fl	.o® 0.957				
Flush-Flo™ 0.469	6.1 Mean F	low over Head Ran	ige –				
The hydrological calculations have b Hydro-Brake® Optimum as specified.		-	-				
Hydro-Brake Optimum® be utilised the							
	2	5					
Depth (m) Flow (l/s) Depth (m) Fl	ow (l/s) Depth	(m) Flow $(1/s)$ De	epth (m) Flow (l/s)				
0.100 3.7 1.200	5.4 3.0	000 8.2	7.000 12.3				
0.200 5.4 1.400		500 8.9	7.500 12.7				
0.300 5.9 1.600	6.1 4.0	000 9.4	8.000 13.1				
0.400 6.0 1.800		500 10.0	8.500 13.5				
0.500 6.1 2.000		000 10.5	9.000 13.9				
0.600 6.0 2.200		500 11.0	9.500 14.3				
0.800 5.6 2.400 1.000 4.9 2.600		000 11.4 500 11.9					
1.000 4.7 2.000		500 11.9					
Hydro-Brake® Optimum Manhol	.e: 10 HB, DS/	'PN: 2.002, Vol	lume (m³): 13.2				
		SHE-0107-6000-157					
	ign Head (m)		1.575				
Design	n Flow (l/s) Flush-Flo™	C - 1 -	6.0 culated				
		nimise upstream s					
	Application	-	Surface				
Sur	mp Available		Yes				
	iameter (mm)		106				
	rt Level (m)		62.249				
Inve							
Inver Minimum Outlet Pipe Di			150				
			150				

Coast Consulting Engineers Ltd Suite 6, Vita House FLOSH MEADOWS										
FLOSH MEADOWS	5									
CLEATOR										
1:30		Micro								
Designed by H	RH									
Checked by PI	L	Drainage								
Network 2020.	.1									
.e: 10 HB, DS/P	N: 2.002, Volume	(m ³): 13.2								
.ow (1/s) Con	ntrol Points He	ad (m) Flow (l/s)								
6.0 5.9 Mean Flo	Kick-Flo® w over Head Range	0.952 4.7 - 5.2								
		i								
	-	-								
ow (1/s) Depth (m	n) Flow (1/s) Depth	(m) Flow (l/s)								
		500 14.0								
le: 17 HB, DS/H	PN: 1.009, Volume	(m³): 9.6								
it Reference MD-SI	HE-0235-3200-1642-320	00								
ign Head (m)										
n Flow (l/s)	32	.0								
Flush-Flo™	Calculate	ed								
Objective Min	imise upstream storad	je								
Application	Surfac	ce								
mp Available	Ye	es								
iameter (mm)	23	35								
rt Level (m)	61.85	52								
iameter (mm)	30	00								
iameter (mm)	180	00								
ow (l/s) Con	ntrol Points He	ad (m) Flow (l/s)								
32.0 32.0 Mean Flo	Kick-Flo® w over Head Range	1.101 26.4 - 27.5								
	pe of control device	other than a								
n these storage r	outing carculations									
	n) Flow (1/s) Depth									
	n) Flow (1/s) Depth	(m) Flow (l/s)								
	CLEATOR 1:30 Designed by H Checked by P1 Network 2020 e: 10 HB, DS/P Manhole Diameter ow (1/s) Con 6.0 5.9 Mean Floc een based on the Should another ty n these storage r ow (1/s) Depth (n 5.3 3.00 5.7 3.50 6.0 4.00 6.4 4.50 6.0 4.00 6.4 5.50 7.3 6.00 7.0 5.50 7.3 6.00 1.5 Con 7.6 6.50 le: 17 HB, DS/H it Reference MD-S. ign Head (m) n Flow (1/s) Flush-Flot Objective Min Application mp Available iameter (mm) iameter (mm) iameter (mm) iameter (mm) Agen Flot	1:30 Designed by RH Checked by PL Network 2020.1 Anhole Diameter (mm) 1200 ow (1/s) Control Points 6.0 Kick-Flo® 5.9 Mean Flow over Head Range een based on the Head/Discharge relat. Should another type of control device n these storage routing calculations ow (1/s) Depth (m) Flow (1/s) Depth Pepth (1/s) 5.3 3.000 8.1 5.7 3.500 8.7 6.0 4.000 9.3 6.1 5.50 10.3 9.6 7.0 5.500 10.3 7.0 5.500 10.3 7.3 6.000 11.3 7.6 A.500 9.5 7.3 6.000 11.3 7.6 S.500 10.8 9.5 7.3 6.000 11.3 7.6 S.500 11.7 1.64 10 A.510 32 1.64 11.7 Calculate Objective Minimise upstream storage<								

oast Consulting Engineers Ltd									
uite 6, Vita House FLOSH MEADOWS									
Fish Quay		CLEATOR	R						
North Shields NE30	1JA	1:30							
Date 09/06/2023		Designe	d by RH						
File 230609 REVISED :	SURFACE W	Checked	l by PL			Drainag			
Innovyze		Network	2020.1			1			
Hydro-Brake® Op					·				
Depth (m) Flow (1/s)) Depth (m) Flo	ow (l/s) De	epth (m) F	Flow (l/s)	Depth (m)	Flow (l/s)			
Depth (m) Flow (1/s)) Depth (m) Flc)w (l/s) De 33.4	epth (m) F 4.000	Slow (1/s) 49.1	Depth (m) 7.500	Flow (1/s) 66.6			
Depth (m) Flow (1/s)) Depth (m) Flc	ow (l/s) De	epth (m) F	Flow (l/s)	Depth (m)	Flow (1/s) 66.6			
Depth (m) Flow (1/s)) Depth (m) Flo 1.800 3 2.000)w (l/s) De 33.4	epth (m) F 4.000	Slow (1/s) 49.1	Depth (m) 7.500	Flow (1/s) 66.6 68.8			
Depth (m) Flow (1/s) 0.500 32.0 0.600 31.3	Depth (m) Flc 1.800 2.000 2.200 2.200	5w (l/s) De 33.4 35.2	epth (m) F 4.000 4.500	Flow (1/s) 49.1 52.0	Depth (m) 7.500 8.000	Flow (1/s) 66.6 68.8 70.8			
Depth (m) Flow (1/s) 0.500 32. 0.600 31.3 0.800 31.0	Depth (m) Flc 1.800 2.000 2.200 2.400	5w (1/s) De 33.4 35.2 36.8	epth (m) F 4.000 4.500 5.000	Flow (1/s) 49.1 52.0 54.7	Depth (m) 7.500 8.000 8.500	Flow (1/s) 66.6 68.8 70.8			
Depth (m) Flow (1/s) 0.500 32. 0.600 31. 0.800 31. 1.000 28.	Depth (m) Flc 1.800 2.000 2.200 2.200 2.400 2.600	bw (1/s) De 33.4 35.2 36.8 38.4	epth (m) F 4.000 4.500 5.000 5.500	Flow (1/s) 49.1 52.0 54.7 57.3	Depth (m) 7.500 8.000 8.500 9.000	Flow (1/s) 66.6 68.8 70.8 72.8			

	1	Page 6
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:30	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W.	Checked by PL	Diamage
Innovyze	Network 2020.1	
Storage S	tructures for 180518 SW1.SWS	
	orage Manhole: 1, DS/PN: 1.000	
Infiltration Coeffic	Invert Level (m) 63.585 Safety Facto ient Base (m/hr) 0.00000 Porosit ient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m²)
0.000 51.8	0.0 0.521 0.0	0.0
0.520 51.8	0.0	
Cellular St	orage Manhole: 2, DS/PN: 1.001	
Infiltration Coeffic Infiltration Coeffic	<pre>Invert Level (m) 63.015 Safety Facto ient Base (m/hr) 0.00000 Porosit ient Side (m/hr) 0.00000 7. Area (m²) Depth (m) Area (m²) Inf.</pre>	ey 0.95
-		
0.000 220.0 0.520 220.0	0.0 0.0	0.0
a 11 1 a.	orage Manhole: 4, DS/PN: 1.003	
<u>Cellular St</u>		
Infiltration Coeffic	Invert Level (m) 62.589 Safety Facto	or 2.0 cy 0.95
Infiltration Coeffic Infiltration Coeffic	Invert Level (m) 62.589 Safety Facto ient Base (m/hr) 0.00000 Porosit	cy 0.95
Infiltration Coeffic Infiltration Coeffic	Invert Level (m) 62.589 Safety Facto ient Base (m/hr) 0.00000 Porosit ient Side (m/hr) 0.00000	cy 0.95
Infiltration Coeffic Infiltration Coeffic Depth (m) Area (m ²) Inf 0.000 129.5 0.520 129.5	Invert Level (m) 62.589 Safety Facto ient Base (m/hr) 0.00000 Porosit ient Side (m/hr) 0.00000 7. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0	Ty 0.95 Area (m²)
Infiltration Coeffic Infiltration Coeffic Depth (m) Area (m²) Inf 0.000 129.5 0.520 129.5 <u>Cellular St</u> Infiltration Coeffic	Invert Level (m) 62.589 Safety Factorient Base (m/hr) 0.00000 Porositient Side (m/hr) 0.00000 7. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 0.0 0.521 0.0 0.0 0.521 0.0 0.0 0.521 0.0 0.0 0.521 0.0	Area (m²) 0.0
Infiltration Coeffic Infiltration Coeffic Depth (m) Area (m ²) Inf 0.000 129.5 0.520 129.5 <u>Cellular St</u> Infiltration Coeffic Infiltration Coeffic	Invert Level (m) 62.589 Safety Factorient Base (m/hr) 0.00000 Porositient Side (m/hr) 0.00000 7. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 0.0 0.521 0.0 0.0 0.521 0.0 Depth (m) Area (m ²) Inf. 0.521 0.0 0.0 0.521 0.0 0.0 0.0 0.0 0.521 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Area (m ²) 0.0 0.2 0.9 0.95
Infiltration Coeffic Infiltration Coeffic Depth (m) Area (m ²) Inf 0.000 129.5 0.520 129.5 <u>Cellular St</u> Infiltration Coeffic Infiltration Coeffic	Invert Level (m) 62.589 Safety Factorient Base (m/hr) 0.00000 Porosit ient Side (m/hr) 0.00000 . Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 0.0 0.521 0.0 . Orage Manhole: 6, DS/PN: 1.005 Invert Level (m) 62.335 Safety Factorient Base (m/hr) 0.00000 Porosit ient Side (m/hr) 0.00000	Area (m ²) 0.0 0.2 0.9 0.95
Infiltration Coeffic Infiltration Coeffic Depth (m) Area (m ²) Inf 0.000 129.5 0.520 129.5 <u>Cellular St</u> Infiltration Coeffic Infiltration Coeffic Depth (m) Area (m ²) Inf 0.000 25.9	Invert Level (m) 62.589 Safety Factorient Base (m/hr) 0.00000 Porositient Side (m/hr) 0.00000 7. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 0.0 0.521 0.0 corage Manhole: 6, DS/PN: 1.005 Invert Level (m) 62.335 Safety Factorient Base (m/hr) 0.00000 Porositient Side (m/hr) 0.00000 7. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0	Area (m ²) 0.0 0.2 0.95 Area (m ²)

Coast Consulting Engineers Lt	zd	Page 7	
Suite 6, Vita House	FLOSH MEADOWS		
Fish Quay	CLEATOR		
North Shields NE30 1JA	1:30	Micro	
Date 09/06/2023	Designed by RH	Drainage	
File 230609 REVISED SURFACE W	-	Diamage	
Innovyze	Network 2020.1		
Infiltration Coeffic	Invert Level (m) 62.224 Safety Factor 2.0 cient Base (m/hr) 0.00000 Porosity 0.95 cient Side (m/hr) 0.00000		
	f. Area (m^2) Depth (m) Area (m^2) Inf. Area (m²)	
0.000 25.9 0.520 25.9	0.0 0.521 0.0	0.0	
	torage Manhole: 8, DS/PN: 2.000		
	Invert Level (m) 63.413 Safety Factor 2.0 cient Base (m/hr) 0.00000 Porosity 0.95 cient Side (m/hr) 0.00000		
Depth (m) Area (m²) In	f. Area (m^2) Depth (m) Area (m^2) Inf. Area (m^2)	m²)	
0.000 77.7 0.520 77.7	0.0 0.0	0.0	
<u>Cellular S</u>	torage Manhole: 9, DS/PN: 2.001		
	Invert Level (m) 62.621 Safety Factor 2.0 cient Base (m/hr) 0.00000 Porosity 0.95 cient Side (m/hr) 0.00000		
Depth (m) Area (m²) In	f. Area (m^2) Depth (m) Area (m^2) Inf. Area (m^2)	m²)	
0.000 388.5 0.520 388.5		0.0	
<u>Cellular Sto</u>	prage Manhole: 10 HB, DS/PN: 2.002		
Infiltration Coeffic	Invert Level (m) 62.249 Safety Factor 2.0 cient Base (m/hr) 0.00000 Porosity 0.95 cient Side (m/hr) 0.00000 f. Area (m ²) Depth (m) Area (m ²) Inf. Area (
- · · · · · · ·		0.0	
0.000 170.0	0.0		
0.000 170.0 0.520 170.0			
0.520 170.0	torage Manhole: 11, DS/PN: 2.003		

Coast Consulting Engineers Ltd		Page 8
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:30	— Micro
Date 09/06/2023	Designed by RH	
File 230609 REVISED SURFACE W	Checked by PL	Drainage
Innovyze	Network 2020.1	
	Markeley 11 DC (DN: 2 002	
<u>Cellular Stora</u>	ge Manhole: 11, DS/PN: 2.003	
	Porosity 0.95	
Depth (m) Area (m²) Inf. An	rea (m ²) Depth (m) Area (m ²) Inf. Are	ea (m²)
0.000 200.0 0.520 200.0	0.0 0.0	0.0
<u>Cellular Stora</u>	ge Manhole: 12, DS/PN: 2.004	
	ert Level (m) 62.079 Safety Factor t Base (m/hr) 0.00000 Porosity (t Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf. An	rea (m²) Depth (m) Area (m²) Inf. Are	∋a (m²)
0.000 129.5 0.520 129.5	0.0 0.0	0.0
Cellular Stora	ge Manhole: 15, DS/PN: 1.008	
	ert Level (m) 61.919 Safety Factor t Base (m/hr) 0.00000 Porosity (t Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf. An	rea (m ²) Depth (m) Area (m ²) Inf. Are	ea (m²)
0.000 30.0 0.520 30.0	0.0 0.521 0.0	0.0
<u>Cellular Stora</u>	ge Manhole: 16, DS/PN: 3.000	
Inve Infiltration Coefficient Infiltration Coefficient		
Depth (m) Area (m²) Inf. An	rea (m ²) Depth (m) Area (m ²) Inf. Are	ea (m²)
0.000 51.8 0.520 51.8	0.0 0.0	0.0
Cellular Storage	e Manhole: 17 HB, DS/PN: 1.009	
Inve Infiltration Coefficient Infiltration Coefficient		
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Coast Consulting E	Ingineers	Lt.d						Page 9	
Suite 6, Vita Hous			FLOSH	MEADOWS					
Fish Quay			CLEATC						
North Shields NE3		1:30					Micco		
Date 09/06/2023			ed by RI	H			— Micro Drainac		
File 230609 REVISE	w 0	Checke	d by PL					JC	
Innovyze			Networ	k 2020.2	1				
<u><u>C</u></u>	ellular S [.]	torage 1	Manhol	e: 17 HB	B, DS/PN	1: 1.0	09		
Depth (m)	Area (m²)	Inf. Area	a (m²)	Depth (m)	Area (m	2) Inf	. Area	(m²)	
0.000	77.7		0.0	0.521	0	.0		0.0	
0.520			0.0	0.021	Ŭ	• •		0.0	
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2.0019600Summer30+0%62.7512.00210HB600Summer30+0%30/30Summer62.7502.00311240Summer30+0%62.32862.3282.00412240Summer30+0%62.3232.00513240Summer30+0%62.318	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 5 1.005 6	Climate C Storm 360 Summer 360 Summer 360 Summer 60 Summer 60 Summer 60 Summer	Return C: Period C 30 30 30 30 30 30 30 30	hange +0% +0% +0% +0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 63.286 62.721 62.600 62.524	
2.002 10 HB 600 Summer 30 +0% 30/30 Summer 62.750 2.003 11 240 Summer 30 +0% 62.328 2.004 12 240 Summer 30 +0% 62.323 2.005 13 240 Summer 30 +0% 62.318	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 5 1.005 6 1.005 7	Climate C Storm 360 Summer 360 Summer 360 Summer 60 Summer 60 Summer 60 Summer 60 Summer	Return CI Period C 30 30 30 30 30 30 30 30 30	+0% +0% +0% +0% +0% +0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 63.286 62.721 62.600 62.524 62.437	
2.003 11 240 Summer 30 +0% 62.328 2.004 12 240 Summer 30 +0% 62.323 2.005 13 240 Summer 30 +0% 62.318	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 5 1.005 66 1.006 7 2.000 8	Climate C Storm 360 Summer 360 Summer 360 Summer 60 Summer 60 Summer 60 Summer 60 Summer 60 Summer	Return CI Period C 30 30 30 30 30 30 30 30 30 30 30	+0% +0% +0% +0% +0% +0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 63.286 62.721 62.600 62.524 62.437 62.751	
2.004 12 240 Summer 30 +0% 62.323 2.005 13 240 Summer 30 +0% 62.318	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 55 1.005 66 1.006 7 2.000 88 2.001 9	Climate C Storm 360 Summer 360 Summer 360 Summer 60 Summer 60 Summer 60 Summer 60 Summer 60 Summer 600 Summer	Return CI Period C 30 30 30 30 30 30 30 30 30 30 30 30 30	+0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 63.286 62.721 62.600 62.524 62.437 62.751 62.751	
2.005 13 240 Summer 30 +0% 62.318	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 5 1.005 66 1.006 7 2.000 8 2.001 9 2.002 10 HE	Climate C Storm Storm S	Return CI Period C 30 30 30 30 30 30 30 30 30 30 30 30 30	hange +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 63.286 62.721 62.600 62.524 62.437 62.751 62.751 62.751	
	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 55 1.005 66 1.006 7 2.000 8 2.001 9 2.002 10 HE 2.003 11	Climate C Storm Storm S	Return CI Period C 30 30 30 30 30 30 30 30 30 30 30 30 30	+0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 63.286 62.721 62.600 62.524 62.437 62.751 62.751 62.751 62.750 62.328	
1.007 14 240 Summer 30 +0% 62.313	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 5 1.005 66 1.006 7 2.000 8 2.001 9 2.002 10 HE 2.003 11 2.004 12	Climate 0 Storm 360 Summer 360 Summer 360 Summer 360 Summer 60 Summer 60 Summer 60 Summer 60 Summer 360 Summer 360 Summer 360 Summer 360 Summer 360 Summer 360 Summer 360 Summer 360 Summer	Return CI Period C 30 30 30 30 30 30 30 30 30 30 30 30 30	hange +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 63.286 62.721 62.600 62.524 62.437 62.751 62.751 62.751 62.750 62.328 62.323	
	US/MH PN Name 1.000 1 1.001 2 1.002 3 HE 1.003 4 1.004 5 1.005 66 1.006 7 2.000 8 2.001 9 2.002 10 HE 2.003 11 2.004 12 2.005 13	Climate 0 Storm 360 Summer 360 Summer 360 Summer 360 Summer 60 Summer 60 Summer 60 Summer 600 Summer 3600 Summer	Return CI Period C 30 30 30 30 30 30 30 30 30 30 30 30 30	hange +0% +0% +0% +0% +0% +0% +0% +0% +0% +0%	Surcharge			0 Overflow	Level (m) 63.286 63.286 63.286 62.721 62.600 62.524 62.437 62.751 62.751 62.751 62.750 62.328 62.323 62.318	

Coast Consulting Engineers Ltd		Page 11
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:30	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

PN	US/MH Name	Surcharged Depth (m)		Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.702	0.000	0.01		183	6.1	OK	
1.001	2	-0.597	0.000	0.01		181	5.2	OK	
1.002	3 HB	0.287	0.000	0.16			6.1	SURCHARGED	
1.003	4	-0.093	0.000	0.65		41	23.7	OK	
1.004	5	-0.064	0.000	0.85			30.4	OK	
1.005	6	-0.036	0.000	0.93		20	33.4	OK	
1.006	7	-0.011	0.000	1.00		18	34.5	OK	
2.000	8	-0.360	0.000	0.03		250	8.6	OK	
2.001	9	-0.139	0.000	0.08		233	18.9	OK	
2.002	10 HB	0.126	0.000	0.06		405	5.9	SURCHARGED	
2.003	11	-0.227	0.000	0.10		101	9.9	OK	
2.004	12	-0.131	0.000	0.17		96	14.0	OK	
2.005	13	-0.094	0.000	0.18			14.7	OK	
1.007	14	-0.055	0.000	0.41			39.2	OK	

Coast Consulting Engineers Ltd		Page 12
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:30	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

PN	US/MH Name		torm		Climate Change	First Surch	,	First (Y) Flood	First Overfl	• •	Overflow Act.	Water Level (m)
1.008	15	240	Summer	30	+0%	30/240	Summer					62.296
3.000	16	240	Summer	30	+0%	30/240	Summer					62.280
1.009	17 HB	240	Summer	30	+0%	30/60	Summer					62.278
1.010	18	240	Summer	30	+0%							61.916

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)		Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.008	15	0.002	0.000	0.40		122	37.5	SURCHARGED	
3.000	16	0.005	0.000	0.03		126	2.9	SURCHARGED	
1.009	17 HB	0.126	0.000	0.48		135	30.8	SURCHARGED	
1.010	18	-0.127	0.000	0.63			30.8	OK	

Coast Co	onsulti	ng En	ginee	rs Ltd							Pa	ge O
Suite 6,	, Vita	House	•		F	LOSH MEADO	WS					
Fish Qua	ау				C	LEATOR						
North Sh	nields	NE30	1JA		1	:100 +50%					N	licro
Date 09/	/06/202	23			De	esigned by	RH					
File 230			SURF	ACE W		hecked by I						rainage
			DOIL	<u> </u>		etwork 2020						
Innovyze	=				ING	etwork 2020	J.1					
					ant 1							
		STORM	1 SEWE	R DESI	GN by	the Modif	ied R	atior	al M	lethod		
			Netwo	ork Des	sign 1	Table for 1	180518	3 SW1	.SWS			
PN	-		-	I.Area		Base	k	HYD		Section	і Туре	
PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)		Base Flow (l/s)		HYD SECT	DIA (mm)	Section	і Туре	Auto Design
	-	(m)	(1:X)			Flow (1/s)			(mm)	Section Pipe/Co		Design
1.000	(m)	(m) 0.105	(1:X) 399.6	(ha)	(mins)	Flow (1/s)	(mm)	SECT	(mm) 975		onduit	Design
1.000	(m) 41.957	(m) 0.105 0.134	(1:X) 399.6 400.3	(ha) 0.061	(mins)	Flow (1/s) 0 0.0 0 0.0	(mm) 0.600	SECT o	(mm) 975 975	Pipe/Co	onduit	Design Ĉ
1.000 1.001 1.002	(m) 41.957 53.639	(m) 0.105 0.134 0.185	(1:X) 399.6 400.3 170.3	(ha) 0.061 0.118	(mins) 5.00 0.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600	SECT 0 0	(mm) 975 975 225 225	Pipe/Co Pipe/Co Pipe/Co Pipe/Co	onduit onduit onduit onduit	Design P P U
1.000 1.001 1.002 1.003 1.004	(m) 41.957 53.639 31.512 25.483 17.652	(m) 0.105 0.134 0.185 0.150 0.104	(1:X) 399.6 400.3 170.3 169.9 169.7	(ha) 0.061 0.118 0.129 0.104 0.035	(mins) 5.00 0.00 0.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0	(mm) 975 975 225 225 225	Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co	onduit onduit onduit onduit onduit	Design P P P P
1.000 1.001 1.002 1.003 1.004 1.005	(m) 41.957 53.639 31.512 25.483 17.652 18.982	(m) 0.105 0.134 0.185 0.150 0.104 0.112	(1:X) 399.6 400.3 170.3 169.9 169.7 169.5	(ha) 0.061 0.118 0.129 0.104 0.035 0.028	(mins) 5.00 0.00 0.00 0.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0	(mm) 975 975 225 225 225 225	Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co	onduit onduit onduit onduit onduit onduit	Design Design D D D D D D D D D D D D D D D D D D D
1.000 1.001 1.002 1.003 1.004 1.005	(m) 41.957 53.639 31.512 25.483 17.652	(m) 0.105 0.134 0.185 0.150 0.104 0.112	(1:X) 399.6 400.3 170.3 169.9 169.7 169.5	(ha) 0.061 0.118 0.129 0.104 0.035	(mins) 5.00 0.00 0.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(mm) 975 975 225 225 225 225	Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co	onduit onduit onduit onduit onduit onduit	Design Design D D D D D D D D D D D D D D D D D D D
1.000 1.001 1.002 1.003 1.004 1.005 1.006	(m) 41.957 53.639 31.512 25.483 17.652 18.982 13.655	(m) 0.105 0.134 0.185 0.150 0.104 0.112 0.080	(1:X) 399.6 400.3 170.3 169.9 169.7 169.5 170.7	<pre>(ha) 0.061 0.118 0.129 0.104 0.035 0.028 0.029</pre>	(mins) 5.00 0.00 0.00 0.00 0.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(mm) 975 975 225 225 225 225 225	Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca	onduit onduit onduit onduit onduit onduit	Design Design D D D D D D D D D D D D D D D D D D D
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000	(m) 41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706	(m) 0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221	(1:X) 399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5	<pre>(ha) 0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115</pre>	(mins) 5.00 0.00 0.00 0.00 0.00 0.00 5.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(mm) 975 975 225 225 225 225 225 225	Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co	onduit onduit onduit onduit onduit onduit onduit	Design 0° 0° 0° 0° 0°
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001	(m) 41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706 37.730	(m) 0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221 0.116	<pre>(1:x) 399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5 325.3</pre>	<pre>(ha) 0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115 0.225</pre>	(mins) 5.00 0.00 0.00 0.00 0.00 0.00 5.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(mm) 975 975 225 225 225 225 225 225 525	Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co Pipe/Co	onduit onduit onduit onduit onduit onduit onduit	Design C C C C C C C C C C C C C
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002	(m) 41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706 37.730 22.253	(m) 0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221 0.116 0.068	(1:X) 399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5 325.3 325.0	<pre>(ha) 0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115 0.225 0.065</pre>	(mins) 5.00 0.00 0.00 0.00 0.00 0.00 5.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(mm) 975 975 225 225 225 225 225 225 225 525 525 375	Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd	onduit onduit onduit onduit onduit onduit onduit onduit	Design C C C C C C C C C C C C C
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003	(m) 41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706 37.730 22.253 33.218	(m) 0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221 0.116 0.068 0.102	(1:X) 399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5 325.3 325.0 325.7	<pre>(ha) 0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115 0.225 0.065 0.065</pre>	(mins) 5.00 0.00 0.00 0.00 0.00 5.00 0.00 0.0	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(mm) 975 225 225 225 225 225 225 525 525 525 375 375	Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca Pipe/Ca	onduit onduit onduit onduit onduit onduit onduit onduit onduit	Design C C C C C C C C C C C C C
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003 2.004	(m) 41.957 53.639 31.512 25.483 17.652 18.982 13.655 71.706 37.730 22.253	(m) 0.105 0.134 0.185 0.150 0.104 0.112 0.080 0.221 0.116 0.068 0.102 0.041	(1:X) 399.6 400.3 170.3 169.9 169.7 169.5 170.7 324.5 325.0 325.0 325.7 323.1	<pre>(ha) 0.061 0.118 0.129 0.104 0.035 0.028 0.029 0.115 0.225 0.065</pre>	(mins) 5.00 0.00 0.00 0.00 0.00 0.00 5.00 0.00	Flow (1/s) 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0 0 0.0	(mm) 0.600 0.600 0.600 0.600 0.600 0.600 0.600 0.600	SECT 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(mm) 975 225 225 225 225 225 525 525 375 375 375	Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd Pipe/Cd	onduit onduit onduit onduit onduit onduit onduit onduit onduit	Design Design

Network Results Table

 1.007
 24.092
 0.074
 325.6
 0.021
 0.00
 0.0
 0.600
 o
 375
 Pipe/Conduit
 #

 1.008
 21.726
 0.067
 324.3
 0.029
 0.00
 0.0
 0.600
 o
 375
 Pipe/Conduit
 #

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (1/s)	Flow (l/s)	
1.000	0.00	5.43	63.013	0.061	0.0	0.0	0.0	1.64	1225.0	0.0	
1.001	0.00	5.97	62.908	0.179	0.0	0.0	0.0	1.64	1223.9	0.0	
1.002	0.00	6.50	62.774	0.308	0.0	0.0	0.0	1.00	39.7	0.0	
1.003	0.00	6.92	62.589	0.412	0.0	0.0	0.0	1.00	39.8	0.0	
1.004	0.00	7.22	62.439	0.447	0.0	0.0	0.0	1.00	39.8	0.0	
1.005	0.00	7.53	62.335	0.475	0.0	0.0	0.0	1.00	39.8	0.0	
1.006	0.00	7.76	62.223	0.504	0.0	0.0	0.0	1.00	39.7	0.0	
2.000	0.00	5.97	62.586	0.115	0.0	0.0	0.0	1.24	268.0	0.0	
2.001	0.00	6.47	62.365	0.340	0.0	0.0	0.0	1.24	267.7	0.0	
2.002	0.00	6.85	62.249	0.405	0.0	0.0	0.0	1.00	110.4	0.0	
2.003	0.00	7.40	62.181	0.470	0.0	0.0	0.0	1.00	110.3	0.0	
2.004	0.00	7.62	62.079	0.532	0.0	0.0	0.0	1.00	110.7	0.0	
2.005	0.00	7.86	62.038	0.574	0.0	0.0	0.0	0.99	109.9	0.0	
1.007	0.00	8.26	61.993	1.099	0.0	0.0	0.0	1.00	110.3	0.0	
1.008	0.00	8.62	61.919	1.128	0.0	0.0	0.0	1.00	110.5	0.0	
				©1982-	2020 Innov	yyze					

ita 6 Mita		-	rs Ltd								P	age 1
ite 6, Vita	House					MEADOV	٧S					
sh Quay				CL	EATO	R						
rth Shields		1JA				+50%						Micro
te 09/06/202	3			De	sign	ed by	RH					Drainag
le 230609 RE	VISED	SURF	ACE W.	Ch	ecke	d by H	PL					
novyze				Ne	twor	k 2020	0.1					
	STORM	SEWE	IR DESI	GN by	the	Modif	ied R	atio	nal M	letho	d	
		Netw	ork Des	sign T	able	for 1	L80518	3 SW1	.SWS			
PN Length (m)		Slope (1:X)	I.Area (ha)			ase (1/s)	k (mm)	HYD SECT		Secti	lon Typ	De Auto Design
3.000 15.459	0.048	322.1	0.070	5.00		0.0	0.600	0	375	Pipe/	'Condui	it 🦰
1.009 26.775 1.010 3.900				0.00 0.00			0.600			-	'Condui 'Condui	-
			Ne	etwork	Res	ults 1	Table					
PN Rai (mm/]	.n T. hr) (mi		JS/IL Σ (m)	I.Area (ha)		Base v (l/s)		Add (1/			Cap (1/s)	Flow (1/s)
3.000 0	.00	5.26 <mark>6</mark>	1.900	0.070		0.0	0.0		0.0	1.00	110.9	0.0
			1.852 1.743			0.0			0.0			
1.010 0	.00	• 10 0	1.710	1.190		0.0	0.0		0.0	1.00	10.5	0.0
	Free	e Flo	wing Ou	utfall	Det	ails f	Eor 18	30518	SW1	.SWS		
	0	fall	Out fo		1	I. Lev	-1 1	lin	. T	5.7		
			r Name		m)	(m)	I.	Level (m)	D,L (mm)	W (mm)		
		1.01	0 0	C1 63	.006	61.7	27 6	1.727	1350	0		
		Simu	lation	Crite	eria	for 1	80518	SW1	.SWS			
Vo	Areal R	educti	noff Coe ion Fact art (min	or 1.0	00			or *	10m³/	ha Sto	orage	2.000
	Hot S eadloss	tart I Coefi	Level (m f (Globa	um) 1) 0.5	00	ow per		n per	Day (Run I		mins)	
Manhole He Foul Sev	Hot S eadloss wage pe Number Numbe	Coeff Coeff of Inp of Inp er of (Level (m f (Globa	m) 1) 0.5 (s) 0.0 cographs controls	0 F1 00 00 5 0 N 5 3 N	umber c	Ou of Stor of Time	n per utput rage S e/Area	Day (Run I Inter Struct Diag	l/per, ime (r val (r ures rams	/day) mins) mins)	0.000 60
Manhole He Foul Sev	Hot S eadloss wage pe Number Numbe	Coeff Coeff of Inp of Inp er of (Level (m f (Globa tare (l/ put Hydr Dnline C ffline C	m) (1) 0.5 (s) 0.0 (controls (controls)	0 F1 00 00 5 0 N 5 3 N 5 0 N	umber c	Ou of Stor of Time of Real	n per atput cage S e/Area L Time	Day (Run I Inter Struct Diag	l/per, ime (r val (r ures rams	/day) mins) mins) 13 0	0.000 60

Coast Consulting Engineers Ltd		Page 2
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:100 +50%	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

Synthetic Rainfall Details

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

Coast Consulting Engineers Ltd			Page 3
Suite 6, Vita House	FLOSH MEADO	WS	
Fish Quay	CLEATOR		
North Shields NE30 1JA	1:100 +50%		
		DU	—— Micro
Date 09/06/2023	Designed by		Drainage
File 230609 REVISED SURFACE W	1		
Innovyze	Network 202	0.1	
Online Cor	ntrols for 180	518 SW1.SWS	
Hydro-Brake® Optimum Manho	le: 3 HB, DS/1	PN: 1.002, Volu	me (m³): 45.9
Un	it Reference MD-	-SHE-0107-7000-211	9-7000
Des	ign Head (m)		2.119
Desig	n Flow (l/s)		7.0
	Flush-Flo™		lated
	Objective Mi Application	nimise upstream st.	corage irface
Su	mp Available	51	Yes
	iameter (mm)		107
	rt Level (m)		52.774
Minimum Outlet Pipe D	iameter (mm)		150
Suggested Manhole D	iameter (mm)		1200
Control Points Head (m) Fl	.ow (1/s) C	Control Points	Head (m) Flow (l/s)
Design Point (Calculated) 2.119	7.0	Kick-Flo	® 0.957 4.8
Flush-Flo™ 0.469	6.1 Mean F	low over Head Rang	e – 5.6
The hydrological calculations have be Hydro-Brake® Optimum as specified.		-	-
Hydro-Brake Optimum as specified.			
Depth (m) Flow (1/s) Depth (m) Fl	.ow (1/s) Depth	(m) Flow (1/s) Dep	oth (m) Flow (1/s)
0.100 3.7 1.200	5.4 3.0	000 8.2	7.000 12.3
0.200 5.4 1.400	5.8 3.	500 8.9	7.500 12.7
0.300 5.9 1.600		000 9.4	8.000 13.1
0.400 6.0 1.800		500 10.0	8.500 13.5
0.500 6.1 2.000		000 10.5	9.000 13.9
0.600 6.0 2.200		500 11.0	9.500 14.3
0.800 5.6 2.400 1.000 4.9 2.600		000 11.4 500 11.9	
1.000 4.9 2.000	/./ 0	11.9	
Hydro-Brake® Optimum Manhol	le: 10 HB, DS/	'PN: 2.002, Volu	ume (m ³): 13.2
Un	it Reference MD-	-SHE-0107-6000-157	5-6000
	ign Head (m)		1.575
Desig	n Flow (l/s)		6.0
	Flush-Flo™		lated
	3	nimise upstream st	2
	Application	Si	Irface
~			Yes
	mp Available		
D	mp Available iameter (mm)		106
D Inve	mp Available iameter (mm) rt Level (m)		106 52.249
D	mp Available iameter (mm) rt Level (m)		106
D Inve Minimum Outlet Pipe D	mp Available iameter (mm) rt Level (m)		106 52.249

Coast Consul	ting Engi	neers	Ltd	l								Pa	age 4	
Suite 6, Vit	a House			FI	LOSH	MEADC	WS							
Fish Quay				CI	LEAT	OR								
North Shield	ls NE30 1	JA		1:	:100	+50%						N	Nicro	
Date 09/06/2	2023			De	esig	ned by	r RH							
File 230609	REVISED S	URFACE	W.	Cł	neck	ed by	ΡL						Drain	laye
Innovyze				Ne	etwo	rk 202	0.1							
<u>Hydro-1</u>	Brake® Opt	imum N	1anh	nole:	10 F	IB, DS	/PN:	: 2.	002, V	olume/	e (m	3):	13.2	
		Sug	gest	ed Manl	hole	Diamete	er (1	mm)	1200					
Control	Points	Head	(m)	Flow (1/s)		Cont	rol	Points	1	Head	(m)	Flow	(l/s)
Design Point					6.0					-Flo®	0.	952		4.7
	Flush-Flo ^r	^m 0.	468		5.9	Mean F	TOM	over	Head F	kange		_		5.2
The hydrolog									-			-		
Hydro-Brake@														
Hydro-Brake	Optimum® be	utilis	ed t	then th	ese	storage	rou	iting	calcul	ations	Wll	l be	ınval	lidate
Depth (m)	Flow (l/s)	Depth	(m)	Flow (1/s)	Depth	(m)	Flow	w (l/s)	Depth	(m)	Flo	w (l/s	;)
0.100	3.6	1	200		5.3	2	000		8.1	-	.000		12.	1
0.100			400		5.7		500		8.7		.500		12.	
0.200			600		6.0		000		9.3		.000		12.	
0.400			800		6.4		500		9.8		.500		13.	
0.400			000		6.7		000		10.3		.000		13.	
0.500			200		7.0		500		10.3		.500		14.	
										9	.500		14.	0
0.800			400 600		7.3 7.6		000 500		11.3 11.7					
Hydro-	Brake® Opt		Man	hole:	17	HB, DS	/PN	: 1	.009, 1	Volume	e (m	³):	9.6	
							-SHE	-023	5-3200-					
				esign H							642			
			Des	ign Flo							2.0			
					ush-F					alcula				
							inim	ise	upstrea		2			
					licat					Surf				
				Sump Av							Yes			
			_	Diamet							235			
				vert Le						61.				
	Minimum (-								300			
	Suggest	.ed Man	nore	Diame	Ler	, 11111)				T	800			
Control	Points	Head	(m)	Flow (1/s)	•	Cont	rol 3	Points	1	Head	(m)	Flow	(l/s)
Design Point	(Calculated) Flush-Flo ^T		642 503		32.0 32.0	Mean F	low	over	Kick- Head F		1.	101 -		26.4 27.5
The hydrolog Hydro-Brake@ Hydro-Brake) Optimum as	specif	ied	. Shou	ld a	nother	type	of	control	devic	e ot	her	than a	1
		1		Flow (1/2)	Depth	(m)	Flor	a (1/e)	Depth	(m)	Flo	w (1/e	;)
Depth (m)	Flow (l/s)	Depth	(m)	FIOW (1/5)		(111)		(1/3)		(,	1 10	W (1/2	•
Depth (m) 0.100	Flow (l/s) 7.8		(m) 200		23.7		300		30.6		.400	110	31.	

Coast Consulting	g Engineers Ltd					Page 5
Suite 6, Vita Ho	ouse	FLOSH	MEADOWS			
Fish Quay		CLEAT	OR			
North Shields N	NE30 1JA	1:100	+50%			Micro
Date 09/06/2023		Design	ned by RH			in ci o
File 230609 REVI	ISED SURFACE W.	Checke	ed by PL			Drainago
Innovyze		Netwo	rk 2020.1			
Depth (m) Flow	v (l/s) Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
Depth (m) Flov 0.500 0.600	v (1/s) Depth (m) 32.0 1.800 31.8 2.000	Flow (1/s) 33.4 35.2	4.000	Flow (1/s) 49.1 52.0	7.500	66.6
0.500	32.0 1.800	33.4	4.000	49.1	7.500	66.6 68.8
0.500 0.600	32.0 1.800 31.8 2.000	33.4 35.2	4.000 4.500 5.000	49.1 52.0	7.500 8.000 8.500	66.6 68.8 70.8
0.500 0.600 0.800 1.000 1.200	32.0 1.800 31.8 2.000 31.0 2.200 28.8 2.400 27.5 2.600	33.4 35.2 36.8 38.4 39.9	4.000 4.500 5.000 5.500 6.000	49.1 52.0 54.7 57.3 59.8	7.500 8.000 8.500 9.000 9.500	66.6 68.8 70.8 72.8
0.500 0.600 0.800 1.000	32.0 1.800 31.8 2.000 31.0 2.200 28.8 2.400	33.4 35.2 36.8 38.4	4.000 4.500 5.000 5.500 6.000 6.500	49.1 52.0 54.7 57.3	7.500 8.000 8.500 9.000 9.500	66.6 68.8 70.8 72.8

Coast Consulting Engineers Lto	1	Page 6
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:100 +50%	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W.	1	Breiniage
Innovyze	Network 2020.1	
Storage S	tructures for 180518 SW1.SWS	
<u>Cellular St</u>	orage Manhole: 1, DS/PN: 1.000	
Infiltration Coeffic	Invert Level (m) 63.585 Safety Factor ient Base (m/hr) 0.00000 Porosity ient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m²)
0.000 51.8 0.520 51.8	0.0 0.0	0.0
<u>Cellular St</u>	orage Manhole: 2, DS/PN: 1.001	
Infiltration Coeffic Infiltration Coeffic	Invert Level (m) 63.015 Safety Factor ient Base (m/hr) 0.00000 Porosity ient Side (m/hr) 0.00000 7. Area (m ²) Depth (m) Area (m ²) Inf.	y 0.95
0.000 220.0	0.0 0.521 0.0	0.0
0.520 220.0		
Cellular St	orage Manhole: 4, DS/PN: 1.003	
Infiltration Coeffic	Invert Level (m) 62.589 Safety Factor ient Base (m/hr) 0.00000 Porosity ient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m²)
0.000 129.5 0.520 129.5	0.0 0.0	0.0
<u>Cellular St</u>	orage Manhole: 6, DS/PN: 1.005	
Infiltration Coeffic	Invert Level (m) 62.335 Safety Factor ient Base (m/hr) 0.00000 Porosity ient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m²)
0.000 25.9 0.520 25.9	0.0 0.0	0.0

Coast Consulting Engineers	Ltd	Page 7
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:100 +50%	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE	2 W Checked by PL	
Innovyze	Network 2020.1	
Infiltration Coef	Storage Manhole: 7, DS/PN: 1.006 Invert Level (m) 62.224 Safety Facto fficient Base (m/hr) 0.00000 Porosit fficient Side (m/hr) 0.00000	
Depth (m) Area (m²)	Inf. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m²)
0.000 25.9 0.520 25.9		0.0
	1	
Cellular	Storage Manhole: 8, DS/PN: 2.000	
	Invert Level (m) 63.413 Safety Factor Eficient Base (m/hr) 0.00000 Porosit Eficient Side (m/hr) 0.00000	
Depth (m) Area (m²)	Inf. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m²)
0.000 77.7 0.520 77.7		0.0
Cellular	Storage Manhole: 9, DS/PN: 2.001	
Infiltration Coef	Invert Level (m) 62.621 Safety Facto ficient Base (m/hr) 0.00000 Porosit ficient Side (m/hr) 0.00000	
Infiltration Coef Infiltration Coef	Invert Level (m) 62.621 Safety Facto ficient Base (m/hr) 0.00000 Porosit	y 0.95
Infiltration Coef Infiltration Coef	Invert Level (m) 62.621 Safety Facto fficient Base (m/hr) 0.00000 Porosit fficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0	y 0.95
Infiltration Coef Infiltration Coef Depth (m) Area (m²) 0.000 388.5 0.520 388.5	Invert Level (m) 62.621 Safety Facto fficient Base (m/hr) 0.00000 Porosit fficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0	y 0.95 Area (m²) 0.0
Infiltration Coef Infiltration Coef Depth (m) Area (m ²) 0.000 388.5 0.520 388.5 <u>Cellular S</u> Infiltration Coef Infiltration Coef	Invert Level (m) 62.621 Safety Factor Efficient Base (m/hr) 0.00000 Porosit Efficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 0.0 0.521 0.0 torage Manhole: 10 HB, DS/PN: 2.00 Invert Level (m) 62.249 Safety Factor Efficient Base (m/hr) 0.00000 Porosit Efficient Side (m/hr) 0.00000	Area (m ²) 0.0 02 0r 2.0 0y 0.95
Infiltration Coef Infiltration Coef Depth (m) Area (m ²) 0.000 388.5 0.520 388.5 <u>Cellular S</u> Infiltration Coef Infiltration Coef	Invert Level (m) 62.621 Safety Factor Efficient Base (m/hr) 0.00000 Porosit Efficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 0.0 torage Manhole: 10 HB, DS/PN: 2.00 Invert Level (m) 62.249 Safety Factor Efficient Base (m/hr) 0.00000 Porosit	Area (m ²) 0.0 02 0r 2.0 0y 0.95
Infiltration Coef Infiltration Coef Depth (m) Area (m ²) 0.000 388.5 0.520 388.5 <u>Cellular S</u> Infiltration Coef Infiltration Coef Depth (m) Area (m ²)	Invert Level (m) 62.621 Safety Factor fficient Base (m/hr) 0.00000 Porosit fficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 torage Manhole: 10 HB, DS/PN: 2.00 Invert Level (m) 62.249 Safety Factor fficient Base (m/hr) 0.00000 Porosit fficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf.	Area (m ²) 0.0 02 0r 2.0 0y 0.95 Area (m ²)
Infiltration Coef Infiltration Coef Depth (m) Area (m ²) 0.000 388.5 0.520 388.5 <u>Cellular S</u> Infiltration Coef Infiltration Coef Depth (m) Area (m ²) 0.000 170.0 0.520 170.0	Invert Level (m) 62.621 Safety Factor fficient Base (m/hr) 0.00000 Porosit fficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0 torage Manhole: 10 HB, DS/PN: 2.00 Invert Level (m) 62.249 Safety Factor fficient Base (m/hr) 0.00000 Porosit fficient Side (m/hr) 0.00000 Inf. Area (m ²) Depth (m) Area (m ²) Inf. 0.0 0.521 0.0	Area (m ²) 0.0 02 0r 2.0 0y 0.95 Area (m ²)

Coast Consulting Engineers Lto	d	Page 8
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:100 +50%	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	-	Diamage
Innovyze	Network 2020.1	
Cellular St	orage Manhole: 11, DS/PN: 2.003	
Double (m) Area (m^2) Inf	Porosity 0.95	maa (m²)
	E. Area (m ²) Depth (m) Area (m ²) Inf. A	
0.000 200.0 0.520 200.0	0.0 0.0	0.0
<u>Cellular St</u>	orage Manhole: 12, DS/PN: 2.004	
	Invert Level (m) 62.079 Safety Factor	2.0
Infiltration Coeffic	eient Base (m/hr) 0.00000 Porosity eient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m²) Depth (m) Area (m²) Inf. A	rea (m²)
0.000 129.5 0.520 129.5	0.0 0.521 0.0	0.0
	l.	
<u>ceituiar st</u>	orage Manhole: 15, DS/PN: 1.008	
Infiltration Coeffic	Invert Level (m) 61.919 Safety Factor eient Base (m/hr) 0.00000 Porosity eient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf. A	rea (m²)
0.000 30.0 0.520 30.0	0.0 0.521 0.0	0.0
Cellular St	orage Manhole: 16, DS/PN: 3.000	
	Invert Level (m) 61.900 Safety Factor	2 0
Infiltration Coeffic	eient Base (m/hr) 0.00000 Porosity Sient Side (m/hr) 0.00000	
Depth (m) Area (m²) Inf	. Area (m ²) Depth (m) Area (m ²) Inf. A	rea (m²)
0.000 51.8 0.520 51.8	0.0 0.521 0.0	0.0
Cellular Stor	cage Manhole: 17 HB, DS/PN: 1.009	
		2.0
Infiltration Coeffic	Invert Level (m) 61.852 Safety Factor eient Base (m/hr) 0.00000 Porosity eient Side (m/hr) 0.00000	
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Coast Consulting Engineers Ltd		Page 9
Suite 6, Vita House	FLOSH MEADOWS	-
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:100 +50%	Micco
Date 09/06/2023	Designed by RH	
File 230609 REVISED SURFACE W	Checked by PL	Micro Drainage
Innovyze	Network 2020.1	
	NCCWOIK 2020.1	
Cellular Storage	Manhole: 17 HB, DS/PN: 1.009	
	ea (m²) Depth (m) Area (m²) Inf. Area (m	1 ²)
0.000 77.7		.0
0.520 77.7	0.0	
©198	82-2020 Innovyze	

Suite 6		lting Eng	ineers	Ltd				Page	e 10
	6, Vit	a House			FLOSH MEAD	OWS			
'ish Qu	Jay				CLEATOR				
	-	ds NE30	1JA		1:100 +50%			N/G	
ate 09					Designed b				cio
		REVISED	CUDEACE		2	-			ainage
		REVISED	SURFACE		Checked by				
nnovyz	ze				Network 20	20.1			
Sum	mary d	of Critic	cal Resu	lts by	Maximum Le	evel (Rar	nk 1) for 18	0518 SW1	.SWS
Μ		Hot St Hot St Headloss Sewage per Number of Number	ot Start cart Leve Coeff (G c hectare of Input c of Onli	Factor 1 (mins) 1 (mm) lobal) 0 (1/s) 0 Hydrogra ne Contr	0 M 0 .500 Flow pe .000 phs 0 Number ols 3 Number	ional Flow ADD Factor r Person p of Storag of Time/ <i>I</i>	w - % of Total c * 10m³/ha St Inlet Coeffie per Day (1/per ge Structures Area Diagrams Sime Controls	corage 2.0 ccient 0.8 c/day) 0.0	00 00
		nulliber	OI OIIII	ne conci	ors o Number	OI KEAI I	time concrois	0	
					tic Rainfall				
		Ra	infall Mo				io R 0.220		
			-		land and Wale				
			M5-60	(mm)	18.60	JU CV (Win	ter) 1.000		
		Margin for	Flood R	isk Warn:	ing (mm)			300.0	
			Aı	nalysis '	Timestep 2.5	Second In	crement (Exter	nded)	
					S Status			OFF	
) Status			OFF	
				Inertia					
					a Status			OFF	
		Retu	Duratic rn Period	Profile on(s) (mi	(s) ns) 15, 30,		er and Winter 180, 240, 360 100	OFF	
		Retu	rn Period	Profile on(s) (mi	r(s) ns) 15, 30, rs)		80, 240, 360	OFF	
	11C /MH	Retu	rn Period Climate	Profile on(s) (mi l(s) (yea e Change	(s) ns) 15, 30, rs) (%)	60, 120, 1	180, 240, 360 100 50		Water
PN	US/MH Name	Retu: Storm	rn Period Climate Return	Profile on(s) (mi l(s) (yea	r(s) ns) 15, 30, rs)	60, 120, 1 First	(Y) First (Z)		Water Level (m)
	Name	Storm	rn Period Climate Return Period	Profile n(s) (mi l(s) (yea c Change Climate Change	(s) ns) 15, 30, rs) (%) First (X) Surcharge	60, 120, 1 First Floo	(Y) First (Z)	Overflow	Level (m)
1.000	Name 1	Storm 360 Winte	rn Period Climate Return Period r 100	Profile on(s) (mi l(s) (yea e Change Climate Change +50%	(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum	60, 120, 1 First Floo	(Y) First (Z)	Overflow	Level (m) 64.689
1.000 1.001	Name 1 2	Storm 360 Winte 360 Winte	rn Period Climate Return Period r 100 r 100	Profile on(s) (mi l(s) (yea e Change Climate Change +50% +50%	(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum	60, 120, 1 First Floo mer mer	(Y) First (Z)	Overflow	Level (m) 64.689 64.689
1.000	Name 1 2	Storm 360 Winte	rn Period Climate Return Period r 100 r 100 r 100	Profile on(s) (mi l(s) (yea e Change Climate Change +50%	(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum	60, 120, 1 First Floo ner ner	(Y) First (Z)	Overflow	Level (m) 64.689
1.000 1.001 1.002	Name 1 2 3 HB 4	Storm 360 Winte 360 Winte 360 Winte	rn Period Climate Return Period r 100 r 100 r 100 r 100	Profile on(s) (mi l(s) (yea e Change Climate Change +50% +50% +50%	(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum	60, 120, 1 First Floo ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690
1.000 1.001 1.002 1.003	Name 1 2 3 HB 4 5	Storm 360 Winte 360 Winte 360 Winte 60 Summe	Return Period r 100 r 100 r 100 r 100 r 100 r 100	Profile on(s) (mi l(s) (yea e Change Climate Change +50% +50% +50% +50%	(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/15 Sum	60, 120, 1 First Floo ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851
1.000 1.001 1.002 1.003 1.004	Name 1 2 3 HB 4 5	Storm 360 Winte 360 Winte 360 Winte 60 Summe 120 Summe 180 Summe	Return Period r 100 r 100 r 100 r 100 r 100 r 100 r 100 r 100	Profile on(s) (mi l(s) (yea e Change Climate Change +50% +50% +50% +50% +50%	(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/15 Sum	60, 120, 1 First Floo ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788
1.000 1.001 1.002 1.003 1.004 1.005	Name 1 2 3 HB 4 5 6 7	Storm 360 Winte 360 Winte 360 Winte 60 Summe 120 Summe 180 Summe	rn Period Climate Return Period r 100 r 100 r 100 r 100 r 100 r 100 r 100	Profile on(s) (mi l(s) (yea e Change +50% +50% +50% +50% +50% +50% +50% +50%	(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/15 Sum 100/15 Sum	60, 120, 1 First Floo ner ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788 62.729
1.000 1.001 1.002 1.003 1.004 1.005 1.006	Name 1 2 3 HB 4 5 6 7 8	Storm 360 Winte 360 Winte 360 Winte 360 Summe 120 Summe 180 Summe 360 Summe	Return Period r 100 r 100	Profile on(s) (mi (s) (yea e Change +50% +50% +50% +50% +50% +50% +50% +50%	<pre>(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/15 Sum 100/15 Sum 100/15 Sum 100/15 Sum 100/15 Sum</pre>	first First Floo ner ner ner ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788 62.729 62.700
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002	Name 1 2 3 HB 4 5 6 7 8 9 10 HB	Storm 360 Winte 360 Winte 360 Winte 60 Summe 120 Summe 180 Summe 360 Summe 360 Winte 360 Winte 360 Winte	Return Period r 100 r 100	Profile on(s) (mi l(s) (yea e Change +50% +50% +50% +50% +50% +50% +50% +50%	<pre>(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/160 Sum 100/15 Sum 1000/15 Sum 1000/15 Sum 1000/15 Sum 1000/15 Su</pre>	first First Floo ner ner ner ner ner ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788 62.729 62.700 63.794 63.794 63.792
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003	Name 1 2 3 HB 4 5 6 7 8 9 10 HB 11	Storm 360 Winte 360 Winte 360 Winte 360 Summe 120 Summe 180 Summe 360 Winte 360 Winte 360 Winte 360 Winte 360 Winte 360 Winte 360 Summe	Return Period r 100 r 100	Profile on(s) (mi (s) (yea e Change +50% +50% +50% +50% +50% +50% +50% +50%	<pre>(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100</pre>	60, 120, 1 First Floo ner ner ner ner ner ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788 62.729 62.700 63.794 63.794 63.792 62.691
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003 2.004	Name 1 2 3 HB 4 5 6 7 8 9 10 HB 11 12	Storm 360 Winte 360 Winte 360 Winte 360 Summe 120 Summe 360 Summe 360 Summe 360 Winte 360 Winte 360 Winte 360 Winte 360 Summe 360 Summe 360 Summe 360 Summe	Return Period r 100 r 100	Profile on(s) (mi (s) (yea c Change +50% +50% +50% +50% +50% +50% +50% +50%	<pre>(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/16 Sum 100/12 Sum 100/120 Sum 100/60 Sum 1000 Sum 100/60 Sum 100/60 Sum 100/60 Sum 100/</pre>	60, 120, 1 First Floo ner ner ner ner ner ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788 62.729 62.700 63.794 63.794 63.792 62.691 62.685
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003 2.004 2.005	Name 1 2 3 HB 4 5 6 7 8 9 10 HB 11 12 13	Storm 360 Winte 360 Winte 360 Winte 360 Summe 120 Summe 360 Summe 360 Summe 360 Summe 360 Winte 360 Winte 360 Summe 360 Summe	Return Period r 100 r 100	Profile on(s) (mi (s) (yea c Change +50% +50% +50% +50% +50% +50% +50% +50%	<pre>(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/16 Sum 100/16 Sum 100/16 Sum 100/60 Sum 100</pre>	60, 120, 1 First Floo ner ner ner ner ner ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788 62.729 62.700 63.794 63.794 63.792 62.691 62.685 62.680
1.000 1.001 1.002 1.003 1.004 1.005 1.006 2.000 2.001 2.002 2.003 2.004	Name 1 2 3 HB 4 5 6 7 8 9 10 HB 11 12 13 14	Storm 360 Winte 360 Winte 360 Winte 360 Summe 120 Summe 360 Summe 360 Summe 360 Winte 360 Winte 360 Winte 360 Winte 360 Summe 360 Summe 360 Summe 360 Summe	Return Period r 100 r 100	Profile on(s) (mi (s) (yea c Change +50% +50% +50% +50% +50% +50% +50% +50%	<pre>(s) ns) 15, 30, rs) (%) First (X) Surcharge 100/180 Sum 100/180 Sum 100/15 Sum 100/16 Sum 100/12 Sum 100/120 Sum 100/60 Sum 1000 Sum 100/60 Sum 100/60 Sum 100/60 Sum 100/</pre>	60, 120, 1 First Floo ner ner ner ner ner ner ner ner ner ner	(Y) First (Z)	Overflow	Level (m) 64.689 64.689 64.690 62.851 62.788 62.729 62.700 63.794 63.794 63.792 62.691 62.685

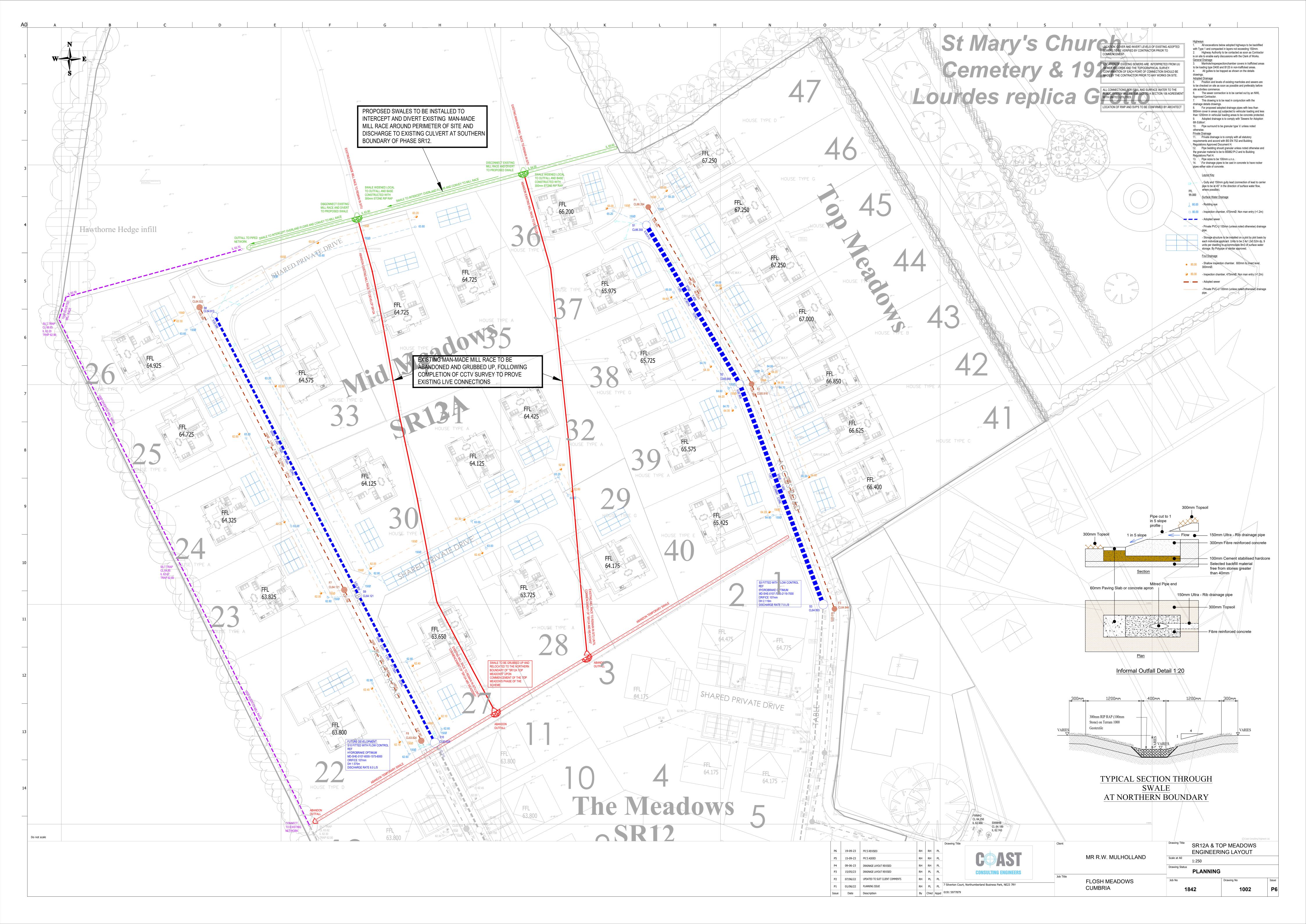
Coast Consulting Engineers Ltd		Page 11
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:100 +50%	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamage
Innovyze	Network 2020.1	

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.701	0.000	0.01		99	7.6	SURCHARGED	
1.001	2	0.806	0.000	0.01			6.5	SURCHARGED	
1.002	3 HB	1.691	0.000	0.18			6.7	FLOOD RISK	
1.003	4	0.037	0.000	0.77		25	28.3	SURCHARGED	
1.004	5	0.124	0.000	1.00			35.6	SURCHARGED	
1.005	6	0.169	0.000	1.01		110	36.3	SURCHARGED	
1.006	7	0.252	0.000	0.91		149	31.3	SURCHARGED	
2.000	8	0.683	0.000	0.06		62	14.5	SURCHARGED	
2.001	9	0.904	0.000	0.09			21.5	SURCHARGED	
2.002	10 HB	1.168	0.000	0.06			5.9	FLOOD RISK	
2.003	11	0.136	0.000	0.15		160	15.3	SURCHARGED	
2.004	12	0.232	0.000	0.26		199	21.6	SURCHARGED	
2.005	13	0.268	0.000	0.26			21.7	SURCHARGED	
1.007	14	0.306	0.000	0.38			36.0	SURCHARGED	
1.008	15	0.362	0.000	0.39		254	36.2	SURCHARGED	

Coast Consulting Engineers Ltd		Page 12
Suite 6, Vita House	FLOSH MEADOWS	
Fish Quay	CLEATOR	
North Shields NE30 1JA	1:100 +50%	Micro
Date 09/06/2023	Designed by RH	Drainage
File 230609 REVISED SURFACE W	Checked by PL	Diamade
Innovyze	Network 2020.1	

PN	US/MH Name	Storm	 Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
3.000		360 Summer		100/30 Summer				62.640
1.009	- · · ·	360 Summer 240 Summer	 +50% +50%	100/15 Summer				62.639 61.920

PN	US/MH Name	Surcharged Depth (m)			Overflow (1/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
3.000	16	0.365	0.000	0.16		254	13.9	SURCHARGED	
1.009	17 HB	0.487	0.000	0.50		273	32.0	SURCHARGED	
1.010	18	-0.123	0.000	0.66			32.0	OK	





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