

# Proposed Gordon House Development

**Revision A** 

2016039-DS

March 2017



@portlandconsult Portland Consulting Engineers



# **Revision Log**

R evision	Description	Ву	Date
ø	Initial Issue	JR	03/03/2017
А	Updated to suit latest layout	JR	22/03/2017



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## Introduction

It is proposed to construct 20No 2 story 3 bed residential houses, along with the improvement of an existing highway and new plot accesses. The site is currently occupied by the former G ordon House Municipal Offices and associated car parks.

The proposed site area is as shown below and is centered on Ordnance Survey reference 436506, 565723.

The site is under 1 hectare and with reference to the Environment Agency flood maps is in Zone 1, therefore no Flood Risk Assessment is required.



## Ext ract from NWL Record Sheet NZ3665NW

(Note: site boundary approximate only)

The full 'GIS' extract can be found in Appendix A and a drawing showing the proposed drainage strategy and the existing network is contained within Appendix B.



# Surface Water Drainage

Part H of the Building Regulations provides a recommended hierarchy for surface water disposal:

- i) By infiltration;
- ii) To watercourse;
- iii) To sewer.

### 4.01 Discharge via Infiltration

The site investigation report shows that the site is underlain by clay and sand and has been given a permeability class of very low. Therefore, the ground conditions are unsuitable for the use of infiltration techniques.

### 4.02 Discharge to Water Course

The closest Water Course is the River Tyne which lies approximately 1000m to the North West of the site, there are various 3<sup>rd</sup> party land ownerships and infrastructure between the site and the River therefore for this reason, this option has been discounted as a method of surface water disposal.

#### 4.03 Discharge to Public Se wers

A pre-development enquiry (PD E) was submitted to Northumbrian Water Ltd (NWL) who have allowed, within their response in Appendix A, a restricted discharge of 20l/s into the existing 300mm diameter combined sewer, via existing manhole 4702 located to the North West of the proposed development site.

LASO O guidance states that brownfield sites should be restricted, as close as reasonably practical to greenfield run off with a minimum of 5 l/s. Greenfield run off for this development has been calculated using ICP SU DS at 0.6l/s. Therefore, the discharge rate will be restricted to 5l/s. These calculations are contained within Appendix A.

The site has an area of  $3380m^2$  of which  $3160m^2$  is impermeable and positively drained. The new development will reduce the impermeable area by 54% ( $1710m^2$ ) to  $1450m^2$ .

It is therefore proposed to attenuate new surface water (S W) run off, generated by new roof and hard standing areas, on site, using plastic storage crates. The attenuation system will be privately owned and maintained by ISO S Developments. The discharge rate will be restricted in accordance with the LAS OO as started above. A drainage strategy drawing has been included within Appendix B along with SW calculations for the 2, 30 and 100 (+40% C C) year events in Appendix C.



# **Foul Water Drainage**

A PD E was submitted to NWL who have allowed, within their response in Appendix A, an unrestricted discharge of into the existing 300mm diameter combined sewer, via existing manhole 4702 located to the North West of the proposed development site, situated within the car park of the NHS Stanhope Parade Health Care Centre.



# Appendix A

NWL Pre-Development response and records.



Leat House, Pattinson Road, District 15, Washington, Tyne & Wear, NE38 8LB, UK Telephone: +44 (0) 845 604 7468 Fax: +44 (0) 191 419 6768 Website: www.nwl.co.uk

 Ext:
 36603

 Direct Line:
 0191 419 6603

 Email:
 niki.mather@nwl.co.uk

 Our Ref:
 16NO43BBB4

 Your Ref:
 16NO43BBB4

Monday, 21 November 2016

Portland Consulting Engineers 10 Bankside The Watermark Swalwell Newcastle upon Tyne Tyne & Wear NE11 9SY

PC)	R	1	engi	neers and
	2	4	NOV	2016
F.A.O :				
				Ref :

Dear Mr. Joe Ryans,

# Re: Pre-Development Enquiry – Former Gordon House Offices, Gordon Street, South Shields

Further to receiving the Pre-Development Enquiry for the above site, received 2<sup>nd</sup> November 2016, we are now able to provide the following response.

We have based our response on the information in your application and accompanying correspondence. Therefore, should any of the information now be different, then you must ensure that you inform us of any changes as further Network Modelling may be required and our response may also change, leading to this response being invalid.

Northumbrian Water assesses the impact of the proposed development on our assets and assesses the capacity within our network's to accommodate and treat the anticipated flows arising from the development. We do not therefore offer comment on aspects of planning applications that are outside of our area of control.

Enclosed for your information is a scaled extract showing the approximate position of our water and wastewater networks and associated assets. Please note that the actual position of any of our assets shown on the plan must be established by taking trial holes in all cases.

An appropriate risk assessment and method statement (RAMS) must be provided to us prior to gaining approval for any trial hole investigations, at least 5 working days in advance of starting any work onsite.

Also enclosed is our extract showing locations within the approximate vicinity of this site that have, from our records, experienced flooding. This has been provided to demonstrate the known flood risks within the vicinity which have been considered as part of our assessment on this enquiry.

We have also carried out a review of your application and can confirm the following:



## Sewerage and Sewerage Treatment

Northumbrian Water would ask that you separate the foul and surface water flows in accordance with Part H of the Building Regulations prior to the final connection to the public sewer.

All new connections to the public sewerage system must first be approved through the Section 106 of the Water Industry Act 1991 process prior to construction.

Should you decide to proceed with this development, a fully completed Sewer Connection application form will be required. These are available to download from the following link:

https://www.nwl.co.uk/developers/new-connections.aspx

• Foul Water Discharge

The foul flows can discharge without restriction into the 300mm diameter combined sewer adjacent to the western boundary of the site as proposed, preferably utilising the existing connection into manhole 4702.

• Surface Water Discharge

In applying for planning permission you will be required to demonstrate to the Local Planning Authority through your flood risk appraisal that you have considered the 3 alternative options for the management of surface water which are listed within Part H of the Building Regulations 2010:

(a) an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

(b) a watercourse; or, where that is not reasonably practicable,

(c) a sewer.

If the more sustainable options prove to be unfeasible, a restricted surface water flow of 20 l/sec would be permitted to discharge into the 300mm diameter combined public sewer via manhole 4702. Any excess in flows must be attenuated on site.

Protection of Existing Sewerage Assets

We wish to draw your attention to the existing sewer which passes through the site. This sewer could be diverted, protected or accommodated within your site layout with an appropriate easement.

Part H of the Building Regulations also details the reasons why Northumbrian Water does not permit buildings to be built over or near to its sewerage network:

- Undue risk in the event of failure of the drain or sewer
- Maintaining access
- Protection of the drain or sewer during construction

- Protection form settlement
- Protection against piling

To discuss the diversion of this asset in further detail, please contact:

Mr. Roger Perkins 0191 419 6621 roger.perkins@nwl.co.uk

Mr. Stephen O'Hair 0191 419 6553 steve.o'hair@nwl.co.uk

Mr. Steve Somerville 0191 419 6648 steve.somerville1@nwl.co.uk

Sewage Treatment Capacity

The Sewage Treatment Works to which this development finally discharges to is able to accept the additional flows.

## Water Efficiency Information

Water efficiency information can be found on our website by following the web link below:

https://www.nwl.co.uk/your-home/saving-water/why-save-water.aspx

Please note that this response is valid for 1 year only and you should resubmit your proposals should this period lapse prior to your development beginning.

Should you require any further assistance or information, then please do not hesitate to contact me via <u>niki.mather@nwl.co.uk</u> or alternatively on 0191 419 6603, please quote our reference number above in any future correspondence.

Yours sincerely,

Mato

Mr. Niki Mather Technical Support Advisor Asset Protection - New Development





rrk - Network Types AB Asbestos	Treated Abandoned	Raw Out of Comm	Fire	Supply	Private	Date:04/11/201612:22:35	Map Sheet : NZ3665	Paper / Scale : A3@1:5015	trown Copyright Reserved. Licence No. 100022480. soever is accepted by Northumbrian Water, it's trial holes in all cases. In the case of water mains rivate lateral drains and sewers automatically These former private drains and sewers together there could be abandoned asbestos & Safety precautions should be taken. The pipes or any failure to take adequate precautions.
Proposed Water Netwo Combined	Foul	Surface				User : BOWMS	Title :	Centre Point : 436494,565732	urvey map with permission of the controller of H.M.S.O. C intended for guidance only. No Liability of any kind what sewers shown on the plan must be established by taking o excavate trial holes. With effect from 1 October 2011, p State pursuant to section 105A Water Industry Act 1991. be anticipated. WARNINGWhere indicated on the plan oned asbestos cement materials, the appropriate Health other liabilities which arise as the result of the presence of
Private/Non NWL Combined	Foul	Surface	Trade Eff	Watercourse		NDIS	austor	d www	eproduced from an Ordnance Su regarded as approximate and is al position of any water mains or ig days notice of their intention to heme made by the Secretary of S hown but their presence should hown but the vicinity of these abando oct of claims, costs, losses or of 00
Waste Water - NWL Responsibility Combined	Foul	Surface	Treated Eff	Untreated Eff	Overflow	NOPTHUMB	WATER /		The material contained on this plot has been in The information shown on this plan should be servants or agents for any omission. The actua Northumbrian Water must be given two workin transferred to Northumbrian Water under a sch with existing private connections may not be st cement materials or shards of pipe. If excavatii Northumbrian Water accepts no liability in resp Emergency Telephone Number: 0345 717 110



# Appendix B

Drainage Strategy



# NOTES:

HEALTH & SAFETY 1. CONTRACTOR SHOULD BE AWARE OF GENERAL CONSTRUCTION RISKS TO PREVENT SLIPS, TRIPS AND FALLS AND TAKE NECESSARY PRECAUTIONS WITHOUT SPECIAL INSTRUCTION. DOADC & DRANGE

ROADS & DRAINAGE 2. CONTRACTOR TO PROVIDE TRENCH SUPPORTS AS APPROPRIATE AND ENSURE THAT PLANT REMAINS A SAFE DISTANCE FROM TRENCHES PRIOR TO INSTALLING DRAINAGE 3. THE TIME THAT EXCAVATIONS ARE OPEN ON SITE SHOULD BE KEPT TO A MINIMUM AND ALL TRENCHES SHOULD BE SURROUNDED BY A BARRIER. 4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY NWL APPROVED CONTRACTOR ONLY.

4. CONNECTIONS TO EXISTING SEWERS TO BE MADE BY NWL APPROVED CONTRACTOR ONLY. 5. CONTRACTOR TO MAKE OPERATIVES AWARE OF ASSOCIATED DANGERS TO HEALTH SUCH AS

LEPTOSPIROSIS (WEILS DISEASE) AND RECOMMENDED PRECAUTIONS. ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING TO BE PROVIDED AS REQUIRED. 6. UNFINISHED MANHOLES MUST BE COVERED WITH LOAD BEARING MATERIALS AND SURROUNDED WITH BARRIER.

PIPES & CABLES 7. SERVICE RECORDS TO BE REFERRED TO PRIOR TO WORK COMMENCING. CONTRACTOR TO PROCEED WITH CAUTION AND SERVICES TO BE LOCATED BY HAND DIG AND PROTECTED ACCORDINGLY. EXCAVATION/FILL

8. CONTRACTOR TO ENSURE RELEVANT MEASURES ARE TAKEN TO KEEP PLANT AND PEOPLE A SAFE DISTANCE FROM STEEP SLOPES DURING THE WORKS. 9. CONTRACTOR TO ENSURE THAT PROCEDURES ARE IN PLACE TO KEEP PEOPLE A SAFE DISTANCE FROM WORKING PLANT WHERE NECESSARY.

10. CONTRACTOR TO REFER TO GROUND INVESTIGATION REPORT FOR CONTAMINATION TESTS AND TO PROVIDE ADEQUATE WELFARE FACILITIES AND PROTECTIVE CLOTHING AS REQUIRED.





# Appendix C

Su rface Water Calculations

Portland Consulting Engineers Ltd						
10 Bankside, The Watermark						
Gateshead		L				
NE11 9SY		Micco				
Date 03/03/2017 09:16	Designed by joe.ryans					
File	Checked by	Diamaye				
Micro Drainage	Source Control 2016.1	1				

### ICP SUDS Mean Annual Flood

Input

Return Period (years)1Soil0.300Area (ha)0.338Urban0.000SAAR (mm)639RegionNumberRegion 3

#### Results 1/s

QBAR Rural 0.6 QBAR Urban 0.6 Q1 year 0.5

Q1 year 0.5 Q30 years 1.0 Q100 years 1.2

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Portland Consulting Engineers Ltd	d	Page 1
10 Bankside, The Watermark		
Gateshead		L
NE11 9SY		Micco
Date 03/03/2017 11:17	Designed by joe.ryans	Desinado
File 2016093 - Drainage	Checked by	Diamaye
Micro Drainage	Network 2016.1	
Time Area	Diagram for Storm	
	Diagram for beorm	
Time (mins)	Area Time Area (ha) (mins) (ha)	
0-4	0.090 4-8 0.055	
Total Area C	Contributing (ha) = $0.145$	
Total Pip	be Volume $(m^3) = 1.585$	
Free Flowing O	utfall Details for Storm	
Outfall Outfall C.	Level I. Level Min D,L W	
Pipe Number Name	(m) (m) I. Level (mm) (mm) (m)	
1.002	23.980 22.405 22.480 0 0	
Simulation	n Criteria for Storm	
Volumetric Runoff Coeff 0. Areal Reduction Factor 1. Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) 0. Foul Sewage per hectare (l/s) 0.	.750Additional Flow - % of Total Flow.000MADD Factor * 10m³/ha Storage0Inlet Coefficient0Flow per Person per Day (1/per/day).500Run Time (mins).000Output Interval (mins)	v 0.000 e 2.000 c 0.800 0.000 60 1
Number of Input Hydrogray Number of Online Contro Number of Offline Contro	phs 0 Number of Storage Structures 1 ols 1 Number of Time/Area Diagrams 0 ols 0 Number of Real Time Controls 0	
<u>Syntheti</u>	<u>c Rainfall Details</u>	
Rainfall Model Return Period (years) Region Englan M5-60 (mm) Ratio R	FSR Profile Type Summe 2 Cv (Summer) 0.75 d and Wales Cv (Winter) 0.84 17.000 Storm Duration (mins) 3 0.344	r 0 0 0
1		

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10 Bankside, The Watermark Gateshead       Image	Portland Consulting Engineers L	td		Page 2
Gateshead NEI1 95Y Date 03/03/2017 11:17 File 2016093 - Drainage Checked by Micro Drainage Network 2016.1 Diline Controls for Storm Hydro-Brake Optimum® Manhole: 2, DS/PN: 1.002, Volume (m³): 2.6 Unit Reference MD-SHD-0097-3500-0400-3500 Design Text (//s) 3.5 Flush-Flo <sup>®</sup> Colculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 97 Invert Level (m) 150 Suggested Manhole Diameter (mm) 150 Control Points Head (m) Flow (1/s) Flush-Flo <sup>®</sup> 0.135 Suggested Manhole Diameter (mm) 150 Suggested Manhole Diameter (mm) 150 Flush-Flo <sup>®</sup> 0.302 3.1 Flush-Flo <sup>®</sup> 0.35 Kick-Flo® 0.302 3.1 Flush-Flo <sup>®</sup> 0.149 3.5 Mean Flow our Head Range - 2.9 The hydrological calculations have been based on the Head/Diacharge relationship for the Rydro-Brake Optimum® tulliad then these storage routing calculations will be invalidated Depth (m) Flow (1/s) Depth (m) Flow (1/s) Depth (m) Flow (1/s) 0.100 3.2 1.200 5.8 3.000 9.0 7.000 13.5 0.100 3.2 1.200 5.3 1.800 7.0 4.000 10.3 8.000 14.5 0.500 3.1 1.600 6.7 4.000 10.3 8.000 14.5 0.500 3.1 1.600 7.0 4.500 13.1 1.600 17.0 18.8.000 14.5 1.000 5.3 2.2600 8.4 6.500 13.1 1.500 15.6 0.500 13.1 1.600 7.7 4.500 11.4 5.000 15.4 1.500 15.4 0.500 3.1 2.500 8.4 6.500 13.1 1.500 15.4 1.500 15.	10 Bankside, The Watermark			
NEI1       95Y         Date 03/03/2017 11:17       Designed by joe.ryans       Differentiation of the state of the s	Gateshead			L
Date 03/03/2017 11:17       Designed by joe.ryans         File 2016093 - Drainage       Checked by         Micro Drainage       Network 2016.1         Online Controls for Storm         Hydro-Brake Optimum® Manhole: 2, DS/PN: 1.002, Volume (m³): 2.6         Drit Reference MD-SHD-0097-3500-0400-3500         Design Head (m)         Drit Reference MD-SHD-0097-3500-0400-3500         Design Head (m)         Drit Reference MD-SHD-0097-3500-0400-3500         Design Head (m)         Design Flow (1/s)         Dismeter (mn)         Dismeter (mn)         Dismeter (mn)         Sung Available         Yes         Dismeter (mn)	NE11 9SY			Micco
File 2016093 - Drainage       Checked by       During         Micro Drainage       Network 2016.1         Online Controls for Storm         Hydro-Brake Optimum® Manhole: 2, DS/PN: 1.002, Volume (m <sup>-</sup> ): 2.6         Unit Reference MD-SHE-0097-3500-0400-3500         Design Read (m)         Diameter (mn)         Design Point (Calculated)         Note (here there the	Date 03/03/2017 11:17	Designed by j	joe.ryans	Desinado
Micro Drainage       Network 2016.1         Online Controls for Storm         Hydro-Brake Optimum® Manhole: 2, DS/PN: 1.002, Volume (m²): 2.6         Unit Reference MD-SHE-0097-3500-0400-3500         Design Read (n)         Outline Controls for Storm         Design Read (n)         Outline Control Points Storage         Application         Surgested Manhole Diameter (ms)         Diameter (ms)         Diameter (ms)         Diameter (ms)         Diameter (ms)         Surgested Manhole Diameter (ms)         Control Points         Head (m) Flow (1/s)         Depth (m) Flow (1/s)	File 2016093 - Drainage	Checked by		Digitiga
Online Controls for Storm         Hydro-Brake Optimum® Manhole: 2, DS/PN: 1.002, Volume (m'): 2.6         Unit Reference MD-SHE-0037-3500-0400-3500         Design Head (m)         Design Head (m)         Design Head (m)         Design Head (m)         Design Plaw (1/3)         Diameter (mm)         Diameter (mm)         Diameter (mm)         Diameter (mm)         Suggested Manhole Diameter (mm)         Diameter (mm)         Suggested Manhole Diameter (mm)         Suggested Manhole biameter (mm)         Suggested Manhole biameter (mm)         Diameter (mm)         Diameter (mm)         Suggested Manhole biameter (mm)         Plush-Plow         Flush-Flow         Vileen Plow (1/s)         Design Point (Calculated)         Advoclspan="2">Mean Flow vor Mead Range         Advoclspan="2">Diameter (mm)         Suggested Manhole biameter type of control device other than a         Hydro-Brake Optimum® as specified. Should another type of control device other than a	Micro Drainage	Network 2016.	. 1	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Date 03/03/2017 11:17 File 2016093 - Drainage Micro Drainage <u>Online</u> <u>Hydro-Brake Optimum® Manho</u> Unit Design Design	Designed by j Checked by Network 2016. Controls for Ole: 2, DS/PN: Controls for Ole: 2, DS/PN: Controls for Objective Minin Objective Minin Ob	I ODE. ryans 1 Storm 1.002, Volume (m <sup>3</sup> E-0097-3500-0400-3500 0.400 3.5 Calculated mise upstream storage Surface Yes 97 23.100 150 1200 trol Points Head Kick-Flo® 0. r over Head Range Head/Discharge relation pe of control device ot buting calculations will Flow (1/s) Depth (m) 0.9.0 7.000	(m) Flow (1/s) 302 3.1 - 2.9 There than a 1 be Flow (1/s) 13.5
0.300         3.1         1.600         6.7         4.000         10.3         8.000         14.5           0.400         3.5         1.800         7.0         4.500         10.8         8.500         14.9           0.500         3.9         2.000         7.4         5.000         11.4         9.000         15.4           0.600         4.2         2.200         7.7         5.500         12.0         9.500         15.8           0.800         4.8         2.400         8.1         6.000         12.5         1.000         5.3         2.600         8.4         6.500         13.1         5.8	0.200 3.4 1.400	6.3 3.500	9.6 7.500	14.0
0.400         3.5         1.800         7.0         4.500         10.8         8.500         14.9           0.500         3.9         2.000         7.4         5.000         11.4         9.000         15.4           0.600         4.2         2.200         7.7         5.500         12.0         9.500         15.8           0.800         4.8         2.400         8.1         6.000         12.5         1.000         5.3         2.600         8.4         6.500         13.1         9.500         15.8	0.300 3.1 1.600	6.7 4.000	10.3 8.000	14.5
0.600         4.2         2.200         7.7         5.500         12.0         9.500         15.8           0.800         4.8         2.400         8.1         6.000         12.5         1.000         15.8           1.000         5.3         2.600         8.4         6.500         13.1         9.500         15.8		7.0 4.500	10.8 8.500 $11.4$ 9.000	14.9 15.4
0.800         4.8         2.400         8.1         6.000         12.5           1.000         5.3         2.600         8.4         6.500         13.1	0.600 4.2 2.200	7.7 5.500	11.4 $9.00012.0$ $9.500$	15.4
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	1.000 5.3 2.600	8.4 6.500	13.1	

Portland Consulting Engineers Ltd						
10 Bankside, The Watermark						
Gateshead		Le				
NE11 9SY		Micco				
Date 03/03/2017 11:17	Designed by joe.ryans	Desinado				
File 2016093 - Drainage	Checked by	Diamage				
Micro Drainage	Network 2016.1					

#### Storage Structures for Storm

### Cellular Storage Manhole: 1, DS/PN: 1.001

Invert Level (m) 23.925 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000

## Depth (m) Area (m²) Inf. Area (m²) $\left| \, \text{Depth} \right.$ (m) Area (m²) Inf. Area (m²)

0.000	97.5	0.0	0.401	0.0	0.0
0.400	97.5	0.0			

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Portland	d Con	sulting	Engine	ers Lto	ł				Pa	age 4
10 Bank	side,	The Wa	termar	k						
Gateshea	ad									L.
NE11 957	Y								N	Airco
Date 03	/03/2	017 11:1	7	I	Designe	ed by j	oe.rya	ins		
File 20	16093	- Drain	age	C	Checked	d by			L	lanaye
Micro D:	raina	ge		1	letwor}	x 2016.	1			
<u>2 year 1</u>	Retur	n Period	Summa	<u>ry of (</u>	<u>Critica</u>	al Resu	<u>ilts by</u>	<u>/ Maximum</u>	Level	<u>(Rank 1)</u>
					<u>for St</u>	orm				
				Simu	lation	Criteria				
		Areal Redu	uction F	actor 1.	000 A	dditiona	l Flow ·	- % of Tota	l Flow (	.000
		Hot Star	Start (: t Level	mins) (mm)	0	MADD	Factor	* 10m³/ha S nlet Coeffi	torage 2	800
Mar	nhole H	leadloss Co	oeff (Gl	obal) 0.	500 Flo	w per Pe	rson pe	r Day (l/pe	r/day) (	0.000
I	Foul Se	wage per h	nectare	(l/s) 0.	000					
		Number of	Input F	lydrograf	ohs () Nu	mber of	Storage	Structure	s 1	
		Number	of Onlir	ne Contro	ols 1 Nu	umber of	Time/Ar	ea Diagrams	s 0	
		Number o	f Offlir	ne Contro	ols O Nu	umber of	Real Ti	me Controls	s 0	
				Synthet	ic Rainf	all Deta	ails			
		Rain	fall Mod	del	10 1101111	FSR	Ratic	R 0.343		
			Regi	ion Engla	and and	Wales Cv	v (Summe	er) 0.750		
			M5-60 (n	nm)	1	7.000 Ct	v (Winte	er) 0.840		
	Ма	rgin for F	lood Ris	sk Warnin	ng (mm)				300.0	
			Ana	alysis T	imestep	2.5 Sec	ond Incr	ement (Exte	ended)	
				DTS	Status				ON	
				Inertia	Status				OFF	
		]	Profile(	s)				Summer an	d Winter	
		Duration	(s) (min	s)	15, 30,	60, 120	, 180, 2	240, 360, 4	80, 600,	
	Dotu	n Doriod(	a) (					720, 9	60, 1440	
	Retu.	Climate (	S) (year Change (	·S) 응)				4,	0, 0, 40	
			5							
										Water
	US/MH		Return	Climate	First	(X) Fi:	rst (Y)	First (Z)	Overflow	Level
PN	Name	Storm	Period	Change	Surcha	irge 1	Flood	Overflow	Act.	(m)
1.000	1	15 Winter	2	+0%	2/15 Su	mmer				23.987
2.000	2	30 Winter	2	+0%	2/15 Su	mmer				23.959
1.001	1	30 Winter	2	+0응	2/15 St	mmer				23.956
1.002	Z	30 Winter	Z	+0%	2/15 St	mmer				23.959
		Sur	charged	Flooded	<b>1</b> 1 /	0	Pipe		T	
	PN	Name	(m)	(m <sup>3</sup> )	Cap.	(1/s)	(1/s)	Status	Exceede	d
	1 0 5 5									
	2 000	⊥ 2	0.102	0.000	0.32		⊥4.0 ⊿ 1	SURCHARGED		
	1.001	1	0.571	0.000	0.40		9.2	SURCHARGED		
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Portlan	d Con	sulting	Engine	ers Lto	ł				Pa	age 5
10 Bank	side,	The Wa	termar	k						
Gateshea	ad								C	L
NE11 9S	Y								N	Airco
Date 03	/03/2	017 11:1	7	I	Designe	ed by jo	be.rya	ins		
File 20	16093	- Drain	age	0	Checked	l by			L	lanaye
Micro D	raina	ge		N	letwork	2016.3	1			
<u>30 yea</u>	<u>r Ret</u>	urn Peri	od Sum	<u>mary of</u> <u>1)</u> Simu	f Crite	<u>Storm</u> Criteria	<u>sults</u>	by Maxim	um Leve	el (Rank
		Hot	Start (	mins)	000 A	MADD F	actor	* 10m³/ha S	torage 2	.000
		Hot Star	t Level	(mm)	0	11100 1	I	nlet Coeffi	ecient 0	.800
Mar	nhole H	leadloss Co	oeff (Gl	obal) 0.	500 Flo	w per Per	son pe	r Day (l/pe	r/day) O	.000
1	Foul Se	wage per 1	nectare	(l/s) 0.	000					
		Number of Number Number o	Input H of Onlir f Offlir	Hydrograp ne Contro ne Contro	ohs 0 Nu ols 1 Nu ols 0 Nu	mber of mber of mber of 3	Storage Time/Ar Real Ti	e Structures ea Diagrams me Controls	s 1 s 0 s 0	
				Synthet	ic Rainf	all Deta	ils			
		Rain	fall Mod	del		FSR	Ratic	R 0.343		
			Regi	ion Engla	and and	Wales Cv	(Summe	(r) 0.750		
			MJ-00 (1	)	T	7.000 CV	(WIIICE	1) 0.040		
	Ма	rgin for F	lood Ri	sk Warnin	ng (mm)				300.0	
			Ana	alysis T:	imestep	2.5 Seco	nd Incr	ement (Exte	ended)	
				DIS	Status				ON	
				Inertia	Status				OFF	
			Profile(	(s)				Summer and	d Winter	
		Duration	(s) (min	ıs)	15, 30,	60, 120,	180,	240, 360, 48	80, 600,	
	Retur	n Period(	s) (vear	s)				720, 9	60, 1440 30 100	
	11004	Climate	Change (	[응)				2,	0, 0, 40	
PN	US/MH Name	Storm	Return Period	Climate Change	First Surcha	(X) Fir rge F	st (Y) lood	First (Z) ( Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	₹0	+೧೪	2/15 5	mmer				24,172
2.000	2	60 Winter	30	+0%	2/15 St	mmer				24.067
1.001	1	60 Winter	30	+0%	2/15 Su	mmer				24.064
1.002	2	30 Winter	30	+0응	2/15 Su	mmer				24.065
		_								
		Sur US/MH T	charged epth	Flooded Volume	Flow /	Overflow	Pipe Flow		J.evel	
	PN	Name	(m)	(m <sup>3</sup> )	Cap.	(1/s)	(1/s)	Status	Exceede	d
	1 000	1	0 207	0 000	0 60		07 7	GUDCUADCED		
	2.000	1 2	0.287	0.000	0.63		∠ı./ 5.5	SURCHARGED		
	1.001	1	0.679	0.000	0.31		7.2	SURCHARGED		
	1.002	2	0.815	0.000	0.14		5.2	SURCHARGED		
				21000 0	016	0.1.1				
			(	91982-2	υιο ΧΡ	Soluti	ons			

Portland Con	sulting E	Inginee	ers Ltd	l				Pa	ge 6
10 Bankside,	The Wat	ermark	:						
Gateshead								4	4
NE11 9SY								M	irm
Date 03/03/2	017 11:17	1	D	esigne	ed by g	joe.rya	ins	n	rainado
File 2016093	File 2016093 - Drainage Checked by								
Micro Draina	ge		N	letwor	2016	.1		L	
<u>100 year Ret</u>	urn Peri	od Sum	<u>mary o:</u> <u>1)</u> <u>Simu</u>	<u>f Crit</u> for s	<u>ical R</u> Storm Criteria	<u>esults</u>	by Maxim	um Leve	el (Rank
Manhole F Foul Se	Areal Reduc Hot Star Headloss Coe ewage per he	ction Fa Start (m t Level eff (Glc ectare (	ctor 1.0 (mm) (bal) 0.1 1/s) 0.0	000 A 0 500 Flo	dditiona MADD w per Pe	al Flow - Factor ' Ir erson per	- % of Tota * 10m³/ha S nlet Coeffi r Day (l/pe	l Flow 0. torage 2. ecient 0. r/day) 0.	000 000 800 000
	Number of Number c Number of	Input H of Online Offline	ydrograp e Contro e Contro	hs 0 Nu ls 1 Nu ls 0 Nu	mber of mber of mber of	Storage Time/Ar Real Ti	Structures ea Diagrams me Controls	s 1 s 0 s 0	
	Rainf	all Mod Regi 15-60 (m	<u>Syntheti</u> el on Engla n)	lc Rainf und and 1	FSR FSR Wales C 7.000 C	<u>ails</u> Ratio v (Summe v (Winte	r) 0.343 (r) 0.750 (r) 0.840		
Ма	rgin for Fl	lood Ris Ana	k Warnin lysis Ti DTS DVD Inertia	ng (mm) mestep Status Status Status	2.5 Sec	ond Incr	ement (Exte	300.0 ended) ON ON OFF	
Retu:	P Duration( rn Period(s Climate C	rofile(s s) (mins ) (years hange (S	5) 5) 5) 5)	15, 30,	60, 120	), 180, 2	Summer an 240, 360, 4 720, 9 2,	d Winter 80, 600, 60, 1440 30, 100 0, 0, 40	
US/MH PN Name	Storm	Return Period	Climate Change	First Surch	(X) F: arge	irst (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000 1 2.000 2 1.001 1 1.002 2	15 Winter 120 Winter 120 Winter 60 Winter	100 100 100 100	+40% +40% +40% +40%	2/15 Si 2/15 Si 2/15 Si 2/15 Si	ummer ummer ummer ummer				24.677 24.307 24.304 24.311
PN	Surc US/MH De Name	charged epth (m)	Flooded Volume (m³)	Flow / Cap.	Overflo (l/s)	Pipe w Flow (l/s)	Status	Level Exceeded	1
1.000 2.000 1.001 1.002	1 2 1 2	0.792 0.422 0.919 1.061	0.000 0.000 0.000 0.000	1.11 0.15 0.25 0.15		49.2 6.5 5.9 5.8	SURCHARGED SURCHARGED SURCHARGED FLOOD RISK		
		©	1982-2	016 XP	Solut	ions			