

Document: SRBR-BSP-ZZ-XX-RP-C-0001-P01_Flood_Risk_Assessment

Project Number: 21-0633

Project Title: Land at Shripney Road, Bognor Regis

Client: LNT Construction Ltd

Location: Shripney Road, Shripney, Bognor Regis

Date: 07 February 2022

Prepared By: [REDACTED]

Checked By: [REDACTED]



12 Oxford Street
Nottingham
NG1 5BG
T: 0345 413 4000
info@bsp-consulting.co.uk
www.bsp-consulting.co.uk

Flood Risk Assessment

1.0 Introduction

1.1 Terms of Reference

- 1.1.1 BSP Consulting has been commissioned by LNT Construction Ltd to undertake a Flood Risk Assessment for a planning application relating to the construction of a new care home at Shripney Road, Shripney, Bognor Regis.
- 1.1.2 This Flood Risk Assessment has been prepared in accordance with the Department for Communities and Local Government (DCLG) Planning Practice Guidance website section on 'Flood Risk and Coastal Change' and the Site-Specific Flood Risk Assessment Checklist and in accordance with the National Planning Policy Framework.

1.2 National Planning Policy Framework

- 1.2.1 The National Planning Policy Framework (NPPF) was published on 27 March 2012, with the latest update published in July 2021.
- 1.2.2 Planning Practice Guidance to the NPPF regarding Flood Risk and Coastal Change has been published and this site-specific FRA is written in compliance with this guidance.
- 1.2.3 The NPPF, and supporting technical guidance, can be downloaded free of charge from the internet at the following link:

<http://www.communities.gov.uk/publications/planningandbuilding/nppf>

2.0 Site Details

- 2.1.1 The proposed development site is located on Shripney Road, Shripney, Bognor Regis, centred on OSGB grid reference 461504, 312286 and is bounded by Shripney Road to the west, an existing hotel to the north, an existing dwelling to the south and greenfield land to the east. The location of the site and other relevant watercourses are indicated in Figure 2.1 below. Watercourse flow arrows are included to confirm the general flows away from the site towards the east, west and south.

2.1.2 The topographical survey, included in **Appendix A**, shows the site to fall from a high point of 4.69m AOD, in the northeast to a low point of 2.08m AOD at the southwest of the site. The site is reasonably level however there is a consistent fall from east to west across the site towards Shripney Road. As such all runoff from the site would pass from the site to the ditch course at the west of the site. Shripney Road is noticeably lower than the site at a level of 1.67m AOD at the proposed site access, falling to circa 1.5m AOD at the opposite western channel line.

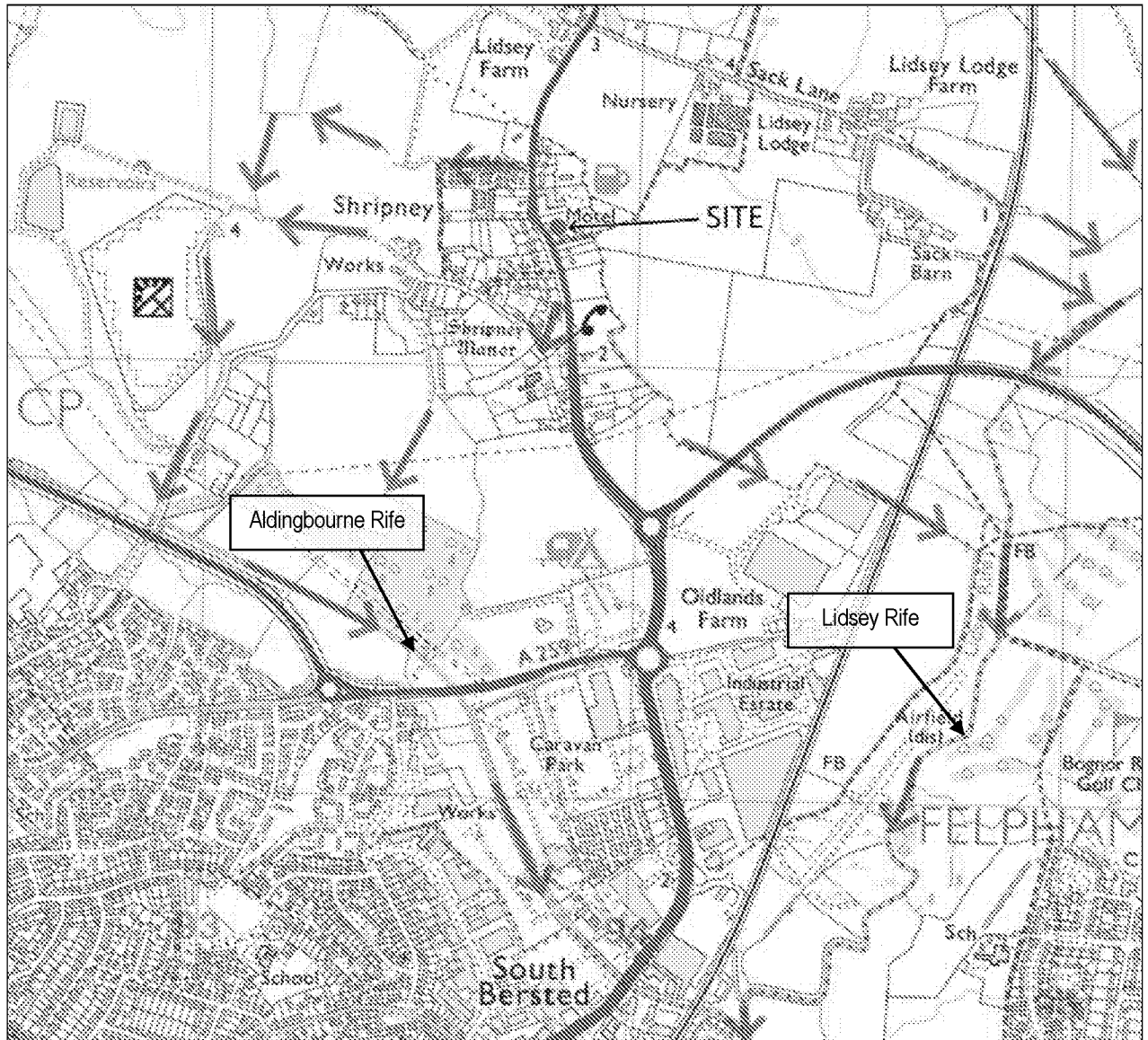


*Figure 2.1 Shripney Road, Shripney, Bognor Regis
– Site Location*

3.0 Existing Flood Risk

3.1.1 The Environment Agency's Risk of Flooding from Rivers and Sea mapping, shown below in Figure 3.1, indicates the site and its locality to be located within the Low Risk Flood Zone 1, with a 1 in 1000 or lower annual probability of flooding from local watercourses. This mapping shows the indicative extent of the natural floodplain, if there were no flood defences or certain other manmade structures, such as surface water sewers, and channel improvements.

3.1.2 Areas of higher fluvial flood risk are noted to the west of Shripney Road and further to the south of Shripney.



*Figure 3.1 Shripney Road, Shripney, Bognor Regis
– Risk of Flooding from Rivers and Sea (Source: EA)*

- 3.1.3 The Environment Agency's Risk of Flooding from Surface Water mapping, shown below in Figure 3.2, confirms that the site is at very low risk of surface water flooding. The mapping does however indicate local surface water flood risk areas. The closest of these to the site is at the western side of Shripney Road at the site entrance with others associated with local watercourses remote from the site.
- 3.1.4 The topographical survey confirms Shripney Road to be cambered just to the north of the proposed site access and changing to a significant crossfall from east to west to the south of the proposed access. This drainage pathway away from the site access is reinforced by a consistent long fall of the western channel line from north to south.
- 3.1.5 Inspection of historic Google Street View mapping indicates that a new, in verge, highway gully was constructed circa 2015 to address the surface water flooding issue. Relevant Street View images are included below in Figure 3.3. The location of this gully is picked up on the topographical survey. A further "in verge" gully was constructed further to the south along Shripney Road.
- 3.1.6 On the basis of the above it appears the Highway Authority have addressed the potential surface water flood risk issue that could affect the west carriageway of Shripney Road at the site access. As such safe access and egress should be available from the proposed development. If surface water flooding of the west carriageway of Shripney Road were to occur in intense rainfall then, from the local levels, it appears that access towards the north would still be safe as lower flood risk is indicated in this direction.



Figure 3.2 Shripney Road, Shripney, Bognor Regis

– Risk of Flooding from Surface Water (Source: EA)

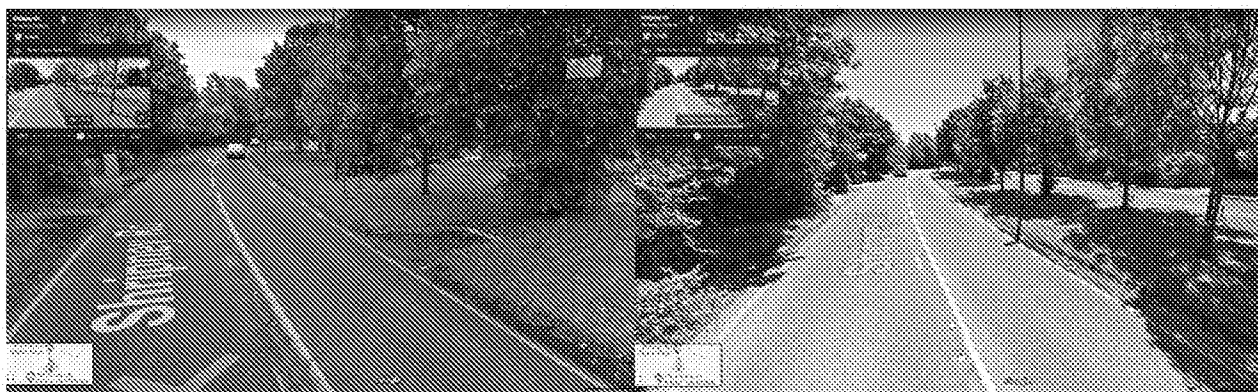


Figure 3.3 Shripney Road, Shripney, Bognor Regis

– Street View Images to the South of the Site (Source: Google)

- 3.1.7 A site specific site investigation has been undertaken for this site and this confirmed the typical water table to be circa 2m below existing ground levels. The risk of groundwater flooding is therefore considered to be low.

4.0 Development Proposals

- 4.1.1 The proposals for the site comprise the construction of a new care home, car parking, a new access onto Shripney Road and associated supporting infrastructure. A copy of the proposed layout is included in **Appendix B**.

- 4.1.2 In accordance with the NPPF, the proposed care home use falls under the **more vulnerable** category in terms of flood risk. Table 4.1 below details which vulnerability classifications are acceptable in Flood Zones 1, 2 3a and 3b respectively and confirms that more vulnerable development is suitable within Flood Zone 1.

Table 4.1: Flood Risk Vulnerability and Flood Zone Compatibility (Source: NPPF)

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test Required	✓	✓
	Zone 3a	Exception Test Required	✓	X	Exception Test Required	✓
	Zone 3b Functional Floodplain	Exception Test Required	✓	X	X	X

5.0 Surface Water Drainage Strategy

- 5.1.1 Surface water runoff from developments should ideally drain to ground via infiltration. At this site infiltration has been proven to be possible but the calculated rates have been proven to be poor and insufficient to promote infiltration as the primary means of surface water disposal. Historic ground water modelling from the exceptionally wet winter of 2020 showed elevated groundwater but only to circa 1m below ground surface on site.
- 5.1.2 In its present state all surface water runoff from the site would runoff from east to west and discharge to the ditch course at the west of the site. This is the closest watercourse to the site. A discharge to this ditch at no greater than the 1-year greenfield runoff rate of 2.1 l/s is proposed. A copy of the greenfield runoff calculation is included in **Appendix C**. This is in line with a previous recommendation from Arun District Council from May 2020.
- 5.1.3 A survey of the ditch adjacent Shripney Road has been undertaken and this has confirmed that the ditch connects to a 150mm diameter pipe to the south (1.21m AOD) and another 150mm diameter pipe to the north (1.27m AOD). The northern pipe collects further surface water from road gullies and then passes west in a 225mm pipe (1.10m AOD) to a further manhole (0.99mAOD) where the survey finishes. The routing of this pipework is included on the drainage strategy drawing included in **Appendix C**.
- 5.1.4 The proposed on-site pipe network, proposed attenuation tank and proposed permeable paved car park have all been modelled in a Microdrainage simulation. FEH 2013 rainfall data has been used as required by Arun District Council. A copy of the supporting calculations is included in **Appendix C**. These calculations confirm that offsite flows to the ditch course are restricted to a peak flow of 1.8 l/s in the critical 1 in 100-year plus 40% climate change rainfall event.

- 5.1.5 It is therefore confirmed that the proposed site surface water drainage will connect to the ditch course at the west of the site at an attenuated greenfield runoff rate no greater than 2.1 l/s in all rainfall events up to and including the critical duration 1 in 100-year event with 40% climate change. The use of permeable paving for the car parking spaces will act to increase the rainfall-runoff response duration while also providing water quality benefits.
- 5.1.6 The precise form of culverting of the ditch course at the site access will need to be agreed with the Local Highway Authority to ensure that appropriate conveyance capacity is provided and that all existing connections are picked up.

6.0 Conclusions

- 6.1.1 The site has been confirmed to be at low risk of flooding from all sources of flood risk.
- 6.1.2 Safe access and egress via the proposed site access can be obtained via Shripney Road with the potential surface water flood risk at the west of the road looking to have been addressed by more recent works by the Local Highway Authority.
- 6.1.3 The proposed surface water drainage strategy seeks to safely drain surface water from the proposed development to the adjacent watercourse at a 1 in 1-year greenfield rate attenuating flows on site up to and including the critical duration 1 in 100-year event with 40% climate change.
- 6.1.4 As such the development can be seen to be safe without increasing the flood risk to others.

Disclaimer

We would note that all comments made in this report are based on the sources of information as noted. This report and its recommendations are intended for the use of LNT Construction Ltd for the above site only.

Appendix A
Topographical Survey

Notes:

The survey has been related to the Ordnance Survey National Grid and level datum using Leica GPS SmartNet data.

Tree heights and spreads are estimated and specie identification cannot be assured.

Only features that are accessible/visible at the time of survey can be detailed.

There are no guarantees offered on the drainage information supplied.

Before commencing works please check important dimensions on-site.

Should there be any discrepancies, inconsistencies, omissions or queries please contact Quickdraw Surveys Ltd as soon as possible for a resolution.

Abbreviations:

Topographical Surveys

BT	British Telecom Cover	FR	Post & Rail	RS	Road Sign
BL	Litter Bin	FW	Post & Wire	RWP	Rain water pipe
BS	Blue Stop	FS	Safety Barrier	SV	Stop Valve
BT	British Telecom Cover	FW	Wire Mesh	ST	Street Light
CP	Conc Paving Slabs	FT	Floodlight	TB	Telephone Box
CTV	Cable Television Cover	FP	Flagpole	TL	Traffic Light
EC	Electric Cover	G	Gully	TP	Telegraph Pole
EP	Electric Pole	GV	Gas Valve	UP	Vent Pipe
ER	Earthing Rod	HY	Hydrant	WM	Water Meter
FE	Mixed Fencing	IC	Inspection Cover	WO	Water Outlet
FW	Barbed Wire	JB	Junction box	U/L	Unable to Lift
CB	Close Board	KO	Kerb Outlet		
CI	Corrugated Iron	LB	Ladder Box		
CL	Chain Link	LP	Lamp Post		
CP	Conc Panel	LM	Lamp Post		
DF	Dispersed Fence	PM	Parking Meter		
IR	Iron Railings	P	Post		
OB	Open Board	RE	Rodding Eye		
PC	Post & Chain	RNP	Road Name Plate		
AL	Arch Level	IL	Invert Level	TL	Threshold Level
BL	Bed Level	PL	Panelp Level	TF	Top of Fence Level
CL	Cover Level	RL	Ridge Level	TW	Top of Wall Level
EL	Eaves Level	SL	Soft Level	WL	Water Level

Station Co-ordinates:

Station	Easting	Northing	Level
STN1	493784.224	102343.692	8.999
STN2	493785.613	102354.086	8.297
STN3	493761.591	102316.128	8.172
STN4	493798.578	102329.495	8.950
STN5	493813.157	102321.820	8.801
STN6	493860.578	102318.852	8.790
STN7	493779.805	102283.021	8.260
STN8	493791.627	102280.532	7.734
STN9	493809.699	102291.245	8.006

A0 Plot @ 1:200

Client: LNT Construction Ltd.

Date: April 2021

Project: Topographical Survey
The Cottage, Shripney Road,
Shripney, P022 9PA.

Scale: 1:200

Drawing Number: QDS/350/1086/TOP | Revision: 0

Appendix B

Site Development Proposal



REV	DATE	DETAILS OF AMENDMENTS	DRAWN
REVISIONS			

LNT Construction

LNT CONSTRUCTION LTD
UNIT 2, HELIOS 47
ISABELLA ROAD
GARFORTH
LS25 2DY
Tel: 0113 3853858
Fax: 0113 3853859

CLIENT

SITE SHRIPNEY ROAD
BOGNOR REGIS
PO22 9PA

TITLE PROPOSED SITE PLAN

SCALE	1:200 @A1	DATE	15-09-21
DRAWN	GB	DWG NO.	PO22-9PA-03
DRAWING STATUS			
FEASIBILITY	PLANNING SUBMISSION		
PLANNING APPROVAL	REGULATION SUBMISSION		
REGULATION APPROVAL	CONSTRUCTION ISSUE		
CHECKED BY		DATE	
APPROVED BY		DATE	

Appendix C

Surface Water Drainage Strategy

BSP Consulting Ltd		Page 1
12 Oxford Street Nottingham NG1 5BG	Proposed Care Home Bognor Regis Greenfield Runoff Calcs	
Date 12/10/2021 File	Designed by TKH Checked by TG	
Micro Drainage		Source Control 2019.1

ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 750 Urban 0.000
Area (ha) 0.676 Soil 0.400 Region Number Region 7

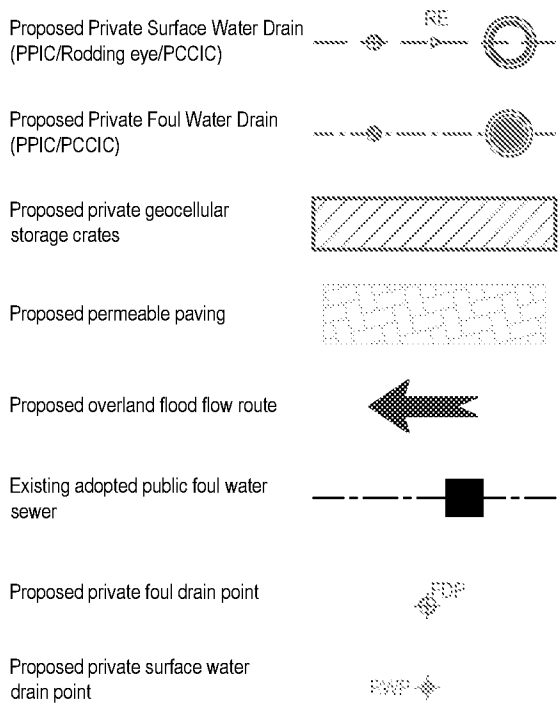
Results 1/s

QBAR Rural 2.5
QBAR Urban 2.5

Q1 year 2.1

Q1 year 2.1
Q30 years 5.7
Q100 years 8.0

Key



Drainage Strategy Notes:

1. Restricted discharge rate of 2.1 l/s based on 1-year greenfield runoff rate for total site area of 0.676Ha.
2. Proposed nett impermeable area 0.328Ha
3. Previous infiltration testing carried out on site by others yielded low results and near-surface ground water levels, as such, the use of soakways has been discounted.
4. Proposal to discharge surface water into existing highway drainage ditch at site boundary.
5. Line, level and condition of existing public sewers shown are subject to confirmation by CCTV drainage survey.

KEY PLAN

Construction Risks

Maintenance/cleaning Risks

Demolition/adaptation Risks

In addition to the hazards normally associated with the type of works detailed on this drawing take note of the above. It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION BOX

NOTES

1. DO NOT SCALE.
2. Should there be any conflict between the details indicated on this drawing and those indicated on other drawings the Engineer should be informed PRIOR to construction on site.
3. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the contractor commence site work prior to such approval being given, it is entirely at his own risk.
4. All dimensions are in millimetres unless otherwise stated.
5. The BSP Hazard Identification and Risk Assessment information for this project must be reviewed and understood by the contractor PRIOR to the commencement of any works on site.

P02	Drawing updated	JO	11/02/22	CLN	11/02/22	TG	11/02/22
P01	First issue	TKH	15/10/21	PN	15/10/21	TG	15/10/21

REV	COMMENT	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
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SCALE @ A1	ISSUING OFFICE	PROJECT NUMBER
1:250	NOTTINGHAM	21-0633

CLIENT APPROVAL

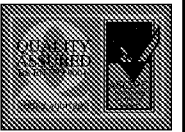
A - APPROVED
B - APPROVED WITH COMMENTS
C - DO NOT USE

STATUS	PURPOSE OF ISSUE
S1	PRELIMINARY

CIVIL • STRUCTURAL • TRANSPORTATION • GEOTECHNICAL • ENVIRONMENTAL

bsp
CONSULTING

12 Oxford Street
Nottingham, NG1 5BG
Tel: (0115) 7045300 - Fax: (0115) 8402228
e-mail: info@bsp-consulting.co.uk
Also offices in Derby, Leicester and Sheffield



PROJECT

Proposed 66-Bed Care Home
Shripney Road, Bognor Regis

TITLE

Drainage Strategy

CLIENT

LNT Construction

PROJECT ORIGINATOR	ZONE	LEVEL	TYPE	ROLE	NUMBER	REV
SRBR-BSP-ZZ-00-DR-C-SK240						P02

BSP Consulting Ltd		Page 1
12 Oxford Street Nottingham NG1 5BG	Proposed Care Home Bognor Regis SW Drainage Strategy	
Date 11/02/2022	Designed by TKH	
File	Checked by TG	
Micro Drainage		Network 2017.1.1

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.346	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Mn Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Mn Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Mn Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

Y - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I. Area (ha)	T. E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	56.400	0.338	167.0	0.037	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	42.000	0.251	167.0	0.076	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	4.300	0.086	50.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	28.700	0.503	57.1	0.071	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	22.500	0.135	167.0	0.017	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	5.300	0.032	167.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.003	5.000	0.030	166.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	1.700	0.150	11.3	0.017	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	2.250	0.015	150.0	0.087	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	6.980	0.047	148.5	0.023	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	5.200	0.035	148.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T. C. (mins)	US/IL (m)	√ I. Area (ha)	√ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.93	2.200	0.037	0.0	0.0	0.0	1.01	40.1	5.0
1.001	50.00	6.63	1.862	0.113	0.0	0.0	0.0	1.01	40.1	15.3
1.002	50.00	6.66	1.611	0.113	0.0	0.0	0.0	1.85	73.7	15.3
2.000	50.00	5.28	2.225	0.071	0.0	0.0	0.0	1.73	69.0	9.6
2.001	50.00	5.65	1.722	0.088	0.0	0.0	0.0	1.01	40.1	11.9
2.002	50.00	5.73	1.587	0.088	0.0	0.0	0.0	1.01	40.1	11.9
2.003	50.00	5.82	1.556	0.088	0.0	0.0	0.0	1.01	40.2	11.9
3.000	50.00	5.01	1.650	0.017	0.0	0.0	0.0	3.01	53.2	2.3
1.003	50.00	6.71	1.350	0.305	0.0	0.0	0.0	0.82	14.57	41.3
1.004	50.00	6.85	1.330	0.328	0.0	0.0	0.0	0.82	14.57	44.4
1.005	50.00	6.96	1.280	0.328	0.0	0.0	0.0	0.82	14.57	44.4

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12 Oxford Street Nottingham NG1 5BG	Proposed Care Home Bognor Regis SW Drainage Strategy	
Date 11/02/2022	Designed by TKH	
File	Checked by TG	
Micro Drainage		Network 2017.1.1

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	M n I. Level (m)	D, L (mm)	W (mm)
1.005		1.700	1.245	1.070	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10mE/ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Offline Controls	0
Number of Online Controls	1	Number of Storage Structures	1
		Number of Time/Area Diagrams	0
		Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	2	Winter Storms	No
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 493799 102335 SU 93799 02335	Cv (Winter)	0.840
Data Type	Point	Storm Duration (mins)	30

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Micro Drainage		Network 2017.1.1

Online Controls for Storm

Hydro-Brake+ Optimum Manhole: 11, DS/PN: 1.005, Volume (m³): 1.5

Unit Reference	MD-SCU-0050-2100-0600-2100
Design Head (m)	0.600
Design Flow (l/s)	2.1
Flush-Flow	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	1.280
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	2.1	Kick-Flow	0.075	0.8
Flush-Flow	0.075	0.8	Mean Flow over Head Range	-	1.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake+ Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	0.800	2.4	2.000	3.7	4.000	5.1	7.000	6.6
0.200	1.3	1.000	2.7	2.200	3.8	4.500	5.4	7.500	6.9
0.300	1.5	1.200	2.9	2.400	4.0	5.000	5.6	8.000	7.1
0.400	1.7	1.400	3.1	2.600	4.1	5.500	5.9	8.500	7.3
0.500	1.9	1.600	3.3	3.000	4.4	6.000	6.1	9.000	7.5
0.600	2.1	1.800	3.5	3.500	4.8	6.500	6.4	9.500	7.7

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Storage Structures for Storm

Complex Manhole: 9, DS/PN: 1.003

Cellular Storage

Invert Level (m) 1.350 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	687.5	0.0	0.400	687.5	0.0	0.401	0.0	0.0

Porous Car Park

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 14.4
Membrane Percolation (mm/hr) 1000 Length (m) 22.8
Max Percolation (l/s) 91.2 Slope (1:X) 1000.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 1.750 Cap Volume Depth (m) 0.320

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12 Oxford Street Nottingham NG1 5BG	Proposed Care Home Bognor Regis SW Drainage Strategy	
Date 11/02/2022	Designed by TKH	
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Micro Drainage		Network 2017.1.1

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10mE/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.346 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (mE)
1.000	1	15 Wnter	1	+0%	100/15 Wnter				2.252	-0.173	0.000
1.001	2	15 Wnter	1	+0%	100/15 Wnter				1.951	-0.136	0.000
1.002	3	15 Wnter	1	+0%	100/15 Wnter				1.694	-0.141	0.000
2.000	4	15 Wnter	1	+0%					2.281	-0.169	0.000
2.001	5	15 Wnter	1	+0%	100/15 Wnter				1.805	-0.142	0.000
2.002	6	15 Wnter	1	+0%	100/15 Wnter				1.680	-0.132	0.000
2.003	7	15 Wnter	1	+0%	100/15 Wnter				1.649	-0.131	0.000
3.000	8	15 Wnter	1	+0%					1.680	-0.120	0.000
1.003	9	960 Wnter	1	+0%	30/180 Wnter				1.422	-0.078	0.000
1.004	10	15 Wnter	1	+0%	30/15 Wnter				1.428	-0.052	0.000
1.005	11	720 Wnter	1	+0%	30/15 Wnter				1.426	-0.004	0.000

		<u>Pipe</u>			
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Level Exceeded
1.000	1	0.12		4.5	OK
1.001	2	0.32		12.2	OK
1.002	3	0.30		12.2	OK
2.000	4	0.14		8.9	OK
2.001	5	0.29		10.6	OK
2.002	6	0.36		10.7	OK
2.003	7	0.36		10.5	OK
3.000	8	0.09		2.1	OK
1.003	9	0.18		2.0	OK
1.004	10	0.13		1.7	OK
1.005	11	0.09		1.1	OK

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10mE/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.346 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (mE)
1.000	1	15 Wnter	30	+0%	100/15 Wnter				2.284	-0.141	0.000
1.001	2	15 Wnter	30	+0%	100/15 Wnter				2.033	-0.054	0.000
1.002	3	15 Wnter	30	+0%	100/15 Wnter				1.766	-0.070	0.000
2.000	4	15 Wnter	30	+0%					2.316	-0.134	0.000
2.001	5	15 Wnter	30	+0%	100/15 Wnter				1.869	-0.078	0.000
2.002	6	15 Wnter	30	+0%	100/15 Wnter				1.754	-0.059	0.000
2.003	7	15 Wnter	30	+0%	100/15 Wnter				1.725	-0.055	0.000
3.000	8	15 Wnter	30	+0%					1.697	-0.103	0.000
1.003	9	720 Wnter	30	+0%	30/180 Wnter				1.530	0.030	0.000
1.004	10	960 Wnter	30	+0%	30/15 Wnter				1.536	0.056	0.000
1.005	11	960 Wnter	30	+0%	30/15 Wnter				1.540	0.110	0.000

		Pipe		Level	
PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Flow (l/s)	Status
1.000	1	0.28		11.0	OK
1.001	2	0.89		34.0	OK
1.002	3	0.81		33.7	OK
2.000	4	0.34		21.7	OK
2.001	5	0.73		26.9	OK
2.002	6	0.91		26.8	OK
2.003	7	0.91		26.6	OK
3.000	8	0.22		5.2	OK
1.003	9	0.19		2.1	SURCHARGED
1.004	10	0.15		1.9	SURCHARGED
1.005	11	0.12		1.4	SURCHARGED

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

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10mE/ha Storage 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.000 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.346 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 450.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

Profile(s) Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (mE)
1.000	1	15 Wnter	100	+40%	100/15 Wnter				2.503	0.078	0.000
1.001	2	15 Wnter	100	+40%	100/15 Wnter				2.424	0.336	0.000
1.002	3	15 Wnter	100	+40%	100/15 Wnter				1.885	0.049	0.000
2.000	4	15 Wnter	100	+40%					2.354	-0.096	0.000
2.001	5	15 Wnter	100	+40%	100/15 Wnter				2.165	0.218	0.000
2.002	6	15 Wnter	100	+40%	100/15 Wnter				1.953	0.140	0.000
2.003	7	15 Wnter	100	+40%	100/15 Wnter				1.846	0.065	0.000
3.000	8	15 Wnter	100	+40%					1.715	-0.085	0.000
1.003	9	960 Wnter	100	+40%	30/180 Wnter				1.707	0.207	0.000
1.004	10	960 Wnter	100	+40%	30/15 Wnter				1.708	0.228	0.000
1.005	11	960 Wnter	100	+40%	30/15 Wnter				1.707	0.277	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.49		18.8	SURCHARGED	
1.001	2	1.41		54.0	SURCHARGED	
1.002	3	1.29		53.4	SURCHARGED	
2.000	4	0.61		39.3	OK	
2.001	5	1.24		45.4	FLOOD RISK	
2.002	6	1.54		45.6	SURCHARGED	
2.003	7	1.56		45.8	SURCHARGED	
3.000	8	0.39		9.5	OK	
1.003	9	0.19		2.1	SURCHARGED	
1.004	10	0.16		2.0	SURCHARGED	
1.005	11	0.15		1.8	SURCHARGED	