Model Details

Storage is Online Cover Level (m) 9.000

Tank or Pond Structure

Invert Level (m) 7.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1800.0	0.700	1800.0	1.400	0.0	2.100	0.0
0.100	1800.0	0.800	1800.0	1.500	0.0	2.200	0.0
0.200	1800.0	0.900	1800.0	1.600	0.0	2.300	0.0
0.300	1800.0	1.000	1800.0	1.700	0.0	2.400	0.0
0.400	1800.0	1.100	0.0	1.800	0.0	2.500	0.0
0.500	1800.0	1.200	0.0	1.900	0.0		
0.600	1800.0	1.300	0.0	2.000	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0090-3600-1000-3600
Design Head (m)	1.000
Design Flow (l/s)	3.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	90
Invert Level (m)	7.600
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	3.6
Flush-Flo™	0.300	3.6
Kick-Flo®	0.631	2.9
Mean Flow over Head Range	-	3.1

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)
0.100	2.8	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.5	1.400	4.2	3.500	6.5	7.500	9.3
0.300	3.6	1.600	4.5	4.000	6.9	8.000	9.5
0.400	3.5	1.800	4.7	4.500	7.3	8.500	9.8
0.500	3.4	2.000	5.0	5.000	7.6	9.000	10.1
0.600	3.1	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.2	2.400	5.4	6.000	8.3		
1.000	3.6	2.600	5.6	6.500	8.6		

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Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 8.700

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	7.931	0.231	3.6	0.0	3.6	415.3	O K
30 min Summer	8.010	0.310	3.6	0.0	3.6	557.2	O K
60 min Summer	8.095	0.395	3.6	0.0	3.6	711.7	O K
120 min Summer	8.186	0.486	3.6	0.0	3.6	874.1	O K
180 min Summer	8.238	0.538	3.6	0.0	3.6	968.7	O K
240 min Summer	8.273	0.573	3.6	0.0	3.6	1032.2	O K
360 min Summer	8.322	0.622	3.6	0.0	3.6	1120.1	O K
480 min Summer	8.357	0.657	3.6	0.0	3.6	1181.8	O K
600 min Summer	8.382	0.682	3.6	0.0	3.6	1227.3	O K
720 min Summer	8.401	0.701	3.6	0.0	3.6	1262.0	O K
960 min Summer	8.428	0.728	3.6	0.0	3.6	1310.5	O K
1440 min Summer	8.455	0.755	3.6	0.0	3.6	1358.9	O K
2160 min Summer	8.462	0.762	3.6	0.0	3.6	1371.3	O K
2880 min Summer	8.449	0.749	3.6	0.0	3.6	1348.8	O K
4320 min Summer	8.409	0.709	3.6	0.0	3.6	1275.6	O K
5760 min Summer	8.375	0.675	3.6	0.0	3.6	1215.5	O K
7200 min Summer	8.346	0.646	3.6	0.0	3.6	1163.0	O K
8640 min Summer	8.320	0.620	3.6	0.0	3.6	1115.9	O K
10080 min Summer	8.295	0.595	3.6	0.0	3.6	1070.3	O K
15 min Winter	7.959	0.259	3.6	0.0	3.6	465.8	O K
30 min Winter	8.047	0.347	3.6	0.0	3.6	625.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	124.633	0.0	306.1	0.0	27
30 min Summer	83.789	0.0	308.8	0.0	42
60 min Summer	53.779	0.0	610.3	0.0	72
120 min Summer	33.337	0.0	598.9	0.0	132
180 min Summer	24.832	0.0	579.5	0.0	190
240 min Summer	20.006	0.0	564.8	0.0	250
360 min Summer	14.706	0.0	548.8	0.0	370
480 min Summer	11.818	0.0	541.4	0.0	490
600 min Summer	9.966	0.0	538.7	0.0	608
720 min Summer	8.665	0.0	539.0	0.0	728
960 min Summer	6.943	0.0	545.7	0.0	968
1440 min Summer	5.071	0.0	559.7	0.0	1446
2160 min Summer	3.696	0.0	1110.0	0.0	2164
2880 min Summer	2.949	0.0	1101.9	0.0	2880
4320 min Summer	2.142	0.0	1088.5	0.0	3676
5760 min Summer	1.705	0.0	2201.3	0.0	4440
7200 min Summer	1.427	0.0	2128.6	0.0	5192
8640 min Summer	1.235	0.0	2031.4	0.0	6048
10080 min Summer	1.093	0.0	1935.9	0.0	6864
15 min Winter	124.633	0.0	308.2	0.0	27
30 min Winter	83.789	0.0	307.5	0.0	41

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	8.144	0.444	3.6	0.0	3.6	799.0	O K
120 min Winter	8.246	0.546	3.6	0.0	3.6	983.2	O K
180 min Winter	8.306	0.606	3.6	0.0	3.6	1090.4	O K
240 min Winter	8.346	0.646	3.6	0.0	3.6	1162.4	O K
360 min Winter	8.402	0.702	3.6	0.0	3.6	1263.4	O K
480 min Winter	8.442	0.742	3.6	0.0	3.6	1335.2	O K
600 min Winter	8.472	0.772	3.6	0.0	3.6	1388.9	O K
720 min Winter	8.495	0.795	3.6	0.0	3.6	1430.5	O K
960 min Winter	8.528	0.828	3.6	0.0	3.6	1490.4	O K
1440 min Winter	8.564	0.864	3.6	0.0	3.6	1556.0	O K
2160 min Winter	8.582	0.882	3.6	0.0	3.6	1587.4	O K
2880 min Winter	8.578	0.878	3.6	0.0	3.6	1579.5	O K
4320 min Winter	8.540	0.840	3.6	0.0	3.6	1511.8	O K
5760 min Winter	8.493	0.793	3.6	0.0	3.6	1427.4	O K
7200 min Winter	8.454	0.754	3.6	0.0	3.6	1356.5	O K
8640 min Winter	8.418	0.718	3.6	0.0	3.6	1292.7	O K
10080 min Winter	8.382	0.682	3.6	0.0	3.6	1228.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	53.779	0.0	607.7	0.0	70
120 min Winter	33.337	0.0	577.3	0.0	130
180 min Winter	24.832	0.0	556.1	0.0	188
240 min Winter	20.006	0.0	545.9	0.0	248
360 min Winter	14.706	0.0	538.8	0.0	364
480 min Winter	11.818	0.0	540.8	0.0	482
600 min Winter	9.966	0.0	548.2	0.0	600
720 min Winter	8.665	0.0	556.5	0.0	718
960 min Winter	6.943	0.0	568.0	0.0	952
1440 min Winter	5.071	0.0	579.5	0.0	1418
2160 min Winter	3.696	0.0	1125.3	0.0	2104
2880 min Winter	2.949	0.0	1134.9	0.0	2772
4320 min Winter	2.142	0.0	1130.2	0.0	4064
5760 min Winter	1.705	0.0	2242.8	0.0	4616
7200 min Winter	1.427	0.0	2174.1	0.0	5544
8640 min Winter	1.235	0.0	2091.8	0.0	6488
10080 min Winter	1.093	0.0	2008.5	0.0	7376

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.800

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.400	4	8	0.800	8	12	0.600

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Model Details

Storage is Online Cover Level (m) 9.000

Tank or Pond Structure

Invert Level (m) 7.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1800.0	0.700	1800.0	1.400	0.0	2.100	0.0
0.100	1800.0	0.800	1800.0	1.500	0.0	2.200	0.0
0.200	1800.0	0.900	1800.0	1.600	0.0	2.300	0.0
0.300	1800.0	1.000	1800.0	1.700	0.0	2.400	0.0
0.400	1800.0	1.100	0.0	1.800	0.0	2.500	0.0
0.500	1800.0	1.200	0.0	1.900	0.0		
0.600	1800.0	1.300	0.0	2.000	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0090-3600-1000-3600
Design Head (m)	1.000
Design Flow (l/s)	3.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	90
Invert Level (m)	7.600
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	3.6
Flush-Flo™	0.300	3.6
Kick-Flo®	0.631	2.9
Mean Flow over Head Range	-	3.1

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)
0.100	2.8	1.200	3.9	3.000	6.0	7.000	9.0
0.200	3.5	1.400	4.2	3.500	6.5	7.500	9.3
0.300	3.6	1.600	4.5	4.000	6.9	8.000	9.5
0.400	3.5	1.800	4.7	4.500	7.3	8.500	9.8
0.500	3.4	2.000	5.0	5.000	7.6	9.000	10.1
0.600	3.1	2.200	5.2	5.500	8.0	9.500	10.4
0.800	3.2	2.400	5.4	6.000	8.3		
1.000	3.6	2.600	5.6	6.500	8.6		

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Weir Overflow Control

Discharge Coef 0.544 Width (m) 1.000 Invert Level (m) 8.700

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Appendix 5

Sewer Records

(c) Crown copyright and database rights 2020 Ordnance Survey 100031673 | Date: 10/12/20 | Scale: 1:2700 | Map Centre: 493556,104084 | Data updated: 16/11/20 | Wastewater Plan A3

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2020 Ordnance Survey 100031673 .This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

Foul Gravity Sewer
Combined Gravity Sewer
Culverted Water Course or Treated Effluent
Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon
Combined Outfall
Surface Water Outfall
Foul Outfall
Surface Water Inlet
Combined Pumping Station
Surface Water Pumping Station
Foul Pumping Station
WWTW Water Treatment Works
Section 104 Area
Building Over Agreement Area
Foul Manhole
Combined Manhole
Surface Water Manhole
Side Entry Manhole, Decarcation Chamber, Dummy Manhole or Surface Water Soakaway

WATER for LIFE from Southern Water.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0102	F	8.99	5.36	
6307	F	0.00	0.00	
6308	F	0.00	0.00	
630D	F	0.00	0.00	
7001	F	9.33	8.08	
7002	F	8.98	6.83	
7003	F	8.90	6.75	
7101	F	8.90	6.48	
7102	F	8.23	6.30	
7201	F	8.46	6.85	
7301	F	9.14	7.99	
7302	F	8.77	6.86	
7303	F	8.84	6.66	
7304	F	9.14	7.93	
7305	F	9.14	7.81	
7306	F	9.00	7.72	
7901	F	9.41	8.33	
7902	F	9.02	7.97	
7903	F	9.32	7.32	
790D	F	0.00	0.00	
8001	F	8.24	6.39	
8101	F	8.05	6.18	
8102	F	8.31	5.99	
810D	F	8.75	5.83	
8202	F	8.85	7.47	
8203	F	8.53	7.20	
8204	F	9.14	7.25	
8205	F	9.42	7.88	
8206	F	9.48	7.81	
8301	F	9.61	8.05	
8901	F	8.95	8.21	
9101	F	7.89	6.48	
9102	F	8.98	5.72	
9103	F	9.16	5.52	
9202	F	9.48	8.35	
9301	F	9.97	8.76	
9302	F	10.01	8.45	
9150	S	0.00	0.00	
915D	S	0.00	0.00	

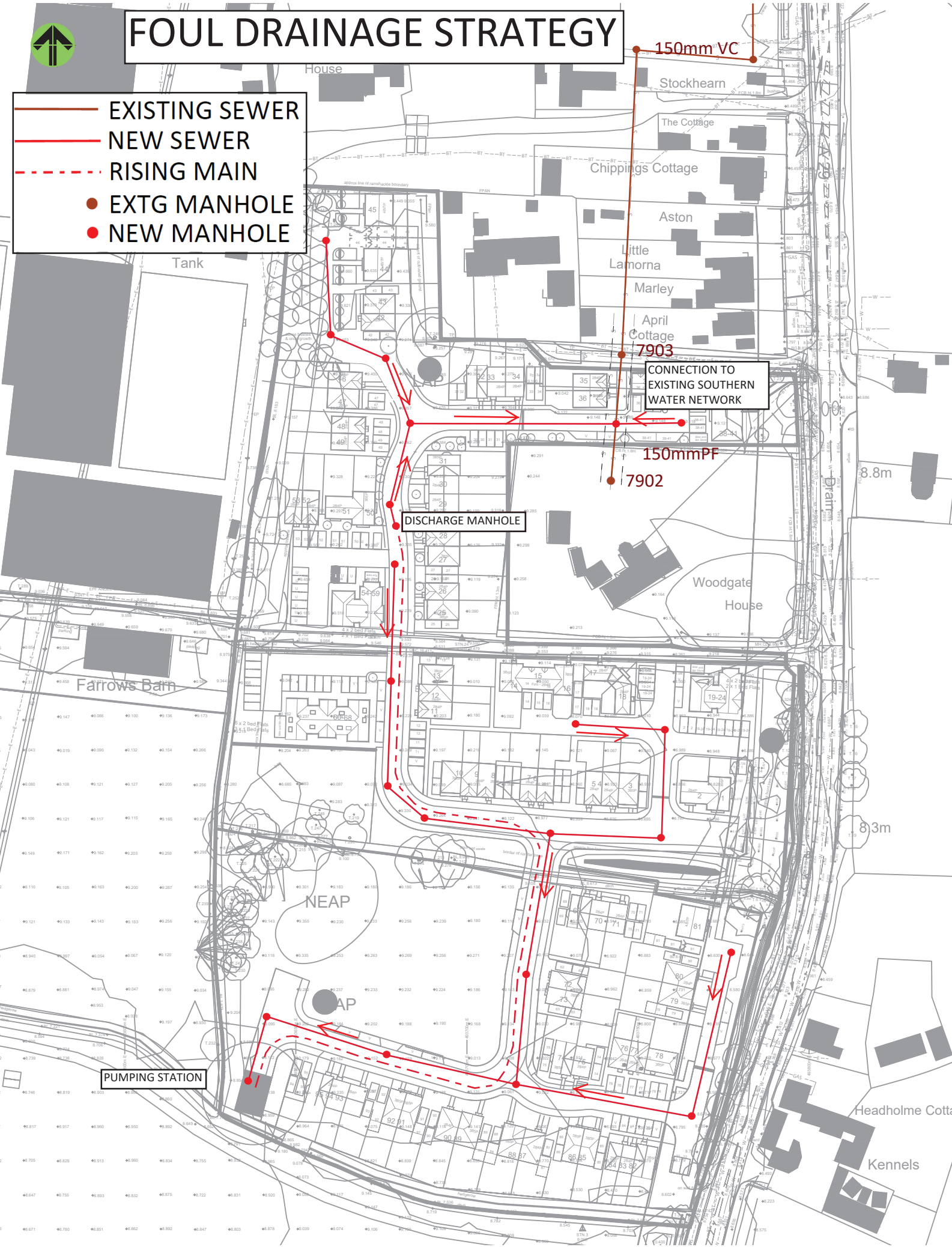
Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Appendix 6

Foul water and surface water drainage strategies

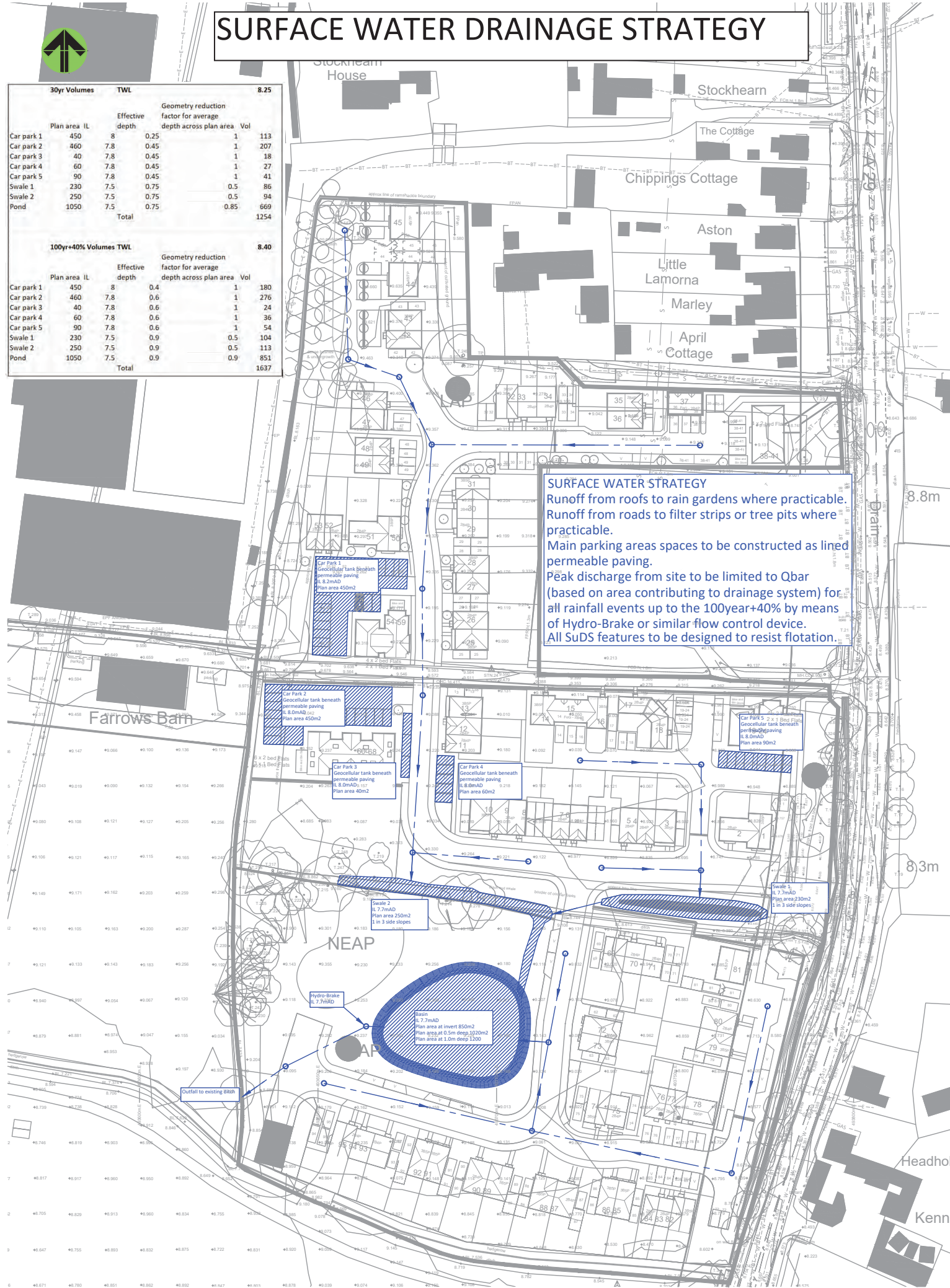
FOUL DRAINAGE STRATEGY



SURFACE WATER DRAINAGE STRATEGY

30yr Volumes		TWL			8.25
	Plan area	IL	Effective depth	Geometry reduction factor for average depth across plan area	Vol
Car park 1	450	8	0.25	1	113
Car park 2	460	7.8	0.45	1	207
Car park 3	40	7.8	0.45	1	18
Car park 4	60	7.8	0.45	1	27
Car park 5	90	7.8	0.45	1	41
Swale 1	230	7.5	0.75	0.5	86
Swale 2	250	7.5	0.75	0.5	94
Pond	1050	7.5	0.75	0.85	669
			Total		1254

100yr+40% Volumes		TWL			8.40
	Plan area	IL	Effective depth	Geometry reduction factor for average depth across plan area	Vol
Car park 1	450	8	0.4	1	180
Car park 2	460	7.8	0.6	1	276
Car park 3	40	7.8	0.6	1	24
Car park 4	60	7.8	0.6	1	36
Car park 5	90	7.8	0.6	1	54
Swale 1	230	7.5	0.9	0.5	104
Swale 2	250	7.5	0.9	0.5	113
Pond	1050	7.5	0.9	0.9	851
			Total		1637



SURFACE WATER STRATEGY

Runoff from roofs to rain gardens where practicable.
Runoff from roads to filter strips or tree pits where practicable.
Main parking areas spaces to be constructed as lined permeable paving.
Peak discharge from site to be limited to Qbar (based on area contributing to drainage system) for all rainfall events up to the 100year+40% by means of Hydro-Brake or similar flow control device.
All SuDS features to be designed to resist flotation.

Appendix 7

West Sussex County Council Developer's Guidance Note and other guidance

West Sussex LLFA Policy for the Management of Surface Water

Updated November 2018.

Planning Context

West Sussex County Council (WSCC), as Lead Local Flood Authority (LLFA) is the risk management authority responsible for local flood risk defined as flooding from surface water, groundwater and ordinary watercourses (2.1.1). Hereafter we will refer to either West Sussex LLFA or more simply as the LLFA.

The LLFA is required to provide consultation responses on the surface water drainage provisions associated with major development (2.2.2). This policy statement sets out the requirements that the LLFA has for drainage strategies and surface water management provisions associated with applications for development.

For all developments, even small, we would expect the principles of this policy & drainage strategy to be considered. For all major developments, we would expect adherence to the full scope of this policy; the drainage strategy is to consider the topics set out in the table below and be consistent with the Sustainable Drainage Systems (SuDS) policies in Sections 5 and 6 of this document.

Scope for Drainage Strategy	**Relevant sections of document**
Drainage Catchment & Impermeable area (pre- and post-development)	5.2.1
Discharge location	5.2.1; 5.2.5
Infiltration capacity	5.2.2-5.2.3
Design calculations for peak flow, volume control and greenfield runoff, and/or brownfield runoff where appropriate	5.3
Inclusion of climate change & future development allowances	5.2.2; 5.3.2; 5.3.5;; 5.4.4; Policy 5; 5.6.1
Topographical survey of the site	5.3.1; 5.4.1
Details of any adjacent watercourse	5.3.1;5.4.1
Areas of flood risk	4.2; 5.5
Quantification of any surface water flows on-site from off-site locations	5.3

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Exceedance routes	5.3.5; Policy 2
Offsite works	5.3.1; 5.5.2
Consents	3.2; 4.3
Any constraints which affect the proposed development	5.3.8; 6.1
Locations of sensitive receptors, including source protection zones, habitat designations or archaeological features	6.1.7
Principles of temporary drainage during construction	6.1.2
Proposed extent of adoption strategy	5.7.6
A Strategic Surface Water Management Strategy for large sites for which the development is to be phased.	5.3.11
Correspondence from any receiving authority or permitting authority	Section 4; 5.2.5

Section 2 provides the regulatory context for this policy and Section 3 summarises specific guidance that informs LLFA consideration of surface water management.

Section 4 describes the consultation process and LLFA expectations for how developers should engage in this process.

This policy statement is consistent with the National Planning Policy Framework (NPPF) National Planning Practice Guidance and Defra Non-Technical Standards for Sustainable Drainage. However, it does not supplant this or any other non-statutory best practice guidance to which this document refers.

Input to the development management process by the LLFA is not restricted to major development applications. LLFA advice should be sought on other planning applications which raise surface water or other local flood risk issues; the basis of consultation between the LLFA and planning authorities can be the subject of pre-arranged protocols (see also planning practice guidance paragraph: 045 reference ID: 7-045-20150323).

Section 7 of this policy relates to management of surface water flood risk for developments smaller developments including homeowner extensions and alterations and commercial developments less than 0.5ha or comprising fewer than 10 properties.

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1 Role of this Policy Statement

1.1 This policy statement sets out how West Sussex LLFA, as a statutory consultee, will review drainage strategies and surface water management provisions associated with applications for development. It is consistent with the Non-Statutory Technical Standards for Sustainable Drainage (as published by Defra in March 2015), and sets out the policy requirements West Sussex County Council has for sustainable drainage. It should be read in conjunction with:

- the NPPF;
- Gov.UK Guidance for the Preparation of Flood Risk Assessments; https://www.gov.uk/guidance/flood-risk-assessment-standing-advice; and
- any specific policy set out by the relevant Local Planning Authority in their Local Plan.

Where Local Plan policies have stronger requirements in terms of need for FRA/drainage strategy or restricting runoff rates, they will take precedence over this policy.

1.2 This policy statement should be used by:

- Developers when considering their approach to the development of new sites or redevelopment of brownfield sites;
- Developers or their consultants when preparing drainage submissions to support a planning application for development;
- Homeowners when considering alterations / extensions to their home that affect surface water run-off (Section 7);
- Professionals involved in developing drainage schemes including engineering, urban and landscape professionals;
- Development Management officers when considering development applications; and
- Local Authorities when developing local planning and land-use policy.

2 Introduction

2.1 Background

2.1.1 West Sussex County Council was made LLFA for West Sussex by the Flood and Water Management Act 2010 (the Act). As LLFA, West Sussex County Council has a strategic overview of 'local flooding.' Local flooding is defined by the Act as flooding which is caused by:

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- Surface water; and/or
- Groundwater; and/or
- Ordinary Watercourses.

The management of surface water for new developments is a key factor in managing local flood risk.

2.2 Use of Sustainable Drainage Systems: Policy and Legislative Requirements

2.2.1 National planning policy directs new development wherever possible away from areas at risk of flooding. This notwithstanding, new development should only be considered appropriate in areas at risk of flooding if priority has been given to the use of sustainable drainage systems (SuDS). When considering major development, SuDS should be provided unless demonstrated to be inappropriate (Planning Practice Guidance paragraph 079 ID: 7-079-20150415).

2.2.2 As the LLFA, West Sussex County Council is required under Article 18 of the Town and Country Planning (Development Management Procedure) (England) Order 2015 (the Development Management Procedure Order) to provide consultation response on the surface water drainage provisions associated with major development.

2.2.3 Major development is defined within the Development Management Procedure Order as development that involves any one or more of the following:

(a) the winning and working of minerals or the use of land for mineral-working deposits;

(b) waste development;

(c) the provision of dwelling houses where:

(i) the number of dwelling houses to be provided is 10 or more; or

(ii) the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);

(d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or

(e) development carried out on a site having an area of 1 hectare or more.

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2.2.4 Input to the development management process by the LLFA is not restricted to major development applications. LLFA advice should be sought on other planning applications which raise surface water or other local flood risk issues; consultation can be on the basis of pre-arranged protocols (see also planning practice guidance paragraph: 045 reference ID: 7-045-20150323).

2.3 Sustainable Drainage in Planning

2.3.1 SuDS are designed to control surface water as close to its source as possible. They should also aim to closely mimic the natural, pre-development drainage across a site, wherever possible. Well-designed SuDS also provide opportunities to:

- reduce the causes and impacts of flooding;
- remove pollutants from urban run-off at source; and
- combine water management with green space yielding benefits for amenity, recreation and wildlife.

2.4 Drainage Strategies

2.4.1 Development has the potential to change surface water and groundwater flows, depending upon how the surface water is managed within the development proposal.

Planning applications for development should therefore be accompanied by a site-specific drainage strategy that demonstrates that the drainage scheme proposed is in compliance with West Sussex County Council's sustainable drainage policies, as outlined within this document.

The drainage strategy must also demonstrate that the proposed surface water management proposal is consistent and integrated with any other appropriate planning policy and flood risk management measures that are required.

2.5 Strategic Consultation

2.5.1 As the LLFA, West Sussex County Council has a consultation role in relation to the preparation of local plans, neighbourhood plans, strategic flood risk assessments and other planning instruments produced by Local Planning Authorities. West Sussex County Council will provide advice and guidance on local flood risks and appropriate policy for the plan area upon request.

2.5.2 Upon request, West Sussex County Council will provide information with respect to drainage and local flood risk for individuals and other organisations to utilise in preparation of planning documents.

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3 Planning policy and regulatory guidance for drainage

3.0 This section sets out the sources of planning policy relevant to the management of surface water. These will form the basis of West Sussex County Council's assessment of any submitted drainage strategy. The drainage strategy will need to demonstrate how the development meets these requirements.

3.1 National Planning Policy Framework (NPPF)

3.1.1 The National Planning Policy Framework (NPPF) was published on 27 March 2012; it sets out the Government planning policies for England and how these are expected to be applied. Planning law requires that applications for planning permission must be determined in accordance with the relevant Local Development Plan, following public consultation and with due regard to other material considerations. Flooding and drainage policy within the NPPF is a material consideration which states that planning authorities should:

- direct development away from areas at highest flood risk;
- take the impacts of climate change into account;
- use opportunities offered by new development to reduce the causes and impacts of flooding;
- ensure flood risk is not increased elsewhere;
- give priority to the use of sustainable drainage systems;
- enhance the natural and local environment; and,
- look to improve discharged water quality.

3.1.2 Paragraphs 155 to 165 of the NPPF have particular relevance to flooding and drainage.

3.1.3 The NPPF is supported by the Planning Practice Guidance[1] which provides further advice on how planning can take account of the risks associated with flooding in plan-making and the application process.

3.2 Watercourse Regulation

3.2.1 Under Section 23 of the Land Drainage Act, 1991 No person shall—

(a) erect any mill, dam, weir or other like obstruction to the flow of any ordinary watercourse or raise or otherwise alter any such obstruction; or

(b) erect any culvert that would be likely to affect the flow of any ordinary watercourse or alter any culvert in a manner that would be likely to affect any such flow,

[1] The Planning Practice Guidance is a web-based resources which can be accessed from the Planning Portal at: http://planningguidance.planningportal.gov.uk/?s=Drainage&post_type=guidance

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without obtaining the consent of the Internal Drainage Board (where one exists), the Environment Agency (if the watercourse is designated as a Main River) or the LLFA.

3.2.2 Where Section 23 of the Land Drainage Act 1991 applies to a development, grant of planning permission, in itself, does not allow construction to commence without grant of an Ordinary Watercourse Consent (OWC) or Environmental Permit (EP) where development affects Main Rivers.

3.2.3 For further details see: https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/

3.3 Non-statutory technical standards for sustainable drainage

3.3.1 To support the LLFA consultee role, Defra published the Non-Statutory Technical Standards for Sustainable Drainage Systems on 23 March 2015. These standards provide advice and guidance for the design, maintenance and operation of sustainable drainage systems[2].

3.3.2 Further guidance on the application of the Non-Statutory Technical Standards will be provided by Defra and associated stakeholders.

3.3.3 The policies in this policy statement are consistent with the Non-Statutory Technical Standards.

3.4 Local Authority Guidance

Local Planning Authorities are ultimately responsible for determining planning applications and have numerous statutory and non-statutory planning policy documents to support the delivery of sustainable development within their districts.

3.4.1 Local Plans

National planning policy places Local Plans at the heart of the planning system. Local Plans set out a vision and a framework for future development of the area. Local Plans should be based upon and reflect the presumption in favour of sustainable development. The Local Plans will address housing, the economy, community infrastructure and environmental issues such as adapting to climate change and ensuring high quality design.

[2] The Non-statutory Technical Standards are published at: https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards

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The management of flood risk and surface water can be dealt with through policies for sustainable construction, flood risk, open space, landscape character and green infrastructure. These policies may be supported by further Supplementary Planning Documents (SPD) or guidance notes.

Any drainage strategy should make reference to the relevant Local Plan policy and may also have to provide evidence which supports delivery of biodiversity, amenity and other benefits.

3.4.2 Strategic Flood Risk Assessments (SFRA)

Strategic Flood Risk Assessments are required to inform the development of Local Plans, as stated within the NPPF. A SFRA assesses the risk to an area from flooding from all sources, now and in the future, taking into account climate change and assesses the impact that land use changes and development in the area will have on flood risk. Each Local Planning Authority within West Sussex has prepared and referenced a SFRA within their planning documents. These documents provide key information on sources of flooding and may provide information for specific site allocations.

3.5 West Sussex County Council Guidance

The Local Flood Risk Management Strategy sets out how we as a LLFA will work alongside other risk management authorities to deliver improvements together to reduce flood risks. The strategy acknowledges that it is currently surface water flooding that causes the most regular impact to communities across West Sussex.

When considering surface water drainage within new developments in West Sussex, it is recommended that reference is made to:

3.5.1 Water. People. Places a guide for master planning sustainable drainage into developments

available at:
https://www.westsussex.gov.uk/media/2270/suds_design_guidance.pdf

This guidance outlines the process for integrating sustainable drainage systems into the master planning of large and small developments. This guidance should be used as part of the initial planning and design process for all types of development.

3.5.2 The Updated Flood Map for Surface Water & Long term flood risk information

available at: https://www.gov.uk/government/publications/flood-maps-for-surface-water-how-they-were-produced

Long term flood risk information is provided via the following link;

https://flood-warning-information.service.gov.uk/long-term-flood-risk

3.5.3 Surface Water Management Plans

Surface water management plans outline how surface water will be managed in a given area that experiences flooding from surface water runoff. Existing plans can be viewed via the following link: https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/flood-reports-projects-and-policies/

Any drainage strategy should incorporate data from the updated Flood Map for Surface Water and if the site falls within an area covered by a SWMP the drainage strategy should include consideration of any relevant findings and recommendations.

3.5.4 **Culvert Policy**

West Sussex Local Authorities are in general opposed to the culverting of watercourses because of the adverse effect on flood defence and ecology. Approval, therefore, will only be granted for an application to culvert an ordinary watercourse if there is no reasonably practicable alternative or if the detrimental effects of culverting would be so minor that they would not justify a more costly alternative. The West Sussex Culvert Policy can viewed here:

3.5.5 **Land Drainage & Consenting Enforcement Policies**

WSCC LLFA's Land Drainage & Consenting Enforcement Policies are currently awaiting final approval. The guiding principle of these policies is to inform and educate landowners, developers, farmers, and other businesses to facilitate a greater level of compliance. WSCC LLFA recognises that a collaborative approach to prevention is better than cure. However, it will take action where it is suspected that an offence has occurred or is reasonably foreseeable. This may range from providing advice and guidance; serving notices; through to prosecution for failure to comply with notices; or any combination that achieves the desired outcome. In order to improve land drainage and seek 'betterment', WSCC LLFA will use its powers of enforcement under the Flood & Water Management Act and LDA91 to require a watercourse to be cleared if matters cannot be resolved by the provision of advice and guidance.

3.6 Other Guidance

In approaching or reviewing design, technical aspects may need further clarification and detailed specification in order to satisfy the LLFA that the design meets the required standard.

West Sussex LLFA will make reference to good practice presented within the following documents, and would recommend that any designer also refers to:

3.6.1 CIRIA SuDS Manual (C753), 2015

This guidance document provides comprehensive information on all aspects of the life cycle of sustainable drainage from initial planning, design through to construction and future management including landscaping, waste management and costs. It reinforces the multi-functional nature of SuDS in meeting a range of policy goals within different regulatory areas: planning; flood risk management; water quality management; and water resource management. This interrelationship between SuDS and key regulatory frameworks is further depicted in Figure 1 below.

3.6.2 BS 8585:2013 Code of practice for surface water management for development sites

The British Standard gives recommendation on the planning, design, construction and maintenance of surface water management systems for new development and redevelopment sites. It gives recommendations for minimizing and/or mitigating flooding and maximizing the social and environmental benefits of development.

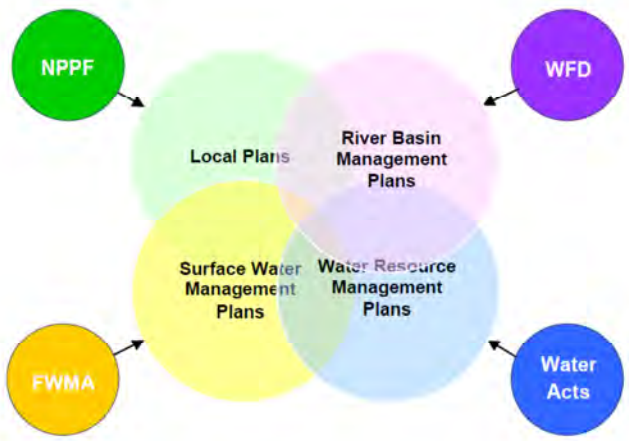

Figure 1: Inter-relationships between different areas of water policy (Planning Advice for Integrated Water Management, Cambridge Natural Capital Leaders Platform, 2014).

3.6.3 Building Research Establishment, Soakaway Design – Digest 365 (BRE DG 365 (2016))

Infiltration rates for soakage structures are to be based on percolation tests undertaken in the winter period at the location and depth of the

proposed structures. The percolation tests must be carried out in accordance with DG 365 (or similar approved method) and the test pits should be above an agreed maximum annual groundwater level based upon best available data.

3.7 Wider Duties as a Public Body under other Environmental Regulatory Mechanisms

West Sussex LLFA as a public body has a duty under other regulatory mechanisms to raise environmental issues with the Local Planning Authority.

3.7.1 Water Framework Directive (WFD)

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI 3242) (WFD) became UK law in December 2003. The aim of the WFD is to provide the opportunity to plan and deliver a better water environment, focusing on ecology. The WFD aimed for the water environment to reach good chemical and ecological status in inland and coastal waters by 2015. Planning and improvement programmes are continuing in six year cycles until 2027.

3.7.2 The WFD drives water quality improvement planning along total river catchment areas, through the production of River Basin Management Plans by the Environment Agency. The directive puts a duty on public bodies to have regard to River Basin Management Plans (and associated supplementary plans) when exercising their functions where it may affect a river basin catchment.

3.7.3 Controlling water is inherent in the WFD's objectives as uncontrolled surface flow or flooding can cause unmanageable quality problems. Sustainable drainage principles are a major contributor in meeting the objectives of the WFD in its continuing cycles.

3.7.4 The Conservation of Habitats and Species Regulations 2010

The Conservation of Habitats and Species Regulations 2010 transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law consolidating all amendments made to the earlier 1994 regulations.

3.7.5 Under section 9(5) of the above regulations, a LLFA, in exercising any of their functions, must have regard to the requirements of the Habitats Directive so far as they may be affected by the exercise of those functions.

3.7.6 The Countryside and Rights of Way Act 2000

This act (section 74) places a duty on duty on public authorities to have regard for the conservation of biodiversity[3] and on government departments to maintain lists of species and habitats for which conservation steps should be taken or promoted, in accordance with the Convention on Biological Diversity.

[3] Amended by section 40,41 and 42 of the Natural Environment and Rural Communities (NERC) Act, 2006.

4 Drainage Consultation

4.1 Introduction

A drainage strategy should be submitted to the relevant Local Planning Authority along with the planning application for any development.

4.1.1 It is important that the consultation reflects the level of risk. Consequently consultation may also occur for development, other than major development in areas of local flood risk, as described in Section 4.2 and Section 7.

4.1.2 Irrespective of whether or not formal consultation is required, all Developers are encouraged to consider the policies outlined in this document with respect to their site drainage design.

4.1.3 Consultation on flood risk will also occur with other risk management authorities. For example, the management of tidal and fluvial flood risk and the prevention of inappropriate development in the flood-plain remains the responsibility of the Environment Agency. The Environment Agency is also responsible for the management of permitting regulations which may affect discharge to water bodies or the ground. Similarly, if any drainage scheme requires connection to a public sewer, approval will be required from the appropriate sewerage undertaker.

4.2 Critical Drainage Areas and Areas of High Local Flood Risk

The Town and Country Planning (General Development Procedure Amendment No. 2, England) Order 2006 introduces the concept of Critical Drainage Areas as *an area within Flood Zone 1 which has critical drainage problems and which has been notified [to] the local planning authority by the Environment Agency*.

4.2.1 West Sussex LLFA will work with the Local Planning Authorities to identify Areas of High Local Flood Risk for their districts. These areas will be based upon the Surface Water Management Plans that it has developed in partnership with other risk management authorities and on the Surface Water Flood Maps (see paragraphs 3.5.2 and 3.5.3). Where these areas are identified, all planning applications with potential surface water management implications will need to be submitted with a more rigorous justification of the chosen drainage system and an assessment of its associated impact.

Any drainage strategy submitted to accompany a planning application for major development should make full reference to the Surface Water Flood Map and the most recent available Surface Water Management plan for the area in which the development is planned.

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4.3 Ordinary Watercourses

An 'ordinary watercourse' is defined as any channel capable of conveying water that is not part of a 'main river'; it may not have a permanent water level. Small rivers, streams, ditches, drains, cuts, culverts, dikes, sluices, sewers (other than public sewers within the meaning of the Water Industry Act 1991) can all be classified 'ordinary watercourses'

When considering the development/redevelopment of any site, existing ordinary watercourses should be identified and accommodated within any drainage strategy design. Culverting (piping) a watercourse is not advised unless there is no alternative. The resulting reduction in storage volume, flow capacity and habitat potential would be unacceptable.

Access to facilitate future maintenance of drainage infrastructure and ordinary watercourses must be incorporated in the drainage strategy irrespective of whether the watercourses are culverted or not.

4.3.1 Existing watercourses should preferably be retained as open features within a designated corridor, and ideally as public open space. It is recommended that any discharge to an ordinary watercourse or any modification to an ordinary watercourse be identified and agreed in principle with West Sussex LLFA prior to submission of any planning application. The ability of a watercourse to convey water (and to function as an effective exceedance flow route, where appropriate) will always need to be maintained.

4.3.2 For ordinary watercourses, Ordinary Watercourse Consent (Land Drainage Consent) must be sought from the LLFA (West Sussex County Council) or its agent, prior to starting any works (temporary or permanent) that affect the flow of water in the watercourse. Such works may include culverting, channel diversion, the construction of new surface water outfalls and the installation of trash screens. If the watercourse affected is a main river, this would require an Environmental Permit under the Environmental Permitting Regulations and guidance should be sought from the Environment Agency in the first instance.

4.4 Consultation on Planning Applications

4.4.1 Overview

Consultation with West Sussex LLFA will occur through the planning process. West Sussex LLFA will be notified of the submission of a major planning application by the Local Planning Authorities within West Sussex. A substantive response to the LPA is legally required from West Sussex LLFA within 21 days of consultation.

4.4.2 Pre Application Advice

Incorporating appropriate drainage is easier and more sustainable if it is planned and designed from the start of a development. Pre-application advice on drainage is strongly encouraged by the LLFA and should normally be arranged with the District / Borough Drainage Engineer via the Local Planning Authority. If an application is submitted which does not comply with the Non-Statutory Technical Standards , NPPF, and / or this policy West Sussex LLFA may object to the application. Pre-application discussions are advocated to avoid this situation. The SuDS Manual, in particular Table B1, provides further guidance for the content of pre-application discussions.

4.4.3 Planning Application Submission

Major applications and other development applications in areas at risk from flooding will, once validated by the Local Planning Authority, be referred for technical review to the District / Borough Drainage Engineer who will identify site specific land use considerations that affect surface water management. West Sussex LLFA will also be reviewing these applications for compliance with this policy statement, considering the implications of flood risk and any Surface Water Management Plan that may apply; and will consider adherence to wider environmental principles of the NPPF that may have a bearing on drainage design (for example, water quality, biodiversity and landscape). Consultation responses from both the District / Borough Engineer and the LLFA will be returned via the Local Planning Authority within the required 21 days following receipt of a suitably detailed submission. Consultation responses may result in a request for further information or for planning conditions for subsequent determination.

4.5 Drainage Strategy Development

The drainage strategy will need to incorporate the policies set out in Section 5.

4.5.1 The required scope for a Drainage Strategy is set out in Table 1 below. Amplifying detailed notes follow Table 2 so a developer is left in no doubt as to the requirements.

Scope for Drainage Strategy	**Relevant sections of document**
Drainage Catchment & Impermeable area (pre- and post-development)	5.2.1; 5.6.4; 5.3.1
Discharge location(s)	5.2.1; 5.2.5
Infiltration capacity	5.2.2-5.2.3
Design calculations for peak flow, volume control and greenfield runoff, and/or brownfield runoff where appropriate	5.3
Inclusion of climate change & future development allowances	5.2.2; 5.3.2; 5.3.4; 5.3.6; Policy 5; 5.6.1
Topographical survey of the site	5.3.1; 5.4.1
Details of any adjacent watercourse	5.3.1;5.4.1
Areas of flood risk	4.2; 5.5
Quantification of any surface water flows on-site from off-site locations	5.3
Exceedance routes	5.3.4; Policy 2
Offsite works	5.3.1; 5.5.2
Consents	3.2; 4.3
Any constraints which affect the proposed development	5.3.8; 6.1
Locations of sensitive receptors, including source protection zones, habitat designations or archaeological features	6.1.7
Principles of temporary drainage during construction	6.1.2
Proposed extent of adoption strategy	5.7.6
A Strategic Surface Water Management Strategy for large sites for which the development is to be phased.	5.3.9
Correspondence from any receiving authority or permitting authority	Section 4; 5.2.5

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4.5.2 Proportionality in compiling a drainage strategy

The drainage strategy needs to follow the above guidance but should be proportionate to the size of the development. A residential development of several houses will be expected to provide appropriate modelled run-off and detailed drawings for how run-off is being attenuated; for a small home-owner extension, architect's drawings annotated with proposed drainage arrangements may suffice.

5 Policies for Sustainable Drainage

5.1 Introduction

5.1.1 West Sussex LLFA has adopted the policies summarised in Table 5.1 to conform to statutory policy and best practice. Policies 1 to 6 set out the requirements for a drainage strategy to be compliant with the NPPF and Non-Statutory Technical Standards for Sustainable Drainage. Policies 7 to 10 set out expectations to be considered within a drainage strategy in response to environmental legislation and guidance that West Sussex County Council and the Local Planning Authorities have a duty to comply with.

5.1.2 All the policies reflect the requirements of the Local Flood Risk Management Strategy, Surface Water Management Plans and Local Planning Authority Local Plans. Sufficient information must be submitted to demonstrate compliance.

Table 5.1: West Sussex LLFA SuDS Policies

Policy	Summary
SuDS Policy 1	Follow the drainage hierarchy
SuDS Policy 2	Manage Flood Risk Through Design
SuDS Policy 3	Mimic Natural Flows and Drainage Flow Paths
SuDS Policy 4	Seek to Reduce Existing Flood Risk
SuDS Policy 5	Maximise Resilience
SuDS Policy 6	Design to be Maintainable
SuDS Policy 7	Safeguard Water Quality
SuDS Policy 8	Design for Amenity and Multi-Functionality
SuDS Policy 9	Enhance Biodiversity
SuDS Policy 10	Link to Wider Landscape Objectives

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SuDS Policy 1: Follow the drainage hierarchy

1. **Surface runoff not collected for use must be discharged according to the following discharge hierarchy:**
   - **to ground,**
   - **to a surface water body,**
   - **to a surface water sewer, highway drain, or another drainage system, or**
   - **to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewerage undertaker.**
2. **The selection of a discharge point should be clearly demonstrated and evidenced.**

5.2 SuDS Policy 1: Discharge Hierarchy

5.2.1 When development occurs, the urbanisation process within a catchment affects the natural hydrology; if the destination of the water is altered this may result in:

- a reduced supply of rainfall to groundwater;
- an accelerated passage of flow to the receiving watercourses; and
- water directed away from existing receiving catchments.

In order to maintain the natural balance of the water cycle, the above discharge hierarchy[4] must be observed. Where development results in changes in runoff destinations, the design must account for how the surface flows are managed and demonstrate it does not exacerbate off-site flood risk.

5.2.2 Infiltration structures (to ground) include soakaways, basins, swales and permeable paving. Infiltration rates for soakage structures are to be based on percolation tests undertaken in the winter period at the location and depth of the proposed structures. The percolation tests must be carried out in accordance with BRE DG 365, CIRIA R156 or a similar approved method, and cater for the 1 in 10 year design storm event[5] between the invert of the lowest entry pipe into the infiltration structure and the base. Tests should be undertaken during winter / early spring when ground water levels are typically highest; if groundwater levels are influenced by the tide then tests should be undertaken over a high-water spring tide.

[4] SuDS selection hierarchy based on: CIRIA C753 - The SuDS Manual; BS8582:2013 – Code of Practice for Surface Water Management for Development Sites; and Approved Document H of the Building Regulations.

[5] The design event will vary according to the storage design and the contribution the storage component makes to the overall SuDS for the site; as a minimum for traditional soakaways the design event will be for a 1:10 year event plus allowance for climate change.

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For the purpose of design, the percolation rate must be applied to the sides of the infiltration structure only and the rate for the base must be zero, unless otherwise agreed with the LPA engineer. This does not apply to infiltration basins or permeable pavements, whereby the percolation rate is applied to the base only. The infiltration structure should drain 50% of its total volume in 24 hours or less for the 1 in 10 year event and for the 1 in 100 year event (unless otherwise agreed with the LPA engineer) in order to provide spare capacity for subsequent storms. Flood risk assessments: climate change allowances can be viewed via the following link: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

5.2.3 Any infiltration drainage design must include adequate winter groundwater monitoring data in areas of known groundwater issues, to determine the highest winter groundwater table. Residential developments in excess of five properties will require ground water monitoring to be carried out between October and March inclusive. The extent of monitoring required for smaller developments will be subject to agreement with the District or Borough Council Engineers. Adequate freeboard must be provided between the base of the soakaway structure and the highest recorded groundwater level identified in that location; ideally this should be 1m where possible.

5.2.4 Deep bore soakaways should only be considered after other forms of infiltration attenuation have been explored and in all cases, the applicant will be required to consult the EA hydrogeologist before their inclusion in a drainage strategy.

5.2.5 Infiltration is not always appropriate, and the advice of the drainage engineer should be sought: for developments in or close to source protection zones (SPZs); in areas with a known history of land contamination; or in areas with known high seasonal groundwater levels.

5.2.6 Surface water must not be discharged into the foul sewer system. Discharge to a watercourse or surface water sewer must be restricted to the estimated mean greenfield runoff rate (Q1) by means of a controlled outflow (but see paragraph 5.4.4 regarding restrictions on runoff rates for brownfield sites). Flood Estimation Handbook (FEH) methods should be the preferred approach for developing runoff estimates used in surface water design[6]. There is also a tool available on www.ukSuDS.com that allows calculation of Q1 by both FEH and IH124. Both the point of connection and discharge rate must be agreed with the relevant owner or

[6] SuDS Manual paragraph 24.3.

responsible body including internal drainage boards, highway authorities, sewerage undertakers, riparian owner, Environment Agency, Canals and River Trust and others (see also paragraph 4.3 Ordinary Watercourses).

SuDS Policy 2: Manage Flood Risk Through Design

1. **The drainage scheme proposed is to:**
    a. **protect people and property on the development site from flooding; and,**
    b. **avoid creating any additional flood risk outside of the development in any part of the catchment, either upstream or downstream.**
2. **Any drainage scheme must manage all sources of surface water, including exceedance flows and surface flows from offsite, provide for emergency ingress and egress and ensure adequate connectivity.**
3. **For large sites where development is to be phased, there will need to be a strategic site surface water management system that allows different parts of the site to be developed at different times while ensuring that each of the design criteria can be met.**

5.3 SuDS Policy 2: Manage Flood Risk through Design

5.3.1 The natural drainage catchment for the site needs to be mapped including the water that drains down into / through the site from outside the site boundary. The pre and post development drainage is to be based upon the whole catchment demonstrating how off-site drainage is being managed within the proposed strategy.

5.3.2 The drainage system must be designed to operate without any flooding occurring during any rainfall event up to (and including) the critical 1 in 30 year storm (3.33% AEP). The system must also be able to accommodate the rainfall generated by events of varying durations and intensities up to (and including) the critical, climate change adjusted 1 in 100 year storm (1% AEP) without any on-site property flooding and without exacerbating the off-site flood-risk. Sufficient steps are to be taken to ensure that any surface flows between the 1 in 30 and 1 in 100 year events are retained on site. Storage should be based upon analyses of a range of winter and summer storm profiles to determine a critical storm event.

5.3.3 The LLFA will wish to review the input values and calculations for storage design and the greenfield run-off rates upon which they are based. Where computer models have been used to underpin design, the drainage strategy should be accompanied by the full results and design criteria.

Where calculations involve use of the **Coefficient for Volumetric Run-off** (**Cv**) Sewers for Adoption (7th Edition) recommends that a Cv of 1.0 should be used whenever calculating runoff from impermeable surfaces (roofs and paved areas should have an impermeability of 100%). When making an application the designer should demonstrate to the LLFA that Cv has been suitably determined.

5.3.4 The choice of where storage volumes are accommodated may be within the drainage system itself or within other areas designated within the site for conveyance and storage.

5.3.5 The drainage design should show flow routes through the proposed development, demonstrating where surface water will be conveyed for three types of flow:

1. Low flow routes

Regular flow from source control features such as permeable pavements should travel in low flow channels through the development in a controlled way contributing to landscape quality.

2. Overflows

In the event of local blockages or surcharge a simple overflow arrangement should allow water to bypass the obstruction and return to the main SuDS drainage system when conditions return to normal.

3. Exceedance routes

Should SuDS be overwhelmed by exceptional rainfall (1:100 + allowance for climate change) then exceedance routes are required to protect people and property. These provide unobstructed overland flow routes from the development and should be considered for all drainage schemes. Exceedance routes should also be protected from future changes in land use.

5.3.6 The primary consideration shall be risks to people and property on and off site.

5.3.7 Wholesale land raising should not be undertaken, for example, by the spreading of excavated material on site or the importation of additional fill. Such action increases the possibility of changing natural flows and increasing flood risk beyond the development area.

5.3.8 Access should be maintained into and through the site for emergency vehicles. The drainage application must give consideration to flood risk vulnerability classifications (as defined through Planning Practice Guidance to the NPPF), as specific measures or protections may be necessary and need to be agreed with the appropriate authority.

5.3.9 The time required for the storage to accept further storm flows should be considered, especially if downstream flood levels can affect the outfall. Attenuation storage volume provided by any drainage area should half empty within 24 hours so that it can receive runoff from subsequent storms. If the drain down time (full to empty) is more than 24 hours, then long duration events should be assessed to ensure that drainage is not compromised by inundation.

5.3.10 If the proposed system connects to an existing drainage system, whether it is a sewer, highway drain, water body or sustainable drainage system, consideration must be given to the operational capacity and functionality of the existing system to ensure that no adverse impacts result or flood risk is increased either on-site or off-site.

5.3.11 For large sites involving phased development, the strategic surface water management system will need to be designed to manage the flows from the final developed site, and specific conditions will need to be set for each development plot so that the original design assumptions are not invalidated[7].

SuDS Policy 3: Mimic Natural Flows and Drainage Flow Paths

1. **Drainage schemes should be designed to match greenfield discharge rates and follow natural drainage routes as far as possible; pumps should therefore not form part of drainage schemes.**
2. **Greenfield runoff should be calculated from FEH or a similar approved method. SAAR and any other rainfall data used in run-off storage calculations should be based upon FEH rainfall values.**

5.4 SuDS Policy 3: Mimic Natural Flows and Drainage Flow Paths

5.4.1 Runoff rates should match Greenfield runoff rates, follow natural or existing drainage routes, utilise existing natural low-lying areas or conveyance pathways, and match infiltration rates and discharges as far as possible for all events up to and including the climate-change adjusted 1 in 100 year (1% AEP) design event.

[7] For further details on this subject, see chapter 7 of the SuDS manual.

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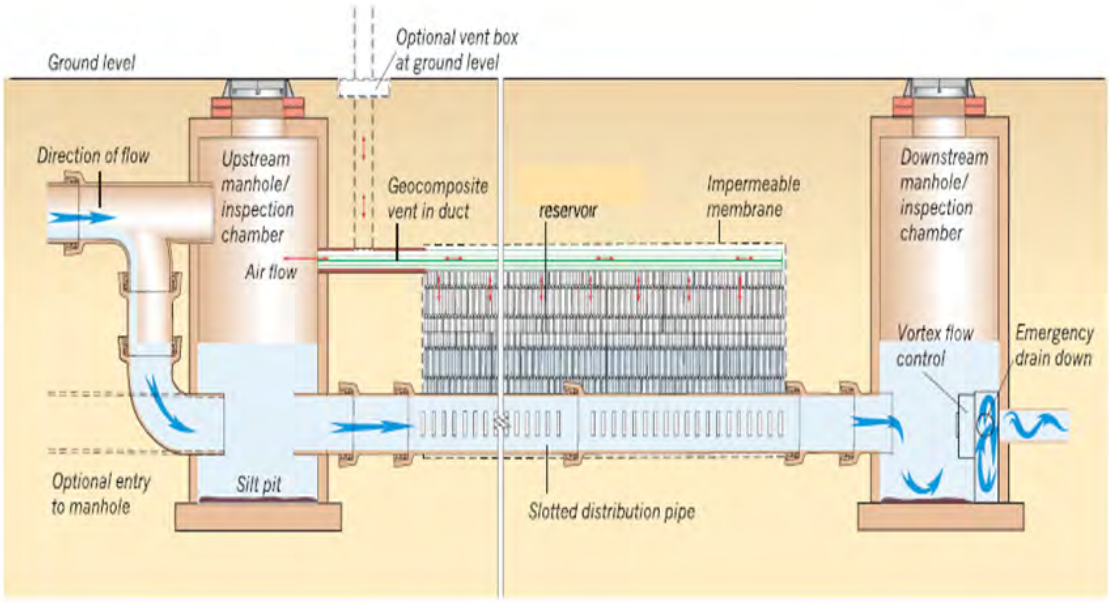
5.4.2 By mimicking the natural drainage flow paths and working within the landscape, more effective and cost-efficient design can be developed and drainage systems can be kept shallower.

5.4.3 Working with existing natural gradients also avoids any reliance on pumped drainage, with its associated energy use and failure risk. The natural environment including woods, trees and hedgerows can play a part in water management.

5.4.4 Redevelopment on brownfield land has the potential to rectify or reduce flood risk. In all cases, including on brownfield sites, runoff should where possible be restricted to the greenfield 1 in 1 year runoff rate during all events up to and including the 1 in 100 year rainfall event with climate change. An alternative approach would be for discharge rates to be limited to a range of greenfield rates, based on the 1 in 1, 1 in 30 and 1 in 100 year storm events. However, the use of this method to restrict discharge rates requires the inclusion of on-line long-term storage, sized to take account of the increased post development volumes, discharging at no greater than 2l/s/ha. While discharging at no greater than 2 l/s/ha is acceptable, it is still the LLFA's preference that the former approach is used wherever possible. If it is deemed that this is not achievable, evidence must be provided and developers should still seek to achieve no increase in runoff from greenfield sites and a 50% betterment of existing run off rates on brownfield sites (provided this does not result in a runoff rate less than greenfield). For further guidance see Susdrain Fact sheet on Designing attenuation storage for redeveloped sites: http://www.susdrain.org/files/resources/fact_sheets/01_15_fact_sheet_attenuation_for_redeveloped.pdf

5.4.5 Storage, where space permits, should be on or as close to the surface as possible. Where cellular storage is opted for then the system should be designed in such a way as to minimise the risk of siltation e.g. by incorporating silt traps and to be filled via a distribution pipe to stop silt entering the units or by incorporating the storage tank off line whereby it only fills when the system surcharges. The cellular units should be manufactured from a recycled material such as PVC.

Long Section



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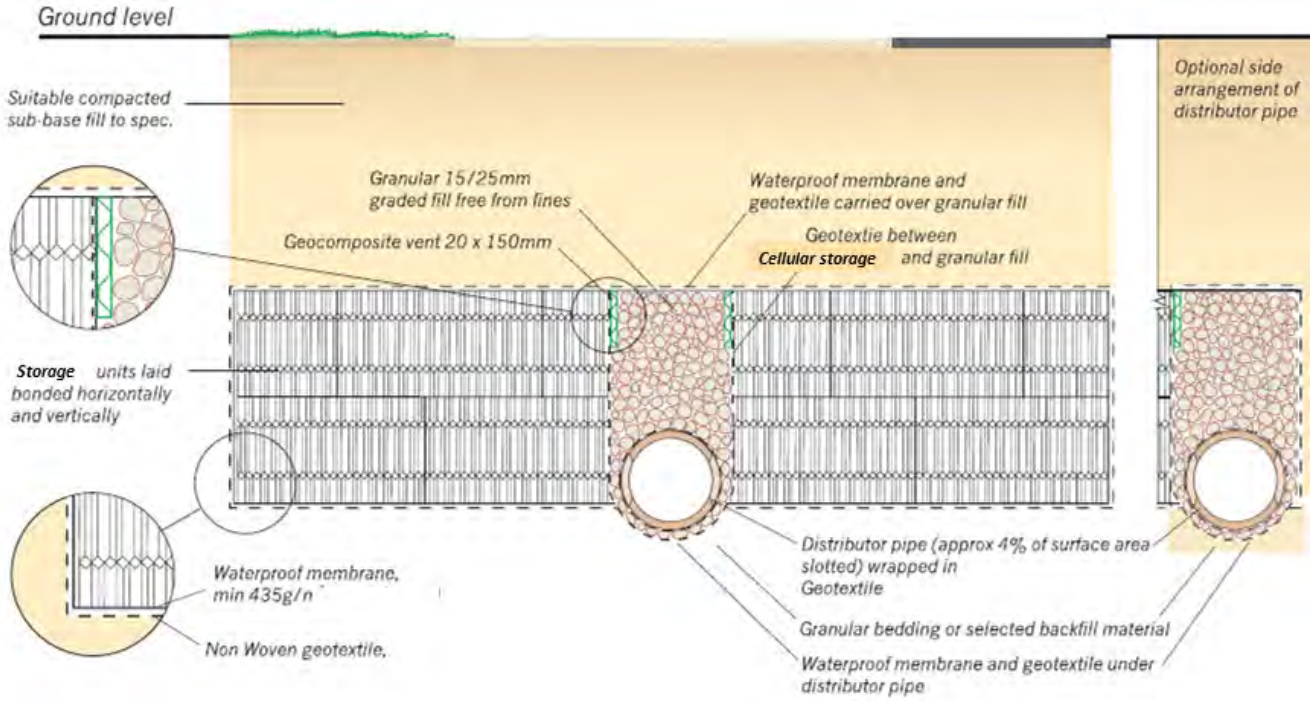

Figure 5.1 Consumer Recycled PVC Storage System minimising risk of siltation.

SuDS Policy 4: Seek to Reduce Existing Flood Risk

1. **New development should be designed to take full account of any existing flood risk, irrespective of the source of flooding.**
2. **Where a site or its immediate surroundings have been identified to be at flood risk, all opportunities to reduce the identified risk should be investigated at an early stage and subsequently incorporated at the detailed design stage.**

5.5 SuDS Policy 4: Seek to Reduce Existing Flood Risk

5.5.1 Paragraph 157 of the NPPF outlines how flood risk management bodies should seek to manage flood risk through using opportunities offered by new development to reduce the causes and impacts of flooding, taking the predicted effects of climate change into account.

5.5.2 As LLFA, West Sussex County Council will endeavour to ensure that this principle is applied across the County. Where a developer's Surface Water Management Strategy has identified that there are existing flood risks affecting a site or its surroundings, there would be an expectation that the developer manages the identified risk appropriately to ensure that there are no on-/off -site impacts as a result of any development. Similarly, where there are opportunities to reduce the off-site flood risk through carefully considered on-site (or off-site) surface water management, the LLFA will encourage developers to explore these fully.

SuDS Policy 5: Maximise Resilience

1. **The design of the drainage system must account for the likely impacts of climate change and changes in impermeable area over the design life of the development. Appropriate allowances should be applied in each case.**
2. **A sustainable drainage approach which considers control of surface runoff at the surface and at source is preferred and should be explored prior to other design solutions.**
3. **Culverting an existing watercourse should only be considered if there is no feasible alternative.**

5.6 SuDS Policy 5: Maximise Resilience

5.6.1 The Environment Agency published updated Flood risk assessments: climate change allowances in February 2016. Further advice on the interpretation of these allowances is available via the following link:

Flood risk assessments: climate change allowances
https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

5.6.2 Design of drainage systems utilising a sustainable drainage design and reducing reliance on below ground systems such as pipes and tanks, provides greater flexibility to accommodate changes in surface water peak flows and volumes. Sustainable measures that control flow rates near to the source and maximise natural losses through infiltration and evaporation are preferred. Surface systems are preferred as their function can be more easily observed and maintenance is generally easier. If underground storage tanks are used, they should have easily accessible surface inspection points to allow maintenance checks / silt removal (see also Section 5.4.5).

5.6.3 Culverting (piping) a watercourse is not advised unless it is for access purposes or there is no reasonable alternative; the resulting reduction in storage volume, flow capacity, habitat potential and ease of access for maintenance is likely to be unacceptable (see also Section 3.5.4).

5.6.4 Development results in the conversion of permeable surfaces to impermeable over time (e.g. surfacing of front gardens to provide additional parking spaces, extensions to existing buildings, creation of large patio areas). The consideration of urban creep should be assessed on a site by site basis but is limited to residential development only. The allowances set out in Table 5.2 must be applied to the impermeable area within the property curtilage according to the proposed development density.

Table 5.2: Impermeable Area Allowances for Urban Creep

Residential development density (Dwellings per hectare)	Change allowance (% of impermeable area)
≤25	10
30	8
35	6
45	4
≥50	2
Flats & Apartments	0

SuDS Policy 6: Design to be Maintainable

1. **No building is to be occupied until a Verification Report pertaining to the surface water drainage system, carried out by a Chartered Engineer, has been submitted to the Local Planning Authority which demonstrates the suitable operation of the drainage system such that flood risk is appropriately managed, as approved by the Lead Local Flood Authority. The Report shall contain information and evidence (including photographs) of earthworks; details and locations of inlets, outlets and control structures; extent of planting; details of materials utilised in construction including subsoil, topsoil, aggregate and membrane liners; full as built drawings; and topographical survey of 'as constructed' features..**
2. **The Verification Report should also include an indication of the adopting or maintaining authority or organisation and may require inclusion within a register of drainage features.**

5.7 SuDS Policy 6: Design to be Maintainable

5.7.1 The drainage system must be designed to take account of the construction, operation and maintenance requirements of both surface and subsurface components, allowing for any personnel, vehicle or machinery access required to undertake this work. Standard 10 of the Defra Non-Statutory Technical Standards states: *S10 Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.*
Ditches and watercourses (including culverts) should retain as a minimum a three and a half metre[8] easement with access that allows for its future maintenance by people / equipment in perpetuity. Without maintenance, the function of drainage systems may alter. Increased leaf litter, sediments and colonisation of vegetation may clog drainage measures or impact the characteristics of operational controls. Consideration should also be given to the Construction Design and Management regulations for health and safety purposes.

5.7.2 Design considerations will need to address the practicalities and funding arrangements for lifetime maintenance, identifying the body responsible and ensuring that financial mechanisms are in place such as bonded maintenance arrangements via S106 agreements and planning conditions. The Verification Report shall include details of the financial management and arrangements for the replacement of components at the end of the manufacturers recommended design life.

[8] Paragraph 23.12 of the SuDS Manual (2015).

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5.7.3 Wherever possible, it is preferable that drainage schemes should be designed at the surface to allow easy inspection and maintenance. Drainage maintenance can usually be incorporated as part of a typical landscape maintenance specification.

5.7.4 With surface water drainage systems, a careful balance must be struck between functionality and the creation of habitats. The encouragement of certain protected species or creation of protected habitats may conflict with the regular maintenance works essential to ensuring long term functionality of the drainage measures. An awareness of any biodiversity objectives should be considered as part of a Management & Maintenance Plan for the drainage measures; specifically timing of vegetation cuts and silt removal to ensure no conflict with nesting or specific life stages of biota.

5.7.5 The Verification Report to be provided should indicate schedules and times of activities, as well as critical controls or components of the drainage scheme. This plan should include an indication of the roles and responsibilities for each authority or organisation which may have a responsibility for maintenance activities. Any interconnectivity with or reliance upon other drainage systems should be indicated. Where automatic systems form part of the operational functionality of a drainage system, then processes should be in place to allow immediate action in terms of restoration of performance.

5.7.6 As LLFA, West Sussex County Council has a duty to maintain a register of structures or features which are likely to have a significant effect on flood risk. SuDS features where they have a significant effect on flood risk would be designated under Section 21 of the Flood and Water Management Act 2010. Drainage schemes within new developments may include structures or features that will be required to be included within the register.

6 Environmental Policies

The policies in this section provide local interpretation of the environmental legislation and guidance that West Sussex County Council and the Local Planning Authorities have a duty to comply with, including the regulations referred to in Section 3.7 of this document.

SuDS Policy 7: Safeguard Water Quality

1. **When designing a surface water management scheme, full consideration should be given to the system's capacity to remove pollutants and to the cleanliness of the water being discharged from the site, irrespective of the receiving system.**
2. **Interception of small rainfall events should be incorporated into the design of the drainage system.**

6.1 SuDS Policy 7: Safeguard Water Quality

6.1.1 Paragraph 170 of the NPPF states that the planning system should contribute to/enhance the natural and local environment by preventing both new and existing development from contributing to (or being put at unacceptable risk from) unacceptable levels of soil, air, water or noise pollution or land instability. The Water Framework Directive Regulations (see paragraph 3.7.1) is the principle statutory instrument that applies.

6.1.2 The design of any drainage proposal should therefore ensure that surface water discharges do not adversely impact the water quality of receiving water bodies, both during construction and when operational. Sustainable drainage design principles have the potential to reduce the risk of pollution, particularly through managing the surface water runoff close to the source and on the surface. Below ground pipes and tanks which are efficient for drainage purposes may not provide appropriate water quality treatment.

6.1.3 Runoff from small rainfall events can pose a particular problem for water quality. The 'first flush' of runoff contains the initial flush of pollutants that has built-up on surfaces during the preceding dry period. It is, therefore, possible to get a high initial pollution concentration for relatively small rainfall events.

6.1.4 Rainfall events that are less than or equal to 5mm in depth also comprise more than half of the rainfall events across the UK. The volume of runoff from these small events therefore can cumulatively contribute significantly to total pollutant loadings from a site over a specified period of time. Interception of an initial rainfall depth of 5 mm would mimic greenfield response characteristics in that small rainfall events do not generally produce any run-off.

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6.1.5 West Sussex LLFA expects developers to demonstrate that the first 5 mm of any rainfall event can be accommodated and disposed of on-site, rather than being discharged to any receiving watercourse or surface water sewer. This can frequently be achieved through the inclusion of sustainable drainage measures such as infiltration systems, rain gardens, bioretention systems, swales, and permeable pavement.

6.1.6 Where it proves exceptionally difficult to achieve this principle, it must be demonstrated that any water leaving the site has been appropriately treated to remove potential pollutants.

6.1.7 When discharging to the ground, ground conditions and locations of any source protection zones should be confirmed.

SuDS Policy 8: Design for Amenity and Multi-Functionality

Drainage design should from the outset consider opportunities for inclusion of amenity and biodiversity objectives and thus provide multi-functional use of open space with appropriate design for drainage measures within the public realm.

6.2 SuDS Policy 8: Design for Amenity and Multi-functionality

6.2.1 Multi-functional use of land constitutes best practice and is underpinned by paragraph 10.1.1 of The SuDS Manual (2015):

The challenge for designers and planners is to create integrated urban spaces that include SuDS in creative and innovative ways, taking into consideration their potential contribution to a range of functions such as flood risk management, water supply, green infrastructure, habitat provision, transport corridors, climate proofing, community identity, recreation and tourism.

6.2.2 Applications of this policy include:

- the use of park areas as temporary flood storage during heavy rainfall events;
- wetlands being used to deliver amenity value and habitat as well as water treatment;
- use of permeable paving, rain gardens and tree pits to improve the design quality of the public realm, while improving permeability.

6.2.3 SuDS should form an integral component of networks of high quality open space which adapt for attenuation of surface water, sports and play and enhancement of biodiversity. A range of other considerations apply to creation of wetland areas / features which can generally be addressed through careful design. Refer to the SuDS Manual for detailed guidance.

SuDS Policy 9: Enhance Biodiversity

Drainage design should from the outset consider opportunities for biodiversity enhancement, through optimising the scope for surface systems, consideration of connectivity to adjacent water bodies or natural habitats, and appropriate planting specification.

6.3 SuDS Policy 9: Enhance Biodiversity

6.3.1 All public authorities have a duty to conserve biodiversity under the Countryside and Rights of Way Act (CROW) 2000 (see paragraph 3.7.4 of this document). The NPPF requires that Local Planning Authorities set out a strategic approach to plan positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure (NPPF para 171). Maximising the ecological value of drainage systems is consistent with national and local policies which aim to conserve and enhance biodiversity.

6.3.2 Drainage Strategies should draw upon best practice guidance clearly signposted in chapter 6 of The SuDS Manual.

SuDS Policy 10: Link to Wider Landscape Objectives

Drainage design should from the outset consider opportunities to contribute to the wider landscape and ensure proposals are coherent with the surrounding landscape character area.

6.4 SuDS Policy 10: Link to Wider Landscape Objectives

6.4.1 The landscape character of West Sussex is defined by its topography, flora and fauna, land use and cultural associations. The West Sussex Landscape Strategy, 2005 aims to protect and enhance the landscape of West Sussex as an asset for future generations. Integral to this is ensuring that new development is well designed and fits sympathetically with the differing character of localities and ensures that natural and historic landscape features are conserved and enhanced.

6.4.2 The form of drainage provision for any new development within or adjacent to any of these areas has the potential to contribute to or detract from the wider landscape. Working with the landscape to provide drainage may promote other opportunities to deliver benefits for biodiversity and also enhance the aesthetic character of these areas. The linear nature of many SuDS features can help create green corridors through

developments; these are important for wildlife and ensure that the associated development is connected with its surrounding environment.

6.4.3 When assessing drainage design, particularly surface systems, it is important to consider the drainage scheme in the context of the surrounding landscape character area. Landscape Character Assessments are valuable in understanding how to create a landscape with its proposed sustainable drainage scheme for a development so it fits into the landscape and townscape of the area. Effective integration will also require carefully researched and selected plants, which work to improve the local green infrastructure.

7 Flood Risk / Surface Water Management: Standing Guidance for Smaller Developments

7.1 Introduction

7.1.1 All development, regardless of its size, has the potential to be affected by surface water run-off or have an impact upon existing surface water flow routes. Surface water flooding, as distinct from other sources of flooding, currently causes the most regular impact to communities across West Sussex as evidenced by the extensive property flooding that occurred during 2012. This section provides guidance on managing surface water for smaller developments to minimise flood risk; guidance is directed both at home owners considering extensions / alterations and to developers for smaller (non-major) commercial developments. Sections 7.2 and 7.3 provide guidance to home-owners and commercial developers, respectively.

7.2 Homeowners

7.2.1 The following paragraphs set out what you as a home-owner are legally required to do if you make changes to your home or garden that will affect the management of surface water and also what measures you can take to mitigate the management of surface water issues and the reduction of flood risk. Two flow charts to summarise the guidance for homeowners are provided at the end of this section.

What do you want / intend to do?

7.2.2 *Paving of a front garden / driveway;*
If you intend to pave your front garden or driveway involving an area of more than $5m^2$, you will require planning permission if free draining ground is being replaced with an impermeable material that will create run off. One of the main reasons for the new legislation is that the conversion of gardens to driveways in urban areas has increased the amount of water that goes into the storm drains when it rains, and this has contributed to the increase in flooding.

7.2.3 From a flood risk and drainage perspective, planning permission is not required if you are creating a driveway from a semi-permeable or permeable material, or if the water is directed to a lawn, border or soakaway to drain naturally with no increase in flow resulting to highway drainage. If you are in any doubt about whether or not planning permission is required, contact your LPA.

7.2.4 In order to help and advise householders of the options for achieving permeability and meeting the condition for permitted development status the Department for Communities and Local Government (CLG) has produce guidance on permeable paving which can be found on the following link https://www.gov.uk/government/publications/permeable-surfacing-of- front-gardens-guidance

7.2.5 *Install a subterranean/basement extension*
Due to the risk of rapid inundation by floodwater basements should be avoided in areas at risk of flooding. Self-contained basement dwellings are 'highly vulnerable' developments and should not be permitted in Flood Zone 3. The Environment Agency is opposed to these developments unless there is adequate protection from flooding and safe means of escape. Detailed technical advice should be sought from your District / Borough planning authority before considering an application in an area at increased risk of flooding.

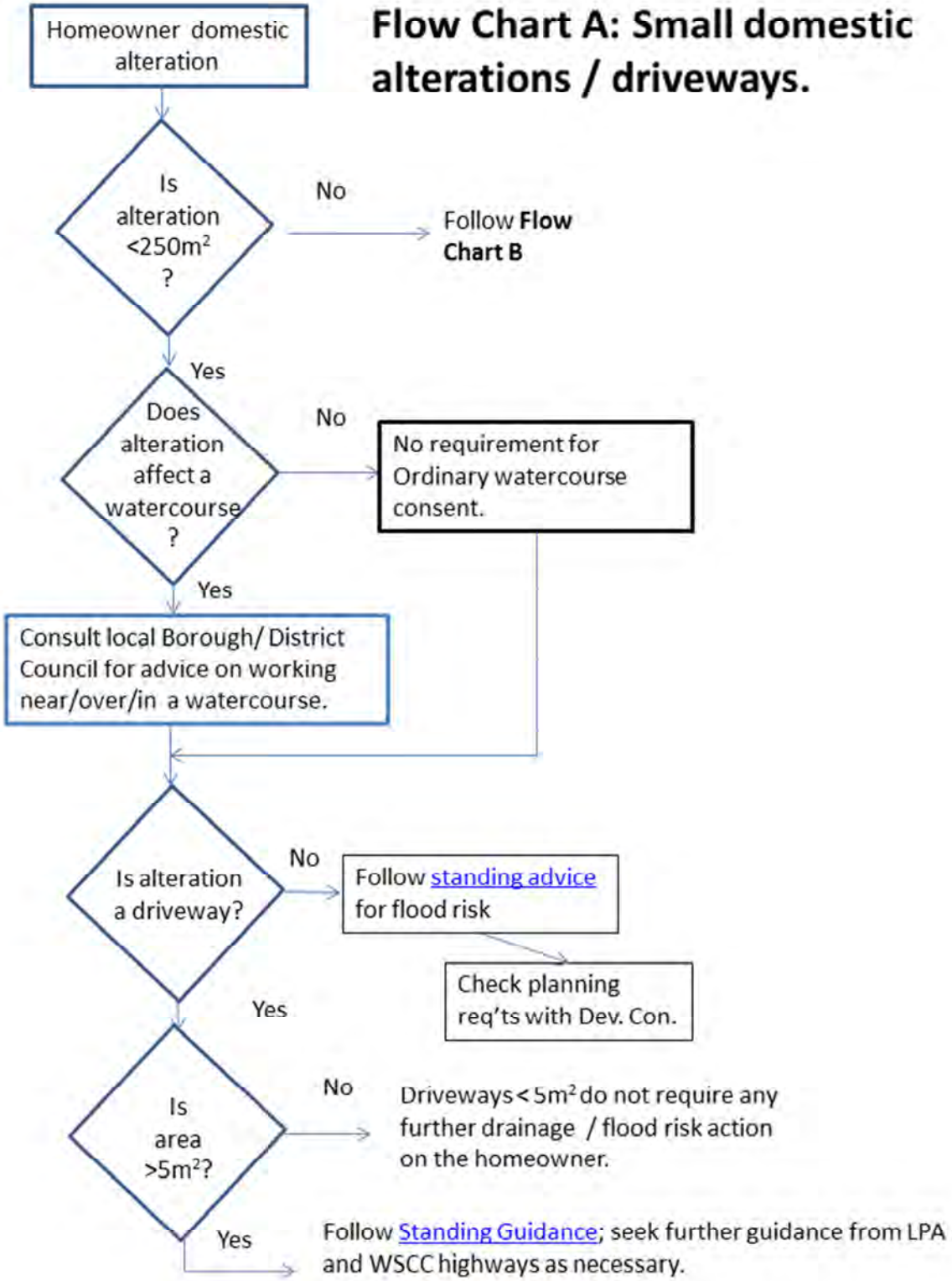
7.2.6 *Extend my home by no more than 250m^2*

LLFA standing advice (adapted from government guidance) on managing flood risk for minor extensions of less than 250m^2 that can be found in **Appendix B**. This advice is additional to any requirement for obtaining planning permission and the guidance of the local planning authority should always be sought at the outset of the process. If an existing property is located within flood zones 2 or 3 or in a flood pathway, the extension unless designed to be flood resilient as opposed to flood resistant, has the potential to remove floodwater storage. In this scenario, specific guidance from the District Engineer should be sought before finalising a design.

7.2.7 *Alter the nature of a watercourse running through or adjacent to my property.*

No alteration should be made to an existing watercourse running through or adjacent to your property without first consulting the Borough or District Council. This includes the bridging of an existing watercourse (and any associated culverting) to provide access to / from your property (see also Section 4.3.1 of the West Sussex LLFA Policy for the Management of Surface Water).

Flow Chart A: Small domestic alterations / driveways.



7.3 Developers

Minor developments of more than 250m^2 but not categorised as major development.

7.3.1 Developments up to 250m^2 is covered by the above paragraphs.

7.3.2 Major development is defined in paragraph 2.2.3 of this policy.

7.3.3 Currently, there appears to be no government guidance specifically informing the management of flood risk for developments greater than 250m^2 but less than 0.5 ha in area or less than 10 houses in total[9]. Given the scarcity of suitable development sites within West Sussex, a high proportion of planning applications are submitted for development that falls within this category, usually referred to as incremental development. Collectively, and over time, incremental development can have a very significant impact upon flood risk from surface water run-off. For this reason, the Lead Local Flood Authority is stipulating local requirements that need to be met by developers to minimise flood risk both to the development itself and to surrounding areas.

7.3.4 The key requirements are:

1. **Establish the existing flood risk from all sources;**
   A suggested starting point is: https://flood-warning-information.service.gov.uk/long-term-flood-risk/map
   Nb. Selecting the detailed view on the map yields information on depths and flow velocities of flood water. Reference should also be made to any surface water management plans (SWMPs published by the Lead Local Flood Authority – see Section 4.5 of the main document) and to relevant SFRAs published by the District / Borough that include the proposed area of development.

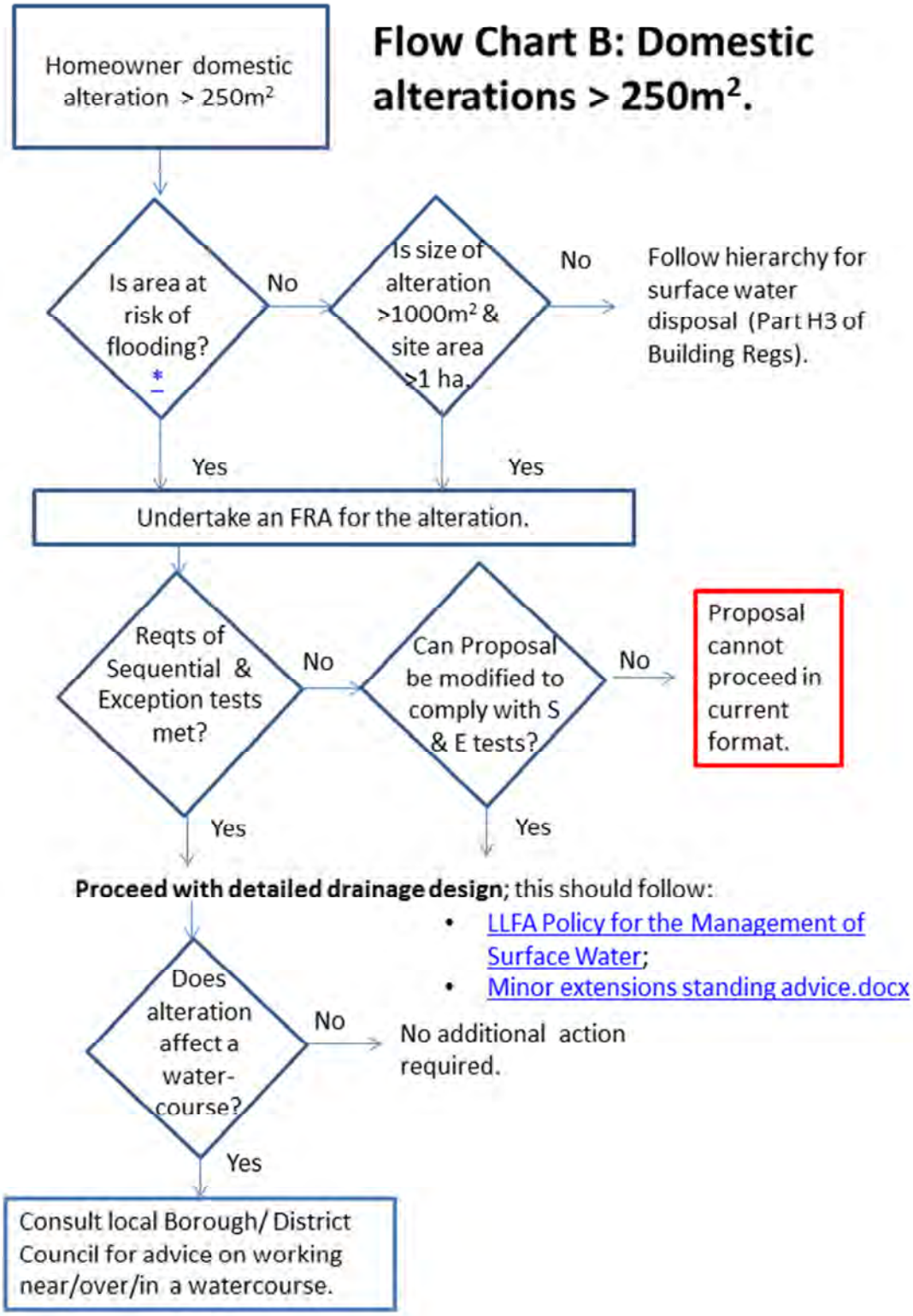
2. **If the area is at significant (medium or high) risk of flooding undertake a Flood Risk Assessment;**
   https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities This will need to demonstrate that the sequential and exception tests have been completed and needs to incorporate a drainage strategy for the site. Section 5.1 of the West Sussex LLFA Policy for the Management of Surface Water provides detailed guidance but contact the planning or drainage staff at your local authority if you require further clarification.

[9] The LLFA Policy for the Management of Surface Water requires all major development to be accompanied by a Drainage Strategy. The LLFA view is that a meaningful Drainage Strategy needs to be informed by a Flood Risk Assessment, notwithstanding that there are circumstances under which major development **may not** require an FRA if site size thresholds is <1ha and in flood zone 2 according to current government guidance.

3. **Is the new development on the site of an existing development, i.e. brownfield?**
   If the development constitutes redevelopment of an existing brownfield site, the detailed guidance provided in paragraph 5.4.4 of this policy should be adhered to.

7.3.5 The flow chart below summarises the guidance to developers.

Flow Chart B: Domestic alterations > 250m².



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Glossary

AEP Annual Exceedance Probability	This is the probability of a flood event being exceeded within a given year. Expressed in percentage terms it is the inverse of the maximum return period. For example, the 100-year flood can be expressed as the 1% AEP flood, which has a 1% chance of being exceeded in any year.
Attenuation	Attenuation is the process of water retention on site and slowly releasing it in a controlled discharge to a surface water or combined drain or watercourse. The amount of discharge will vary depending whether it is a brown or Greenfield site. For brownfield sites the developer must determine the likely run off and agree an acceptable discharge with the LLFA, environment agency or water authority.
Biodiversity	The diversity of plant and animal life in the world, an area or a particular habitat – a high level of which is considered to be important or desirable.
Biota	The animal and plant life of a particular region or habitat.
Brownfield site	Any land or site that has been previously developed.
Catchment	The area contributing surface water flow to a point on a drainage or river system.
CIRIA	Construction Industry Research and Information Association. www.ciria.org
Climate change	Long-term variations in global temperature and weather patterns both natural and as a result of human activity (anthropogenic) such as greenhouse gas emissions
Culvert	A structure which fully contains a watercourse as it passes through an embankment or below ground.
Development	The undertaking of building, engineering, mining or other operations in, on, over or under land or the making of any material change in the use of any buildings or other land.
EA	Environment Agency. Government Agency responsible for flooding issues from Main River, and strategic overview of flooding.
Easement	The right to use the real property of another for a specific purpose. The easement is itself a real property interest, but legal title to the underlying land is retained by the original owner for all other purposes.

Exceedance Route	A pre-determined route for flows that exceeds the flood event that the drainage system has been designed to accommodate.
FEH	The Flood Estimation Handbook, produced by the Institute of Hydrology in 1999; an accepted method for estimating runoff.
Flood event	A flooding incident usually in response to severe weather or a combination of flood generating characteristics.
Flood risk	The combination of the flood probability and the magnitude of the potential consequences of the flood event.
Flood Risk Assessment	An appraisal of the flood risks that may affect development or increase flood risk elsewhere.
Freeboard	A vertical distance that allows for a margin of safety to account for uncertainties.
Flood and Water Management Act	The Flood and Water Management Act clarifies the legislative framework for managing surface water flood risk in England.
Greenfield	Undeveloped land.
Greenfield runoff rate	The rate of runoff which would occur from a site that was undeveloped and undisturbed.
Groundwater	Water that exists beneath the ground in underground aquifers and streams.
Groundwater flooding	Flooding caused by groundwater rising and escaping due to sustained periods of higher than average rainfall (years) or a reduction in abstraction for water supply.
IH124	A report published by the Institute of Hydrology in 1994 that was specifically produced to address the runoff from small catchments; it provides an accepted method for estimating runoff from catchments.
Impermeable	Will not allow water to pass through it.
Infiltration	Infiltration or soakaway is the temporary storage of water to allow it to naturally soak away into the ground. Because water soaks into the ground gradually, reduces the risk of flooding downstream. Infiltration may be used where there is no surface water sewer or where existing systems are at full capacity. Infiltration helps to recharge natural ground water levels.
Internal Drainage Board (IDB)	Internal drainage boards (IDB) are public bodies that Boards manage water levels in some areas where there is a special

	need for drainage. These areas are known as internal drainage districts (IDD). IDBs undertake works to reduce flood risk to people and property, and manage water levels for agricultural and environmental needs.
LLFA	Lead Local Flood Authority is the risk management authority responsible for local flood risk defined as flooding from surface water, groundwater and ordinary watercourses. In West Sussex, the LLFA is West Sussex County Council.
Local Flood Risk Management Strategy	Strategy outlining the Lead Local Authority's approach to local flood risk management as well as recording how this approach has been developed and agreed.
Main River	A watercourse designated on a statutory map of Main rivers, maintained by Department for Environment, Food and Rural Affairs (Defra).
Mean Annual Flood	Referred to as QBAR, or the mean annual flood, is the value of the average annual flood event recorded in a river. This flow rate is used to provide a measure of the Greenfield runoff performance of a site in its natural state to enable flow rate criteria to be set for post development surface water discharges for various return periods.
On-line	A part of the drainage system that receives flows during all frequent events.
Ordinary Watercourse	An ordinary watercourse is a watercourse that is not part of a main river.
Overland Flow	Flooding caused by surface water runoff when rainfall intensity exceeds the infiltration capacity of the ground, or when the soil is so saturated that it cannot accept any more water.
Percolation	The passing of water (or other liquid) through a porous substance or small holes e.g. soil or geotextile fabric. A percolation (or infiltration) test is used to assess the rate of flow through the soil; see chapter 25 of SuDS Manual.
Qbar	(See Mean Annual Flood)
Q1	The Greenfield runoff for a 1:1 year flood event. This is derived from standard growth curves being applied to Qbar.
Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium.

Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
SAAR	Standard Annual Average Rainfall; SAAR is the standard average annual rainfall for the period 1941 to 1970 in mm[10].
Source Protection Zone	Defined areas showing the risk of contamination to selected groundwater sources used for public drinking water supply.
Strategic Flood Risk Assessment	A study to examine flood risk issues on a sub-regional scale, typically for a river catchment or local authority area during the preparation of a development plan.
Supplementary Planning Documents (SPD)	Documents which add further detail to the policies in the Local Plan. They can be used to provide further guidance for development on specific sites, or on particular issues, such as design. Supplementary planning documents are capable of being a material consideration in planning decisions but are not part of the development plan.
Surface water flooding	Flooding caused by the combination of pluvial flooding, sewer flooding, flooding from open channels and culverted urban watercourses and overland flows from groundwater springs
Surface Water Management Plan	A study undertaken in consultation with key local partners to understand the causes and effects of surface water flooding and agree the most cost effective way of managing surface water flood risk for the long term.
SuDS	Sustainable drainage systems. A sequence of management practices and control structures that are designed to drain surface water in a more sustainable manner.
Topography	The topography of a place or region is the description of its physical features, both geographical and man-made. It is usually represented on a topographical map.
Urban creep	The increasing density of development due to extensions, paving over of gardens, and other permeable area, and the addition or extension of roads or buildings, which increases the impermeability of developed areas and causes rates and volumes of runoff to increase.
Watercourse	A term including all rivers, streams, ditches drains cuts culverts dykes sluices and passages through which water flows.

[10] SAAR 61-90, which was analysed for the Flood Estimation Handbook (FEH) for rainfall from 1961 - 1990, is virtually the same and can also be used in runoff calculations.

Appendix A to West Sussex Lead Local Flood Authority Policy for the Management of Surface Water dated July 2017

Links to Further Information

Introduction

West Sussex County Council as the Lead Local Flood Authority (LLFA) benefits from working in partnership with Drainage Engineers within the Districts and Boroughs throughout the County. These engineers undertake technical review of drainage proposals and act as Agents to the LLFA for the review / granting of Ordinary Watercourse Consents under the Flood and Water Management Act, 2010.

Technical queries relating to individual developments should in the first instance be directed to these officers as they have a greater level of local knowledge than staff at the LLFA. Contact Details for the Engineering staff at respective authorities are set out below, together with links to standing advice (where appropriate) which may serve to answer initial queries).

Adur-Worthing Councils - Drainage Engineer

Contact Tel No: 01903 221374

Contact email: planning@adur-worthing.gov.uk

Standing advice is available via the following web link: https://www.adur-worthing.gov.uk/severe-weather/flooding-and-heavy-rain/

Arun District Council - Drainage Engineer : Contact Tel No: 01903 737819

Contact email: engineering.services@arun.gov.uk

Standing advice is available via the following web link:

http://www.arun.gov.uk/drainage

http://www.arun.gov.uk/surfacewater

http://www.arun.gov.uk/planning-obligations

http://www.arun.gov.uk/making-a-planning-application

Chichester District Council - Drainage Engineer

Contact Tel No: 01243 785166

Contact email: landdrainage@chichester.gov.uk

Standing advice is available via the following web link:

Surface Water and Foul Drainage SPD

http://www.chichester.gov.uk/CHttpHandler.ashx?id=26891&p=0

Crawley Borough Council

Contact Tel No: 01293 438 596

Standing advice is available via the council's planning portal following web link: http://www.crawley.gov.uk/pw/Planning_and_Development/index.htm

Policies pertinent to surface water management – Local Plan policies: Policies ENV8 (Development and Flood Risk) and ENV9 (Tackling Water Stress)

http://www.crawley.gov.uk/pw/web/pub271853

Strategic Flood Risk Assessment

http://www.crawley.gov.uk/pw/web/PUB228566

Horsham District Council

Contact Tel No: 01403 215063 (Planning)

Contact email: planning@horsham.gov.uk

Standing advice is available via the following web link: https://www.horsham.gov.uk/planning/development-management

- Surface Water Drainage Advice Note;
- Surface Water Drainage Statement;
- Adoption and Maintenance of SuDS.

Mid Sussex District Council - Drainage Engineer(s)

Contact Tel No: (01444) 477408 (Contact Centre)

Contact email: drainage@midsussex.gov.uk

Mid Sussex District Council Strategic Flood Risk Assessment and a guide to master planning sustainable drainage into developments can be found via the following link:

https://www.midsussex.gov.uk/planning-building/evidence-supporting-documents/

Development Contributions

https://www.midsussex.gov.uk/planning-building/development-contributions/

Local List giving validation requirements for planning applications:

https://www.midsussex.gov.uk/media/1976/validation-criteria-for-planning-applications.pdf

South Downs National Park Authority

Contact Tel No: 01730 814810

Contact email: planning@southdowns.gov.uk

Standing advice is available via the following web link:

Water Cycle Study and SFRA Level 1

https://www.southdowns.gov.uk/planning/planning-policy/national-park-local-plan/evidence-and-supporting-documents/water-cycle-study/

Local List giving validation requirements for planning applications:

https://www.southdowns.gov.uk/planning/making-an-application/local-validation-list/

Appendix B

Minor extensions standing advice

[advice adapted from www.gov.uk/guidance]

You need to provide a plan showing the finished floor levels and the estimated flood levels.

Make sure that floor levels are either no lower than existing floor levels or 300 millimeters (mm) above the estimated flood level. If your floor levels aren't going to be 300mm above existing flood levels, you need to check with your local planning authority if you also need to take flood **resilience** measures.

State in your assessment all levels in relation to Ordnance Datum (the height above average sea level). You may be able to get this information from the Ordnance Survey. If not, you'll need to get a land survey carried out by a qualified surveyor.

Your plans need to show how flood risk for the development is minimized and that there is no increase in flood risk for people / property outside of the development. If the proposed extension to your property is in an area that is affected by surface water flooding or is on a flood plain, the avoidance of increased flood risk should consider how flows can be routed through / under the extension to avoid loss of flood storage capacity in the immediate vicinity by incorporating flood **resilience** measures. These measures allow water to pass through the property to avoid structural damage by:

- using materials that are flood resilient not flood resistant;
- making it easy for water to drain away after flooding;
- making sure there's access to all spaces to enable drying and cleaning.

Specific guidance on flood **resilience** can be found in improving the flood performance of new buildings. Flood resistance for new extensions in areas prone to flooding should be avoided. Further advice on this issue can be sought from the Drainage Engineer at your local authority.

Supplementary Requirements for Surface Water Drainage Proposals

Any proposed surface water scheme must consider sustainable drainage principles.

SuDS Selection

The following destinations must be considered for surface runoff in order of preference:

1. Discharge into the ground (infiltration).

2. Controlled discharge to a surface water body.

3. Controlled discharge to a surface water sewer.

Surface water must not be discharged into the foul sewer system. Infiltration structures include soakaways, basins, swales and permeable paving. Open Suds features are encouraged. Structures that span individual property boundaries are discouraged. Discharge to surface water bodies and surface water sewers must be restricted to an agreed rate.

SuDS selection hierarchy based on:
CIRIA C753 - The SuDS Manual
BS8582:2013 – Code of Practice for Surface Water Management for Development Sites
Approved Document H of the Building Regulations

For additional guidance, please refer to the ' West Sussex County Council (Lead Local Flood Authority) Policy For The Management of Surface Water'
https://www.westsussex.gov.uk/media/12230/ws_llfa_policy_for_management_of_surface_water.pdf

Infiltration Drainage Design

Any infiltration drainage design must include adequate winter groundwater monitoring data to determine the highest winter groundwater table. Residential developments of ten properties or more will require ground water monitoring to be carried out between October and March inclusive. The extent of monitoring required for smaller developments will be subject to agreement with the Council's Engineers but will need to capture likely peak groundwater levels during the winter period. This is likely to be during January/February but is dependent on the weather, etc up to that point.

Adequate freeboard must be provided between the base of the soakaway structure and the highest recorded groundwater level identified in that location.

Infiltration rates for soakage structures are to be based on percolation tests undertaken at an agreed time during the winter period and at the location and depth of the proposed structures. The percolation test depth is also dependent on the peak groundwater levels recorded at that location, ensuring that the test depth does not exceed the depth to the peak

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groundwater level recorded. The percolation tests must be carried out in accordance with BRE 365, CIRIA R156 or a similar approved method. For the purpose of design, the percolation rate must be applied to the sides of the infiltration structure only and the rate for the base must be zero, unless otherwise agreed. In respect to infiltration basins or permeable pavements, the percolation rate is generally applied to the base only.

There must be provision to ensure that there is capacity in the system to contain the 1 in 100 year storm event plus 40% on stored volumes/rainfall intensity, as an allowance for climate change and cater for the 1 in 10 year storm event plus climate change between the invert of the lowest entry pipe into the infiltration structure and the base The infiltration structure should also drain 50% of its total volume in 24 hours or less for both the 1 in 10 (plus 40%) and 1 in 100 year (plus 40%) storm events, in order to provide spare capacity for subsequent storms.

Restricted Discharge

Discharge to a watercourse or surface water sewer must be restricted to the estimated mean greenfield runoff rate (Q_{bar}) for all design storm events, using the impermeable area (and including other permeable areas that are positively drained) of the site to be developed as the basis for the calculations, rather than the entire greenfield site area. For brownfield sites, the above criteria also applies, but if this cannot be achieved, then a minimum 50% reduction in existing peak runoff rate should be considered. Flow restriction is to be achieved using a suitable controlled outflow with a minimum outflow of 2 l/s, unless otherwise agreed, with satisfactory blockage mitigation measures specified. Greenfield runoff rates can be derived from IH124 or a similar approved method. Any storage design must be submitted with winter groundwater monitoring data where applicable to ensure there will be no detrimental effect on the structure or storage.

Flow Exceedance Routes

The drainage design should show flow routes through the proposed development, demonstrating where surface water will be conveyed for three types of flow:

1. Low flow routes

Regular flow from source control features such as permeable pavements should travel in low flow channels through the development in a controlled way contributing to landscape quality.

2. Overflows

In the event of local blockages or surcharge a simple overflow arrangement should allow water to bypass the obstruction and return to the management train sequence until conditions return to normal.

3. Exceedance routes

When SuDS are overwhelmed by exceptional rainfall, then exceedance routes are required to protect people and property. These provide unobstructed overland flow routes from the

development and should be considered for all drainage schemes. Exceedance routes should also be protected from future changes in land use.

Culverting a Watercourse

Culverting (piping) a watercourse is not advised unless there is no alternative. The resulting reduction in storage volume, flow capacity and habitat potential would be unacceptable. Culverted watercourses are also more difficult to maintain due to the limited accessibility.

Land Drainage Consent must be sought from the Lead Local Flood Authority (West Sussex County Council), or its agent (Arun District Council – land.drainage@arun.gov.uk), prior to starting any works (temporary or permanent) that affect the flow of water in the watercourse. Such works may include culverting, channel diversion, discharge of flows, connections, headwalls and the installation of trash screens.

Please also refer to the 'culvert policy' and consent application form available on the West sussex County Council website; https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/

The development layout must take account of any existing watercourses (open or culverted) to ensure that future access for maintenance is not restricted.

See also:
Land Drainage Act 1991 (amended 1994)

Maintenance and Management

Ditches and watercourses (including culverts) should retain a three metre easement with access that allows for its future maintenance.

Details of the maintenance and management of the SuDS system are to be set out in writing in a site specific maintenance manual. This manual shall include details of the financial management and arrangements for the replacement of components at the end of the manufacturers recommended design life. This document is then to be submitted as part of the planning process.

References

The Building Regulations 2000
Drainage and waste disposal
Approved document H
ISBN: 1-859462-08-1

Building Research Establishment,
Soakaway Design – Digest 365 (BRE 365)
ISBN: 978 1 84806 918 6, 2016

Centre for Ecology and Hydrology
Flood Estimation for Small Catchments - IH Report 124
Marshall, D.C.W. & Bayliss, A.C.
ISBN: 0948540621, 1994

CIRIA
C753 The SUDs Manual
Woods-Ballard, B.; Kellagher, R. et al
ISBN: 978-0-86017-760-9, 2015

CIRIA
R156 Infiltration Drainage – Manual of Good Practice
Bettess, R.
ISBN: 0 86017 457 3

British Standards Institution
BS8582:2013 – Code of Practice for Surface Water Management for Development Sites
ISBN: 978 0 580 76700 5

Version Dated; 3rd August 2021

Surface Water Drainage Proposal Checklist

During the planning process, applicants are often required to submit surface water drainage proposals for appraisal by the Local Planning Authority's (LPA's) Drainage Engineers. This 'Surface Water Drainage Proposal Checklist' has been designed to clearly define the expectations and requirements that proposals, submitted to LPA's within West Sussex, need to satisfy.

It is recommended that applicants take time, at the outset of the planning process, to familiarise themselves with the requirements set out in this checklist.

The expectation is that applicants will include a completed checklist in the supporting documentation they submit to the LPA, during the planning process.

Applicants should be aware that:

- It is in an applicant's interest to provide all the information requested by the checklist, to enable the LPA's Engineers to quickly and efficiently appraise their proposals.
- The omission of information may lead to delays in the planning process.

However, if this checklist requests information that an applicant does not consider to be relevant to their application:

- In the first instance the applicant should discuss this with the LPA's Drainage Engineer. (The Planning Officer dealing with the application will be able to provide applicants with the appraising Engineer's contact details).
- Alternatively, the applicant can provide an explanation as to why they have omitted certain information in the 'Additional Information' section at the end of the checklist, quoting the relevant 'requirement number'. However, be aware; the decision whether or not certain information is required ultimately lies with the appraising Engineer (hence the above advice to consult them before omitting information).

The Town and Country Planning Regulations now require pre-commencement conditions to have the prior agreement of the applicant regarding their wording and use. Therefore, to avoid pre-commencement conditions relating to surface water drainage, applicants will need to submit proposals that provide the information requested in this checklist, and also align with the requirements of the following documents:

- The West Sussex Policy for the Management of Surface Water
- Any supplementary planning guidance issued by the respective LPA.

If surface water drainage conditions have been applied to a planning permission; this document will also help applicants prepare a 'Discharge of Conditions' application'.

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Surface Water Drainage Proposal Checklist

Ground Investigation Results					
No.	**Requirement**	**Results/Information Provided?**			
1	**Winter groundwater monitoring results** Please refer to guidance note 'a' below.	**Yes**		**No**	
2	**Period of winter groundwater monitoring** Note 'a'	**From**	DD/MM/YYYY		
		To	DD/MM/YYYY		
3	**Maximum recorded groundwater level** Note 'a'	**mAOD**			
		mBGL			
4	**Winter infiltration test results** Notes 'b' and 'c'	**Yes**		**No**	
5	**Date of winter infiltration testing** Note 'b'	DD/MM/YYYY			
6	**Details of the location and depth of the infiltration testing** Notes 'b' and 'c'	**Yes**		**No**	
7	**Minimum infiltration rate** Note 'd'	**m/s**			

Guidance Notes

a. Groundwater monitoring should be undertaken during the winter period (October to March inclusive) to enable the peak annual groundwater levels to be established. The duration of monitoring required for smaller developments (e.g. those consisting of less than 10 properties) can be discussed with the LPA's Engineers as; for some locations, a shorter duration may be acceptable. However, unless dispensation is agreed in advance with the LPA's Engineers, a full winter season of monitoring should be undertaken. Groundwater on sites near the coast may be influenced by tidal conditions and therefore this consideration needs to be factored into the monitoring programme.

b. Infiltration testing should be undertaken during the wet winter months (typically January or February) and in line with BRE365 or a similar approved method, such as CIRIA R156. Infiltration testing needs to be carried out at the locations and depths of proposed infiltration structures, this must also be at a depth above the maximum recorded groundwater level in the vicinity of the test pit. Tests must be repeated 3 times consecutively, to replicate saturated ground conditions.

c. Deep-bore Soakaways: Where it is not possible to undertake conventional BRE365 or CIRIA R156 testing due to depth; advice should be sought from the Council's engineers. Please note that; deep-bore soakaways are generally resisted unless there is no alternative. Evidence of the Environment Agency's agreement with the principle of using deep-bore methods to drain the site must be provided within the submission.

d. The minimum infiltration rate obtained at the location and depth of the proposed infiltration structures should be used to inform the design of the infiltration structures. Please use the 'additional information' section at the end of this checklist if multiple infiltration structures are proposed, which utilise different minimum rates.

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Proposed Method of Surface Water Disposal					
8	**Infiltration on-site**, via soakaway structures.	Yes		No	
9	**If on-site infiltration is not to be used, has justification for this decision been provided?** Note 'e'	Yes		No	
10	**Attenuation** (on-site) with a **restricted discharge to a watercourse** on, or adjacent to, the site.	Yes		No	
11	**Attenuation** (on-site) with a **restricted discharge to a surface water sewer** on, or adjacent to, the site.	Yes		No	
12	**Attenuation** (on-site) with a **restricted discharge to a foul water or combined sewer** on, or adjacent to, the site.	Yes		No	

Guidance Note

e. If on-site infiltration is deemed unviable; evidence supporting the move to the next step(s) of the drainage hierarchy must be provided, to the satisfaction of the LPA's Engineer.

Drainage Design: Supporting Calculations						
	No.	Requirement	Provided?			
Infiltration Structures	13	**Calculations demonstrating the 1 in 10 year event, plus climate change allowance (CCA), can be accommodated below the lowest incoming pipe within each structure.** Notes 'f' and 'g'.	Yes		No	
	14	**Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site.** Notes 'f' and 'g'.	Yes		No	
	15	**Lowest base level of any infiltration structure**	mAOD mBGL			
	16	**Half-drain time for 10 year event (plus CCA)**	Yes		No	
			Hours			
	17	**Half-drain time for 100 year event (plus CCA)**	Yes		No	
			Hours			
	18	**Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.**	Yes		No	
Attenuation / Restricted Discharge	19	**Pre-development run-off rate calculations** Note 'h'	Yes		No	
			l/s			
	20	**Proposed discharge rate** Note 'h'	l/s			
	21	**Calculations demonstrating the 1 in 100 year event, plus CCA can be accommodated on-site.** Note 'g' and 'h'	Yes		No	
	22	**Has the design sought to provide treatment of potential contaminants? E.g. hydrocarbons.**	Yes		No	
	23	**If the proposed scheme incorporates any impermeable lined attenuation features; calculations are required to demonstrate that appropriate resistance to floatation (due to groundwater levels) is catered for in the design.**	Yes		No	
	24	**Is a discharge into, or an alteration to, an ordinary watercourse is proposed? (If so, Ordinary Watercourse/ Land Drainage Consent will be required).** Note 'i'	Yes		No	
	25	**If discharging to a watercourse, piped system or the sea, has the proposed drainage network been modelled against predicted top water levels for the 1 in 100 year storm event, plus CCA, within the existing system?** Note 'j'	Yes		No	

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Guidance Notes

f. The appropriate factor of safety from the table below must be applied to calculations to ensure the design is fully in accordance with CIRIA R156/CIRIA C753. This is applicable to infiltration systems, utilising the base area.

Factor of Safety Table						
Size of Area to be Drained	Consequences of failure					
	No damage or inconvenience		Minor inconvenience, e.g. surface water on car park		Damage to buildings, structures or roads.	
	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75	Cv=1.0	Cv=0.75
<100 m^2	1.5	2	2	3	10	13
100m^2 to 1000m^2	1.5	2	3	4	10	13
>1000m^2	1.5	2	5	6.5	10	13

g. Climate change allowance on peak rainfall intensities or stored volumes must take into account the lifetime of the development.

h. Calculations of Qbar are to be based upon the area to be positively drained. It is advised that agreement is sought with the LPA's Engineer, at an early stage, regarding the area to be considered for this calculation. Unless otherwise agreed; the minimum acceptable discharge rate is 2l/s when using formal flow control devices. For lower flow rates; evidence must be provided that adequate measures are in place to protect the flow control device from blockage. **For Greenfield sites**; run-off must be restricted to the Greenfield Qbar runoff rate during all events up to and including the 1 in 100 year rainfall event, including climate change allowance. **For Brownfield sites**; infiltration should be investigated as the first option, but where evidence can be provided that this is unviable, off-site flows from all events should also be restricted to Greenfield Qbar. If that is not possible; flow should be restricted to as close to Qbar as is achievable, with a minimum requirement of 50% betterment. Applicants are expected to provide fully detailed plans of the site's existing surface water drainage arrangements, including impermeable areas, gullies, outfalls, pipes & diameters, manholes, etc., to prove the extent of the existing positively drained areas and their associated points of discharge.

i. Ordinary Watercourse/Land Drainage Consent will need to be sought, ideally in parallel with planning permission, if the proposals incorporate discharge into, culverting or altering a watercourse.

j. Modelling is required to ensure that the effects of surcharged outfalls are taken into account.

Plans/Drawings/Diagrams					
No.	**Requirement**	**Provided?**			
26	**Plan detailing the location of groundwater monitoring and infiltration testing**	**Yes**		**No**	
27	**Detailed drainage layout plan** Note 'k'	**Yes**		**No**	
28	**Construction detail plans** Note 'l'	**Yes**		**No**	
29	**Exceedance flow route plans** Note 'm'	**Yes**		**No**	
30	**Impermeable area plan**	**Yes**		**No**	
31	**If ground levels are being raised ≥ 300mm above existing levels and is unavoidable, have fully detailed plans been provided, together with drainage proposals, to address any potential drainage related issues.**	**Yes**		**No**	

Guidance Notes

k. Drainage layout plans should include:
- All surface water drainage pipes labelled with: diameters, pipe materials, gradients and invert levels.
- All infiltrating and attenuating structures (including permeable paving) labelled with; dimensions, invert/base and cover levels.
- All manholes labelled with: a reference number, cover levels, invert levels, cover loading grade.
- All silt traps clearly labelled with sump depths.
- Control structures with discharge rates, hydraulic head and invert levels.
- Proposed/existing levels of any areas subject to ground raising, together with suitable measures/detailed drawings for the associated management of surface water runoff**. Please note that ground raising should be avoided unless there are exceptional circumstances**. In any instances where this is envisaged early consultation with the Council Engineer is recommended.

l. Site specific construction detail plans should be supplied. The following elements must be included (where applicable): infiltrating structures; attenuating structures; manholes; catch-pits/silt traps; flow control devices; permeable paving; headwalls; channel drains; gullies; pipe bedding and surround, etc.

m. Unless specifically requested by the Council's drainage Engineers 'Exceedance Flow Route Plans' are only required for developments of more than 10 residential properties or more than 0.5ha of commercial development.

Additional Information

The space below can be used to provide an explanation for any required information that has been omitted in the submission of this form or to raise specific queries seeking clarification. Please enter the appropriate line entry number to which the comments relate in the box at the left-hand side of the form.

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West Sussex LLFA Culvert Policy

Culvert[1] Policy – intended for use by Council officers, landowners and developers.

This document is an explanation of the agreed West Sussex County Council (LLFA) and District and Borough Council policy regarding the culverting of ordinary watercourses, and a guide to good practice and design principles.

Culverting of a watercourse, or the alteration of an existing ordinary watercourse, requires land drainage consent under Section 23 of the Land Drainage Act 1991 (and as amended). The District and Borough Councils under powers from the LLFA are responsible for processing ordinary watercourse consent applications.

The Environment Agency now regulates permits for works in / around watercourses designated as 'Main River' under the Environmental Permitting Regulations 2010 (EPR2010).

The following works require consent from District and Borough Authorities:

- Construction of any mill dam, weir or other similar obstruction to the flow of any ordinary watercourse or raising or otherwise altering any such obstruction;
- Installation of a culvert in any ordinary watercourse;
- Alteration of a culvert in a manner that would be likely to affect the flow of an ordinary watercourse;
- Installation of a structure within the watercourse that would be likely to affect the flow of said watercourse;
- Removal of a culvert within an ordinary watercourse;
- Diversion or filling of any ordinary watercourse;

The above list should not be considered exhaustive. If you are not sure if the work you are proposing requires a consent / permit please contact your local District or Borough Authority, EA office or Lead Local Flood Authority (LLFA).

1.0 Local Authority Policy

Watercourses fulfil many roles in today's environment. They provide drainage for developed and agricultural land and are vital water resources. They are important features of the landscape and provide habitats for a wide variety of wildlife. It is therefore important that watercourses and their associated habitats are protected and enhanced for the benefit of future generations. A watercourse includes all; rivers, streams, ditches, drains, cuts, dykes, culverts, sluices,

1. A culvert is a structure that allows water to flow under a road, railroad, trail, or similar obstruction from one side to the other side. Typically embedded so as to be surrounded by concrete, granular material, soil etc., a culvert may be made from a pipe, reinforced concrete or other material.

sewers (other than public sewers within the meaning of the Water Industry Act 1991) and passages through which water flows.

West Sussex Local Authorities are in general opposed to the culverting of watercourses because of the potential for adverse effect on flood risk and ecology. The Competent Authority will therefore adopt a precautionary principle and only approve an application to culvert an ordinary watercourse if there is no reasonably practicable alternative or if the potential negative impact of culverting would be so minor that they would not justify a more costly alternative.

However, a culvert will not be considered until alternatives have been considered, for example:

- Clear span bridges;
- Revision of the site layout to incorporate an open watercourse that can be easily maintained; or
- Diverting the watercourse without loss of its hydraulic flow characteristics.

In all cases and where it is appropriate to do so, compensation in full is to be provided for any loss in storage capacity or habitat.

2.0 Deculverting Policy

There are many benefits to deculverting, which include; the provision of valuable wetland habitat, increased storage capacity, educational opportunities, reduction of maintenance costs and ease of inspection

Deculverting requires consent as the removal of a culvert which previously constrained flow could increase the downstream flood risk; modelling should therefore be employed (where necessary) to ensure there is no adverse flood risk as a consequence of a particular activity. Some culverts may be formally listed or scheduled for their historic importance, therefore careful consideration is required. Appropriate ecological surveys should be provided in support of any deculverting activity.

The removal of culverts is actively encouraged by the council when:

- Removing the culvert is physically possible, and no ecological or historical damage will result;
- Flood risk may be reduced and a more natural flow regime restored; or
- The local environment would be enhanced significantly.

3.0 Impacts of Culverting

The Council's general opposition to culverting is a result of the legal requirements of the Water Framework Directive (2003) that the quality of a watercourse should not be reduced. Therefore, opposition is based on the detrimental effects that are likely to arise; these may include:

- Loss of environmental features; the continuity of the watercourse corridor is broken, causing an adverse impact on the ecological value of the watercourse, loss of habitat and inhibiting the migration of some species.
- Increased likelihood of blockages; the culvert itself or screens have an increased risk of blockage and require frequent maintenance.
- Loss of floodwater storage; open channels generally provide more storage capacity than culverts.
- Impact of flooding; increased overland flooding as a result of a culvert exceeding its capacity.
- Greater difficulties in providing for drainage connections; it is more difficult to provide for the addition of connections within a culvert; outfalls within culverts are prone to blockage.
- Difficulties in the repair, maintenance and replacement of culverts; the landowner or owner of the culvert is responsible for the condition and maintenance of a culvert. They must therefore ensure they are in good condition and free from obstructions. Failure to do so could result in the liability for any damage caused by flooding. Access into culverts is restricted and in some cases is classified as a confined space which requires trained operatives and specialist equipment.
- Development above or near a culvert; the presence of a watercourse is concealed by a culvert; this can lead to inappropriate land use above or near them, and could lead to structural failures, difficulties in future access for maintenance, etc.
- Culverts in urban areas are susceptible to pollution as a result of misconnected foul sewers, overflows from blocked sewers or discharge of contaminated surface water.
- Increase in erosion to the banks and beds of a watercourse where adjacent to a culvert entrance.

4.0 Culvert Design Requirements

Where culverting is unavoidable it is necessary to seek land drainage consent from the relevant District or Borough Council. It needs to be shown that steps have been taken to reduce the risk of flooding and to reduce or mitigate environmental degradation. Detailed guidance on the design of culverts can be found in Culvert Design and Operation Guide (CIRIA C689).

1. A detailed design will need to be submitted with your formal application for consent. Hydraulic calculations are to be submitted and include an allowance for climate change over the life time of the activity or development.
2. The environmental implications of all options of the works should be considered in order to determine the least environmentally damaging solution supported with evidence.
3. Culvert length should be kept as short as possible and diameter as large as possible. Depending on local circumstances, we require a minimum culvert diameter of 450mm or as agreed with the local authority depending on watercourse size and flow.
4. The design of the culvert should consider any impact on flood flow. They must not increase flood risk to property. Consideration should also be given to the alternative flow paths in the event of a culvert becoming obstructed.
5. The shape of the culvert and the materials used should be chosen to satisfy hydraulic requirements and have a design life exceeding that of the structure.
6. Pipes should be of a consistent cross-section within the culvert length unless adequate hydraulic transitions are incorporated into the design, this will be necessary when extending an existing culvert.
7. Appropriate inlet and outlet structures should be provided to ensure a smooth hydraulic transition and avoid erosion. Headwall arrangements at the upstream and downstream ends of a culvert should be suitably keyed into the bed and banks of the watercourse, and should be appropriate to the local environment.
8. Where there are safety concerns, headwalls will need to be fitted with safe guarding measures ie. handrails, etc.
9. Details should be stated of future maintenance and clearance arrangements, including access considerations. The responsibility for the maintenance of a culvert lies with the landowner or the person or management company who owns the culvert.
10. Sharp bends should be avoided and suitable access chambers provided at each change of direction in the culvert.
11. Inlet and outlet screens may be required to prevent debris entering the culvert and causing clogging, or where there is a danger to public safety. Screens need to be sized and designed to reduce the risk of blocking and provision made for clearing and maintenance, including allowance for a removable front section (fitted with a padlock); wing walls should be sufficiently high to prevent bank erosion in the event of a blockage; flat screens should be avoided as these are prone to blockage. Further guidance can be found in the Environment Agency Trash Screen and Security Screen Guide, 2009 https://www.gov.uk/government/publications/trash-and-security-screen-guide-2009

Figure 1-Culvert with Wingwalls and Trash Screen

12. Most culverts should be set so that the inlet/outlet is at the true bed level.

13. Applications with multiple small diameter culverts will generally be refused, only in exceptional circumstances where site constraints prevent a single pipe or box-culvert option being practical, will they be considered. This is a result of multiple culverts being more prone to blockage at the inlet.
14. Syphons are generally not acceptable.
15. Where watercourses are subject to severe erosion and siltation problems, consideration should therefore be given to the provision of silt traps upstream of the culvert.
16. Services (for example sewers, gas pipes, water mains, etc.) should not impinge into the cross-section of the culvert.
17. Vehicular loading needs to be considered where the culvert is located in trafficked areas and therefore suitable protection may be required.

5.0 Environmental Considerations

Each application for consent will be considered on its own benefits / disbenefits. Mitigation to reduce the impact to the natural environment will be taken into consideration when determining an application for culverting.

5.1 Environmental Mitigation:

- Increase the culvert diameter to slightly greater than that needed to accommodate the design flow and position the invert level at the true bed

level of the watercourse. This enables more natural bed features to form over time.

- Provide ledges above the water level in large culverts to allow for the passage of mammals. Or make provision for appropriately located animal underpasses close to the culvert.

Figure 2- Culvert with Ledges for Mammal Passage

- The invert level should not pose an obstruction to fish passage.
- Propose suitable environmental enhancements, for example opening up a length of previously culverted watercourse elsewhere on site, enhancing other lengths of watercourse, creation of ponds/marshy areas/ bays.
- Construct headwalls and wingwalls in 'soft-engineering' or natural materials in keeping with the natural channel without reducing the design life of the structure.

6.0 Consent Procedure

Advice should be sought as early as possible on any proposal, allowing sufficient time before the intended start date, so as to minimise any delays. The consent application form and details on how to apply and pay the appropriate fee are available on the West Sussex LLFA website;

https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/dealing-with-flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent.

As part of the consent procedure we will consult where appropriate with the Environment Agency, Highway Authorities and Natural England.

7.0 Planning Application and Building Control Considerations

- The requirement for ordinary watercourse land drainage consent is independent of the need for planning permission and the granting of planning permission does not imply or guarantee that Land Drainage consent will be granted.
- Consideration must be given to any relevant planning conditions.
- Buildings and structure must not be sited within 5 metres from the outer edge of new or existing culverts/ watercourses.
- Any works must comply with the local council land drainage byelaws, if present.

A representative from the Council will inspect the culvert on completion of works to ensure that it has been installed as per the approved design.

8.0 Enforcement

When unconsented works are identified by a District or Borough Council, and they constitute a contravention of the Land Drainage Act (1991), enforcement action will be pursued. This will include site investigations and informal contact with the land owner to try to resolve the issue. If the obstruction is not removed or there is a failure to submit a consent application within the set period a legal notice will be issued. If the notice is not complied with, then the due legal process will be initiated. This could result in the Council carrying out work by default and recovering all associated costs including an administrative on-cost.

Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
West Sussex BN17 5LF
Planning & Building Control General Enquiries
Tel: (01903) 737756 Fax: (01903) 730442
Dx: 57406 Littlehampton
Minicom: 01903 732765
e-mail:planning@arun.gov.uk
website: www.arun.gov.uk/planning

Nigel Jarvis
Luken Beck MDP
30 Carlton Crescent
Southampton
Hampshire
SO15 2EW

Date: 27th August 2021

Please ask for: Mr S Davis
Tel: 01903 737874

Your Ref:
Our Ref: PAA/80/21/

Dear Mr Jarvis,

Pre-Application Advice

Erection of 85 dwellings with associated Public Open Space and Landscaping.

Land west of Lidsey Road (adjoining Woodgate Nurseries) Woodgate Westergate West Sussex PO20 3SU

I write regarding the above matter and your enquiry received on 9th June 2021.

DESCRIPTION OF PROPOSED DEVELOPMENT

You propose to develop the site with around 85 dwellings and public open space with a new T-junction access from the A29 incorporating a right turn ghost island on the carriageway. According to your illustrative masterplan and planning statement, the proposal will have:

- A mix of 1, 2, 3 & 4 bedroom houses and apartments;
- A mix of detached, semi-detached and terraced housing;
- Market and affordable housing;
- 2 and 2.5 storey scale;
- Traditional, vernacular design;
- Sustainable and efficient construction
- High quality informal public open space also comprising a minimum of 500sqm of play space in a combined LAP / LEAP incorporating SUDs;
- A density of around 24.3 dwellings per hectare;
- The retention of vegetation and significant trees as well as the provision of a new footway to link with footways to the north of the site (this is not indicated by the masterplan;

You specifically seek responses to the following points:

- Confirmation of the planning history of the site.
- Confirmation of relevant adopted/emerging planning policies and their correct interpretation when applied to this proposal.
- Update on the current 5-year housing land supply in Arun and whether the principle of residential development would be supported by officers.
- Confirmation of supplementary information necessary to provide a valid planning application.
- Provision of advice on other statutory consents that may be required and how they relate to the planning process.
- Confirmation of whether pre-determinative protected species surveys can be undertaken after the submission of the planning application.
- Likely s106 head of terms and how financial contributions are to be calculated.
- Possible requirements of planning conditions, in particular pre-commencement conditions, covering matters such as landscaping, ecology, drainage, materials, tree protection and any ground works.
- The content of necessary Notices and Certificates.
- Confirmation of statutory designations for the site and surrounding area.

These are covered by the contents of this letter.

DESCRIPTION OF SITE

An attempt to view the site from the roadside was made but this was not easy due to screening along boundaries and the lack of pedestrian footway. The site comprises three agricultural fields and has significant screening on the A29. There is an access point just south of Woodgate House which is understood to be a private drive leading to a large horticultural nursery site to the west. This is being retained but it is assumed it is only for pedestrian & cycle movements.

There are trees/hedgerow to the eastern, southern and part northern/western boundaries. There are several trees in and around Woodgate House (excluded from the site area) and extending into the site from a point due south of Woodgate House. The land appears to be predominantly flat.

DESCRIPTION OF LOCALITY

The north part of the site (north of the private drive) is semi-rural due to it having houses to the north/east and a large nursery site to the west. The land south of the private drive is more rural as it borders open fields and the surrounding landscape is agricultural fields with relatively few residential properties. Surrounding houses are predominantly one or one and a half storeys but Woodgate House and Stockhearn House (opposite the very northern boundary) are two storey exceptions.

PLANNING ISSUES

The following issues have been identified for consideration:

Principle;
Design;
Neighbour Amenity;
Amenity Space Provision;
Bin Storage;
Affordable Housing;
Highways, Transport and Parking;

Sustainable Construction;
Barnham Special Consultation Area;
Protected Trees;
Open Space Provision;
Light Pollution;
Noise Pollution;
Contamination;
Infrastructure Provision;
Protected Species;
Sites of International Conservation Importance;
Loss of Agricultural Land; and
Other Considerations (Housing Mix, Homes for Older People, Internal Space Standards, Air Pollution, Economic Development Comments).

RELEVANT PLANNING HISTORY

AL/33/71	Outline - One Agricultural Cottage	Refused 11-08-71

COMMENT ON SITE HISTORY

There is no site history pertaining to the site other than the above entry.

RELEVANT POLICIES - the following policies are considered relevant to your proposal:

Arun District Local Plan 2011-2031

AHSP2	AH SP2 Affordable Housing
CSP1	C SP1 Countryside
DDM1	D DM1 Aspects of form and design quality
DDM2	D DM2 Internal space standards
DSP1	D SP1 Design
ECCSP1	ECC SP1 Adapting to Climate Change
ECCSP2	ECC SP2 Energy and climate change mitagation
ENVDM1	ENV DM1 Designated Sites of Biodiversity or geographical imp
ENVDM4	ENV DM4 Protection of trees
ENVDM5	ENV DM5 Development and biodiversity
ENVSP1	ENV SP1 Natural Environment
HDM1	H DM1 Housing mix
HSP1	HSP1 Housing allocation the housing requirement
HSP2	H SP2 Strategic Site Allocations
HSP2C	H SP2c Inland Arun
HWBSP1	HWB SP1 Health and Wellbeing

HERDM6	HER DM6 Sites of Archaeological Interest
HERSP1	HER SP1 The Historic Environment
GISP1	GI SP1 Green Infrastructure and Development
INFSP1	INF SP1 Infrastructure provision and implementation
LANDM1	LAN DM1 Protection of landscape character
OSRDM1	Protection of open space,outdoor sport,comm& rec facilities
QEDM1	QE DM1 Noise Pollution
QEDM2	QE DM2 Light pollution
QEDM3	QE DM3 Air Pollution
QEDM4	QE DM4 Contaminated Land
QESP1	QE SP1 Quality of the Environment
SDSP1	SD SP1 Sustainable Development
SDSP1A	SD SP1a Strategic Approach
SDSP2	SD SP2 Built-up Area Boundary
SKILLSSP1	SKILLS SP1 Employment and Skills
SODM1	SO DM1 Soils
TDM1	T DM1 Sustainable Travel and Public Rights of Way
TSP1	T SP1 Transport and Development
WDM1	W DM1 Water supply and quality
WDM3	W DM3 Sustainable Urban Drainage Systems
WMDM1	WM DM1 Waste Management
WSP1	W SP1 Water

Neighbourhood Plan Policies:

Aldingbourne Neighbourhood Plan 2019-31 Policy EH1	Built up area boundary
Aldingbourne Neighbourhood Plan 2019-31 Policy EH3	Development of agricultural land
Aldingbourne Neighbourhood Plan 2019-31 Policy EH5	Surface water management
Aldingbourne Neighbourhood Plan 2019-31 Policy EH6	Protection of trees and hedgerows
Aldingbourne Neighbourhood Plan 2019-31 Policy EE8	Communications infrastructure
Aldingbourne Neighbourhood Plan 2019-31 Policy EH10	'Unlit Village' status
Aldingbourne Neighbourhood Plan 2019-31 Policy EH2 2019	Protection of bat habitation
Aldingbourne Neighbourhood Plan 2019-31 Policy GA1	Promoting sustainable movement
Aldingbourne Neighbourhood Plan 2019-31 Policy GA2	Footpath and cycle path network

Aldingbourne Neighbourhood Plan 2019-31 Policy GA3	Parking and new developments
Aldingbourne Neighbourhood Plan 2019-31 Policy LC4	Provision of allotments
Aldingbourne Neighbourhood Plan 2019-31 Policy H1 2019	Provide Housing to meet District Council allocation
Aldingbourne Neighbourhood Plan 2019-31 Policy H2	Housing Mix
Aldingbourne Neighbourhood Plan 2019-31 Policy H3	Housing Density
Aldingbourne Neighbourhood Plan 2019-31 Policy H4	Affordable Housing
Aldingbourne Neighbourhood Plan 2019-31 Policy H7	Development in the vicinity of businesses
Aldingbourne Neighbourhood Plan 2019-31 Policy H8	Outdoor space
Aldingbourne Neighbourhood Plan 2019-31 Policy H9	Attention to detail

Planning Policy Guidance:

NPPDG	National Design Guide
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance

Supplementary Guidance:

SPD11	Arun Parking Standards 2020
SPD12	Open Space,Playing Pitches & Indoor& Built Sports Facilities
SPD13	Arun District Design Guide (SPD) January 2021

PRINCIPLE

The relevant policies are:

- Arun Local Plan 2018 (ALP) policies C SP1, SD SP1, SD SP2 & H SP1;
- Aldingbourne Neighbourhood Development Plan 2021 (ANDP) policies EH1, H1 2019 & GA1; and
- The NPPF paras 11 and 14.

Section 38(6) of the Planning and Compulsory Purchase Act 2004 states applications should be determined in accordance with the development plan unless material considerations indicate otherwise. In this case, the development plan comprises the ALP, the ANDP, the South Inshore & South Offshore Marine Plan and the West Sussex Waste and Minerals Plans.

Section 38 (5) of the Planning and Compulsory Purchase Act 2004 states: "If to any extent a policy contained in a development plan for an area conflicts with another policy in the

development plan, the conflict must be resolved in favour of the policy which is contained in the last document". Any conflict between the current ANDP and the ALP, should be resolved in favour of the ANDP.

In December 2020, the Council republished its Authority Monitoring Report (AMR) for 2019/20. This states the HLS has increased to 3.3 years. The HDT results for 2020 were published on 19/01/21 and show that Arun achieved 61%. The policies most important for the determination in the ALP (C SP1) have reduced weight as Arun cannot demonstrate an adequate supply of housing land (currently 3.3 years). The revised ANDP has recently been made (14/07/21) and so has greater weight.

Paragraph 14 of the NPPF states in situations where the 'presumption in favour of sustainable development' applies to applications involving the provision of housing, then the adverse impact of allowing development that conflicts with the neighbourhood plan will not significantly and demonstrably outweigh the benefits if four specific criteria apply. In this case, all four are applicable and the NPPF confirms the adverse impact of allowing development that conflicts with the neighbourhood plan is likely to significantly and demonstrably outweigh the benefits.

Having regard to Policy SD SP2 of the ALP and Policy EH1 of the ANDP, the site lies outside the Built Up Area Boundary (BUAB) of Aldingbourne (in which development should be focused) and instead is defined as being located in the countryside under the provisions of ALP policy C SP1 where development will only be permitted for a defined list of countryside uses (none of which apply).

ANDP policy EH1 relates to the BUAB and states development outside this area will be resisted. The policy recognises the need to provide more housing to meet the current housing land shortfall as defined by the Arun Local Plan and so provides an opportunity for development outside the BUAB provided it meets 7 criteria, these being:

(i) the scale of development is proportionate to the housing supply shortfall and local housing needs of the Parish and can be deliverable in the short term;
(ii) the development will protect the local landscape character and wider setting of the South Downs National Park and support the dark skies policy;
(iii) the proposal is sensitively designed and located and respects the character and built heritage of neighbouring settlements;
(iv) it is demonstrated through appropriate assessment that there would be no significant harm to biodiversity, including the roosting, feeding and commuting of bat species, or to bat species associated with the Singleton and Cocking Tunnels Special Area of Conservation (SAC) and Slindon Woods;
(v) the proposal is sustainably located and accessible to local facilities and services and sufficient capacity exists or can be provided to accommodate additional needs;
(vi) there would be no unacceptable environmental, amenity or traffic implications including an increased risk of groundwater flooding; and
(vii) the development does not lie within 50m of the biodiversity corridors where these are used by roosting or feeding or commuting bats.

Our analysis of these criteria is as follows:

(i) The scale would be proportionate to the housing supply shortfall defined by the ALP but it is not possible to say whether it is proportionate to Aldingbourne's housing needs and you will

need to investigate this. You will need to demonstrate that development can be delivered in the short term.

(ii) Our Landscape Officer (see comments later) does not object and states that subject to a landscaping scheme, the development can blend into the character of this rural fringe area. You need to ensure any lighting scheme is minimal and makes use of downlighters etc so as not to pollute the existing dark skies.

(iii) I am not able to advise on these aspects with the current level of detail and so this would require assessment at the detailed application stage.

(iv) This requires assessment through the Habitat Regulations process. This is something that ADC would be required to carry out but it would assist if you can provide a Shadow Habitat Regulations Assessment with the submission. This is covered elsewhere in this letter.

(v) It is stated later in this letter that the site is sustainably located but that mitigation is required (new footway/travel plan) to improve on this and encourage the use of walking & cycling.

(vi) I am not able to advise on these aspects with the current level of detail and so this would require assessment at the detailed application stage.

(vii) The site does not lie within 50m of the ANDP designated biodiversity corridors.

If you are unable to demonstrate compliance with these policy criteria, then you would be in conflict with policy EH1 and having regard to the provisions of para 14 of the NPPF, we would likely recommend the application for refusal. Should you be able to meet all 7 criteria the policy EH1, you would then benefit from the provisions of section 38(5) of the Planning and Compulsory Purchase Act 2004 i.e. being in accordance with a newer plan.

Please note that ANDP policy GA1 states that proposals which increase travel demand are to be located in places accessible to public and community transport.

The Council's Action Plan (June 2019) made a series of recommendations to boost housing delivery. This includes relying on the 'presumption in favour of sustainable development' until such time as the 5-year housing land supply is re-established and the HLS is progressed though plan making. It recommended the Council consider inviting applications from landowners/developers on 'deliverable' HELAA sites to re-establish the 5 year housing land supply. The part of the site south of the private drive has been subject to assessment in the HELAA under ref 20AL2 and is considered to be deliverable.

In February 2021, Arun published an Interim Policy Statement for Housing Delivery. This is not policy but it meant as a guide for developers proposing housing development on sites outside the BUAB and to inform planning decisions. It is stated to only apply to sites adjacent to settlement boundaries. This site does not adjoin with but is within 40m of the ANDP BUAB with a house and private drive in between and so would be considered to be adjacent. The Statement provides a tick list to determine whether sites are suitable to come forward. You have assessed the criteria in your planning statement and conclude with the exception of the site being outside of the BUAB, the proposal meets the criteria.

Paragraphs 10 and 11 confirm that at the heart of the NPPF (2021) is the presumption in favour of sustainable development. For decision taking this means approving development proposals that accord with an up-to-date development plan without delay. Alternatively, where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, planning permission should be granted unless the application of policies in the NPPF that protect areas or assets of particular importance provides a clear reason for refusing the development proposed, or any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the NPPF taken as a whole.

Footnote 8 confirms, for applications involving the provision of housing, this includes situations where local planning authorities cannot demonstrate a five year supply of deliverable housing sites (with the appropriate buffer, as set out in paragraph 74), or where the Housing Delivery Test indicates that the delivery of housing was substantially below (less than 75% of) the housing requirement over the previous three years.

The principle of development would be contrary to the policies in the Local Plan but, assuming all 7 criteria of policy EH1 are met, would be in accordance with the ANDP and the conflict between the two would be resolved in favour of the ANDP. Notwithstanding, there are material considerations that may serve to outweigh the conflict with the Local Plan.

DESIGN

The relevant policies are:

- ALP policies D DM1, D SP1, LAN DM1, AH SP2;
- ANDP policies H3, H8;
- National Design Guide;
- Arun Design Guide (adopted January 2021); and
- NPPF.

There are no immediate concerns with the layout on the masterplan. It is positive that the layout shows different road hierarchies, a centrally sited area of open space/play and good sized private garden areas. Some houses to the fringes appear quite close to trees so may not afford these trees sufficient respect and may result in concerns as shading of gardens by trees may result in future pressure from residents to prune or fell.

Clarification is required as to how the private drive will function (will it allow pedestrian/cyclist use, will it provide emergency access), what other links there will be for pedestrians/cyclists (will pedestrian footway be provided on the A29 for its length going north to link to the existing), how much of the POS is usable (and not taken up by SuDS), arrangements for future maintenance access to the existing ditches, whether any buildings will be visible from the road (if so these should be in character i.e. not semi, terraced, apartments) and whether there will be wildlife buffers to the existing natural boundaries.

The proposal is likely to be acceptable from the point of view of design subject to compliance with the policies, a more detailed assessment when the plans are finalised (depending on whether a full or outline application is submitted) and the comments above.

NEIGHBOUR AMENITY

The relevant policies are:

- ALP policies D DM1, QE SP1;
- Arun Design Guide; and
- NPPF.

The Arun Design Guide includes guidance and criteria on several aspects of layout in relation to residential amenity including distances between dwellings, front/rear garden depths, boundary treatments, defensible space and sunlight & daylight levels. Please review the Design Guide carefully and ensure your scheme achieves, as far as possible, the appropriate standards. In particular, please note the following interface standards:

- Back to Back: min. 21m between habitable rooms of properties or to existing buildings;
- Back/Front to Side: min. 14m between habitable rooms and side gable of adjacent property;
- Front to Front: min. 16m between habitable rooms of properties facing each other;
- Back to Boundary: min. 12m between habitable rooms and site boundary to existing landscaping.

(there are no standards given for either side to side or front to back)

A detailed measured assessment of the masterplan drawing has not been carried out but it does suggest there will be adequate interface distances and screening to houses on adjacent land.

The proposal is likely to be acceptable subject to compliance with the guidance in the Design Guide.

AMENITY SPACE PROVISION

The relevant policies are:

- ALP policy D DM1;
- ANDP policy H8;
- Arun Design Guide; and
- NPPF.

The Arun Design Guide sets out the following requirements:

- Private Rear Garden: min. 10.5m depth (smaller gardens with adequate daylight and privacy may also be acceptable in certain circumstances, when justified);
- Private Front Garden: min. 2m depth which will act as a defensible zone and privacy strip;
- Balconies: max. 2m beyond the building frontage, subject to minimum balcony to balcony distances of 17m. At least 3sqm of useable space; and
- Residential Communal Shared Spaces: minimum 40sqm plus 10sqm for each unit. These should be provided around the respective apartment building (like a moat of space).

These requirements are in addition to any Public Open Space requirements (set out elsewhere).

The proposal is likely to be acceptable subject to compliance with the Design Guide.

BIN STORAGE

ALP policy WM DM1 is relevant. Where bin stores are adjacent to the access road serving the development or across a parking area there will need to be a road up to full highway

standards and an indemnity provided for the Council's contractors to pass across servicing. Access of this type must be accessible/passable for collection schedules i.e. no parking or other obstruction. Maximum pulling distances under Health and Safety legislation are 10m for 1100 litre bins and 50m for 240 litre bins.

If any communal provision is near or adjacent to the highway it should be suitably enclosed and landscaped so that maximum pulling distances and vehicle access requirements are complied with. You may need to show a bin collection point (screened if on the main street) if any flatted buildings are proposed at or near the highway boundary. Refuse vehicle tracking must be for a 12m long vehicle.

The proposal is likely to be acceptable subject to compliance with the above.

AFFORDABLE HOUSING

Developments over 11 residential units require a minimum provision of 30% affordable housing on site as per ALP policy AH SP2. The ANDP policy states that affordable housing should trigger for sites of 10 or more however, your proposal is well in excess of this. The Council's Housing Strategy & Enabling Manager has made the following comments:

"In accordance with the Arun Local Plan 2018, the Council aims to ensure that 30% affordable housing is achieved on all new residential developments in the district where 11 units or more are proposed such as on this site. The Council's Affordable Housing policy requires a tenure split of 75% rented and 25% intermediate housing.

There is high demand for affordable housing throughout the Arun District for both rent and low-cost home ownership. As of June 2021, there were 1100 households in housing need on the Council's housing register.

To meet the requirements of the Council's Affordable Housing policy the applicants will need to provide 26 x affordable dwellings, which equates to 19 x rented and 7 x intermediate. The affordable housing statement should reflect the mix recommended in the Strategic Housing Market Assessment.

We anticipate that at least 50% of the rented dwellings would be set at rents no higher than 65% of open market rent and that the remainder do not exceed Local Housing Allowance levels, including service charge.

The development should comply with Policy AH SP2 of the Local Plan in terms of clustering. Ideally, the affordable dwellings should be in small clusters, of no more than five dwellings, which are pepper potted throughout the development.

The rent level of the rented homes should not exceed Local Housing Allowance (LHA) levels, including service charge. All of the necessary affordable housing requirements would need to be included in s106 planning obligation not secured by planning condition."

The proposal is likely to be acceptable subject to compliance with the above.

HIGHWAYS TRANSPORT AND PARKING

The relevant policies are:

- ALP policies T SP1 & T DM1;

- ANDP policies GA1 & GA3;
- NPPF; and
- Arun Parking Standards SPD.

Whether the intensification of the vehicular access to the adjoining site is acceptable depends on advice from WSCC Highways and you should approach them separately. For the Wings development to the north (AL/20/21/PL), WSCC requested several off-site transport mitigation measures. The applicant helpfully included these in the application red edge ensuring they can be secured through the s106.

In terms of parking, please refer to our Parking Standards SPD and note garages (if measuring at least 6m x 3m internally), only qualify as 0.5 of a space (garages less than 6 x 3 would not be counted at all). However, car ports/barns are still counted as 1 space.

We wish to see any development provides additional opportunities for walking/cycling throughout the layout and to adjacent roads/footpaths/land. You indicate there will be footway access to link to the existing on Lidsey Road but this is not shown by the masterplan. It would be useful if a second pedestrian access could be created where the site comes close to the A29 north of Woodgate House (however this may not be possible as it noted that the red edge does not quite meet the road edge).

Given the proximity to the A27 and the scale of development, Highways England would be consulted. You may wish to note that for the Wings development to the north, they asked for a strategic highway contribution and this is being included in the s106 Agreement.

SUSTAINABLE CONSTRUCTION

ALP policy ECC SP2 "Energy and Climate Change Mitigation" is relevant. Major developments are required to produce 10% of the total predicted energy requirements from renewable or low carbon energy generation on site, unless it can be demonstrated that this is unviable. Energy efficiency measures will be taken into consideration when the total predicted energy requirements are calculated. The Council will consider 'allowable solutions' where it is clearly demonstrated that the provision of on site renewable or low carbon energy generation is unviable or not feasible." The Arun Design Guide includes guidance on sustainable construction. The proposal is likely to be acceptable subject to compliance with the above.

BARNHAM SPECIAL CONSULTATION AREA

Due to flooding problems during the winter of 1993/94 in the Barnham area, a Barnham Rife Catchment Area was defined. Special development control consultation procedures with Southern Water services and the Environment Agency apply to this area. Recently, there have been significant pollution problems associated with an inadequate foul sewer network which is unable to cope especially in times of high rainfall.

Although only a very small part of your site is in this designation (the strip of land between April Cottage & Woodgate House), it is necessary to demonstrate compliance with part 3 of ALP policy W DM1. To comply with this, you will need to provide a Drainage Impact Assessment that takes account of both the individual and cumulative impacts upon foul water disposal; flood storage capacity and surface water drainage or flood flows within the Lidsey Wastewater Treatment Works Catchment Area. Please also see the response of our drainage engineer set out elsewhere in this letter.

The site lies in Flood Zone 1 (low risk) and that future climate change models are not

predicted to change this designation.

The proposal is likely to be acceptable provided a surface water drainage statement and drainage impact assessment are provided.

PROTECTED TREES

The relevant policies are:

- ALP policy ENV DM4;
- ANDP policy EH6;
- Arun Design Guide; and
- NPPF.

The presence of large trees & hedging to the site boundaries/in the site is noted. It appears as though the new access goes through or runs very close to a line of mature trees The Council's Tree Officer assessed the proposal with the following comments:

"There are significant trees both on and off this site which could be adversely affected by the proposals. There is no supporting arboricultural information submitted with the application - a requirement of BS5837:2012. As such, were this application to now proceed, we will not have sufficient
information to guarantee such trees would be adequately respected and protected.

The illustrative masterplan appears broadly sympathetic to the presence of established trees and hedgerow, although we cannot be confident that is the case until we see a detailed survey with trees and hedgerow accurately plotted on a topographical map and overlaid with plots and infrastructure.

As a guiding principle of layout design; careful consideration should be given to the intended land use beneath existing canopy of established trees and the potential for further tree growth (root and crown extension). With such a large and open site to work with I would expect a layout proposal to place great emphasis on eliminating future 'pressure to prune' of retained trees.

Furthermore, there would need to be a compelling argument in favour of any Root Protection Area incursion as this site clearly lends itself to a harmonious design that avoids direct interference with established trees of current and future landscape value.

Trees that provide high visual amenity should be made focal points both within any development and from beyond, not obscured by built form; in addition to allocating sufficient area of undisturbed ground around their ultimate root and crown spreads.

1. The applicants will need to employ the services of an Arboricultural Consultant to carry out a tree survey exercise and then prepare an Arboricultural Implications Assessment (AIA) which must be inclusive of; a 'Tree Survey Schedule', a 'Root Protection Area (RPA) Schedule' and a 'Tree Constraints Plan' - with the trees accurately plotted on same.

2. In the event that a RPA of any tree which is proposed for retention overlaps the development then BS5837:2012 requires that the Detailed Planning Application is accompanied by an Arboricultural Method Statement (AMS) and also most importantly a Tree Protection Plan - to both describe and illustrate the mitigation measures which are to be

employed to ensure that the trees survive without detriment to their vigour and vitality and are given adequate protection both above and below ground."

The proposal is likely to be acceptable subject to important trees being respected/preserved and replacement trees being planted to compensate for any lost. This should be on a ratio of 2:1 and new trees should be native species and of a potential scale to correspond with the scale of any lost.

OPEN SPACE PROVISION

The relevant policies are:

- ALP policy OSR DM1 (2); and
- the Open Space, Playing Pitches, Indoor and Built Sports Facilities SPD.

According to our SPD, 85 new dwellings would require the following:

- 7,013m2 of well connected, usable, quality POS provision within the development; and
- Included within this figure, play provision totalling 1,029m2 in the form of onsite LAPs and a LEAP.

The SPD sets out requirements for allotments, built leisure and sports pitches but these would be collected through CIL.

The POS should be all useable and drainage features should not be counted in the area requirements. The areas need to connect in and beyond the site promoting and enhancing footpath and cycle links and their use in the wider area. The play areas should be separate facilities, not combined in one area.

The proposal is likely to be acceptable subject to compliance with the above.

LIGHT POLLUTION

ALP policy QE DM2 states outdoor lighting should not have adverse impact on neighbouring uses or the wider landscape, particularly with regard to the South Downs International Dark Sky Reserve designation. Light levels should be the minimum required for security and working purposes. ANDP policy EH10 states proposals which detract from unlit environments of the Parish will not be supported and that new lighting will be required to conform to the highest standard of light pollution restrictions in force at the time.

Lighting should be designed to minimise impact on bat and other nocturnal wildlife species in the area. This is especially important given that bats and other wildlife will be using the trees in/adjacent to the site. This will require further assessment at application stage by both Environmental Health and our Ecologist or can be made subject of a condition.

NOISE POLLUTION

Local Plan policies emphasise noise sensitive development will not be permitted if its users would be affected by noise by noise generating uses. ALP policy QE DM1 requires that residential development likely to experience noise from road be supported by a noise assessment.

The Council's Environmental Health officer (see comments elsewhere) requested an acoustic report be submitted which takes into account noise from nearby noise sources such as the

A29 & the adjacent horticultural nursery premises. This assessment should consider noise to residents from any new noise sources (such as heat pumps, pumping stations and electricity sub-stations).

The proposal is likely to be acceptable subject to the submission of an assessment and assessment by Environmental Health.

CONTAMINATION

Development on or in close proximity to hazardous sites or contaminated land will be permitted provided the Council is satisfied that appropriate remedial measures can be or have been undertaken in respect of human health and groundwater. The requirements of ALP policy QE DM4 should be met.

Environmental Health requested contaminated land information be submitted as part of an application. The proposal is likely to be acceptable subject to the submission of this and assessment by Environmental Health.

INFRASTRUCTURE PROVISION

The relevant policies are:

- ALP policy INF SP1; and
- Arun CIL (this site is in Zone 3).

Any off-site financial contributions (except if requested by Highways England) will be sought through CIL at the current rate. A s106 Agreement will be used for on-site affordable housing and any other on-site mitigation. If highway improvements are proposed and they are in the red edge these can be secured through a s106. We may use conditions to secure delivery of POS and play areas.

PROTECTED SPECIES

The relevant policies are:

- ALP policy ENV DM5;
- ANDP Policy EH6;
- ANDP Review Policy EH12 2019; and
- NPPF.

The site is within 12km of the Singleton and Cocking Tunnels Special Area of Conservation and is a greenfield site with large trees in and to the boundaries. You will need to submit a phase 1 Wildlife Survey and any species specific surveys as required by the results of the Phase 1. These species specific surveys must be submitted prior to determination and cannot be made subject to condition. You will need to demonstrate the proposal results in a net gain in biodiversity. In accordance with national policy, this should provide as a minimum a 10% gain but strive for greater.

Policy EH12 2019 of the ANDP states proposals for development of greenfield sites must evaluate whether there is a potential for the loss of suitable foraging habitat and/or the severance of commuting flight lines, such as in the form of mature treelines. The policy seeks retention of such features unless it can be proven that they are not used by Barbastrelle, Bechstein or other bats linked with nearby roosting sites. It is noted your site is not adjacent to any ANDP designated biodiversity corridors.

The proposal is likely to be acceptable subject to receipt of the information & details set out above.

SITE OF INTERNATIONAL IMPORTANCE FOR NATURE CONSERVATION

- ALP policy ENV DM1
- South Downs National Park Authority (SDNPA) Local Plan policy SD10
- NPPF

SDNPA policy SD10 is applicable as approximately half of the site* lies in the 12km buffer of the Singleton & Cocking Tunnels Special Area of Conservation. Policy SD10 advises significant impacts on bats or severance of flightlines should be considered. It is recommended you carefully consider impacts on bats and ensure that hop over points are provided where gaps are created in tree belts. We will consult our Ecologist, Natural England and the South Downs National Park Authority at application stage to determine compliance with these policies.

* it is the northern half but the designation crosses the site at an angle.

We will have to carry out an Appropriate Assessment as per the Habitat Regulations 1997 to determine whether there is any impact from the proposal on the SAC. Appropriate Assessments have been carried out in respect of sites including AL/79/20/OUT & AL/20/21/PL. This issue was considered by an Inspector in the appeal decision for Sundown, Little Heath Road, Aldingbourne (APP/C3810/W/19/3241407). In order to do this, it would be helpful if you can provide a Shadow Habitat Regulations Assessment.

LOSS OF AGRICULTURAL LAND

The relevant policies are:

- ALP policy SO DM1;
- ANDP Policy EH3; and
- NPPF.

Your planning statement notes the site area comprises of three agricultural fields. It states the proposal will avoid/protect/conserve the best and most versatile/productive soils but there is no evidence given as to the grade of the land.

ALP policy SO DM1 states the use of Grades 1, 2 and 3a of the Agricultural Land Classification for any form of development not associated with agriculture, horticulture or forestry will not be permitted unless the need for the development outweighs the need to protect such land in the long term. ANDP policy EH3 is relevant and states development proposals affecting best and most versatile agricultural land will be resisted unless it can be demonstrated it supports diversification of an agricultural enterprise or other land-based rural business; or the need for the development clearly outweighs the harm.

The policies require that you submit sustainability and options appraisals, mitigation measures and a soil resources plan for the development site. Failure to provide the reports mean we would have to report conflict with the policies although this conflict would then be subject to the overall balancing exercise of harm versus benefits. As a minimum, you need to provide a soil resources/mitigation plan to set out how the important soils are to be protected during construction and then retained/reused.

It is considered that a case can be made for the harm to be outweighed by housing need but that you will still need to demonstrate compliance with all parts of policy SO DM1.

OTHER CONSIDERATIONS

HOUSING MIX:

ALP policy H DM1 provides for a mix of housing to meet local needs and requires development to provide a mix of dwelling types and sizes to address the nature of local housing needs and market demand. The policy preamble (12.2.4) acknowledges that the final mix will be negotiated on a site by site basis, having regard to the most up to date Strategic Housing Market Assessment (SHMA).

The 2012 SHMA was the subject of an update by GL Hearn in 2016 ("Updated Housing Needs Evidence", Sep 2016) in which paragraph 6.3 stated that the evidence highlighted a direction towards the provision of 2 and 3 bed units for market units and smaller affordable units. The 2016 update acknowledges at paragraph 6.10 that the analysis clearly shows the different profiles in the different broad tenures with affordable (rented) need being more heavily skewed towards smaller dwellings and market housing predominantly homes with three or more dwellings. Table 29 identifies a suggested broad mix housing by size and tenure for the District.

ANDP policy H2 states that "Proposals for new housing must deliver a range of house types, sizes and tenures. Applicants should demonstrate how the proposal will meet local needs. This is also referred to in one of the 7 criteria for policy EH1. It is recommended that you discuss this with the Parish Council."

The proposal is likely to be acceptable subject to the mix being in accordance with the stated policies.

HOMES FOR OLDER PEOPLE:

ANDP Policy H2 states proposals where at least 25% of dwellings meet Lifetime Home Standards, or its equivalent, will be supported. Lifetime Home standards no longer exist and the equivalent current standard is contained in part M4(2) of the Building Regulations. To achieve this support, a scheme of 85 dwellings should provide at least 21 M4(2) homes.

Arun DC has an agreed internal policy on the provision of housing accommodation to provide for an ageing generation ("Accommodation for Older People and People with Disabilities", 2020). This is not adopted policy or a supplementary planning document but is considered to have some weight as a material planning consideration. It is supported by references in ALP policies D DM1 & D DM2. For a scheme of 85 dwellings, this requires at least 42 of the homes (50%) are designed to the M4(2) standard, and that 4 are designed to meet M4(3) i.e. be wheelchair accessible. These units should both be in the open market and affordable sectors.

INTERNAL SPACE STANDARDS:

The relevant policies are:

- ALP policy D DM2;

- Arun Design Guide; and
- National Space Standards.

Please ensure the scheme is in accordance with the nationally described space standards.

AIR POLLUTION:

ALP policy QE DM3 states that major development proposals must assess the likely impacts of the development on air quality and mitigate any negative impacts. This can be achieved by:

a. Ensuring the development is located within easy reach of established public transport services;
b. Maximising provision for cycling and pedestrian facilities;
c. Encouraging the use of cleaner transport fuels on site, through the inclusion of electric car charging points; and
d. Contributing towards the improvement of the highway network where the development is predicted to result in increased congestion on the highway network.

Environmental Health requests an air quality report be provided and the proposal is likely to be acceptable subject to the submission of this. You should provide electric car charge points in the development as per the requirements of the Arun Parking Standards SPD.

ECONOMIC DEVELOPMENT COMMENTS:

"If an application comes forward Economic Development would ask that an Employment and Skills Plan is put in place and that applicants use local supply chains. We are happy to assist with both."

Please note the requirements of ALP policy SKILLS SP1 as set out in the validation section.

LANDSCAPE COMMENTS

The Council's Landscape Officer has made the following comments:

"This proposed development site is open agricultural, located west of the A29 and south of the railway crossing at Woodgate. There are no physical, visual, historical or cultural links, protected landscapes, scheduled ancient monuments, listed buildings, conservation area or Historic Parks or Gardens associated with this site. South Downs National Park to the north

This proposal is for residential development of up to 85 dwellings. The site is adjacent to Woodgate Nurseries, Woodgate, West Sussex, 1 mile to the south of Westergate and 4 miles to the north of Bognor Regis. The site sits outside a defined built-up area boundary, but adjacent to the west of the BEW Strategic Housing Allocation. The site is approximately 3.5 ha and comprises three agricultural fields, two to the south of Woodgate House that are regular in shape and one irregular field to the rear and north.

The site benefits from a relatively flat topography, and is visible from the A29 which runs along its south eastern boundary. The northern and north eastern boundaries abut existing residential dwellings. To the south and west of the site is open countryside and agricultural / horticultural holdings. The site is not in the setting of any heritage assets, however, the southern section of the site does lie within an SSSI Impact Zone.

The information provided in the Draft Planning Statement June 2021 and Illustrative Masterplan indicates a well-spaced site with a good central area of POS surrounded by areas of housing. The indicative location of the areas of POS would appear to allow for the formation of a village green area and areas that cater for existing trees and hedges on the boundaries and in the site, where some worthy of retention trees and hedges are located. Of note is the mention re the removal of conifers in favour of native tree planting, this will need to be in consultation with the LPA Tree Officer.

Any trees which are worthy of retention must be considered, protected and retained. Trees along the A29 road frontage will provide screening and are contributing to wildlife habitat in this location. This site does not form part of any strategic allocation identified for development in ADCs adopted Local Plan 2011-2031. It would be assumed that CIL contributions would be sought accordingly, these will need to include contributions towards playing pitches, sport, leisure, pools, halls and ancillary facilities as set out in ADC SPD Open Space, Playing Pitches, Indoor and Built Sports Facilities January 2020.

The design of the site should promote a high-quality development that respects, maintains and enhances the local landscape character. This new development should consider the character and distinctiveness of the area reflecting local design characteristics where possible and its setting with the surrounding countryside and rural fringe. All nature conservation features within the development site including existing habitats, trees, hedges, watercourses and other features should be incorporated into the site design and protected from change.

Quality, well-designed Public Open Space will be fundamental to any proposal submission, these will need to accord with Arun District Councils OS SPD January 2020. There would be requirement for confirmation of the areas of public open space proposed with this development, and clarification re quantum. The Landscape Masterplan shows where these are proposed, but includes SuDS features in these areas. Our SPD January 2020 would require 7,0125m2 as a minimum of well connected, usable, quality POS provision within this development.

This development will trigger the requirement for play in the form of onsite LAPs and LEAP provision, which would need to be suitable for location in material choice and play experience offer. Both LAP and LEAP have been indicated and appear to be well located in the development which is good to see. Off-site allotment contribution would be triggered from this development.

POS areas will need to connect within and beyond the site promoting and enhancing footpath and cycle links and their use in the wider area. Consideration should be made to the siting of open space and buffer areas and their use in softening and integrating the proposals with any existing residential development on this fringe. POS should be considered not only for any larger open character areas but also any perimeter buffer areas. Buffer areas will be important in this setting because of the A29 and proximity to existing dwellings. Planting within the boundaries will be needed with a varied species composition and create buffer zones which will assist in providing screening and habitat formation.

SuDS Policy W DM3 of the Arun Local Plan requires development to integrate SuDS into the overall design of the development. The primary purpose of SuDS is to minimise the impact of urban development on the water environment, reduce flood risk and provide habitats for wildlife. SuDS should increase the levels of water capture and storage. It is essential that

SuDS do not impact on the usable levels of public open space whilst providing benefit in the correct capacity within the development and should not be included in the 'usable open space calculations' SuDS feature are presently shown within the POS areas.

The potential impact on the location would require that Landscaping be provided as mitigation towards screening and softening of the development. Consideration will be required re the access into the site and the Impact this may have on existing trees and hedges on any boundaries. Consideration would also need to be made re access from the A29.

Existing green vegetation is evident along the boundaries of this site and further enhancement and improvement would be required. A robust and detailed landscape scheme will be required within these proposals for all areas of development and POS to increase biodiversity net gain and habitat within this rural fringe site. Opportunities to enhance the landscape in association with any development of the site, by implementing an ambitious soft landscape and tree planting programme would be sought. A detailed landscape scheme which would incorporate a good selection of native tree species in conjunction with suitable ornamentals would be required.

All greenspaces should be considered and valued and their connection for biodiversity and habitat explored. Tree specification should be at a size which allows instant impact, but which will establish and mature as the site develops. There is a requirement for any scheme, in accordance with policy to be of High-Quality Design. The emerging landscape design aims should be:

- To design and implement a scheme that reflects and incorporates elements of its surroundings and enhances the atmosphere of local distinctiveness.
- To create a visually pleasing and interesting landscape for owners, employees and visitors to the development.
- To enhance the landscape quality of the site when viewed from the surrounding area.
- To provide a planting scheme that includes native species to blend with the surrounding location, enhance biodiversity and create enhanced wildlife corridor opportunity.
- To provide a sense of flow and cohesion between the different elements of the landscape, buildings, open areas and surrounding environment

A clear indication of the future management of the open space must be set out. A clear directive of responsibility should be set out with this statement explaining how the differing typologies will be maintained ie responsibility of play and public open space areas.

Early and continued consultation throughout development progression is welcomed. A landscape led development in this location would be advised in order to blend this development proposal into the character of this rural fringe area. I would have no landscape objection to the PAA outline proposals as presented based on the Landscape Masterplan submitted with this application."

DRAINAGE ENGINEERS COMMENTS

The Council's Drainage Engineers have made the following comments:

"Site Specific Comments:
A Drainage Technical Note has been provided as part of the pre-application advice documents. It is encouraging that the applicant is considering surface water drainage at this stage of the process. As noted in the document there are watercourses on some of the

boundaries of the site which require further investigation and (depending on the drainage strategy) remediation works. Irrespective of the surface water drainage strategy, a 3m easement must be provided from the top of the bank of all watercourses, this must include all boundary treatments including fences.

The Drainage Note references ground investigations completed by Ashdown Site Investigation Ltd, however, as far as I can see this has not been supplied. The report refers to high groundwater but no monitoring data has been supplied.

The Drainage Technical Note also rules out infiltration 'due to the presence of impermeable ground' (para 5.1). This is an insufficient justification and we would expect infiltration testing to be done in winter months above peak groundwater level and at the proposed location of any infiltration devices to confirm whether or not infiltration is viable.

IF infiltration is proven to not be viable then we will support disposal of surface water to a watercourse. In this case, the applicant will need to provide their calculations for QBAR (mean greenfield runoff) as the proposed discharge rate of 8l/s seems high. The discharge rate must be calculated using only the proposed impermeable area of the site.

The applicant is encouraged to contact this department in advance of winter to agree the level of groundwater monitoring and infiltration testing that is required. Doing insufficient ground investigations without consulting us beforehand can result in extensive delay to the project in having to wait for the following winter to undertake further surveys.

General Comments (excuse any duplication):

The hierarchy for sustainable drainage must be followed with infiltration fully investigated. Winter infiltration testing and winter groundwater monitoring must be undertaken, it is advised that the applicant discusses the extent of this monitoring with us at the earliest opportunity. Infiltration tests must be carried out in accordance with BRE365, CIRIA R156 or a similar approved method and cater for the 1 in 10 year storm event plus 40% on stored volumes, between the invert of the entry pipe to the soakaway, and the base of the structure. It must also have provision to ensure that there is capacity in the system to contain below ground level the 1 in 100 year storm event plus 40% on stored volumes, as an allowance for climate change. Adequate freeboard must be provided between the base of the soakaway structure and the highest recorded annual groundwater level identified in that location.

If on-site infiltration is not possible, drainage via a restricted discharge to a suitable local watercourse may be acceptable. Any discharge should be restricted to the mean QBAR greenfield run-off rates for all design storm events. This rate is derived from only the impermeable area of the development, including any permeable areas that are positively drained. A minimum allowable rate of 2 l/s is generally considered to avoid blockage risk of flow control devices, however, lesser rates can be achieved if adequate blockage prevention measures are incorporated.

We suggest that, at the earliest stage, the developer gives due consideration to the appropriate location and design of surface water drainage features to achieve necessary capacity, water quality (via the SuDS management/treatment train), as well as ease of on-going maintenance. Surface water drainage features should also be designed in a manner that positively affects the amenity of the site.

We would like to remind the developer that, open features, such as swales, basins and ponds, when designed correctly, can satisfy all the above aspirations in addition to; being easier to maintain, having longer lifespans and offering ecological advantages over subterranean features such as "plastic crate systems".

It should be noted that attenuation features should not be counted within useable public open space provision. Existing and proposed trees (root protection zones) must not conflict with suds features/pipework. Ground raising is discouraged. If it is considered absolutely necessary, then due consideration must be given to the potential impacts on existing properties adjacent the development site, in terms of possible elevated groundwater levels and surface water run-off implications. Adequate treatment of surface water must be ensured prior to discharge.

Supplementary guidance notes regarding surface water drainage are located on Arun District Councils website. A surface water drainage checklist is also available, and this should be submitted with a Discharge of Conditions Application."

ENVIRONMENTAL HEALTH COMMENTS

The Council's Environmental Health Officers have made the following comments:

"Contaminated land - Standard contaminated land condition to be attached to any permission granted, and a precautionary watching brief condition

Air Quality - The applicant shall submit an Air Quality Impact assessment to assess impacts of NO2 PM10 and PM2.5 from both the construction operational phases of the development. The AQIA shall include emissions mitigations cost calculations in accordance with Air Quality & Emissions Mitigation Guidance for Sussex (2013)

Construction - Standard Construction Environmental Management Plan condition attached to any permission granted

Road traffic noise - A noise assessment for impacts of traffic noise from the A29 on residents in the proposed development will be required. The assessment shall include mitigation measures to ensure internal and external area/s noise level criteria detailed in BS8233:2014 are met.

Nursery and commercial premises noise - A noise assessment for impacts of commercial / industrial noise from Woodgate Nurseries and any other nearby commercial units on residents in the proposed development will be required. The assessment shall include mitigation measures to ensure that noise level criteria for internal and external area/s detailed in BS8233:2014 are met.

Electricity sub-station noise - If an electricity substation is to be installed as part of the proposal then it will be necessary to demonstrate that noise will be controlled so as not to cause a potential nuisance to residents, the assessment shall include consideration for low frequency noise.

Pumping station noise - If a pumping station is to be installed as part of the proposal then it will be necessary to demonstrate that noise will be controlled so as not to cause a potential nuisance to residents, the assessment shall include consideration for low frequency noise.

Air Source Heat pump - If any air source heat pumps are to be installed, they must be installed in accordance with MCS standards 2020. Noise shall be less than 42dBa at the facade of the nearest receptor.

External Lighting - The applicant shall be required to provide details of external lighting to include the type of lighting appliance, the height and position of fitting, illumination levels and light spillage."

CONCLUSION

Paragraph 11 of the NPPF sets out the application of the 'presumption' for sustainable development which is triggered where policies most important for determining the application are out-of-date. To be able to benefit from the presumption, the proposal must be assessed as being sustainable development and this assessment should consider environmental, social and economic factors.

The proposal despite being outside of the BUAB, is sustainably located as it lies on the southern edge of Aldingbourne and it will be possible for residents to use non-car means of transport to access schools, pubs, shops and other services. This is reliant on footway being provided on the site frontage to enable pedestrians to walk from the site to the north. The site context plan shows the presence of nearby shops/facilities but please correct the location of the site as it is shown too far to the north on this (it currently corresponds with the Wings site).

Whilst the private car could be required for longer distances, residents would not need to rely on a car for local journeys. Recent applications (BN/50/20/PL and AL/20/21/PL) have included measures in their Travel Plans to provide future residents with Travel Information Packs, cycle vouchers and other benefits to encourage alternative means of transport. You should consider doing the same.

The proposal results in economic and social benefits but you should seek to quantify these through an application submission. We will need to consider any environmental, social or economic harms such as disturbance to wildlife, loss of agricultural land and any increase in air pollution. It is not possible at this time to say for certain whether the proposal meets the definition of Sustainable Development. It may not be necessary to apply the NPPF presumption in favour of sustainable development as subject to meeting the 7 criteria in ANDP policy EH1, you may be in accordance with the most recent policies of the development plan despite the site being outside the BUAB.

Please consider impacts of the proposal cumulatively alongside committed or proposed developments in the local area. This assessment should cover highway impacts, infrastructure requirements and air pollution. You should make reference to the BEW strategic allocation and any unbuilt sites in existing/proposed Neighbourhood Plans. For instance, the nearby Wings and Land North of Lees Yard sites. You may also find it useful to review the sites in the latest HELAA.

You are strongly advised to discuss the proposal with Aldingbourne Parish Council and give a presentation on any draft detailed application to the Barnham, Eastergate and Westergate Advisory Group (BEWAG), prior to submission. Please contact us if you wish to do this.

FOLLOW UP MEETING

Your pre-application advice fee included a meeting so please contact me to arrange a convenient appointment.

MAKING AN APPLICATION

If you decide to proceed with making an application you will need to quote the reference number for this advice in the pre-application advice section of the relevant application form. This will ensure that the application receives priority and a speedy validation process.

You will need to submit the following documentation/information with your application to meet the National Validation Requirements:

Fully completed and signed Application Form with full description of the proposal;
Ownership Certificate and Agricultural Land Declaration;
Notice of Service on any other Landowners (to include WSCC Highways);
Design and Access Statement;
Correct Fee;
Location Plan (1:1250);
Site / Block Plan (1:500); and
Proposed Elevations, Floor Plans, Roof Plans.

You should also consider putting in a Screening Request to determine whether or not an EIA would be required.

The Council has a Local Validation Requirements List for each type of application and you should refer to it before submitting your application. Failure to provide the required documentation will result in the application being treated as incomplete and delay the validation of the planning application.

Having looked though the Local Validation Requirements List, I would suggest that the following additional documents will be required:

Street Scene & Section Drawings;
Topographic Survey;
CIL Additional Information Form;
Affordable Housing Statement;
Biodiversity Survey and Report (plus any required species specific surveys);
Flood Risk Assessment;
Foul and Surface Water Drainage Statement;
Land Contamination Assessment;
Lighting Strategy;
Tree Survey and Arboricultural Report (see Tree Officer comments elsewhere in this letter);
Landscaping Strategy;
Noise Assessment; and
Transport Assessment & Travel Plan.

In addition:

- Policy W DM3 requires that you submit a Drainage Impact Assessment though this could

form part of the Foul/Surface Water Drainage Statements;
- Policy ENV DM5 requires that a net gain in biodiversity be demonstrated;
- Policy QE DM3 requires that you submit an assessment of the likely impacts of the development on air quality. This should take the form of an Air Quality Assessment;
- Policy SO DM1 requires that you submit sustainability and options appraisals, mitigation measures and a soil resources plan for the development site; and
- Policy SKILLS SP1 requires that Employment and Skills plans are submitted for the construction phases of residential development of more than 50 homes.
- The site lies in an Archaeological Notification Area (RAG rating RED) and as such, policy HER DM6 requires that you submit a desk based archaeological assessment of the proposed development site as undertaken by a suitably qualified person.

It would be very helpful (if a full application is submitted) if you could provide a Plot Information Schedule (to include no. of beds/no. of persons, internal space standards in m2, external garden depths in m). If you are able to, it would be helpful to have materials and parking provision on this (but not essential). This will assist us in demonstrating compliance with certain other policies.

Should any changes in levels be proposed then it would helpful if you could provide a drawing to show new vs old levels and finished floor levels.

Due to the location in the 12km buffer of the Singleton & Cocking Tunnels Special Area of Conservation (SAC), we have to carry out an Appropriate Assessment as per the Habitat Regulations 1997 to determine if there is any impact on the SAC. In order to do this, we require you to submit a Shadow Habitat Regulations Assessment. This is not an official validation requirement but is required to carry out an Appropriate Assessment and it is much easier to do this with a SHRA to refer to.

You should be aware that any advice given by the Council in relation to pre-application advice will be based on the case Officer's professional judgement and will not constitute a formal response or decision of the Council with regard to any future planning applications. Any views or opinions expressed are given without prejudice to the consideration by the Council of any formal planning application which will be subject to wider consultation and publicity. Although the case officer may indicate the likely outcome of a formal planning application, no guarantees can or will be given about the decision that will be made on any such application. Any further correspondence will be at the Case Officer's discretion depending on the nature of the further enquiry. It may be necessary to submit a further pre-application advice request. Please note this advice only relates to planning and does not relate to any other legislation which may or may not apply such as Building Regulations or ordinary watercourse consents. You will need to carry out your own checks to determine whether any other consents or permissions are required.

I trust this is of assistance to you.

Yours sincerely

Neil Crowther

Group Head of Planning

Appendix 8

Pre-Development Enquiry Response from Southern Water

from Southern Water

Alistair Aitken
Fortridge Consulting Limited
Stone House Business Centre
Market Place
Chipping Norton
OX7 5NA

Your ref

Our ref
SWS-SUSXW-CC-005793

Date
30 September 2021

Contact
Tel 0330 303 0119

Dear Mr Aitken,

Level 1 Capacity Check Enquiry: Land Adjacent to Woodgate House, Lidsey House, Woodgate, Chichester, West Sussex, PO20 3SU.

We have completed the capacity check for the above development site and the results are as follows:

Foul Water

There is currently inadequate capacity within the foul sewerage network to accommodate a foul flow of **0.86 l/s** for the above development at manhole reference SU9303**7903**. The proposed development would increase flows to the public sewerage system which may increase the risk of flooding to existing properties and land. Additional off-site sewers or improvements to existing sewers will be required to provide sufficient capacity to service the development. Southern Water has a duty to provide Network capacity from the point of practical connection (point of equivalent or larger diameter pipe) funded by the New Infrastructure Charge.

Southern Water aim to provide this within 24 months following the date that planning has been granted for developments not identified as strategic sites in our current business plan. Strategic sites are larger developments and will often take longer than 24 months for a full solution to be provided.

The nearest point where capacity is currently available is at **Lidsey WTW** which is located approximately **800m** South East of the proposed development site. Rights are not issued for a direct connection to Wastewater Treatment Works (WTW). Please note that connection to the WTW will have to be agreed by Southern Water Services before being carried out.

New Infrastructure Charging

Please note as of 1st April 2018 we have moved to the “New Connections Services Charging Arrangements”. We understand that this may cause uncertainty for customers, particularly where they may have already committed to a development based on previous charging arrangements. We have worked with our stakeholders and Water UK to agree a set of principles by which we will base

our charges. Please read through our new charging arrangement documents available at the following link: southernwater.co.uk/developing-building/connection-charging-arrangements

Alternatively, New Appointees and Variations (NAVs), also known as 'inset' companies, can provide new connection services or take ownership of the new water and wastewater connection infrastructure provided for a new development. NAVs are appointed by Ofwat and replace the regional water company. It is for the developer to choose whether to use a NAV or the regional water company to supply services for new sites, according to certain legal criteria.

Connecting to our network

It should be noted that this information is only a hydraulic assessment of the existing sewerage network and does not grant approval for a connection to the public sewerage system. A formal Sewer Connection (S106) application is required to be completed and approved by Southern Water Services. To make an application visit: Developer Services Portal (southernwater.co.uk)

Please note the information provided above does not grant approval for any designs/drawings submitted for the capacity analysis. The results quoted above are only valid for 12 months from the date of issue of this letter.

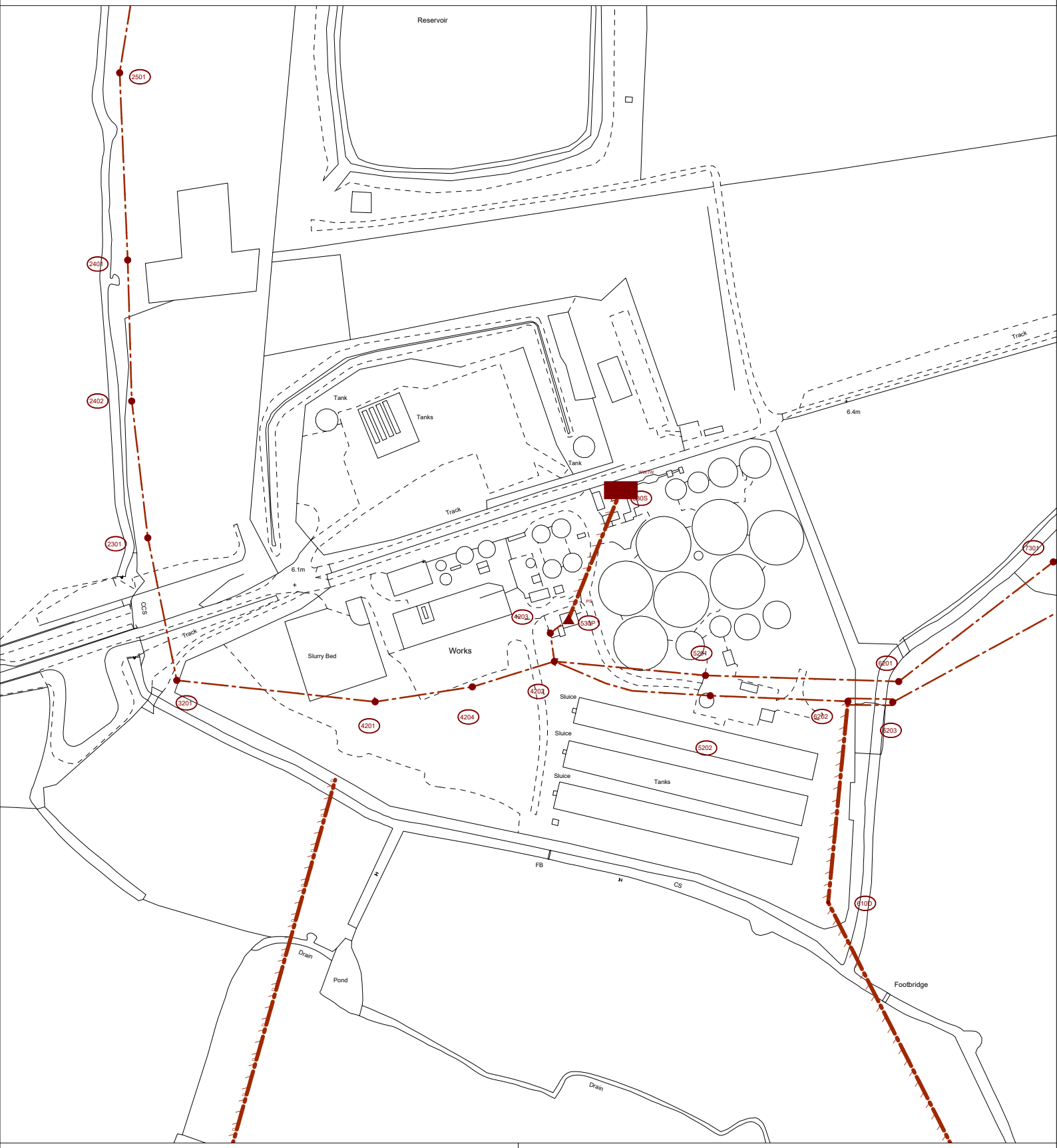
Should it be necessary to contact us please quote our above reference number relating to this application by email at southernwaterplanning@southernwater.co.uk

Yours sincerely,

Growth Planning Team
Business Channels

southernwater.co.uk/developing-building/planning-your-development

SOUTHERN WATER



The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

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Southern Water

O.S. REF: SU9403SW	Scale: 1:2500	N	Printed By: Mercy	Date: 30-9-2021
Sewer Plot			WTW
WARNING: BAC pipes are constructed of Bonded Asbestos Cement			Requested By:
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement			

ARUN DISTRICT COUNCIL AI/129/21/OUT

SOUTHERN WATER

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site.

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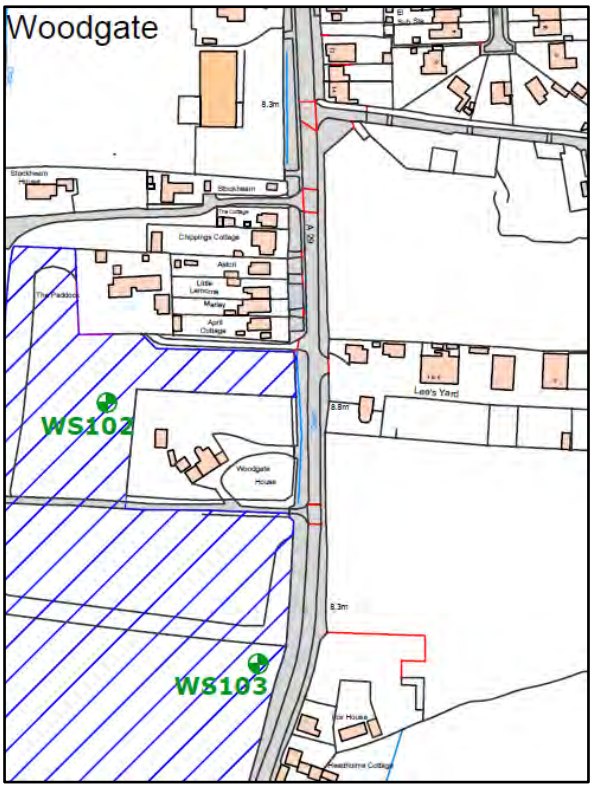
Southern Water

O.S. REF: SU9303NE	Scale: 1:2500	Printed By: Mercy	Date: 14-9-2021
Sewer Plot		Site Plan	
WARNING: BAC pipes are constructed of Bonded Asbestos Cement		Requested By:	
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement			

ARUN DISTRICT COUNCIL AL/129/21/OUT

Appendix 9

Site Investigation Information WS102 and WS103



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LOCATION PLAN FOR WINDOW SAMPLES WS102 AND WS103

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WS LOCATIONS SHOWN ON DEVELOPMENT LAYOUT

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Woodgate, West Sussex

Job Number: P14891

Start Date: 19/11/2020

End Date: 19/11/2020

Borehole Number: **WS102**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth	Stratum Description
						0.00	Topsoil.
	D	0.30				0.10	REWORKED: Brown and dark brown gravelly sandy clay. Gravel is angular to subrounded fine to coarse flint.
	D	0.70				0.40	Orange brown, brown and grey gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse flint. Sand is fine to coarse. (River Terrace Deposits)
	D	1.20					
	D	1.80				1.60	Orange brown silty clayey fine to coarse SAND. (River Terrace Deposits)
	D	2.50					
	D	3.80				3.40	Orange brown and brown very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. (River Terrace Deposits)
	D	4.20				4.20	End of borehole at 4.20m

Remarks

Groundwater: Groundwater encountered at 0.45m depth.

Stability: Borehole cased to 3.00m depth.
Borehole collapsed to 2.50m depth on completion.

Notes: No further progress below 4.20m depth.
Standpipe installed to 2.50m depth; 2.50m to 0.50m slotted pipe with gravel surround; 0.50m to ground level plain pipe with bentonite seal; completed with end cap and upstanding cover.

Excavation Method: WLS

Borehole Diameter: Various

Made By: RJ

ASHDOWN SITE INVESTIGATION LIMITED
E-mail: contact@ashdownsi.co.uk
Web: www.ashdownsi.co.uk
Tel: 01273 483119

Site Name: Woodgate, West Sussex

Job Number: P14891

Start Date: 19/11/2020

End Date: 19/11/2020

Borehole Number: **WS103**

Standpipe	Sample/ Test Type	Depth From (m)	Depth To (m)	Test Result	Legend	Depth	Stratum Description
	D	0.20				0.00	REWORKED: Brown gravelly sandy clay. Gravel is angular to subrounded fine to coarse flint.
	D	0.70				0.35	Orange brown and brown gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse flint. (River Terrace Deposits)
	D	1.30					
	D	1.90				1.70	Orange brown and brown clayey silty fine to coarse SAND. (River Terrace Deposits)
	D	2.60					
	D	3.60				3.00	Orange brown very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse flint. (River Terrace Deposits)
	D	4.20					
						4.60	End of borehole at 4.60m

Remarks

Groundwater: Groundwater at 0.56m depth on completion.

Stability: Borehole cased to 3.00m depth.
Borehole collapsed to 3.40m depth on completion.

Notes: No further progress below 4.60m depth.
Standpipe installed to 3.40m depth; 3.40m to 0.40m slotted pipe with gravel surround; 0.40m to ground level plain pipe with bentonite seal; completed with end cap and upstanding cover.

Excavation Method: WLS

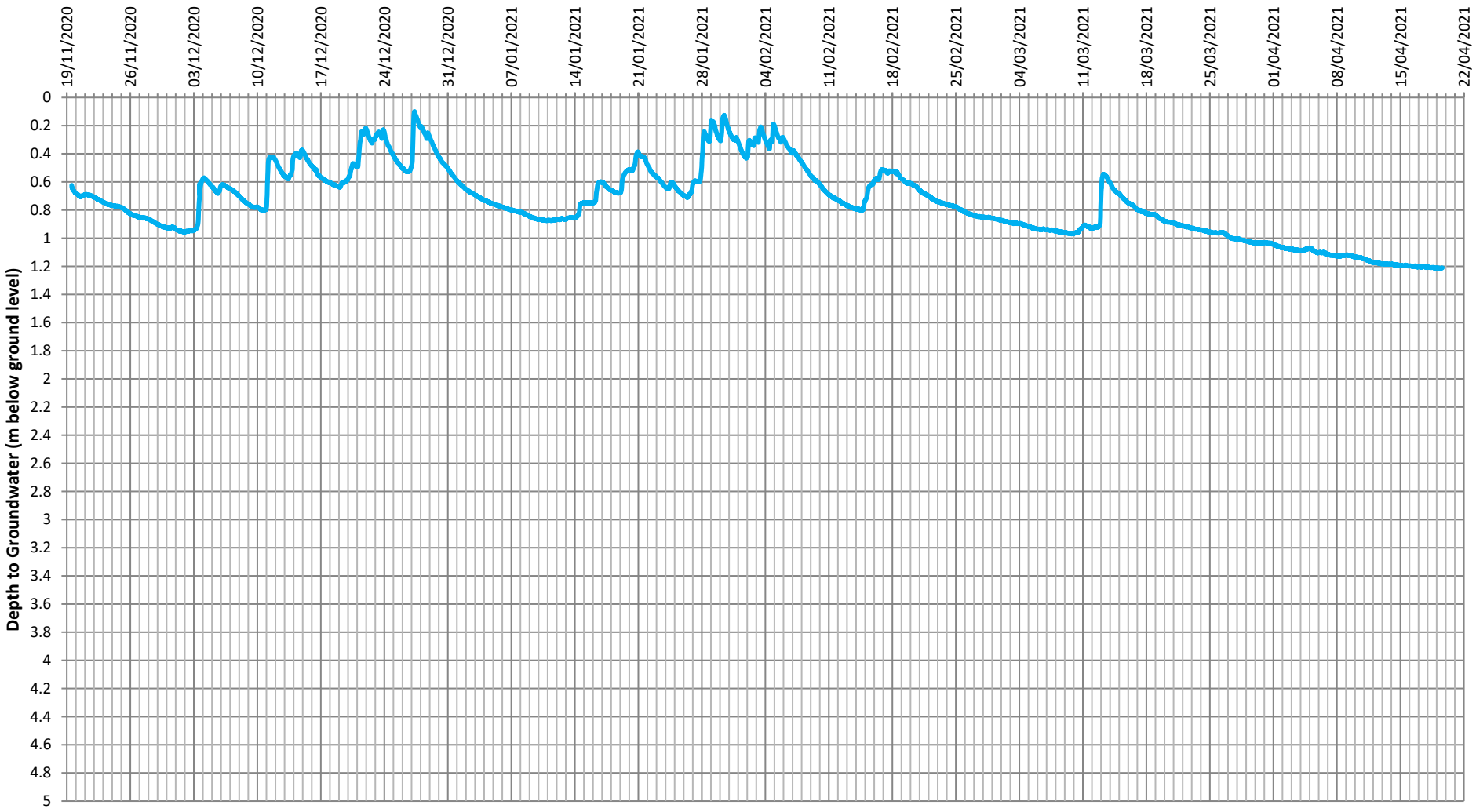
Borehole Diameter: Various

Made By: RJ

Ashdown Site Investigation Limted

Site: Woodgate, West Sussex	Report No. P14891

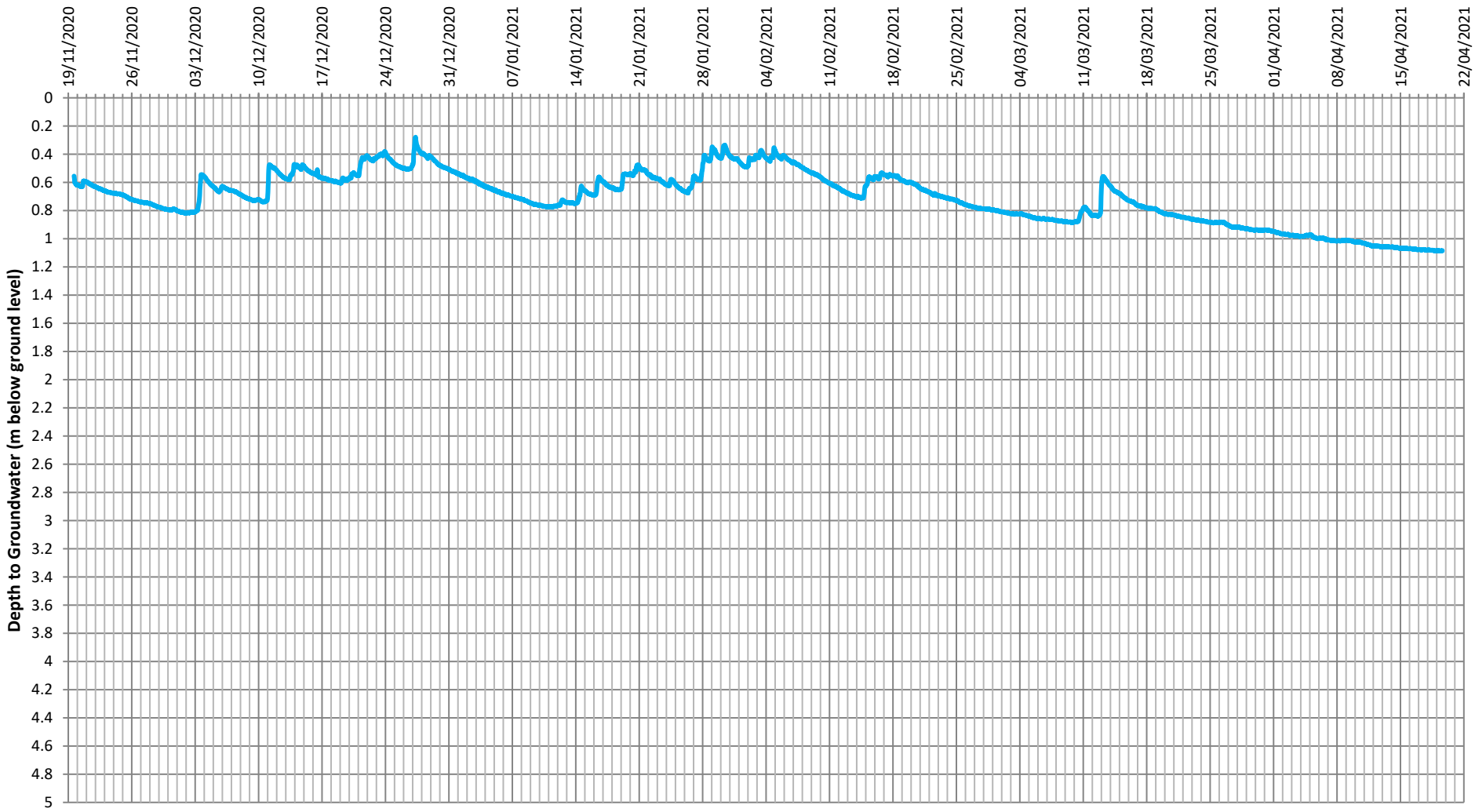
Groundwater Monitoring Results - WS102



Ashdown Site Investigation Limted

Site: Woodgate, West Sussex	Report No. P14891

Groundwater Monitoring Results - WS103



Appendix 10

Correspondence with Arun District Council

From:	Alistair Aitken
To:	Sarah Burrow
Cc:	Paul Cann
Subject:	RE: Pre Application Advice Consultation on: PAA/80/21/ Land Adjacent to Woodgate House
Date:	21 September 2021 09:16:00
Attachments:	image014.png

Hi Sarah

Thank you for your email.

I did exchange emails with Paul and all of the questions asked in relation to ARUN/WSCC Policy were answered. Paul very kindly provided us with relevant policy documents for inclusion in any site specific FRA.

We will include recommendations concerning possible flotation issues for all SuDS and underground features.

We will include copies of pre-app correspondence as you have suggested.

Kind regards

Alistair Aitken C Eng MICE MCIWEM C.WEM
Director, FortRidge Consulting Limited
01608 644265
07984 204615

FortRidge
Consulting Limited

From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Sent: 14 September 2021 14:44
To: Alistair Aitken <AlistairAitken@fortridge.co.uk>
Cc: Paul Cann <Paul.Cann@arun.gov.uk>
Subject: RE: Pre Application Advice Consultation on: PAA/80/21/ Land Adjacent to Woodgate House

Hi Alistair,

I noticed you have been in correspondence with Paul regarding the Management of Surface Water Policy and our guidance. I assume this was a separate enquiry and that Paul has not answered these questions?

I discussed it with him briefly and we are agreed that you could rule out infiltration on the site due to high groundwater. In an ideal world we would like to see more monitoring points however we are agreed that these would likely show the same conditions.

However, we did note that neither of the monitoring points were in close proximity to the proposed basin. Therefore, if you wish to consider groundwater at any less than ground level (for the purposes of buoyancy calculations for the basin) then we suggest that a groundwater monitoring

point is installed at this location over the coming winter. If this causes unwanted additional delay or expense then we will accept calculations showing groundwater at ground level for this purpose.

The QBAR rate that you have suggested seems more reasonable and in line with what we would expect, this will be scrutinised further when the FEA is submitted.

Please include this correspondence in your appendices to avoid any confusion/delay when the application comes in (should another officer review the plans and request further monitoring etc).

Kind regards

Sarah Burrow
Engineering Assistant, Engineering Services

T: 01903 737815
E: sarah.burrow@arun.gov.uk
M: 07733 125764

Current working pattern: Monday 8am-2:30pm, Tuesday 8am-5:30pm, Wednesday 8am-5pm, Thursday 8am-5:30pm, Friday 8am-11:30am.

Arun District Council, Civic Centre, Maltravers Rd, Littlehampton, West Sussex, BN17 5LF
www.arun.gov.uk

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From: Alistair Aitken <AlistairAitken@fortridge.co.uk>
Sent: 09 September 2021 12:18
To: Sarah Burrow <Sarah.Burrow@arun.gov.uk>; Paul Cann <Paul.Cann@arun.gov.uk>
Subject: RE: Pre Application Advice Consultation on: PAA/80/21/ Land Adjacent to Woodgate House

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Hi Sarah

Thank you for your prompt reply after your holiday, it is much appreciated.

Please find attached information relating to window sample WS103 (together with WS102). The information included is as follows:

1. A location plan showing the WS locations and also how they relate to the proposed development site.
2. Logs for WS102 and WS103.
3. Groundwater monitoring result for both locations.

Your points concerning QBAR are noted. We have measured the impermeable areas of the site as approximately 1.8ha. This provides a QBAR figure of 3.6l/s (based on 2l/s/ha. This will of course be detailed in the FRA in due course.

Kind regards

Alistair Aitken C Eng MICE MCIWEM C.WEM
Director, FortRidge Consulting Limited
01608 644265
07984 204615

FortRidge
Consulting Limited

From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Sent: 07 September 2021 16:58
To: Alistair Aitken <AlistairAitken@fortridge.co.uk>; Paul Cann Paul.Cann@arun.gov.uk
Subject: RE: Pre Application Advice Consultation on: PAA/80/21/ Land Adjacent to Woodgate House

Hi Alistair,

My apologies that you weren't able to get through to either myself or Paul at the time of your e-mail, unfortunately it was right at the beginning of my leave period and I'm only just catching up.

As this came in as a pre-application and is not viewable on the public portal I no longer have access to the original documents you supplied at the time (including site plan), therefore please forgive the general nature of my reply.

I would agree that infiltration in the vicinity of WS102 is not viable due to high groundwater. However, I would not be prepared to rule out infiltration for the whole site without a site plan and the groundwater monitoring results for each catchment.

Our policy is for the drainage design to mimic the natural drainage catchments of the site, so it is possible that you may need to have a hybrid design, utilising infiltration where possible.

With regards to the calculation for QBAR this needs to be based upon the positively drained (impermeable) area only. Not the full 4ha site (as shown in your calcs).

I hope this information is useful and apologies for the delay in response.

Kind regards

Sarah Burrow
Engineering Assistant, Engineering Services

T: 01903 737815
E: sarah.burrow@arun.gov.uk
M: 07733 125764

Current working pattern: Monday 8am-2:30pm, Tuesday 8am-5:30pm, Wednesday 8am-5pm, Thursday 8am-5:30pm, Friday 8am-11:30am.

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www.arun.gov.uk

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From: Alistair Aitken <AlistairAitken@fortridge.co.uk>
Sent: 27 August 2021 09:42
To: Paul Cann <Paul.Cann@arun.gov.uk>; Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Subject: Pre Application Advice Consultation on: PAA/80/21/ Land Adjacent to Woodgate House

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Hi Paul/Sarah

I tried calling your office but got a recorded message saying you were away from the office. We would be happy to discuss this email with you if possible.

I wanted to discuss with you the attached Drainage response to a pre-app for Land Adjacent to Woodgate House. You may recall I contacted you earlier this year to discuss existing drainage in the vicinity.

I have attached the following:

1. Soilscapes information relating to the area
2. Winter groundwater monitoring for 102 that was undertaken Nov 2020 -April 2021
3. Greenfield runoff estimation for the site area
4. Window sample log WS102 showing clay beneath the site

"Any discharge should be restricted to the mean QBAR greenfield run-off rates for all design storm events. This rate is derived from only the impermeable area of the development"

We were surprised by the comment that "the proposed discharge rate of 8l/s seems high". This represents only 2l/s/ha. I have attached the output from the HR Wallingford estimation tool showing 7.77l/s for the 4ha site with soil type 2. Bearing in mind the presence of the clay subsoil it is likely the greenfield estimate is low.

In light of the information and data contained in the attached we would be grateful for confirmation of your agreement that infiltration devices are not appropriate for the site, given the presence of high groundwater levels that are entirely consistent with the Soilscapes information. Adequate freeboard cannot be provided between the base of any soakaway/infiltration structure and the highest recorded groundwater level identified.

Kind regards

Alistair Aitken C Eng MICE MCIWEM C.WEM
Director, FortRidge Consulting Limited

01608 644265
07984 204615

FortRidge
Consulting Limited

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