



Blenheim Estates

**37 – 41 BRIGHTON ROAD,
SHOREHAM-BY-SEA**

Surface Water Drainage Strategy





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Surface Water Drainage Strategy

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70118838

OUR REF. NO. 70118838

DATE: NOVEMBER 2025

Blenheim Estates

37 - 41 BRIGHTON ROAD, SHOREHAM-BY-SEA

Surface Water Drainage Strategy

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Drainage Strategy	Updated based on LLFA comments-1	Updated based on LLFA comments-2	
Date	26/05/2025	23/10/2025	17/11/2025	
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Project number	70118838	70118838	70118838	
Report number				
File reference				

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1. INTRODUCTION

1.1. SCOPE OF REPORT

- 1.1.1. WSP UK Limited (WSP) have been commissioned by Blenheim Estates to prepare a surface water drainage strategy in support of an outline planning application for the redevelopment of the Kwik-Fit site at 37-41 Brighton Road, Shoreham-by-Sea (herein referred to as 'the development' in this report).
- 1.1.2. The development will include up to 49 apartments and approximately 90 m² of retail space. The proposed development is situated south of Brighton Road and to the north of the Free Wharf Development.
- 1.1.3. The proposed development site covers an area of approximately 0.215 hectares (ha).
- 1.1.4. This strategy has been developed in accordance with National standards for sustainable drainage systems (SuDS), 2025 and SuDS manual (C753, 2015).

The following documents have been reviewed in the preparation this surface water drainage strategy.

- Adur Local Plan 2017¹
- Shoreham Harbour Flood Risk Management Guide, 2015²
- Shoreham Harbour Joint Area Action Plan, 2019³
- West Sussex Local Flood Risk Management Strategy (LFRMS), 2014⁴
- Shoreham Harbour Joint Area Action Plan, 2019⁵
- National planning policy framework, 2024⁶
- National standards for sustainable drainage systems (SuDS), 2025⁷

¹ [Adur Local Plan 2017 \(adopted\) - Complete document \(adur-worthing.gov.uk\)](https://www.adur-worthing.gov.uk/Adur-Local-Plan-2017)

² [FRMG SPD Consultation Statement Final Sep 15.pdf \(brighton-hove.gov.uk\)](https://www.brighton-hove.gov.uk/FRMG-SPD-Consultation-Statement-Final-Sep-15.pdf)

³ [Shoreham Harbour Joint Area Action Plan \(JAAP\) - adopted October 2019 \(adur-worthing.gov.uk\)](https://www.adur-worthing.gov.uk/Shoreham-Harbour-Joint-Area-Action-Plan-JAAP)

⁴ https://www.westsussex.gov.uk/media/1595/local_flood_risk_management_strategy.pdf

⁵ <https://www.adur-worthing.gov.uk/media/Media,156282.smx.pdf>

⁶ <https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf>

⁷ [standards-for-sustainable-drainage-systems](https://www.gov.uk/government/standards-for-sustainable-drainage-systems)

2. EXISTING SCENARIO

2.1. SITE LOCATION

2.1.1. The proposed development site is currently occupied by a single storey industrial unit with Kwik Fit as a tenant. The postcode for the site is BN43 6RE. The site fronts Brighton Road and is surrounded by a mix of residential and commercial properties. To the east and south, it is adjacent to the Free Wharf Development that is currently under construction. To the west, there is a car wash facility that has right of way access at both the front and rear of the site.

A general site location plan is presented in Figure 1 below:



Figure 1 Site location

2.2. TOPOGRAPHY

2.2.1. Existing ground levels surrounding the site generally lies in the range of 4.0 mAOD to 4.6 mAOD as per the topographical survey. The River Adur is located 65 m away (at closest point) which flows from west to east at the southern side of the site.

The site generally slopes from south-west to north towards Brighton Road, with a high point of 4.6mAOD at the south-west corner and a low point of 4.0mAOD on the north edge of the site.

2.3. EXISTING SURFACE WATER DRAINAGE

- 2.3.1. The total catchment area of the site is 0.215ha which is fully impermeable with hardstanding surfaces and building roofs. According to the topographical survey, the site slopes towards the north edge along Brighton Road.
- 2.3.2. The topographical survey identifies several surface water gullies and chambers placed across the site. The initial proposal was developed based on the topographical survey. Given the existing ground slope and the presence of several gullies on the northern side of the road, it was logically assumed that runoff from the site discharged into the Brighton Road drainage network. However, the exact point of discharge to the road drainage network was not identified. Hence, an objection was raised by the Lead Local Flood Authority, with a requirement to establish a proof of connection (refer to Appendix A for correspondence from the LLFA).
- 2.3.3. To determine the site drainage and how and where it discharges outside the property, a connectivity survey was commissioned. Based on the inspection report, which is enclosed in Appendix E, it has been determined that the drainage flows south and, via a petrol interceptor - discharges to a surface water drainage network in an adjacent, recently developed Free Wharf site. The ultimate outfall for this drainage network is the River Adur.
- 2.3.4. Refer to Appendix G for the drainage plan developed for the adjacent Free Wharf site which indicates the presence of the receiving storm water network and the spur provided at the point-of-connection for the Kwik-Fit site runoff.
- 2.3.5. It is assumed that infiltration to ground is very unlikely in this area due to assumed high ground water levels being in close vicinity to the sea. Further investigation of groundwater levels and infiltration rates will be undertaken prior to detailed design stage.
- 2.3.6. The Proposed development is at very low probability of surface water flooding as identified The EA's flood map for planning from surface water (shown in Figure 2).

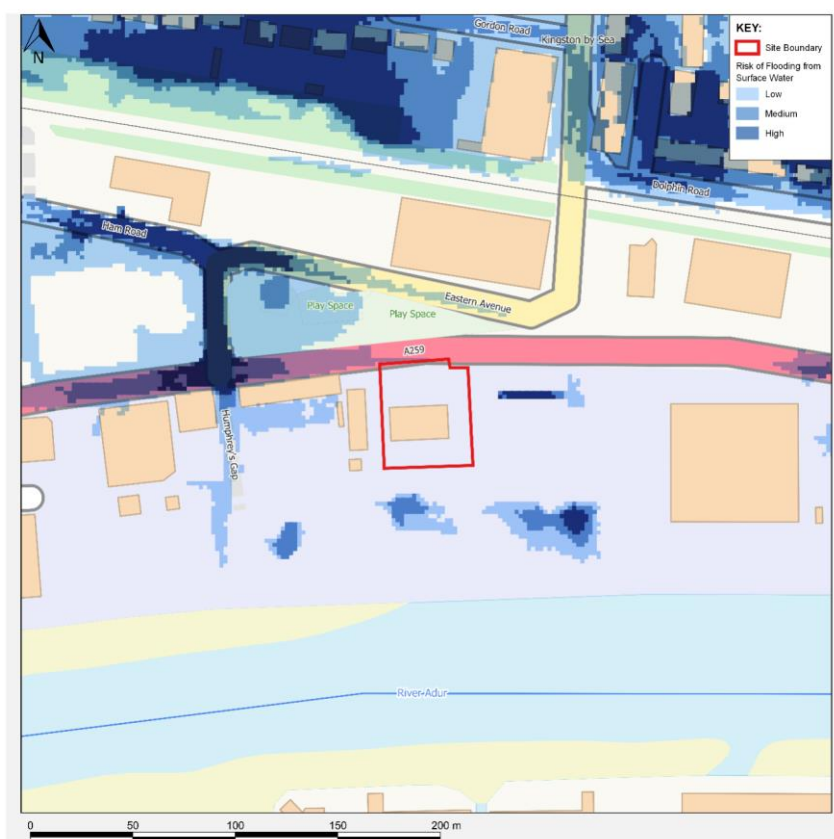


Figure 2 EA surface water flood extents

2.4. EXISTING PEAK DISCHARGE RATES

2.4.1. Peak surface water discharge rates for pre-development site have been calculated in InfoDrainage software using FEH rainfall data (2 yr, 30 yr and 100 yr) and FSR data (1 yr) for the site by creating a model based on the topographical survey and assumed outfall. The calculated peak discharge rates are presented in the Table 1 below. InfoDrainage calculations are attached in Appendix C. The calculation incorporated the updated inputs and parameters outlined in LLFA Response-2 (Appendix B). However, InfoDrainage currently does not provide an option to set the MADD factor.

Table 1 Pre-development surface water run-off rates

Storm return period (years)	Pre-development surface water peak rate of runoff (l/s)
1	31.4
2	37.7
30	64.0
100	75.6

3. PROPOSED DEVELOPMENT SCHEME

3.1.1. The proposed development is mixed-use and will include up to 49 apartments and approximately 90m² of retail space. The scheme includes 18 parking spaces in the undercroft. The residential lobby and a commercial unit are proposed on the ground floor with prominent corners facing Brighton Road, while the undercroft car park is located at the rear of the site. The established frontage along Brighton Road is enhanced by a double-height colonnade and a landscaped green strip. The building is designed with residential units located on the upper floors, with a minimum finished floor level (FFL) of 8.0 mAOD. The finished floor level for the ground floor, which is designated for commercial use, is set at 4.4 mAOD. Figure 3 shows the FFLs and northern elevation of the proposed development.



Figure 3 Floor levels and northern elevation

The proposed development masterplan is shown in Figure 4 below.



Figure 4 Proposed development

3.2. PROPOSED SURFACE WATER DRAINAGE

- 3.2.1. The impermeable area of the site post-development is considered for design purposes to be equal to that of the pre-development site i.e. 0.215ha. The existing outfall shall be retained in the post-development site.
- 3.2.2. According to 'National standards for sustainable drainage systems (SuDS)'⁷ The peak allowable discharge rate from the development to surface waters or sewers for the 50% and 1% AEP events shall be limited to the equivalent 50% AEP greenfield runoff rate, or 3 l/s/ha, whichever is the greater (paragraph 3.18). Where the volume of runoff discharged from the development to surface waters or sewers for the 1% AEP, 6-hour rainfall event is greater than the volume of greenfield runoff for the same rainfall event, the peak allowable discharge rate from the development for the 1% AEP event shall be limited to the 50% AEP greenfield runoff rate or 3l/s/ha, whichever is the greater (paragraph

- 3.19). The greenfield runoff rate for the Kwik-fit site is calculated using web-based greenfield runoff rate estimation tool⁸ and FEH data which is 0.1 l/s (refer Appendix C for calculations).
- 3.2.3. According to paragraph 3.21.1 from the "National standards for sustainable drainage systems" For previously developed sites a 'relaxation factor' shall be applied to the target 50% and 1% AEP greenfield runoff rates. The relaxation factor shall be no greater than 5 times the greenfield runoff rate. As per this consideration, the calculated allowable discharge rates are 0.5 l/s (applying 5 times the greenfield rate) and 0.645 l/s (for an area of 0.215 ha) – the latter value being the greater of the two values and thus used as the design permitted discharge value - for all rainfall events up to and including 100-year rainfall event with 45% climate change. The existing drainage outfall will be retained in the post-development site. As per the analysis conducted using InfoDrainage software in the Source Control module with this flow control setting estimates the required attenuation volume as 271.3m³. The storage estimate calculations are given in Appendix E. The calculation incorporated the updated inputs and parameters outlined in LLFA Response-2 (Appendix B). However, InfoDrainage currently does not provide an option to set the MADD factor. The storage structure can be accommodated below the right of access for the car wash on the driveway on the east of the apartment building. The detailed design of surface water drainage will include the exact location and dimensions of the attenuation feature. A tentative layout for the same is shown in the Figure 5.
- 3.2.4. As the existing outfall connection is to be retained, the receiving drainage network should be able to accommodate the reduced discharge rate in in the post-development site. Whilst the actual flow rate assumed by the designers of the adjacent Free Wharf development as an input from the Kwik Fit site has not been determined, it can reasonably be assumed that the 0.645l/s design discharge assumed from this proposed development is conservative and will not cause surcharge or flooding in the downstream network.
- 3.2.5. The guidance stipulates that the surface water drainage system must be designed to prevent flooding on any part of the site during a 1 in 30-year rainfall event. Additionally, it should ensure that no flooding occurs in any part of a building, including basements, or in any utility plants susceptible to water during a 1 in 100-year event. The detailed design of the surface water drainage system will consider these parameters, with pipe networks appropriately arranged to meet these requirements.
- 3.2.6. According to the drainage inspection report, the existing drainage system directs water toward the southern boundary where it ultimately discharges to an existing surface water conveyance pipe in the service road at the back of the site. (Refer Appendix F and G for details). During extreme rainfall events, exceedance flow will eventually get directed towards Brighton Road, based on the existing slope of the site, where it will be captured by the Brighton Road drainage system.
- 3.2.7. The use of planting, landscaping area with bioretention features and permeable paving at the ground level or a green roof will offer improvement in post-development peak run-off both qualitatively and quantitatively. The amount of potential improvement to the surface water run-off

⁸<https://www.uksuds.com/tools/members/greenfield-runoff-rate-estimation-members>

post development is dependent upon the landscaping design and shall be addressed at detailed design stage.

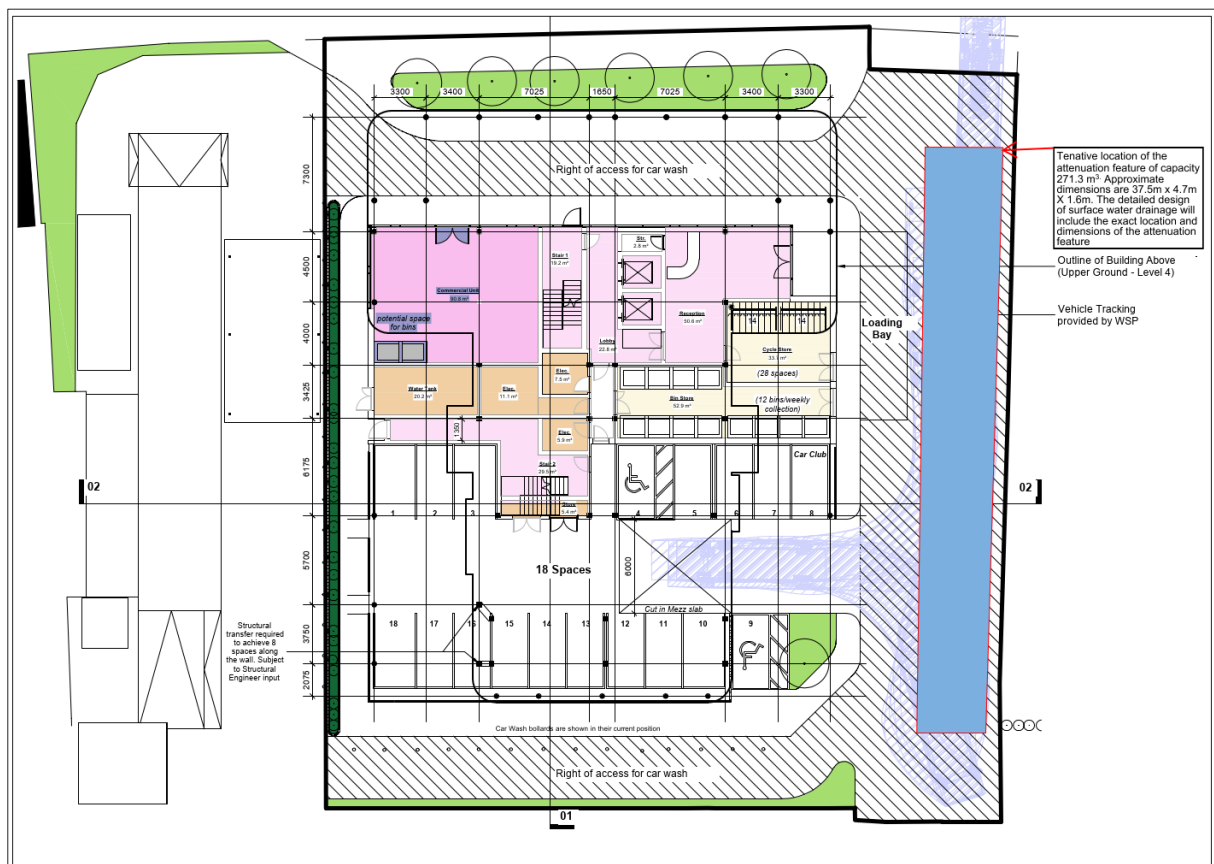


Figure 5 Tentative location of attenuation feature

3.3. WATER QUALITY

- 3.3.1. According to SuDS manual (CIRIA 7539 - Table 4.3), the runoff from residential roofs is considered of very low risk of pollution hazard and does not require and pollution control measures except removal of gross solids and sediments only. This can be achieved by use of trapped gullies, silt traps and catchpits etc. in the surface water drainage system. The detailed design of the drainage will consider these provisions.
- 3.3.2. The post-development site will have car parks and internal roads which are considered as low risk areas for containing contaminants. SuDS manual (CIRIA 753 – Table 4.3) suggests using the simple index method to assess the pollution control measures.

⁹https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C753

3.3.3. The simple index method is specified in the SuDS Manual (CIRIA 753 – Table 26.2) and provides pollution hazard indices for different land use classifications. An extract applicable to the development site is provided in Table 2.

Table 2 Extract of table 26.3 from SuDS manual

Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4

3.3.4. These indices are to be compared against the mitigation indices specified in SuDS manual (CIRIA-753 – Table 26.3), an extract of which showing the mitigation indices for SuDS options is provided in Table 3.

Table 3 Indicative SuDS mitigation indices - Extract of Table 26.3 from the SuDS Manual

Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation indices ¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.8
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

3.3.5. The SuDS manual also specifies that proprietary systems also can be used as pollution control measures. These products must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.

3.3.6. The specification of the SuDS components shall be determined in the detailed design phase.

Provision of pollution control elements and treatment prior to discharging in the receiving drainage network shall ensure a significant improvement to the quality of the surface water run-off from the site.

3.4. SuDS MAINTENANCE

- 3.4.1. Details for the SuDS operation and maintenance activities are provided within chapter 32 of the SuDS manual. A summary of typical key SuDS components is given in Table 4 (an extract of Table 32.1 from SuDS manual) All the proposed SuDS components shall undergo regular inspection and maintenance activities in accordance with the SuDS manual.
- 3.4.2. SuDS components at the site are not to be adopted and will be maintained for their lifetime by the managing company of the development for the site-wide SuDS features.
- 3.4.3. Further operational activities for the SuDS components described for the site include regular litter and debris removal; and weed and invasive plant control to ensure the drainage systems function without their design characteristics being compromised.
- 3.4.4. Contractors should protect SuDS components from adverse sediment runoff during the construction phase, and an initial pre-handover inspection is required (CCTV survey, etc.) to ensure that the drainage system has been constructed as designed.

Table 4 Extract of Table 32.1 of the SuDS Manual

Typical key SuDS components operation and maintenance activities (for full specifications, see Chapters 11–23)													
Operation and maintenance activity	SuDS component												
	Pond	Wetland	Detention basin	Infiltration basin	Soakaway	Infiltration trench	Filter drain	Modular storage	Pervious pavement	Swale/bioretention/trees	Filter strip	Green roofs	Proprietary treatment systems
Regular maintenance													
Inspection	■	■	■	■	■	■	■	■	■	■	■	■	■
Litter and debris removal	■	■	■	■	□	■	■	□	■	■	■		□
Grass cutting	■	■	■	■	□	■	■	□	□	■	■		
Weed and invasive plant control	□	□	□	□		□	□		□		□	■	
Shrub management (including pruning)	□	□	□	□					□	□	□		
Shoreline vegetation management	■	■	□										
Aquatic vegetation management	■	■	□										
Occasional maintenance													
Sediment management ¹	■	■	■	■	■	■	■	■	■	■	■		■
Vegetation replacement	□	□	□	□						□	□	■	
Vacuum sweeping and brushing									■				
Remedial maintenance													
Structure rehabilitation /repair	□	□	□	□	□	□	□	□	□	□	□	□	
Infiltration surface reconditioning				□	□	□	□		□	□	□		

Key

- will be required
- may be required

Notes

1 Sediment should be collected and managed in pre-treatment systems, upstream of the main device.

4. CONCLUSION

- 4.1.1. The total catchment area or the pre-development site is 0.215 ha which is fully impermeable with hardstanding surfaces and building roofs. The outfall for the existing surface water drainage network is assumed to be to the existing drainage network in the service road to the south of the site.
- 4.1.2. The impermeable area of the site post-development is considered for design purposes to be equal to that of the pre-development site, i.e. 0.215 ha. The existing outfall shall be retained in post-development site.
- 4.1.3. To provide a robust drainage solution to reduce flood risk downstream, discharge rate of 3 l/s/ha i.e. 0.645 l/s, during all rainfall event up to and including 100-year rainfall event with 45% climate change, which requires approximately 271.3m³ of attenuation volume which can be provided within the site. The detailed design of surface water drainage will include the exact location and dimensions of the attenuation feature.
- 4.1.4. The use of proprietary systems is considered compliant in accordance with SuDS manual for pollution control measures. These products must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area. The specification of the proprietary system shall be determined in the detailed design phase.
- 4.1.5. West Sussex surface water statement proforma has been enclosed in Appendix D of this report.

Appendix A

LEAD LOCAL FLOOD AUTHORITY RESPONSE-1



Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH



Lead Local Flood Authority

Date 11th July 2025

Stephen Cantwell
Local Planning Authority
Planning and Development
Adur & Worthing Councils
Portland House
Richmond Road
Worthing
BN11 1HS

Dear Stephen,

RE: AWDM/0738/25 – 39-41 Brighton Road, Shoreham-by-Sea, West Sussex, BN43 6RE

Thank you for your consultation on the above site, received on 20th June 2025. We have reviewed the application as submitted and wish to make the following comments.

This is an outline application for the demolition of the existing building and the erection of a one to nine-storey block of residential apartments, a commercial unit (Class E), with associated cycle parking and car parking.

We **object** to this planning application in the absence of an acceptable Drainage Strategy relating to:

- The application is not in accordance with the updated [National standards for sustainable drainage systems \(SuDS\)](#). It is unclear why the previous WSCC Policy for the Management of Surface Water is being referred to as this hasn't been used since 2023.
- As there is no other viable method of draining the site, the location of the outfall must be determined at outline stage, to ensure the receiving system has capacity. Given the location of the site, this is likely to be from a third-party.

We support the use of bioretention features and permeable paving. While this is more within the EA remit as the site is not currently at surface water flood risk, it is noted that there isn't much on flood resilience and resistance.

Yours sincerely,

Eleanor Read
Flood Risk Management Team
FRM@westsussex.gov.uk

Annex

The following documents have been reviewed, which have been submitted to support the application;

Flood Risk Assessment by WSP, May 2025, First issue

Surface Water Drainage Strategy by WSP, 31/01/2025, First issue

Appendix B

LEAD LOCAL FLOOD AUTHORITY RESPONSE-2



Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH



Lead Local Flood Authority

Date 11th November 2025

Stephen Cantwell
Local Planning Authority
Planning and Development
Adur & Worthing Councils
Portland House
Richmond Road
Worthing
BN11 1HS

Dear Stephen,

RE: AWDM/0738/25 – 39-41 Brighton Road, Shoreham-by-Sea, West Sussex, BN43 6RE

Thank you for your consultation on the above site, received on 28th October 2025. We have reviewed the application as submitted and wish to make the following comments.

This is an outline application for the demolition of the existing building and the erection of a one to nine-storey block of residential apartments, a commercial unit (Class E), with associated cycle parking and car parking.

We **object** to this planning application in the absence of an acceptable Drainage Strategy relating to:

As the outfall is now demonstrated as viable, we have completed a review of the calculations, some of which have been updated since our previous comments. The following need amending:

- FEH 2022 rainfall
- MADD Factor of 0
- Calculations for 1 in 30 plus climate change and 1 in 100 plus climate change event
- Cv value 1 for summer and winter

Once these are addressed, we should be able to recommend conditions.

Yours sincerely,

Eleanor Read
Flood Risk Management Team
FRM@westsussex.gov.uk

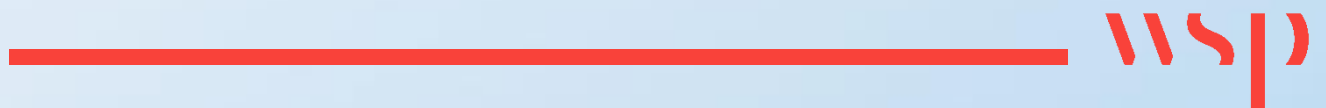
Annex

The following documents have been reviewed, which have been submitted to support the application;

Surface Water Drainage Strategy by WSP, 23rd October 2025, Revision 1

Appendix C

**GREENFIELD RUNOFF RATE ESTIMATION AND
EXISTING DISCHARGE RATES CALCULATIONS**



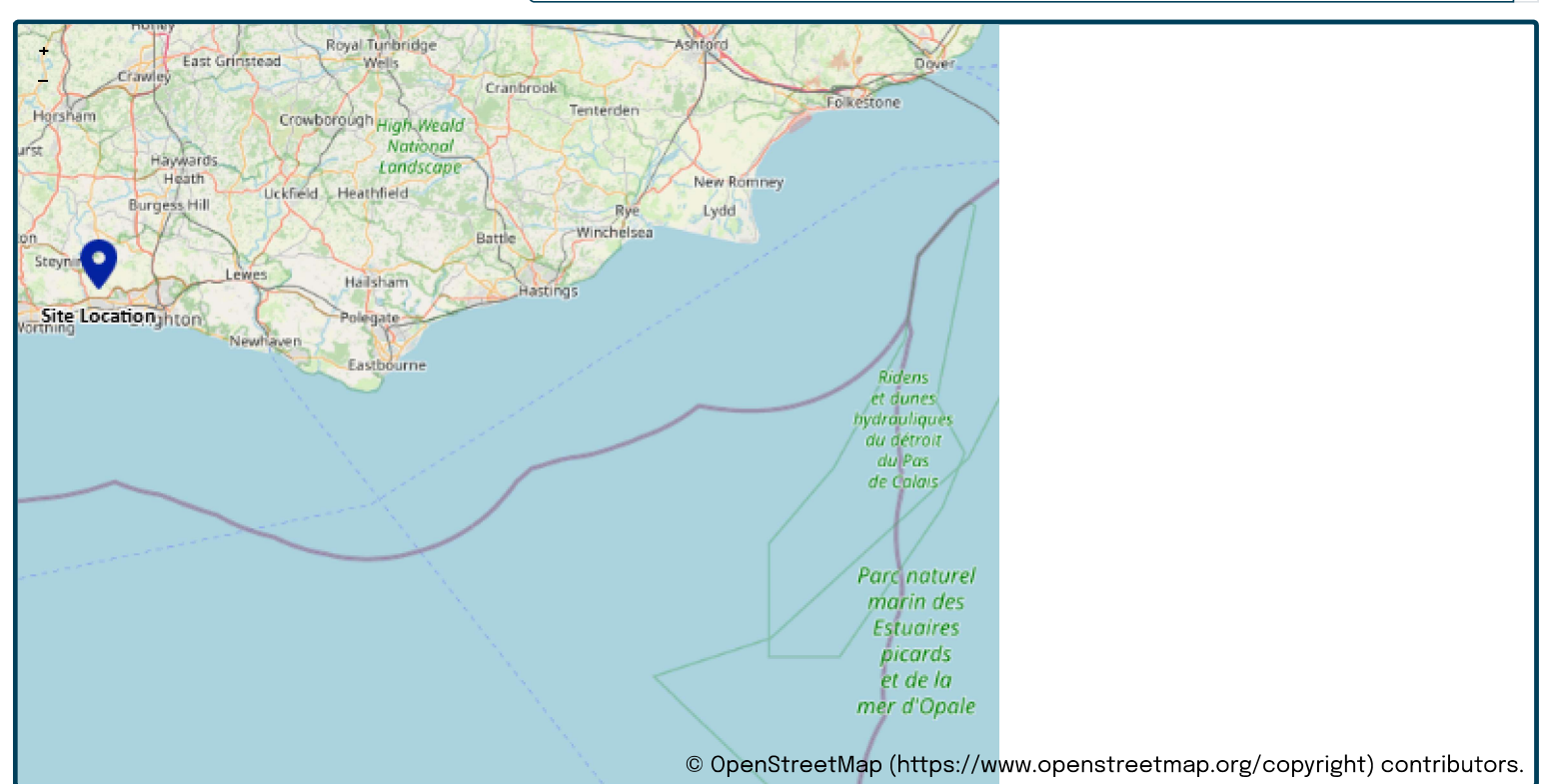
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	<input type="text" value="17/10/2025"/>
Calculated by	<input type="text" value="Arjun K R"/>
Reference	<input type="text"/>
Model version	<input type="text" value="2.2.1"/>

Location

Site name	<input type="text" value="Kwik-Fit"/>
Site location	<input type="text" value="Shoreham by Sea"/>



Site easting (British National Grid)	<input type="text" value="522221"/>
Site northing (British National Grid)	<input type="text" value="105119"/>

Site details

Total site area (ha)	<input type="text" value="0.215"/>	ha
----------------------	------------------------------------	----

Greenfield runoff

Method

Method

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	<input type="text" value="736"/>	<input type="text" value="mm"/>
BFIHOST19scaled	<input type="text" value="0.873"/>	
QMed-QBar conversion	<input type="text" value="1.136"/>	<input type="text" value="1.136"/>
QMed (l/s)	<input type="text" value="0.1"/>	<input type="text" value="l/s"/>
QBar (FEH statistical 2025) (l/s)	<input type="text" value="0.1"/>	<input type="text" value="l/s"/>

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	<input type="text" value="7"/>	<input type="text" value="7"/>
1 year growth factor	<input type="text" value="0.85"/>	
2 year growth factor	<input type="text" value="0.88"/>	
10 year growth factor	<input type="text" value="1.62"/>	
30 year growth factor	<input type="text" value="2.3"/>	
100 year growth factor	<input type="text" value="3.19"/>	
200 year growth factor	<input type="text" value="3.74"/>	

Results

Method	<input type="text" value="FEH statistical (2025)"/>	
Flow rate 1 year (l/s)	<input type="text" value="0.1"/>	<input type="text" value="l/s"/>
Flow rate 2 year (l/s)	<input type="text" value="0.1"/>	<input type="text" value="l/s"/>
Flow rate 10 years (l/s)	<input type="text" value="0.2"/>	<input type="text" value="l/s"/>
Flow rate 30 years (l/s)	<input type="text" value="0.3"/>	<input type="text" value="l/s"/>
Flow rate 100 years (l/s)	<input type="text" value="0.4"/>	<input type="text" value="l/s"/>
Flow rate 200 years (l/s)	<input type="text" value="0.5"/>	<input type="text" value="l/s"/>

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.


Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.1) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com/) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Storm Flow Path: Mainline 1	Company Address:		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analyzed (ha)
G1 - DA	G1		Time of Concentration	0.037	100	0	100	0.037
G2 - DA	G2		Time of Concentration	0.030	100	0	100	0.030
G3 - DA	G3		Time of Concentration	0.032	100	0	100	0.032
Branch: 2.000								
G6 - DA	G6		Time of Concentration	0.022	100	0	100	0.022
Branch: 3.000								
G7 - DA	G7		Time of Concentration	0.031	100	0	100	0.031
Branch: 4.000								
G9 - DA	G9		Time of Concentration	0.032	100	0	100	0.032
Branch: 5.000								
G11 - DA	G11		Time of Concentration	0.021	100	0	100	0.021
Branch: 6.000								
G12 - DA	G12		Time of Concentration	0.019	100	0	100	0.019
TOTAL		0.0		0.224				0.224

Kwik Fit Site:	Date: 09-01-2025			
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	Approved By:	
Report Details: Type: Network Design Criteria Storm Phase: Storm	Company Address:			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30


Pipe Options

Lock Slope Options	None
Design Options	Minimize Excavation
Design Level	Level Inverts
Min. Slope (1:x)	1000.00
Max. Slope (1:x)	40.00
Use Flow Restriction	<input checked="" type="checkbox"/>
Reduce Channel Depths	<input checked="" type="checkbox"/>

Pipe Size Library


Add. Increment (mm)	0
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:x)	Max. Slope (1:x)
100	0.00	0.00
150	0.00	0.00

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	
Report Title: Rainfall Analysis Criteria	Company Address:		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	0
Perform No Discharge Analysis	<input type="checkbox"/>

Rainfall

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	
Report Title: Rainfall Analysis Criteria	Company Address:		

SRP Wizard FSR

Type: FSR

Region	England and Wales	
M5-60 (mm)	19.6	
Ratio R	0.350	
Summer	<input checked="" type="checkbox"/>	
Winter	<input checked="" type="checkbox"/>	

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0.000


Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880

FEH

Type: FEH

Site Location	GB 522076 105104 TQ 22076 05104	
Rainfall Version	2022	
Summer	<input checked="" type="checkbox"/>	
Winter	<input checked="" type="checkbox"/>	

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	
Report Title: Rainfall Analysis Criteria	Company Address:		

Return Period

Return Period (years)	Increase Rainfall (%)
30.0	0.000
100.0	0.000
2.0	0.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520
7200	14400
8640	17280
10080	20160

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm Flow Path: Mainline 1	Company Address:		



SRP Wizard FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
G1	SRP Wizard FSR: 1 years: +0 %: 15 mins: Summer	4.320	3.120	3.185	0.065	6.2	0.010	0.000	6.1	2.688	OK
G2	SRP Wizard FSR: 1 years: +0 %: 15 mins: Summer	4.260	3.039	3.132	0.093	11.2	0.015	0.000	10.7	4.886	OK
G3	SRP Wizard FSR: 1 years: +0 %: 15 mins: Summer	4.140	2.938	3.096	0.158	16.0	0.025	0.000	15.3	7.178	Surcharged
IC4	SRP Wizard FSR: 1 years: +0 %: 15 mins: Summer	4.340	2.901	3.036	0.135	15.3	0.153	0.000	14.4	7.170	OK
IC5	SRP Wizard FSR: 1 years: +0 %: 15 mins: Summer	4.330	2.767	2.903	0.136	14.4	0.154	0.000	12.7	7.163	OK
IC13	SRP Wizard FSR: 1 years: +0 %: 15 mins: Summer	4.270	2.677	2.831	0.154	32.0	0.174	0.000	31.4	16.185	OK
Outfall	SRP Wizard FSR: 1 years: +0 %: 15 mins: Summer	4.270	2.622	2.757	0.135	31.4	0.000	0.000	31.4	16.185	OK

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm Flow Path: Mainline 1	Company Address:		



FEH: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
G1	FEH: 30 years: +0 %: 30 mins: Summer	4.320	3.120	4.120	1.000	11.9	0.159	0.000	10.5	10.286	Surcharged
G2	FEH: 30 years: +0 %: 30 mins: Summer	4.260	3.039	4.086	1.047	20.2	0.167	0.000	18.8	18.699	Surcharged
G3	FEH: 30 years: +0 %: 30 mins: Summer	4.140	2.938	3.963	1.025	28.9	0.163	0.000	27.7	27.470	Surcharged
IC4	FEH: 30 years: +0 %: 15 mins: Summer	4.340	2.901	3.822	0.921	28.6	1.042	0.000	26.8	20.640	Surcharged
IC5	FEH: 30 years: +0 %: 15 mins: Summer	4.330	2.767	3.363	0.596	26.8	0.674	0.000	28.4	20.652	Surcharged
IC13	FEH: 30 years: +0 %: 15 mins: Summer	4.270	2.677	3.010	0.333	65.0	0.377	0.000	63.6	46.579	Surcharged
Outfall	FEH: 30 years: +0 %: 15 mins: Summer	4.270	2.622	2.847	0.225	63.6	0.000	0.000	64.0	46.579	OK

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm Flow Path: Mainline 1	Company Address:		



FEH: 100 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
G1	FEH: 100 years: +0 %: 30 mins: Summer	4.320	3.120	4.320	1.200	15.1	0.321	0.130	14.3	13.115	Flood
G2	FEH: 100 years: +0 %: 15 mins: Summer	4.260	3.039	4.262	1.223	32.5	2.371	2.177	19.5	17.738	Flood
G3	FEH: 100 years: +0 %: 15 mins: Summer	4.140	2.938	4.141	1.203	38.6	0.922	0.731	33.3	26.052	Flood
IC4	FEH: 100 years: +0 %: 30 mins: Summer	4.340	2.901	3.966	1.065	29.3	1.204	0.000	29.4	35.008	Surcharged
IC5	FEH: 100 years: +0 %: 30 mins: Summer	4.330	2.767	3.457	0.690	29.4	0.780	0.000	29.7	35.023	Surcharged
IC13	FEH: 100 years: +0 %: 30 mins: Summer	4.270	2.677	3.077	0.400	76.1	0.453	0.000	76.0	79.060	Surcharged
Outfall	FEH: 100 years: +0 %: 15 mins: Summer	4.270	2.622	2.847	0.225	75.4	0.000	0.000	75.6	58.826	OK

Kwik Fit Site:	Date: 09-01-2025		
	Designed by: Arjun Ramanunni	Checked by: Vaidyanathan	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Storm Flow Path: Mainline 1	Company Address:		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Elevation (m)	Invert Elevation (m)	Max. Elevation (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
G1	FEH: 2 years: +0 %: 15 mins: Summer	4.320	3.120	3.231	0.111	7.9	0.018	0.000	6.2	3.449	OK
G2	FEH: 2 years: +0 %: 15 mins: Summer	4.260	3.039	3.222	0.183	12.7	0.029	0.000	11.0	6.270	Surcharged
G3	FEH: 2 years: +0 %: 15 mins: Summer	4.140	2.938	3.174	0.236	17.8	0.038	0.000	16.3	9.209	Surcharged
IC4	FEH: 2 years: +0 %: 15 mins: Summer	4.340	2.901	3.109	0.208	16.3	0.235	0.000	15.0	9.200	Surcharged
IC5	FEH: 2 years: +0 %: 15 mins: Summer	4.330	2.767	2.953	0.186	15.0	0.211	0.000	14.2	9.200	Surcharged
IC13	FEH: 2 years: +0 %: 15 mins: Summer	4.270	2.677	2.854	0.177	38.4	0.200	0.000	37.6	20.768	OK
Outfall	FEH: 2 years: +0 %: 15 mins: Summer	4.270	2.622	2.775	0.153	37.6	0.000	0.000	37.7	20.768	OK

Appendix D

**WEST SUSSEX SURFACE WATER STATEMENT
PROFORMA**



Surface Water Drainage Statement

In order to provide the required information on surface water drainage from the proposed development this pro-forma must be completed in full and be submitted with any planning application which seeks permission for ‘major’ development. This information contained in this form will be used by West Sussex County Council in its role as Lead Local Flood Authority and ‘statutory consultee’ on SuDs for all ‘major’ planning applications. The pro-forma is supported by the [Defra/EA Guidance on Rainfall Runoff Management](#) and can be completed using freely available tools including [SuDS Tools](#). The pro-forma should be considered alongside other supporting SuDS Guidance but focuses on ensuring flood risk is not made worse elsewhere. The SuDS solution must operate effectively for as long as the development exists. This pro-forma is based upon current industry standard practice.

1. Site Details

Site	Kwik Fit
Address & post code or LPA reference	37-41 Brighton Road, Shoreham-by-Sea, BN43 6RN
Grid reference	TQ 22212 05113 (E: 522212 m, N:105113 m)
Is the existing site developed or Greenfield?	Developed site
Total Site Area served by drainage system (excluding open space) (Ha)*	0.215 ha
Topographical survey plan showing existing site layout, site levels and drainage system	Yes.

* The Greenfield runoff off rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA manual for detail on this.

2. Impermeable Area

	Existing	Proposed	Difference (Proposed-Existing)	Notes for developers & Local Authorities
Impermeable area (ha) (areas to be shown on a plan)	0.215	0.215	-	If the proposed amount of impermeable surface is greater, then runoff rates and volumes will increase. Section 6 must be filled in. If proposed permeability is equal or less than existing, then section 6 can be skipped & section 7 filled in.
Drainage Method (infiltration/sewer/watercourse)	Surface water drainage sewer	Surface water drainage sewer	N/A	If different from the existing, please fill in section 3. If existing drainage is by infiltration and the proposed is not, discharge volumes may increase. Fill in section 6.

PPG Paragraph 080

3. Proposing to Discharge Surface Water via

	Yes	No	Evidence that this is possible	Notes for developers & Local Authorities
Existing and proposed micro-drainage calculations	Yes		Peak surface water discharge rates for pre-development site are calculated in InfoDrainage software using FEH rainfall data (2 yr, 30 yr and 100 yr) and FSR data (1 yr) for the site by creating a model based on the topographical survey and assumed outfall to drainage system for Brighton Road.	Please provide micro-drainage calculations of existing and proposed run-off rates and volumes in accordance with a recognised methodology or the results of a full infiltration test (see line below) if infiltration is proposed.
Infiltration		No	Investigation of groundwater levels and infiltration rates will be undertaken prior to detailed design stage.	e.g. soakage tests. Section 6 (infiltration) must be filled in if infiltration is proposed.
To watercourse		No		e.g. Is there a watercourse nearby? Please provide details of any watercourse to which the site drains including cross-sections of any adjacent water courses for appropriate distance upstream and downstream of the discharge point (as agreed with the LLFA and/or EA)
To surface water sewer	Yes		Discharge rate 3 l/s/ha i.e. 0.645 l/s, during all rainfall event up to and including 100-year rainfall event with 45% climate change. Existing drainage outfall will be retained in the post-development site.	Confirmation from sewer provider that sufficient capacity exists for this connection.

Combination of above		No		e.g. part infiltration part discharge to sewer or watercourse. Provide evidence above.
Has the drainage proposal had regard to the SuDS hierarchy?	Yes			Evidence must be provided to demonstrate that the proposed Sustainable Drainage proposal has had regard to the SuDS hierarchy.
Layout plan showing where the sustainable drainage infrastructure will be located on site.	Yes		The tentative layout for the SuDS components included in the Strategy. The detailed design of surface water drainage will include the exact location and dimensions of the attenuation feature.	Please provide plan reference numbers showing the details of the site layout showing where the sustainable drainage infrastructure will be located on the site. If the development is to be constructed in phases this should be shown on a separate plan, and confirmation should be provided that the sustainable drainage proposal for each phase can be constructed and can operate independently and is not reliant on any later phase of development.

Technical Standards S2 and S3

4. Peak Discharge Rates – This is the maximum flow rate at which surface water runoff leaves the site during a particular storm event.

	Existing Rates (l/s)	Proposed Rates (l/s)	Difference (l/s) (Proposed-Existing)	Notes for developers & Local Authorities
Greenfield QBAR	0.14	N/A	N/A	Mean annual Greenfield peak flow - QBAR is approx. 1 in 2 storm events. Use that figure in Section 7a.
1 in 1	31.4	0.645	-30.755	Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. e.g. discharging all flow from site at the existing 1 in 100 event increases flood risk during smaller events.
1 in 2	37.7	0.645	-37.055	
1 in 30	64.0	0.645	-63.355	
1in 100	75.6	0.645	-74.955	
1 in 100 plus climate change	N/A	0.645		To mitigate for climate change the proposed 1 in 100 +CC must be no greater than the existing 1 in 100 runoff rate. If not, flood risk increases under climate change should be added to the peak rainfall intensity. EA Guidance - Flood Risk Assessments: Climate Change Allowances (Published Feb 2016) https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

Technical Standards S4 to S9

5. Calculate discharge volumes –The total volume of water leaving the development site for a particular rainfall event. Introducing new impermeable surfaces increases surface water runoff and may increase flood risk outside the development.

	Existing Volume (m ³)	Proposed Volume (m ³)	Difference (m ³) (Proposed-Existing)	Notes for developers & Local Authorities
1 in 1				Proposed discharge volumes (without mitigation) should be no greater than existing volumes for all corresponding storm events. Any increase in volume increases flood risk elsewhere. Where volumes are increased section 6 must be filled in.
1 in 30				
1 in 100				
1 in 100 plus climate change				To mitigate for climate change the volume discharge from site must be no greater than the existing 1 in 100 storm event. If not, flood risk increases under climate change.

To provide a robust drainage solution to reduce flood risk downstream, the calculated allowable discharge rates are 0.5 l/s (applying 5 times the greenfield rate) and 0.645 l/s (for an area of 0.215 ha) – the latter value being the greater of the two values and thus used as the design permitted discharge value - for all rainfall events up to and including 100-year rainfall event with 45% climate change. Existing drainage outfall will be retained in the post-development site. Hence volumetric assessment is not necessary.

6. Calculate attenuation storage – In order to minimise the negative impact on flood risk resulting from increased volumes runoff from the proposed development, storage must be provided.

		Notes for developers & Local Authorities
Storage volume required to retain discharge rates as existing (m ³)	271.3m ³	Volume of water to attenuate on site if discharging at existing rates. Can't be used where discharge volumes are increasing
Where will the storage be provided on site?	Tentative plan is included in the strategy.	

7. How is Storm Water stored on site?

Storage is required for the additional volume from site but also for holding back water to slow down the rate from the site. This is known as attenuation storage and long-term storage. The intention is to not discharge that volume into the watercourses so as not to increase flood risk elsewhere.

		Notes for developers & Local Authorities	
Infiltration	State the Site's Geology/drift material overlaying)	Investigation of groundwater levels and infiltration rates will be undertaken prior to detailed design stage.	Avoid infiltrating in made ground.
	Does the site have a high ground water table? Yes/No?		If yes, please provide details of the site's hydrology.
	Is the site within a known Source Protection Zones (SPZ)? Yes/No?		Infiltration rates are highly variable and refer to Environment Agency website to identify and source protection zones (SPZ)
	Are infiltration rates suitable?		Infiltration rates should be no lower than 1x10 ⁻⁶ m/s.
	Is the site contaminated? If yes, consider advice from others on whether infiltration can happen.		Water should not be infiltrated through land that is contaminated. The Environment Agency may provide bespoke advice in planning consultations for contaminated sites that should be considered.
	State the distance between a proposed infiltration device base and the ground water (GW) level		Need 1m (min) between the base of the infiltration device & the water table to protect Groundwater quality & ensure GW doesn't enter infiltration devices. Avoid infiltration where this isn't possible.
	Were infiltration rates obtained by desk study or infiltration test?		Infiltration rates can be estimated from desk studies at most stages of the planning system if a back-up attenuation scheme is provided.
Is infiltration feasible?	Yes/No?	If infiltration is not feasible how will the additional volume be stored? The applicant should then consider the following options in the next section.	

7a. Storage requirements

Where infiltration is not possible, then the developer must confirm that either of the two options below will be implemented for dealing with the amount of water that needs to be stored on site.

Option 1 Simple – Store both the additional volume and attenuation volume in order to make a final discharge from site at **QBAR**. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.

Option 2 Complex – If some of the additional volume of water can be infiltrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the runoff from site.

		Notes for developers & Local Authorities
Please confirm what option has been chosen and how much storage is required on site.	Discharge rate 3 l/s/ha will be used i.e. 0.645 l/s, during all rainfall event up to and including 100-year rainfall event with 45% climate change. Existing drainage outfall will be retained in the post-development site. As per the analysis conducted using InfoDrainage software with this flow control setting estimates the required attenuation volume as 271.3m ³ .	The developer at this stage should understand the site characteristics and be able to explain what the storage requirements are on site and how it will be achieved.

8. Additional Consideration to comply with the Technical Standards and PPG

		Notes for developers & Local Authorities
Which Drainage Systems measures have been used?	Trapped gullies, silt traps and catchpits, bioretention system, soft landscaping etc.	SUDS can be adapted for most situations even where infiltration isn't feasible e.g. impermeable liners beneath some SUDS devices allows treatment but not infiltration. See CIRIA SUDS Manual C753.
How will exceedance events be catered on site without increasing flood risks (both on site and outside the development)?	The existing drainage system directs water toward the southern boundary where it ultimately discharges to an existing surface water conveyance pipe in the service road at the back of the site. During extreme rainfall events, exceedance flow will be directed toward Brighton Road, following the existing slope of the site, where it will be captured by the Brighton Road drainage system	Safely: not causing property flooding or posing a hazard to site users i.e. no deeper than 300mm on roads/footpaths

How are rates being restricted?	Flow control device shall be specified in detailed design.	Hydrobrakes to be used where rates are between 2l/s to 5l/s. Orifices cannot be used below 5l/s as the pipes may block. Pipes with flows < 2l/s are prone to blockage.
Drainage during construction period		Provide details of how drainage will be managed during the construction period including any necessary connections, impacts, diversions and erosion control.
Key Drainage components / Features		Which component if blocked (even partial) will lead to flooding?

Technical Standards S10 to S12

9. Management and Maintenance of SuDs

Details are required to be provided of the management and maintenance plan for the SUD, including for the individual plots in perpetuity.

<p>How is the entire drainage system to be maintained in perpetuity?</p>	<p>SuDS components at the site are not to be adopted and will be maintained for their lifetime by the managing company of the development for the site-wide SuDS features.</p>	<p>Clear details of the maintenance proposals of all elements of the proposed drainage system must be provided to show that all parts of SuDs are effective and robust.</p> <p>Provide a management plan to describe the SUDS scheme and set out the management objectives for the site. It should consider how the SuDs will perform and develop over time anticipating any additional maintenance tasks to ensure the system continues to perform as designed.</p> <ul style="list-style-type: none"> — Specification notes that describe how work is to be undertaken and the materials to be used. — A maintenance schedule describes what work is to be done and when it is to be done using frequency and performance requirements as appropriate. — A site plan showing maintenance areas, control points and outfalls. <p>Responsibility for the management and maintenance of each element of the SUDS scheme will also need to be detailed within the Management Plan.</p> <p>Where open water is involved please provide a health and safety plan within the management plan.</p>
<p>Please confirm the owners/adopters of the entire drainage systems throughout the development. Please list all the owners.</p>	<p>Shall be specified in detailed design.</p>	<p>If these are multiple owners then a drawing illustrating exactly what features will be within each owner's remit must be submitted with this Proforma. Please give details of each feature and how it will be managed in accordance with the details in the management plan.</p>
<p>Please provide details demonstrating that any third-party agreements required using land outside the application site have been secured.</p>		

The above form should be completed using evidence from information which should be appended to this form. The information being submitted should be proportionate to the site conditions, flood risks and magnitude of development. It should serve as a summary of the drainage proposals and should clearly show that the proposed discharge rate and volume as a result of development will not be increasing. Where there is an increase in discharge rate or volume, then the relevant section of this form must be completed with clear evidence demonstrating how the requirements will be met.

This form is completed using factual information and can be used as a summary of the surface water drainage strategy on this site.

Form Completed By: *Arjun Ramanunni*

Qualification of person responsible for signing off this pro-forma: Edward Clarke, BSc MSc MCIWEM C.WEM CEng CEnv

Company: *WSP UK Limited*

On behalf of (Client's details): *Blenheim Estates Ltd*

Date: *17/11/2025*