

WORTHING LOCAL PLAN 2020- 2036

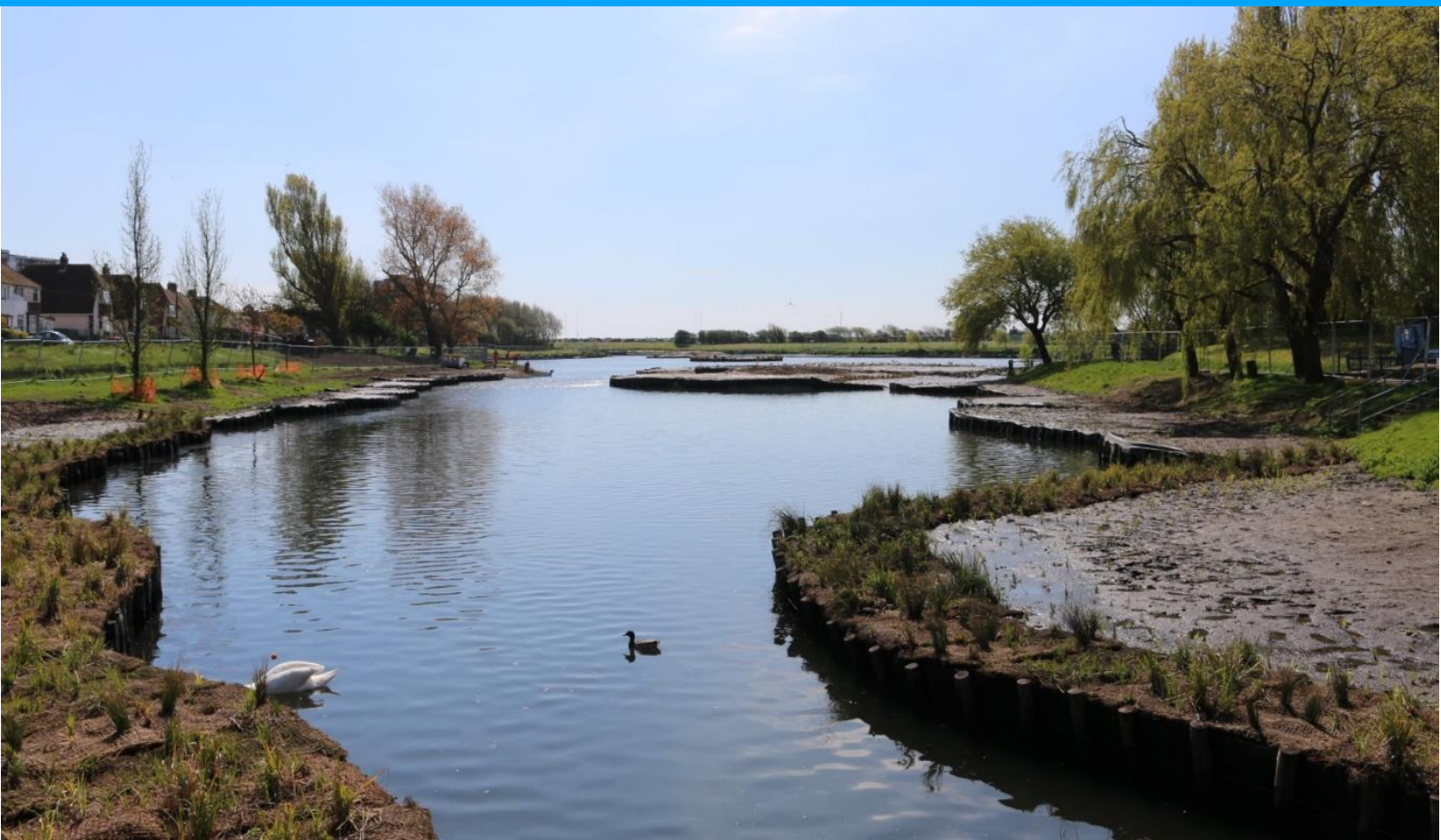
**FLOOD RISK SEQUENTIAL
& EXCEPTIONS TEST**

**SUBMISSION DRAFT WORTHING LOCAL
PLAN**

January 2021



**WORTHING BOROUGH
COUNCIL**



**Flood Risk Sequential and Exception Test for the
Submission Draft Worthing Local Plan**

January 2021

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Part 1

1.1 Introduction

Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.
National Planning Policy Framework (2019), paragraph 155

1.1.1 The National Planning Policy Framework (NPPF) requires Local Plans to apply a sequential risk-based approach to development to avoid, where possible, flood risk to people and property.

1.1.2 This paper sets out the Sequential Test and where required Exception Test for the sites identified in the Submission Draft Worthing Local Plan. It has been undertaken using the Environment Agency flood maps and information contained in the Adur & Worthing Level 1 and Level 2 Strategic Flood Risk Assessment (2020).

1.1.3 The paper is split into three sections:

- **Part 1** provides information about the sites including flood risk, flood defences, proposed and existing uses and the vulnerability classification related to these uses.
- **Part 2** sets out the Sequential Test for each site;
- **Part 3** sets out the Exception Test for sites identified as being at risk of flooding.

1.2 Strategic Flood Risk Assessment

1.2.1 Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA). The Adur & Worthing Level 1 and Level 2 Strategic Flood Risk Assessment (2020) was prepared by the Council's consultant's JBA Consulting. The Level 1 assessment considers all sources of flooding in the Local Plan area and the impacts of climate change. In addition it provides guidance on how the sequential and exception tests should be applied. The Level 2 SFRA has been prepared to support application of the Exception Test. It contains site specific summaries of actual risk and recommendations for those sites that are identified to be at risk of flooding.

1.2.2 The SFRA considers all sources of flood risk. It notes there have been several recorded flood incidents across the study area, with surface water the most frequent cause of flooding. There have also been a number of fluvial and tidal incidents (although tidal flooding in Worthing is rare) recorded in the past, as well as records of flooding from groundwater and sewers. These sources of flooding can also occur in combination, causing a cumulative effect.

Flood Zones

1.2.3 The Flood Zones relate to flooding of the land from rivers or the sea. The Flood Zones are based on the undefended scenario with the exception of Flood Zone 3b. Flood Zones are defined as follows:

Table 1: Flood Zones

Flood Zone 1	Low Probability	Comprised of land having a less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1% AEP).
Flood Zone 2	Medium Probability	Comprises of land having between a 1 in 100 (1% AEP) and 1 in 1,000 annual probability of river flooding or 1 in 200 (0.5% AEP) and 1 in 1,000 (0.1% AEP) annual probability of sea flooding.
Flood Zone 3a	High Probability	This Zone comprises land assessed as having a greater than 1 in 100 (>1% AEP) annual probability of river flooding or Land having a 1 in 200 or greater annual probability of sea flooding.
Flood Zone 3b	Functional Floodplain	This Zone comprises land where water has to flow or be stored in times of flood

		(the functional floodplain). The mapping in the SFRA identifies this Flood Zone as land which would flood with a 5% chance (Annual Exceedance Probability) in each and every year (a 1 in 20-year return period), where detailed modelling exists. Where the 5% Annual Exceedance Probability (AEP) outputs are not available, the precautionary approach has been taken using the 1% AEP undefended scenario (Flood Zone 3a).
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1.2.4 Flood Zone 3b, unlike other Zones, takes account of the presence of existing flood risk management features and flood defences. If a proposed development is shown to be within this area, further investigation should be undertaken as part of a detailed site-specific FRA to define and confirm the extent of Flood Zone 3b. In particular consideration should be given to whether the specific location is used for the storage or flow of water in time of flood.

Risk of Flooding from Surface Water

1.2.5 Flooding from surface water runoff (or 'pluvial' flooding) is caused by intense short periods of rainfall and usually affects lower lying areas, often where the natural (or artificial) drainage system is unable to cope with the volume of water. Surface water flooding problems are inextricably linked to issues of poor drainage, or drainage blockage by debris, sewer flooding and where surface water is draining to tidal outfalls, tide-locking.

1.2.6 Mapping of surface water flood risk in the Local Plan areas has been taken from the Risk of Flooding from Surface Water (RoFSW) published online by the Environment Agency. The RoFSW is derived primarily from identifying topographical flow paths of existing watercourses or dry valleys that contain some isolated ponding locations in low lying areas. They provide a map which displays different levels of surface water flood risk depending on the annual probability of the land in question being inundated by surface. The different surface water risk categories used in the RoFSW mapping are defined below:

Table 2: Risk of Flooding from Surface Water

High	Flooding occurring as a result of rainfall with a greater than 1 in 30 chance in any given year (3.3% AEP)
Medium	Flooding occurring as a result of rainfall of between 1 in 100 (1% AEP) and 1 in 30 (3.3% AEP) chance in any given year.

Low	Flooding occurring as a result of rainfall of between 1 in 1000 (0.1% AEP) and 1 in 100 (1% AEP) chance in any given year.
Very Low	Flooding occurring as a result of rainfall of less than 1 in 1000 (0.1% AEP)

Groundwater Flood Map

1.2.7 Groundwater flooding occurs when groundwater rises above ground levels. The JBA Groundwater Flood Map (prepared by Jeremy Benn Associates Ltd), used in the SFRA, compares groundwater levels to ground surface levels to determine the head difference in metres. The JBA Groundwater Map categorises the head difference (m) into five feature classes based on the 100-year model outputs:

Table 3: JBA Groundwater Map

	No risk.
	Groundwater levels are at least 5m below the ground surface.
	Groundwater levels are between 0.5m and 5m below the ground surface.
	Groundwater levels are between 0.025m and 0.5m below the ground surface.
	Groundwater levels are either at or very near (within 0.025m of) the ground surface.

Climate Change

1.2.8 The SFRA has also considered the impact of climate change directly on fluvial, tidal, coastal and surface water flooding through the application of The Environment Agency 2016 climate change guidance, which takes account of UKCP18 projections for sea level rise. This shows that for watercourses in the South East River Basin District the 35%, 45% and 105% allowances should be considered.

1.2.9 The climate change guidance also requires that increases in the peak rainfall intensity in small and urban catchments should be considered when preparing FRAs. The recommended uplifts for the central and upper end allowances are 20% and 40% respectively. Therefore, the SFRA has uplifted the peak rainfall intensities for the RoFSW 1% AEP event by 20%, 30% and 40% to assess the impact of climate change on surface water flood risk.

Other Sources

1.2.10 Initial capacity analysis of Somerset's Lake (also referred to as Fulbeck Avenue pond) identified this to not be classed as a large raised reservoir under the definition set out in the Reservoirs Act (1975). As part of the Level 2 SFRA a breach analysis was conducted on Somerset Lake and overtopping of the Malthouse Way

balancing pond to understand the impacts of these events on flood risk in the surrounding areas both in isolation and in combination.

1.3 The Local Plan

1.3.1 Worthing is tightly constrained with the National Park to the north and sea to the south, and there is little scope to grow beyond the current Built Up Area Boundary without merging with the urban areas of Ferring (to the west) and Sompting/Lancing (to the east) and damaging the borough's character and environment. Furthermore, the town is relatively compact and there are very few vacant sites or opportunity areas within the existing Built Up Area that could deliver significant levels of growth.

1.3.2 The spatial strategy seeks to achieve the right balance between planning positively to meet the town's development needs (particularly for jobs, homes and community facilities) with the continuing need to protect and enhance the borough's high quality environments and open spaces within and around the town. The overarching objective is therefore to maximise appropriate development on brownfield land and add sustainable urban extensions adjacent to the existing urban area.

1.3.3 However, the NPPF now requires that local planning authorities meet their full need for both market and affordable housing as far as is consistent with other policies in the Framework. The most up-to-date assessment of objectively assessed housing need (based on the standard method as set out in national planning guidance and the 2014 household projections published in September 2016) is 14,160 dwellings over the Plan period (2020 to 2036) which currently equates to 885 dwellings per annum. This is a much higher level of housing delivery than the borough has previously planned for or delivered.

1.3.4 The Council's Strategic Housing Land Availability Assessment (SHLAA) has provided the mechanism through which the quantity and suitability of land potentially available for housing development has been determined. Although the Council has been positive in its approach when reviewing options within the town it was very clear at an early stage that there was no prospect of all of Worthing's identified housing needs being met within the existing Built Up Area Boundary. For that reason, the Council has also positively assessed the potential of edge of town sites to help meet development needs.

1.3.5 Although the delivery of housing provides a key focus of this Plan, it is vital that other uses such as commercial, community and leisure facilities are not overlooked. The Worthing Economic Research and Employment Land Review and

update has highlighted the need to retain employment premises and land in the borough, and in addition forecasts an employment land requirement.

1.3.6 Taking the above into account, the Plan sets an average minimum housing target of 230 homes per annum to be achieved by 2036. It is clear however that, despite taking a positive approach to development, the delivery rate for housing will fall significantly below the levels of housing need identified.

1.4 Assessment of Sites

1.4.1 The Local Plan has allocated sites that are considered to be deliverable.

1.4.2 The Draft Local Plan also included a number of sites as omission sites. These are sites where, in principle, a level of development might be acceptable. However at this stage sufficient and robust evidence had not been submitted that would provide confidence that the identified constraints could be overcome. These sites could be allocated in the future as part of a Local Plan Review if it can be demonstrated that the current delivery constraints can be suitably addressed. It should be noted that none of these sites were omitted due to flood risk. The Submission Draft Local Plan includes them all as allocations apart from Worthing United Football Ground which is dependent on the relocation of the Football Club. At this stage the Council is not satisfied that the Football Club can be suitably relocated and that the resulting loss of a playing field is justified.

1.4.3 In addition the following sites were positively tested but have not been included within the Submission Draft Local Plan due to landscape and ecological evidence.

- Goring Ferring Gap - Due to landscape and ecological evidence this site is being designated through the Local Plan as a Local Green Space and Local Gap. It has also recently been designated as a Local Wildlife Site.
- Chatsmore Farm - Due to landscape and ecological evidence this site is being designated through the Local Plan as a Local Green Space and Local Gap.

1.4.4 The previous version of the Sequential and Exception Test (2018) which supported the Draft Local Plan also highlighted a site known as Land north of Dale Road, which is an unclaimed area of land to the north of Brooklands Park. This was included within the Worthing Core Strategy as part of the Brooklands Recreation Area. Landscape and ecological evidence continues to support this approach. The site was included within the Draft Local Plan as part of the Local Green Space and Local Gap designations for Brooklands. This approach has been continued in the Submission Draft Local Plan.

1.4.5 The Draft Worthing Local Plan also included Worthing Leisure Centre as a potential area of change. This has not been taken forward to the Submission Draft version of the Local Plan due to uncertainties regarding the scope of development and timescales for delivery.

1.4.6 Therefore for the purposes of the Sequential Test it is not considered that any of these sites are reasonably available. For this reason they have not been included within the Sequential Test.

Part 2

2.1 Sequential Test

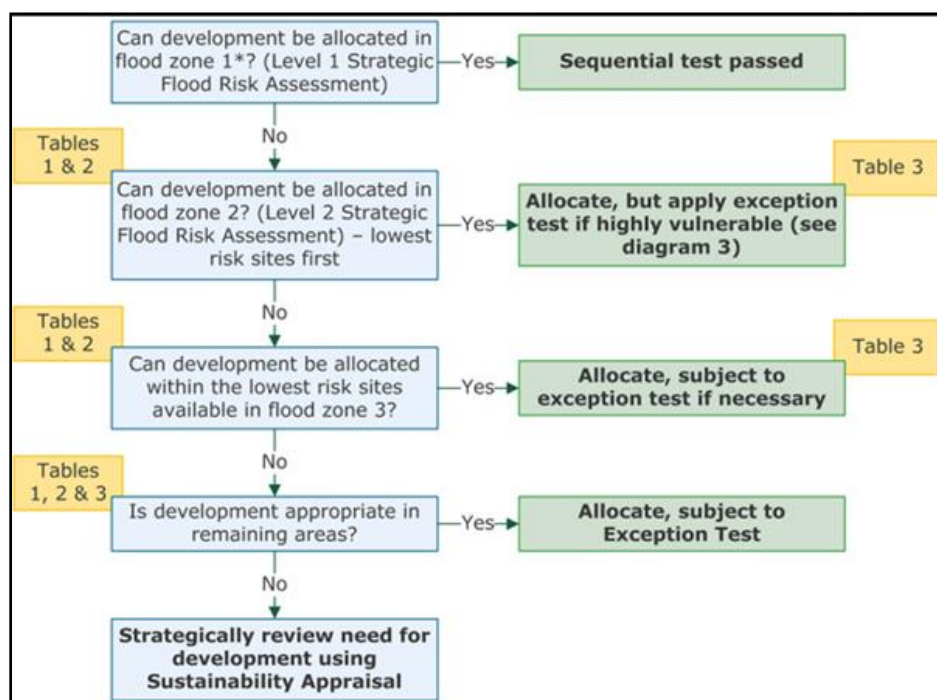
The aim of the sequential test is to steer new development to areas with the lowest risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.

National Planning Policy Framework (2019), paragraph 158

2.1.1 The aim of the Sequential Test is to direct development to areas of lowest flood risk first to ensure that these are developed in preference to areas at higher risk. The Level 1 SFRA has provided the basis for applying the Test. In accordance with Paragraph 156 of the NPPF all sources of flood risk are considered. Only where there are no available sites in areas at low or no risk of flooding should the suitability of sites in medium or high risk flooding areas be considered.

2.1.2 The Planning Practice Guidance gives detailed instructions on how to perform the test based upon flood zone classifications only.

Figure 1: Application of the Sequential Test for Local Plan preparation



PPG Paragraph: 021 Reference ID: 7-021-20140306

2.1.3 To enable a consideration of all sources of flooding the following classifications have been used to define high, medium and low risk:

Table 4: Flood Risk Classifications

Source of Flooding	High	Medium	Low
Fluvial	Greater than 1 in 100 year (FZ3)	Between 1 in 100 and 1 in 1,000 year (FZ2)	Less than 1 in 1,000 year
Coastal	Greater than 1 in 200 year (FZ3)	Between 1 in 200 and 1 in 1,000 year (FZ2)	Less than 1 in 1,000 year
Surface Water	Greater than 1 in 30 year	Between 1 in 30 and 1 in 100 year	Between 1 in 100 and 1 in 1,000 year
Groundwater	0 - 0.025m	0.025 - 0.5m	More than 0.5m below ground
Somerset Lake	Dry Day	Wet Day	No risk

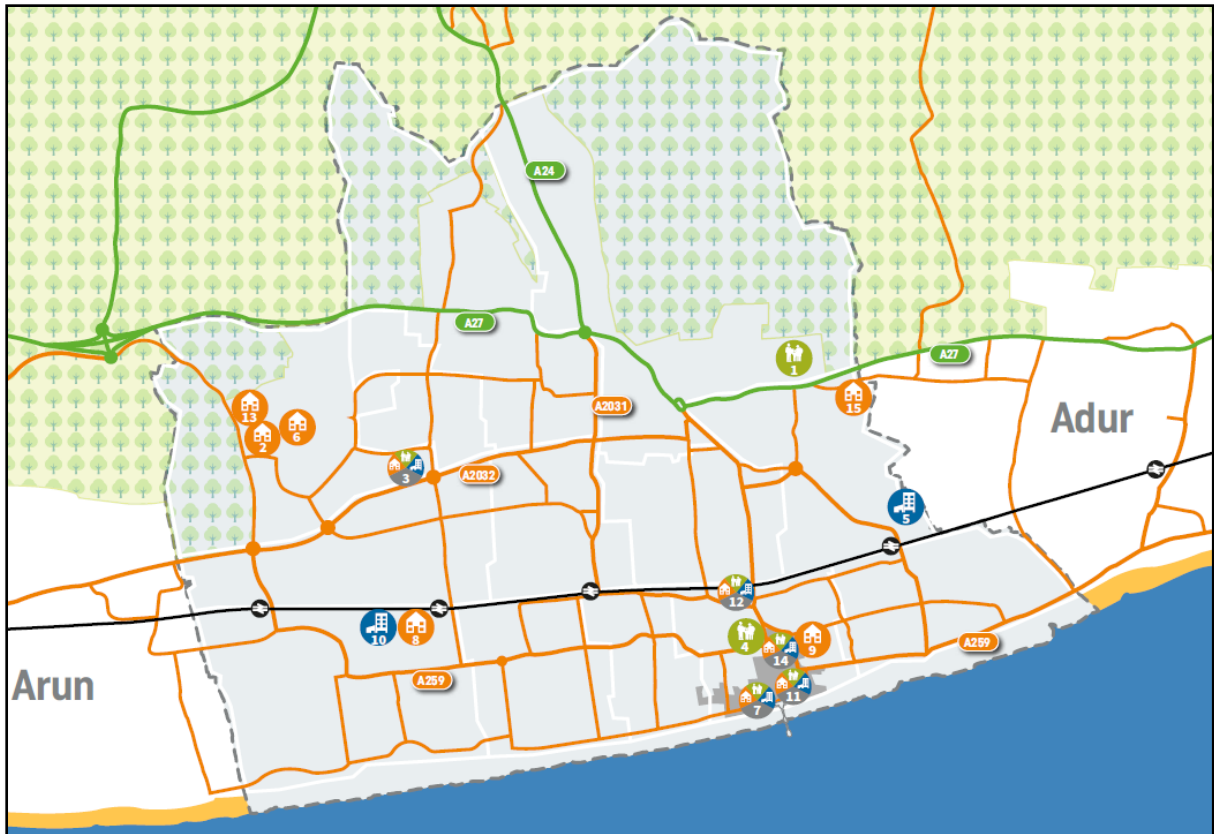
2.1.4 For the purposes of the sequential test sites are classified by the highest level of risk across all sources. The information used to complete the sequential test can be found in Appendix L of the SFRA which provides a summary of the flood risks posed to each site. The information relating to Somerset Lake can be found in the Level 2 SFRA.

2.1.5 The following sites have therefore been considered as part of the sequential test and have been found to have the following flood ratings based on the above table.

- A1 Beeches Avenue - low
- A2 Caravan Club, Titnore Way - high
- A3 Centenary House - high
- A4 Civic Centre, Stoke Abbott Road - medium
- A5 Decoy Farm - high
- A6 Fulbeck Avenue - high
- A7 Grafton - high
- A8 HMRC Offices, Barrington Road - medium

- A9 Lyndhurst Road - medium
- A10 Martlets Way - medium
- A11 Stagecoach, Marine Parade - high
- A12 Teville Gate - high
- A13 Titnore Lane (referred to in the SFRA as West Durrington) - high
- A14 Union Place - medium
- A15 Upper Brighton Road – high

Figure 2: Location of Site Allocations – Extract from Worthing Local Plan



1. Can development be allocated in areas at low risk of flooding?

2.1.6 The following sites are in areas of lowest risk:

- A1 Land north of Beeches Avenue

2. Can development be allocated in areas at medium risk of flooding?

2.1.7 The following sites are in areas of medium risk:

- A4 Civic Centre, Stoke Abbott Road (groundwater)
- A8 HMRC Offices, Barrington Road (surface water and groundwater)
- A9 Lyndhurst Road (groundwater)
- A10 Martlets Way (surface water and groundwater)
- A14 Union Place (surface water and groundwater)

3a. Can development be allocated within the lowest risk sites available in high risk sites?

2.1.8 The following sites are in areas of high risk:

- A2 Caravan Club, Titnore Way (fluvial and surface water)
- A3 Centenary House (groundwater)
- A5 Decoy Farm (fluvial, surface water and groundwater)
- A6 Fulbeck Avenue (fluvial, groundwater and somerset lake)
- A7 Grafton (coastal)
- A11 Stagecoach, Marine Parade (coastal)
- A12 Teville Gate (surface water)
- A13 Titnore Lane (fluvial, surface water and groundwater)
- A15 Upper Brighton Road (groundwater)

3b. Could the proposed development be alternatively located in a site wholly within low flood risk?

2.1.9 As explained in Section 1.4, the alternative sites identified through the SHLAA (including the Call for Sites) and Local Plan process were either not recommended for development by the evidence collated or there was insufficient evidence that the constraints identified could be suitably overcome. Therefore none of the sites identified and assessed were considered to be reasonably available for development at this time. In addition none of these sites were wholly within areas of low flood risk.

3c. Can the more sensitive development use types be directed to parts of the site where the risks are lower for both occupiers and the premises themselves?

2.1.10 As shown in Table 4 below, the majority of the sites are only partly located in areas of high risk and so it may be possible to direct more vulnerable development uses to parts of the site where the risks are lower. However, in doing so the risks posed by climate change should also be considered. This is supported by Local Plan Policy DM20 - Flood Risk and Sustainable Drainage which requires Flood Risk Assessments to demonstrate that within the site the most vulnerable development is located in areas at lowest flood risk, unless there are overriding reasons for not doing so.

Table 4: Extent of Flood Risk

A2 Caravan Club, Titnore Way		
Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	0%
	Flood Zone 3a (high)	0%
	Flood Zone 3b (high)	0%
Surface Water	1000yr (low)	3%

	100yr (medium)	0%
	30yr (high)	0%
	0.025 - 0.5 (medium)	0%
	0-0.25 (high)	18%
A3 Centenary House		
Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	0%
	Flood Zone 3a (high)	0%
	Flood Zone 3b (high)	0%
Surface Water	1000yr (low)	53%
	100yr (medium)	6%
	30yr (high)	0%
Groundwater	0.025 - 0.5 (medium)	0%
	0-0.25 (high)	100%
A5 Decoy Farm		
Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	3%
	Flood Zone 3a (high)	0%
	Flood Zone 3b (high)	13%
Surface Water	1000yr (low)	17%
	100yr (medium)	7%
	30yr (high)	2%
Groundwater	0.025 - 0.5 (medium)	1%
	0-0.25 (high)	12%
A6 Fulbeck Avenue		
Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	6%
	Flood Zone 3a (high)	20%
	Flood Zone 3b (high)	5%

Surface Water	1000yr (low)	53%
	100yr (medium)	30%
	30yr (high)	25%
Groundwater	0.025 - 0.5 (medium)	0%
	0-0.25 (high)	36%
Somerset Lake	Wet day (medium)	65%
	Dry day (high)	38%
A7 Grafton		
Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	13%
	Flood Zone 3a (high)	4%
	Flood Zone 3b (high)	68%
Surface Water	1000yr (low)	22%
	100yr (medium)	5%
	30yr (high)	0%
Groundwater	0.025 - 0.5 (medium)	0%
	0-0.25 (high)	0%
A11 Stagecoach, Marine Parade		
Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	24%
	Flood Zone 3a (high)	15%
	Flood Zone 3b (high)	6%
Surface Water	1000yr (low)	4%
	100yr (medium)	0%
	30yr (high)	0%
Groundwater	0.025 - 0.5 (medium)	8%
	0-0.25 (high)	0%
A12 Teville Gate		
Source of Flooding		Percentage of Site

Tidal/Fluvial	Flood Zone 2 (medium)	0%
	Flood Zone 3a (high)	0%
	Flood Zone 3b (high)	0%
Surface Water	1000yr (low)	73%
	100yr (medium)	48%
	30yr (high)	33%
Groundwater	0.025 - 0.5 (medium)	100%
	0-0.25 (high)	0%

A13 Titnore Lane

Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	0%
	Flood Zone 3a (high)	0%
	Flood Zone 3b (high)	2%
Surface Water	1000yr (low)	22%
	100yr (medium)	6%
	30yr (high)	4%
Groundwater	0.025 - 0.5 (medium)	0%
	0-0.25 (high)	2%

A15 Upper Brighton Road

Source of Flooding		Percentage of Site
Tidal/Fluvial	Flood Zone 2 (medium)	0%
	Flood Zone 3a (high)	0%
	Flood Zone 3b (high)	0%
Surface Water	1000yr (low)	4%
	100yr (medium)	1%
	30yr (high)	0%
Groundwater	0.025 - 0.5 (medium)	28%
	0-0.25 (high)	35%

Conclusions

2.1.11 The majority of sites are located in Flood Zone 1 and these are the most sequentially preferable. However due to the limited number of sites available, to ensure that every effort has been made to meet Worthing's full local housing need as far as is practicable and reasonable, all suitably available sites are required including those at risk of flooding. Even with these there is still insufficient capacity to meet Worthing's full local housing need. Therefore it is considered that all the above sites pass the sequential test, as required by the NPPF.

2.2 Windfall Sites

2.2.1 The Submission Draft Local Plan housing target includes a reliance on windfall sites to deliver 871 homes. Windfall sites are defined in the revised NPPF Glossary as: *"Sites which have not been specifically identified as available in the Local Plan process. They normally comprise previously developed sites that have unexpectedly become available."*

2.2.2 It is recommended that the acceptability of windfall applications in flood risk areas should be considered at the strategic level through a policy approach. In the absence of a flood risk windfall policy, it may be possible (where the data is sufficiently robust) for the LPA to apply the Sequential Test taking into account reasonably available sites, historic windfall rates and their distribution relative to Flood Zones.

2.2.3 Given the limited land availability in Worthing the Local Plan is unable to meet the local housing need. It is therefore considered that all potential windfall sites will need to be developed (where acceptable in terms of planning policy) to further contribute to meeting this need as far as possible. Individual sites not allocated through the Local Plan will be required to undertake the Sequential Test, and where necessary the Exception Test at the planning application stage. This should consider the Flood Zones and other sources of flooding. However, given the scale of unmet need it is unlikely to be possible for development to be directed to areas of lower flood risk.

Part 3

3.1 Exception Test

For the exception test to be passed it should be demonstrated that:
a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Both elements of the exception test should be satisfied for development to be allocated or permitted.

National Planning Policy Framework (2019), paragraphs 160 & 161

3.1.1 The Planning Practice Guidance describes the Exception Test as a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

3.1.2 The Test consists of two parts as follows:

- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
- b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

3.1.3 Both elements of the exception test should be satisfied for development to be allocated or permitted. Where this is not possible the Exception Test has not been satisfied and the allocation should not be made.

3.1.4 The Exception Test should be applied following the application of the Sequential Test, as indicated in Table 3 of the 2014 NPPF Planning Practice Guidance: Flood Risk and Coastal Change:

Table 5: Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	X	Exception Test required	✓	✓
Zone 3b	Exception Test required	X	X	X	✓

Key:

✓ Development is appropriate

X Development should not be permitted

PPG Paragraph: 067 Reference ID: 7-067-20140306

3.1.5 All of the sites that were identified as being in an area of high risk through the sequential test have been subject to the Exception Test apart from Titnore Lane due to the small percentages of the site area affected (less than 5%). Table 13-1 of the SFRA lists the sites that were included in the Level 2 SFRA and the justification for their inclusion. This is set out below:

Table 6: Sites Included in Level 2 SFRA

Site	Proposed Development	Reason for inclusion
Stagecoach, Marine Parade	Residential and commercial / leisure	The site has been shown to be at risk from coastal / tidal flooding
Caravan Club, Titnore Way	Residential	The site has been shown to be at risk from groundwater flooding
Centenary House	Residential and office	The site has been shown to be

	space	at risk from both surface water and groundwater flooding
Grafton	Residential and commercial/ leisure / retail	The site has been shown to be at risk from both coastal and surface water flooding
Decoy Farm	Industrial / warehousing	The site has been shown to be at risk from both surface water and groundwater flooding
Fulbeck Avenue	Residential	The site has been shown to be at risk from both fluvial and surface water flooding and there is also a risk of flooding from a breach of Somerset's Lake and overtopping of the Malthouse Way balancing pond
Upper Brighton Road	Residential	The site has been shown to be at risk from groundwater flooding
Teville Gate	Residential and commercial / leisure / retail and hotel	The site has been shown to be at risk from surface water and flooding

3.1.6 The commercial development proposed at Decoy Farm is defined as a less vulnerable use, so in accordance with the Guidance the Exception Test is not required to be undertaken. However for completeness the site has been included.

3.2 Part A

The development would provide wider sustainability benefits to the community that outweigh the flood risk

National Planning Policy Framework (2019), paragraph 160

3.2.1 The individual site allocation policies were tested through the Sustainability Appraisal as part of the assessment of the total effects of the Local Plan. These are set out in Appendix D of the Sustainability Appraisal Report of the Submission Draft Worthing Local Plan and are also copied below in Appendix A of this Report.

3.2.2 The Sustainability Appraisal found that these sites, as with other allocations tended to score negatively against environmental objectives including flood risk, but positively against social and economic objectives. However, it is expected that many of these negative effects will be mitigated through policies within Part 5 of the Plan.

3.2.3 Overall it is considered that the Sustainability Appraisal of the above sites demonstrates that the development would provide wider sustainability benefits to the community that outweigh the flood risk. Thereby demonstrating that Part a) of the Exception Test has been satisfied.

3.3 Part B

The development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

National Planning Policy Framework (2019), paragraph 160

3.3.1 In accordance with the NPPF to satisfy part b) of the Exception Test it must be demonstrated that

- Development will be safe for its lifetime;
- Not increase flood risk elsewhere; and
- Where possible, reduce flood risk overall

3.3.2 The Adur & Worthing Level 2 Strategic Flood Risk Assessment (2020) provides site specific summaries which include the relevant evidence to undertake this part of the Exception Test in accordance with the Planning Practice Guidance. These include an overview of the potential flood risk from all sources associated with each site and recommendations for site design to make development safe. These are included in Appendix B and demonstrate that the development will be safe for its

lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Therefore overall it is considered that both elements of the Exception Test have been satisfied for development to be allocated. However at the planning application stage Part b) of the Exception Test will need to be reapplied to take into account more detailed information about the proposed development and the specific mitigation proposed to make development safe and reduce flood risk overall through a site specific Flood Risk Assessment.

Appendix A: Sustainability Appraisal of Exception Test Sites

SA Objective	A2 Caravan Club, Titnore Way
1. Environmental Quality	<p>?</p> <p>Any new development without mitigation has the potential to increase car use contributing to air quality issues. However given the distance of this site from the AQMA the direct impact of allocating this site on air quality is difficult to determine.</p>
2. Biodiversity	<p>-</p> <p>Development of greenfield sites is likely to result in a loss of biodiversity. The landscape and ecology study that supports the Local Plan found the site was dominated by species poor and amenity grassland. However habitats bordering the northern and western boundaries form part of the Titnore and Goring Woods Local Wildlife Site. Biodiversity should be enhanced to achieve net gains.</p>
3. Land and Soils	<p>-</p> <p>Development of part of the caravan club would have a negative impact on of this objective as the existing site is largely undeveloped.</p>
4. Energy	<p>-</p> <p>Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.</p>
5. Water Management	<p>-</p> <p>The SFRA identifies the eastern section of the site as being at a high risk of groundwater flooding. The SFRA recommends that a SuDS scheme should be developed for the site to provide mitigation and opportunities to achieve a reduction in overall flood risk.</p>
6. Landscape and Character	<p>/</p> <p>Development of this largely undeveloped site will likely have an negative impact on this objective. However the landscape and ecology study that supports the Local Plan found the site formed a logical inclusion within the settlement pattern and concluded it had a medium/high suitability for development. To minimise any negative effects development requirements should include the importance to retain and enhance boundary vegetation to limit views of the site from the National Park.</p>
7. Built Environment	<p>0</p> <p>This policy would have no impact on the quality of the townscape or securing high quality design</p>
8. Historic Environment	<p>0</p> <p>The site is not expected to affect any heritage assets or the historic environment.</p>
9. Healthy Lifestyles	<p>0</p> <p>It is not expected the allocation of this site would have any direct impact on healthy lifestyles. However it is recognised that access to good quality housing will help support people's health and wellbeing.</p>
10. Crime and Public Safety	<p>0</p> <p>This policy would have no impact on crime and public safety</p>
11. Housing	<p>++</p> <p>The allocation of this site for housing would have a very positive effect in helping to meet this objective.</p>
12. Communities	<p>?</p>

	This policy would have no direct impact on communities but additional housing could, without mitigation, increase demand for existing community services.
13. Education	?
	This policy would have no direct impact on education but additional housing could without mitigation increase demand for school places.
14. Economy	/
	Although the development of this site will reduce the area of the caravan club the policy seeks to protect and enhance the continued use of of the northern part of the site as a Caravan Club which will continue to support local tourism.
15. Town and Local Centres	0
	This allocation would have no impact on town or local centres
16. Travel and Access	/
	It is not expected that this allocation would have any significant positive or negative impact on improving access to sustainable modes of transport
Mitigation	<p>To minimise negative effects on biodiversity as a result of loss, biodiversity should be enhanced to achieve net gains.</p> <p>To ensure no negative effects against the water management objective a SuDs scheme should be delivered as part of development.</p> <p>To minimise negative effects on landscape & character boundary vegetation should be enhanced to limit views of the site from the National Park.</p>

SA Objective	A3 Centenary House
1. Environmental Quality	?
	Any new development without mitigation has the potential to increase car use contributing to air quality issues. However given the type of development allocated and the distance of this site from the AQMA the direct impact of allocating this site on air quality is difficult to determine.
2. Biodiversity	0
	The allocation of this brownfield site will have no direct impact on this objective. The need to protect and enhance biodiversity to achieve a net gain is covered through other policies in the Local Plan
3. Land and Soils	++
	The redevelopment of this brownfield site will make efficient use of land and will re-use previously developed land. This will have a very positive impact on this objective.
4. Energy	-
	Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.
5. Water Management	--
	The SFRA identifies the site as being at a high risk of groundwater flooding. There would also be a significant increase in surface water flood risk in the future due to climate change particularly in the south of the site. The SFRA recommends that a SuDS scheme should be developed for the site to provide mitigation and opportunities to achieve a reduction in overall flood risk.

6. Landscape and Character	0
	The allocation of this brownfield site within the existing Built Up Area would have no impact on landscape and character.
7. Built Environment	0
	This policy would have no impact on the quality of the townscape or securing high quality design
8. Historic Environment	0
	The site is not expected to affect any heritage assets or the historic environment.
9. Healthy Lifestyles	0
	It is not expected the allocation of this site would have any direct impact on healthy lifestyles.
10. Crime and Public Safety	++
	The allocation and redevelopment of this site will provide enhanced facilities for Sussex Police which will help reduce crime.
11. Housing	+
	The allocation of this site for mixed-uses including housing will have a positive effect in helping to meet this objective. This site could provide additional housing helping to further meet identified need if it was allocated for just housing.
12. Communities	++
	Redevelopment of this site provides an opportunity to deliver a multi-agency hub offering integrated and co-located public services which will benefit local communities
13. Education	?
	This policy would have no direct impact on education but additional housing could without mitigation increase demand for school places.
14. Economy	++
	The delivery of new office space will have a very positive impact on this objective.
15. Town and Local Centres	0
	This allocation would have no impact on town or local centres
16. Travel and Access	/
	It is not expected that this allocation would have any significant positive or negative impact on improving access to sustainable modes of transport
Mitigation	Mitigation has been identified to minimise negative effects on water management through development of a SuDS scheme to address the high risks posed by groundwater flood risk and in the future, as a result of climate change, surface water flooding.

SA Objective	A5 Decoy Farm
1. Environmental Quality	?

	<p>Any new development without mitigation has the potential to increase car use contributing to air quality issues. However given the type of development allocated here and the distance of this site from the AQMA the direct impact of allocating this site on air quality is difficult to determine.</p> <p>In addition the site is adjacent to the Teville Stream. Policy wording should ensure this is protected from contamination as a result of construction on the landfill site.</p>
2. Biodiversity	-
	This site is on a former landfill and consists of grassland with the Teville Stream running along the site boundary. Development therefore has the potential to result in a loss of biodiversity. The policy should refer to development requirements to protect and enhance valued habitats to achieve a net gain in biodiversity.
3. Land and Soils	+
	Although the site is largely undeveloped it is a former landfill. Therefore, development will support the remediation of contaminated soils. This will have a positive impact on this objective.
4. Energy	-
	Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.
5. Water Management	-
	Parts of the site along the site boundaries are shown in the SFRA as in Flood Zone 3. However this does not take into account the recent realignment of the Teville Stream. Small parts of the site are also shown as at a high risk of surface and groundwater flood risk. The SFRA recommends that the most vulnerable development types are located in the lowest risk parts of the site and that a SuDS scheme should be developed.
6. Landscape and Character	-
	This undeveloped site is located within the current Built Up Area but also adjoins the Worthing/Sompting Gap. Development will need to have regard to and protect and enhance the distinctive character of the Local Green Gap.
7. Built Environment	0
	This policy would have no impact on the quality of the townscape or securing high quality design
8. Historic Environment	0
	The site is not expected to affect any heritage assets or the historic environment.
9. Healthy Lifestyles	0
	It is not expected the allocation of this site would have any direct impact on healthy lifestyles.
10. Crime and Public Safety	0
	This policy would have no impact on crime and public safety
11. Housing	0
	This site is not suitable for housing due to levels of contaminated land so the policy will have no impact on this objective.

12. Communities	0
	This policy would have no direct impact on communities
13. Education	0
	This policy would have no direct impact on education
14. Economy	++
	The delivery of new industrial / warehousing floorspace will have a very positive impact on this objective.
15. Town and Local Centres	0
	This allocation would have no impact on town or local centres
16. Travel and Access	+
	The allocation of this site has the potential to help facilitate pedestrian links to proposed routes across the Local Green Gap. This should be included as a policy requirement to maximise this positive effect.
Mitigation	<p>To reduce potential negative effects against environmental quality objective the policy should ensure the Teville Stream is protected from contamination as a result of construction or land remediation.</p> <p>To minimise negative effects on biodiversity valued habitats should be protected and enhanced to achieve a net gain in biodiversity.</p> <p>To ensure no negative effects against the water management objective the most vulnerable uses should be located in the parts of the site with lowest flood risk and a SuDs scheme should be delivered.</p> <p>To minimise negative effects on landscape & character development should protect and enhance the character of the Local Green Gap</p> <p>To maximise positive effects on travel links should be facilitated to proposed pedestrian routes in the Gap.</p>

SA Objective	A6 Fulbeck Avenue
1. Environmental Quality	?
	Any new development without mitigation has the potential to increase car use contributing to air quality issues. However given the distance of this site from the AQMA the direct impact of allocating this site on air quality is difficult to determine.
2. Biodiversity	-
	Development of greenfield sites is likely to result in a loss of biodiversity. The landscape and ecology study that supports the Local Plan found the habitats of greatest value associated with the site include treelines and scrub bordering the north-western site boundary which form part of Titnore & Goring Woods Complex Local Wildlife Site. Biodiversity should be enhanced to achieve net gains.
3. Land and Soils	-
	Development of this site would have a negative impact on of this objective as the existing site is undeveloped.
4. Energy	-
	Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.
5. Water Management	--

	<p>The SFRA shows a small section of the site in the north and centre is located within Flood Zone 3b. A further northern section of the site is also located within Flood Zone 3a. In addition 1/4 of the site is at a high risk of surface water flooding and approximately 1/3 of the site is at high risk of groundwater flooding. The SFRA also found that Somerset Lake posed a risk to the site in event of breach resulting in 38% of the site being affected on a dry day with depths up to 1.4m and on a wet day over half the site affected with depths up to 1.6m. Therefore development in this location would place additional people at risk of flooding. The SFRA recommends that any FRA considers other sources of flooding, the most vulnerable development types are located in the lowest risk parts of the site and that mitigation will be required to ensure development is made safe and to reduce the overall level of flood risk at the site.</p>
6. Landscape and Character	-
	<p>Development of this undeveloped site will have an negative impact on this objective. However the landscape and ecology study that supports the Local Plan found the southern half of the site formed a logical inclusion within the settlement pattern. The study concludes that the southern half has a high suitability for development and the northern half a medium suitability for development. Mitigation should be included within the development requirements to ensure the northern area of woodland is retained and enhanced to limit views of the site from the National Park.</p>
7. Built Environment	0
	This policy would have no impact on the quality of the townscape or securing high quality design
8. Historic Environment	0
	The site is not expected to affect any heritage assets or the historic environment.
9. Healthy Lifestyles	0
	It is not expected the allocation of this site would have any direct impact on healthy lifestyles. However it is recognised that access to good quality housing will help support people's health and wellbeing.
10. Crime and Public Safety	0
	This policy would have no impact on crime and public safety
11. Housing	++
	The allocation of this site for housing would have a very positive effect in helping to meet this objective.
12. Communities	?
	This policy would have no direct impact on communities but additional housing could, without mitigation, increase demand for existing community services.
13. Education	?
	This policy would have no direct impact on education but additional housing could without mitigation increase demand for school places.
14. Economy	0
	The delivery of housing will provide employment opportunities in the short term. However, this policy would have no direct impact on the economy in the long term.
15. Town and Local Centres	0

	This allocation would have no impact on town or local centres
16.Travel and Access	/
	It is not expected that this allocation would have any significant positive or negative impact on improving access to sustainable modes of transport
Mitigation	<p>To minimise negative effects on biodiversity valued habitats should be protected and enhanced to achieve a net gain in biodiversity.</p> <p>To ensure no negative effects against the water management objective the most vulnerable uses should be located in the parts of the site with lowest flood risk, a FRA should consider all sources of flooding and mitigation provided to ensure development is safe and to reduce flood risk overall.</p> <p>To minimise negative effects on landscape & character woodland should be retained and enhanced to minimise the impact on views from the National Park.</p>

SA Objective	A7 Grafton
1. Environmental Quality	?
	Any new development without mitigation has the potential to increase car use contributing to air quality issues. However given the type of development allocated and the distance of this site from the AQMA the direct impact of allocating this site on air quality is difficult to determine.
2. Biodiversity	0
	The allocation of this brownfield site will have no direct impact on this objective. The need to protect and enhance biodiversity to achieve a net gain is covered through other policies in the Local Plan
3. Land and Soils	++
	The redevelopment of this brownfield site will make efficient use of land and will re-use previously developed land. This will have a very positive impact on this objective.
4. Energy	-
	Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.
5. Water Management	--
	Parts of the site lie within Flood Zone 3 the site is therefore at a high risk of coastal flooding and the SFRA states that climate change will have a significant impact on this site with Flood Zone 3 covering the whole site in the future. Therefore development in this location would place additional people at risk of flooding. The SFRA recommends that mitigation will be required to ensure development is made safe and to reduce the overall level of flood risk at the site.
6. Landscape and Character	0
	The allocation of this brownfield site within the existing Built Up Area would have no impact on landscape and character.
7. Built Environment	+
	Redevelopment of this town centre site car park will help improve the quality of the townscape and help improve the relationship between the town centre and the seafront.

8. Historic Environment	-
	The site is surrounded by several Conservation Areas and is opposite the Lido (a Grade II Listed Building). To mitigate any potential negative effects the policy wording should require development to provide an attractive setting to the historic environment, improving its current setting.
9. Healthy Lifestyles	0
	It is not expected the allocation of this site would have any direct impact on healthy lifestyles. However it is recognised that access to good quality housing will help support people's health and wellbeing.
10. Crime and Public Safety	+
	Regeneration of a town centre site could help improve links between the town centre and seafront. Increasing the number of people living here may help to improve the vibrancy of this section of the high street and help improve natural surveillance reducing crime and the fear of crime.
11. Housing	+
	The allocation of this site for mixed-uses (including a significant level of housing) housing would have a positive effect in helping to meet this objective. This site could provide additional housing helping to further meet identified need if it was allocated for just housing.
12. Communities	?
	This policy would have no direct impact on communities but additional housing could, without mitigation, increase demand for existing community services.
13. Education	?
	This policy would have no direct impact on education but additional housing could without mitigation increase demand for school places.
14. Economy	+
	The delivery of new commercial floorspace as part of a mixed use scheme will help support economic growth.
15. Town and Local Centres	++
	This policy would have a very positive impact as it will facilitate regeneration through the creation of a high quality mixed use development that will help to create an improved link between the town centre and seafront. This will help to meet this objective.
16. Travel and Access	+
	The allocation of this site has the potential to provide a new route linking the seafront with the primary shopping area. This should be included as a policy requirement to maximise this positive effect.
Mitigation	<p>To minimise negative effects against the water management objective mitigation should be provided to ensure development is safe and reduce the overall level of flood risk.</p> <p>To minimise negative effects against the historic environment development should seek to improve the current setting of heritage assets.</p> <p>To maximise positive effects on travel and access development should create and enhance pedestrian routes between the seafront and primary shopping area.</p>

SA Objective	A11 Stagecoach, Marine Parade
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1. Environmental Quality	?
	Any new development without mitigation has the potential to increase car use contributing to air quality issues. However given the type of development allocated and the distance of this site from the AQMA the direct impact of allocating this site on air quality is difficult to determine.
2. Biodiversity	0
	The allocation of this brownfield site will have no direct impact on this objective. The need to protect and enhance biodiversity to achieve a net gain is covered through other policies in the Local Plan
3. Land and Soils	++
	The redevelopment of this brownfield site will make efficient use of land and will re-use previously developed land. This will have a very positive impact on this objective.
4. Energy	-
	Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.
5. Water Management	--
	Parts of the site lie within Flood Zone 3 the site is therefore at a high risk of coastal flooding and the SFRA states that climate change will have a significant impact on this site with Flood Zone 3 covering the whole site in the future. Therefore development in this location would place additional people at risk of flooding. The SFRA recommends that mitigation will be required to ensure development is made safe and to reduce the overall level of flood risk at the site.
6. Landscape and Character	0
	The allocation of this brownfield site within the existing Built Up Area would have no impact on landscape and character.
7. Built Environment	+
	Redevelopment of this town centre bus depot will help improve the quality of the townscape and help improve the relationship between the town centre and the seafront.
8. Historic Environment	-
	The whole site is bounded by Conservation Areas with a small part of the site within the Steyne Gardens Conservation Area. It is also adjacent to the Dome Cinema a Grade II* Listed Building and several other listed buildings in close proximity. To mitigate any potential negative effects the policy wording should ensure development is sensitive to the surrounding heritage assets and help to enhance their setting.
9. Healthy Lifestyles	0
	It is not expected the allocation of this site would have any direct impact on healthy lifestyles. However it is recognised that access to good quality housing will help support people's health and wellbeing.
10. Crime and Public Safety	0
	Regeneration of a town centre site could help improve links between the town centre and seafront. Increasing the number of people living here may help to

	improve the vibrancy of this part of the town centre and help improve natural surveillance reducing crime and the fear of crime.
11. Housing	+
	The allocation of this site for mixed-uses (including a significant level of housing) housing would have a positive effect in helping to meet this objective. This site could provide additional housing helping to further meet identified need if it was allocated for just housing.
12. Communities	?
	This policy would have no direct impact on communities but additional housing could, without mitigation, increase demand for existing community services.
13. Education	?
	This policy would have no direct impact on education but additional housing could without mitigation increase demand for school places.
14. Economy	+
	The delivery of new commercial floorspace as part of a mixed use scheme will help support economic growth.
15. Town and Local Centres	++
	This policy would have a very positive impact as regeneration will deliver a mixed use development in the heart of the town centre. Enhanced permeability and Improved access will help to meet this objective.
16. Travel and Access	+
	The allocation of this site has the potential to provide attractive and accessible pedestrian links from the seafront to Warwick Street. This should be included as a policy requirement to maximise this positive effect.
Mitigation	<p>To minimise negative effects against the water management objective mitigation should be provided to ensure development is safe and reduce the overall level of flood risk.</p> <p>To minimise negative effects against the historic environment development should be sensitive to nearby assets and help to enhance their setting.</p> <p>To maximise positive effects on travel and access development should provide attractive and accessible pedestrian links between the seafront and Warwick Street.</p>

SA Objective	A12 Teville Gate
1. Environmental Quality	?
	Any new development without mitigation has the potential to increase car use contributing to air quality issues. However given the type of development allocated and the distance of this site from the AQMA the direct impact of allocating this site on air quality is difficult to determine.
2. Biodiversity	0
	The allocation of this brownfield site will have no direct impact on this objective. The need to protect and enhance biodiversity to achieve a net gain is covered through other policies in the Local Plan
3. Land and Soils	++
	The redevelopment of this brownfield site will make efficient use of land and will re-use previously developed land. This will have a very positive impact on this objective.

4. Energy	-
	Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.
5. Water Management	-
	The SFRA shows 1/3 of the site is at a high risk of surface water flooding. This is a brownfield site. The SFRA recommends that a SuDS scheme should be developed for the site to provide mitigation and opportunities to achieve a reduction in overall flood risk.
6. Landscape and Character	0
	The allocation of this brownfield site within the existing Built Up Area would have no impact on landscape and character.
7. Built Environment	++
	Redevelopment of this vacant site will help to integrate the site with the surrounding area and will provide high quality public realm. This will have a positive impact on this objective.
8. Historic Environment	-
	The site is located in close proximity to the Worthing Railway Station and the Grand Victorian Hotel (Grade II Listed). To mitigate any potential negative effects the policy wording should ensure development protects and enhances nearby heritage assets and that no significant harm is caused to them or their settings.
9. Healthy Lifestyles	0
	It is not expected the allocation of this site would have any direct impact on healthy lifestyles. However it is recognised that access to good quality housing will help support people's health and wellbeing.
10. Crime and Public Safety	+
	Regeneration of a key site adjacent to the train station will help improve the public realm, pedestrian routes and improve natural surveillance reducing crime and the fear of crime.
11. Housing	+
	The allocation of this site for mixed-uses (including a significant level of housing) housing would have a positive effect in helping to meet this objective. This site could provide additional housing helping to further meet identified need if it was allocated for just housing.
12. Communities	?
	This policy would have no direct impact on communities but additional housing could, without mitigation, increase demand for existing community services.
13. Education	?
	This policy would have no direct impact on education but additional housing could without mitigation increase demand for school places.
14. Economy	+
	The delivery of new commercial floorspace as part of a mixed use scheme will help support economic growth.
15. Town and Local Centres	+
	This policy would have a positive effect as improved connectivity between the station and town centre will help to meet this objective
	+

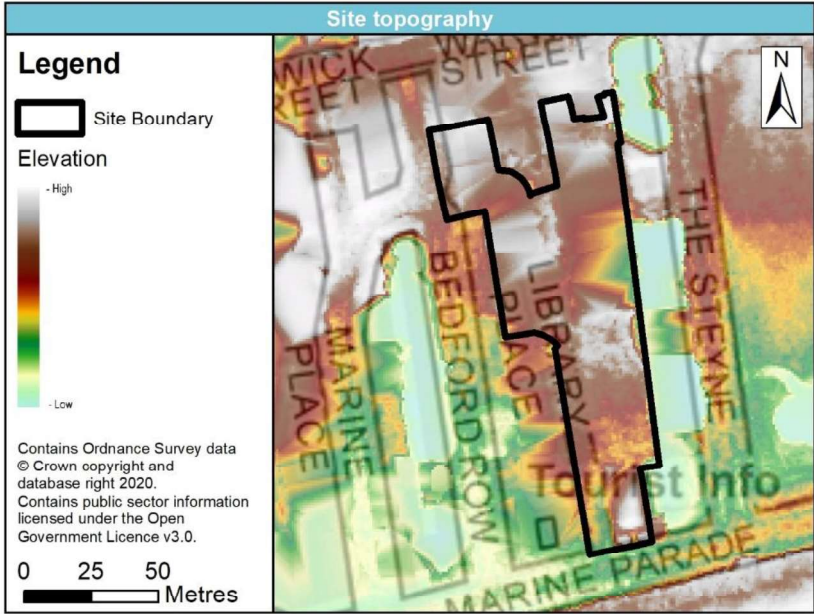
16.Travel and Access	The allocation of this site has the potential to provide cycle and pedestrian links from the station to the town centre and under the A24 to Morrisons. This should be included as a policy requirement to maximise this positive effect.
Mitigation	<p>To minimise negative effects against the water management a SuDS scheme should be developed to reduce overall risk.</p> <p>To minimise negative effects against the historic environment development should seek to protect and enhance heritage assets and their settings to ensure no significant harm is caused.</p> <p>To maximise positive effects on travel and access development should provide pedestrian and cycle routes from the station to the town centre and Morrisons.</p>

SA Objective	A15 Upper Brighton Road
1. Environmental Quality	<p>-</p> <p>The proximity of this site to the AQMA means development here without mitigation is likely to exacerbate congestion contributing to air pollution. Development should therefore be required to incorporate measures that deliver mitigation in line with the requirements of the Worthing Air Quality Action Plan.</p>
2. Biodiversity	<p>-</p> <p>Development of greenfield sites is likely to result in a loss of biodiversity. The landscape and ecology study that supports the Local Plan found the habitats/features of highest ecological interest were the hedgerows and scrub along field boundaries and the potential waterbody to the east of the site which form part of a wider wildlife corridor. These features should be enhanced to achieve biodiversity net gains.</p>
3. Land and Soils	<p>--</p> <p>Development of this site would have a negative impact on of this objective as the existing site is undeveloped arable fields.</p>
4. Energy	<p>-</p> <p>Development is likely to cause increased emissions and waste, contributing to climate change unless fully mitigated. This will have a negative impact on this objective. This will be addressed through other policies in the Local Plan.</p>
5. Water Management	<p>-</p> <p>The SFRA identifies part of the site as being at a high risk of groundwater flooding. The SFRA recommends that a SuDS scheme should be developed for the site to provide mitigation and opportunities to achieve a reduction in overall flood risk.</p>
6. Landscape and Character	<p>-</p> <p>Development of this site would result in an extension of the current Built Up Area into the open space that forms the part of the physical separation between Worthing and Sompting. However the landscape and ecology study that supports the Local Plan found the site was detached from the Worthing-Sompting gap but did form part of the undeveloped setting of the National Park. It concluded that the site had a medium suitability for development. To minimise negative effects development requirements should seek to avoid coalescence and mitigate visual impacts from the National Park.</p>
7. Built Environment	<p>0</p> <p>This policy would have no impact on the quality of the townscape or securing high quality design</p>
8. Historic Environment	<p>-</p> <p>The site is located in close proximity Sompting Conservation Area and Upton Farm House (Grade II Listed Building). To mitigate any potential negative effects</p>

	the policy wording should ensure development protects and enhances nearby heritage assets and that no significant harm is caused to them or their settings.
9. Healthy Lifestyles	<p>+</p> <p>The location of the site has the potential to improve walking links and access into the national park helping to improve people's physical health and connecting them with nature. This should be included as a development requirement to maximise this positive effect.</p>
10. Crime and Public Safety	<p>0</p> <p>This policy would have no impact on crime and public safety</p>
11. Housing	<p>++</p> <p>The allocation of this site for housing would have a very positive effect in helping to meet this objective.</p>
12. Communities	<p>?</p> <p>This policy would have no direct impact on communities but additional housing could, without mitigation, increase demand for existing community services.</p>
13. Education	<p>?</p> <p>This policy would have no direct impact on education but additional housing could without mitigation increase demand for school places.</p>
14. Economy	<p>0</p> <p>The delivery of housing will provide employment opportunities in the short term. However, this policy would have no direct impact on the economy in the long term.</p>
15. Town and Local Centres	<p>0</p> <p>This allocation would have no impact on town or local centres</p>
16. Travel and Access	<p>+</p> <p>The allocation of this site has the potential to improve pedestrian and cycle routes along Upper Brighton Road. This should be included as a policy requirement to maximise this positive effect.</p>
Mitigation	<p>To minimise negative effects on environmental quality development should be required to incorporate measures that deliver mitigation in line with the requirements of the Worthing Air Quality Action Plan.</p> <p>To minimise negative effects on biodiversity those features of highest ecological value on the site should be enhanced to achieve net gains.</p> <p>To minimise negative effects against the water management objective a SuDS scheme should be developed to reduce overall risk.</p> <p>To minimise negative effects on landscape and character development should avoid coalescence and mitigate visual impacts from the National Park.</p> <p>To minimise negative effects against the historic environment development should ensure it protects and enhance the setting of nearby heritage assets.</p> <p>To maximise positive effects on health development should improve walking links and access to the National Park.</p> <p>To maximise positive effects on travel development should improve pedestrian and cycle routes along Upper Brighton Road.</p>

Appendix B: Level 2 SFRA Site Summaries

SHLAA / HELAA site reference	WB08046
Site name	Bus Depot, Library Place (Also known as Stagecoach, Marine Parade)

Site details	OS Grid reference	TQ 15078 02522
	Local Authority	Worthing Borough Council
	Area	0.67 ha
	Current land use	Bus depot
	Proposed site use	Mixed use- 60 residential units and 3,500m ² of leisure and retail development.
	Flood risk vulnerability	More vulnerable
	Topography	 <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> <p>0 25 50 Metres</p> <ul style="list-style-type: none"> • There is an existing building which covers the majority of the west of the site and a carpark. • The presence of buildings on the site has affected localised filtering of the LIDAR data. • The site is generally flat with a downward slope from west to east. • The ground slope across the site generally has a gradient of less than 5%

SHLAA / HELAA site reference	WB08046
Site name	Bus Depot, Library Place (Also known as Stagecoach, Marine Parade)

Sources of flood risk	Existing watercourses	There are no watercourses in the vicinity of the site.		
	Flood history	There are no recorded flood events within the site.		
	Coastal / tidal	Proportion of the site at risk (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		5% AEP	0.5% AEP	0.1% AEP
		6%	15%	24%
		Available modelled data: The site is covered by the Environment Agency Arun to Adur (Coastal) 2016 SWAN model. The extent of the Flood Zones predicted by the flood model are also the extent of the actual flood risk, as there are no flood risk management features that change the risk.		
		Flood characteristics: The site is predicted to be at risk from coastal flooding due to the proximity of the sea to the south of the site. <ul style="list-style-type: none"> A small section of the site along the east and southern boundaries is located within the 5% AEP flood extent (approximately 6%). A further 15% in the east, south and west of the site is located within the 0.5% AEP flood extent. Finally, a further 24% of the site is located within Flood Zone 2, covering areas in the south, north west and centre. 		
	Surface Water	Proportion of site at risk (RoFSW) (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		3.3% AEP	1% AEP	0.1% AEP
		0%	0%	4%
		Description of surface water flow paths: The majority of the site is at a very low risk of surface water flooding. Two surface water pathways enter the site from Warwick Street in the north and Marine Parade to the south during the 0.1% AEP rainfall event, impacting 4% of the site.		
		RoFSW takes account of building footprints so the flood risk may be affected by existing buildings on the site. It also only considers flood risk where the hazard rating is greater than 0.575.		
	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		0%	8%	8%
		A small southern most section of the site (8%) has a medium to high risk of groundwater flooding, with groundwater levels predicted to lie between 0.025m and 0.5m below the ground surface during a 1% AEP groundwater flood event. The remainder of the site has a medium to low risk of groundwater flooding with levels predicted between 0.5 and 5m below the surface during this event.		

SHLAA / HELAA site reference	WB08046
Site name	Bus Depot, Library Place (Also known as Stagecoach, Marine Parade)

		Tidal Groundwater Risk Zone (maximum risk)	Tidal Drainage Risk Zone (maximum risk)
		GW2	SW2
	Tidal Risk Zones	<p>The site is mostly situated within Tidal Groundwater Risk Zone 1. This is because the site is situated above the current tidal level but below the future tidal level and within an area of medium groundwater flood risk where groundwater levels are more than 0.5m below the surface during a 1% AEP groundwater flood event.</p> <p>Small sections in the east and south of the site is situated within Tidal Groundwater Risk Zone GW2. The area to the east is in this zone due to being situated below the existing tidal level and at a medium groundwater risk where groundwater levels are between 0.5m and 5m below the surface during a 1% AEP groundwater flood event. The area to the south is located in zone GW2 as it is situated between the present-day and future tidal levels and within a higher groundwater risk area where groundwater levels are between 0.025m and 0.5m below the surface during a 1% AEP groundwater flood event.</p> <p>The site is mostly located within Tidal Drainage Risk Zone 1. This is due to the site being located above the current tidal level but below the future tidal level. The site is also at a negligible risk from surface water flooding during the 1% AEP surface water event. A small section in the east of the site is situated within Tidal Drainage Risk Zone 2. This is due to this area being located at a lower elevation, below the present-day tidal level, and at a negligible risk from surface water flooding during the 1% AEP surface water event.</p>	
	Reservoir	The site is not at risk of reservoir flooding.	

SHLAA / HELAA site reference	WB08046
Site name	Bus Depot, Library Place (Also known as Stagecoach, Marine Parade)

Flood risk management infrastructure	Defences	Defence Type		Standard of Protection		Condition			
		There are no defences within the vicinity of the site.							
	Residual risk	Culvert / structure blockage?			There are no known culverts or structures in the vicinity of the site.				
		Impounded water body failure?			The site is not at risk of flooding due to reservoir breach.				
Defence breach / overtopping?			The site is not at risk from defence breach or overtopping.						
Emergency planning	Flood warning	The site is situated within the Environment Agency's 'Coastal areas of Rustington to Shoreham' (065WAC407) Flood Alert Area and the Environment Agency's 'Rustington, Worthing and Lancing' (065FWC2801) Flood Warning Area.							
	Access and egress	Dry access and egress could be available to the site during the 3.33% and 1% AEP surface water events to the north of the site via Warwick Street. Dry access and egress would be cut off in the 0.1% AEP event. However wet access and egress could still be available given the maximum hazard rating of 0.75-1.25 to the north of the site. This generally means that only the most vulnerable people would be in danger when walking through this floodwater. Dry access and egress can be available to the site to the north via Bedford Row in all coastal flood events.							
Climate Change	Climate change allowances for the '2115 EPOCH' (2017 base year)	Proportion of site at 0.5% AEP coastal / tidal flood risk							
		Coastal region		Present day		Higher Central		Upper End	
		South East	n/a		+0.84m		+1.12m		
			15%		100%		100%		
	Implications for the site	There is a large increase in flood extent for both climate change allowances in comparison to the 0.5% AEP event. For the climate change scenarios, the flood extent reaches and exceeds that of the present day 0.1% AEP event, to affect the entire site. Therefore, climate change is predicted to have significant impact the proposed site.							
	Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk							
		Present day		+20% rainfall uplift		+30% rainfall uplift		+40% rainfall uplift	
		0%		Less than 1%		1%		1%	
	Implications for the site	A very slight increase in flood extent during the 1% AEP surface water flood event is predicted for the plus 20%, 30% and 40% climate change events. However, these extents are not predicted to reach that of the 0.1% AEP surface water flood extent. These increases are located within the south east corner of the site. Therefore, the site will be at a marginally higher risk from surface water flooding in the future.							

SHLAA / HELAA site reference	WB08046
Site name	Bus Depot, Library Place (Also known as Stagecoach, Marine Parade)

Requirement for drainage control and impact mitigation	Bedrock Geology	The entire site's bedrock geology consists of Lewes Nodular Chalk Formation (chalk).
	Superficial Geology	The entire site is overlain with River Terrace Deposits (undifferentiated), sand, silt and clay.
	Soils	The site has freely draining slightly acid loamy soils.
	Groundwater Source Protection Zone	The site is not within a Groundwater Source Protection Zone.
	Historic Landfill Site	There are no historic landfill sites in the vicinity of the site
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems across the site given the possible risk from groundwater flooding (medium to high). This must be confirmed via site investigation to assess the potential for infiltration. Whilst controlling run-off from proposed development must be addressed, there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>Infiltration techniques may be appropriate. Mapping suggests a medium risk of groundwater flooding across most of the site, although there is a small area of high risk in the south of the site. Underlying soils may be permeable. Further site investigation must be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in southern areas of the site where the depth to the water table is <1m.</p> <p>Given the high-density nature of the site, use of SuDS is recommended – urban sites should not preclude the use of SuDS.</p> <p>Mapping suggests that the ground slopes on the site would mean it would be possible to consider most forms of detention. A liner maybe required due to the potential groundwater flooding on the site.</p> <p>Where there is not a significant risk of groundwater flooding, all filtration techniques are likely to be appropriate, subject to confirming that the underlying soils have appropriate seepage and storage capacity via site investigation works.</p> <p>All forms of conveyance are likely to be appropriate. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the ingress of groundwater.</p>

SHLAA / HELAA site reference	WB08046
Site name	Bus Depot, Library Place (Also known as Stagecoach, Marine Parade)

	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		River Adur (not part of a river water basin catchment)	High
Recommendations for Local Plan policy	Sequential Test and Exception Test requirements		
	<p>The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.</p> <p>The Exception test will be required in the following scenarios:</p> <ul style="list-style-type: none"> • If Highly vulnerable development is proposed to be located in FZ2. • If More vulnerable or Essential Infrastructure development is proposed to be located in FZ3. • If Essential infrastructure is proposed to be located in FZ3b. <p>Development will not be permitted in the following scenarios:</p> <ul style="list-style-type: none"> • Highly vulnerable development within FZ3a. • Highly vulnerable, More vulnerable and / or Less vulnerable development within FZ3b. 		
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers		
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> • At the planning application stage, a site-specific flood risk assessment will be required for this site if development: <ul style="list-style-type: none"> ○ is located in Flood Zones 2 or 3; ○ is subject to other sources of flooding, where the development would introduce a more vulnerable use; ○ is on land which has been identified by the Environment Agency as having critical drainage problems; or ○ is on land identified in the strategic flood risk assessment as being at increased flood risk in future. • Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water and groundwater. • Consideration should be given to the potential effects of climate change including the impact of higher sea levels on groundwater and surface water. Proposals should consider the opportunity to include measures that provide for a reduction in the predicted surface water and coastal / tidal flood risk at existing development. • Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. • Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. • Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. • Proposals will need to demonstrate that users will be safe and more vulnerable use is located outside Flood Zone 3b. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> • New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> ○ Reducing volume and rate of runoff ○ Relocating development to zones with lower flood risk ○ Creating space for flooding. 		

SHLAA / HELAA site reference	WB08046
Site name	Bus Depot, Library Place (Also known as Stagecoach, Marine Parade)

	<ul style="list-style-type: none"> • Safe access and egress should be demonstrated in the tidal/coastal 0.5% AEP plus climate change event and as there is a risk of surface water flooding on the site, consideration should also be given to providing safe access and egress during surface water flood events. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. • Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Assessment of runoff should include allowances for climate change effects. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753 Manual 2015). • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space. • Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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Site name		Bus Depot, Library Place	
Site area (ha)		0.67	
		Adur and Worthing Level 2 Strategic Flood Risk Assessment Site Summary Sheet mapping	
<div>ADUR & WORTHING COUNCILS</div>		<div>JBA consulting</div>	
<div>All maps: Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government License v3.0. JBA Groundwater Flood RiskMap: Contains JBA data © JBA Consulting, 2020. Some of the responses contained in this mapping are based on data and information provided by the Natural Environment Research Council (NERC) or its component body the British Geological Survey (BGS). Your use of any information contained in this mapping is at your own risk. Neither JBA, NERC or BGS give any warranty, condition or representation as to the quality, accuracy or completeness of such information and all liability (including for negligence) arising from its use is excluded to the fullest extent permitted by law. Your use of the mapping constitutes your agreement to bring no claim against JBA, NERC or BGS in connection with it.</div>			
Coastal / Tidal Flood Extent		Coastal / Tidal Flood Depth (0.5% AEP defended)	
<div><div>Legend</div><div><div>Site Boundary</div><div>FloodZone2</div><div>FloodZone3a</div><div>FloodZone3b</div></div></div>		<div><div>Legend</div><div><div>Site Boundary</div><div>Depth (m)</div><div>0 - 0.50</div><div>0.50 - 1.0</div><div>1.0 - 1.50</div><div>1.50 - 2.0</div><div>2.0 - 2.50</div><div>>2.50</div></div></div>	
Coastal / Tidal Flood Hazard (0.5% AEP defended)		Coastal / Tidal Flood Velocity (0.5% AEP defended)	
<div><div>Legend</div><div><div>Site Boundary</div><div>Very low hazard- caution</div><div>Danger for some</div><div>Danger for most</div><div>Danger for all</div></div></div>		<div><div>Legend</div><div><div>Site Boundary</div><div>Velocity (m/s)</div><div>0 - 0.2</div><div>0.2 - 0.5</div><div>0.5 - 1.0</div><div>1.0 - 1.5</div><div>1.5 - 2.0</div><div>> 2.0</div></div></div>	
JBA Groundwater Flood Risk Mapping			
<div><div>Legend</div><div><div>Site Boundary</div><div>No risk.</div><div>at least 5m below the ground surface.</div><div>between 0.5m and 5m below the ground surface.</div><div>between 0.025m and 0.5m below the ground surface.</div><div>at or very near (within 0.025m of) the ground surface.</div></div></div>			

Site name		Bus Depot, Library Place		ADUR & WORTHING COUNCILS		ADUR and Worthing Level 2 Strategic Flood Risk Assessment Site Summary Sheet mapping		JBA consulting	
Site area (ha)		0.67							
<p>All maps: Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government License v3.0. Tidal Groundwater Risk Zones Map: Contains JBA data © JBA Consulting, 2020. Some of the responses contained in this mapping are based on data and information provided by the Natural Environment Research Council (NERC) or its component body the British Geological Survey (BGS). Your use of any information contained in this mapping is at your own risk. Neither JBA, NERC or BGS give any warranty, condition or representation as to the quality, accuracy or completeness of such information and all liability (including for negligence) arising from its use is excluded to the fullest extent permitted by law. Your use of the mapping constitutes your agreement to bring no claim against JBA, NERC or BGS in connection with it.</p>									
Risk of Flooding from Surface Water- 3.33%, 1% and 0.1%		Risk of Flooding from Surface Water (1% AEP Depth)		Risk of Flooding from Surface Water (1% AEP Velocity)		Tidal Groundwater Risk Zones		Tidal Drainage Risk Zones	
<p>Legend</p> <p>Site Boundary</p> <p>0.1% AEP Surface Water Extent</p> <p>1% AEP Surface Water Extent</p> <p>3.33% AEP Surface Water Extent</p>		<p>Legend</p> <p>Site Boundary</p> <p>Depth (m)</p> <p>0.00 - 0.15</p> <p>0.15 - 0.30</p> <p>0.30 - 0.60</p> <p>0.60 - 0.90</p> <p>0.90 - 1.20</p> <p>> 1.20</p>		<p>Legend</p> <p>Site Boundary</p> <p>Velocity (m/s)</p> <p>0.00 - 0.25</p> <p>0.25 - 0.50</p> <p>0.50 - 1.00</p> <p>1.00 - 2.00</p> <p>> 2.00</p>		<p>Legend</p> <p>Site Boundary</p> <p>Zone GW0</p> <p>Zone GW1</p> <p>Zone GW2</p> <p>Zone GW3</p> <p>Zone GW4</p>		<p>Legend</p> <p>Site Boundary</p> <p>Zone SW0</p> <p>Zone SW1</p> <p>Zone SW2</p> <p>Zone SW3</p> <p>Zone SW4</p>	
Risk of Flooding from Surface Water Climate Change									
<p>Legend</p> <p>Site Boundary</p> <p>1% AEP +20% Surface Water Extent</p> <p>1% AEP +30% Surface Water Extent</p> <p>1% AEP +40% Surface Water Extent</p>									

SHLAA / HELAA site reference	(Part of) WB08138
Site name	Caravan Club

Site details	OS Grid reference	TQ 10509 04579
	Local Authority	Worthing Borough Council
	Area	2.55 ha
	Current land use	Caravan Park
	Proposed site use	75 Residential units
	Flood risk vulnerability	More vulnerable
	Topography	<div data-bbox="649 888 1455 1499"> <p>Site topography</p> <p>Legend</p> <p>Site Boundary</p> <p>Elevation</p> <p>- High</p> <p>- Low</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> <p>0 30 60 Metres</p> </div> <ul style="list-style-type: none"> • There are a small number of existing permanent buildings on the site • The site is currently used as a caravan park • There is a downhill slope from west to east across the site • The ground slope across the site generally has a gradient of less than 5%
Sources of flood risk	Existing watercourses	There are no watercourses within the site boundary, however, Somerset's Lake is situated 100m to the north east of the site. Barleyfields Stream lies approximately 85m north east of the site and flows from north west to south east from the lake, joining the Ferring Rife watercourse in the south.
	Flood history	There are no recorded flood events within the site.

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	Fluvial	Proportion of the site at risk (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		5% AEP	1% AEP	0.1% AEP
		0%	0%	0%
		Available modelled data: The site is covered by the Environment Agency Ferring Rife (Fluvial/Tidal) 2019/20 Flood Modeller-TUFLOW model. The model was updated by JBA Consulting for Adur and Worthing Councils for the purpose of this SFRA. The extent of the Flood Zones predicted by the flood model are also the extent of the actual flood risk, as there are no flood risk management features that change the risk.		
		Flood characteristics: The site is within Flood Zone 1 and is therefore at negligible risk of flooding from rivers.		
	Surface Water	Proportion of site at risk (RoFSW) (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		3.3% AEP	1% AEP	0.1% AEP
		0%	0%	3%
		Description of surface water flow paths: The site is at a very low risk of surface water flooding in the north east during the 1% AEP rainfall event (less than 1%). There is a 3% increase in flood extent during the 0.1% AEP event in the east of the site.		
	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		18%	0%	18%
		The eastern section of the site (18%) has a high risk of groundwater flooding with groundwater levels predicted to be less than 0.025m below surface during a 1% AEP groundwater flood event. The remainder of the site is at a negligible risk of groundwater flooding.		
	Tidal Risk Zones	Tidal Groundwater Risk Zone (maximum risk)		Tidal Drainage Risk Zone (maximum risk)
		GW0		SW0
	Reservoir	The site is entirely located within Tidal Groundwater Risk Zone GW0 and Tidal Drainage Risk Zone SW0. This is due to the site being located above the future tidal level.		
		The site is not at risk of reservoir flooding.		

SHLAA / HELAA site reference	(Part of) WB08138
Site name	Caravan Club

Flood risk management infrastructure	Defences	Defence Type		Standard of Protection		Condition	
		There are no defences within the vicinity of the site. Therefore, the defended and undefended modelled flood extents are the same.					
	Residual risk	Culvert / structure blockage?		There are no known culverts or structures in the vicinity of the site.			
		Impounded water body failure?		The site is not at risk of flooding due to a reservoir breach.			
Defence breach / overtopping?		The site is not at risk from defence breach or overtopping.					
Emergency planning	Flood warning	The site is not covered by an Environment Agency Flood Alert Area or Flood Warning Area.					
	Access and egress	Dry access and egress could be available to the site during the 3.3% AEP and 1% AEP surface water flood events from the south via Titmore Way. Dry access and egress would not be available during the 0.1% AEP rainfall event. However, wet access and egress could be possible for some via the same route, given the low to medium hazard rating of 0.75-1.25. This generally means that only the most vulnerable people would be in danger when walking through this floodwater. Dry access and egress via Titmore Way would be available for all fluvial flood events.					
Climate Change	Climate change allowances for '2080s'	Proportion of site at 1% AEP fluvial flood risk					
		River Basin District	Present day	Central	Higher Central	Upper End	
		South East	n/a	+35% flow uplift	+45% flow uplift	+105% flow uplift	
			0%	0%	0%	0%	
	Implications for the site	The future extent of the 1% AEP event is not predicted to impact the site.					
	Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk					
		Present day	+20% rainfall uplift	+30% rainfall uplift	+40% rainfall uplift		
		0%	1%	1%	1%		
	Implications for the site	A very slight increase in flood extent of the future 1% AEP surface water flood events is predicted to occur for the plus 20%, 30% and 40% climate change events. However, they do not reach the 0.1% AEP surface water flood extent. These increases are located in the east of the site. Therefore, the site will be at a marginally higher risk from surface water flooding in the future.					

SHLAA / HELAA site reference	(Part of) WB08138
Site name	Caravan Club

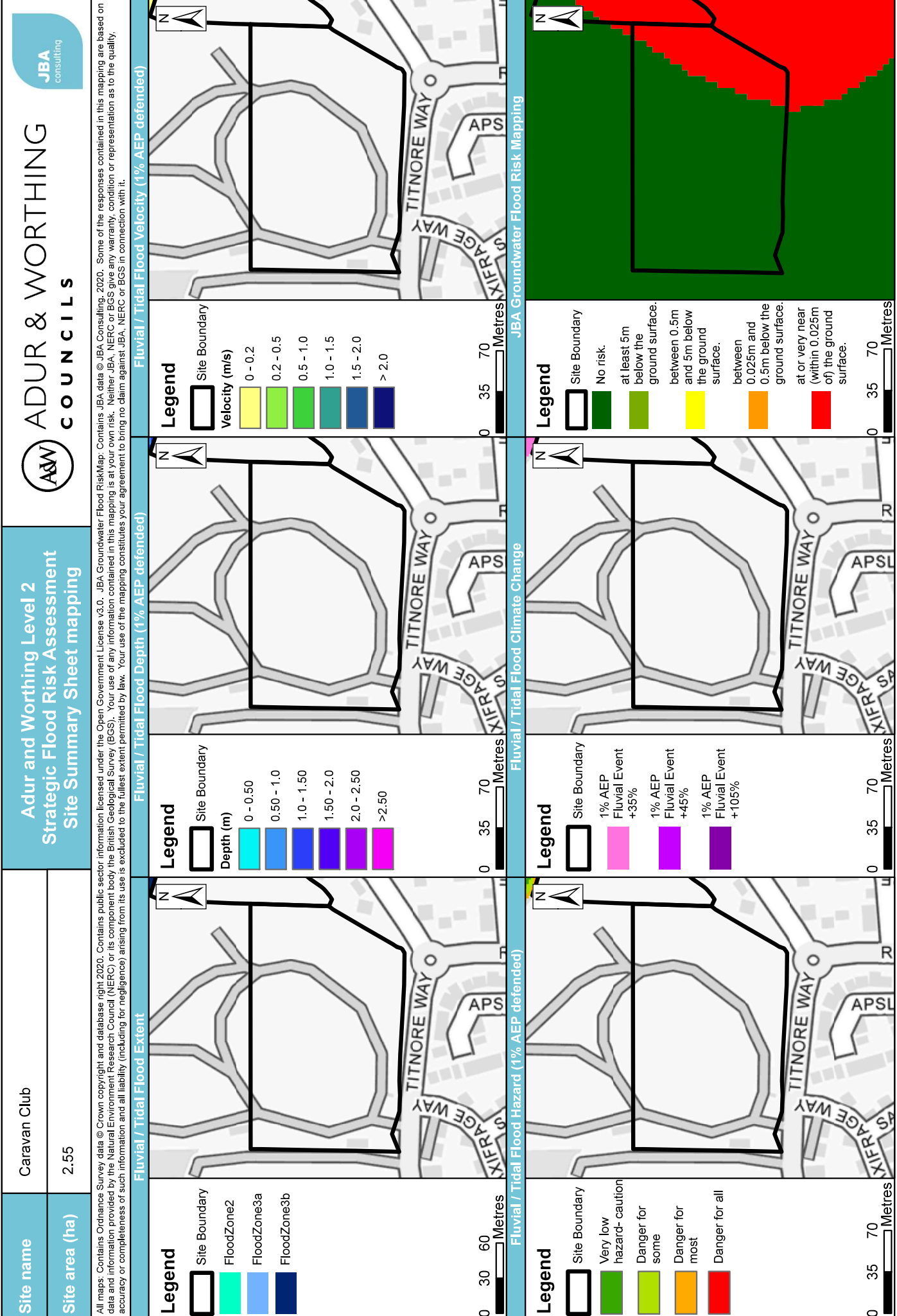
Requirement for drainage control and impact mitigation	Bedrock Geology	The entire site's bedrock geology consists of London Clay Formation (clay, silt and sand).	
	Superficial Geology	The majority of the site's superficial geology is Head- Clay, Silt, Sand and Gravel. The south eastern edge of the site is formed of River Terrace Deposits (undifferentiated).	
	Soils	The site has slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.	
	Groundwater Source Protection Zone	The site is not within a Groundwater Source Protection Zone.	
	Historic Landfill Site	There are no historic landfill sites in close proximity to the site.	
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems on parts of the given the possible risk from groundwater flooding (high in the south east corner). This must be confirmed via site investigations to assess the potential for infiltration techniques across the whole site.</p> <p>Mapping also suggests that slopes may be suitable for selective source control techniques. Whilst controlling run-off from the proposed development must be addressed there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>Mapping suggests that the site slopes make it possible to consider most forms of detention. A liner maybe required due to the potential for groundwater flooding on the site.</p> <p>All filtration techniques are likely to be appropriate, provided site slopes are <5% at the location of the filtration feature, and areas in the north are avoided where depth to water table is >1m, subject to confirming that the underlying soils have appropriate seepage and storage capacity.</p> <p>All forms of conveyance are likely to be appropriate. If the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the ingress of groundwater.</p>	
	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		Ferring Rife	Medium

SHLAA / HELAA site reference	(Part of) WB08138
Site name	Caravan Club

Recommendations for Local Plan policy	Sequential Test and Exception Test requirements
	<p>The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.</p> <p>The Exception Test is not required as the site is not within Flood Zone 2 or 3. However, a Flood Risk Assessment is still likely to be required. See below for further details on requirements for a Flood Risk Assessment.</p>
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> At the planning application stage, a site-specific flood risk assessment will be required for this site as the site area is greater than one hectare. It will also be required where development is: <ul style="list-style-type: none"> on land which is subject to other sources of flooding, where the development would introduce a more vulnerable use; or on land which has been identified by the Environment Agency as having critical drainage problems. Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water and groundwater. Consideration should be given to the potential effects of climate change, particularly with respect to surface water. Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. Proposals should consider the opportunity to include measures that provide for a reduction in the predicted surface water flood risk at existing development. Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> Reducing volume and rate of runoff Relocating development to zones with lower flood risk Creating space for flooding. Safe access and egress should be demonstrated. As there is a risk of surface water flooding adjacent to the site, consideration should be given to providing safe access and egress during surface water flood events. All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. Assessment of runoff should include allowances for climate change effects. Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753 Manual 2015). Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.

SHLAA / HELAA site reference	(Part of) WB08138
Site name	Caravan Club

	<ul style="list-style-type: none">Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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SHLAA / HELAA site reference	WB16006
Site name	Centenary House

Site details	OS Grid reference	TQ 11766 04353
	Local Authority	Worthing Borough Council
	Area	4.11 ha
	Current land use	Office use / Police Custody Suite
	Proposed site use	Mixed use - 100 residential units & 10,000m ² employment floorspace
	Flood risk vulnerability	More vulnerable
	Topography	<div data-bbox="649 989 1453 1600"> <p>Site topography</p> <p>Legend</p> <p>Site Boundary</p> <p>Elevation</p> <p>- High</p> <p>- Low</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> <p>0 55 110 Metres</p> </div> <ul style="list-style-type: none"> • There is a slight downhill slope from north to south across the site. • There are a number of existing buildings across the site and which have affected localised filtering of the LIDAR data. • The ground slope across the site generally has a gradient of less than 5%

SHLAA / HELAA site reference	WB16006
Site name	Centenary House

Sources of flood risk	Existing watercourses	There are no watercourses within the vicinity of the site.		
	Flood history	The Environment Agency's Recorded Flood Outline dataset identifies that the entire site was affected by a drainage flood incident in 1980. A further incident of flooding as a result of the overtopping of defences in 1981 was recorded by the Environment Agency, along the south west boundary of the site, on Littlehampton Road, although it is likely this has been miss-recorded given there are no defences in close proximity to the site.		
	Fluvial	Proportion of the site at risk (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		5% AEP	1% AEP	0.1% AEP
		0%	0%	0%
		Flood characteristics: The site is within Flood Zone 1 and is therefore at negligible risk of flooding from rivers.		
	Surface Water	Proportion of site at risk (RoFSW) (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		3.3% AEP	1% AEP	0.1% AEP
		0%	6%	47%
		Description of surface water flow paths: The site is at a very low risk of surface water flooding (1%) along the southern boundary during the 3.3% AEP rainfall event. During the 1% AEP event there is a 5% increase in flood extent, which originates from a surface water flow path along the existing access road in the east before ponding in the centre of the site. In a 0.1% AEP event over half of the site (53%) is at risk of flooding, in particular in the north, south and east. RoFSW takes account of building footprints so the flood risk may be affected by existing buildings on the site. It also only considers flood risk where the hazard rating is greater than 0.575.		
	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		100%	0%	100%
		The entire site is at a high risk of groundwater flooding, with groundwater levels predicted to lie either at or very near (within 0.025m of) the ground surface during a 1% AEP groundwater flood event.		

SHLAA / HELAA site reference	WB16006
Site name	Centenary House

	Tidal Risk Zones	Tidal Groundwater Risk Zone (maximum risk)		Tidal Drainage Risk Zone (maximum risk)		
		GW0		SW0		
		The site is entirely located within Tidal Groundwater Risk Zone GW0 and Tidal Drainage Risk Zone SW0. This is due to the site being located above the future tidal level.				
	Reservoir	The site is not at risk of reservoir flooding.				
Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition		
		There are no defences within the vicinity of the site.				
	Residual risk	Culvert / structure blockage?	There are no known culverts or structures in the vicinity of the site.			
		Impounded water body failure?	The site is not at risk of flooding due to a reservoir breach.			
Defence breach / overtopping?		The site is not at risk from defence breach or overtopping.				
Emergency planning	Flood warning	The site is not covered by an Environment Agency Flood Alert or Flood Warning Area.				
	Access and egress	Dry access and egress could be available to the west of the site via Hildon Close in all surface water and fluvial flood events.				
Climate Change	Climate change allowances for '2080s'	Proportion of site at 1% AEP fluvial flood risk				
		River Basin District	Present day	Central	Higher Central	Upper End
		South East	n/a	+35% flow uplift	+45% flow uplift	+105% flow uplift
			0%	0%	0%	0%
	Implications for the site	The future extent of the 1% AEP event is not predicted to impact the site.				
	Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk				
		Present day	+20% rainfall uplift	+30% rainfall uplift	+40% rainfall uplift	
		6%	17%	24%	29%	
	Implications for the site	There is a significant increase in flood extent between the baseline 1% AEP event and the future 1% AEP surface water flood event for the plus 20%, 30% and 40% climate change scenarios. However, the extents do not reach that of the 0.1% AEP surface water event. These increases are located predominantly within the south of the site. The site will be at a higher risk from surface water flooding in the future.				

SHLAA / HELAA site reference	WB16006
Site name	Centenary House

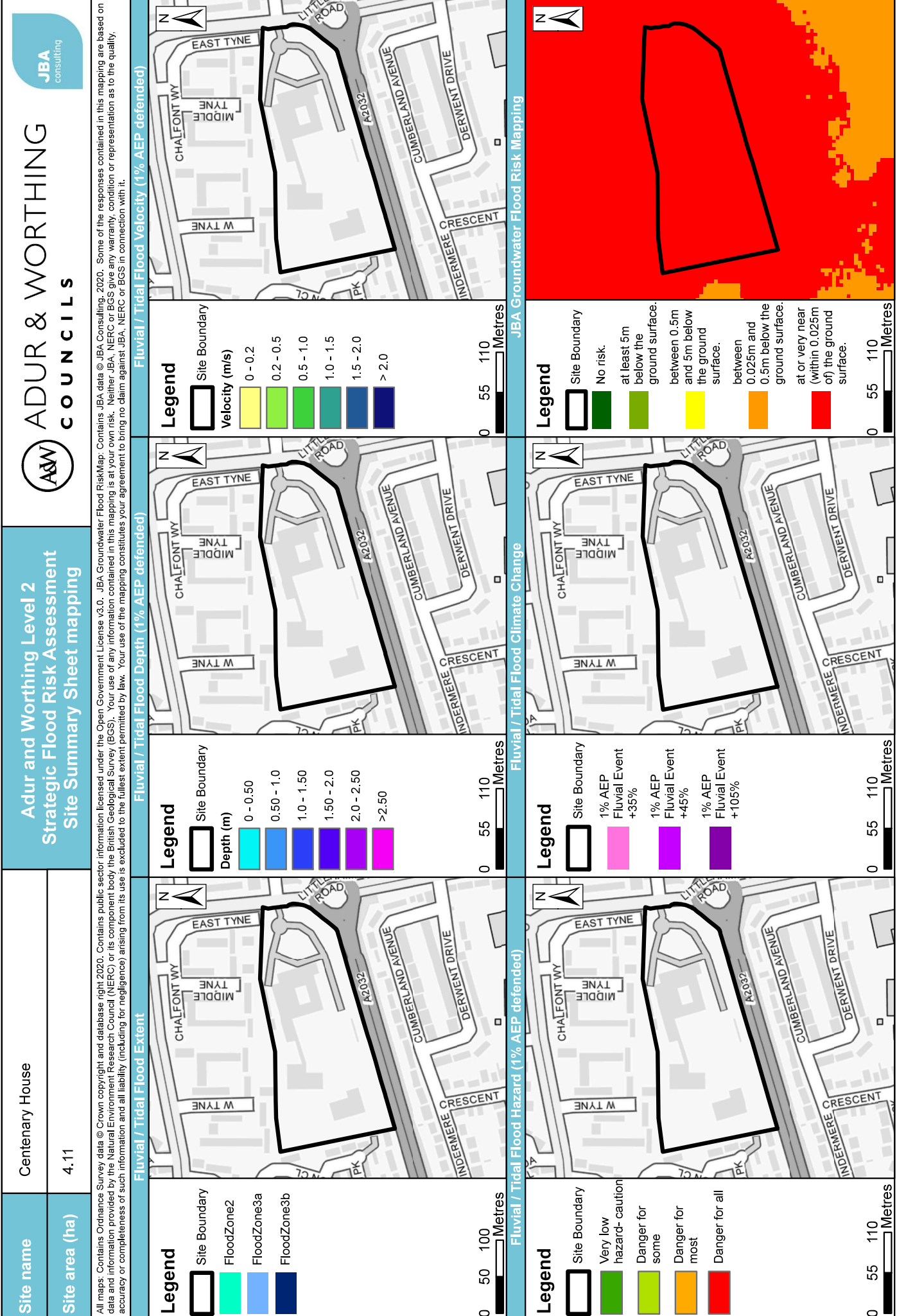
Requirement for drainage control and impact mitigation	Bedrock Geology	The northern section of the site is formed of a bedrock of Lambeth Group (clay, silt and sand). The southern section of the site is formed of London Clay Formation (clay, silt and sand).	
	Superficial Geology	The entire site is overlain with River Terrace Deposits (undifferentiated).	
	Soils	The site has freely draining slightly acid loamy soils.	
	Groundwater Source Protection Zone	The site is not within a Groundwater Source Protection Zone.	
	Historic Landfill Site	There are no historic landfill sites in close proximity to the site.	
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems given the possible risk from groundwater flooding (high). This must be confirmed via site investigations to assess the potential for infiltration. Whilst controlling run-off from proposed development must be addressed there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>Forms of detention may be appropriate provided site slopes are < 5% at the location of the detention feature. A liner maybe required due to the potential risk of groundwater flooding on the site.</p> <p>Filtration techniques may be appropriate in limited areas provided site slopes are <5% and the depth to the water table is >1m, subject to confirming that the underlying soils have appropriate seepage and storage capacity.</p> <p>All forms of conveyance are likely to be appropriate. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the egress of groundwater.</p>	
	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		Ferring Rife	Medium

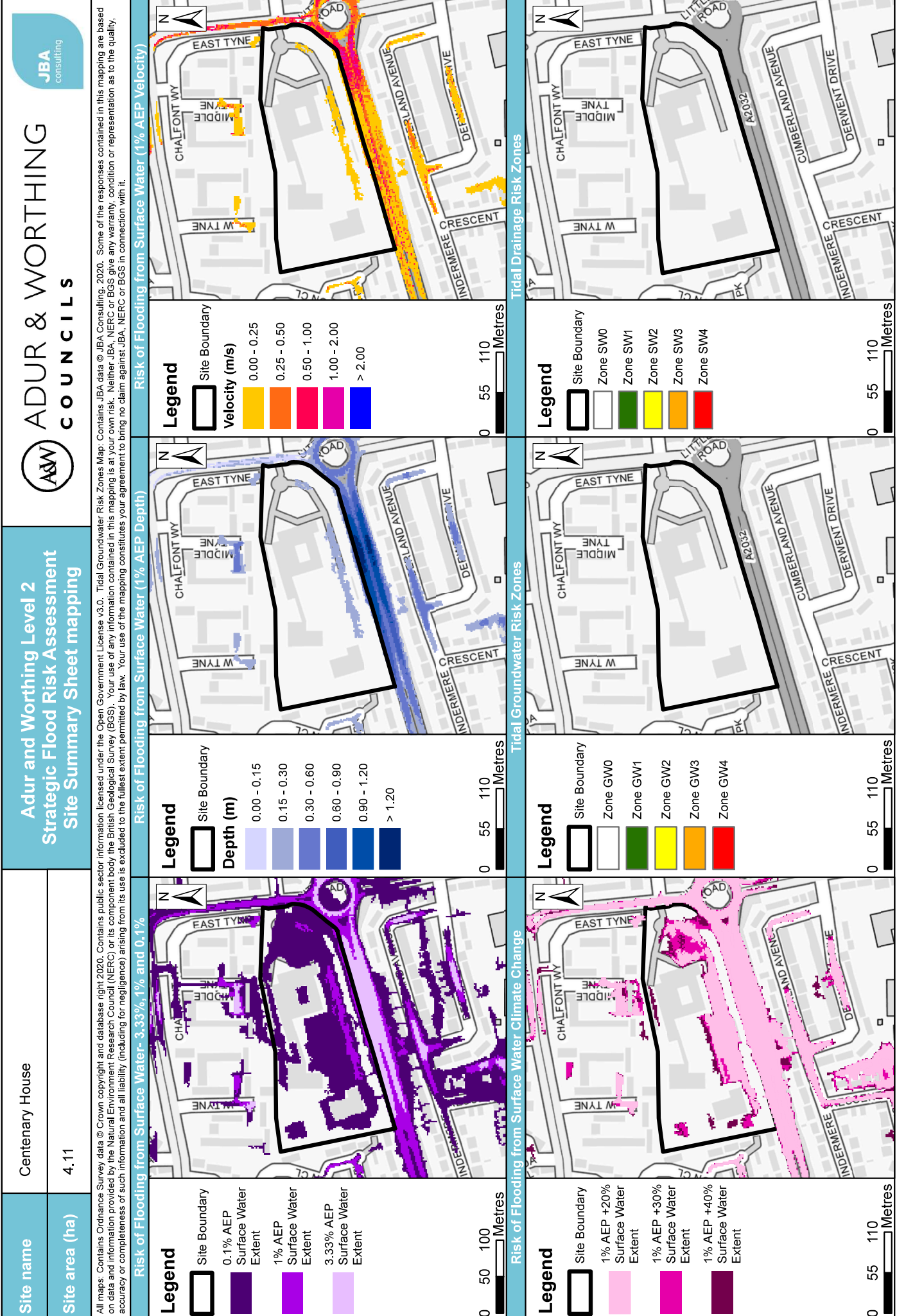
SHLAA / HELAA site reference	WB16006
Site name	Centenary House

Recommendations for Local Plan policy	Sequential Test and Exception Test requirements
	The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.
	The Exception Test is not required as the site is not within Flood Zone 2 or 3 but a Flood Risk Assessment is still required. See below for further details on requirements for a Flood Risk Assessment.
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> At the planning application stage, a site-specific flood risk assessment will be required for this site as the site area is greater than one hectare. It will also be required if development is: <ul style="list-style-type: none"> on land which may be subject to other sources of flooding, where the development would introduce a more vulnerable use; on land which has been identified by the Environment Agency as having critical drainage problems; or on land identified in the strategic flood risk assessment as being at increased flood risk in future. Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water and groundwater. Consideration should be given to the potential effects of climate change, particularly with respect to surface water. Proposals should consider the opportunity to include measures that provide for a reduction in the predicted surface water flood risk at existing development. Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> Reducing volume and rate of runoff Relocating development to zones with lower flood risk Creating space for flooding. Safe access and egress should be demonstrated. As there is a risk of surface water flooding adjacent to the site, consideration should be given to providing safe access and egress during surface water flood events. All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. Development should be directed away from areas of surface water flooding where possible Surface water attenuation and infiltration features should be directed away from areas at risk of surface water flooding. SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. Assessment of runoff should include allowances for climate change effects. Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk.

SHLAA / HELAA site reference	WB16006
Site name	Centenary House

	<ul style="list-style-type: none">• SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753 Manual 2015).• Green infrastructure should be considered within the mitigation measures for surface water runoff from potential.• Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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SHLAA / HELAA site reference	WB08180 and part of WB08045
Site name	Grafton MSCP and part of Land at 51-93 Montague Street

Site details	OS Grid reference	TQ 14703 02372
	Local Authority	Worthing Borough Council
	Area	0.77 ha
	Current land use	Car park, bowling alley, retail and service yard
	Proposed site use	Mixed use - 113 residential units & 2,979m ² of commercial space
	Flood risk vulnerability	More vulnerable
	Topography	<div data-bbox="649 877 1455 1486"> <p>Site topography</p> <p>Legend</p> <p>Site Boundary</p> <p>Elevation</p> <p>- High</p> <p>- Low</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> <p>0 15 30 Metres</p> </div> <ul style="list-style-type: none"> The ground levels surrounding the site are generally flat. However, due to the presence of sub-surface features in the existing building there is significant variation in ground levels across the site. The presence of the buildings has also affected localised filtering of the LIDAR data. The ground slope across the site varies significantly. However, much of the variance is caused by poor filtering of the DTM and subsurface parking which is part of the existing development.

SHLAA / HELAA site reference	WB08180 and part of WB08045
Site name	Grafton MSCP and part of Land at 51-93 Montague Street

Sources of flood risk	Existing watercourses	There are no watercourses within the vicinity of the site		
	Flood history	There are no recorded flood events within the site		
	Coastal / tidal	Proportion of the site at risk (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		5% AEP	0.5% AEP	0.1% AEP
		68%	4%	13%
		Available modelled data: The site is covered by the Environment Agency Arun to Adur (Coastal/Tidal) 2016 SWAN model. The extent of the Flood Zones predicted by the model are also the extent of the actual flood risk, as there are no flood risk management features that change the risk.		
		Flood characteristics: The site is predicted to be at risk from coastal flooding due to the proximity of the sea to the south of the site.		
		<ul style="list-style-type: none"> Over two thirds of the site (68%) covering the east, south and centre is located within the 5% AEP flood extent. As the site is already developed it does not currently function as a floodplain and therefore this extent would not be considered to be Flood Zone 3b in policy terms. A further 4% in the west and north east is located within Flood Zone 3a. Finally, a further 13% of the site in the south west is located within Flood Zone 2. 		
	Surface Water	Proportion of site at risk (RoFSW) (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		3.3% AEP	1% AEP	0.1% AEP
		0%	5%	17%
		Description of surface water flow paths: During a 1% AEP rainfall event, the site is at a low risk of flooding along two surface water pathways within the site boundary. Both pathways flow from the east and pool in the centre of the site. There is a 17% increase in flood extent along these pathways during the 0.1% AEP rainfall event. RoFSW takes account of building footprints so the flood risk may be affected by existing buildings on the site. It also only considers flood risk where the hazard rating is greater than 0.575.		
	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		0%	0%	0%

SHLAA / HELAA site reference	WB08180 and part of WB08045
Site name	Grafton MSCP and part of Land at 51-93 Montague Street

		The site has a low to medium risk of groundwater flooding, with groundwater levels predicted to be between 0.5 and 5m below the surface during a 1% AEP groundwater flood event.	
	Tidal Risk Zones	Tidal Groundwater Risk Zone (maximum risk)	Tidal Drainage Risk Zone (maximum risk)
		GW2	SW3
		The site is mostly located within Tidal Groundwater Risk Zone GW2. This is due to most of the site being situated below the present-day tidal level. Additionally, the site is also located within an area of medium groundwater flood risk where groundwater levels are more than 0.5m below the surface during a 1% AEP groundwater flood event. The north and southern boundary of the site are located within Tidal Groundwater Risk Zone GW1. This is due to these areas being situated at a higher elevation above the current tidal level but below the future tidal level and within an area of medium groundwater flood risk, where groundwater levels are more than 0.5m below the surface during a 1% AEP groundwater flood event.	
		The centre of the site is partially located within Tidal Drainage Risk Zone SW3. This is due to this area being at risk during the 1% AEP surface water flood event. The east, west and south of the site are located within Tidal Drainage Risk Zone SW2. This is due to these areas being located below the present-day tidal level but at a negligible risk from surface water flooding during the 1% AEP surface water event. The remainder of the site in the north is located within Tidal Drainage Risk Zone SW1. This is due to these areas being located above the current tidal level but below the future tidal level, and at a negligible risk from surface water flooding during the 1% AEP surface water event.	
	Reservoir	The site is not at risk of reservoir flooding.	

SHLAA / HELAA site reference	WB08180 and part of WB08045
Site name	Grafton MSCP and part of Land at 51-93 Montague Street

Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition	
		There are no defences within the vicinity of the site.			
	Residual risk	Culvert / structure blockage?	There are no known culverts or structures in the vicinity of the site.		
		Impounded water body failure?	The site is not at risk of flooding due to reservoir breach.		
Defence breach / overtopping?		The site is not at risk from defence breach or overtopping.			
Emergency planning	Flood warning	The majority of the site is located within the Environment Agency's 'Coastal areas of Rustington to Shoreham' (065WAC407) Flood Alert Area and the Environment Agency's 'Rustington, Worthing and Lancing' (065FWC2801) Flood Warning Area.			
	Access and egress	Dry access and egress could be available to the site to the north west via Augusta Place and Montague Street in all surface water events and present day coastal flood events.			
Climate Change	Climate change allowances for the '2115 EPOCH' (2017 base year)	Proportion of site at 0.5% AEP coastal / tidal flood risk			
		Coastal region	Present day	Higher Central	Upper End
		South East	n/a	+0.84m	+1.12m
			72%	100%	100%
	Implications for the site	There is a significant increase in flood extent for both climate change allowances in comparison to the 0.5% AEP event. For the climate change scenarios, the flood extent reaches and exceeds that of the 0.1% AEP event, affecting the entire site. Therefore, climate change is predicted to have significant impact the proposed site.			
	Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk			
		Present day	+20% rainfall uplift	+30% rainfall uplift	+40% rainfall uplift
		5%	7%	8%	10%
	Implications for the site	A small increase in flood extent for the future 1% AEP surface water flood event is predicted to occur for the plus 20%, 30% and 40% climate change events. However, the extents do not reach that of the 0.1% AEP surface water flood event. These increases are located along the two flow routes from the east. Therefore, the site will be at a higher risk from surface water flooding in the future.			

SHLAA / HELAA site reference	WB08180 and part of WB08045
Site name	Grafton MSCP and part of Land at 51-93 Montague Street

Requirement for drainage control and impact mitigation	Bedrock Geology	The entire site's bedrock geology consists of Lewes Nodular Chalk Formation (chalk).
	Superficial Geology	The entire site is overlain with River Terrace Deposits (undifferentiated), sand, silt and clay.
	Soils	The site has freely draining slightly acid loamy soils.
	Groundwater Source Protection Zone	The site is not within a Groundwater Source Protection Zone.
	Historic Landfill Site	There are no historic landfill sites in the vicinity of the site.
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems given the possible medium risk from groundwater flooding. This must be confirmed via site investigations to assess the potential for infiltration. Whilst controlling run-off from proposed development must be addressed there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>Infiltration techniques may be appropriate. Mapping suggests a medium risk of groundwater flooding and underlying soils may be permeable. Further site investigation must be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in areas where the depth to the water table is <1m.</p> <p>Given the high-density nature of the site, use of SuDS is recommended – urban sites should not preclude the use of SuDS.</p> <p>Detention techniques may be feasible, however mapping suggests mean site slopes could be greater than 5% in some areas, although this is generally due to the existing below ground parking on the site. Feasibility of such options must be assessed as part of a site-specific assessment. If this feature is feasible a liner maybe required due to the potential groundwater flooding on the site.</p> <p>Filtration options are unlikely to be feasible as mapping suggests mean site slopes are > 5%. Feasibility of such options must be assessed as part of a site-specific assessment, including an assessment of the seepage and storage capacity of the underlying soils. If this feature is feasible it must be located where the depth to the water table is >1m.</p> <p>All forms of conveyance are likely to be appropriate. Where the slopes are >5% features must follow contours or utilise check dams to slow flows. A liner maybe required to prevent the egress of groundwater.</p>

SHLAA / HELAA site reference	WB08180 and part of WB08045
Site name	Grafton MSCP and part of Land at 51-93 Montague Street

	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		Coastal Catchment (not part of a river WB catchment)	Medium
Recommendations for Local Plan policy	Sequential Test and Exception Test requirements		
	<p>The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.</p> <p>The Exception test will be required in the following scenarios:</p> <ul style="list-style-type: none"> • If Highly vulnerable development is proposed to be located in FZ2. • If More vulnerable or Essential Infrastructure development is proposed to be located in FZ3. • If Essential infrastructure is proposed to be located in FZ3b. <p>Development will not be permitted in the following scenarios:</p> <ul style="list-style-type: none"> • Highly vulnerable development within FZ3a. • Highly vulnerable, More vulnerable and / or Less vulnerable development within FZ3b. 		
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers		
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> • At the planning application stage, a site-specific flood risk assessment will be required for this site as development will be located within Flood Zone 3. It will also be required where development: <ul style="list-style-type: none"> ○ may be subject to other sources of flooding, where the development would introduce a more vulnerable use; ○ is on land which has been identified by the Environment Agency as having critical drainage problems; or ○ is on land identified in the strategic flood risk assessment as being at increased flood risk in future. • Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water and groundwater. • Consideration should be given to the potential effects of climate change, with respect to surface water and coastal/ tidal flooding. Proposals should consider the opportunity to include measures that provide for a reduction in the predicted flood risk at existing development. • Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. • Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. • A site specific risk assessment must demonstrate that surface water will not be displaced as a result of development. • Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. • Proposals will need to demonstrate that users will be safe and more vulnerable use is located outside the 1 in 20 year flood extent where possible. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> • New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> ○ Reducing volume and rate of runoff ○ Relocating development to zones with lower flood risk ○ Creating space for flooding. 		

SHLAA / HELAA site reference	WB08180 and part of WB08045
Site name	Grafton MSCP and part of Land at 51-93 Montague Street

	<ul style="list-style-type: none"> • Safe access and egress should be demonstrated in the fluvial 0.5% AEP plus climate change event and as there is a risk of surface water flooding on the site, consideration should also be given to providing safe access and egress during surface water flood events. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • More vulnerable land use is likely not be acceptable at ground floor level for the majority of the site. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. • Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • Assessment of runoff should include allowances for climate change effects. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753Manual 2015). • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space. • Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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SHLAA / HELAA site reference	WB08059
Site name	Land Site Decoy Farm, Dominion Way

Site details	OS Grid reference	TQ 16034 04078
	Local Authority	Worthing Borough Council
	Area	7.36 ha
	Current land use	Former landfill/scrub
	Proposed site use	Minimum of 28,000m ² commercial
	Flood risk vulnerability	Less vulnerable
	Topography	<div data-bbox="649 963 1453 1575"> <p>Site topography</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> </div> <ul style="list-style-type: none"> • The site lies at a higher ground level than that of the surrounding area, and slopes down from the centre of the site towards all the site boundaries. • Teville Stream flows along the west and southern boundaries of the site. A number of other small watercourses which drain the site flow along the north and east boundaries. • There are no existing buildings on the site. • The ground slope across the site generally has a gradient of less than 5%.

SHLAA / HELAA site reference	WB08059
Site name	Land Site Decoy Farm, Dominion Way

Sources of flood risk	Existing watercourses	Since re-alignment work was completed in 2019 the Teville Stream flows along the eastern site boundary, from north to south. There is also a secondary channel which flows from north to south along the western and southern boundary. This section of watercourse is culverted between Deacon Way and the junction of Dominion Way and Willowbrook Road. This channel is also culverted at a number of other locations where there are access structures to the site.		
	Flood history	There are no historic flood records within the vicinity of the site.		
	Fluvial	Proportion of the site at risk (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		5% AEP	1% AEP	0.1% AEP
		13%	0%	3%
		Available modelled data: The site is covered by the Teville Stream (Fluvial) 2012 Flood Modeller-TUFLOW model. The extent of the Flood Zones predicted by the flood model are also the extent of the actual flood risk, as there are no flood risk management features that change the risk. It should be noted that this model contains a surface water component, as such, the depth, velocity and hazard mapping outputs shown include the surface water element as well as the fluvial risk. Re-alignment of the watercourse from the western and southern boundary to the eastern boundary was completed in 2019. This is not included in the existing modelling and so the flood risk may differ slightly from that which is reported. Flood characteristics: The site is predicted to be at risk from fluvial flooding due to the proximity of Teville Stream. <ul style="list-style-type: none"> A moderate section of the site along the north, east and south site boundaries is located within the 5% AEP flood extent (approximately 13%). There is a further 3% of the site along the north and east site boundaries located within the 0.1% AEP flood extent. 		
	Surface Water	Proportion of site at risk (RoFSW) (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		3.3% AEP	1% AEP	0.1% AEP
		2%	5%	10%
		Description of surface water flow paths: During the 3.33% AEP rainfall event, the site is at a very low risk of flooding along the site boundary in the north west, east and south, affecting 2% of the site. There is a 5% increase in flood extent, predominantly in the north, during the 1% AEP event. In the 0.1% AEP event this flood extent increases a further 10% covering all edges of the site, with the exception of a small section in the south east. RoFSW considers flood risk where the hazard rating is greater than 0.575.		

SHLAA / HELAA site reference	WB08059
Site name	Land Site Decoy Farm, Dominion Way

	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		12%	1%	13%
		The northern most section of the site (12%) has a high risk of groundwater flooding with groundwater levels predicted to be within 0.025m from the ground surface, during a 1% AEP groundwater flood event. Localised areas in the north (1%) have a medium risk of groundwater flooding, with levels predicted between 0.025 and 5m below the surface. The remainder of the site is it a negligible risk of groundwater flooding during the 1% AEP event.		
	Tidal Risk Zones	Tidal Groundwater Risk Zone (maximum risk)		Tidal Drainage Risk Zone (maximum risk)
		GW4		SW4
		A small section in the north of the site is located within Tidal Groundwater Risk Zone GW4. This is due to this area being located below the present-day tidal level and in a high groundwater risk area, where groundwater levels are within 0.025m of the surface during a 1% AEP groundwater flood event. Small localised areas in the north are also located within Tidal Groundwater Risk Zone GW3. This is due to these areas being situated below present tidal level, with groundwater levels between 0.025 and 0.5m below the surface during a 1% AEP groundwater event. The rest of the site lies within Tidal Groundwater Risk Zone GW0 due to its location within an impermeable geological unit and therefore not at risk of being tidally influenced.		
		A very small section along the northern boundary of the site is located within Tidal Drainage Risk Zone SW4, where ground levels are below the present-day tidal level and the area is at risk of flooding during the 1% AEP surface water flood event. The southern and eastern site boundaries are located within Tidal Drainage Risk Zone SW3, at risk of flooding from surface water flooding in the future and below the present-day tidal level. Towards the centre of the site risk decreases through Zones SW2 and SW1 as ground levels increase and risk of flooding from surface water decreases. The centre of the site is located within Tidal Drainage Risk Zone SW0 due to this area being located above the future tidal level and at a negligible risk of flooding during the 1% AEP surface water event.		
	Reservoir	The site is not at risk of reservoir flooding.		

SHLAA / HELAA site reference	WB08059
Site name	Land Site Decoy Farm, Dominion Way

Flood risk management infrastructure	Defences	Defence Type		Standard of Protection		Condition			
		High ground		10%		Fair			
		Teville Stream is lined with high ground on both sides of the channel. A section of this high ground runs 150m along the north west site boundary and another section runs for 120m along the southern site boundary. The site is not protected by these defences for events greater than the standard of protection that they provide.							
	Residual risk	Culvert / structure blockage?		A number of culverted watercourses are located to the east and south of the site. These culverts may pose a residual risk to the site in the event of a blockage.					
		Impounded water body failure?		The site is not at risk of flooding due to reservoir breach.					
Defence breach / overtopping?		The site is not at risk from defence breach or overtopping.							
Emergency planning	Flood warning	The site is not covered by an Environment Agency Flood Alert or Flood Warning Area.							
	Access and egress	Dry access and egress could be available to the site during the 3.3% and 1% AEP surface water events from the south via the B2223 and Dominion Way. Dry access and egress would be cut off in the 0.1% AEP event. However, wet access and egress would still be available via the same route given the low hazard rating (<0.75) meaning generally there would be little risk for people walking through the floodwater. Dry access and egress could be available to the site via Dominion Way in all fluvial events.							
Climate change	Climate change allowances for '2080s'	Proportion of site at 1% AEP fluvial flood risk							
		River Basin District		Present day		Flood Zone 2 as a proxy for climate change			
		South East		0%		16%			
	Implications for the site	Note: For Teville Stream modelling the present day 0.1% AEP fluvial event has been used as a proxy for future 1% AEP fluvial events. Using Flood Zone 2 as a proxy for climate change shows that the site is sensitive to the impact of increased flows. Increases are located along the north and east site boundaries. Therefore, climate change is likely to have an impact on the flood extents at the proposed site.							
		Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk						
	Present day		+20% rainfall uplift		+30% rainfall uplift		+40% rainfall uplift		
	7%		8%		9%		10%		
	Implications for the site	A small increase in flood extent of the 1% AEP surface water flood event is predicted for the plus 20%, 30% and 40% climate change events. However, the extents do not reach that of the 0.1% AEP surface water event. These increases are located along the north, east and south site boundaries. Therefore, the site will be at a slightly higher risk from surface water flooding in the future.							

SHLAA / HELAA site reference	WB08059
Site name	Land Site Decoy Farm, Dominion Way

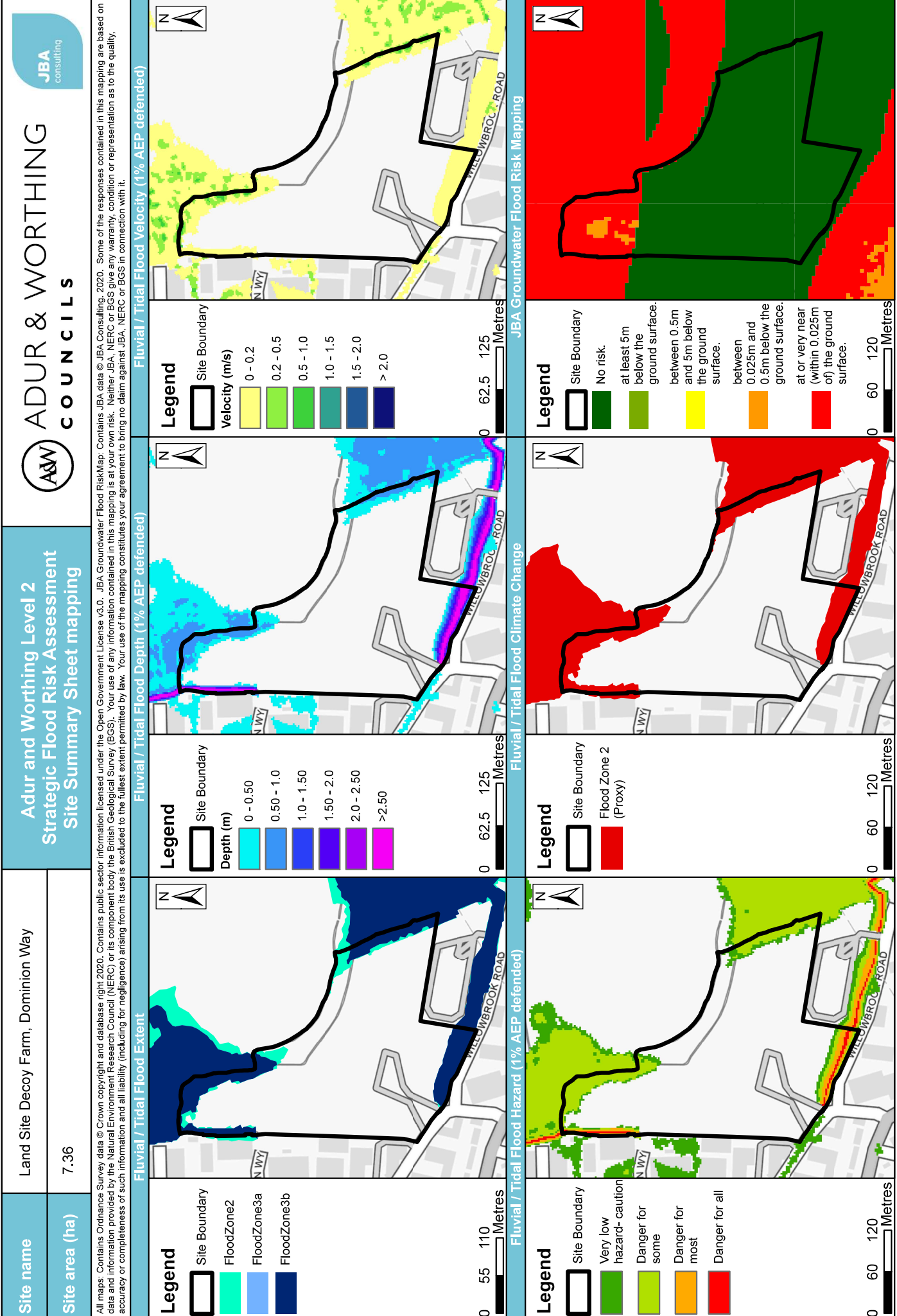
Requirement for drainage control and impact mitigation	Bedrock Geology	The majority of the site's bedrock geology consists of Lambeth Group (clay, silt and sand). A small section in the north of the site consists of the permeable bedrock geology, Tarrant Chalk Member.
	Superficial Geology	The entire site is overlain with Alluvium (clay, silt, sand and peat).
	Soils	The majority of the site has loamy and clayey soils of coastal flats with naturally high groundwater. The southern edge of the site has freely draining slightly acid loamy soils.
	Groundwater Source Protection Zone	The site is not within a Groundwater Source Protection Zone.
	Historic Landfill Site	The site is situated within the historical landfill site at Decoy Farm.
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>This site has areas within its boundary designated by the Environment Agency as being a landfill site. A thorough ground investigation will be required as part of a detailed FRA to determine the extent of the contamination and the impact this may have on SuDS. As such proposed SuDS should be discussed with the relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems in the north of the site given the possible medium to high risk from groundwater flooding. This must be confirmed via site investigations to assess the potential for infiltration. Whilst controlling run-off from proposed development must be addressed there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>Infiltration techniques may be appropriate, although mapping suggests a high risk of groundwater flooding in the north of the site. Underlying soils may be permeable. Further site investigation must be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in areas where the depth to the water table is <1m.</p> <p>Mapping suggests that the site slopes make it possible to consider most forms of detention. A liner maybe required due to the potential for groundwater flooding in the north of the site.</p> <p>All filtration techniques are likely to be appropriate, provided site slopes are <5% at the location of the filtration feature, and areas in the north are avoided where depth to water table is >1m, subject to confirming that the underlying soils have appropriate seepage and storage capacity.</p> <p>All forms of conveyance are likely to be appropriate. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the ingress of groundwater.</p>

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Site name	Land Site Decoy Farm, Dominion Way

	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		Teville Stream	Low
Recommendations for Local Plan policy	Sequential Test and Exception Test requirements		
	<p>The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.</p> <p>The Exception test will be required in the following scenarios:</p> <ul style="list-style-type: none"> • If Highly vulnerable development is proposed to be located in FZ2. • If Essential infrastructure is proposed to be located in FZ3b. <p>Development will not be permitted in the following scenarios:</p> <ul style="list-style-type: none"> • Highly vulnerable, More vulnerable and / or Less vulnerable development within FZ3b 		
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers		
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> • At the planning application stage, a site-specific flood risk assessment will be required for this site as the site area is greater than one hectare. It will also be required where development is: <ul style="list-style-type: none"> ○ located in Flood Zones 2 or 3; ○ on land which may be subject to other sources of flooding, where the development would introduce a more vulnerable use; ○ on land which has been identified by the Environment Agency as having critical drainage problems; or ○ on land identified in the strategic flood risk assessment as being at increased flood risk in future. • Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water and groundwater. • Consideration should be given to the potential effects of climate change, particularly with respect to surface water. • Proposals should consider the opportunity to include measures that provide for a reduction in the predicted surface water flood risk at existing development. In particular, the scope should be explored for 'daylighting' of the culverted sections of the Teville Stream that run through the site. • Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. • Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. • Site specific hydraulic modelling will need to be undertaken due to the age of the model and recent changes to the alignment of the watercourse. • Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. • Proposals will need to demonstrate that users will be safe and more vulnerable use is located outside Flood Zone 3b. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> • New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> ○ Reducing volume and rate of runoff ○ Relocating development to zones with lower flood risk ○ Creating space for flooding. 		

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Site name	Land Site Decoy Farm, Dominion Way

	<ul style="list-style-type: none"> • Safe access and egress should be demonstrated in the fluvial 1% AEP plus climate change event and as there is a risk of surface water flooding on the site, consideration should also be given to providing safe access and egress during surface water flood events. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. • SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. • Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • The potential impact of the culverted watercourses flowing to the east and south of the site, must be considered when designing site drainage and attenuation. • Assessment of runoff should include allowances for climate change effects. • Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk. • SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753 Manual 2015). • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space. • All existing watercourses should be retained and buffers to these provided. Any proposals to divert, alter, culvert infill or discharge to ordinary watercourses will require the prior consent of West Sussex County Council as the Lead Local Flood Authority. • Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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SHLAA / HELAA site reference	WB08183
Site name	Land Site West of Fulbeck Avenue

Site details	OS Grid reference	TQ 10699 04735
	Local Authority	Worthing Borough Council
	Area	2.00 ha
	Current land use	Greenfield - unmanaged scrub and woodland
	Proposed site use	50 residential units
	Flood risk vulnerability	More vulnerable
	Topography	<div data-bbox="649 934 1453 1543"> <p>Site topography</p> <p>Legend</p> <p>Site Boundary</p> <p>Elevation</p> <p>- High</p> <p>- Low</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> <p>0 45 90 Metres</p> </div> <ul style="list-style-type: none"> • There are no existing buildings on the site. • The site generally slopes from west to east although there is higher ground to the north and south of the site as well. • There is a watercourse which flows through the centre of the site and Somerset's Lake is located immediately to the west of the site. There are also a number of other small watercourses which drain the site. • The ground slope across the site generally has a gradient of less than 5%

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Site name	Land Site West of Fulbeck Avenue

Sources of flood risk	Existing watercourses	<p>Somerset's Lake is situated 10m to the north west of the site, from which Barleyfields Stream flows north west to south east through the centre of the site and joins the Ferring Rife watercourse to the south.</p> <p>There are also two ordinary watercourses on the site which drain the toe of the Somerset's Lake embankment. To the north of Barleyfields Stream the watercourse also receives pumped flows from the Malthouse Way balancing pond and to the south the watercourse is a continuation of the Titnore Lane stream which flows to the north of the West Worthing Tennis and Squash Club.</p> <p>Finally, there is another small watercourse which flows through the site from east to west north of the Barleyfields Stream.</p>		
	Flood history	There are no recorded flood events within the site.		
	Fluvial	<p>Proportion of the site at risk</p> <p>(proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)</p>		
		5% AEP	1% AEP	0.1% AEP
		5%	20%	6%
		<p>Available modelled data:</p> <p>This site is covered by the Environment Agency Ferring Rife (Fluvial/Tidal) 2019/20 Flood Modeller-TUFLOW model. The model was updated by JBA Consulting for Adur and Worthing Councils for the purpose of this SFRA. The extent of the Flood Zones predicted by the flood model are also the extent of the actual flood risk, as there are no flood risk management features that change the risk.</p> <p>Flood characteristics:</p> <p>The site is predicted to be at risk from fluvial flooding due to the proximity of Ferring Rife to the east of the site.</p> <ul style="list-style-type: none"> A small section of the site in the north, and centre along the channel of the watercourse is located within Flood Zone 3b (approximately 5%) A further 20% (in the north of the site) is located within Flood Zone 3a. Finally, a further 6% of the site is located within Flood Zone 2 covering more central areas. 		
Surface Water		<p>Proportion of site at risk (RoFSW)</p> <p>(proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)</p>		
		3.3% AEP	1% AEP	0.1% AEP
		25%	5%	23%
		<p>Description of surface water flow paths:</p> <p>During the 3.3% AEP rainfall event, areas across the north east, and centre of the site are at risk of surface water flooding, as well as the southern boundary. There is a 5% increase in flood extent in the north east, centre and along the south eastern boundary during the 1% AEP event. For the 0.1% AEP event there is a further 23% increase in flood extent, with over half the site at risk, with the exception of the south west section.</p> <p>RoFSW takes account of building footprints so the flood risk may be affected by existing buildings on the site. It also only considers flood risk where the hazard rating is greater than 0.575.</p>		

SHLAA / HELAA site reference	WB08183
Site name	Land Site West of Fulbeck Avenue

	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		36%	0%	36%
		Approximately a third of the site (36%) has a high risk of groundwater flooding with groundwater levels predicted to be less than 0.025m from the ground surface, during a 1% AEP groundwater flood event. This area is located to the south of the site. The remainder of the site is at a negligible risk of groundwater flooding.		
	Tidal Risk Zones	Tidal Groundwater Risk Zone (maximum risk)		Tidal Drainage Risk Zone (maximum risk)
GW0		SW0		
The site is entirely located within Tidal Groundwater Risk Zone GW0 and Tidal Drainage Risk Zone SW0. This is due to the site being located above the future tidal level.				
Reservoir	While the site is not at risk of flooding from reservoirs, there is a potential risk of breach from Somerset's Lake or overtopping of the Malthouse Way balancing pond (see section below for information on risk from impounded water bodies).			

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Site name	Land Site West of Fulbeck Avenue

Flood risk management infrastructure	Defences	Defence Type	Standard of Protection		Condition
		There are no defences within the vicinity of the site.			
	Residual risk	Culvert / structure blockage?	There is a culvert located to the south of the site which runs under Fulbeck Avenue. This culvert may pose a residual risk to the site in the event of a blockage.		
		Impounded water body failure?	Somerset's Lake breach	Somerset's Lake poses a residual risk to the site in the event of a breach from the pond. Modelling has been undertaken to assess two different breach scenarios at two locations, one at the outlet and one further to the north. Results of this modelling show that for a dry day, a breach in the north of the lake would cause flooding of 38% of the site across the north and centre. There is a 1% decrease in this flood extent in the north of the site for a southern breach. Maximum flood depths on the site are estimated to be 1.2m for a northern breach and 1.4m for a southern breach. For a wet day (0.1% AEP), a breach of this lake would significantly increase the risk of flooding to the site during the 0.1% AEP event. For a northern breach there would be a 20% increase in flood extent in the north compared to the dry day scenario. For a southern breach there is a 27% increase in flood extent compared to the day scenario. Maximum flood depths on site for the wet day scenario range between 1.2m for a northern breach and 1.6m for a southern breach.	
			Malthouse Way balancing pond overtopping	The northern section of the site (44%) is at risk of overtopping from the balancing pond on Malthouse Way during a 0.1% AEP event. Maximum flood depths of 0.6m are estimated in topographic lows.	
			Combination of both failures	The overtopping of the balancing pond and a breach of Somerset's Lake during a 0.1% event would result in a further increase in risk to the site. A 2% increase in flood extent would occur for a combination of the two failures compared to the northern breach only extent. There is a 3% increase in flood extent of the combined failures compared to the southern breach only extent. These increases occur along the northern boundary of the site.	
		Defence breach / overtopping?	The site is not at risk from defence breach or overtopping.		

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Site name	Land Site West of Fulbeck Avenue

Emergency planning	Flood warning	The site is not covered by an Environment Agency Flood Alert or Flood Warning Area.				
	Access and egress	<p>Dry access and egress could be available to the site during all fluvial flood events from the south east via Fulbeck Avenue.</p> <p>For surface water events dry access and egress would be cut off however, wet access and egress could still be available for some via Fulbeck Avenue. During the 3.33% AEP and 1% AEP surface water flood events this access route would have a maximum hazard rating of 0.75-1.25. This generally means that only the most vulnerable people would be in danger when walking through this floodwater.</p> <p>During a 0.1% AEP the maximum hazard increases to 1.25-2 which would place most people in danger if walking through floodwater. However, given the maximum flood depths of 0.3-0.6m, vehicular access could still be available.</p> <p>If a breach event were to occur from Somerset's Lake flood depths have been shown to reach between 0.25m and 0.5m across a significant proportion of the north of the site with depths in some areas exceeding 0.5m. A maximum hazard rating of 0.75-1.25 across much of the north of the sites has also been modelled, with ratings rising to 1.25-2 near watercourses. In the event of a breach occurring it is likely that access to Fulbeck Avenue would be cut off due to high water depths and hazard along the road.</p>				
Climate Change	Climate change allowances for '2080s'	Proportion of site at 1% AEP fluvial flood risk				
		River Basin District	Present day	Central	Higher Central	Upper End
		South East	n/a	+35% flow uplift	+45% flow uplift	+105% flow uplift
			20%	27%	28%	41%
	Implications for the site	There is an increase in flood extent for all climate change allowances in comparison to the 1% AEP flood extent. For the 1% AEP + 105% CC scenario the flood extent reaches and exceeds that of the 0.1% AEP flood extent. Therefore, climate change is predicted to impact the proposed site. However, the impact of the Central and Higher Central uplifts is only minor.				
	Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk				
		Present day	+20% rainfall uplift	+30% rainfall uplift	+40% rainfall uplift	
		30%	36%	41%	45%	
Implications for the site	Moderate increases in flood extent during the 1% AEP surface water flood event are predicted for the plus 20%, 30% and 40% climate change events. However, the extents do not reach that of the 0.1% AEP surface water flood extent. These increases are located within the centre and north of the site. Therefore, the site will be at a higher risk from surface water flooding in the future.					

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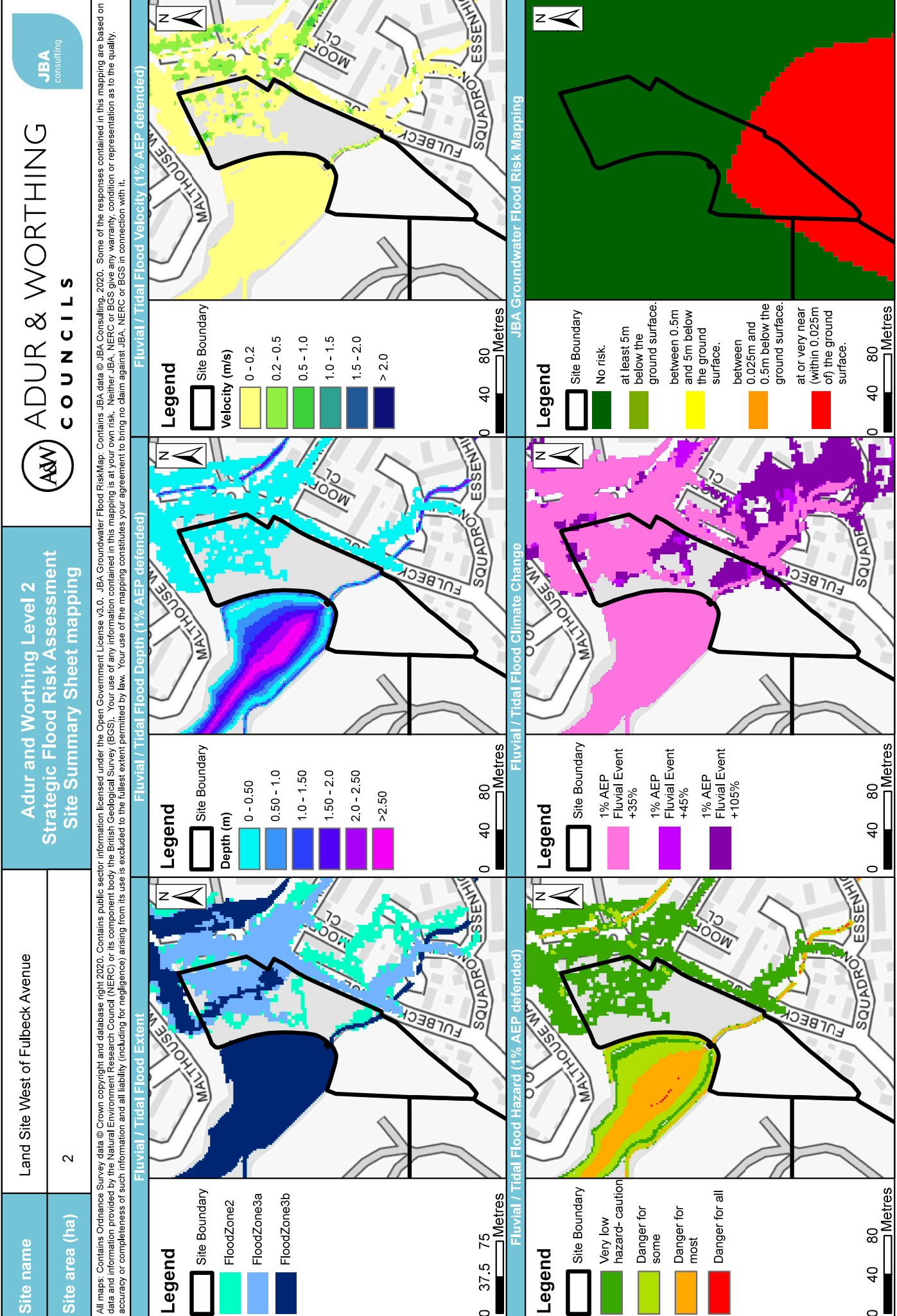
Requirement for drainage control and impact mitigation	Bedrock Geology	The majority of the site's bedrock geology is Lambeth Group- Clay, Silt and Sand. The south west section of the site is formed of London Clay Formation- Clay, Silt and Sand.	
	Superficial Geology	The majority of the site's superficial geology is Head- Clay, Silt, Sand and Gravel. The south east section of the site is formed of River Terrace Deposits (undifferentiated).	
	Soils	The centre of the site has freely draining slightly acid loamy soils. The north and south of the site has slowly permeable seasonally wey slightly acid but base-rich loamy and clayey soils.	
	Groundwater Source Protection Zone	The site is not within a Groundwater Source Protection Zone.	
	Historic Landfill Site	There are no historic landfill sites in close proximity to the site.	
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems given the possible high risk from groundwater flooding in the south of the site. This must be confirmed via site investigations to assess the potential for infiltration. Whilst controlling run-off from proposed development must be addressed there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>Infiltration techniques may be appropriate. Mapping suggests a high risk of groundwater flooding in the south of the site and underlying soils may be permeable. Further site investigation must be carried out to assess potential for drainage by infiltration. If infiltration is suitable it should be avoided in areas where the depth to the water table is <1m.</p> <p>Mapping suggests that the slope of the site makes it possible to consider most forms of detention. A liner maybe required due to the potential for groundwater flooding on the site.</p> <p>Where there is not a significant risk of groundwater flooding, all infiltration techniques are likely to be appropriate, subject to confirming that the underlying soils have appropriate seepage and storage capacity.</p> <p>All forms of conveyance are likely to be appropriate. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the ingress of groundwater.</p>	
	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		Ferring Rife	Medium

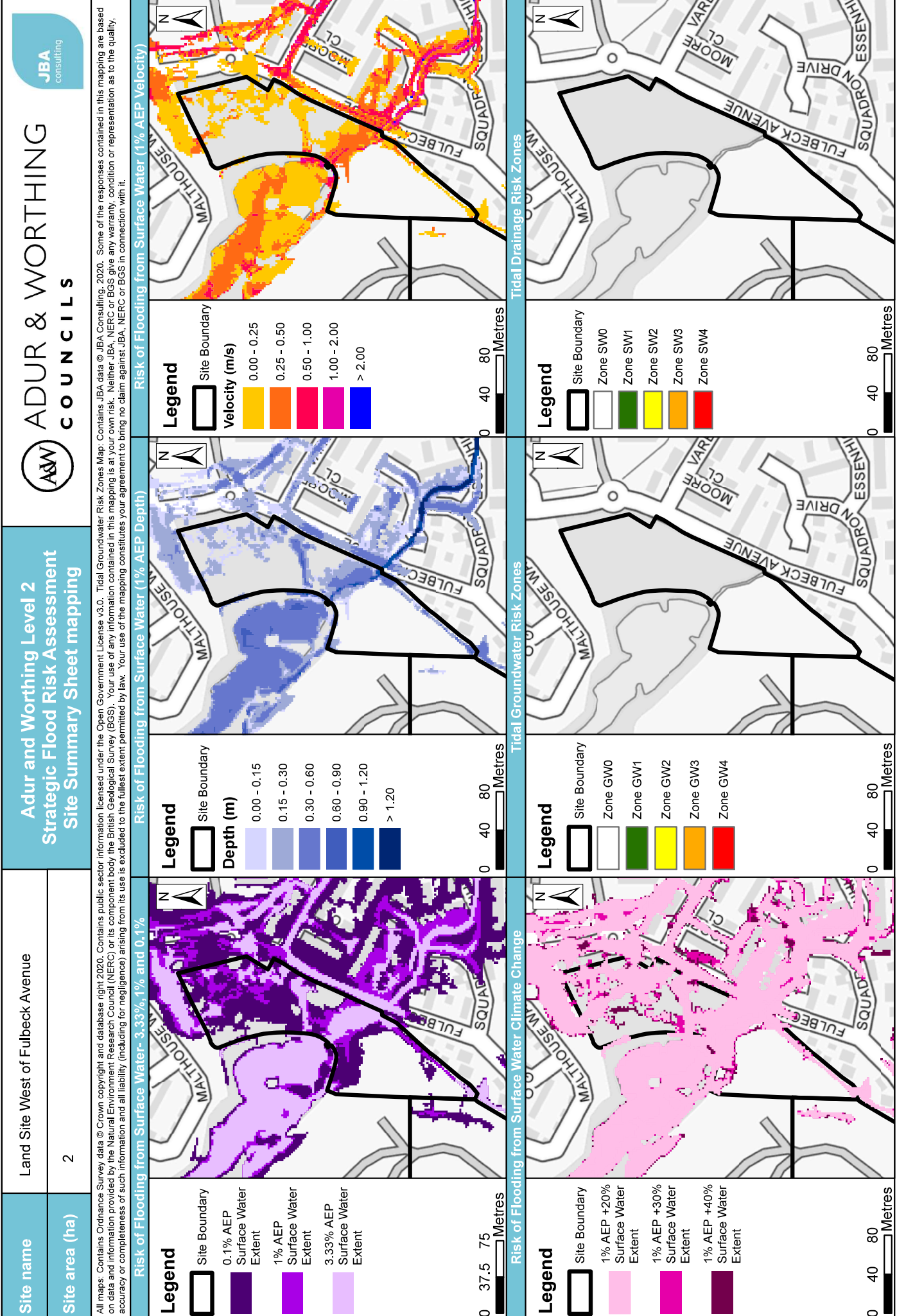
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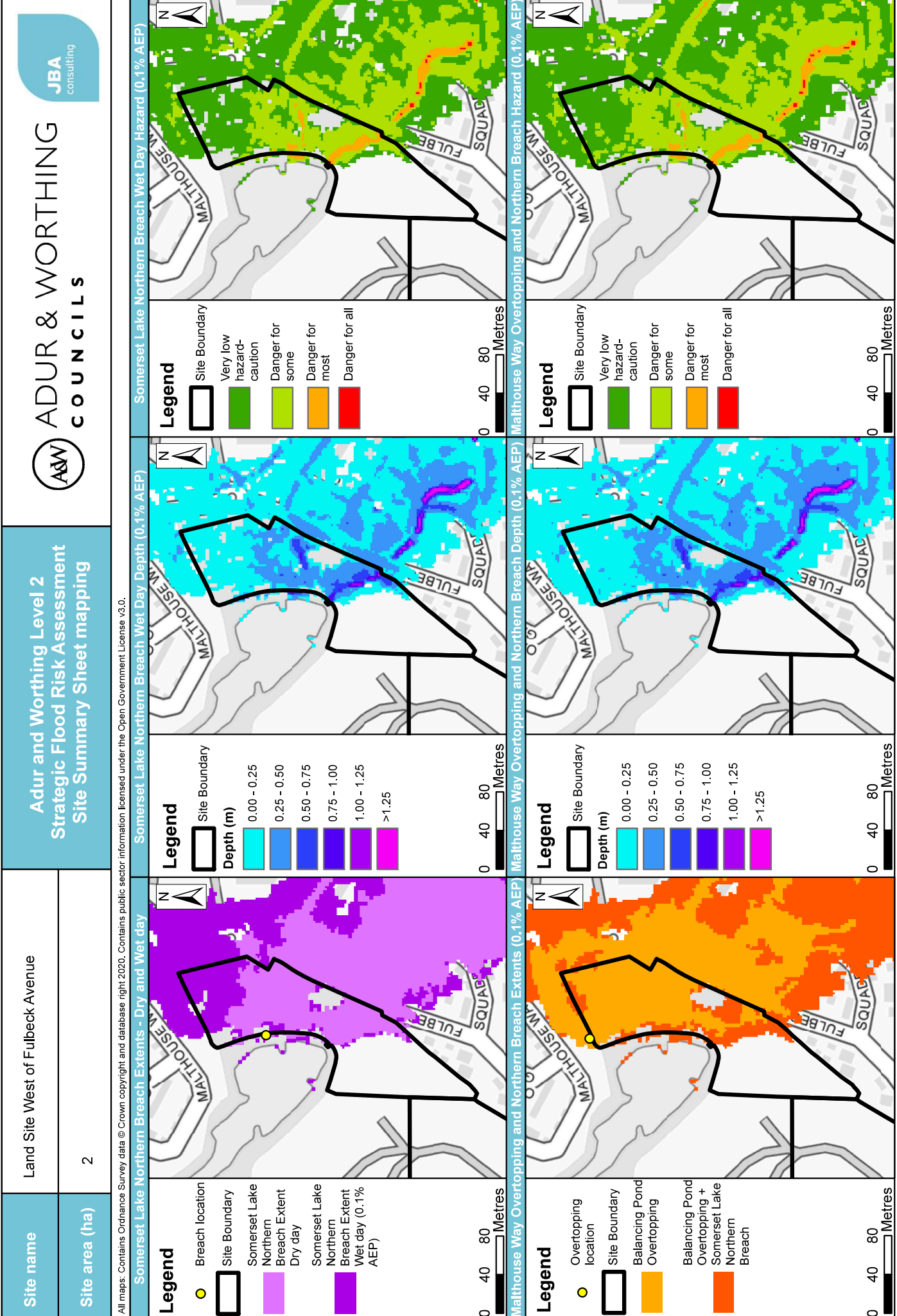
Recommendations for Local Plan policy	Sequential Test and Exception Test requirements
	<p>The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.</p> <p>The Exception test will be required in the following scenarios:</p> <ul style="list-style-type: none"> • If Highly vulnerable development is proposed to be located in FZ2. • If More vulnerable or Essential Infrastructure development is proposed to be located in FZ3. • If Essential infrastructure is proposed to be located in FZ3b. <p>Development will not be permitted in the following scenarios:</p> <ul style="list-style-type: none"> • Highly vulnerable development within FZ3a. • Highly vulnerable, More vulnerable and / or Less vulnerable development within FZ3b.
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> • At the planning application stage, a site-specific flood risk assessment will be required for this site as development will be located within Flood Zones 2 and 3 and the site area is greater than one hectare. It will also be required where development: <ul style="list-style-type: none"> ○ may be subject to other sources of flooding, where the development would introduce a more vulnerable use; ○ is on land which has been identified by the Environment Agency as having critical drainage problems; or ○ is on land identified in the strategic flood risk assessment as being at increased flood risk in future. • Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water, groundwater and impounded waterbodies (Somerset's Lake and the Malthouse Way balancing pond). • Consideration should be given to the potential effects of climate change, particularly with respect to surface water. Proposals should consider the opportunity to include measures that provide for a reduction in the predicted surface water flood risk at existing adjacent development and further downstream. • Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. • Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. • Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. • Proposals will need to demonstrate that users will be safe and more vulnerable use is located outside Flood Zone 3b. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> • New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> ○ Reducing volume and rate of runoff ○ Relocating development to zones with lower flood risk ○ Creating space for flooding. • Safe access and egress should be demonstrated in the fluvial 1% AEP plus climate change event and as there is a risk of surface water flooding on the site, consideration should also be given to providing safe access and egress during surface water flood events. • All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff.

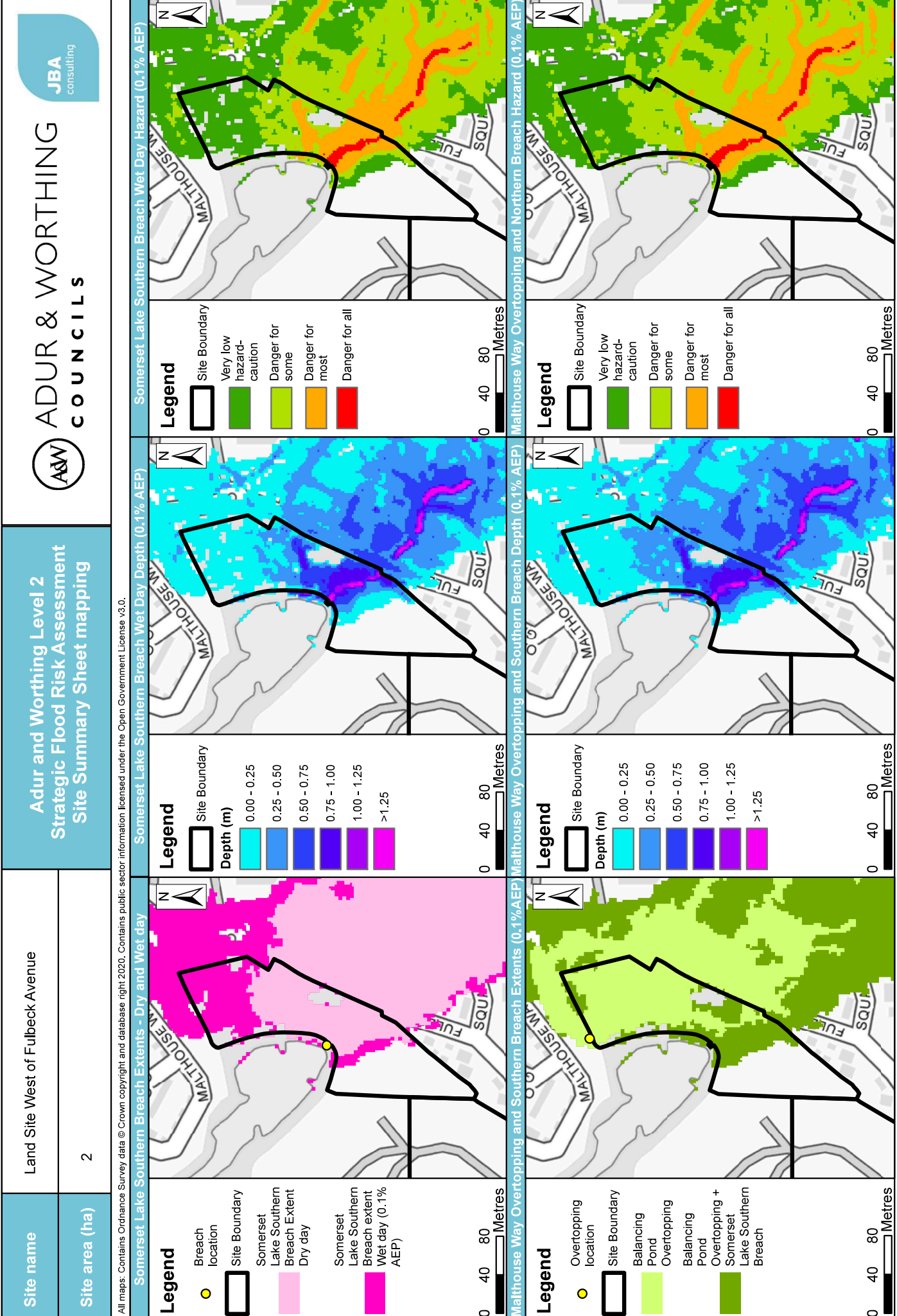
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Site name	Land Site West of Fulbeck Avenue

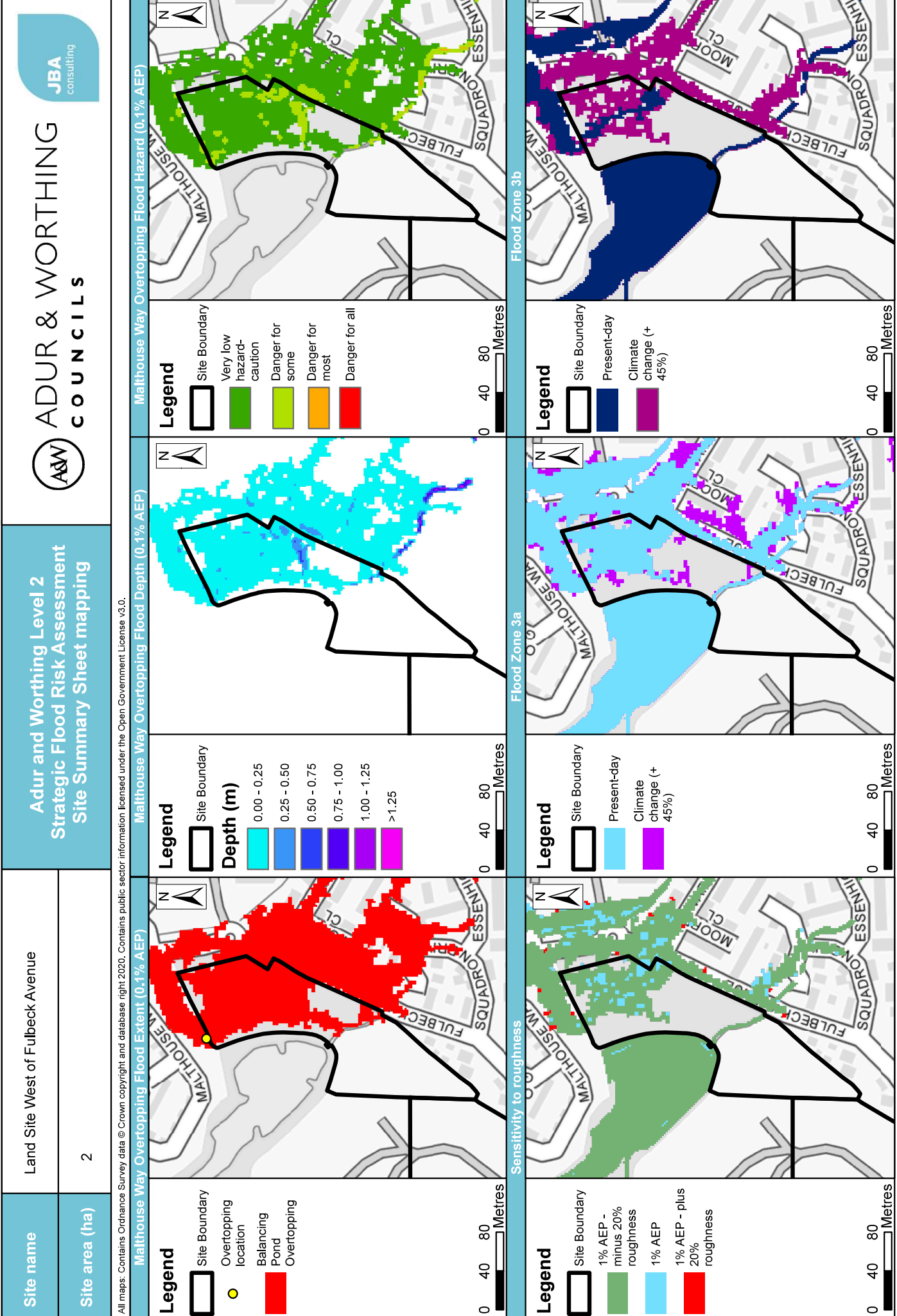
	<ul style="list-style-type: none"> • A greenfield site such as this should be able to implement an exemplar surface water drainage scheme to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. • Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. • The potential impact of the culvert which flows under Fulbeck Avenue, to the south of the site, must be considered when designing site drainage and attenuation. • Assessment of runoff should include allowances for climate change effects, and discharge rates from the site should not increase downstream flood risk. • SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753 Manual 2015). • Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development and consider using Flood Zones 2 and 3 as public open space. • The residual risks associated with failure of the water retaining features must be addressed so that proposed development is safe. The considerations should include the appropriate arrangements and responsibilities for the maintenance and operation of water retaining structures as this will be directly linked to the likelihood of failure. • All existing watercourses should be retained and buffers to these provided. Any proposals to divert, alter, culvert infill or discharge to ordinary watercourses will require the prior consent of West Sussex County Council as the Lead Local Flood Authority. • Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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SHLAA / HELAA site reference	WB08163
Site name	Land South of Upper Brighton Road

Site details	OS Grid reference	TQ 15618 04998
	Local Authority	Worthing Borough Council
	Area	5.83 ha
	Current land use	Greenfield- arable fields and paddock
	Proposed site use	123 residential units
	Flood risk vulnerability	More vulnerable
	Topography	<div data-bbox="649 903 1461 1512"> <p>Site topography</p> <p>Legend</p> <p>Site Boundary</p> <p>Elevation</p> <p>High</p> <p>Low</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> <p>0 60 120 Metres</p> </div> <ul style="list-style-type: none"> • The site slopes gradually downhill from north to south. • There are no existing buildings on the site. • Upper Brighton Road cuts through the northern section of the site in an east-west alignment. • A small watercourse runs through the southern section of the site. • The ground slope across the site generally has a gradient of less than 5%

SHLAA / HELAA site reference	WB08163
Site name	Land South of Upper Brighton Road

Sources of flood risk	Existing watercourses	Teville Stream (Main River) flows from north to south approximately 100m south east of the site. A drain cuts through the southern section of the site and flows for approximately 170m from the south west to north east site boundary. This drain forms part of the drainage network flowing into Teville Stream. There is also an ordinary watercourse which flows from north to south along the south eastern edge of the site.		
	Flood history	There are no historic flood records within the vicinity of the site.		
	Fluvial	Proportion of the site at risk (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		5% AEP	1% AEP	0.1% AEP
		0%	0%	0%
		Available modelled data: The site is covered by the Teville Stream (Fluvial) 2012 Flood Modeller-TUFLOW model. The extent of the Flood Zones predicted by the flood model are also the extent of the actual flood risk, as there are no flood risk management features that change the risk. It should be noted that this model contains a surface water component, as such, the depth, velocity and hazard mapping outputs shown include the surface water element as well as the fluvial risk.		
		Flood characteristics: The site is within Flood Zone 1 and is therefore at negligible risk of flooding from rivers.		
	Surface Water	Proportion of site at risk (RoFSW) (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		3.3% AEP	1% AEP	0.1% AEP
		0%	1%	3%
		Description of surface water flow paths: The site is at a very low risk of surface water flooding during the 1% AEP rainfall event in two localised areas in the south of the site where ponding occurs. There is a small 3% increase in flood extent in the 0.1% AEP event in the south, north and along a section of the western site boundary. RoFSW only considers flood risk where the hazard rating is greater than 0.575.		
	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		35%	28%	63%

SHLAA / HELAA site reference	WB08163
Site name	Land South of Upper Brighton Road

		<p>The south of the site, accounting for 35%, has a high risk of groundwater flooding, with groundwater levels predicted to be within 0.025m from the ground surface during a 1% AEP groundwater flood event. Approximately a quarter of the site (28%) is located within an area of medium groundwater flood risk in the centre of the site, with groundwater levels predicted to be between 0.025 and 0.5m below the surface, during a 1% AEP groundwater flood event. The remaining 37% of the site in the north has a lower risk of groundwater flooding, with groundwater levels predicted to be at least 0.5m below the surface.</p>	
	Tidal Risk Zones	Tidal Groundwater Risk Zone (maximum risk)	Tidal Drainage Risk Zone (maximum risk)
		GW4	SW2
		<p>Approximately three quarters of the site is located within Tidal Groundwater Risk Zone GW0, due to it being situated above future tidal level. The elevation of the site decreases to the south resulting in localised areas within tidal groundwater risk zones GW1,2,3 and 4. The southernmost section of the site is located within the maximum Tidal Groundwater Risk Zone GW4. This is due to this area being located within the vicinity of an area below the present-day tidal level and in a high-risk groundwater area where groundwater levels are within 0.025m of the surface during a 1% AEP groundwater flood event.</p> <p>A very small section of the site along the southern boundary is located within Tidal Drainage Risk Zone SW2. This is due to this area being located above the present-day tidal level but at risk from surface water flooding in the future. The area immediately north of this section is located within Tidal Drainage Risk Zone SW1, above the current tidal level and at a negligible risk from surface water flooding. The remainder of the site is located above the future tidal level so is not at risk of being tidally influenced (SW0).</p>	
	Reservoir	The site is not at risk of reservoir flooding.	

SHLAA / HELAA site reference	WB08163
Site name	Land South of Upper Brighton Road

Flood risk management infrastructure	Defences	Defence Type	Standard of Protection		Condition	
		High Ground	10%		Fair	
		Approximately 100m south east of the site is an area of high ground which lines both sides of Teville Stream. The defences offer no protection for the site.				
	Residual risk	Culvert / structure blockage?	There are no known culverts in the vicinity of the site. However there are likely to be field access culverts over the watercourses which cross the site.			
		Impounded water body failure?	The site is not at risk of flooding due to reservoir breach.			
Defence breach / overtopping?		The site is not at risk from defence breach or overtopping.				
Emergency planning	Flood warning	The site is not covered by an Environment Agency Flood Alert or Flood Warning Area.				
	Access and egress	Dry access and egress could be available to the site during all surface water and fluvial flood events. For the section of the site located north of Upper Brighton Road access and egress could be available to the west via The Templars and for the section of the site south of Upper Brighton Road, access and egress could be available via the north west corner onto Upper Brighton Road.				
Climate Change	Climate change allowances for '2080s'	Proportion of site at 1% AEP fluvial flood risk				
		River Basin District	Present day	Flood Zone 2 as a proxy for climate change		
		South East	n/a	0%		
	Implications for the site	Using Flood Zone 2 as a proxy for climate change shows that the site is not sensitive to the impact of increased flows. The site remains at a negligible risk from fluvial flooding during the 0.1% AEP Event.				
	Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk				
		Present day	+20% rainfall uplift	+30% rainfall uplift	+40% rainfall uplift	
		1%	1%	1%	1%	
Implications for the site	There is a very small increase (less than 1%) in the future flood extent of the 1% AEP surface water flood event for the plus 20%, 30% and 40% climate change events. These increases are located in the south of the site and along a new surface water flow path that forms along Upper Brighton Road in the north of the site. However, the extents do not reach that of the 0.1% AEP surface water event. Therefore, the site will be very slightly at a higher risk from surface water flooding in the future.					

SHLAA / HELAA site reference	WB08163
Site name	Land South of Upper Brighton Road

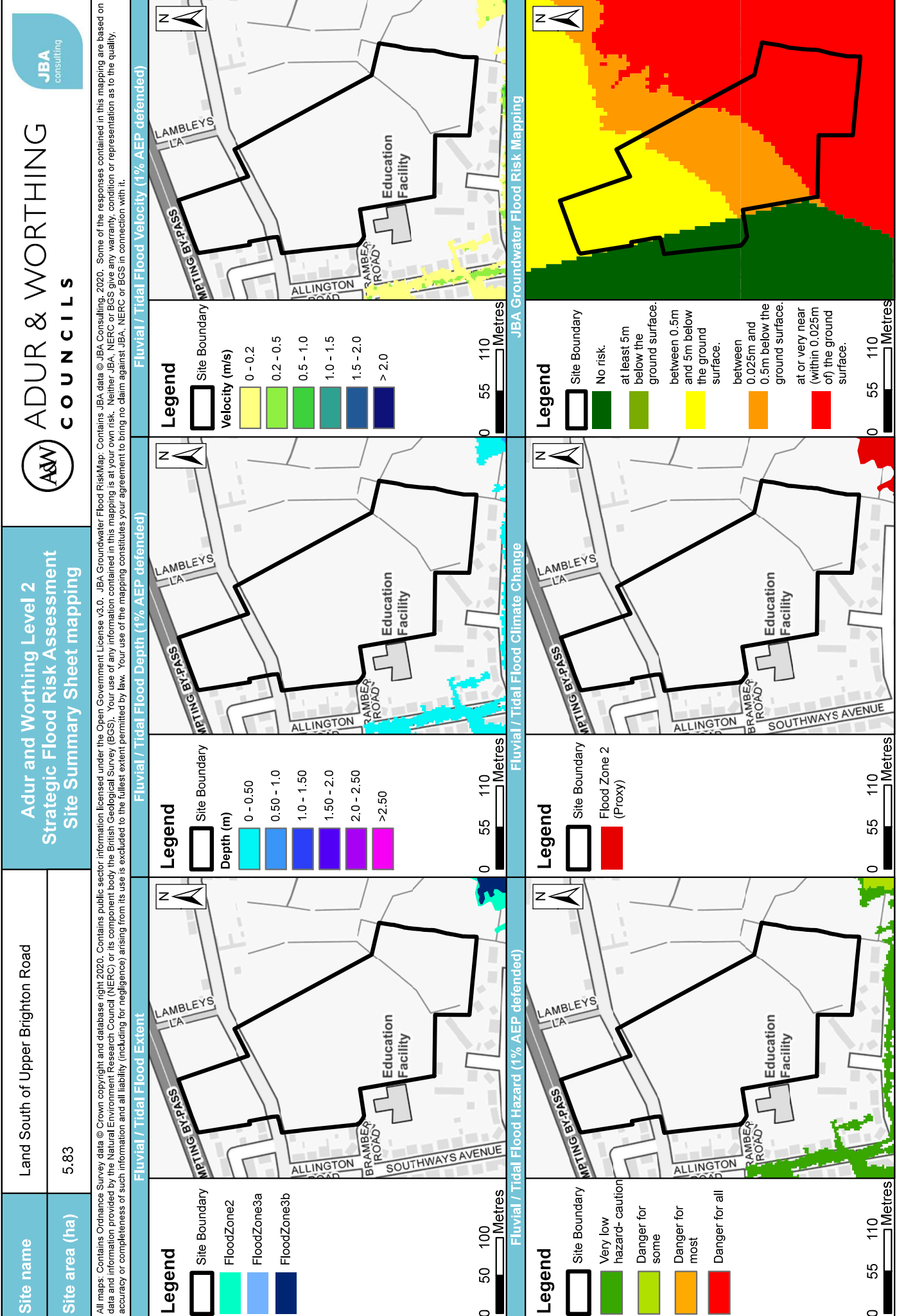
Requirement for drainage control and impact mitigation	Bedrock Geology	The entire site's bedrock geology consists of Tarrant Chalk Member (chalk).
	Superficial Geology	The entire site is overlain with Head (clay, silt, sand and gravel).
	Soils	The site has freely draining slightly acid but base-rich soils.
	Groundwater Source Protection Zone	Two thirds of the site in the south and west is located within Groundwater Source Protection Zone 1, which is defined as the 50 day travel time of pollutant to source with a 50m default minimum radius. The rest of the site in the north and east is located within Groundwater Protection Zone 2, which is defined as the 400 day travel time of pollutant to source. This has a 250 or 500m minimum radius around the source depending on the amount of water abstracted.
	Historic Landfill Site	There are no historic landfill sites in the vicinity of the site.
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems given the possible risk from groundwater (medium to high). This must be confirmed via site investigations to assess the potential for infiltration. Whilst controlling run-off from proposed development must be addressed there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>The site is located within a Source Protection Zone. As such infiltration techniques must only be used where there are suitable levels of treatment although it is possible that infiltration may not be permitted in the south of the site, given the high risk of groundwater flooding. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints.</p> <p>Mapping suggests that the site slopes make it possible to consider most forms of detention. A liner maybe required due to the potential risk of groundwater flooding on the site.</p> <p>In the north of the site where there is a lower risk of groundwater flooding, all filtration techniques may to be appropriate, subject to confirming that the underlying soils have appropriate seepage and storage capacity.</p> <p>All forms of conveyance are likely to be appropriate. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the ingress of groundwater.</p>

SHLAA / HELAA site reference	WB08163
Site name	Land South of Upper Brighton Road

	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		Teville Stream	Low
Recommendations for Local Plan policy	Sequential Test and Exception Test requirements		
	The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.		
	The Exception Test is not required as the site is not within Flood Zone 2 or 3 but a Flood Risk Assessment is still required. See below for further details on requirements for a Flood Risk Assessment.		
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers		
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> At the planning application stage, a site-specific flood risk assessment will be required for this site as the site area is greater than one hectare. It will also be required where development is: <ul style="list-style-type: none"> on land which is subject to other sources of flooding, where the development would introduce a more vulnerable use; or on land which has been identified by the Environment Agency as having critical drainage problems. Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water and groundwater. Consideration should be given to the potential effects of climate change, particularly with respect to surface water. Proposals should consider the opportunity to include measures that provide for a reduction in the predicted surface water flood risk at existing development. Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. <p>Guidance for site design and making development safe:</p> <ul style="list-style-type: none"> New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> Reducing volume and rate of runoff Relocating development to zones with lower flood risk Creating space for flooding. Safe access and egress should be demonstrated. As there is a risk of surface water flooding on the site, consideration should be given to providing safe access and egress during surface water flood events. All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. A greenfield site such as this should be able to implement an exemplar surface water drainage scheme to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. Assessment of runoff should include allowances for climate change effects, and discharge rates from the site should not increase downstream flood risk. 		

SHLAA / HELAA site reference	WB08163
Site name	Land South of Upper Brighton Road

	<ul style="list-style-type: none">• SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753 Manual 2015).• Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.• All existing watercourses should be retained and buffers to these provided. Any proposals to divert, alter, culvert infill or discharge to ordinary watercourses will require the prior consent of West Sussex County Council as the Lead Local Flood Authority.• Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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SHLAA / HELAA site reference	WB08039
Site name	Teville Gate, Railway Approach

Site details	OS Grid reference	TQ 14646 03288
	Local Authority	Worthing Borough Council
	Area	1.75 ha
	Current land use	Vacant office buildings and cleared site
	Proposed site use	Mixed use- to include 300 residential units
	Flood risk vulnerability	More vulnerable
	Topography	<div data-bbox="654 970 1455 1581"> <p>Site topography</p> <p>Legend</p> <p>Site Boundary</p> <p>Elevation</p> <p>- High</p> <p>- Low</p> <p>Contains Ordnance Survey data © Crown copyright and database right 2020. Contains public sector information licensed under the Open Government Licence v3.0.</p> <p>0 25 50 Metres</p> </div> <ul style="list-style-type: none"> • The site is generally flat, although there is a slight downhill slope from the north west to the south east. • There is an existing building on the site in the north west corner as well as a park. • The ground slope across the site generally has a gradient of less than 5%.

SHLAA / HELAA site reference	WB08039
Site name	Teville Gate, Railway Approach

Sources of flood risk	Existing watercourses	There are no existing watercourses located near the site.		
	Flood history	The Environment Agency's Recorded Flood Outline dataset records flooding occurring in 1980 as a result of poor drainage along Station Road and Newland Road, 300m to the east of the site. West Sussex County Council's recorded flood incidents dataset also records a number of incidents in these locations between 1960 and 1970 as well as in 2012.		
	Fluvial	Proportion of the site at risk (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		5% AEP	1% AEP	0.1% AEP
		0%	0%	0%
		Available modelled data: The site is covered by the Teville Stream (Fluvial) 2012 Flood Modeller-TUFLOW model. The extent of the Flood Zones predicted by the flood model are also the extent of the actual flood risk, as there are no flood risk management features that change the risk. It should be noted that this model contains a surface water component, as such, the depth, velocity and hazard mapping outputs shown include the surface water element as well as the fluvial risk, this has not been included in the percentages above.		
		Flood characteristics: The risk of flooding from fluvial sources is negligible for the site. The site is entirely located within Flood Zone 1.		
	Surface Water	Proportion of site at risk (RoFSW) (proportion reported are for the area of land occupied by each flood extent between larger or smaller return period events, and therefore not cumulative. Percentages rounded to the nearest 1%. Areas <0.5% not recorded)		
		3.3% AEP	1% AEP	0.1% AEP
		33%	15%	25%
		Description of surface water flow paths: During the 3.3% AEP surface water event, areas in the southern half of the site and towards the south east corner of the site are predicted to be at risk of surface water flooding (33%). For the 1% AEP event, there is an 15% increase in flood extent and flooding covers almost half of the site (48%). Increases in flood extent occur in the centre, south west corner and along the east boundary of the site. A further increase of 25% is predicted to occur during the 0.1% AEP event. Flooding is predicted to occur for the entire southern half of the site with only areas within the north east and north west corner of the site at negligible risk.		
		RoFSW takes account of building footprints so the flood risk may be affected by existing buildings on the site. It also only considers flood risk where the hazard rating is greater than 0.575.		

SHLAA / HELAA site reference	WB08039
Site name	Teville Gate, Railway Approach

	Groundwater	Proportion of site at risk in JBA Groundwater Map 1% AEP risk categories		
		Depth below surface 0-0.025m	Depth below surface 0.025-0.5m	Total in highest risk categories
		0%	100%	100%
		The site is predicted to be at a high risk of groundwater flooding with groundwater levels predicted to be between 0.025m and 0.5m from a ground surface during a 1% AEP groundwater flood event.		
	Tidal Risk Zones	Tidal Groundwater Risk Zone (maximum risk)		Tidal Drainage Risk Zone (maximum risk)
		GW0		SW3
		The site is entirely located within Tidal Groundwater Risk Zone 0. This is due to the site being located within an impermeable geological unit and therefore the groundwater is not thought to be tidally influenced.		
		Approximately two thirds of the site is located within Tidal Drainage Risk Zone SW3. This is due to this area being located above the present-day tidal level but at risk during the 1% AEP surface water flood event. A small section of the site in the north east corner and along the eastern boundary is located within Tidal Drainage Risk Zone SW2. This correlates to an area above the present-day tidal level but at risk from surface water flooding in the future. A small section of the site in the north west is located within Tidal Drainage Risk Zone SW2 where it lies above the present tidal level and at a negligible risk from surface water flooding in the 1% AEP surface water event. Finally, the remainder of the site in the north west lies within Tidal Drainage Risk Zone SW0. The higher elevation of this land raises this area above the future tidal level and is therefore no longer at risk of being tidally influenced.		
	Reservoir	The site is not at risk of reservoir flooding.		

SHLAA / HELAA site reference	WB08039
Site name	Teville Gate, Railway Approach

Flood risk management infrastructure	Defences	Defence Type	Standard of Protection	Condition	
		There are no defences within the vicinity of the site.			
	Residual risk	Culvert / structure blockage?	It is understood there may be a culverted watercourse which runs under the site.		
		Impounded water body failure?	The site is not at risk of flooding due to a reservoir breach.		
		Defence breach / overtopping?	The site is not at risk of flooding from a defence breach or overtopping.		
Emergency planning	Flood warning	The site is not covered by an Environment Agency Flood Alert or Flood Warning Area.			
	Access and egress	Dry access and egress could be available to the site during all surface water and fluvial events via Railway Approach located in the north west corner of the site.			
Climate Change	Climate change allowances for '2080s'	Proportion of site at 1% AEP fluvial flood risk			
		River Basin District	Present day	Flood Zone 2 as a proxy for climate change	
		South East	0%	0%	
	Implications for the site	Using Flood Zone 2 as a proxy for climate change shows that the site is not sensitive to the impact of increased flows.			
	Impact of climate change on risk from surface water	Proportion of site at 1% AEP surface water flood risk			
		Present day	+20% rainfall uplift	+30% rainfall uplift	+40% rainfall uplift
		48%	52%	53%	57%
	Implications for the site	There is a small increase in flood extent during the 1% AEP surface water event for the plus 20%, 30% and 40% climate change events. These increases are located to the north west and south west of the site. However, these increases do not reach the 0.1% AEP surface water extent. Therefore, the site will be at a moderately higher risk from surface water flooding in the future.			

SHLAA / HELAA site reference	WB08039
Site name	Teville Gate, Railway Approach

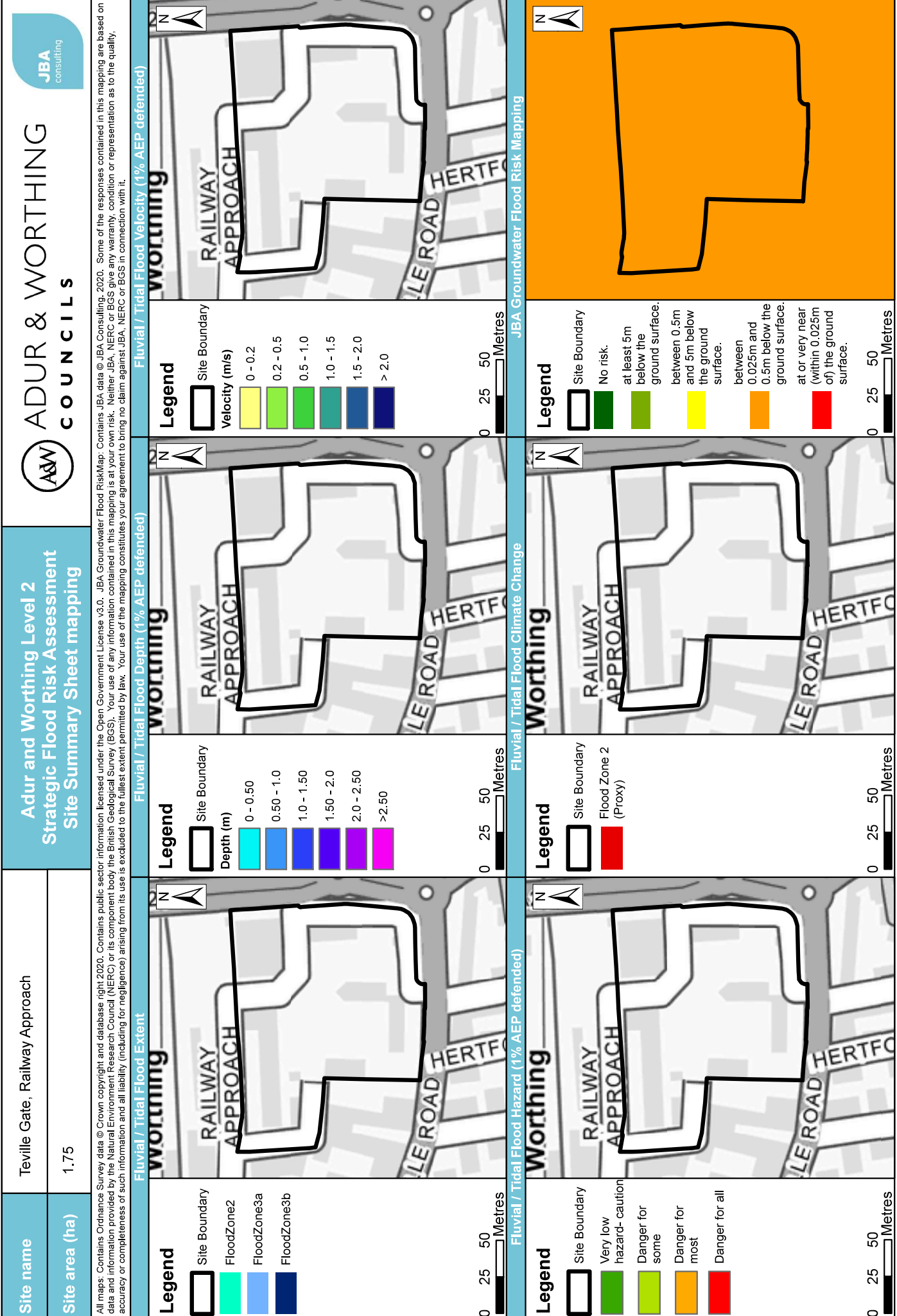
Requirement for drainage control and impact mitigation	Bedrock Geology	The majority of the site's bedrock geology consists of London Clay Formation (clay, silt and sand). The south of the site is formed of Lambeth Group (clay, silt and sand).
	Superficial Geology	The site is overlain with Raised Beach (sand and gravel) superficial deposits.
	Soils	The site has freely draining slightly acid loamy soils.
	Groundwater Source Protection Zone	The site is not located within a Groundwater Source Protection Zone.
	Historic Landfill Site	The site is not situated near a historic landfill site.
	Broad scale assessment of possible SuDS	<p>Implementation of SuDS at the site could provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the site and surrounding area.</p> <p>Development at this site should not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.</p> <p>There are numerous foul and surface water sewers crossing the site which are likely to have an impact on surface water drainage design.</p> <p>Most source control techniques are likely to be appropriate. Mapping suggests that permeable paving may have to use non-infiltrating systems given the possible risk from groundwater flooding (medium to high across the site). This must be confirmed via site investigations to assess the potential for infiltration. Whilst controlling run-off from proposed development must be addressed there is also a need to consider the effect of proposals on surface water flows such that predicted surface water flooding is not exacerbated at existing adjacent development.</p> <p>Given the high-density nature of the site, use of SuDS is recommended – urban sites should not preclude the use of SuDS.</p> <p>Infiltration techniques may be appropriate. Mapping suggests a medium to high risk of groundwater flooding and underlying soils may be permeable. Further site investigation must be carried out to assess potential for drainage by infiltration.</p> <p>Mapping suggests that the site slopes make it possible to consider most forms of detention. A liner maybe required due to the potential groundwater flooding on the site.</p> <p>All forms of conveyance are likely to be appropriate. Where the slopes are >5% features should follow contours or utilise check dams to slow flows. A liner maybe required to prevent the ingress of groundwater.</p>

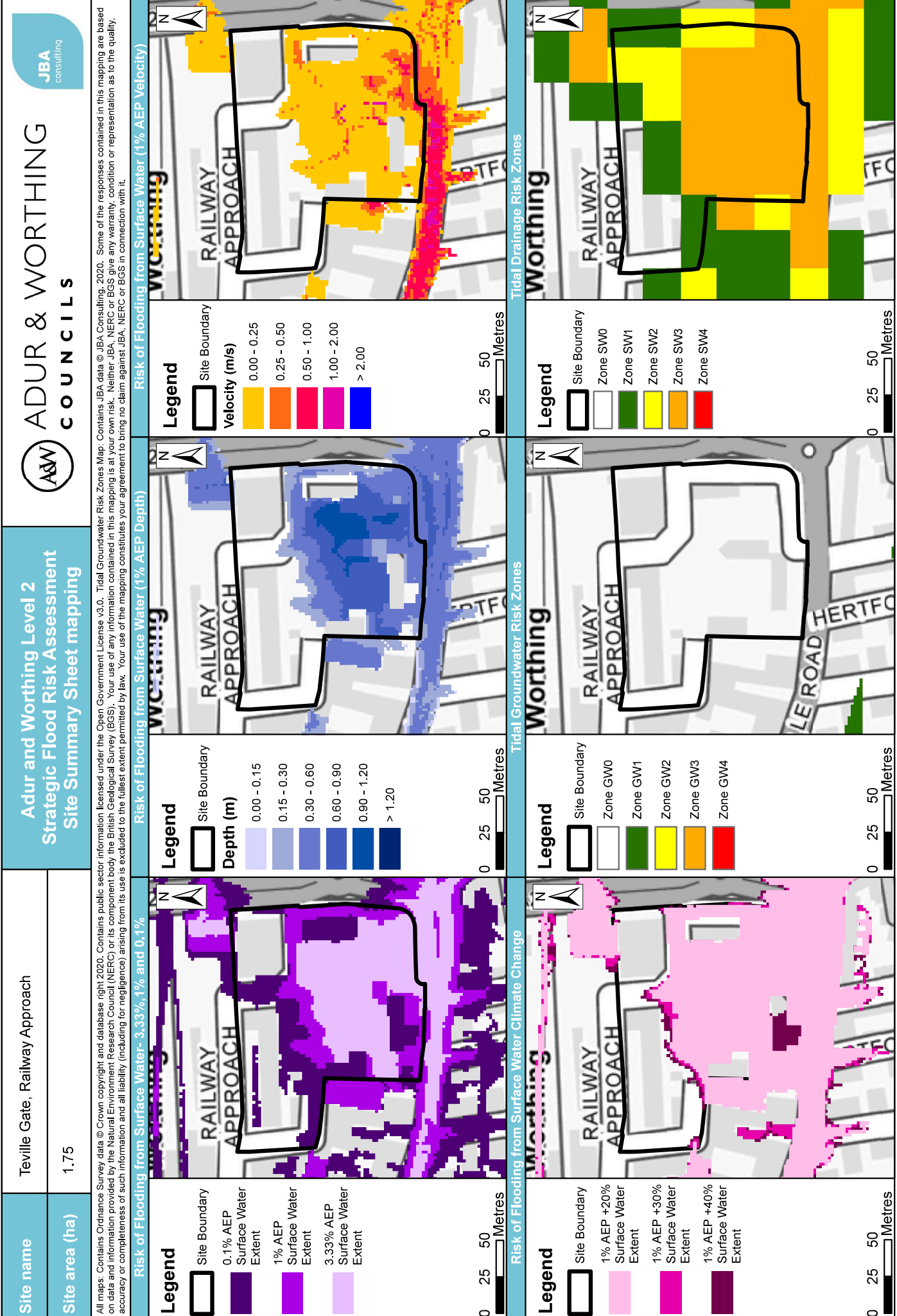
SHLAA / HELAA site reference	WB08039
Site name	Teville Gate, Railway Approach

	Cumulative impacts of development	Water Framework Directive Catchment	Sensitivity to cumulative impacts
		Teville Stream	Low
Recommendations for Local Plan policy	Sequential Test and Exception Test requirements		
	The Sequential Test must be satisfied based on fluvial and other sources of flood risk before the Exception test is applied.		
	The Exception Test is not required as the site is not within Flood Zone 2 or 3 but a Flood Risk Assessment is still required. See below for further details on requirements for a Flood Risk Assessment.		
	Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers		
	<p>Flood risk assessment:</p> <ul style="list-style-type: none"> At the planning application stage, a site-specific flood risk assessment is likely to be required for this site as the area is greater than one hectare. It will also be required where development is: <ul style="list-style-type: none"> on land which may be subject to other sources of flooding, where the development would introduce a more vulnerable use; on land which has been identified by the Environment Agency as having critical drainage problems; or on land identified in the strategic flood risk assessment as being at increased flood risk in future. in the strategic flood risk assessment as being at increased flood risk in future. Other sources of flooding must be considered as part of any site-specific flood risk assessment, including surface water and groundwater. Consideration should be given to the potential effects of climate change, particularly with respect to surface water. Proposals should consider the opportunity to include measures that provide for a reduction in the predicted surface water flood risk at existing development. Climate change modelling should be undertaken using the relevant allowances for the type of development and level of risk. Where there is a reasonable likelihood of multiple sources of flood risk having significant impact in combination it is recommended that consideration is given to assessing the combined risks of these. Consultation with the Local Authority, Lead Local Flood Authority and Environment Agency should be undertaken at an early stage. Guidance for site design and making development safe: New development must seek opportunities to reduce the overall level of flood risk at the site. For example, by: <ul style="list-style-type: none"> Reducing volume and rate of runoff Relocating development to zones with lower flood risk Creating space for flooding. Safe access and egress should be demonstrated. As there is a risk of surface water flooding on the site, consideration should be given to providing safe access and egress during surface water flood events. All development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post development runoff. SuDS should be designed to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. Example features include swales, attenuation features, green roofs, rainwater capture and reuse and permeable paving. 		

SHLAA / HELAA site reference	WB08039
Site name	Teville Gate, Railway Approach

	<ul style="list-style-type: none">• Assessment of runoff should include allowances for climate change effects.• Efforts should be made to limit runoff to greenfield rates and discharge rates from the site should not increase downstream flood risk.• SuDS design must follow West Sussex County Council policy, meet the Defra National Non-Statutory Technical Standards, and follow current best design practice (CIRIA C753 Manual 2015).• Green infrastructure should be considered within the mitigation measures for surface water runoff from potential development.• Further details regarding Adur and Worthing Council requirements are available on the following webpage https://www.adur-worthing.gov.uk/planning/applications/submit-fees-forms. A surface water drainage checklist is also available on this webpage. This clearly sets out the LPA's requirements for avoiding pre-commencement conditions, or to discharge conditions.
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Worthing Borough Council
Planning Policy
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West Sussex
BN11 1HS



WORTHING BOROUGH
COUNCIL