

1 Introduction

1.1 Background to the study

This version of the Adur District and Worthing Borough Councils SFRA replaces the previous document "Strategic Flood Risk Assessment of Worthing Borough Council and Adur District Council - Final - January 2008". The primary objective for updating the previous version of the SFRA was to prepare a document that was compliant with the latest guidance described in the Planning Policy Statement 25 (PPS25) Practice Guide¹.

The key issues being:

- the information on Sequential Testing was out of date;
- the flood modelling needed to be updated to reflect recent changes;
- the flood outlines needed to be updated to reflect the latest master planning proposals; and
- there was a need to clarify and provide a consistent approach to the designation of flood zone 3b (functional floodplain).

The report contains information on flood zones and an assessment of risks from all sources of flooding and contains more detailed information on the nature of flood hazards that exist in areas that do flood. In addition, the strategic responses that should be considered to address the effect of proposed development allocations are described to address conditions as they are now and as they will be in the future.

1.2 Study area

The study area comprises the whole of the district of Adur (43km²) and the Borough of Worthing (34km²), located on the south coast of England and is adjoined by the districts of Brighton and Hove, Horsham, and Arun. Around 50% of Adur and 25% of Worthing lies within the boundary of the South Downs National Park.

Adur District Council have highlighted ten potential development sites, the two largest of these are the brownfield sites 'Shoreham Harbour' and 'Shoreham Airport'. The remainder are greenfield sites, the two largest of these being 'New Monks Farm Extension' and 'Land North West of the Hasler Estate'. Worthing Borough Council highlighted 13 potential development sites. No specific site boundaries were available at the time of writing, but all the sites appear to be brownfield. The development sites and study area is outlined in Map1 (Appendix A).

Lying at the foot of the South Downs, the geology of the area is dominated by chalk, with a swath of clay, silt and sand, which stretches from West Durrington down to Lancing and then continues in a thin band along the coastline around Shoreham-by-Sea. The chalk layers of the South Downs are covered by generally shallow and well-drained topsoils, which allow rainfall to quickly seep into the chalk aquifers below. The underlying geology throughout Adur and Worthing is outlined in Map 2 (Appendix A).

There are three designated main rivers within the study area; these are shown on Map 2 (Appendix A):

- River Adur
- Teville Stream
- Ferring Rife

The section of the River Adur within the study area runs parallel to the A283 Steyning Road down to Shoreham where it flows through Shoreham Harbour to the sea. The river is tidally influenced throughout the study area, yet there is still a fluvial flood risk posed. There are defences along both banks of the River Adur through the study area. The defences on the River Adur upstream of Shoreham Harbour are predominantly earth embankments. According

¹ Planning Policy Statement 25: Development & Flood Risk Practice Guide (Communities and Local Government, March 2010)

to the Rivers Arun to Adur Flood and Erosion Management Strategy² "*the defences on the west bank are mostly maintained by the Environment Agency and provide a very low standard of protection with the possibility of regular overtopping and defence failure*". The defences of the River Adur through Shoreham Harbour include steel sheet piling, concrete walls, rock revetments and a shingle beach at Kingston Beach.

The Teville stream, designated as main river, begins south of Burry cottages and generally flows along the boundary between Adur and Worthing. At Deacon Way, east of Worthing, it enters a culvert then emerges at Willowbrook Road and runs parallel to the road until it reaches the railway. The Teville Stream then flows under the railway and continues south until it enters a culvert at the Industrial Estate, north of Dale Road. It emerges from the culvert in the north end of Valley Gardens at Brooklands Lake, before out falling to the sea. Brooklands Lake acts as a balancing pond and provides a storage area during tide-locking. Lengths of the Teville Stream are culverted, yet other than the balancing pond the Teville Stream is undefended.

The Ferring Rife, designated as main river, begins at Southern House south west of Longcroft Park. The Ferring Rife splits at Northbrook College with one branch entering a culvert and another flowing south under the A2032. It joins again at Amy bridge and from here it flows west across the Worthing-Arun border, and then south down to the sea at Ferring.

There has been a wide range of flooding events within Adur and Worthing in the past, from a range of sources including fluvial, sewer and surface water flooding. Map 3 (Appendix A) outlines known incidents of flooding in Adur and Worthing.

1.3 SFRA objectives

SFRAs should be a key part of the evidence base to help inform the allocation of development in a Local Plan area through the preparation of Local Development Documents (LDD). The primary objective of the SFRA is that it should form part of the evidence base of the Local Development Framework to inform Core Strategy allocations and ensure that they are in accordance with PPS25. In order to achieve this, the Practice Guide states that SFRAs need to provide sufficient detail on all types of flood risk to enable the Local Planning Authority (LPA) to:

- apply the Sequential and, where necessary, Exception Tests in determining land use allocations;
- fully understand flood risk from all sources within its area and also the risks to and from surrounding areas in the same catchment;
- inform the Sustainability Appraisal so that flood risk is fully taken account of when considering options and in the preparation of LPA land use policies.;
- prepare appropriate policies for the management of flood risk within LDDs;
- identify the level of detail required for site-specific flood risk assessments in particular locations;
- determine the acceptability of flood risk in relation to emergency planning capability;

To meet these objectives it will also be a requirement that those preparing information for assessment and testing of flood risk understand the assessment process and the specific characteristics of the flooding that affects the District/Borough. The SFRA should also:

- identify strategic measures required to address the effects of proposed development; and
- influence and provide evidence that assists when making decisions on windfall planning applications.

² Rivers Arun to Adur flood and erosion management strategy 2010 - 2020 (Environment Agency, April 2010)
2011s5199 Adur and Worthing Councils SFRA Update Final Report (v1 Jan 12)

1.4 Overarching legislation

1.4.1 Hierarchy

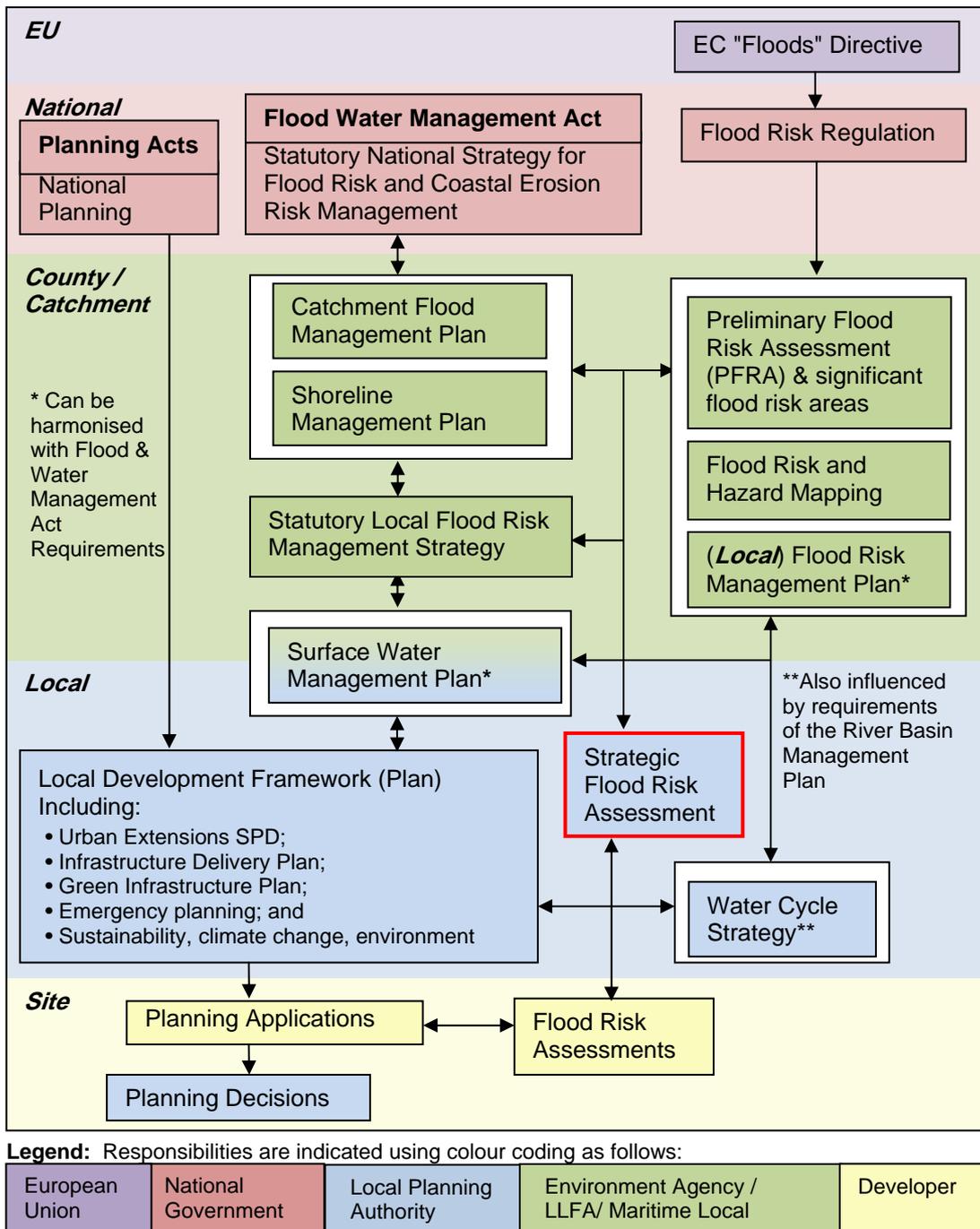
The over arching aim of planning policy on development and flood risk is to ensure that flood risk is taken into account at all stages of the planning process. Following announcements by Communities and Local Government (CLG) (on the 6th July 2010 the Secretary of State announced that all regional strategies were to be revoked)³ Regional Spatial Strategies will no longer be attributed substantial weight in the local planning process. It can be concluded that the role of Regional Flood Risk Appraisals is also reduced, since the context for their preparation will be removed. The new landscape for the assessment of flood risk is now illustrated in Figure 1.1.

Figure 1.1 shows that the Flood Risk Regulations (2009) and the Flood and Water Management Act (2010) introduce a wider requirement for the exchange of information and the preparation of strategies and management plans than existed previously. SFRAs contain information that should be referred to in responding to the Flood Risk Regulations and the formulation of local flood risk management strategies and plans. As previously stated, SFRAs are also linked to the preparation of Catchment Flood Management Plans, Shoreline Management Plans and Surface Water Management Plans and Water Cycle Strategies.

It should be recognised that there is also a requirement for decisions to be based on sustainability appraisals and the information in the SFRA should be used to inform this process at the local level.

³ This was challenged at Judicial review in November 2010 - but the outcome was not affected
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Figure 1.1: Key documents and strategic planning links - Flood Risk - (©JBA)



1.4.2 Responsibilities

The new and emerging responsibilities under the Flood and Water Management Act and the Flood Risk Regulations are summarised in Table 1.1.

Table 1.1: Roles and responsibilities

Risk Management Authority (RMA)	Strategic Level	Operational Level
Environment Agency	National Statutory Strategy Reporting and general supervision	Main rivers Sea Reservoirs For these flood sources prepare and publish: PFRA; Significant Flood Risk Areas; Flood Risk and Hazard Maps; and Flood Risk Management Plan (or exercise "Exception")
Lead Local Flood Authority	Input to national strategy Formulate and implement local flood risk management strategy	Surface Water Groundwater, and Other sources of flooding For these flood sources prepare and publish: PFRA; Significant Flood Risk Areas; Flood Risk and Hazard Maps; and Flood Risk Management Plan (or exercise "Exception")
District Councils Internal Drainage Board	Input to National and Local Statutory Strategies	Ordinary watercourse and sea (with EA approval)

The River Adur Internal Drainage District's area extends from the Old Shoreham Tollbridge northwards up to a point several kilometres upstream from the tidal limits of the East and West Branch of the River Adur, extending outside of this study area. It includes the low lying areas of the river valley and the boundary roughly follows the predicted extreme flood outline. The Internal Drainage District has Byelaws to secure the effective working of the drainage system within the District, including Byelaw 33, which controls any works in, over, under or within 5 metres of any watercourse within the District. The Environment Agency acts as the Internal Drainage Board and undertakes its permissive powers to carry out maintenance works and enforces the Boards Byelaws.

Those making use of flood risk information described in the Adur and Worthing SFRA should also make reference to and be aware of the following:

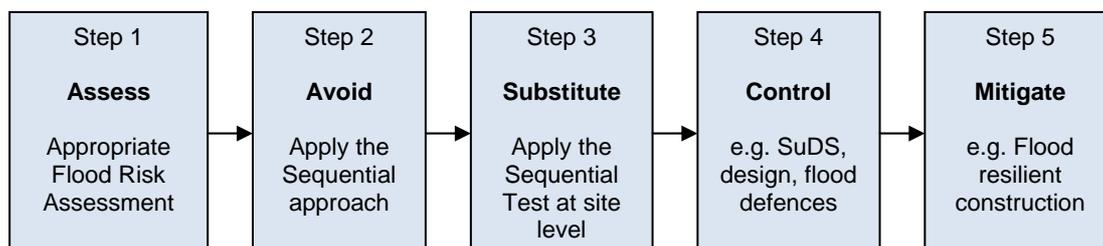
- River Adur Catchment Flood Management Plan (CFMP), published September 2009.
- Arun and Western Streams Catchment Flood Management Plan (CFMP) published December 2009.
- West Sussex Preliminary Flood Risk Assessment (PFRA), published May 2011.
- Worthing Surface Water Management Plan, 2011.

1.5 Approach

1.5.1 General assessment of flood risk

The SFRA adopts the flood risk management hierarchy advocated in the Practice Guide as summarised in Figure 1.2.

Figure 1.2: Flood risk management hierarchy



This hierarchy underpins the risk based approach and must be the basis for making all decisions involving development and flood risk. When using the hierarchy account shall be taken of:

- The nature of the flood risk (the **source** of the flooding);
- the spatial distribution of the flood risk (the **pathways** & areas affected by flooding);
- climate change impacts; and
- the degree of vulnerability of different types of development (the **receptors**).

Site allocations should reflect the application of the Sequential Test using the maps and guidance in this SFRA. The information in this SFRA should be used as evidence and where necessary reference should also be made to relevant evidence in the documents described in Section 1.4 of this chapter. The flood zone maps and flood risk information on other sources of flooding contained in this SFRA should be used to apply the Sequential Test.

Where other sustainability criteria outweigh flood risk issues, the decision making process should be transparent. Information from this SFRA should be used to justify decisions to allocate land in areas at high risk of flooding. To that end this report contains information on the level of flood hazard at the allocated sites proposed by Adur District and Worthing Borough Councils within their Local Plan and Core Strategy respectively.

The basis for all decision making in flood risk is to first understand the risk and then identify responses to that risk so that it is effectively managed. The SFRA provides detailed information that must be supplemented, where necessary, with more detailed information contained in the other relevant documents noted in this chapter.

1.5.2 Scope of assessment

This version of the SFRA contains flood risk information that satisfies the requirements of a Level 1 and Level 2 SFRA. The Practice Guide advises that:

"A Level 1 SFRA should be sufficiently detailed to allow application of the Sequential Test (annex D table D.1 of PPS25) and to identify whether development can be allocated outside high and medium flood risk areas, based on all sources of flooding, not just river and coastal, or whether application of the Exception Test is necessary. The information may also be used to assess how any environmental objectives relating to flooding, as defined in the Sustainability Appraisal, may be affected by additional development. A Level 1 SFRA may principally be a desk-based study making use of existing information." and that

"The Level 2 SFRA corresponds to the 'increased scope' SFRA referred to in paragraph E6 of PPS25. The principal purpose of a Level 2 SFRA is to facilitate application of the Sequential and Exception Tests. More detailed information is required where there is deemed to be development pressure in areas that are at medium or high flood risk and there are no other suitable alternative areas for development after applying the Sequential Test. This more detailed study should consider the detailed nature of the flood hazard, taking account of the presence of flood risk management measures such as flood defences. This will allow a sequential approach to site allocation to be adopted within a flood zone (paragraphs 17 and D4 of PPS25). It will also allow the policies and practices required to ensure that development in such areas satisfies the requirements of the Exception Test, to be identified for insertion into the LDD."