Bath & North East Somerset Council

# Strategic Flood Risk Assessment of Bath & North East Somerset Council

## EXECUTIVE SUMMARY

**FINAL**

April 2008

CAPITA SYMONDS

successful people | successful projects | successful performance

# Issue box

The Bath & North East Somerset (B&NES) Strategic Flood Risk Assessment (SFRA) is a "live" document. The current version is developed using the best information and concepts available at the time.

As new information and concepts become available the document will be updated and so it is the responsibility of the reader to be satisfied that they are using the most up-to-date information and that the SFRA accounts for this information.

All revisions to this summary document are listed in the table below

| Version | Issue Date | Issued by | Issued to | Amendments from previous version |
|---|---|---|---|---|
| Final | 31/01/2008 | Capita Symonds Ltd | Bath & North East Somerset District Council | N/A |
| Final | 23/04/2008 | Capita Symonds Ltd | Bath & North East Somerset District Council | Logo, Local plan details in technical report (section 3) |
| | | | | |

CAPITA SYMONDS

Capita Symonds House
Quays Office Park
Conference Avenue
Portishead
Bristol
BS20 7LZ
Tel: 01275 840840
Fax: 01275 840930
Project manager: Andrew Cook
Project director: Alastair Dale
www.capitasymonds.co.uk

| Document management system | |
|---|---|
| Job Number: | CS/024611 |
| PD: | AD |
| PM: | ARC |
| Report status: | Final Draft |
| Date of issue: | 23rd April 2008 |
| Main author(s): | KC / ARC |
| Checked: | AD |
| Approved: | N/A |

# Contents



## Figures

# Document register

The Bath & North East Somerset Strategic Flood Risk Assessment (SFRA) is a 'live' document. The current version is developed using the best information and concepts available at the time.

As new information and concepts become available the document will be updated and so it is the responsibility of the reader to be satisfied that they are using the most up-to-date information and that the SFRA accounts for this information.

The Bath & North East Somerset Strategic Flood Risk Assessment (SFRA) is presented in a number of documents;

Executive summary (this document)

Volume I – Technical report and flood maps

Volume II – User guide and site specific assessment

Volume III – Management guide

This document is a non technical summary of the SFRA for decision makers.

All revisions to this summary document to date are listed in Table D1.

***Table D1 Document register***

| Version | Issue Date | Issued by | Issued to | Amendments from previous version |
|---|---|---|---|---|
| Final | 31/01/2008 | Capita Symonds Ltd | Bath & North East Somerset District Council | N/A |
| Final | 23/04/2008 | Capita Symonds Ltd | Bath & North East Somerset Council | Logo, Local plan details |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

# 1. Introduction

1.1 This document is a summary of the Bath & North East Somerset Strategic Flood Risk Assessment (SFRA).

1.2 It is intended to provide flood risk information to strategic planners during the land use allocation process and also inform the wider community in matters relating to development and flood risk throughout the planning process. The information contained within this document will be used to inform the application of the sequential risk based test and precautionary principle - the underlying principles of national policy on development and flood risk (DCLG, 2006).

1.3 This volume does not provide the full technical context of the Bath & North East Somerset Council SFRA. **Volume I – Technical Report** contains the technical report which outline assumptions and processes used to prepare the flood risk information. A suite of procedures and protocols for using this technical information is presented in **Volume II – User Guide**, which also contains an annex with an assessment of flood risk at a number of potential development sites in Bath & North East Somerset.

1.4 The SFRA is a live document that is intended to be updated as new information becomes available. The data underpinning the Bath & North East Somerset Council SFRA is based on the best available information as at November 2007. As such, the outcomes and conclusions may not be valid in the event of future change. It is the responsibility of the user to ensure they are using the best available information. **Volume III – Management Guide** provides a summary of procedures and protocols for management and maintenance of the SFRA document and supporting data and models, and provides a full account of changes that have been made to date.

1.5 The SFRA creates a strategic framework for making planning decisions. It has been developed with reference to Planning Policy Statement 25 (PPS25) and additional guidance provided by the Environment Agency and Bath & North East Somerset Council.

Reference;

DCLG Department of Communities and Local Government (2006) 'Planning Policy Statement 25' (PPS25)

# 2. Purpose of the SFRA

2.1 The regional development agency and the local planning authority (Bath and North East Somerset District Council) are required to prepare a SFRA to support the production of the Local Development Framework.

2.2 The fundamental concepts that underpin the SFRA are outlined in PPS25. The guidance provided in this documents requires local authorities and those responsible for development decisions to demonstrate that they have applied a risk based, sequential approach in preparing development plans and consideration of planning through the application of a sequential test. Failure to demonstrate that such a test has been undertaken potentially leaves planning decisions and land allocations open to challenge during the planning process.

2.3 The underlying objective of the risk based sequential allocation of land is to reduce the exposure of new development to flooding and reduce the reliance on long-term maintenance of built flood defences. Within areas at risk from flooding, it is expected that development proposals will contribute to a reduction of flood risk.

2.4 SFRA are essential to enable a strategic and proactive approach to be applied to flood risk management. The assessment allows us to understand current flood risk on a wide-spatial scale and how this is likely to change in the future.

2.5 The main objectives of the Bath & North East Somerset SFRA are to provide information;

- so that an evidence based and risk based sequential approach can be adopted when making planning decisions, in line with PPS25
- that is strategic and covers a wide spatial area
- that looks at flood risk today and in the future
- that supports sustainability appraisals of local development frameworks
- that identifies what further investigations may be required in flood risk assessments for specific development proposals.

# 3. Links with other strategies and plans

3.1 There are a number of other plans and policies that influence, and are influenced, by the SFRA. Figure 3.1 shows the conceptual framework in which the SFRA was developed and how it may fit into the wider planning framework in England and Wales.

3.2 The River Avon CFMP represents the first 'tier' in the strategic flood risk management process, providing the overall framework within which more detailed assessments, such as the SFRA are undertaken. The SFRA covers a smaller area and is better able to address local issues, opportunities and constraints, although there are places where it is more appropriate for the CFMP to recommend specific flood risk management measures.

3.3 The SFRA's relationship with the land use (spatial) planning process is particularly important and operates at two levels, with a strong link to local development frameworks and a slightly weaker, but still important, link to regional spatial strategies (RSS). They provide information so that an evidence-based and risk-based sequential test may be carried out when making planning decisions.

3.4 The SFRA does not eliminate the need for more detailed flood risk assessments (FRAs) of individual proposed development sites. More detailed FRAs will still be required, as per Appendix E of PPS25. Rather the SFRA will provide additional information for these FRAs to draw upon and identify more detailed issues associated with flood hazards and flood consequences. It is intended that all current and subsequent FRAs refer to the SFRA together with any generic guidance that can be assigned to development proposals within Bath and North East Somerset.

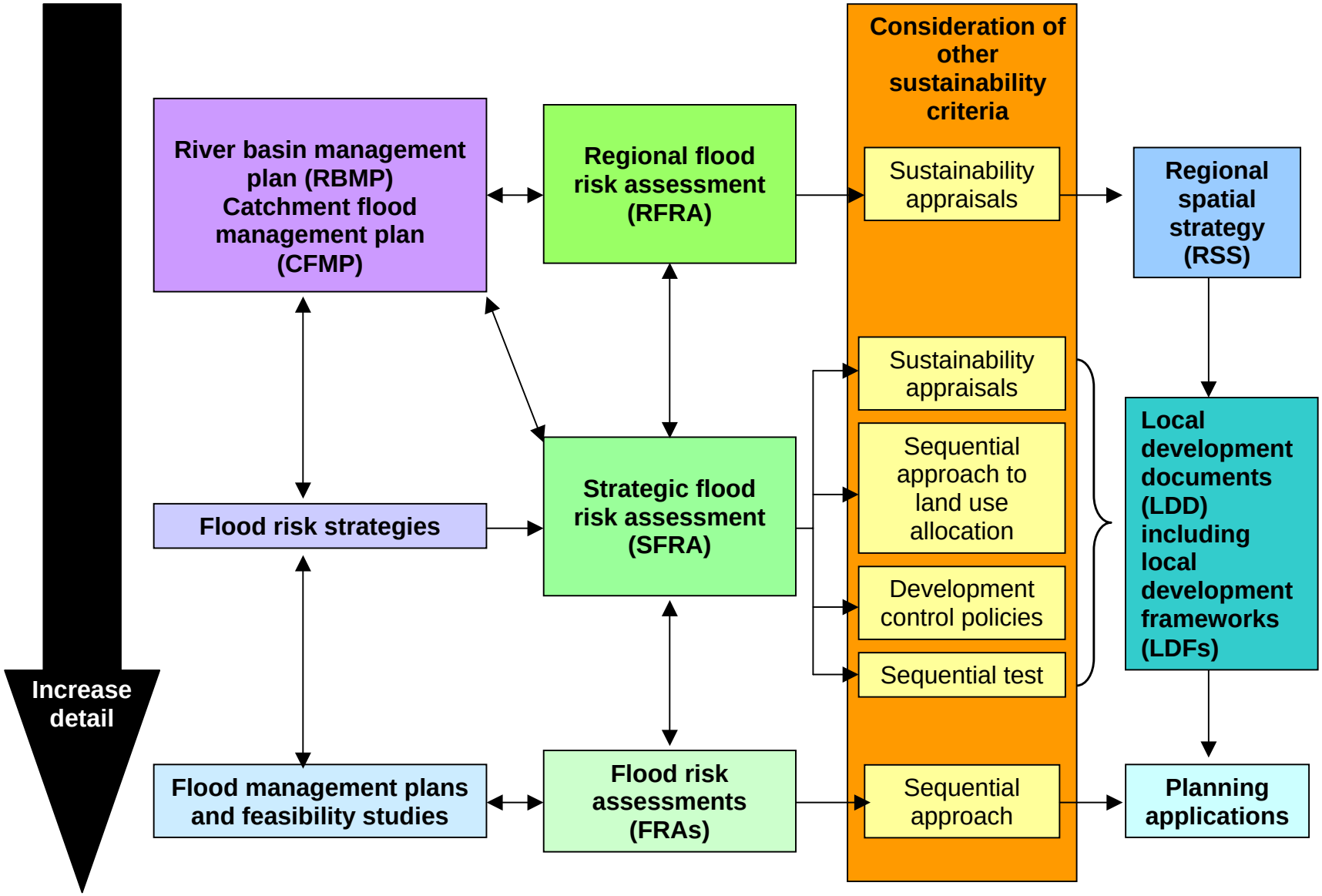


*Figure 3.1 How SFRAs fit within the wider planning context*

# 4. Strategic risk evaluation procedure

4.1 The SFRA has been developed using the Strategic Risk Evaluation Procedure (SREP). The basis for the SREP is taken from published guidance. The Environment Agency's 'Strategy for Flood Risk Management 2003 - 2008' describes flood risk as a combination of;

*(1) "**chance (or probability)** of a particular flood event and the*

*(2) **impact (or consequence)** that the event would cause if it occurred."*

4.2 The Government also wants flood risk to be investigated using the "source-pathway-receptor" concept. This means that when investigating flood risk, it is important to consider how flooding occurs and the characteristics of different types of flooding.

4.3 Considering both the definition of risk and the "source-pathway-receptor" model, it is beneficial to assess risk in terms of the components shown in Figure 4.1.

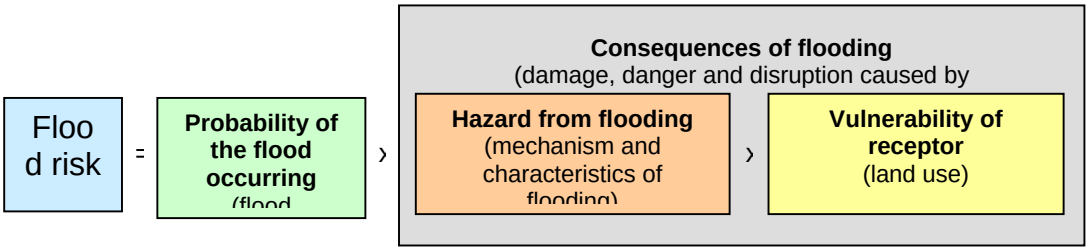


***Figure 4.1 Conceptual definition of flood risk***

4.4 The probability of flooding can be defined using data and statistical analysis. The hazard from flooding can be evaluated by considering the depth of flood water, the velocity of flow, the speed of onset of flooding and the rate of rise of floodwater. The vulnerability of flooding can assessed through analysis of the land use, property or people at risk from flooding.

4.5 There is inherent uncertainty in estimation of flood probability due to the need to simplify variability in rainfall, storm types, soil types, land cover and antecedent conditions into one design event. By separating flood risk into its three components, it is possible to gauge risk even if the exact probability of an event is uncertain. In this way a precautionary principle can be applied, as flood risk will be higher for floods with significant hazards and consequences, even when the probability of occurrence is uncertain.

4.6 The SREP uses this definition of flood risk to define flood zones, actual risk, residual risk and breach and/or failure hazards. Flood zones, actual flood risk and residual risk, are described in Table D1 of PPS25. Those using this information should be aware that there is no implied priority given to any of these specific kinds of risk. When performing the sequential test it will be important that all flood risks are considered.

4.7 This information can then be used to inform the sequential test. By including consideration of climate change the procedure is precautionary, in accordance with PPS25.

4.8 It can be seen from the risk equation that by reducing the hazard or vulnerability of flooding, it is possible to reduce the risk. It follows that, development proposals within the district should be developed and assessed using a risk-based search sequence avoiding risk where possible and managing it elsewhere.

4.9 The SFRA should be used to provide high level information for decisions on land use planning along the river. This can be done on an “as required” basis, matching the needs of phased submission of applications. The strategic approach defined in this document will require that information supporting all planning applications in the study area make reference to the SFRA and clearly demonstrate adoption of a risk-based sequential approach.

4.10 The strategic risk evaluation procedure is shown diagrammatically in Figure 4.2.

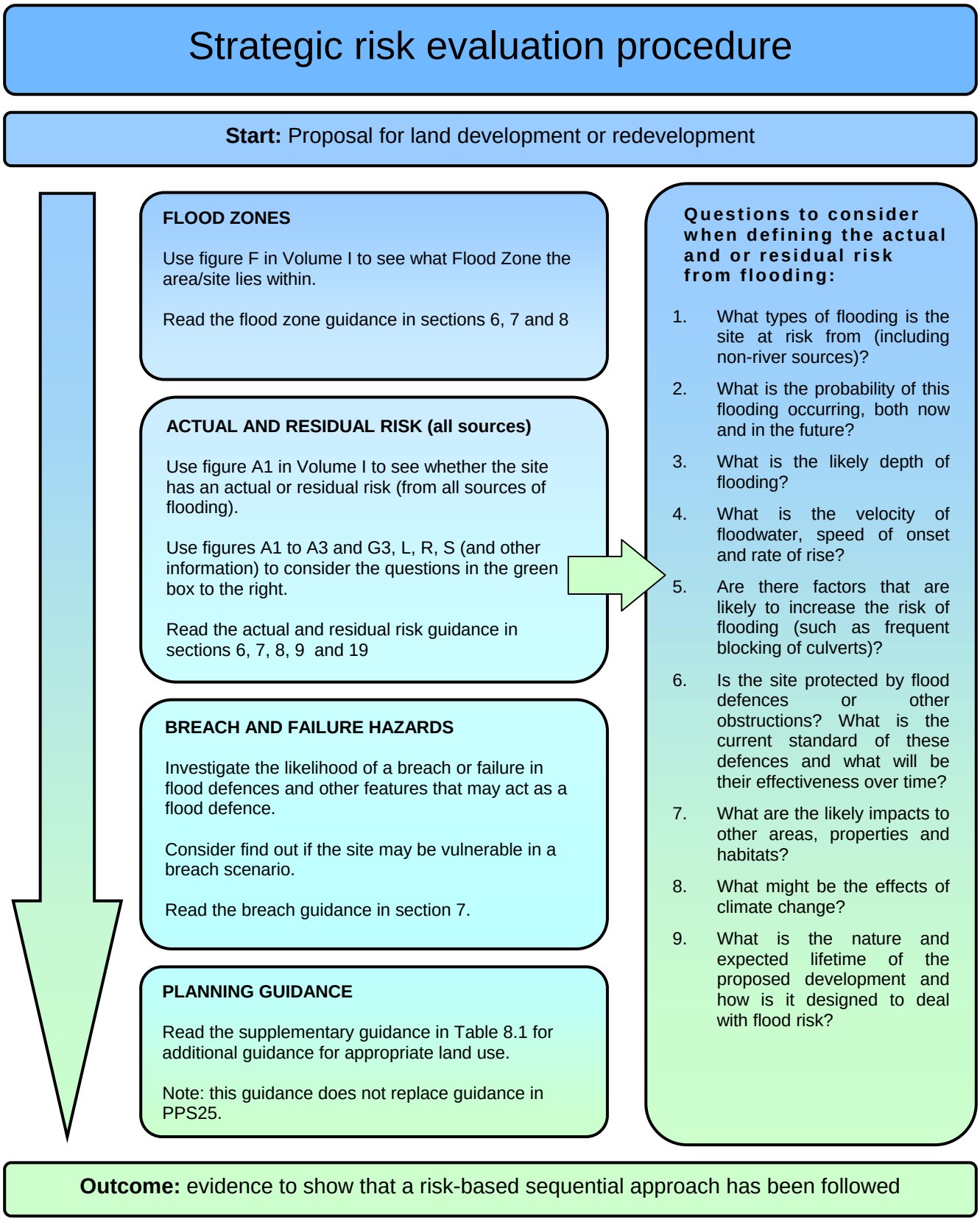


***Figure 4.2 The strategic risk evaluation procedure***

# 5. The study area

5.1 The district of Bath & North East Somerset covers approximately 350km². There are four main catchment areas of interest are the River Avon, River Chew, Cam Brook and Wellow Brook

- River Avon is a major river in South West England and is the largest river within B&NES. It rises in Wiltshire and flows through Bath and Bristol before joining the River Severn at Avonmouth. The river is known as Lower Avon when it flows through the centre of Bath. Downstream of Bath, the river forms the northern boundary of Bath & North East Somerset district. Flow on the Lower Avon through Bath is controlled by a series of weirs. Flooding is controlled by a series of embankments and walls in Bath.
- The River Chew rises from the limestone hills of the Mendips in the western side of B&NES. It flows north west through Chew Valley Reservoir, a large artificial reservoir that attenuates flow, before flowing through the Chew Valley towards its confluence with the River Avon at Keynsham.
- The Cam and Wellow Brooks are two tributaries of the River Avon that join to form the Midford Brook at Midford. Both the brooks rise from springs in the south of B&NES near Midsomer Norton. The valleys are well defined with the brooks free to meander across their floodplain. Flooding on the River Somer, a tributary of the Wellow Brook, is controlled in Midsomer Norton by a bypass tunnel.

5.2 Bath & North East Somerset is located a significant distance from the coastline (14.5km) and, as such, it is not affected by coastal flooding. The River Avon freely discharges into the Severn Estuary, so water levels on the River Avon are influenced by tide levels. The current normal tidal limit on the River Avon is a weir in Keynsham, meaning that in normal events, tide levels do not influence flooding in Bath & North East Somerset.

5.3 The underlying geology of the area largely determines the geographic characteristics and therefore flood risk within Bath & North East Somerset District.

5.4 The area surrounding Bath is underlain by limestone and clays mainly Great Oolite, Inferior Oolite, Upper Lias and Lower Lias characteristic of the Cotswolds to the east. This area is dominated by a lime rich loamy over clayey soils with a slight impeded drainage and in the higher regions a layer of freely draining, shallow lime rich soils. The semi-permeable geology and steep gradients allow for the emergence of springs, including the famous hot springs, which may cause flooding. The river valley and floodplains are underlain by Clays and Alluvium. The combination of low lying ground, soils with slightly impeded drainage and a semi-permeable underlying geology can lead to surface water flooding.

5.5 The lower lying areas in the north of the district where the River Avon and the River Chew flow into Keynsham, are underlain by mudstones and Limestone (and coal beds). In a low lying area with a mixture of both impermeable and semi-permeable geology only a reduced amount of water can penetrate into the underlying geology and therefore there is a higher risk of surface water flooding. Along the Chew Valley, before the confluence with the River Avon, the river is underlain by loamy and clayey soils that are slowly permeable but have impeded drainage. The town of Keynsham is underlain these soils which are either naturally or seasonally wet with high groundwater levels. This puts the town and its surrounding area at risk of both groundwater and surface water flooding.

5.6 The Cam and Wellow Brook catchments are areas of high ground, underlain by Mudstones with a band of hard limestone separating the two streams. The town of Midsomer Norton is situated near the source of the Wellow Brook at the top of the Cam Valley. The soils consist of acid loam-clay soils which are slowly permeable with impeded drainage in the higher to middle reaches of the two streams, changing to seasonally wet acid loamy and clayey soils which are slowly permeable and freely draining in the lower reaches. In the higher reaches of the two streams the emergence of springs indicates a possible risk of groundwater flooding within this area. The mid reaches of the two streams are at risk from surface water flooding due to the underlying impermeable geology and soils with impeded drainage.

5.7 The Chew Valley Lake is situated at the northern edge of the Mendips, is underlain by mudstone but is surrounded by the limestone hills of the Mendips. The soils of the low lying land around the lake are acid loamy and clayey soils with slightly impeded drainage. Due to the mixed geology and topography, the area is particularly at risk from surface water flooding as the water is unable to freely drain into the soil and the underlying geology.

5.8 The soils covering the limestone ridge of the Mendips in the south consist of slightly acid but base rich soils which are freely draining. In the north and west the limestone ridges are covered with freely draining shallow lime rich soils. This area has a low risk of flooding due to the topography of the land and the freely draining soils.

# 6. The approach

6.1 Part 1 of the SFRA involved a baseline assessment of flood risk for existing conditions (see figure 6.1). This assessment will provide the technical evidence upon which future planning decisions should be based.

6.2 In keeping with PPS25, there are four components in this baseline assessment;

- Flood zones - as defined in Table D1 of PPS25. It is important to recognise that the zones in PPS25 do not describe an actual level of flood risk as they 'ignore the presence of flood defences'. In most cases, this means that the flood zones show areas that are protected by existing flood defences. However in some cases, the flood defences may be designed to increase flooding in some areas so that areas protected by flood defences can obtain the necessary benefits. In these circumstances, for areas not protected by flood defences the actual risk of flooding is greater than that defined by the flood zones. For the purpose of the SFRA, the definition of flood zones has been extended to the area at risk of flooding without flood defences in place. Flood zones only show areas at risk of flooding from rivers and the sea (not sewers, foul, flooding, surface water flooding or groundwater flooding)

- Actual risk - provides information on the actual flood risk, where the impact of existing flood defences (assuming that they operate as they are supposed to) is considered. The actual risk of a river flood with 1% AEP was examined. Actual risk also included an assessment of the risk of surface water and groundwater flooding obtained via a search of historical records and qualitative assessment of catchment characteristics

- Residual risk - in recognition that engineered flood reduction measures cannot completely eliminate flood-risk, there is a need to be aware of the residual risk generated by an event more severe than that for which the defences have been designed to provide protection. Accordingly, this assessment looked at the implications of a flood event larger than the defences were designed.

- Breach and/or failure hazards - this involves the assessment of breach of tidal and river defences or other features which may act as a defence. This assessment is important where the probability of a breach is low but the consequences are high. Breach and failure hazard can be site specific and should be assessed in individual FRAs.

6.3 All four components must be considered when making planning decisions and there is no set weight given to each component. The weight placed on each component will vary between development proposals according to the vulnerability of the development to specific mechanisms of flooding.

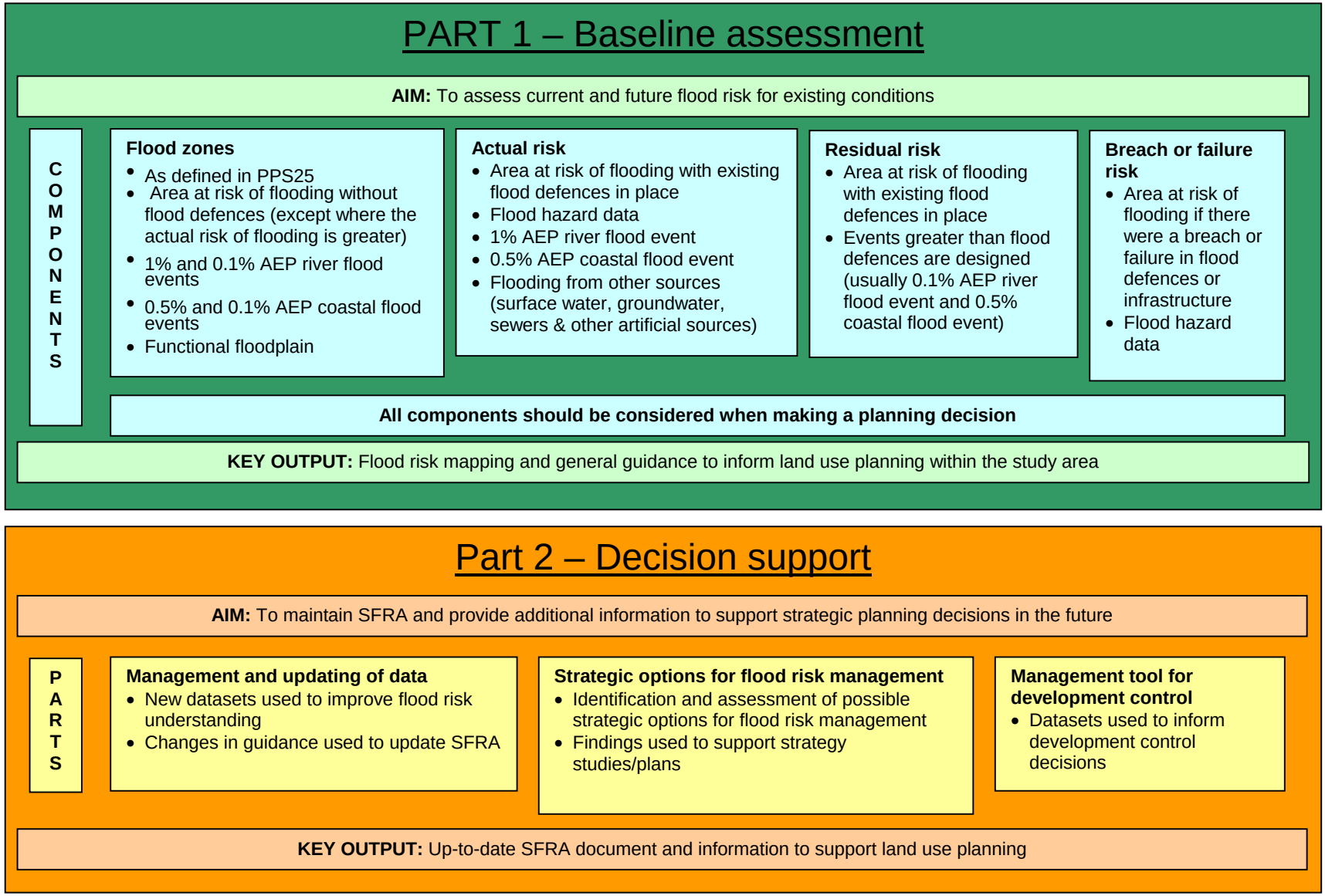


***Figure 6.1 Overview of the Bath & North East Somerset SFRA***

# 7. Results

7.1 The flood zones for the Bath & North East Somerset District are shown in Figure F and Figure 7.1. The Flood Zones only show flooding from the rivers and the sea and do not take into account the presence of flood defences. **Note**: the definition of Flood Zones in the SFRA varies slightly from PPS25 in that it shows the extent of flooding ignoring the presence of flooding defences, "except where the 'actual risk' extent is greater".

7.2 The actual risk flood risk extents (including defences) are shown in Figure A1. Actual flood risk takes into account the influence of flood defences. Figure 7.2 is an example of the flood extents from actual risk. **Note**: as with the flood zone maps, the actual risk maps only show flooding from rivers and the sea.

7.3 The Environment Agency, the planning authorities and Wessex Water retain some records of historic incidents of surface water flooding and are presented in figure H.

7.4 The sequential risk-based approach is based on the concept that land use allocation decisions consider flood risk within Bath & North East Somerset District (both Flood Zones, not including the presence of defences; and the Actual Risk, including the presence of defences). To develop an understanding of actual risk, the following questions should be considered;

- what types of flooding is the site at risk from?
- what is the probability of this flooding occurring, both now and in the future?
- what is the likely depth of flooding, both now and in the future?
- what is the velocity of flood water, speed of onset and rate of rise?
- is the site protected by flood defences or other obstructions?
- What is the standard of these defences and what will be their effectiveness over time?
- what are the likely impacts to other areas, properties and habitats?
- what might be the effects of climate change?
- what is the nature and expected lifetime of the proposed development and how is it designed to deal with flood risk?

7.5 In order to answer these questions, the SFRA hydraulic model has been used to predict the depths and rates of flow for given flood events. Using these results conclusions may be drawn on the likely impacts of flooding to other areas, properties and habitats.

7.6 Maximum flood depths and maximum flood velocities in relation to the 1%AEP flood event have been mapped in Figures A2 to A3. It is possible to gain a greater understanding of the magnitude of flooding and likely consequences through analysing this data and considering it when making planning decisions, particularly when conducting the exception test.

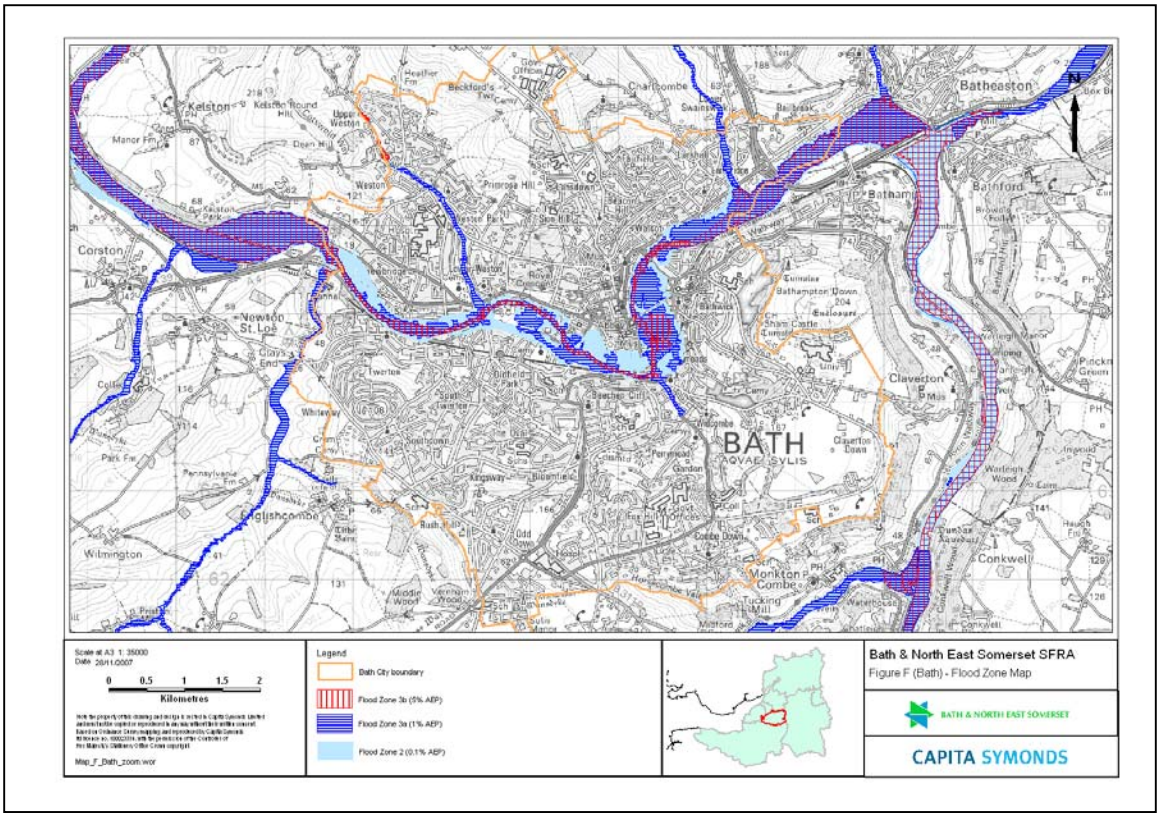


***Figure 7.1 Example of flood zones***

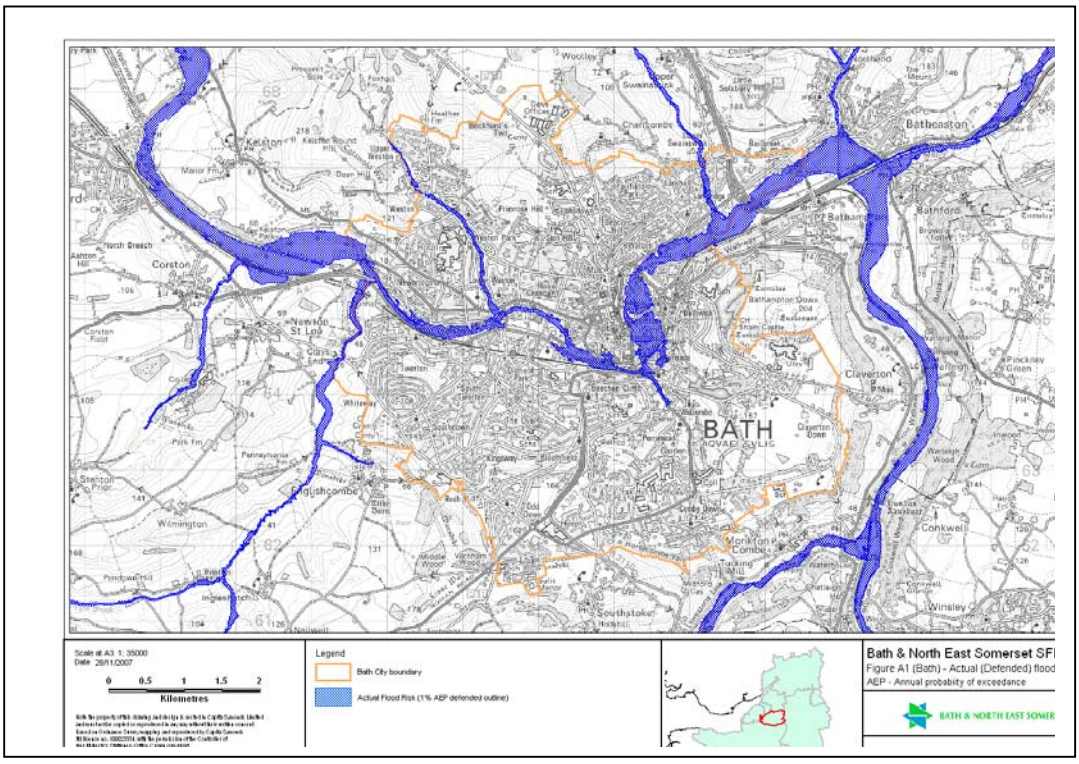


***Figure 7.2 Example of actual risk flood extents***

# 8. Using the results

## Land use planning

8.1 Table 8.1 provides guidance in relation to the four components of the SFRA to potential land uses for use during the decision making process. It must be noted that the table does not supersede advice in PPS25 or other plans and policies. It is intended as a summary table to simplify and consolidate guidance relating to flood risk and planning decision making.

8.2 It is intended that future FRAs will refer to the SFRA data and planning guidance.

## Strategic responses to flood risk

8.3 The outcome of the SFRA identifies that there is a requirement for strategic responses to flood risk within Bath and North East Somerset. The strategic responses require consideration of;

- selection of development solutions that complement least risk options in accordance with the flood zones, actual risk areas, residual risk areas and breach and/or failure hazards
- commitment to provision, management and maintenance of the standard of protection afforded by existing flood defences
- where necessary, identification and implementation of strategic solutions that offer a sustainable means of addressing long-term flood risk and hazard, and compliment catchment wide solutions
- where necessary the provision of low vulnerability development forms in areas of flood risk with limited consequences, subject to the provision of safe and preferably complementary strategic solutions
- an acceptance that certain relatively vulnerable developments may not be permitted in areas of high flood risk, and this land should be allocated for relatively low vulnerability development or set aside for
- use of sustainable drainage systems in new developments and redevelopments
- preparation of an emergency flood management plan or updating of existing plans for incorporation in local emergency plans and/or major incident plans.

## Emergency planning

8.4 Outcomes of the SFRA data should be addressed in an emergency flood management plan, which may then be incorporated into a local emergency plan or major incident plan as judged appropriate. It is expected that other professional partners including local authorities, fire service, police and health authority will contribute to the plan.

8.5 It is likely the aims of the emergency flood management plan will be to;

- identify the responsibilities of partners and others in the management of flood risk
- identify the flood warning decision making and delivery process
- identify the actions required during instigation of the plan
- identify recovery actions following a flood event
- identify the most

## Planning Guidance

8.6 The SFRA provides flood risk information to inform a range of activities, including land use planning, emergency planning, development control and the development of specific flood risk management policy.

8.7 A suggested generic decision support table is provided in Table 8.1. The precise contents of this table will be based in guidance provided in PPS25 and should be agreed by both the Bath & North East Somerset Council and Environment Agency. It must be noted that the table will not supersede advice in PPS25 or other plans and policies. It will be intended as a summary table to simplify and consolidate guidance relating to flood risk and planning decision making.

## Delivery of the SFRA

8.8 The SFRA will be delivered in the following documents;

Volume I – Technical Guide (including supporting maps)

Volume II – User Guide (including site specific assessment as an annex)

Volume III – Management Guide

8.9 These documents are "live" and must be updated when new flooding information and/or Government guidance become available. The following are recommended for future commissions to ensure the SFRA remains "live" and the information is fully utilised.

Figure 8.1 SFRA planning guidance summary table (to be used in conjunction with Table D1 and D2 of PPS25, classification of flood risk and vulnerability respectively.

| | | Essential infrastructure | Water compatible development | Highly vulnerable | More vulnerable | Less vulnerable |
|---|---|---|---|---|---|---|
| Map F | Flood Zone 1 | Development is appropriate, No constraints on development, other than managing surface water runoff (check Maps A1, R, L,S &G). | | | | |
| | Flood Zone 2 | Development is appropriate. Opportunities should be sought to reduce overall risk by layout and form or development and management of surface water runoff. Must remain operational during extreme flood event. | Development is appropriate. May be suitable with flood resistant construction and suitable evacuation procedures | Development should be avoided. Exception Test is required. | Development is appropriate. Opportunities should be sought to reduce overall risk by layout and form or development and management of surface water runoff. | Development is appropriate. Opportunities should be sought to reduce overall risk by layout and form or development and management of surface water runoff. Risk assessment required to establish level of flood hazard during 1 in 100 year return period flood event. Also detailed risk assessment to identify level of hazard during breach/blockage failure event, |
| | Flood Zone 3a | Development should be avoided. Exception Test is required. Must remain operational during an extreme flooding event. . Consideration of built form, emergency planning and evacuation. Must remain operational during an extreme flooding event. (extreme flood event analyses should consider operation during breach/blockage failures and 1 in 1000 year return period residual risk event) | Development is appropriate. Could be suitable subject to flood resistant construction and suitable warning/evacuation procedures | Development should not be permitted. | Development should be avoided. An Exception test is required. | |
| | Flood Zone 3b | | | | Development should not be permitted. | Development should not be permitted. |
| Map A1 | Actual Risk (ie. Including defences in 3a) | | | | Development should be avoided. Development could be suitable with strategic solution or careful design of built form. Subject to an Exception Test, and a detailed study of flood hazard being undertaken in relation to possible failure of flood defences. Flood warning measures required | Development should be avoided. Could be to be suitable with strategic solution or careful design of built form. Subject to an Exception test, and a detailed study of flood hazard being undertaken in relation to possible failure of flood defences. |
| Map R | Reservoirs, canals and other artificial sources | Generally should be avoided. Consideration of built form, emergency planning and evacuation. Must remain operational during an extreme flooding event. | Generally suitable as long as development does not impede floodplain flows or cause a loss of floodplain storage, use of site is expected to be restricted during times of flood risk. | Generally should be avoided unless minor extension to already established use with suitable flood warning and evacuation procedures, if practical, for the lifetime of the development. Not suitable in areas where flood warning and evacuation procedures are not practical due to speed of inundation. | | Could be suitable with strategic solution or careful design of built form. Detailed risk assessment to identify level of hazard during breach/blockage failure events |
| | Coastal flooding | Coastal flooding is not expected to affect B&NES. This must be reconsidered if further government guidance on climate change is published at a later date. | | | | |
| Map L<br>Map G | Surface water flooding<br>Groundwater flooding | Consider potential effect of extreme events, particularly in relation to location identified as 'high risk'. Should assess requirement for strategic solutions or careful design of built form. | Generally suitable with flood resistant design. | Consider potential effect of extreme events, particularly in relation to locations identified as being at 'high risk'. Assessments should consider strategic solutions or careful design of individual built form on an case by case basis in relation to a detailed assessment of risk. | Consider potential effect of extreme events, particularly in relation to locations identified as being at 'high risk'. Assessments should consider strategic solutions or careful design of individual built form on an case by case basis in relation to a detailed assessment of risk. | Consider potential effect of extreme events, particularly in relation to locations identified as being at 'high risk'. Assessments should consider strategic solutions or careful design of individual built form on an case by case basis in relation to a further assessment of risk. |
| Map S | Sewer flooding | Consultation with Wessex Water or Bristol Water should be sought to confirm localised risk of flooding and any ongoing mitigation. | | Consultation with Wessex Water or Bristol Water should be sought to confirm localised risk of flooding and any ongoing mitigation. | Consultation with Wessex Water or Bristol Water should be sought to confirm localised risk of flooding and any ongoing mitigation.. | Consultation with Wessex Water or Bristol Water should be sought to confirm localised risk of flooding and any ongoing mitigation. |

Notes:

i. This Matrix is designed to provide planning guidance to B&NES Local Planning Authority in accordance with the Strategic Flood Risk Assessment, and it does not in any way supersede or replace PPS25 or Table D.2.

ii. The Sequential Test should be applied before considering the application of the Exception test or determining whether a particular location is appropriate for the development vulnerability defined.

iii. For potential solutions affected by flood risk full consideration shall be given to the management, maintenance and operation of any necessary measures (be they strategic or site specific). Failure to be able to demonstrate commitment to the long term operation, management and maintenance of such measures for the lifetime of development will deliver development that cannot be sustained.

iv. This Matrix is based on the principles of PPS25, adjusted in include latest government reaction to the flood risk to essential infrastructure following flooding of July 2007

v. Further details of the exception test can be found in PPS25, the practice guide companion to PPS25 and the Strategic Flood Risk Assessment. Any proposed development requiring an exception test, or development where the actual risk is reduced due to the presence of defences should utilities the velocity and depth data provided in the Strategic Flood Risk Assessment and allocated reduced vulnerability land uses appropriately.

vi. Where development is proposed that relies on a reduced level of flood risk due to flood defences, the FRA must include a full assessment of the impact of the failure of flood defence infrastructure (ie. Overtopping, breaching, blockage etc).

vii. Third party infrastructure may act as a Flood Defence, although it must never be assumed that this infrastructure IS a flood defence (ie. It may not be constructed of suitable materials, or not be maintained as a flood defence).

viii. Flood risk assessments should include consideration of flooding from all sources identified in the SFRA, a qualitative methodology has been used to assess risk of flooding from Surface Water, Sewer and Groundwater in order to predict relatively problematic areas. However the scale of the risk has not been assessed quantitatively, hence the scale of the response in planning or development terms must be considered on a site by site basis and always in consultation with the appropriate responsible body, namely the Environment Agency, Bristol Water, Wessex Water, British Waterways, the Highways Agency (with respect to Surface Water drainage from road network) and B&NES departments as appropriate.

# 9. The future

9.1 The anticipated number of development proposals will require that the Bath & North East Somerset SFRA be monitored and reviewed when necessary to accommodate future change. To be robust and able to withstand challenge in the planning process there is a need to ensure that the SFRA reflects conditions at the time of evaluation. Failure to maintain the SFRA will result in delays in plan making, the potential neglect of flood risk considerations and failure to capture strategic solutions.

9.2 It is strongly recommended that a management group has been established with responsibility for monitoring, managing and maintaining the SFRA. This group is led by representatives from the Bath & North East Somerset Council and Environment Agency, and includes representatives from other organisations as appropriate.

9.3 The management and update protocols for SFRA data are outlined in Volume III of the SFRA.

9.4 By following this process of information dissemination and review, the SFRA Management Group can ensure a consistent and up to date supply of strategic flood risk information to all levels of planning process, as shown diagrammatically in Figure 9.1.

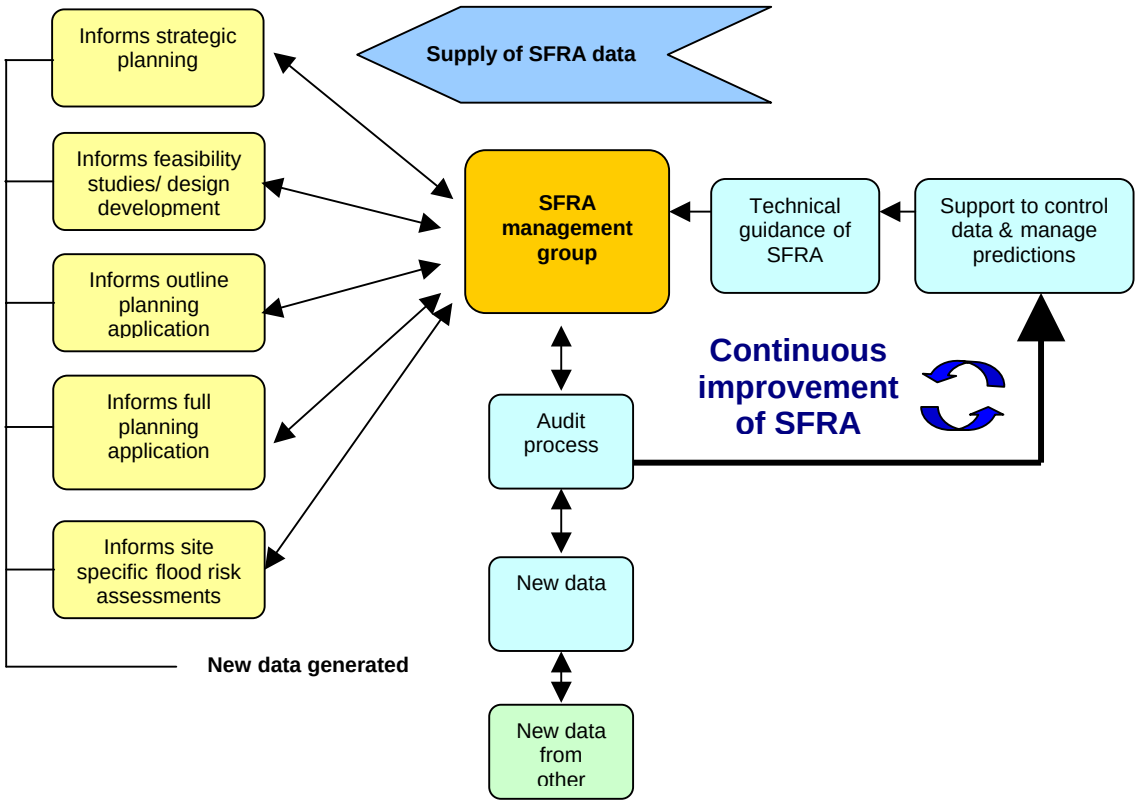


**Figure 9.1 SFRA Management Group Protocol**

# 10. Glossary and annotation

| | |
|---|---|
| **Actual risk** | The risk that has been estimated based on a qualitative assessment of the performance capability of the existing flood defences |
| **AEP** | Annual probability of exceedence. The annual chance of experiencing a flood with the corresponding flood magnitude, i.e. a 1% AEP flood is a flood with a flow magnitude that has a 1% chance of occurring in each and every year |
| **Breach or failure hazard** | Hazards attributed to flooding caused by a breach or failure of flood defences or other infrastructure which is acting as a flood defence. |
| **CFMP** | Catchment flood management plan |
| **DCLG** | Department for Communities and Local Government. |
| **EA** | Environment Agency |
| **Flood defence** | Natural or man-made infrastructure used to prevent flooding |
| **Flood risk** | *Flood risk is a combination of two components: the chance (or probability) of a particular flood event and the impact (or consequence) that the event would cause if it occurred* (EA 2003). |
| **FRA** | Flood risk assessment |
| **Flood risk management** | *Flood risk management can reduce the probability of occurrence through the management of land, river systems and flood defences, and reduce the impact through influencing development in flood risk areas, flood warning and emergency response* (EA 2003). |
| **Flood zones** | This refers to the Flood Zones in accordance with Table 1 of PPG25. For the purpose of the SFRA, the definition of flood zones varies slightly from PPG25 in that it shows the extent of flooding ignoring the presence of flooding defences, "except where the 'actual risk' extent is greater" |
| **LDF** | Local development framework |
| **m/s** | metres per second (measure of velocity) |
| **ODPM** | Office of the Deputy Prime Minister (ODPM). Former government body responsible for PPG25 and PPS25. DCLG is now the responsible Government body. |
| **PPG25** | Policy Planning Guidance Note 25: Development and Flood Risk - Guidance explaining how flood risk should be considered at all stages of the planning and development process in order to reduce future damage to property and loss of life. |

| | |
|---|---|
| **PPS25** | Planning Policy Statement Note 25: Development and Flood Risk. Currently at consultation draft status (Adopted December 2006). |
| **Precautionary principle** | *''Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation*''. The precautionary principle was stated in the Rio Declaration in 1992. Its application in dealing with the hazard of flooding acknowledges the uncertainty inherent in flood estimation. |
| **RBMP** | River basin management plan. |
| **Residual risk** | Flood risks resulting from an event more severe than for which particular flood defences have been designed to provide protection. |
| **RFRA** | Regional flood risk assessment |
| **RSS** | Regional spatial strategy |
| **Sequential risk-based assessment** | Priority in allocating or permitting sites for development, in descending order to the flood zones set out in Table 1 of PPG25, including the sub divisions in Zone 3. Those responsible for land development plans or deciding applications for development would be expected to demonstrate that there are no reasonable options available in a lower-risk category (PPG25 paragraph 30). |
| **SFRA** | Strategic flood risk assessment |
| **SFRM** | Strategic Flood Risk Management. Current Environment Agency framework for commissioning flood mapping products (2003 - 2008). |
| **SREP** | Strategic risk evaluation procedure |
| **S105** | National Section 105 Framework Agreement (NATCON 257) (1998 to 2003). Previous Environment Agency framework for commissioning flood mapping products under Section 105 of the Water Resources Act (1991). |
| **TUFLOW** | A two-dimensional fully hydrodynamic modelling package developed by WBM Oceanics Australia. The TUFLOW model differs from the ISIS model in that it models the whole floodplain as 2D domains, providing a more complete description of flood behaviour where complex overland flows and backwater filling occur. |
| **1D** | 1 Dimensional |
| **2D** | 2 Dimensional |
| **1 in 100 year return period flood event** | A flood with an average return period of 100 years. This term is not used in the SFRA as it can be misleading, in that it is possible that this size flood will not occur once in a 100 year period and likewise it is possible that it will occur more than once.<br>The flood is also known as 1 per cent annual probability of exceedence (1% AEP) flood and this term is used throughout the SFRA reports. |

## Glossary and annotation