

Methodology on how to use flood risk data as part of a Sequential Test

Final

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This report describes work commissioned by the South Downs National Park Authority by an instruction dated 31st August 2023. The Client's representative for the contract was Katharine Stuart of South Downs National Park Authority. Hannah Booth of JBA Consulting carried out this work.

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Abbreviations

AEP	Annual Exceedance Probability
BGS	British Geological Survey
BRAVA	Baseline Risk and Vulnerability Assessment
DWMP	Drainage and Wastewater Management Plan
EA	Environment Agency
JBA	Jeremy Benn Associates
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NPPF	National Planning Policy Framework
ROFSW	Risk of Flooding From Surface Water
PPG	Planning Policy Guidance
SFRA	Strategic Flood Risk Assessment

1 Introduction

1.1 Background

JBA Consulting have been commissioned the South Downs National Park Authority to prepare a Level 1 SFRAs. As part of the reporting, it was agreed that a sequential test methodology would be outlined for reference and sharing with the Lead Local Flood Authority (LLFA) and Local Planning Authority (LPA) and the Environment Agency.

The need to outline the approach to using data as part of the Sequential Test arises from changes to the National Planning Policy Framework (NPPF) in July 2021 and revisions to the accompanying Planning Practice Guidance (PPG) in August 2022.

The scope and extent of changes to the PPG in August 2022 require that additional analysis and mapping is prepared so the content of the SFRA addresses the new matters introduced in the updated guidance and provides the evidence to support that preparation of the Sequential Test.

This document addresses the use of flood risk information in the performance of the Sequential Test with the aim of confirming that the LLFAs and Environment Agency are in agreement with the proposed flood risk approach but does not include the consideration of wider planning issues, as set out in the Sustainability Appraisal.

1.2 Summary of changes

Paragraph 168 of the NPPF has been changed such that the recommended approach to the Sequential Test must now *“steer new development to areas with the lowest risk of flooding from any source. 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 (as described in Para 167) should be used in areas known to be at risk now or in the future from any form of flooding.”*

Prior to the changes to the NPPF the recommendation was set out as follows and only required consideration of river and sea flood risk when applying the Sequential Test:

Previous Policy Wording	New Policy Wording (July 2021)
<p>The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding (the Planning Practice Guidance advised that the exercise should be performed using the flood zones, as describe river and sea flood risk assuming there are no flood risk management measures or defences in place)</p>	<p>The aim of the Sequential Test is to steer new development to areas with the lowest risk of flooding from any source. (The Planning Practice Guidance has not yet been updated to describe how this exercise should be performed)</p>

The August 2022 PPG application of the Sequential Test diagram (Figure 1-1) shows that flood risk should preferably be considered in terms of low, medium and high-risk areas, both now and in the future. To address this requirement, it is necessary to explicitly consider the effects of climate change when performing the Sequential Test. It is important to recognise that the new guidance advises that the Sequential Test can no longer be performed by simply using the present-day Flood Zones describing river and sea risk.

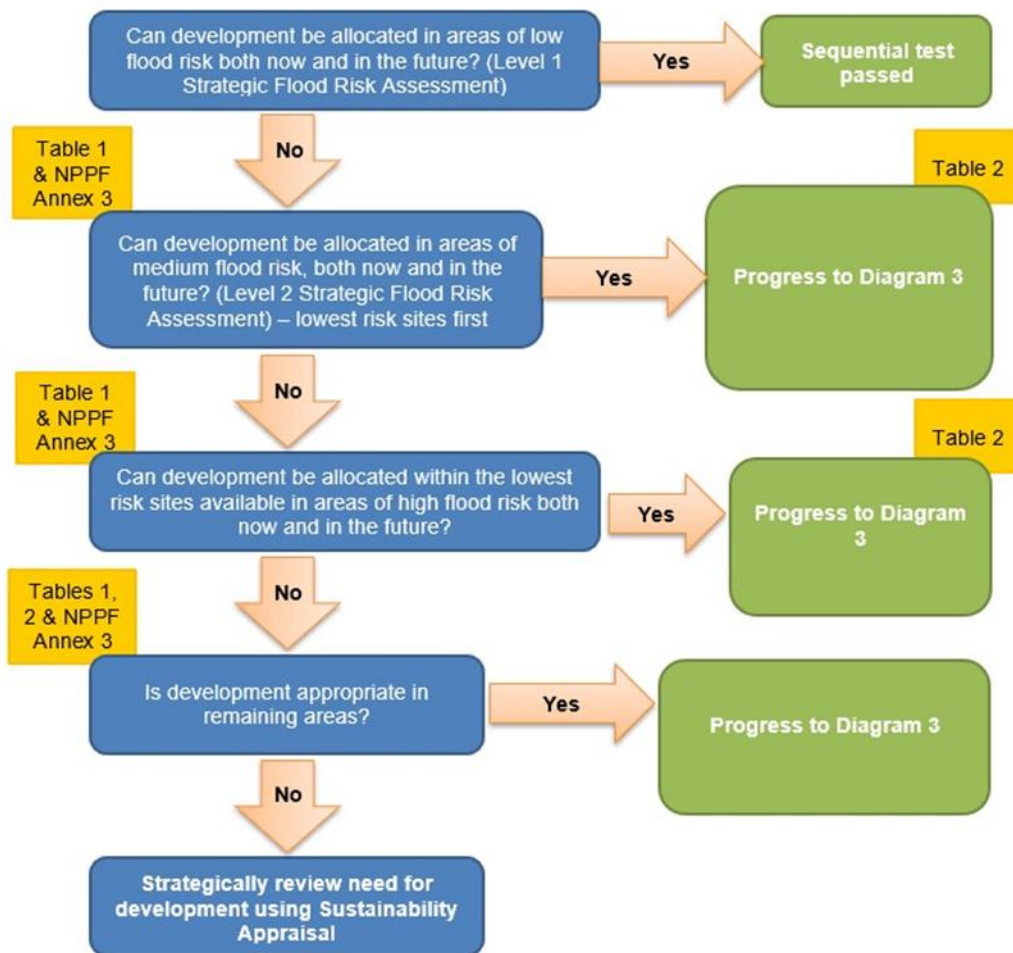


Figure 1-1 Diagram 2 in PPG

In addition, the August 2022 version of the PPG now also notes that where Neighbourhood Plans are considering proposing development they should address how this would be consistent with the local planning authority’s application of the Sequential Test and if necessary, the Exception Test for the plan. If not, these tests will need to be re-visited on a local authority-wide basis.

1.3 What happens next

Formal confirmation is sought from the LLFA and Environment Agency to confirm that the proposed approach outlined in this document to address surface water flood risk and the Sequential Test will be supported in principle at examination.

The content of the SFRA will be prepared on the basis of the agreed approach.

If a Level 2 SFRA is required, it will involve more detailed consideration of surface water drainage, reservoir flooding and groundwater than was the case prior to the NPPF and PPG updates. The implications of this have not been assessed in this document.

In some circumstances the proposed approach will require more detailed consideration of surface water drainage requirements in the Level 2 SFRA. At this stage it might be necessary and appropriate to engage more closely with Southern and Thames Water (responsible for sewerage) in circumstances where there is long term reliance on the performance of existing drainage systems affected by lack of capacity as a consequence of climate change effects (increased rainfall intensities and depths).

2 Summary of implications of NPPF Policy changes

The Sequential Test, based on the sequential approach, was originally conceived to direct proposed new development to locations that did not rely on Flood Risk Management features, so they are inherently safe and don't place a burden on future generations. The test was previously performed using a set of "Zone" maps that showed the extent of river flooding for circumstances where no defences were present for events with high, medium and low probability. This provided a logical conceptual basis for the placement of proposed new development that would not require investment in flood risk management (and so not place a burden on future generations).

The test process recognised that in some circumstances it would not be possible to locate development in locations outside of medium and high risk Flood Zones, as there are no reasonable alternatives. An obvious circumstance being proposed town centre development in locations of high flood risk, as it is not possible to redevelop town centre sites unless they remain in the town centre. In circumstances where the Sequential Test has been performed and it is not possible for development to be located in areas with a lower risk of flooding the policy requires that the Exception Test is performed. The Exception Test is a two-part process that requires preparation of evidence to demonstrate that development proposals at risk of flooding deliver wider sustainability benefits and that it is evidenced it can be made safe for the intended lifespan (thus it is a requirement to demonstrate that proposed development will be safe under climate change conditions).

The updated NPPF (July 2021) recommends that application of the Sequential Test applies to any source of flooding. The updated PPG (August 2022) further states in paragraph 23 of the Flood risk and coastal change guidance: *"Other forms of flooding need to be treated consistently with river and tidal flooding in mapping probability and assessing vulnerability, so that the sequential approach can be applied across all areas of flood risk"*. The general implications of this are summarised as follows:

- The Sequential Test should be based on mapping that enables decision making according to a prioritisation based on a risk-based sequence (for river and sea flooding national mapping is available that describes low, medium and high-risk

flood zones but comparable mapping of this specific type and quality is not available for other sources. For river and sea flooding the risk zones are based on the assumption that no flood risk management features are present).

- The other sources of flood risk that can be included in the Sequential Test are surface water, ground water, sewer flooding and reservoir flooding (or other water impounding features such as canals).
- It follows that proposed new development placed in locations at high or medium risk from flooding from other sources now and in the future (note that the explicit requirement to include climate change in the test, as set out in the August 2022 PPG will require the preparation of additional modelling and mapping) should be accompanied by evidence that the Exception Test can be satisfied (in a Level 2 SFRA).

The exception test is required if development is:

- Highly vulnerable and in an area of medium flood risk
- Essential infrastructure in areas of high flood risk or functional floodplain
- More vulnerable in flood areas of high flood risk

The exception test in the SFRA provides additional evidence to demonstrate that the principle of development can be supported at a proposed site and shows that the sustainability benefits of the development to the community outweigh the flood risk.

A basic requirement for the Sequential Test to be performed is that appropriate, competent mapping is available to enable logical comparison of the flood risk from different sources at alternative locations, both now and in the future, as this is fundamental to establishing a logical “risk sequence”.

The following summary describes the implications of including different sources of flooding both now and in the future in the Sequential Test. It also highlights matters to be considered and identifies a proposed approach.

2.1 River and sea risk - now and in the future

2.1.1 Implication

Source of Flooding	Available Mapping	Implications of making use of mapping in the Sequential Test
Rivers and Sea	Flood Map for Planning and detailed flood models.	<ul style="list-style-type: none"> The Sequential Test can be carried out using the Flood Map for Planning for present day low (Flood Zone 1), medium (Flood Zone 2) and high risk (Flood Zone 3) as previously was the case. Where detailed models are available, Future Flood Zones 2 (0.1% AEP event), 3a (1% AEP event) and 3b (now the 3.3% AEP) will be assessed with climate change allowances. The fluvial models may experience instabilities during 0.1% AEP plus climate change runs which may mean that results cannot be prepared. Generalised modelling is used to delineate Flood Zones where there is no detailed mapping.

2.1.2 Recommendations for using river and sea flood risk in the Sequential Test

- For present river flood risk, the EA's Flood Zones 1, 2 and 3a and the SFRA defined Flood Zone 3b should be used.
- For future river flood risk, the EA's Flood Zones 2, 3a and 3b with the appropriate climate change allowances for each management catchment should be used where there is detailed modelling.
- Where generalised modelling has been used to delineate Flood Zones, Flood Zone 2 should be used as a proxy for Flood Zone 3a with climate change and Flood Zone 3a should be used as a proxy for Flood Zone 3b. If a development site is located within Flood Zone 2 using generalised modelling, then an assessment of climate change for this zone can be undertaken at the Level 2 SFRA stage.
- The Environment Agency's national team have been consulted and confirmed that they recommend that future Flood Zones 2, 3a and 3b are assessed as part of the Sequential Test.

2.2 Surface water flood risk now and in the future

2.2.1 Implications

Source of Flooding	Available Mapping	Implications of making use of mapping in the Sequential Test
Surface Water	Risk of Flooding from Surface Water (RoFSW)	<ul style="list-style-type: none"> • Mapping based on a generalised modelling methodology. • Generally suitable for showing surface water flow routes at different probability flood events (3.3% AEP, 1% AEP, and 0.1% AEP), although the uncertainty associated with the predicted outlines for the respective probabilities as high. RoFSW mapping which accounts for future projected climate change has been produced for consideration within the Sequential Test. • Doesn't always include allowance for drainage features such as culverts and can over or underestimate flooding where there are linear features such as embankments. • Unlike the Zone maps for river and sea flooding the surface water mapping makes an allowance for the assumed performance of a local drainage system. • Normal profile of extent and shape of surface water flooding is a "dendritic" pattern that follows low lying topography and is not an extensive blanket, as is most often the case for river flooding. • The flood risk is normally more likely to be relatively short lived and much more localised than would be the case for river flooding (most likely being caused by local high intensity short duration rainfall events). • It is likely that in many circumstances surface water flood risk zones based on the surface water mapping could affect a relatively small proportion of a proposed allocation site, but in practical terms this might not in itself be a factor that demonstrated that the principle of development could not be supported.

2.2.2 Recommendations for using zone maps for surface water flooding

- Use the 0.1% AEP surface water flood extent mapping to define a simple zoning scheme that identifies a high risk and low risk zone:

Surface Water mapping does not strictly describe the same conceptual risk zone as is defined for river and sea flooding (even though it is notionally associated with the same probability) as the mapping is based on different assumptions. However, it does create a product that can accommodate an appropriate level of sequential testing, as it can facilitate strategic decisions that direct development to land in a “low risk surface water flood zone”

The decision has been made to use the 1 in 1000-year (0.1% AEP) surface water extent as the high-risk zone. This is a potentially a slightly more conservative approach but as the predicted 0.1% AEP surface water extents include assumptions that a proportion of the predicted flow is conveyed in pipe or channel systems the outlines could potentially underpredict the flood extents where such watercourse and drainage systems don't in fact exist. The proposed approach will direct development to areas at low risk in a similar way to the fluvial/tidal Flood Zone 1 and will not preclude development in the surface water high risk zone provided that an FRA is performed to demonstrate that the risks in the high-risk zone can be appropriately managed.

Using such mapping, it is not anticipated that the Sequential Test for surface water would normally require the consideration of alternative sites at lower risk, as the widespread and dendritic nature of surface water flood risk is conceptually very different to river and sea flood risk, but in some circumstances for relatively small sites that are potentially substantially affected it is possible that alternatives should be considered (as these could potentially not satisfy the flood risk requirements when assessed under the Exception Test).

The application of the test would logically be accompanied by a commitment to be made in the Local Plan Policy that all proposed development on sites identified for allocation would be placed in the “low risk surface water flood zone”. In circumstances where it is not possible to place all proposed development in the “low risk surface water flood zone” or circumstances arose where encroachment on land affected by surface water flood risk could not be avoided then it would be necessary to provide supplementary evidence that the Exception Test could be satisfied. For the purpose of the Plan, this supplementary exercise will be set out in the Level 2 SFRA and might simply involve more specific requirements with respect to the scope of an FRA. The proposed approach is relatively simple, enables an appropriate level of sequential selection to be made, is not totally aligned with the river and sea zones (but this is appropriate as the mapping is not based on the same parameters), but from a practical perspective is strongly aligned with the sequential approach defined in para 167 of the NPPF. For these reasons it is recommended. (See example map showing indicative zone in Appendix A).

2.3 Groundwater flood risk

2.3.1 Implications

Source of Flooding	Available Mapping	Implications of making use of mapping in the Sequential Test
Groundwater	<p>BGS Groundwater flood susceptibility maps</p> <p>Also: JBA Groundwater Map</p> <p>Historic flood event data provided by the LLFA's</p>	<ul style="list-style-type: none"> • BGS mapping describes the risk of groundwater emergence but does not show the likelihood or risk of groundwater flooding occurring, i.e. it is a hazard and consequence base product and does not enable the application of risk-based approach. • The JBA Groundwater Map provides a more detailed assessment of groundwater levels than the BGS map due to its 5m grid size. The map also provides an indication of groundwater depth below ground level, and areas of potential emergence. Five zones are defined to describe the depth of groundwater being: at or very near ground surface; between 0.025m and 0.5m below the ground surface; between 0.5m and 5m below the ground surface; at least 5m below the ground surface; and no data. • The underlying challenge with these datasets is that the data is very uncertain and could not be used with confidence unless supported by more detailed local studies. The mapping provides an indication of where risk of elevated groundwater levels might be higher, but it would not be easy to defend. • Historic flood data does not always list the source of flooding. In addition, it is often difficult to determine the source of historical flood events and groundwater and surface water flooding can often be confused. • There is no climate change mapping available for groundwater and in view of the uncertainty in the present day data it is unlikely that such mapping will be available in the near future.

2.3.3 Recommendations for using zone maps for groundwater flooding

It is recommended that the groundwater flood risk is not considered in the Sequential Test on the basis that the available groundwater mapping datasets and historical known events do not currently provide the confidence or certainty required to undertake the Sequential Test. As the available mapping does not provide competent evidence on the relative risk of flooding across the study area it could potentially result in inappropriate allocations if used without understanding the limitations of the data.

JBA Groundwater mapping should therefore be used in conjunction with other relevant sources of flooding such as historical records so that areas can be identified that are unlikely to be affected by groundwater flooding (low risk) and also areas where groundwater flooding is potentially a material consideration can be identified (high or medium risk). The combination of these datasets can then accommodate an appropriate level of sequential testing. At the Level 2 SFRA stage (or for a site-specific Flood Risk Assessment), more detailed assessment will be performed of the proposed development sites where the potential for groundwater flooding is medium or high. This will address the potential effects of climate change on groundwater flood risk to the extent permissible by the available data.

Proposed development sites where groundwater flooding is possible will require an accompanying Flood Risk Assessment and the Exception Test may need to be applied.

2.4 Sewer flood risk

2.4.1 Implications

Source of Flooding	Available Mapping	Implications of making use of mapping in the Sequential Test
Sewer flooding risk	Southern Water and Thames Water DG5 records and Drainage and Wastewater Management Plan (DWMP)	Only available at incident location level and thus mapping does not define areas of potential risk of sewer flooding. Mapping does not enable execution of risk based sequence.

2.4.2 Recommendations for using zone maps for sewer flooding

It is recommended that the sewer flood risk is not considered in the Sequential Test on the basis that the available information is not of appropriate resolution or format and so does not support spatial comparison of risk.

Water companies were required to publish Drainage Water Management Plans for river basin catchments across England as part of the Environment Act. The plans describe the basis for long term investment proposals by Water Companies that span for more than 25 years and set out the commitment needed to make wastewater systems safe and secure.

The plans contain substantive volumes of mapping, information and data that has not previously been made available by water companies. Southern Water published their DWMP in March 2023 and Thames Water published their DWMP in May 2023. As part of the DWMPs a risk based catchment screening (RBCS) has been completed, where existing, readily available data is used to identify where there is a current and/or potential risk or vulnerability in the sewer catchment to future changes, such as new residential development or changes in climate. This feeds into a baseline risk and vulnerability assessment (BRAVA) enabling comparison across locations based on different levels of risk.

The data resolution provided in Southern Water and Thames Water's DWMPs are catchment scale and applicable to the entire study area. Consequently it is not possible to take a risk based approach using this data and it is not considered to be comparable to the river and sea flooding information. If specific spatial information becomes available on sewer flood risk that provides competent data on the spatial relative risk of flooding this will be evaluated in the Level 2 SFRA and as appropriate inform the Sequential Test process.

2.5 Reservoir flood risk

2.5.1 Implications

Source of Flooding	Available Mapping	Implications of making use of mapping in the Sequential Test
Reservoir flooding risk	Reservoir Flood Mapping	<ul style="list-style-type: none"> • The mapping shows “wet day” and “dry day” reservoir inundation extents. The “wet day” being a reservoir breach at the same time as a 0.1% AEP river flood (as this is a likely time when a reservoir might fail) and the dry day shows the failure just from the water retained by the dam. • Neither set of mapping describes a risk-based scenario as it does not provide the probability of a dam failure but are intended to describe a “worst credible case”. • More detailed information on flood velocities and depths have been prepared as part of the modelling and mapping study, but this is not publicly available and can only be viewed by those with appropriate security classifications. The flood extents are publicly available. • A dataset exists which shows where the impact of reservoir flooding no longer affects the fluvial flood extent. This is known as a Wet Day Termination Extent. This dataset can be used to provide two zones:

		<ul style="list-style-type: none"> ○ Where reservoir flooding is predicted to make fluvial flooding worse. ○ Where reservoir flooding is not predicted to make fluvial flooding worse. <ul style="list-style-type: none"> • The mapping could be used to direct proposed new development away from locations that could potentially be affected by reservoir flood risk. However, it would not be conceptually similar to the risks pertaining to river and sea flooding and further assessment would be required to understand the magnitude of the potential hazard. • A consideration with respect to the reservoir maps is that placing new development in locations potentially affected by reservoir inundation could potentially change the “risk category” of the reservoir and this could result in the reservoir owner “undertaker” having to invest in substantive remedial works to demonstrate that the reservoir had the appropriate level of safety. This is not strictly related to the Sequential Test, but should be a consideration that should be appropriately managed when planning new development. • The mapping does not provide climate change information on future flood risk and provision of such mapping is unlikely based on the existing methodology
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2.5.2 Recommendations for using zone maps for reservoir flooding

It is recommended that the available reservoir flood mapping is not included in the Sequential Test as the available data is inappropriate to be used alongside risk mapping from other sources when performing the Sequential Test.

Where appropriate the potential consequences of reservoir flooding will be assessed in the Level 2 SFRA.

The RFM Wet Day Termination Extent will be used to define two zones:

- Where reservoir flooding is predicted to make fluvial flooding worse.
- Where reservoir flooding is not predicted to make fluvial flooding worse.

3 Sequential approach at a site level

In cases where the proportion of the site at risk of flooding is smaller than the proposed non-developed area of a site, a sequential approach at the site level would be appropriate and enable development to be placed in locations at low risk of flooding (by avoiding high risk areas that might exist at a particular site). This involves incorporating the less vulnerable aspects of the development (according to the flood risk vulnerability classification in Annex 3 of the NPPF) in the areas at risk of flooding. The more vulnerable aspects can be incorporated within areas at lower risk.

For sites where only a small proportion of the site is identified as being at high or medium risk of flooding it may be possible for the Sequential Test to be satisfied if all proposed development can be placed in areas of low flood risk. This can be sequentially preferable to site locations where high or medium flood risk areas cannot be avoided. It should be noted that in most circumstances the flooding from different sources is likely to affect the same “low lying” location within a proposed site, and therefore site selection should usually not be based on the number of different sources of flooding that could affect a site. Also, it is not strictly appropriate to seek to suggest that flood risks from different sources can be simply combined to derive a combined risk or ranking, as the logic and likelihood of such conclusions cannot easily be evidenced by the supporting data.

4 Conclusions

This technical note has been prepared to formalise the flood risk arrangements used by the South Downs National Park Authority in performing the Sequential Test. Updates to the August 2022 PPG recommends that the Sequential Test now assesses all sources of flooding for low to high-risk areas both now and in the future.

A review of readily available information has been undertaken to assess suitable data sources which could be considered for other sources of flood risk not previously included in the Sequential Test. A summary of the datasets to be used in the Sequential Test can be found in Appendix B.

For river and sea flood risk it is recommended that Flood Zone 2, 3 and 3b are assessed both for the present day and future.

For Surface Water, it is recommended that the Environment Agency's 1 in 1000-year Risk of Flooding from Surface Water flood extent mapping is used to define a simple zoning scheme that identifies a high risk and low risk zone. It should be noted that the Risk of Flooding from Surface Water includes an allowance for drainage (a flood risk management feature), so this is not strictly the same conceptual risk zone as defined for river and sea flooding (even though it is associated with the same probability). However, it does create a product that can accommodate sequential testing, as it facilitates strategic decisions that direct development to land in a "low risk surface water flood zone".

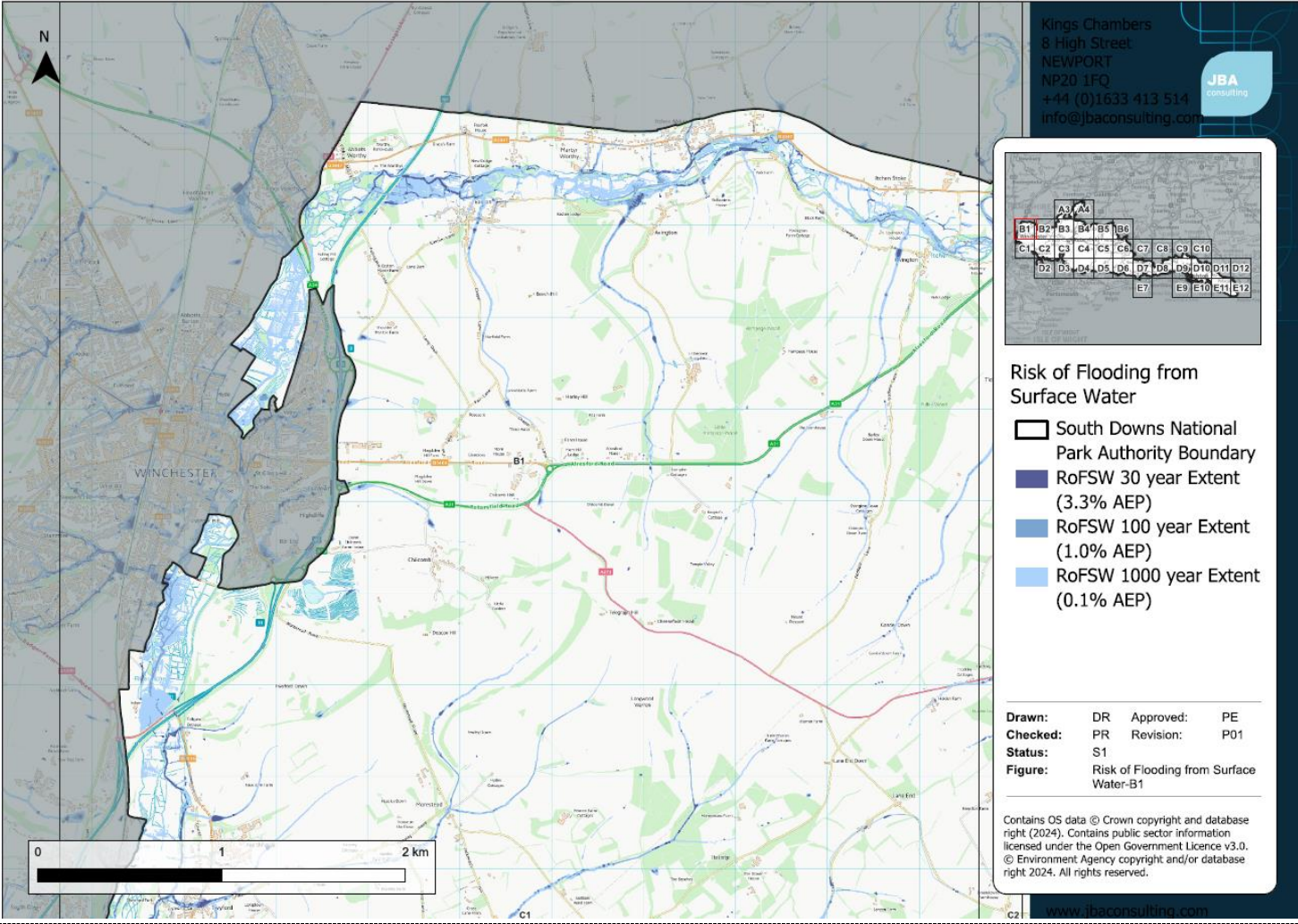
The available datasets for groundwater do not competently define areas of high or low risk of flooding and so more detailed assessment is performed in the Level 2 SFRA to inform the Sequential Test. Sewers, reservoirs and other artificial sources are residual flood risks and it may not be appropriate to consider these risks on the same basis as other sources of flooding therefore it is recommended that the sequential test should not consider these risks.

If the Local Planning Authority considers that the Sequential Test is performed and it is not possible for development to be located in areas with a lower risk of flooding then consideration must be given to the Exception Test and more detailed assessment included in the Level 2 SFRA.

Consultation will be sought from the LLFAs and the Environment Agency for their comments on the methodology and approval in principle to the approach will be obtained before the inclusion in the SFRA.

Appendices

A Example Surface Water Zone Map



B Summary of Sequential Test methodology

Source of Flooding	High risk	Medium risk	Low risk	Justification of approach	
				Risk now	Future risk
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	Environment Agency's Flood Zones 1, 2 and 3 use a risk-based approach	Use Flood Zones 1, 2 and 3a and 3b with climate change allowances where available. Use FZ2 as proxy for FZ3a and FZ3a as proxy for FZ3b where not available.
Surface Water	Greater than 1 in 1000 year		Less than 1 in 1,000 year	Different assumptions are used to derive surface water risk than is the case for fluvial and tidal flood zones. The RoFSW dataset potentially does not provide the confidence or certainty required to define areas of high, medium and low flood risk that are comparable with the risk zones for river and sea flooding. Therefore, a precautionary approach should be taken so development is located in areas of low flood risk. This approach will require that sites where proposed development is located in a high risk surface water zone are assessed in more detail in the Level 2 SFRA, unless proposed development can be places in a low risk zone on the site.	The use of the 0.1% AEP surface water Zone implicitly includes an allowance for climate change when considering high risk areas.

Source of Flooding	High risk	Medium risk	Low risk	Justification of approach	
				Risk now	Future risk
Groundwater	Screening to be undertaken to assess the potential susceptibility of all sites to groundwater emergence. Additional information required via the Level 2 SFRA or site specific Flood Risk Assessment where susceptibility is considered to be high.			Datasets potentially do not have the confidence or certainty required to provide mapping that enables a comparative assessment to be made of the risk of flooding of land from groundwater. Therefore, a precautionary approach should be taken, and all sites where groundwater flood risk identified to be high will be identified and assessed in a Level 2 SFRA or site specific Flood Risk Assessment. The implications for sequential selection of alternative locations should be considered at that stage.	(Not available)
Sewer	Screening to be undertaken to assess the potential susceptibility of all sites to sewer flooding. Additional information required via the Level 2 SFRA or site specific Flood Risk Assessment where susceptibility is considered to be high.			Datasets potentially do not have the confidence or certainty required to provide mapping that enables a comparative assessment to be made of the risk of flooding of land from sewers. Therefore, a precautionary approach should be taken, and all sites where sewer flood risk identified to be high will be identified and assessed in a Level 2 SFRA or site-specific Flood Risk Assessment. The implications for sequential selection of alternative locations should be considered at that stage.	(Not available)

Source of Flooding	High risk	Medium risk	Low risk	Justification of approach	
				Risk now	Future risk
Reservoir	Screening to be undertaken to identify sites where reservoir flooding is predicted to make fluvial flooding worse for development or where development is proposed in a high hazard zone. Additional information required via the Level 2 SFRA or site specific Flood Risk Assessment where susceptibility is considered to be high.			Datasets potentially do not have the confidence or certainty required to provide mapping that enables a comparative assessment to be made of the risk of flooding of land from reservoirs. In addition, the reservoir flood map identifies the consequence of a reservoir breach rather than risk, so applying high, medium and low 'risk' is not possible using this dataset. Therefore, a precautionary approach should be taken and sites where reservoir flooding is predicted to make fluvial flooding worse for development or where development is proposed in a high hazard zone will be identified and assessed in a Level 2 SFRA or site specific Flood Risk Assessment. The implications for sequential selection of alternative locations should be considered at that stage.	(Not available)

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