

# ADDENDUM TO LEVEL 1 SFRA



JBA Project Code	2023s1075
Contract	Uttlesford SFRA EiP support
Client	Uttlesford District Council
Date	18 October 2023 (Final - A1 C02)
Author	Fiona Barraclough
Reviewer	Joanne Chillingworth / Alastair Dale
Subject	SFRA supplementary review to support EiP

## 1 Introduction

JBA Consulting was commissioned by Uttlesford District Council to undertake a Level 1 Strategic Flood Risk Assessment (SFRA) in 2021, which updated the 2016 SFRA for the District. The study was intended for use in informing decisions on the location of future development and the preparation of sustainable policies for the long-term management of flood risk, and to also provide a comprehensive and robust evidence base to support the new Uttlesford District Council Local Plan.

As part of the Level 1 SFRA, a total of 268 potential development sites were screened for fluvial and surface water flood risk, to inform the Uttlesford District Council site selection process. Subsequent to the issue of the Final Level 1 SFRA in November 2021, Uttlesford District Council did not identify any sites proposed for allocation which were located in areas of high fluvial flood risk, and therefore a Level 2 SFRA was not commissioned.

This document provides an addendum statement on how elements of the Level 1 SFRA were conducted in 2021, in accordance with previous version of the Planning Practice Guidance (PPG), and the implications of the latest version of the PPG, released in August 2022. The document includes a review of the Proposed Allocation sites for the currently emerging draft Local Plan, undertaken between August and October 2023, ahead of the Regulation 18 consultation in November 2023. The review has been undertaken against the latest requirements of the Sequential Test, to identify where a Level 2 SFRA may be required to support application of the Exception Test, and the allocation of sites. This document also provides a review of the Anglian Water and Thames Water Drainage Water Management Plans (DWMPs), as published in June 2023 and the potential implications of these plans on the SFRA.

### 1.1 Changes in policy and guidance since SFRA publication

Following issue of the Final Level 1 SFRA in November 2021, there have been two notable changes in flood risk guidance and plans. The PPG, which provides guidance on the National Planning Policy Framework (NPPF) was issued in August 2022, and the Water Company draft DWMPs were issued in June 2023. In addition, Environment Agency (EA) climate change allowances for surface water flood risk (peak rainfall) were updated in May 2022.

The Level 1 SFRA for Uttlesford District was prepared in line with the latest version of the PPG available in 2021, which has now been updated. However, it is understood that Local Plan evidence will be Examined against policy and guidance as it now stands, which includes the August 2022 PPG. There have been a number of updates, but the most significant change is that the PPG now requires the Sequential Test to be performed for 'all' sources of flood risk (rather than just the fluvial Flood Zones) and requires climate change to be considered for high, medium and low risk areas. Therefore, this review will identify what the implications of these changes are for Level 1 SFRA and whether more detailed assessment is recommended, as would be included in a Level 2 SFRA, following the Regulation 18 consultation.

The DWMPs have been developed by Water Companies for river basin catchments, and describe the long-term investment proposals required to make wastewater systems safe and secure. They include a risk assessment (and in some instances mapping) used to prioritise locations to reduce sewer flooding to customers for a 1 in 50-year return period. As such, the DWMP risk assessment could potentially be perceived as being appropriate for consideration in the Sequential and Exception Tests. Feedback to date from Water Companies in the Thames and Anglian basins indicates that the DWMP data and mapping is not applicable at a site-specific scale, for example in application of the Sequential Test, due to the coarse resolution of the data. However, the DWMP data and mapping could be used by other parties when examining the Local Plan, and therefore the use of DWMP data should be addressed within the SFRA so that formal confirmation of this circumstance can be obtained from Thames and Anglian Water.

### 1.2 Robustness of the Level 1 SFRA (2021)

#### 1.2.1 Available Information

The Level 1 SFRA included a comprehensive and robust assessment of flood risk in Uttlesford District. This involved using the latest available data, hydraulic modelling and flood risk assessment

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methodologies at the time of preparation of the study, to inform the site selection process.

Data was requested and sourced from the following parties (external to Uttlesford District Council) to inform the SFRA:

- Essex County Council (Lead Local Flood Authority)
- Environment Agency
- Thames Water
- Anglian Water
- Essex Fire and Rescue Service
- Neighbouring authorities:
  - Braintree District
  - South Cambridgeshire District
  - North Hertfordshire District
  - East Hertfordshire District
  - Epping Forest District
  - Chelmsford District
  - Cambridge District, Harlow District and Stevenage District are also located nearby, enveloped within one or more of the neighbouring authorities above.

Appendix B of the Level 1 SFRA provides further detail on the data which was supplied and used to assess each source of flooding.

## 1.2.2 Robustness of the SFRA Methodology

The Level 1 SFRA methodology assessed all sources of flood risk across the administrative area of Uttlesford District, in line with the concurrent version of the PPG and the EA's guidance 'How to prepare a Strategic Flood Risk Assessment'<sup>1</sup> (with the latest version at the time of the study updated in September 2020). Following the preparation of the Level 1 SFRA, the Council performed the Sequential Test exercise, informed by their estimation of development potential of the sites using a range of planning policy constraints criteria, which included flood risk and water management considerations. This process informed the decision making on whether allocation and development of a site should be considered as part of the Local Plan.

A total of 268 potential development sites were provided by the Council, and were screened against fluvial and surface water flood risk data, to determine the percentage area of the site which was at risk. Although the Sequential and Exception Test guidance at the time of preparing the SFRA focused on flood risk from fluvial Flood Zones alone, historic risk and surface water flood risk was also considered in the site screening as part of the SFRA. The following datasets were assessed:

- Fluvial Flood Zones - Flood Zone 3b, Flood Zone 3a, Flood Zone 2
- Surface water flood map - 1 in 30-year, 1 in 100-year and 1 in 1,000-year rainfall events
- Historic flood map
- Sites within 100m of a watercourse (as identified by the Environment Agency Detailed River Network)
- Areas at very low risk of fluvial flooding (i.e. outside Flood Zones 2 and 3)

It should be noted that groundwater flood risk was not included in the site screening assessment, as this was not a requirement for the Sequential Test within the NPPF or PPG, and no widely adopted national dataset of groundwater flood risk existed at the time, or now exists. The JBA Groundwater map was used to show the risk of groundwater emergence to the surface for the 1 in 100 year event map the Level 1 SFRA. This dataset could potentially provide the basis for a sequential risk-based approach, as it depicts different levels of risk. However, the underlying challenge with groundwater flood risk datasets is that the data is very uncertain, does not allow a comparative assessment of risk with fluvial and surface water sources, and as it shows the risk of emergence it does not necessarily depict locations at risk from groundwater flooding (as emergence does not necessarily equate to flood risk). It is

<sup>1</sup> Environment Agency (2022) How to prepare a strategic flood risk assessment - GOV.UK ([www.gov.uk](http://www.gov.uk)). Available at: How to prepare a strategic flood risk assessment - GOV.UK ([www.gov.uk](http://www.gov.uk))

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suggested that the JBA Groundwater Map is used to screen sites for potential groundwater risk, and a more detailed assessment is undertaken within a Level 2 SFRA, where deemed required.

There were no competent datasets to enable a comparative assessment of sewer flooding, as this data can only be obtained for postcode areas and again this remains the case today. Catchment-scale sewer flood risk mapping has been produced as part of the DWMPs, but this is not publicly available at a site scale. Reservoir risk mapping was unavailable for analysis as a GIS layer at the time of the Level 1 SFRA, although the EA Reservoir Flood Maps are now available. The mapping prepared describes a "credible worst case" dam failure but does not provide information on the probability (and hence the risk) of such an event, and therefore is not considered to be appropriate for inclusion in the Sequential Test alongside fluvial and surface water mapping.

Where available, climate change data was obtained, but climate change mapping was not prepared for all sources of risk. As the change to the NPPF in July 2021 and the update to the PPG had not been published at the time of issuing the final report for the Level 1 SFRA, the assessment was not prepared strictly in accordance with current policy and guidance.

Level 1 SFRA are high-level strategic documents and do not provide a detailed assessment of flood risk on an individual, site-specific basis. The primary purpose is to provide an evidence base to inform the Local Plan and any future flood risk policies. Developers are required to undertake site-specific Flood Risk Assessments to support Planning Applications, and are able to use the information in the SFRA to scope out the sources of flood risk that will need to be explored in more detail at site level.

## 1.3 Hydraulic modelling approach

The Level 1 SFRA was comprehensive and robust with regards to hydraulic modelling and flood risk in accordance with the guidance and policy as applied at the time of preparation.

All available hydraulic models were requested and received from the EA and LLFA. Mapped model outputs were used to form the SFRA mapping (Flood Zones 3b, 3a and 2), particularly as the EA Flood Map for Planning in this region did not reflect latest model outputs. For areas outside of the detailed model coverage, this is represented by the Environment Agency's Flood Map for Planning Flood Zones 2 and 3 to provide a conservative indication.

The models used in the Level 1 SFRA include the Blackwater, Upper Roding, Upper Middle Stort, Stort Tribs, Stansted Mountfitchet, Chelmer and Cam models. Section 4.4 of the Level 1 SFRA sets out what the model data was used for (i.e. mapping the current Flood Zones and climate change), as well as if the models could not be run, or if data quality was deemed insufficient. In these instances, an appropriate proxy was used.

In agreement with the Environment Agency, it was not deemed necessary to re-run the majority of models for the latest climate change allowances at the time of the study. The exception was the Blackwater model, which was re-run for the latest climate change uplifts due to concerns over whether the existing climate change results were sufficient for the updated allowances. Climate Change is discussed further in Section 1.2.1 of this document.

Since 2021, there may have been updates to some of the models used. While these updates might have resulted in localised changes to mapped flooding, overall it would not be expected to materially change the flood risk assessed in the SFRA at the time, as the topography generally confines the extent of the floodplain within the District. Any future FRA for a particular allocated site would require the latest available modelling to be requested from the EA and so would be informed by an up-to-date assessment of flood risk.

### 1.3.1 Climate change modelling

The Level 1 SFRA was prepared under the 2021 Environment Agency climate change guidance. The guidance moved from the 2016 allowances, which were based on large river basins (River Thames, Anglian), to a smaller, management catchment scale. Uttlesford District falls into four new catchments (shown in Table 1-1), each with different Central, Higher Central and Upper End allowances.

Most of the new allowances were covered conservatively by the previously modelled +35% or +70%

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allowances (except for the Combined Essex and Roding, Beam and Ingrebourne catchments) and latest guidance suggests assessing the Central and Higher allowances within SFRA, for the majority of instances for development. Therefore, having the previously modelled Upper End allowance gives a conservative estimate of climate change compared to the new allowances.

Table 1-1: 2021 fluvial climate change allowances covering Uttlesford District

Management Catchment	2080s Central	2080s Higher	2080s Upper
Cam and Ely Ouse	9%	19%	45%
Combined Essex	25%	38%	72%
Roding, Beam and Ingrebourne	26%	36%	64%
Upper Lee	10%	22%	59%

A pragmatic approach to climate change was agreed with the EA for the Uttlesford L1 SFRA. As the centre of the authority area forms a catchment boundary for three major basins, this means the watercourses are in their headwaters where the topography is very confined, meaning generally narrow floodplains with little difference seen between FZ2 and FZ3 extents (1 in 100-year climate change extents usually sit between these events).

It was agreed with the EA via email correspondence received on 21 October 2021 that (with the exception of the Blackwater model, which was re-run for the latest climate change uplifts) no new climate change modelling would be carried out for the L1 SFRA, based on the following justifications:

- For all EA models provided (as shown in Figure 1-1), there is at least one existing climate change model output, and for one model there are the three 2080s pre-July 2021 allowances.
- The majority of updated 2021 catchment climate change allowances are lowered (the only increase is Chelmer Upper End, though the focus for FRAs is now on the Central allowance in the new guidance).
- There was a minor difference between Flood Zone 3 and Flood Zone 2 extents. Modelling climate change would show minimal difference as the extents would fall between these scenarios – all watercourses are in their headwaters with confined topography, and therefore negligible difference would be seen in the mapping. This approach was agreed in the previous L1 SFRA, and allowances have since decreased further, meaning FZ2 is a conservative indication.
- Climate change flows in the previous 2016 Level 1 SFRA were compared and were contained within the 1,000-year event (FZ2) and now the flows are lower again with latest guidance.
  - The majority have a 'climate change' flood outline for the 100 year +20% event, with the exception of the two studies of the River Cam and its tributaries (including The Slade), which both used +25%. These outlines reasonably represent the 'Central' allowance for both river basin districts. Analysis of the 1 in 1,000-year flow estimation points for these studies (most studies usually include a 1 in 1,000-year event) shows the average increase for each model is between +39% and +79% above the 1 in 100 year flows. These outlines can therefore be used as an approximation for the 'Upper end' estimate for most areas. The exception is the River Stort catchment, which is probably more representative of the 'Higher central' estimate. Following discussion with the Environment Agency it was decided to take a precautionary approach based on the assumption that the current Flood Zone 2 outline (1 in 1,000-year flood extent) represents a future Flood Zone 3a taking into account climate change."
- The focus in the latest guidance for vulnerability of developments is on the Central allowance. The previous 20% climate change covers majority of the models' Central allowances conservatively.
- The Council was not proposing to develop in areas of fluvial flood risk.

For completeness, it is recommended that the extent of Flood Zone 3b and Flood Zone 3b plus climate change is defined where existing model outputs are available, to allow application of the updated Sequential Test. However, this is not expected to affect decision making on site selection. The Level 1 SFRA currently uses the 1 in 1,000-year flood extent as a proxy for climate change, which provides a

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conservative estimate of the impact of climate change on fluvial and surface water flood risk during a 1 in 100-year event.

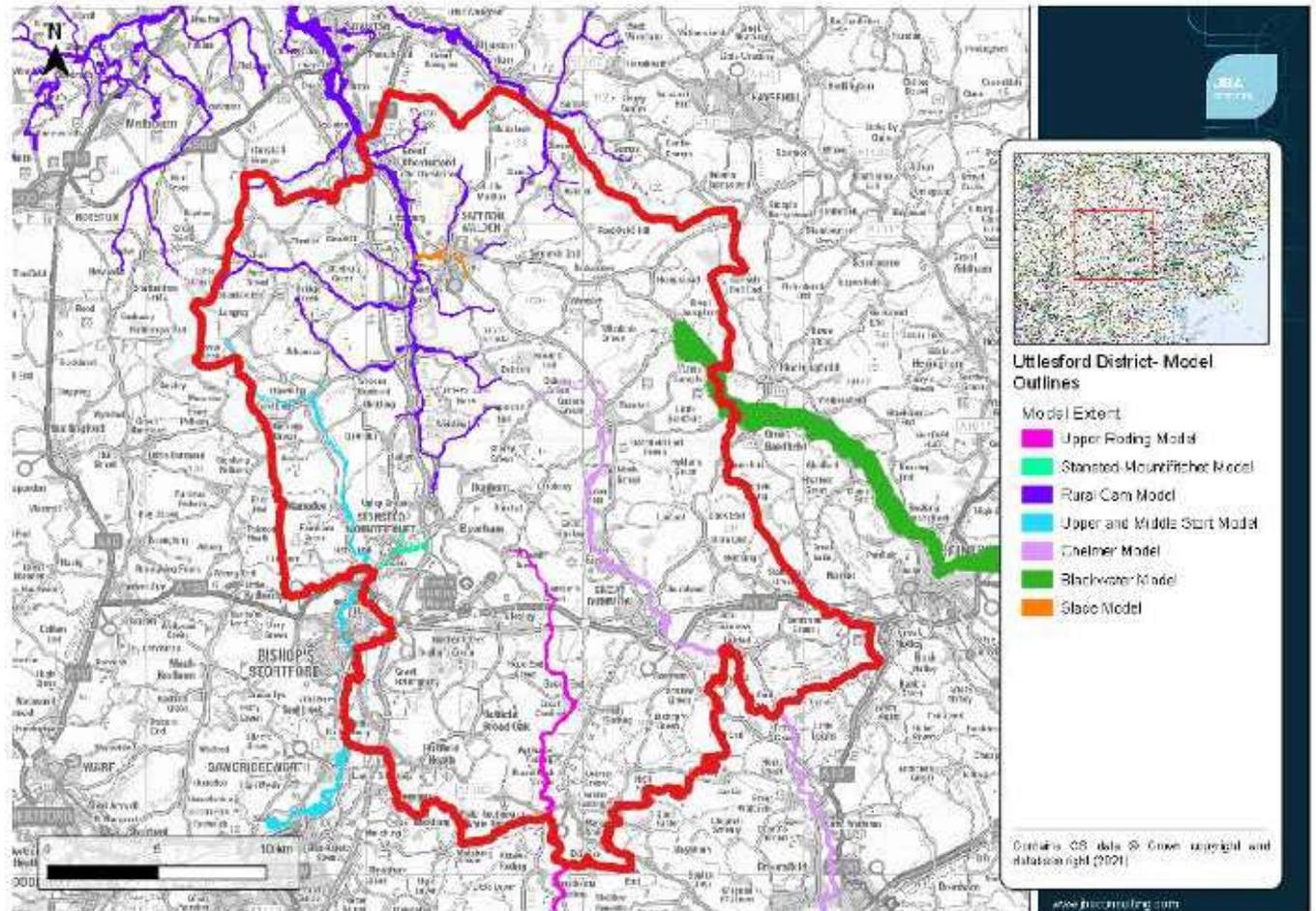


Figure 1-1: Existing hydraulic modelling coverage

## 2022 Guidance

In 2022, the equivalent rainfall climate change allowances were updated. The SFRA did not explicitly model climate change on surface water. However, the 1 in 1,000-year surface water flood extent was used to infer climate change risk on surface water, which was considered to be an appropriate proxy. It was also used to represent fluvial flood risk to smaller watercourses, which were not included within the EA Flood Zones.

More detailed hydraulic modelling in these areas would be required by developers at site-specific Flood Risk Assessment stage to confirm flood risk and climate change impacts, using the latest climate change allowances, based on the EA guidance: [Peak river flow climate change allowances by management catchment](https://www.gov.uk/government/publications/peak-river-flow-climate-change-allowances-by-management-catchment) - GOV.UK ([www.gov.uk](https://www.gov.uk)). It is recommended that the climate change section of the Level 1 SFRA is updated to reference the May 2022 peak rainfall climate change allowances.

## 1.3.2 Implications of latest PPG

With regards to the implications of the more recent changes to PPG, which had not been released at the time of the issue of the current SFRA, we would make the following observations:

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- There is no nationally available groundwater dataset available and so it is not possible to use existing best available data to include groundwater in a comparative assessment of flood risk alongside river, sea and surface water flood risk (as groundwater mapping shows the risk of emergence but not flooding). If groundwater is material to the placement of development then more detailed studies would now be included in a Level 2 SFRA. This is a more detailed analysis, based on an in-depth assessment of local data, but can only practically be performed on sites that have already been selected using the flood risk information presented within the Level 1 SFRA. Groundwater flood risk should in any case be addressed and mitigated at FRA stage.
- Flood Zone 3b has changed from the 1 in 20-year extent to the 1 in 30-year extent. The SFRA looked at a range of severity of flood risk events, so sites would have been captured conservatively for assessment due to being at risk in more severe events: Flood Zone 3a, Flood Zone 2. The main implication is most likely to affect the potential developable area rather than the principle of development at a particular site allocation. The updated Flood Zone 3b extent should be modelled and mapped as part of new FRAs in line with latest guidance but this is an exercise performed for completeness and should not normally affect decision making on site selection.
- As already noted, the guidance recommends that climate change mapping is now used in addition to present-day flood risk to inform the preparation of the Sequential Test. The SFRA used the latest climate change allowances at the time of the studies where required, in agreement with the EA, and the site screening assessment was based on all of the Flood Zone classifications. It is difficult to comment on the extent to which the introduction of climate change data affects the comparative risk at particular sites. It is probable that it would not normally affect the principle of development as the topography of the valleys will provide a relatively well defined floodplain corridor, that would not be expected to increase substantively for climate change flows. However, it should be recognised that if this is a concern then there would be a need to understand the exact circumstances applying to particular sites and whether this affected the selection of alternatives.
- The guidance now recommends that the impacts of climate change should be evaluated for all sources of flood risk. For groundwater flood risk, there is considerable uncertainty surrounding the impacts of climate change. However, there is greater certainty over the impact of climate change on surface water flood risk. The SFRA used the 1 in 1,000-year extent as a conservative proxy for the impact of climate change on surface water flood risk, as there was no modelling required at the time. The important factor is that surface water risk has been considered in the existing SFRA and the sequential site selection process.

Overall, it is observed that the SFRA technical work supporting the site selection process contained flood risk information that exceeded the minimum recommendations as existed in the guidance at the time of preparation of the assessment. The SFRA does not explicitly contain all of the flood risk mapping that is now recommended in the current guidance, but it should be noted that some of this data is not readily available today and the information that is available would not currently be appropriate for use in a comparative assessment of flood risk if the SFRA was prepared.

The SFRA does not explicitly address all of the matters raised by the changes to policy and guidance in 2022. It is anticipated that additional modelling required by the latest PPG would not be expected to have a material effect on the site allocations, although without performing a more detailed exercise on the comparison of particular alternatives this cannot be verified for all circumstances. It is probable that the decision on whether the principle of development can be supported is not changed in most cases. However, it should be recognised that other technical matters will need to be addressed at the site-specific FRA stage.

## 1.4 Site-specific Flood Risk Assessments (FRA)

The SFRA contains mapping and data that has been used to support application of the Sequential Test, based on predicted flood risk mapping, detailed modelling available at the time, and historic flood risk data.

It is observed that there are ways of controlling flood risk issues at the site level as part of masterplanning. This includes through applying the sequential approach to site layouts, and where avoiding flood risk cannot be achieved, by designing flood mitigation measures into buildings. Any future FRA will be required to assess all sources of flood risk in line with latest PPG requirements. Therefore,

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in the absence of any SFRA data, a site could still be brought forward for allocation, and the FRA would need to provide the appropriate level of detail (in line with the latest guidance) to demonstrate flood risk at the site and to provide details of any mitigation measures required to prevent any adverse impacts on flood risk, either on or off site.

There have been a series of requirements for FRAs in the August PPG. These include, but are not limited to:

- The 'design flood' is now defined as the 1 in 100-year plus climate change event, for both fluvial and surface water flood risk.
- Lifetime of non-residential development now has a 75-years starting point.
- FRAs must detail any increase in flood risk elsewhere, as part of the development.
- Guidance on compensatory flood storage – requirement for level-for-level storage.
- Clarification that stilts/ voids should not be relied upon for compensatory storage.

The Level 1 SFRA recommends, and has been used to apply, a sequential approach in locating development away from areas of flood risk. The scope of site-specific FRAs will need to reflect the content of the latest guidance and policy, regardless of the guidance under which the Level 1 SFRA was prepared. To avoid any doubt or confusion, it is recommended that the Level 1 SFRA is updated to reference the latest FRA guidance, as set out in the August 2022 PPG.

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## 2 Proposed site allocations

Following completion of the Level 1 SFRA, the Sequential Test was applied to identify preferred sites for allocation in the Local Plan. A total of 10 proposed sites for allocation in the Local Plan were provided by Uttlesford District Council in 2023, for use in this review. As part of this addendum, the sites were compared against the flood risk screening exercise produced as part of the 2021 Level 1 SFRA, to identify the relative flood risk to each of the sites.

During application of the Sequential Test, where development cannot be accommodated within sites outside areas of flood risk, and development is proposed in areas at risk of flooding now or in the future, the PPG states that a Level 2 SFRA should be undertaken, to support application of the Exception Test.

### 2.1 Review of flood risk screening at proposed sites

Table 2-1 identifies the fluvial and surface water flood risk at the 10 sites proposed for allocation within the Local Plan (shown in Figure 2-1).

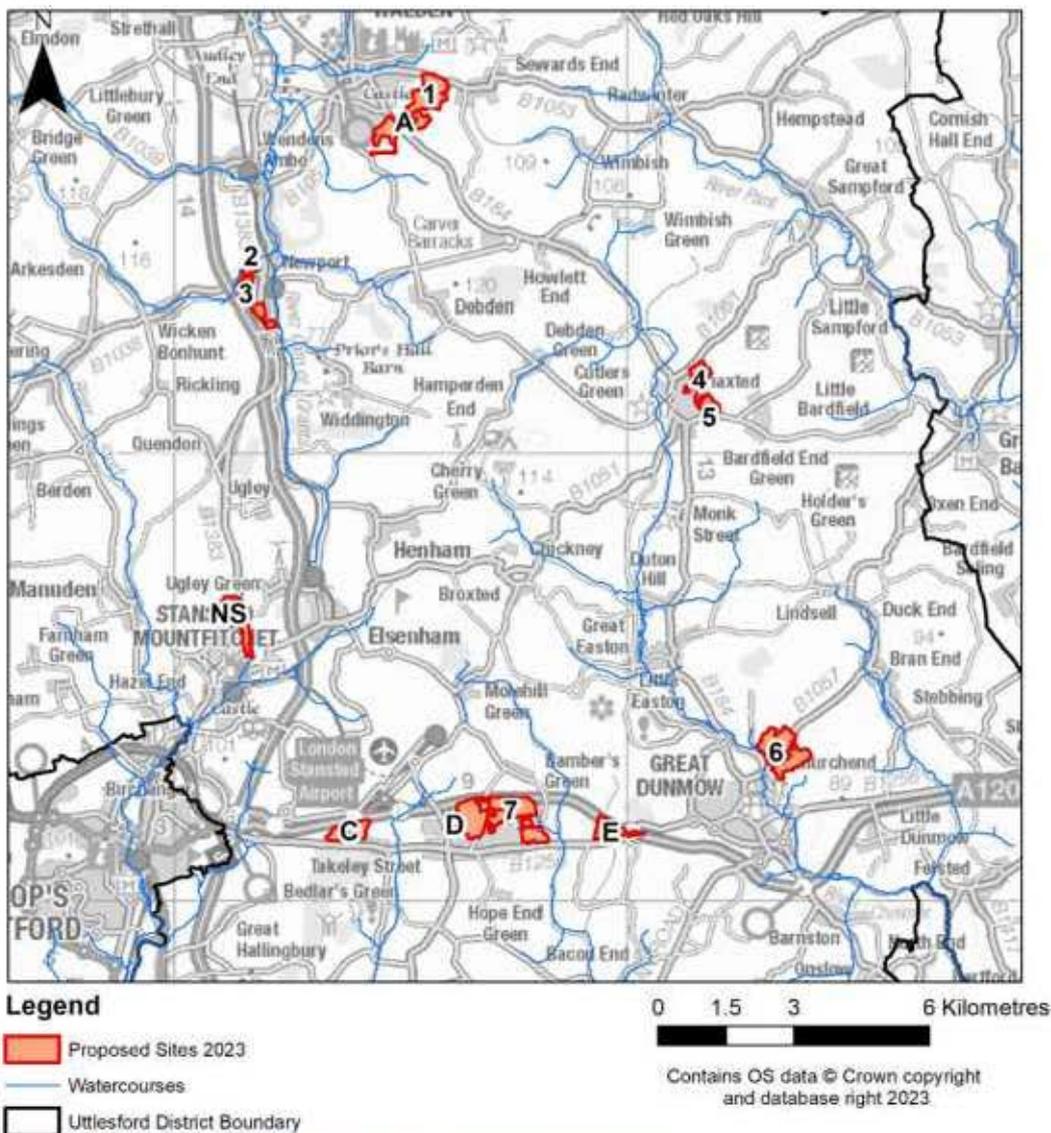


Figure 2-1: Location of the 10 proposed sites in Uttlesford District

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Table 2-1: Summary of fluvial and surface water flood risk at proposed sites

Settlement	Site Name(s)	Development type	Map reference	Fluvial risk	Surface water risk
Takeley	North Takeley	Residential	7	Very low (100% of site is located in Flood Zone 1)	High (1% of site is at risk during a 30-year event) Surface water mapping represents the flood risk associated with ordinary watercourses within the site.
Great Dunmow / Takeley	Land Between A120 and Stortford Road	Employment	E	Very low (100% of site is located in Flood Zone 1)	High (3% of site is at risk during a 30-year event) Surface water flow paths pass through the centre, north and south of the site. An ordinary watercourse passes through the centre of the site.
Newport	North West Newport	Residential	2	High (1% of site is in Flood Zone 3b)	High (1% of site is at risk during a 30-year event) Surface water risk corresponds with the extents of Flood Zone 3a and 2.
	South West Newport	Residential	3	Very low (100% of site is located in Flood Zone 1)	High (1% of site is at risk during a 30-year event) Surface water flow path present in the centre of the site.
Saffron Walden	South East Saffron Walden	Residential	1	Very low (100% of site is located in Flood Zone 1)	High (2% of site is at risk during a 30-year event) Several surface water flow paths pass through the site, corresponding with existing watercourses.
	Land Behind Knights Park	Employment	A	Very low (100% of site is located in Flood Zone 1)	High (3% of site is at risk during a 30-year event) Several surface water flow paths pass through the site,

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Settlement	Site Name(s)	Development type	Map reference	Fluvial risk	Surface water risk
					corresponding with existing watercourses.
Thaxted	Land to the North of Holst Lane	Residential	4	Very low (100% of site is located in Flood Zone 1)	High (1% of site is at risk during a 30-year event)  Several smaller surface water flow paths pass through the site, and the site is adjacent to an existing watercourse.
	Land to the North-East of Barnards Field	Residential	5	Very low (100% of site is located in Flood Zone 1)	Low (Small area of the site is at risk during a 1 in 1,000-year event)
Great Dunmow	North East Great Dunmow	Residential	6	High - very small area of site. (0.01% of site is in Flood Zone 3b)	High (1% of site is at risk during a 30-year event)  Surface water flow paths cross the site, some corresponding with existing watercourses.
North Stansted	Walpole Meadows North, Est of Pennington Lane  East of High Lane North	Residential	NS	High (6% of site is in Flood Zone 3b)	High (4% of site is at risk during a 30-year event)  Surface water flow paths cross the site, some corresponding with existing watercourses.

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Of the 10 proposed sites, nine sites have areas which are at high fluvial flood risk, and/or high surface water flood risk. As shown in Table 2-1, the percentage area of the proposed sites at high risk of fluvial or surface water risk is small (less than 10% in all cases). As a result, the majority of the developable area within the proposed sites is at very low risk of fluvial or surface water flooding. Therefore, there is potential for the risk of flooding to the site can be mitigated through applying the sequential approach to designing the site layout. This will result in the highest vulnerability development types (e.g. residential) being located in the areas of lowest flood risk on the site. However, it is recommended that the nine sites identified in Table 2-1 as either being at fluvial flood risk, or at significant surface water flood risk, are considered for assessment in further detail within a Level 2 SFRA, to assess the flood risk and hazard to each site and suitable mitigation measures, as well as the residual flood risk and safe access and egress.

The remaining site, Land to the North-East of Barnards Field, is at very low risk of flooding from fluvial sources, and at low surface water flood risk. Therefore, a Level 2 SFRA is not considered to be required for this site.

At the time of preparing the Level 1 SFRA there was not a requirement to consider non-fluvial sources of flood risk within the Sequential Test, and the SFRA site screening exercise undertaken went beyond requirements by assessing surface water flood risk. However, the July 2021 update to the NPPF required all sources of flood risk to be considered, both now and in the future. Therefore, it is recommended that the proposed sites are screened for other sources of flood risk (e.g. groundwater) as well as the impact of climate change on fluvial and surface water flood risk. If this screening exercise identifies additional sites at high flood risk from other sources, or future flood risk, it is recommended that a Level 2 SFRA is undertaken for these sites.

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## 3 Drainage and Wastewater Management Plans (DWMPs)

### 3.1 Introduction

Water companies are required to publish Drainage Water Management Plans (DWMPs) for river basin catchments across England as part of the Environment Act. Uttlesford District is served by two water companies, Anglian Water and Thames Water. Both companies have recently published their DWMPs.

The DWMPs provide a wider geographical extent of information on sewer flood risk than has previously been available. In doing this, the DWMPs include risk assessment and mapping which could potentially be used in the proposed land use planning prioritisation process and could potentially be perceived as being appropriate for consideration in the Sequential and Exception Tests.

As this is a matter that could be raised at Examination, this review is performed to understand the nature of the DWMP mapping and data that is now available and the extent to which it can appropriately be used to support the preparation of the Sequential Test. The intention is that this review is used to support consultation with Anglian Water and Thames Water, so that formal confirmation can be given to the proposed methods and approach used in the preparation of the SFRA and the Plan.

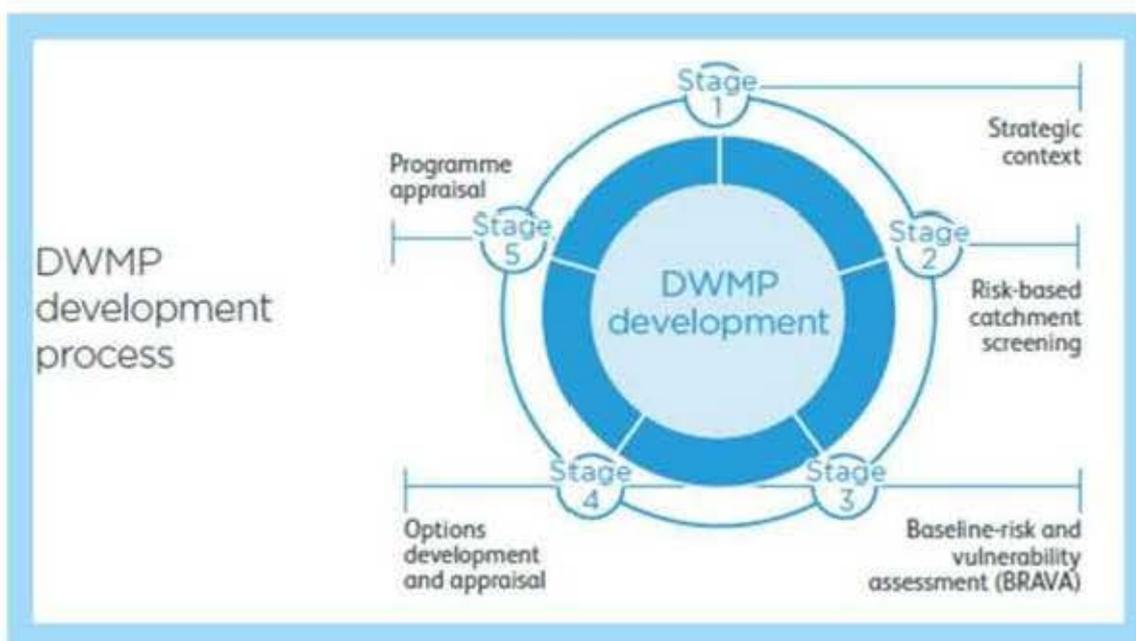


Figure 3-1: DWMP Development Process (credit: Thames Water)

### 3.2 Background

The aim of the DWMPs is to identify future catchment risks to drainage and wastewater treatment systems and develop sustainable, efficient solutions to ensure that systems remain robust and resilient to future pressures. This assessment then informs a long term strategic plan, setting out how wastewater systems (and the drainage systems that impact them) will be maintained, improved and extended over the next 25 years.

The risks and pressures for drainage and wastewater identified by Thames Water include:

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- Population growth
- Climate change
- Protecting and enhancing the environment
- Loss of green spaces resulting in more surface water runoff
- Keeping customer bills affordable

## 3.3 DWMP planning objectives

### 3.3.1 Anglian Water

The Anglian Water DWMP objectives are as follows:

1. Adaptive plan to meet the challenges faced over the next 25 years.
2. A strategic direction for the approach to minimise the risks the region faces.
3. Takes a catchment-based approach to these risks and challenges the region faces.
4. Promotes the use of nature based solutions, especially when it comes to surface water removal.
5. Protects the environment through improvements to discharges.
6. Demonstrates how a growing population will be served over the next 25 years.
7. Shows what is needed to protect assets and customers from the impacts of heavy rainfall caused by climate change.
8. Identifies opportunities for partnership working to release benefits and resolve risks through matched funding.
9. Aligns with other strategic plans, such as the Long Term Delivery Strategy (LTDS), Water Resources Management Plan (WRMP), Water Resources East (WRE) Regional Plan, Flood Risk Management Plans (FRMPs), River Basin Management Plans (RBMP) and Local Plans.
10. Includes all water recycling customers, regardless of who serves their water.
11. Excludes upstream water supply and downstream resources, which will be reviewed separately through the business plan.

### 3.3.2 Thames Water

The Thames Water DWMP planning objectives are as follows:

- Flooding
  - Stop property flooding internally (within the home or business) and externally (outside the home or business) from sewers where possible, up to a 1 in 50-year storm event,
- Storm overflows
  - Limit environmental impact by discharging on average, no more than 10 times per year, per storm overflow, and no more than three in designated bathing waters, by 2045.
- Sewage Treatment Works (STWs)
  - Enhance the ability of sewage treatment works to recover from difficulties, without impacting service or the environment.
- Carbon
  - Support the carbon neutrality goals of stakeholders.
- Wellbeing
  - Enhance the wellbeing in communities by increasing access to green space.

A total of 12 DWMP objectives were set by Thames Water. Six are reported on nationally by all Water Companies, and six reflected local stakeholder needs.

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## 3.4 Risk Based Catchment Screening

As part of the DWMPs, a Risk-Based Catchment Screening (RBCS) exercise was completed. The screening involved using existing data to identify where there were current and/or potential risk or vulnerability in the wastewater system to future changes, such as new residential development or changes in climate. The screening exercise informed the scope of the Baseline Risk and Vulnerability Assessment (BRAVA) enabling comparison across wastewater systems based on different levels of risk.

### 3.4.1 Anglian Water

In the Anglian Water DWMP, all ~1,100 Water Recycling Centre catchments were assessed as part of the RBCS process. If a catchment was triggered on any one metric, it progressed through the DWMP, to be assessed within BRAVA. Across the Anglian Water region, 55% of water recycling catchments progressed through the DWMP, and were assessed within BRAVA.

### 3.4.2 Thames Water

In the Thames Water DWMP, a total of 382 catchments were assessed, of which 293 (77%) reached the required threshold to progress to assessment within BRAVA. Assessments highlighted the increase in flood risk to properties in London and the Thames Valley, due to the impacts of climate change and population growth.

## 3.5 Baseline Risk and Vulnerability Assessment (BRAVA)

The objective of the BRAVA is to assess infrastructure risks now and to provide a view of how these may change due to future pressures across the region, including population and climate change, to understand the risks. As a result, the assessment provides a strategic view of the level of risk facing drainage and wastewater services now and in the longer term.

The assessment was undertaken on a catchment scale, with the catchments assessed against each of the DWMP planning objectives.

### 3.5.1 Anglian Water

The Anglian Water BRAVA assessment was completed in 2019 and catchments were assessed against a total of 19 measures, which included:

- Wastewater resilience metric catchment characterisation
- Intermittent discharge impacts upon bathing or shellfish waters
- Continuous or intermittent discharge impacts upon other sensitive receiving waters (part A)
- Continuous or intermittent discharge impacts upon other sensitive receiving waters (part B)
- Storm Overflow Assessment Framework (SOAF)
- Common Assessment Framework (CAF)
- Internal sewer flooding
- External sewer flooding
- Pollution incidents (category 1, 2 and 3)
- WRC quality compliance
- WRC DWF compliance
- Storm overflows
- Risks from interdependencies between Risk Management Authorities (RMA) systems
- Planned residential new development
- The Water Industry National Environment Programme (WINEP)
- Sewer collapses
- Sewer blockages
- WRC biological capacity
- WRC descriptive permit

The objectives were assessed this over a period of time, starting from a 2020 baseline and moving to planning horizons in 2025, 2030, 2035 and 2050. The catchments were then assigned a score of 0 =

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low risk, 1 = medium risk or 2 = high risk.

BRAVA was carried out at a range of spatial scales:

- Level 1: Anglian Water statutory sewer boundary
- Level 2: Catchment Based Approach (CaBA) level
- Level 2: Regional Flood and Coastal Committee (RFCC) level
- Level 2: Council Level (District, Borough, Unitary)
- Level 2: County Level
- Level 2: Internal Drainage Board (IDB) level
- Level 3: Water Recycling Centre (WRC) catchment

The BRAVA data for Uttlesford District was available online at a County (rather than a District) scale within the online mapping portal. Uttlesford District lies within the Essex County catchment, which had the following scores relevant to internal and external flooding:

Name	Risk
Internal flooding 2020	0 = Low risk
Internal flooding 2050	2 = High risk
External flooding 2020	0 = Low risk
External flooding 2050	2 = High risk

## 3.5.2 Thames Water

The Thames Water BRAVA assessment was completed in 2019 and considered 12 objectives, six were reported nationally by all Water Companies, and six reflected local stakeholder needs:

- **Environment**
  - Sewage treatment works quality compliance
  - Sewage treatment works flow compliance
  - Risk of pollution incidents
  - Storm overflow performance
  - Carbon
  - Wellbeing
- **Property flooding**
  - Internal sewer flooding risk
  - External sewer flooding risk
  - % of population at risk of sewer flooding in a 1 in 50-year storm
  - Reduce surface water runoff
  - Reduce misconnections
- **Asset health**
  - Sewer collapses

In the Thames Water DWMP, the BRAVA assessment was undertaken at three spatial levels:

- Level 3: Sewage Treatment Works catchment
- Level 2: Thames Regional Flood and Coastal Committee (TRFCC) sub-committee level
- Level 1: Entire Thames Water region

Overall, the risk assessment showed that both growth and climate change, if left unmitigated, will have a significant impact on the performance of the wastewater service over the next 25 years.

The southern and western boundaries of Uttlesford District are located in the Essex and Thurrock TRFCC area. The area has a low baseline and predicted 2050 risk of foul sewer flooding in a 1 in 50-year event.

Typical interventions discussed for the area with stakeholders in May 2020 are stated to include Reduce

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infiltration, increase sewer capacity and storage, sewer sealing, property level protection, re-configure network, separate surface and foul networks, update surface water modelling, source control SuDS, increase treatment capacity, and monitor sites.

Within the Catchment Strategic Plan for Essex and Thurrock, the results from hydraulic sewer flood risk modelling indicated that the Essex and Thurrock TRFCC area is at risk of flooding. However, Thames Water experience suggested that in some locations, flooding is more likely to occur as a result of blockages, rather than hydraulic overload as a result of storm flows. Therefore, sewer maintenance was identified as a priority within the plan.

### 3.6 Implications for Sequential Test of resolution and scope of DWMP BRAVA data and mapping

The following matters are material with respect to the application of DWMP BRAVA data and mapping to support the Sequential Test:

- It is understood that the BRAVA table and mapping have been prepared for the purpose of Long-Term Investment Planning and not for the sequential placement of new development. The mapping shows where certain wastewater systems would require investment. However, as there is no certainty about any potential investment and the benefits this may bring, it is not necessarily possible to conclude that this should be used as the basis for the Sequential Test.
- Results provide one risk category for each wastewater system, the actual level of risk within the areas shown might potentially vary substantially and thus the spatial resolution might not be appropriate for use in a comparative analysis of specific sites. The data resolution used as part of the DWMPs does not appear to be comparable to the river and sea flooding information and thus could not easily be used alongside the existing data and mapping on a site-specific basis. In addition, the Local Plan area is split across two BRAVA datasets prepared by different Water Companies (Anglian Water and Thames Water), which have been assessed at different catchment scales, and against different planning objectives.
- The data provided on the Anglian Water and Thames Water websites are not provided in GIS format, which would be required to undertake the site screening as part of the Level 1 SFRA. The availability of the data in GIS format will be discussed with Anglian Water and Thames Water.
- Whilst it might not be possible to use the DWMP data and mapping in a comparative assessment to support the Sequential Test, the content might influence the timing and viability of potential allocations that are identified. It is not possible to report on the extent to which these considerations might affect viability from the information available, but this matter should be discussed and a formal position agreed with Anglian Water and Thames Water. For sites where it is understood that the DWMP data does potentially introduce sewer flooding matters that affect the implementation of development, then appropriate content should be included in a Level 2 SFRA, by way of demonstrating that the principle of development can be supported.

## 4 Implications of other BRAVA outputs

As noted in Sections 3.5.1 and 3.5.2, the Anglian Water and Thames Water DWMPs assessed a range of risks. As such, there are several BRAVA outputs, which assess these objectives. Although, it is our understanding that these products are not influential to the Sequential Test, they might have implications for other planning considerations, which are outside the scope of the SFRA.

It is recommended to seek clarification with Anglian Water and Thames Water on the understanding of each BRAVA output, and whether the data is appropriate to use in the sequential selection of sites within a Local Plan. The smallest scale at which the data is provided is a sewer catchment basis.

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## 5 Recommendations

### 5.1 Updates to Level 1 SFRA

It is recommended that consideration is given to the following updates being made to the Level 1 SFRA:

1. Review available modelling datasets, and consider whether there is sufficient data to define Flood Zone 3b as the 1 in 30-year fluvial flood event, and define the Flood Zone 3b plus climate change flood extent.
2. Update all references to the Sequential and Exception Tests to align with the 2022 PPG. It is recommended that Uttlesford District Council performs a check of the site selection criteria and process, and consider whether there would be any change to the sites taken forward or rejected, in light of the latest Sequential Test requirements.
3. Include reference to the May 2022 peak rainfall climate change allowances.
4. Update the site-specific FRA guidance section to include the latest advice set out in the 2022 PPG.

### 5.2 Requirements for Level 2 SFRA

Of the 10 sites proposed for allocation in the Local Plan, nine sites have areas which are at high fluvial flood risk, and/or high surface water flood risk. However, as the percentage area of the proposed sites at high risk of fluvial or surface water risk is small (less than 10% in all cases), the majority of the developable area within the proposed sites is at very low risk of fluvial or surface water flooding. Therefore, there is potential for the risk of flooding to the site to be mitigated through applying the sequential approach to designing the site layout, to locate highest vulnerability development types (e.g. residential) in the areas of lowest flood risk on the site. However, it is recommended that the nine sites identified in Table 2-1 as either being at fluvial flood risk, or at significant surface water flood risk, are considered for assessment in further detail within a Level 2 SFRA, to assess the flood risk and hazard to each site and suitable mitigation measures, as well as the residual flood risk and safe access and egress.

It is recommended that consideration is given to the following steps in preparing a Level 2 SFRA:

1. Screen the 10 proposed sites for other sources of flood risk (e.g. groundwater) as well as the impact of climate change on fluvial and surface water flood risk.
2. Undertake a Level 2 SFRA for the sites identified in Section 2.1 as at high fluvial or surface water flood risk. Where additional sites are identified as at risk, following the more detailed site screening, it is recommended that a Level 2 SFRA is undertaken for these sites.

Consultation with Uttlesford District Council has identified that a Level 2 SFRA will be undertaken to inform the Regulation 19 stage of the plan process.

### 5.3 Sewer flood risk mapping and data

On the basis of our understanding it is recommended that the DWMP information and mapping is not used to assess sewer flooding in the Sequential Test alongside river, sea and surface water flooding on the basis that the available information is not of appropriate resolution or format. This understanding should be addressed with Anglian Water and Thames Water and formal confirmation obtained as necessary to support the Plan and Examination. The Level 1 SFRA should be updated to clearly state this, and where possible the DWMP information will be used to inform the scope of site specific FRAs.

Further consultation with Anglian Water and Thames Water should clarify the necessity and extent to which identified DWMP sewer flood risk should be addressed at sites where this is potentially an influential matter. This can then inform the necessity to include content on sewer flood risk in a Level 2 SFRA.