



Sevenoaks District Council Level 2 Strategic Flood Risk Assessment

FINAL

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This report describes work commissioned by Carlyn Kan on behalf of Sevenoaks District Council by an instruction dated 16th April 2026. The Client's representative for the contract was Carlyn Kan of Sevenoaks District Council. Grace Sheppard, Fiona Barraclough, Jackson Pawley, Amber Stevens and Holly Robertson of JBA Consulting carried out this work.

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Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

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Abbreviations

AEP	Annual Exceedance Probability
AIMS	Asset Information Management System
BGS	British Geological Survey
CC	Climate Change
CCTV	Closed Circuit Television
EA	Environment Agency
FAA	Flood Alert Area
FMfP	Flood Map For Planning
FRA	Flood Risk Assessment
FWA	Flood Warning Area
GIS	Geographical Information System
JBA	Jeremy Benn Associates
KCC	Kent County Council
LiDAR	Light Detection And Ranging
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NaFRA2	National Flood Risk Assessment 2
NPPF	National Planning Policy Framework
OS	Ordnance Survey
PPG	Planning Practice Guidance
RMA	Risk Management Authority
RoFSW	Risk of Flooding from Surface Water
SDC	Sevenoaks District Council
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Systems

Definitions

1D model: One-dimensional hydraulic model, typically representing a watercourse and structures within the channel (for example bridges and culverts).

2D model: Two-dimensional hydraulic model, typically representing the floodplain flows.

Annual Exceedance Probability: The probability (expressed as a percentage) of a flood event occurring in any given year.

Brownfield: A previously developed parcel of land.

Climate change: Long term variations in global temperature and weather patterns caused by natural and human actions.

Flood defence: Infrastructure used to protect an area against floods such as floodwalls and embankments; they are designed to a specific standard of protection (design standard).

Green infrastructure: A network of natural environmental components and green spaces that intersperse and connect the urban centres, suburbs, and urban fringe.

Greenfield: An undeveloped parcel of land.

Lead Local Flood Authority: The unitary authority for the area or if there is no unitary authority, the county council for the area.

Local Planning Authority (LPA): The local government body which is responsible by law to exercise planning functions for a particular area.

Main river: A watercourse shown as such on the statutory main river map held by the Environment Agency. They are usually the larger rivers and streams. The Environment Agency has permissive powers (not duties) to carry out maintenance and improvement works on main rivers.

Ordinary watercourse: Any river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows but which does not form part of a main river. The local authority or internal drainage board has permissive powers (not duties) on ordinary watercourses.

Return period: An estimate of the interval of time between events of a certain intensity or size, in this instance it refers to flood events. It is a statistical measurement denoting the average recurrence interval over an extended period of time.

Risk: In flood risk management, risk is defined as a product of the probability or likelihood of a flood occurring, and the consequence of the flood.

Risk Management Authority: The Environment Agency, Lead Local Flood Authorities, District and Borough Councils in an area where there is no unitary authority, Coast Protection Authorities in coastal areas, Water and sewerage companies, Internal Drainage Boards, and Highways authorities.

Standard of Protection (SoP): Defences are provided to reduce the risk of flooding (typically from a river, sea or surface water). A Standard of Protection is usually described

in terms of an AEP flood event. For example, a flood embankment could be described as providing a 1% AEP Standard of Protection

Stakeholder: A person or organisation affected by the problem or solution or interested in the problem or solution. They can be individuals or organisations, includes the public and communities.

Sustainable Drainage Systems: Sustainable Drainage Systems are methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques, such as grates, gullies, and channels.

Windfall site: A site which becomes available for development unexpectedly and therefore not included as allocated land in a planning authority's local plan.

Executive Summary

Introduction and context

This Level 2 Strategic Flood Risk Assessment (SFRA) document was prepared with the purpose of providing part of the evidence base for the Local Plan 2027 - 2042 for Sevenoaks District Council (SDC). It follows on from the Level 1 SFRA produced in January 2026 and should be read in conjunction.

The primary purpose of the Level 2 SFRA is to provide an appropriate understanding of the level of flood risk affecting development included in the updated Local Plan. The assessment takes into account all sources of flooding and considers other factors affecting flood risk such as residual risk. The information provided as part of the Level 2 SFRA enables Sevenoaks District Council to apply the Exception Test to sites in accordance with the National Planning Policy Framework (NPPF).

SFRA objectives

The Government's Planning Practice Guidance (PPG) on Flood Risk and Coastal Change advocates a tiered approach to risk assessment involving Level 1 and Level 2 SFRAs.

After completing the Level 1 SFRA and the 'Call for Sites' process, Sevenoaks District Council have undertaken the Sequential Test and have shortlisted sites which cannot be relocated outside of flood risk areas due to additional planning factors. The Level 2 assessment aims to build on identified risks from the Level 1 SFRA in order to provide a greater understanding of fluvial, surface water, groundwater, sewer, and reservoir related flooding risks to these shortlisted sites. From this, Sevenoaks District Council and developers can make more informed decisions regarding future development. The Level 2 assessment also identifies sites requiring further risk analysis at the site-specific Flood Risk Assessment (FRA) stage.

Summary of Level 2 SFRA

A total of 103 potential site allocations were provided by Sevenoaks District Council, as Local Planning Authority (LPA), and were screened against all sources of flooding risk, with a percentage coverage for each flood risk dataset calculated. The outputs were used to summarise the flood risks at each site. A Red, Amber, Green category was assigned to each site, based on the relative flood risk.

'Red' sites were those identified with significant obstacles or challenges for development in terms of flood risk that would need to be addressed if development were to take place. They may need the Exception Test to demonstrate that the site can be safely developed. These sites were identified where more than 10% of the site was located within the EA Flood Zones 2 and 3, or at significant surface water risk (over 20% of the site was at risk in the present day 0.1% AEP event or over 50% of the site was at risk in the 1% AEP plus 'Upper End' climate change allowance event). They were also identified where sites were at high risk of groundwater emergence. Of the 'Red' high risk sites identified, four sites were identified as having 'Significant Constraints', due to either access and escape concerns, or because they are considered a higher planning priority by Sevenoaks District Council.

These include the following sites: HO/21/00232, HO/25/00012, MX/21/00014 and MX/26/00002

'Amber' sites were those generally at moderate flood risk, but which have specific considerations in order for the sites to be taken forward for development. These sites were identified to have less than 10% of the site located within the EA Flood Zones 2 and 3, or moderate surface water risk (between 10% and 20% of the site was at risk in the present day 0.1% AEP event or between 20% and 50% of the site was at risk in the 1% AEP climate change surface water event), potentially impacting access and escape in vicinity of the site. They were also identified where sites were at high to moderate risk of groundwater flooding. Amber sites were flagged for further consideration by planners and developers, but it is likely to be possible to address the flood risk constraints at planning application stage.

The remaining sites were classified as 'Green', indicating that flood risk was unlikely to have an impact on future development of the site. However, it should be noted that green sites may still require an FRA and drainage strategy, depending on the size and location of the site.

Of the 103 sites screened as part of this assessment, the results were as follows:

- 20 Red sites (of which 4 are described as having Significant Constraints)
- 38 Amber sites
- 45 Green sites

The detailed Level 2 assessments and accompanying mapping can be found in Appendix A, with the site screening spreadsheet included as Appendix B.

The following points summarise the Level 2 assessment:

- **Fluvial flooding** - A total of 7 sites assessed in detail with the Level 2 SFRA were at high risk of fluvial flooding. This includes the following sites: EM/26/0001, HO/21/00059, HO/21/00232, HO/24/00014, HO/25/00012, MX/21/00009 and MZ/21/00014. The remaining sites may be appropriate for development, providing the recommendations and guidance set out in the detailed assessments are considered and development is located away from areas at risk of flooding.
- **Flood Warning Areas (FWAs)** - Sites EM/21/0006, EM/25/00001, EM/26/00001, HO/21/00044, HO/21/00232, HO/21/00233/B, HO/21/00279, HO/24/00014, HO/25/00012, MX/21/00009, MX/21/00013, MX/21/00014 are located within existing EA FWAs. For proposed development within existing Environment Agency (EA) FWAs, developers should consult the EA to ensure that adequate flood warning procedures and evacuation processes are in place, and that Risk Management Authorities (RMAs) are not put under any additional burden.
- **Surface water flooding** - Surface water tends to follow topographic flow routes, for example, along watercourses or isolated pockets of ponding where there are topographic depressions. Of the sites assessed within this Level 2 SFRA, 14 were at high surface water flood risk. This includes the following sites:

EM/21/00014, ENE14, HO/21/00044, HO/21/00059, HO/21/00094, HO/21/00096, HO/21/00227, HO/21/00287, HO/24/00018, HO/25/00018, HO/25/00021, MX/21/00039, MX/26/0002 and SsM06. Of these 14 sites, one site (MX/26/00002) was identified as having significant surface water flood risk and was subsequently classified as a 'Significant Constraints' site due to the presence of a railway line running through the site. For the remaining sites at risk of surface water flooding in the present day 0.1% AEP (Annual Exceedance Probability) and 1% AEP climate change events, it is likely that development can proceed, providing the recommendations and guidance set out in the detailed assessments are considered, and the areas of greatest surface water flood risk are avoided or incorporated into the site drainage design.

- **Access and escape routes** - Several sites have potential access and escape route issues as a result of fluvial and/or surface water flooding of the surrounding roads. These include the following sites: EM/21/00014, EM/26/00001, ENE14, HO/21/00044, HO/21/00096, HO/21/00227, HO/21/00232, HO/24/00018, HO/25/00018, HO/25/00021, MX/21/00014, MX/26/0002 and SsM06. At these sites, consideration should be made as to how safe access and escape routes can be provided during flood events, both for people and emergency vehicles. Consideration should also be given to the nature of the risk, for example whether the flooding forms a flow path or bisects the site meaning access across the site from one side to another may be compromised.
- **Climate change** - Fluvial and surface water climate change mapping indicates that flood extents are predicted to increase. As a result, the depths, velocities, and hazard of flooding may also increase. The significance of the increase will depend on the topography of the site and the climate change percentage allowance used. Site-specific FRAs should confirm the impact of climate change using latest guidance. The sites most at risk from increased risk due to climate change are EM/21/00014, EM/26/00001, ENE14, HO/21/00059, HO/21/00094, HO/21/00096, HO/21/00227, HO/21/00287, HO/24/00014, HO/24/00018, HO/25/00012, HO/25/00018, HO/25/00021, MX/21/00009, MX/21/00039, MX/21/00014, MX/26/00002 and SsM06. It is recommended that Sevenoaks District Council work with other RMAs to review the long-term sustainability of existing and new development in these areas when developing climate change plans and strategies for the borough.
- **Historic flooding** - 7 of the 20 sites taken forward for assessment within the Level 2 SFRA fall within areas that have historically flooding from fluvial sources, as indicated by the EA Historic Flood Map dataset. Further historic flood data was provided by Kent County Council (KCC) as the Lead Local Flood Authority (LLFA), who provided a database of recorded flood incidents. This indicates that 17 of the 20 sites were within 100m of a record flood incident.
- **Sewer flooding** - Sewer flooding was assessed within the detailed site assessments using information from the historic sewer flooding database made available by Thames Water. Site developers should consult with Southern Water

or Thames Water (depending on the site location) in all cases to ensure development will be safe from flooding and to ensure the development is integrated into plans for managing sewer capacity risks across the area.

- **Groundwater flooding** - Groundwater flood risk is variable throughout Sevenoaks District, with several areas of known groundwater emergence risk. The JBA Groundwater emergence map was used to screen the sites and attribute risk to a site of groundwater emergence. A total of 7 sites were identified as high risk, where groundwater levels within the site are either at or very near (within 0.025m of) the ground surface during a 1% AEP groundwater flood event. These sites include EM/21/00014, HO/21/00044, HO/21/00059, HO/21/00232, HO/21/00287, HO/25/00012 and HO/25/00018. An appropriate assessment of the groundwater regime for a site should be carried out at the site-specific FRA stage.
- **Reservoir flooding** - There are three sites (HO/21/00232, HO/25/00012 and MX/21/00014) assessed within the detailed site assessments that are shown to be at risk of reservoir flooding. The level and standard of inspection and maintenance required under the Reservoirs Act means that the risk of flooding from reservoirs is very low. However, there is a residual risk of a reservoir breach, and this risk should be considered in any site-specific FRA.
- **SuDS** - As part of the Level 2 site assessments, a strategic assessment of SuDS options at each site was undertaken using regional datasets. A detailed site-specific assessment of suitable SuDS techniques would need to be undertaken at site-specific level to understand which SuDS options would be appropriate at an individual site.

Recommendations

Section 7 sets out the recommendations based on the findings of this Level 2 SFRA. This includes recommendations for applying the Exception Test, where required, requirements for developers in developing the Local Plan allocations, and guidance for windfall sites and development of sites not included within the Local Plan.

1 Introduction

1.1 Purpose of the Strategic Flood Risk Assessment

Paragraph 171 of the [National Planning Policy Framework \(NPPF\) \(2024\) \(gov.uk\)](#) states that '*Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.*'

1.2 Levels of SFRA

The [Planning Practice Guidance \(PPG\) Flood risk and coastal change \(gov.uk\)](#) advocates a staged approach to risk assessment and identifies two levels of a Strategic Flood Risk Assessment (SFRA):

- A Level 1 assessment, which all Local Planning Authorities (LPAs) are required to undertake. Where potential site allocations are at low flood risk and where development pressures are low a Level 1 assessment is likely to be sufficient, without the LPA progressing to a more detailed Level 2 assessment. The Level 1 assessment should be of sufficient detail to enable application of the Sequential Test, to inform the allocation of development to areas of lower flood risk.
- A Level 2 assessment is required where land outside flood risk areas cannot appropriately accommodate all necessary development, creating the need to apply the NPPF's Exception Test, or if an LPA believe they may receive high numbers of applications in flood risk areas on sites not identified in the Local Plan. In these circumstances the assessment should consider the detailed nature of the flood characteristics within a Flood Zone and assessment of all sources of flooding.

This SFRA report fulfils the requirements for a Level 2 assessment of potential development allocations within Sevenoaks District and has been prepared in accordance with the NPPF (2024) and PPG (2025).

This report should be read alongside the [Sevenoaks Level 1 SFRA](#), and builds upon information presented within the Level 1 SFRA.

1.3 SFRA objectives

The objectives of this Level 2 SFRA are to:

1. Provide individual flood risk analysis for site options using the latest available flood risk data, thereby assisting the Council in applying the Exception Test, where required, to its proposed site options in preparation of its Local Plan.

2. Using the available data, provide information and comprehensive mapping presenting flood risk from all sources for the site.
3. Provide recommendations for making sites safe throughout their lifetime.
4. Take into account most recent policy and legislation in the NPPF, PPG, EA SFRA Guidance, and LLFA SuDS guidance.

1.4 Consultation

SFRAs should be prepared in consultation with other RMAs.

As part of the Level 2 SFRA, the following organisations have been consulted for data requests:

- Sevenoaks District Council (SDC)
- Kent County Council (KCC)
- Environment Agency (EA)
- Southern Water (SW)
- Thames Water (TW)

1.5 How to use this report

Table 1-1 below outlines the contents of this report and details how different users can apply this information.

Table 1-1: Outline of the contents of each section of this report.

Section	Contents	How to use
1. Introduction	Outlines the purpose and objectives of the Level 2 SFRA.	For general information and context.
2. Flood risk policy - policy and strategy for flood risk management and the Sequential and Exception Tests	Includes information on the implications of recent changes to planning and flood risk policies and legislation and signposts to relevant sections of the Level 1 SFRA. Signposts to relevant sections of the Level 1 SFRA for information on the Sequential and Exception Tests.	Users should refer to this section and the relevant sections of the Level 1 SFRA for details of relevant policy and guidance underpinning strategic and site-specific assessments, and to understand the process for applying the Sequential and Exception Tests.
3. Information used in the Level 2 SFRA	Summarises the data used in the Level 2 detailed site assessments and mapping.	Users should refer to this section in conjunction with the detailed site assessments (Appendix A) and associated mapping to understand the data presented.

Section	Contents	How to use
4. Level 2 Assessment Methodology	Summarises the sites taken forward to a Level 2 assessment and the outputs produced for each of these sites.	Users should refer to this section in conjunction with the detailed site assessments (Appendix A) and associated mapping to understand the data presented.
5. Flood risk management requirements for developers	Identifies the scope of the assessments that must be submitted in Flood Risk Assessments (FRAs) supporting applications for new development. Refers to relevant sections in the Level 1 SFRA for mitigation guidance.	Developers should use this section alongside the relevant sections of the Level 1 SFRA to understand requirements for FRAs, which conditions/guidance documents should be followed, and information on flood mitigation options.
6. Surface water management and SuDS	Signposts to relevant sections of the Level 1 SFRA for information on the management of surface water including types of SuDS, SuDS policy and guidance, and SuDS constraints.	Developers should use this section alongside the relevant sections of the Level 1 SFRA to understand what national, regional, and local SuDS standards are applicable.
7. Summary of Level 2 assessment and recommendations	Summarises the results and conclusions of the Level 2 assessment, and signposts to the Level 1 SFRA for planning policy recommendations.	Developers and planners should use this section to see a summary of the Level 2 assessment and understand the key messages from the detailed site assessments. Developers should refer to the Level 1 SFRA recommendations when considering requirements for site-specific assessments.

Section	Contents	How to use
Appendix A: Detailed site assessments with site specific mapping	Provides a detailed summary of flood risk for sites requiring a more detailed assessment, which considers flood risk, emergency planning, climate change, broadscale assessment of possible SuDS, Exception Test requirements, and requirements for site-specific FRAs. Site specific mapping is also provided within the site assessment and includes depth, velocity and hazard information for fluvial and surface water flood risk where available, alongside climate change risk.	Planners should use this appendix to inform the application of the Sequential and Exception Tests, as relevant. Developers should use these assessments to understand flood risk, access and escape route requirements, climate change, SuDS, and FRA requirements for site-specific assessments.
Appendix B: L2 Site Screening	A site screening exercise has been completed on the potential sites which shows the percentage of the site which is at risk of fluvial, surface water and groundwater flooding.	Planners should use this appendix to inform the allocation of sites based on flood risk.
Appendix C: Data sources used in this SFRA	Summarises the data used in the Level 2 detailed site assessments and mapping	Users should refer to this section to understand the data used and where this data can be obtained

1.6 SFRA study area

Sevenoaks District is located in west Kent, in the south-east of England, covering an area of approximately 370km² and a population of 120,514 (Census 2021). There are several towns and villages throughout the district, including Swanley in the north, Sevenoaks in the centre, Edenbridge in the south and Westerham in the west. Sections of the M25, M26 and M20 are situated in the northern part of the district. Sevenoaks District is located within Kent County Council's administrative area and is bordered by eight other local authorities:

- Dartford Borough Council
- Gravesham Borough Council
- London Borough of Bexley Council
- London Borough of Bromley Council
- Tandridge District Council
- Tonbridge and Malling Borough Council
- Tunbridge Wells Borough Council

- Wealden District Council

A number of Main Rivers flow through the district, including the River Medway, which rises in the High Weald in West Sussex and flows in a north-easterly direction through the south-east of the district towards Tonbridge. The River Eden, a tributary of the River Medway, flows westwards through the southern part of the district. The River Darent rises in Westerham, to the west of the district, and flows northwards through the catchment. Further information regarding the rivers in the district can be found in Section 3.2 and Sections 4.4.2 and 4.4.3 of the L1 SFRA report.

2 Flood risk policy

2.1 Policy and Strategy for flood risk management

The flood risk management roles and responsibilities for different organisations and relevant legislation, policy and strategy are detailed within Section 2 of the Sevenoaks District Level 1 SFRA.

This contains details on:

- Key legislation for flood and water management.
- Key national, regional, and local policy documents and strategies.
- Roles and responsibilities for flood risk management in Sevenoaks.

2.2 Sequential and Exception Tests

Information on planning policy for flood risk management is detailed in Section 3 of the Sevenoaks District Level 1 SFRA. Users should consider this section within the Level 1 SFRA to understand national planning policy guidance and how to evidence that a proposed development will pass the Sequential Test, and if necessary, the Exception Tests.

Section 3 contains detail on:

- the NPPF and PPG;
- the risk-based approach; and
- the Sequential and Exception Tests.

3 Information used in the Level 2 SFRA

This section outlines the datasets used in assessing the Local Plan proposed development sites in the Level 2 SFRA detailed site assessments (Appendix A).

It should be noted that datasets used to inform this SFRA may be updated following the publication of this SFRA and new information on flood risk may be produced by RMAs. This new information (such as updated mapping and modelling) may supersede the information included in this SFRA. Guidance should be sought from the LPA, LLFA, and the EA as appropriate to check the most up to date source of information is used for future flood risk assessment.

Appendix C provides an overview of the supplied data used to inform the appraisal of flood risk for Sevenoaks District, including when the data was provided, the source of the data, and how the data can be obtained by a developer if applicable.

3.1 Historic flooding

Historic flooding was assessed using a database of recorded flood incidents across the district provided by Kent County Council as LLFA. The EA's Historic Flood Map dataset has also been used to understand the extent of historic fluvial flooding within the study area.

It is important to note that the absence of historic flood records does not mean that an area has never flooded, only that records are not held. For previously undeveloped sites, it is likely that historic flooding incidents may have gone unreported due to a lack of site use or interest. In addition, it is also possible that flooding mechanisms have changed since the date of a recorded flooding incident, making it more or less likely for flooding to occur on site.

3.2 River networks

Main Rivers are represented by the EA's Statutory Main River layer and ordinary watercourses are represented by the Ordnance Survey (OS) Watercourse Link layer.

Caution should be taken when using these layers to identify culverted watercourses which may appear as straight lines but, in reality, are not.

Not all Ordinary Watercourses are apparent within the above datasets. It should be noted that the EA's LiDAR dataset has been used to identify some ordinary watercourses within the Sevenoaks District. For site specific developments, further site surveys should be undertaken to identify all ordinary watercourses within a site.

3.3 Fluvial flooding

3.3.1 Available datasets

The Environment Agency (EA) initially updated the [Flood Map for Planning \(FMfP\) \(gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/614444/Flood_Map_for_Planning_FMfP.pdf) in March 2025 following the release of the National Flood Risk Assessment 2 (NaFRA2).

The latest round of updates to the FMfP fluvial data occurred on 24 October 2025, and the intention is for the FMfP to be updated every six months. The FMfP now shows updated extents for Flood Zone 2 (0.1% AEP) and Flood Zone 3 (1% AEP) which incorporate new national modelling, as well as appropriate local models where available. In addition to the Flood Zones, the following information is now also provided in the FMfP:

- Rivers and sea with defences
 - Mapping for the 3.3% AEP, 1% AEP, and 0.1% AEP events for present day and climate change (using the Central allowance for the 2080s epoch) taking account the presence of flood defences (extents only).
- Rivers and sea without defences
 - Mapping for the 3.3% AEP, 1% AEP, and 0.1% AEP events for present day and climate change (using the Central allowance for the 2080s epoch) which ignores the presence and condition of flood defences (extents only).

Detailed hydraulic models used to support this SFRA are shown below in Table 3-1. The outputs included flood outlines, and detailed grids containing flood depth, velocity and hazard results.

Table 3-1: Fluvial models used in the Level 2 SFRA assessment

Model Name	Model year	CC-uplift % Central - 2080s epoch	CC-uplift % Higher - 2080s epoch	CC-uplift % Upper - 2080s epoch
Darent and Cray	2016	1% AEP +25%	1% AEP +35%	1% AEP +70%
Medway	2023	1% AEP +27%	1% AEP +37%	1% AEP +62%

3.3.2 Representation of fluvial Flood Zones in the Level 2 SFRA

In agreement with the Environment Agency, Flood Zone 3b (the functional floodplain) was defined using the Rivers and Sea defended 3.3% Annual Exceedance Probability (AEP) extent. This was deemed more appropriate than using the 3.3% AEP modelled flood extent from available detailed models, as the Rivers and Sea extent includes mapped tributaries and ensures a more complete and precautionary delineation of Flood Zone 3b across the study area. This approach has been agreed with the EA.

Flood Zone 2 was defined using detailed modelling where available; using the 0.1% AEP (present day) fluvial event. Where this was not available, the Flood Map for Planning (FMfP) Flood Zone 2 was used. Similarly, Flood Zone 3a was defined using detailed modelling as preference where available; using the 1% AEP (present day) fluvial event. Where not available, the FMfP Flood Zone 3 was used.

Where areas are not covered by detailed fluvial modelling and Flood Zones have been informed by the New National Modelling included in the FMfP, however there is currently no

flood depth, velocity or hazard information available for these areas. Further assessment should be undertaken as required within a site-specific Flood Risk Assessment, using the latest available flood risk data, to determine flood depth, velocity and hazard at these sites.

3.4 Flood defences

Current flood defence information has been taken from the EA's Asset Information Management System (AIMS) Spatial Defences dataset. These datasets include all flood defences currently owned, managed or inspected by the EA and include information pertaining to their current condition and standard of protection.

Section 6 of the Sevenoaks Level 1 SFRA report provides information on flood defences and schemes.

3.5 Surface water flooding

The [EA's FMfP Surface Water Spatial Planning extents \(gov.uk\)](#) dataset has been used to assess surface water risk within this SFRA. This dataset was released on 28 May 2026, and includes additional flood depth data, as well as climate change outputs for the 2070s epoch.

The new surface water mapping aims to provide a consistent standard for assessing surface water flood risk across England and Wales, supporting LLFAs, the EA, and developers in managing and mitigating surface water flood risk more effectively. Whilst the dataset is not intended for assessing flood risk at individual properties, it is appropriate for high-level studies such as SFRAs prepared for Local Authorities.

Within this dataset, surface water flood risk is subdivided into three categories:

- 3.3% AEP (1 in 30) - high risk event
- 1% AEP (1 in 100) - medium risk event
- 0.1% AEP (1 in 1000) - low risk event

The EA has also released depth outputs as part of the Surface Water Spatial Planning dataset.

It should be noted that new Surface Water Spatial Planning dataset does not include flood hazard and velocity data, therefore, the [EA's Risk of Flooding from Surface Water \(RoFSW\) \(gov.uk\)](#) has been used to represent this information. This represents the low, medium, or high likelihood of a flood experiencing a given velocity or hazard. The available banded layers have been used to give a broad indication of velocity and hazard across assessed sites in the absence of available gridded data. However, this data is not sufficiently detailed to inform site-specific planning decisions.

3.6 Climate change

Climate change mapping is shown in the site scale mapping included in Appendix A for fluvial flooding using modelled outputs with the latest climate change uplifts where available.

3.6.1 Climate change allowances for peak flows

Climate change is expected to increase the peak flows of rivers, meaning that flows which were previously thought to be extreme will now be considered far more possible. Areas benefiting from flood defences will find the standard of protection changes over time with overtopping of defences more likely unless they are upgraded.

Peak river flow climate change allowances developed by the EA are divided into a series of Management Catchments. Sevenoaks District is covered by two Management Catchments, with the relevant allowances for each Management Catchment detailed in Table 3-2 and Table 3-3.

Table 3-2: Peak river flow allowances for the Darent and Cray Management Catchment.

Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2125)
Upper end	21%	23%	41%
Higher Central	11%	8%	18%
Central	6%	3%	10%

Table 3-3: Peak river flow allowances for the Medway Management Catchment.

Allowance category	Total potential change (%) anticipated for '2020s' (2015 to 2039)	Total potential change (%) anticipated for '2050s' (2040 to 2069)	Total potential change (%) anticipated for '2080s' (2070 to 2125)
Upper end	29%	37%	62%
Higher Central	19%	21%	37%
Central	14%	15%	27%

3.6.2 Representation of fluvial climate change in the Level 2 SFRA

Where detailed modelling is available at the assessed sites, these outputs have been used. The climate change extents from all models used within this Level 2 SFRA, fall within the required '2080s' epoch Central allowance for the relevant Management Catchments within Sevenoaks District.

The Risk of Flooding from Rivers and Seas (RoFRS) 1% AEP plus climate change layer has been used to assess the impact of climate change on fluvial flood risk where detailed

fluvial modelling is unavailable. This represents the 'Central' climate change allowance for the 2080s epoch for risk of flooding from rivers. It should be noted that the dataset provides flood extent information only, with no associated data on flood depth, velocity, or hazard. Therefore, it is recommended that further assessment of climate change, including modelling of the relevant allowances, is undertaken within a site-specific Flood Risk Assessment.

3.6.3 Climate change allowances for peak rainfall

Climate change is predicted to result in wetter winters and increased summer storm intensity in the future. This increased rainfall intensity will affect land and urban drainage systems, resulting in surface water flooding, due to the increased volume of water entering the systems.

Peak rainfall climate change allowances developed by the EA are divided into the same Management Catchments as peak river flows and are detailed in Table 3-4 and Table 3-5.

Table 3-4: Peak rainfall intensity allowances for small and urban catchments for the Darent and Cray Management Catchment.

Allowance category	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 3.3% AEP	Total potential change (%) anticipated for '2050s' (2022 to 2060) for 1% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 3.3% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) for 1% AEP
Upper end	35%	45%	35%	40%
Central	20%	20%	20%	25%

Table 3-5: Peak rainfall intensity allowances for small and urban catchments for the Medway Management Catchment.

Allowance category	Total potential change (%) anticipated for '2050s' (2022 to 2060) 3.3% AEP	Total potential change (%) anticipated for '2050s' (2022 to 2060) 1% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) 3.3% AEP	Total potential change (%) anticipated for '2070s' (2061 to 2125) 1% AEP
Upper end	35%	45%	35%	40%
Central	20%	20%	20%	20%

3.6.4 Representation of surface water climate change in the Level 2 SFRA

The [Surface Water Spatial Planning climate change extents \(gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/614441/surface_water_spatial_planning_climate_change_extents.pdf) dataset was used to assess climate change. On 28th May 2026, alongside present-day scenarios, the EA released new surface water climate change mapping for the 3.3%, 1% and 0.1% AEP events to indicate the predicted impacts of climate change on future flood risk. Within this SFRA, the 1% AEP event incorporating the 'Upper End' allowance for the 2070s epoch has

been used to assess the impact of climate change on surface water flood risk. It should be noted that this is a long-term epoch and appropriate to support long-term planning and development decisions.

3.7 Groundwater flooding

The JBA Groundwater Emergence map has been used to assess potential areas that are likely to be at higher risk of groundwater flooding. The JBA Groundwater Emergence map, shows the likelihood of groundwater emergence posing a risk to both surface and subsurface assets, based on predicted groundwater levels during a 1% AEP event. Surface water mapping and topographic data is used to gain an understanding of the overland flow routes which may be impacted by this emergence.

The JBA Groundwater Emergence mapping is categorised into five different classes; a detailed description of the classes is in Table 3-6 below.

Table 3-6: JBA Groundwater Emergence Map category descriptions.

Category	Potential risk
Groundwater levels are either at or very near (within 0.025m of) the ground surface.	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.
Groundwater levels are between 0.025m and 0.5m below the ground surface.	Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
Groundwater levels are between 0.5m and 5m below the ground surface.	There is a risk of flooding to subsurface assets, but surface manifestation of groundwater is unlikely.
Groundwater levels are at least 5m below the ground surface.	Flooding from groundwater is not likely.
Negligible risk.	This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.

3.7.1 Groundwater flooding and climate change

The impact of climate change is more uncertain for groundwater flooding associated with rivers and land catchments and those watercourses where groundwater has a large influence on winter flood flows. Changes in frequency and intensity of groundwater flooding due to climate change would depend on the flooding mechanism and geological characteristics.

Milder wetter winters may increase the frequency of groundwater flooding incidents in areas that are already susceptible, but warmer drier summers may counteract this effect by drawing down groundwater levels to a greater extent during the summer months.

3.8 Reservoir flooding

The risk of inundation as a result of a breach or failure of a number of reservoirs within the area has been identified from the EA's [Reservoir Flood Extents dataset \(gov.uk\)](https://www.gov.uk/government/datasets/reservoir-flood-extents). Although it is predicted that there is a risk to life if these reservoirs were to fail, the risk of such an event occurring is very low.

This dataset consists of flood extents for two scenarios including 'Wet Day' and 'Dry Day', for all large, raised reservoirs. The 'Dry Day' scenario shows flood extents in the event that reservoirs were to fail and release the water they hold when local rivers are at normal levels. The 'Wet Day' scenario shows flood extents in the event that reservoirs were to fail and release the water they hold when local rivers are in flood.

Flood extents are not included for smaller reservoirs or for reservoirs commissioned after the reservoir modelling programme began in October 2016. Furthermore, only those reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoir Act 1975.

3.9 Sewer flooding

Thames Water and Southern Water are the water companies responsible for the management of the sewerage networks across Sevenoaks District.

Historic sewer flooding data was provided by Thames Water, which records the number of external and internal sewer flooding incidences at postcode level within the district. The database covers reported incidents of sewer flooding up to April 2026.

It should be noted that Southern Water was also contacted to request relevant data; however, this was not provided.

Due to licencing and confidentiality restrictions, sewer data has not been represented in the mapping, but incidents within the same postcode location as a site have been referred to within the detailed site assessments.

3.10 Residual risk

Several sites assessed within Sevenoaks District are near culverted sections of watercourses which flow beneath roads, railway lines, and footpaths, which present a residual flood risk should they become blocked or collapse. Potential culvert blockages that may affect a site were identified on OS Mapping and the OS Watercourse Link layer to determine where watercourses flow into culverts or through structures (i.e. bridges) in the vicinity of the sites. Any potential locations were flagged in the detailed site assessments.

3.11 Depth, velocity, and hazard to people

The Level 2 assessment seeks to map the probable depth and velocity of flooding as well as the hazard to people and use this within the detailed site assessments.

3.11.1 Fluvial

Where detailed modelling is available, the flood depth, velocity and hazard grids were used to provide a more accurate picture of flood risk at the sites. Where only national modelling covers a site, flood depth, velocity and hazard data is not available.

3.11.2 Surface Water

The new EA Surface Water Spatial Planning dataset has been used to assess flood depths at the development sites. However, as this dataset does not include velocity or hazard information, therefore the RoFSW mapping has been used to determine these outputs. The data is displayed in bands showing the probability of a given velocity or hazard being exceeded, rather than based on discrete events of a given return period.

Hazard to people has been calculated using the below formula as suggested in [Defra's Supplementary note on flood hazard ratings and thresholds for development planning and control purpose \(gov.uk\)](#). The different hazard categories are shown in Table 3-7.

Developers should also test the impact of climate change depths, velocities, and hazard on the site, as part of the site-specific FRA.

The RoFSW dataset includes a band where the hazard rating is greater than or equal to 0.5, but less than 0.75. Within the Level 2 site assessments this category has been given a conservative description of "Very low hazard/caution".

Table 3-7: Defra's 'Flood Risks to People' classifications

Description of Flood Hazard Rating	Flood Hazard Rating	Classification Explanation
Very Low - Caution	<0.75	'Flood zone with shallow flowing water or deep standing water'
Moderate - Danger For Some (i.e. children)	0.75 - 1.25	'Danger: flood zone with deep or fast flowing water'
Significant - Danger For Most	1.25 - 2.00	'Danger: flood zone with deep fast flowing water'
Extreme - Danger For All	>2.00	'Extreme danger: flood zone with deep fast flowing water'

3.12 SuDS suitability

The hydraulic and geological characteristics of each site have been assessed to determine the factors that potentially constrain schemes for surface water management. This assessment is designed to inform the early-stage site planning process and is not intended to replace site-specific detailed drainage assessments. A high-level assessment of suitability of SuDS is included in the site assessments in Appendix A.

The assessment is based on catchment characteristics using the following data:

- EA 1m LiDAR (2025)
- [The British Geological Survey website \(bgs.ac.uk\)](https://www.bgs.ac.uk) geology and soils mapping

- JBA Groundwater Emergence Mapping (see Section 3.7 for further details)
- Historic landfill sites
- Groundwater Source Protection Zones
- Nitrate Vulnerable Zones
- Main River and OS Watercourse Link layers
- RoFSW mapping
- Flood Zones derived as part of this Level 2 SFRA (see Section 3.3 for further details)

This data was then collated to provide an indication of particular groups of SuDS systems which might be suitable at a site. SuDS techniques were categorised into five main groups, as shown in Table 3-8.

Table 3-8: Summary of SuDS categories

SuDS Type	Technique
Source Controls	Green Roof, Rainwater Harvesting, Rain Gardens
Infiltration	Infiltration Trench, Infiltration Basin, Soakaway, Pervious Pavements
Detention	Pond, Wetland, Subsurface Storage, Shallow Wetland, Extended Detention Wetland, Pocket Wetland, Submerged Gravel Wetland, Wetland Channel, Detention Basin
Filtration	Surface Sand Filter, Sub-Surface Sand Filter, Perimeter Sand Filter, Bioretention, Filter Strip, Filter Trench
Conveyance	Dry Swale, Under-drained Swale, Wet Swale

The suitability of each SuDS type for the development sites has been described in the detailed site assessments, where applicable. The assessment of suitability is broadscale and indicative only; a surface water drainage scheme, with a detailed assessment should be carried out during the site planning stage to confirm the feasibility of different types of SuDS.

3.13 Emergency Planning

Flood Warning Areas (FWAs) and Flood Alert Areas (FAAs) are detailed in the EA's GIS datasets and can be used to inform emergency planning. FAAs inform the EA when there is flooding first in the catchment, irrespective of properties, hence this coverage tends to apply to whole watercourses or stretch of coastline. FWAs are derived from the extreme flood outline (0.1% AEP event), focussed on communities, properties, and/or infrastructure. Modelled depth, velocity and hazard data can be used to understand safe access and escape routes for each site.

4 Level 2 Assessment Methodology

This section outlines how sites were screened against flood risk datasets to determine which sites required a Level 2 detailed site assessment. It also identifies other sites, referred to in this SFRA as 'amber sites', at lower risk with general recommendations for developers.

4.1 Site screening

Sevenoaks District Council provided 103 sites for assessment. These sites were screened using an 'overlap analysis' tool in GIS. This analysed various flood risk datasets against the site allocations layer and calculated the percentage cover for each flood risk dataset against each site. This was used to provide a summary of risk to each site, including:

- the proportion of the site in each Flood Zone derived from detailed hydraulic model outputs where available, and where detailed modelling was unavailable the information is taken from the EA's FMfP (see Section 3.2 for a summary of how the Flood Zones were derived for this SFRA).
- the proportion of the site affected by climate change within detailed modelling extents, where available, and the EA RoFRS dataset, where not available.
- whether the site is shown to be at risk from surface water flooding in the Surface Water Spatial Planning extent mapping for the 3.3%, 1%, and 0.1% AEP events, and the 3.3%, 1% and 0.1% AEP plus 'Upper End' climate change allowance events.
- whether the site is within, or partially within, the reservoir 'Dry Day' or 'Wet Day' flood extents.
- whether the site is at risk from groundwater emergence using the JBA Groundwater Emergence Map.
- whether the site is within, or partially within, the EA Historic Flood Map dataset or within 100m of a LLFA record flood incident.

The results of the screening provide a quick and efficient way of identifying sites that are likely to require a Level 2 assessment, supporting Sevenoaks District Council with Sequential Test decision-making so that flood risk is taken into account when considering allocation options.

The screening also provides an opportunity to identify sites which may be shown to be 100% in Flood Zone 1, but upon visual inspection in GIS, have an ordinary watercourse flowing through or adjacent to them. Although this may not be represented in available flood mapping, it does not mean the watercourse does not pose a risk, it just means no modelling has yet been undertaken to identify the risk.

Flood Zones are not derived for specific sites or land where the catchment area of the watercourse falls below 3km². For this reason, the Flood Zones are not of a resolution to be

used as application evidence to provide the details of possible flooding for individual properties or sites and for any sites with watercourses on, or adjacent to the site.

4.2 Sites taken forward to a Level 2 assessment

A Red-Amber-Green (RAG) assessment was carried out following the site screening on both site lists:

- 'Red' sites were identified where more than 10% of the site was located within the EA Flood Zones 2 and 3, or at significant surface water risk (over 20% of the site was at risk in the present day 0.1% AEP event or over 50% of the site was at risk in the 1% AEP plus 'Upper End' climate change allowance event). They were also identified where sites were at high risk of groundwater emergence. Red sites had significant obstacles or challenges for development which would need consideration if taken forward. They may need the Exception Test to demonstrate that the site can be safely developed, from a flood risk perspective.
- 'Amber' sites were identified to have less than 10% of the site located within the EA Flood Zones 2 and 3, or moderate surface water risk (between 10% and 20% of the site was at risk in the present day 0.1% AEP event or between 20% and 50% of the site was at risk in the 1% AEP climate change surface water event), potentially impacting access and escape in vicinity of the site. They were also identified where sites were at moderate risk of groundwater flooding. Amber sites were flagged for further consideration by planners and developers, but it is likely to be possible to address the flood risk constraints at planning application stage.
- 'Green' sites were identified as sites at low fluvial risk (Flood Zone 1) and surface water risk (less than 10% within the present day 0.1% AEP surface water event and less than 20% within the 1% AEP plus climate change event), where flood risk is unlikely to have an impact on future development. However, it is noted green sites may still require an FRA and drainage strategy, depending on the size and location of the site.

Of the 'Red' high risk sites identified, four sites were identified as having 'Significant Constraints', due to either access and escape concerns, or because they are considered a higher planning priority by Sevenoaks District Council. These include the following sites: HO/21/00232, HO/25/00012, MX/21/00014 and MX/26/00002

Of the 103 sites screened, the results were as follows:

- 20 Red sites (of which 4 are described as having Significant Constraints)
- 38 Amber sites
- 45 Green sites

4.3 Detailed site assessments

As part of the Level 2 SFRA, detailed site assessments have been produced for the 20 sites identified in Section 4.2. The site assessments and associated mapping can be found

in Appendix A, Table 4-1 sets out the information contained within each section of the site assessment.

Table 4-1: Summary of the information within each section of the detailed site assessments.

Section	Information
1. Background	• Site details including location, area, current land use (greenfield/brownfield) and proposed site use • Topography of the site • Geology and soil characteristics
2. Sources of flood risk	• Location of the site within the catchment • Existing drainage features • Fluvial – proportion of site at risk including description from mapping/modelling, utilising depth, hazard, and velocity information from detailed hydraulic models where available • Surface Water – proportion of site at risk including description from the Surface Water Spatial Planning and RoFSW mapping • Reservoir flood risk in both the 'Dry Day' and 'Wet Day' scenarios • Groundwater emergence risk • Sewer flood risk - reported incidences within the site and any additional known risks identified by Thames Water • Flood history - historic incidents on or surrounding the site from the EA Historic Flood Map dataset and LLFA flood records
3. Climate Change	• Fluvial climate change - summary of available climate change allowances and increase in flood extent compared to the 1% AEP event (Flood Zone 3a) • Surface water climate change - summary of available climate change allowances and increase in flood extent compared to the 1% AEP event
4. Flood risk management infrastructure	• Flood risk management infrastructure • Description of residual risk
5. Emergency planning	• Flood warnings and alerts • Access and escape routes
6. Requirements for drainage control and impact mitigation	• Broadscale assessment of possible SuDS to provide indicative surface water drainage advice for each site assessed for the Level 2 SFRA. • Identification of potential SuDS constraints including Groundwater Source Protection Zones, Nitrate Vulnerable Zones and historic landfill sites
7. NPPF and planning	• Exception Test requirements

Section	Information
implications	- Requirements and guidance for site-specific Flood Risk Assessment - Guidance for site design and making development safe
8. Conclusions	- Summary of key risks to the site - Summarising considerations if development proceeds
A. Detailed hydraulic modelling maps (where applicable)	Displays extent, depth, velocity and hazard mapping for sites covered by the Darrent and Cray or Medway hydraulic models

4.4 Amber sites assessment

As set out in Section 4.2, 38 of the 103 sites assessed were identified as 'Amber' in terms of fluvial and surface water flood risk, or there was a risk of groundwater emergence at the site. These sites are likely to have some challenges for development but are not identified as requiring a Level 2 assessment.

5 Flood risk management requirements for developers

The flood risk management requirements for developers are detailed within Section 7 of the Sevenoaks Level 1 SFRA. Users should refer to this section for guidance on site-specific FRAs and other principles for managing flood risk in new development.

This contains details on:

- early consultation with statutory and non-statutory consultees;
- requirements for site-specific FRAs, including signposting to specific guidance; and
- emergency planning.

The sections below contain further information on emergency planning and the requirements for developer contributions.

5.1 Emergency planning

Safe access and escape routes from the site should be provided. The developer should seek to incorporate an emergency plan and a safe refuge point if the development site has been identified to be at risk of flooding. The Local Authority and Emergency Services should be consulted when designing an emergency plan.

This Level 2 assessment has identified 12 proposed sites (EM/21/0006, EM/25/00001, EM/26/00001, HO/21/00044, HO/21/00232, HO/21/00233/B, HO/21/00279, HO/24/00014, HO/25/00012, MX/21/00009, MX/21/00013, MX/21/00014) located within existing EA FWAs and/or FAAs. For proposed development within existing EA FWAs, developers should consult the EA to ensure that adequate flood warning procedures and evacuation processes are in place and that RMAs are not put under any additional burden.

Section 10 of the Level 1 SFRA report discusses NPPF requirements and what an emergency plan will need to consider and other relevant information on emergency planning. Further information is provided on the [Kent County Council Emergency Planning webpage](#).

The duration and onset of flooding affecting a site depends on several factors:

- Location of the site within the catchment: flooding is likely to be rapid and flashy in the upper catchment (e.g. small tributaries) and slower responding and longer in duration in the lower catchment.
- Upstream storage: floodplains, reservoirs, and other storage areas upstream of a site may provide some online flood storage that reduces the flood risk downstream and delays the onset of flooding.
- Timing of peak flow: at the confluence of the larger watercourses and smaller tributaries, there may be different timings of peak flows, for example smaller tributaries would peak much earlier than the larger catchments.

- The principal source of flooding: where this is surface water, depending on the intensity and location of the rainfall, flooding could be experienced within 30 minutes of the heavy rainfall event e.g., a thunderstorm. Typically, the duration of flooding for areas at risk of surface water flooding, or from flash flooding from small watercourses, is short (hours rather than days).
- The preceding weather conditions prior to the flooding: wet weather lasting several weeks will lead to saturated ground. Rivers respond much quicker to rainfall in these conditions.
- Whether a site is defended, noting that if the defences were to fail, a site could be affected by very fast flowing and hazardous water within 15 minutes of a breach developing (depending on the size of the breach and the location of the site in relation to the breach), causing danger to life.
- Catchment geology: the permeability of a catchment affects its response time, for example chalk catchments take longer to respond than clay catchments.

5.2 Developer contributions

In some cases, and following the application of the Sequential Test, it may be appropriate for the developer to contribute to the improvement of flood defence provision that would benefit both proposed new development and the existing local community. Developer contributions should include the following:

- Developers should check the online [Flood Map for Planning \(gov.uk\)](https://www.gov.uk/guidance/flood-map-for-planning) in the first instance to identify any major changes to the Flood Zones and the [long-term flood risk mapping portal \(gov.uk\)](https://www.gov.uk/guidance/long-term-flood-risk-mapping-portal) for any changes to flood risk from surface water or inundation from reservoirs.
- Developer contributions can be made to maintenance and provision of flood risk management assets, flood warning and the reduction of surface water flooding (i.e. SuDS).
- Developers should also confirm that a development will not impact upon the ability of a floodplain to store or convey and seek opportunities to provide floodplain betterment, should the footprint of a development change.
- Where necessary, compensatory flood storage should be provided up to the 1% AEP plus climate change flood level and adjacent to the floodplain so that the flood storage can hydraulically fill and drain.
- Developers must be aware that that information within the Level 1 and Level 2 SFRAs will be a useful starting point for development considerations, however they must request the most recent data and update hydraulic modelling where required. The EA has published new national risk information for flooding and coastal erosion; this includes future scenarios accounting for climate change. This information should be used as the main source of flood risk information, unless site-specific modelling / information is available.

The council should only use planning obligations to secure contributions where it is satisfied that the contribution will fund works / measures which are:

- Necessary to make the development acceptable in planning terms;
- Directly related to the development; and
- Fairly and reasonably related in scale and kind to the development (Paragraph 57, NPPF).

6 Surface water management and SuDS

The Surface Water Management roles and responsibilities for different organisations and relevant legislation, policy and strategy are detailed within Section 9 of the Sevenoaks Level 1 SFRA. Users should refer to this section when considering the different sources of flood risk to the site and how this can be mitigated in a sustainable way.

This contains detail on:

- role of the LLFA and LPA in surface water management;
- types of SuDS;
- sources of SuDS guidance; and,
- other surface water considerations including Groundwater Vulnerability Zones (GVZs), Groundwater Source Protection Zones (GSPZs), and Nitrate Vulnerability Zones (NVZs).

6.1 Opportunities for wider sustainability benefits and integrated flood risk management

The following recommendations for managing surface water and integrate flood risks are included in the Level 2 site assessments in Appendix A, and should be considered as part of any site proposed for development in Sevenoaks District:

- Implementation of SuDS at the development sites should provide opportunities to deliver multiple benefits including volume control, water quality, amenity and biodiversity. This could provide wider sustainability benefits to the sites and surrounding areas. Proposals to use SuDS techniques should be discussed with relevant stakeholders (Local Planning Authority, Lead Local Flood Authority, and the EA) at an early stage to understand possible constraints.
- Development at the development sites must not increase flood risk either on or off site. The design of the surface water management proposals should take into account the impacts of future climate change over the projected lifetime of the development.
- Opportunities to incorporate filtration techniques such as filter strips, filter drains and bioretention areas must be considered.
- The use of multistage SuDS treatment will improve water quality of surface water runoff discharged from the site and reduce the impact on receiving water bodies.
- Opportunities to incorporate source control techniques such as green roofs, permeable surfaces and rainwater harvesting must be considered in the design of the site.
- Consideration should be made to the existing condition of receiving waterbodies and their Water Framework Directive objectives for water quality. The use of multistage SuDS treatment will improve water quality of surface water runoff discharged from the development sites and reduce the impact on receiving water bodies.

- The potential to utilise conveyance features such as swales to intercept and convey surface water runoff should be considered. Conveyance features should be located on common land or public open space to facilitate ease of access. Where slopes are >5%, features should follow contours or utilise check dams to slow flows.

7 Recommendations

7.1 Considering the Exception Test for the proposed development sites

If the Exception Test is required, it must be demonstrated that the development will provide wider sustainability benefits that outweigh flood risk, and that the development will be safe throughout its lifetime without increasing flood risk elsewhere. The former is a planning-related consideration and the Level 2 SFRA helps to answer the latter part of the Test.

Some of the sites assessed in this Level 2 SFRA are at greater risk and will require careful consideration and significant mitigation to pass the flood risk element of the Exception Test. These sites include HO/21/00232, HO/25/00012, MX/21/00014 and MX/26/0002.

In principle, the remaining sites assessed within this Level 2 SFRA are likely to pass the flood risk element of the Exception Text by:

- Undertaking a sequential approach to the site layout with the most vulnerable aspects of development situated in the areas of lowest flood risk.
- Considering safe access/escape routes in the event of a flood (from all parts of the site, if say the site is cut off by a flood flow path). If access and escape are affected, a Flood Response Plan may be required.
- Designing buildings with finished floor levels above the estimated flood level (fluvial 1% AEP event with an allowance for climate change), including an appropriate allowance for freeboard.
- Using areas in areas of lower flood risk for the least vulnerable parts of the development in accordance with Table 2 in the PPG. No development should be permitted in Flood Zone 3b (aside from Essential Infrastructure).
- Testing flood mitigation measures if these are to be implemented, to ensure that they will not displace water elsewhere (for example, if land is raised to permit development on one area, compensatory flood storage will be required in another).
- Considering space for green infrastructure in the areas of highest flood risk.

Although not explicitly required within the PPG, consideration should be given to the surface water risk where this is high, with regards to the Exception Test. The following sites were identified to be at significant surface water risk as part of the Level 2 SFRA:

EM/21/00014, ENE14, HO/21/00044, HO/21/00059, HO/21/00094, HO/21/00096, HO/21/00227, HO/21/00287, HO/24/00018, HO/25/00018, HO/25/00021, MX/21/00039M MX/26/0002 and SsM06.

If a site is split in future into smaller land parcels for development, and some of those parcels are in areas of flood risk, the Exception Test may need to be re-applied by the developer at the planning application stage.

7.2 Recommendations from the Level 1 SFRA

Recommendations from this report should be considered in addition to recommendations from the Level 1 SFRA, which still stand for the site allocations and any windfall development that comes forward. The recommendations for the Level 1 SFRA are set out in Section 13 of the Sevenoaks Level 1 SFRA report.

7.3 Requirements for developers

The sections below set out requirements for developers to consider both for developing sites assessed within this Level 2 SFRA and for developing windfall sites.

7.3.1 Watercourses

Any sites located where there is a Main River (including culverted reaches of a Main River) will require an easement of 8m either side of the watercourse from the top of the bank. This may introduce constraints regarding what development will be possible and consideration will also need to be given for access and maintenance at locations where there are culverts. Developers will be required to apply for appropriate permits so the activity being carried out over easements does not increase flood risk. Further information relating to this can be viewed on the government website [Flood risk activities: environmental permits \(gov.uk\)](https://www.gov.uk/government/topics/flood-risk-management/flood-risk-activities).

Where no recent detailed hydraulic modelling is present, it is recommended that developers construct new, or update existing, detailed hydraulic models at these sites as part of a site-specific FRA using channel, structure, and topographic survey to confirm flood risk. Site-specific flood modelling will likely need to be developed in locations where it is necessary to understand the effects of proposed development schemes on the existing flood flow paths and flood volume storage, in the present day and in the future.

At the planning application stage, developers may need to undertake more detailed hydrological and hydraulic assessments of unmodelled watercourses and surface water interactions so that the potential effects of proposals can be evaluated at site level and ensure that there is no increase in risk off-site as a result of development. Where a site is at risk from an unmodelled watercourse, a detailed hydraulic 1D/2D model should be produced, informed by channel, structure and topographic survey. The modelling should evidence flood extents, depths, velocities and hazard (including latest climate change allowances), inform development zoning within the site and prove, if required, whether the Exception Test can be passed.

If an ordinary watercourse is within or immediately adjacent to the site area, consultation with Kent County Council as the LLFA should be undertaken. If alterations or discharges are proposed to the watercourse, a land drainage consent will be required.

Developers should be aware of the need to identify the route of, and flood risk associated with, any culverts within a site. CCTV condition survey will be required to establish the current condition of the culvert and hydraulic assessments will be necessary to establish culvert capacity of both culverts on site and those immediately offsite that could pose a risk

to the site. The risk of flooding should be established using site survey, including the residual risk of culvert blockage.

7.3.2 Flood risk management infrastructure and residual risk

For sites where existing flood defences provide a reduction in the flood risk to the site, it is important to understand the standard of protection these structures and measures provide. It is also necessary to understand how this level of protection changes over time, considering the implications of climate change.

If flood defences are required to protect a development site, evidence will be required to show that the new development does not adversely impact and increase flood risk to other areas, for example that there is no net loss in floodplain storage in circumstances where this is a material consideration. It will need to be established that these defences can be appropriately managed and maintained during the lifetime of the development. In some cases, it will be a requirement to demonstrate that there is an appropriate level of commitment to the maintenance of the standard of protection afforded by existing defences, where reliance is placed on the standard they provide.

7.3.3 Access and escape routes

Access and escape routes should be considered at the site, but also in the vicinity of the site, for example, a site may have low surface water risk, but in the immediate locality, access/escape routes to and from the site could be restricted for vehicles and/or people. For sites assessed within this Level 2 SFRA, an initial overview of potential access and escape options is provided within the detailed site assessments and potential constraints identified.

7.3.4 Surface water flood risk and SuDS

Surface water risk should be considered in terms of the proportion of the site at risk in the 3.3% (high risk), 1% (medium risk) and 0.1% AEP (low risk) events (with an appropriate allowance for climate change), whether the risk is due to isolated minor ponding or deeper pooling of water, or whether the risk is due to a wider overland flow route.

A strategic assessment of SuDS options has been undertaken using regional datasets for sites assessed within this Level 2 SFRA. A detailed site-specific assessment of suitable SuDS techniques should be undertaken at site-specific level to understand which SuDS options are most appropriate. This may need to include infiltration testing to determine the suitability of infiltration methods.

Surface water risk and mitigation should be considered as part of a detailed site-specific FRA and surface water drainage strategy.

7.4 Use of SFRA data and future updates

It is important to recognise that the SFRA has been developed using the best available information at the time of preparation. This relates both to the current risk of flooding from all sources and the potential impacts of future climate change.

The SFRA should be a 'living document', and as a result should be updated when new information on flood risk, flood warning, or new planning guidance or legislation becomes available. New information may be provided by Sevenoaks District Council as LPA, Kent County Council as LLFA, the EA, Thames Water and Southern Water. Such information may be in the form of:

- New hydraulic modelling results.
- Flood event information following a future flood event.
- Policy or legislation updates.
- Updates to the EA flood mapping.
- New flood defence schemes or flood alleviation schemes.

The EA regularly reviews their flood risk mapping, and it is important that they are approached to determine whether updated information is available prior to commencing a detailed FRA. It remains uncertain whether any additional data will be released. The most recent publication in May 2026 includes the Surface Water Spatial Planning dataset, which provides updated surface water flood depth and climate change mapping. This information has been incorporated within this Level 2 SFRA.

It is recommended that the SFRA is reviewed in line with the EA's Flood Zone map updates to ensure latest data is still represented in the SFRA, allowing a cycle of review and a review of any updated data by checking with the above bodies for any new information.

Appendices

A Detailed site assessments including mapping

B L2 Site Screening

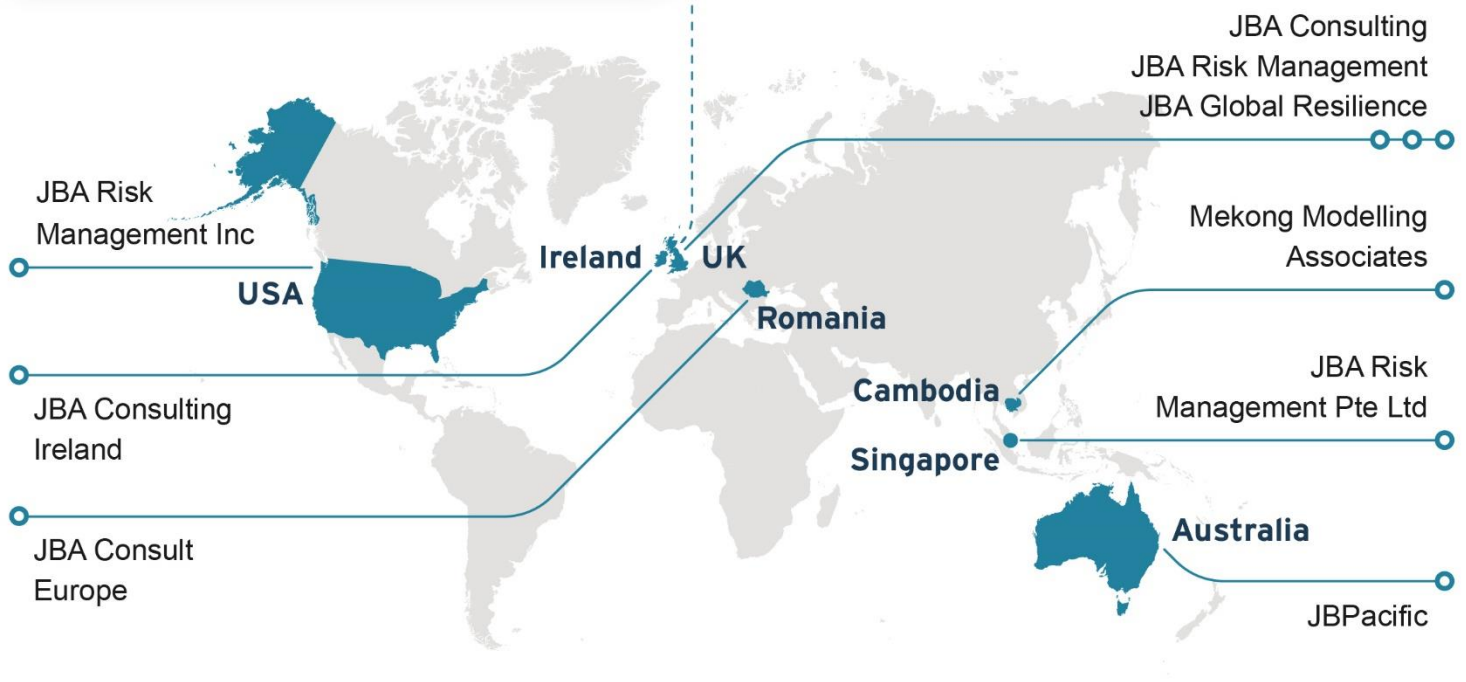
C Data sources used in this SFRA



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Doncaster
Dublin
Edinburgh
Exeter
Glasgow
Haywards Heath
Leeds
Limerick

Newcastle
Newport
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