

Tonbridge and Malling Borough Council Level 1 Strategic Flood Risk Assessment

Final Report

October 2025

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Tonbridge and Malling Borough Council

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Contract

This report describes work commissioned by Julian Ling on behalf of Tonbridge and Malling Borough Council, by a contract dated 01 July 2025. Tonbridge and Malling's representatives for the contract were Julian Ling and Jenny Knowles. Hannah Booth and Dominic Richardson of JBA Consulting carried out this work.

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Purpose

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JBA Consulting has no liability regarding the use of this report except to Tonbridge and Malling Borough Council.

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Executive summary

Introduction

This Strategic Flood Risk Assessment (SFRA) 2025 document replaces the Level 1 SFRA originally published by Tonbridge and Malling Borough Council in August 2016.

The SFRA update was required to be compliant with the latest guidance described in the revised National Planning Policy Framework (NPPF) (last updated on the 07 February 2025) and accompanying Planning Practice Guidance (PPG) (last updated in August 2022). The 2025 SFRA provides flood risk evidence and long-term strategy to support the management and planning of development, protect the environment and deliver infrastructure. The SFRA supports the selection of site allocations in the Local Plan 2024-2042 and provides information and guidance to be used in the preparation of Flood Risk Assessments in support of site-specific planning applications.

SFRA Objectives

The key objectives of this SFRA are:

- To provide a robust evidence base to inform the application of the Sequential, and if necessary, Exception Tests for developers and planners.
- To assess the flood risk to and from the study area from all sources, now and in the future (accounting for climate change).
- To assess the impact that cumulative land use changes and development in the area will have on flood risk.
- To identify and provide recommendations on opportunities to reduce the causes and impacts of flooding to existing communities and developments.
- To identify land usage for flood risk management.

Levels of SFRA

The Planning Practice Guidance advocates a tiered approach to risk assessment and identifies the following two levels of SFRA:

1. Level 1: where flooding is not a major issue and where development pressures are low. The assessment should be sufficiently detailed to allow application of the Sequential Test.
2. Level 2: where allocations are proposed in flood risk areas (i.e. from any source now and in the future), or where future windfall pressures in flood risk areas are expected. The Level 2 SFRA should be detailed enough to identify which development sites have the least risk of flooding and the application of the Exception Test, if relevant. The above text suggests that the Level 2 SFRA is used to assess whether the Exception Test can be satisfied and that the Sequential Test has been addressed appropriately.

This report fulfils the Level 1 SFRA requirements. The report has evaluated potential development sites across Tonbridge and Malling Borough and provided an assessment of cumulative impacts. The information included in this report is appropriate to enable Tonbridge and Malling Borough Council to apply the Sequential Test when considering potential allocations in the Local Plan 2024-2042.

Summary of the Level 1 SFRA

Planning policy for flood risk management

The **National Planning Policy Framework** and associated **Planning Practice Guidance** (PPG) have been reviewed in terms of their requirements as to how flood risk and surface water drainage should be managed through the planning system, and how these policies should be implemented. Proposed development sites at locations at risk of flooding will need to address the Sequential and, where necessary, Exception Tests in accordance with the NPPF and PPG. Links are provided to various guidance documents and policies published by other Risk Management Authorities such as the Lead Local Flood Authority and the Environment Agency.

Historic flooding

Tonbridge and Malling Borough has a history of documented flood events from several sources of flood risk. Flood records indicate that the main source of risk is from fluvial sources across the River Medway, and its tributaries, notably the River Bourne, Botany Stream, Mill Stream, Alder Stream and Hildern Brook.

The most significant flood events reported to have affected Tonbridge and Malling Borough occurred in 1953, 1968, 2000 and 2013/2014 each of which included notable flooding from the River Medway. When looking at the River Medway, areas historically affected by flooding include East Peckham, Beltring, Tonbridge, Aylesford, New Hythe, Leybourne, and Snodland.

Historic records also indicate that Tonbridge and Malling Borough has experienced several surface water / drainage related flood events, which have been attributed to a range of sources.

The Environment Agency's Historic Flood Map can be found in Appendix A.

Fluvial flooding

The River Medway and its tributaries are the main watercourses within the Local Plan area. The River Medway is of fluvial influence in the south, and tidal influence in the north. Other sources of fluvial flood risk include, but are not limited to, the River Bourne and Hawden Stream, both of which are also designated Main Rivers.

Mapping of the fluvial flood risk in the Local Plan area has been prepared as part of the Level 1 SFRA and can be found in Appendix A.

Tidal flooding

The tidal influence of the River Medway extends from the far north of the borough to beyond Allington, located at the border of the borough. Aylesford and Snodland have previously been flooded from overtopping of defences that line the river. However, the improvements to coastal and tidal defences that have taken place following the flooding on 1953 should be kept in mind when viewing the data for this event. Mapping of the tidal flood risk in the Local Plan area has been prepared as part of the Level 1 SFRA and can be found in Appendix A.

Surface water flooding

Tonbridge and Malling Borough has also experienced a number of historic surface water / drainage related flood events, which have been attributed to a range of sources. The primary source of surface water flooding was attributed to heavy rainfall overloading highway carriageways and paved areas, drains and gullies, but other sources of flooding were perceived to be from blockages and high-water levels impeding free discharge from surface water drains and gullies. The Risk of Flooding from Surface Water (RoFSW) mapping shows a number of surface water flow paths which predominantly follow

topographical flow paths along existing watercourses or dry valleys with some isolated ponding located in low lying areas.

The Environment Agency's RoFSW mapping can be found in Appendix A.

Groundwater flooding

The JBA Groundwater Emergence Map identifies a large proportion of the northern Tonbridge and Malling Borough area is potentially at risk of groundwater emergence, particularly to the north of Oldbury and Ightham, Borough Green, to the north of Wrotham Heath, Addington, Ryarsh, Birling, Ham Hill New Hythe, Leybourne and Lunsford. This potential risk of emergence can be attributed to the bedrock geology of the area. In southern areas of the Borough, there are isolated areas of groundwater flood risk. Groundwater flooding has occurred previous in West Malling and East Malling. See historic flood risk for further details.

The areas at high and medium risk of emergence have been joined with areas of the RoFSW 1000-year flood extent to understand where the emerging groundwater is likely to flow. This outline will give an indication of areas of the Local Plan area which are potentially at higher risk than other. Areas at potentially higher risk of groundwater flooding can be found in Appendix A with the methodology outlined in Appendix C.

Reservoir flooding

In relation to reservoir flooding, there are no records of flooding from reservoirs impacting properties inside the borough. The Environment Agency's Risk of Flooding from Reservoir's flood extent mapping shows the risk of flooding during normal conditions (dry day scenario) and when a breach coincides with a severe fluvial flood event (wet day scenario) and indicates that reservoirs in or outside of the borough could affect properties in the event of a breach. This includes the Leigh Flood Storage Area, which is located immediately upstream of Tonbridge and Malling Borough, and a breach of which could have notable implications for Tonbridge and the wider borough area.

The Environment Agency's Risk of Flooding from Reservoirs dataset can be found in Appendix A.

Sewer flooding

The Sewer Incident Report Form (SIRF) data supplied by Southern Water indicates a total of 3070 recorded flood incidents from January 2011 to October 2021 within Tonbridge and Malling Borough. The more frequently flooded postcodes are ME18, ME19, ME20, ME6, TN11, TN12, TN15, and TN9. However, it is important to recognise that the information does not present whether flooding incidences were caused by general exceedance of the design sewer system, or by operational issues such as blockages. Thames Water covers a small area of the borough with no history of hydraulic flooding or cross boundary issues.

Flood defences

A high-level review of formal flood defences was carried out using existing information to provide an indication of their condition and standard of protection. Details of the flood defence locations and condition were provided by the Environment Agency for the purpose of preparing this assessment.

Alongside the current flood risk management infrastructure within the borough, the Environment Agency are considering additional flood risk management measures. However, it is uncertain whether and in what form these will proceed at this time. When considering proposed development consideration must be given to the status and timing of FRM measures and schemes to provide evidence on whether a proposed development may benefit from, hinder, adjust or facilitate delivery and implementation.

The Environment Agency's flood defence locations can be found in Appendix A.

Climate change

The SFRA has considered the impacts of climate change on the Local Plan area in the future. The UK Climate Change Projections 2018 (**UKCP18**) were published on 26 November 2018.

The Environment Agency updated their **climate change allowances** based on the UKCP18 projections. Climate change allowances for peak river flows, peak rainfall intensity and sea level allowances have been updated by the Environment Agency since the publication of the 2016 SFRA. The latest allowances have been used within this SFRA. The SFRA has also included modelling for the future high, medium and low risk scenarios for fluvial, tidal and surface water to conceptually reflect the latest PPG requirements.

When undertaking an FRA, reference should be made to the most up to date climate change allowances provided by the Environment Agency.

Cumulative impacts and strategic flood risk solutions

Under the NPPF, strategic policies and their supporting Strategic Flood Risk Assessments (SFRAs), are required to 'consider cumulative impacts in, or affecting, local areas susceptible to flooding' (para.171), rather than just to or from individual development sites. An assessment of cumulative impacts on flood risk has been undertaken and can be found in Section 14.4.

Consideration has been made to the potential for strategic flood risk solutions within Tonbridge and Malling Borough and how these could potentially be implemented. Potential solutions include flood storage, natural flood management, promotion of SuDS and floodplain restoration.

Sources of information used in preparing the SFRA

The SFRA has collated flood risk information from a number of key sources to understand flood risk within the Plan area. This includes the definition of Flood Zones that has been made as part of the SFRA and 'High and Low Risk Surface Water Flood Zones'. Other datasets such as the Risk of Flooding from Surface Water (RoFSW) mapping have also been analysed as well as records of historic flood incidents, Reservoir Flood Mapping, groundwater emergence risk and sewer flooding incidents.

The Environment Agency regularly reviews its flood risk mapping. It is important that they are approached to determine whether updated (more accurate or higher resolution) information is available prior to commencing a site-specific FRA.

How to use this report

Tonbridge and Malling Borough Council Planners

The SFRA provides the latest flood risk data and guidance to inform the Sequential Test and provides guidance on how to apply the Exception Test. The Council can use this information to apply the Sequential Test to strategic allocations and identify where the Exception Test should also be considered.

The SFRA provides guidance for developers, which can be used by development management staff to assess whether site-specific Flood Risk Assessments appropriately address the relevant matters.

It provides recommendations regarding all sources of flood risk in Tonbridge and Malling Borough, which can be used to inform policy on flood risk within the Local Plan. This includes how the cumulative impact of development should be considered. Policy recommendations are outlined below.

Policy recommendations

Tonbridge and Malling Borough Council will take account of the following recommendations with respect to flood risk management when preparing appropriate policy.

A. Development and planning considerations

Sequential and Exception tests

A Sequential Test methodology has been prepared in consultation with, and agreed by, the Environment Agency, Kent County Council (as Lead Local Flood Authority) and Tonbridge and Malling Borough Council. The methodology is outlined in Appendix C.

Proposed development sites at locations at risk of flooding will be required to satisfy the Sequential and, where necessary, Exception Tests in accordance with the NPPF which requires an assessment of all sources. Tonbridge and Malling Borough Council will use the information in this SFRA when deciding which development sites to take forward in the emerging Local Plan.

Site-specific Flood Risk Assessments

Site specific Flood Risk Assessments (FRAs) are required by developers to provide a greater level of detail on flood risk from any source and any protection provided by defences and, where necessary, demonstrate the development satisfies part b of the Exception Test.

Where required, developers should undertake more detailed hydrological and hydraulic assessments of the watercourses and tidal areas to verify flood extents (including latest climate change allowances) and more detailed assessment of flood risk from other sources. The modelling will inform flood risk, floodplain and development zoning within the site and provide evidence that the Exception Test is satisfied if required. Where a site-specific Flood Risk Assessment (FRA) has produced modelling outlines which differ from the Environment Agency's Flood Map for Planning a full evidence-based review would be required. Where the watercourses are embanked, the effect of overtopping and breach must be considered and appropriately assessed.

All new development within the 1% AEP (Annual Exceedance Probability) fluvial flood extent including an allowance for climate change (for the lifetime of the development) must not normally result in a net loss of flood storage capacity to avoid cumulative effects. Where possible, opportunities should be sought to achieve an increase in the provision of floodplain storage. Where proposed development results in a change in building footprint, the developer should normally ensure that it does not impact upon the ability of the floodplain to store or convey water and seek opportunities to provide floodplain betterment. Similarly, where ground levels are elevated to raise the development out of the floodplain, compensatory floodplain storage within areas that currently lie outside the floodplain should normally be provided so the total volume of the floodplain storage is not reduced. Any flood risk management measures should be consistent with the wider catchment policies set out in the Catchment Flood Management Plan, Flood Risk Management Plan, Local Flood Risk Management Strategy and other relevant strategies. Where necessary more detailed analyses should be prepared so that surface water, groundwater, reservoirs and flood risk from sewers so that development is implemented safely without adversely affecting others.

An updated NPPF was published in December 2024 and was updated on 07 February 2025 to align with updates to government planning policies and their application.

There are also several guidance documents which provide information on the requirements for site-specific Flood Risk Assessments:

- **Standing Advice on Flood Risk (Environment Agency)**
- **Flood Risk Assessment for Planning Applications (Environment Agency)**

- **Site-specific Flood Risk Assessment: CHECKLIST (PPG, Defra)**

The **UKCP18** projections replace the UKCP09 projections and is the official source of information on how the climate of the UK may change over the rest of this century. This resulted in the Environment Agency climate change allowances being updated with the latest in May 2022. When undertaking an FRA, reference should be made to the most up to date climate change allowances provided by the Environment Agency.

Developers should consult with Tonbridge and Malling Borough Council, Kent County Council, Upper or Lower Medway Internal Drainage Board, the Environment Agency and Southern Water or Thames Water at an early stage to discuss flood risk including requirements for site-specific FRAs, detailed hydraulic modelling, and drainage assessment and design.

B. Review of planning applications

The Council should consult the Environment Agency's '**Flood Risk Assessment: Local Planning Authorities**', (last updated 10 April 2025) and any subsequent updates when reviewing planning applications for proposed developments at risk of flooding.

The Council will consult the relevant statutory consultees as part of the planning application process and they may, in some cases, also contact non-statutory consultees (e.g. Southern Water) that have an interest in the planning application. The Council will, when appropriate consult with Lower and Upper Medway Internal Drainage Boards with respect to flood related and water level management aspects. The Internal Drainage Boards can have more detailed local knowledge on the performance and characteristics of particular water features in the authority area.

C. Infrastructure and safe access

According to the government's guidance on '**Preparing a flood risk assessment: standing advice**', it is recommended that floor levels are set at least 600 millimetres (mm) above the estimated flood level. It may be possible to reduce this to 300mm if there is a high level of certainty about your estimated flood level. If there is a particularly high level of uncertainty it may need to be increased.

Flood water can put pressure on buildings, causing structural issues. If the building design aims to keep out a depth of more than 600mm of water, advice from a structural engineer should be sought.

If the floor levels cannot be raised, extra flood resistance and resilience measures will need to be incorporated into the development. These measures should protect the property to at least 600mm above the estimated flood level.

Development plans also need to show how the development is not flooded by surface water or groundwater.

This could be by:

- diverting water away from buildings but safely managing it within the site
- raising floor levels above the estimated flood depths of surface and groundwater flooding

Prior to diverting or protecting property from surface water, the LLFA would expect all efforts to have been made to place property outside of known areas of flood risk in line with the sequential approach.

Safe access and egress will need to be demonstrated at all development sites. Emergency vehicular access should be possible during times of flood.

Where development is located behind, or in an area benefitting from defences, consideration should be given to the potential safety of the development, finished floor levels and for safe

access and egress in the event of rapid inundation of water due to a defence breach with little warning.

Resilience measures will be required if buildings are situated in the flood risk area, and opportunities to enhance green infrastructure and reduce flood risk by making space for water should be sought.

D. Residual risk

Residual risk is the risk that remains after the effect of mitigation measures is taken into account. The residual risk includes the consideration of flood events that exceed the design thresholds of the flood defences or circumstances where there is a failure of the defences, e.g. flood banks collapse. Residual risks should be considered as part of site-specific Flood Risk Assessments.

Further, any developments located within an area protected by flood risk management measures, where the condition of those defences is 'fair' or 'poor', where the standard of protection is not of the required standard or where the failure of the intended level of service gives rise to unsafe conditions should be identified by the developer as part of an FRA.

The risk to development from reservoirs is residual but developers should consider reservoir flooding during the planning stage. They should seek to contact the reservoir owner to obtain information and should apply the sequential approach to locating development within the site. Developers should also consult with relevant authorities regarding emergency plans in case of reservoir breach.

E. Future flood management

Developments should demonstrate opportunities to create, enhance and link green assets. This can provide multiple benefits across several disciplines including flood risk and biodiversity / ecology and may provide opportunities to use the land for amenity and recreational purposes. Development that may adversely affect green infrastructure assets should not normally be permitted.

The information provided in the SFRA should be used as a basis for investigating potential strategic flood risk solutions within the study area. Opportunities could consist of the following:

- Catchment and floodplain restoration;
- Flood storage areas;
- Buffer strips;
- Opening up culverts, weir removal, and river restoration;
- The Regional Habitat Creation Programme;
- Green infrastructure; and
- Preserving the function of surface water flood routes where appropriate.
- Water reuse.

For successful future flood risk management, it is recommended that the Council adopts a catchment partnership working approach in tackling flood risk and environmental management.

F. Surface water management and SuDS

Planners should be aware of the conditions and requirements set by Kent County Council as the Lead Local Flood Authority for surface water management and ensure development proposals and applications are compliant with the **Kent County Council Drainage and Planning Policy** and Paragraph 182 of the NPPF outlines what applications should consider with regards to sustainable drainage systems to control flow rates and reduce runoff.

Developers

For sites that are not allocations, developers will need to use this SFRA to help apply the Sequential Test. For the following circumstances, whether allocations or windfall sites, developers will need to apply the Exception Test and use information in a site-specific Flood Risk Assessment to inform this test at planning application stage:

- Highly vulnerable and in Flood Zone 2
- Essential infrastructure in Flood Zone 3a or 3b
- More vulnerable in Flood Zone 3a
- Proposed development in locations materially affected by surface water, groundwater, reservoir or sewer flood risk

This is a strategic assessment and does not replace the need for site-specific Flood Risk Assessments where a development is either within Flood Zones 2 or 3 or greater than a hectare in Flood Zone 1 or is located in an area affected by surface water, groundwater, reservoir or sewer flood risk. In addition, a surface water drainage strategy will be needed for all major developments in any Flood Zone to satisfy Kent County Council, the Lead Local Flood Authority (LLFA).

Developers can use the information in this SFRA, alongside site-specific research to help scope out what additional work will be needed in a detailed Flood Risk Assessment. To do this, they should refer to Appendix A (Interactive PDF mapping) and Section 7 (Sources of information used in preparing the SFRA). At the planning application stage, developers may need to undertake more detailed hydrological and hydraulic assessments of the watercourses to verify flood extent (including latest climate change allowances, last updated in May 2022), inform master-planning and demonstrate, if required, that the Exception Test is satisfied. As part of the Environment Agency's updated guidance on climate change, which must be considered for all new developments and planning applications, developers will need to undertake a detailed assessment of climate change as part of the planning application process when preparing FRAs.

Developers need to ensure that new development does not increase surface water runoff from a site or contribute to cumulative effects at sensitive locations, see Section 14.4. Section 11 provides information on the surface water drainage requirements of the LLFA. Sustainable Drainage Systems should be considered at the earliest stages that a site is developed which will help to minimise costs and overcome any site-specific constraints.

Site-specific Flood Risk Assessments will need to identify how flood risk will be mitigated so development is safe from flooding and does not have an adverse effect on third parties. In high-risk areas the Flood Risk Assessment will also need to consider emergency arrangements, including how there will be safe access and egress from the site.

Any developments located within an area protected by flood defences and where the standard of protection is not of the required standard (either now or in the future) should be identified and the use of developer contributions considered to fund improvements.

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Abbreviations

Term	Definition
AEP	Annual Exceedance Probability
BGS	British Geological Survey
Brownfield	Previously developed parcel of land
CC	Climate change - Long term variations in global temperature and weather patterns caused by natural and human actions.
CFMP	Catchment Flood Management Plan- A high-level planning strategy through which the Environment Agency works with their key decision makers within a river catchment to identify and agree policies to secure the long-term sustainable management of flood risk.
CIRIA	Construction Industry Research and Information Association
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EU	European Union
FEH	Flood Estimation Handbook
Flood defence	Infrastructure used to protect an area against floods as floodwalls and embankments; they are designed to a specific standard of protection (design standard).
Flood Risk Area	An area determined as having a significant risk of flooding in accordance with guidance published by Defra and WAG (Welsh Assembly Government).
Flood Risk Regulations	Transposition of the EU Floods Directive into UK law. The EU Floods Directive is a piece of European Community (EC) legislation to specifically address flood risk by prescribing a common framework for its measurement and management. These Regulations were discontinued in December 2023 and so the statutory obligations no longer apply but the flood risk and flood risk management information contained in documents prepared under the Regulations might still be of material influence.
Flood and Water Management Act (FWMA)	Part of the UK Government's response to Sir Michael Pitt's Report on the Summer 2007 floods, the aim of which is to clarify the legislative framework for managing surface water flood risk in England.
Fluvial Flooding	Flooding resulting from water levels exceeding the bank level of a main river
FRA	Flood Risk Assessment - A site-specific assessment of all forms of flood risk to the site and the impact of development of the site to flood risk in the area.
FRMP	Flood Risk Management Plan
GI	Green Infrastructure – a network of natural environmental components and green spaces that intersperse and connect the urban centres, suburbs and urban fringe
Greenfield	Undeveloped parcel of land
Ha	Hectare
Indicative Flood Risk	Nationally identified flood risk areas, based on the definition of 'significant' flood risk described by Defra.

Area	
JBA	Jeremy Benn Associates
KCC	Kent County Council
LFRMS	Local Food Risk Management Strategy
LLFA	Lead Local Flood Authority - Local Authority responsible for taking the lead on local flood risk management
LPA	Local Planning Authority
mAOD	metres Above Ordnance Datum
Main River	A watercourse shown as such on the Main River Map, and for which the Environment Agency has responsibilities and powers
NaFRA2	National Flood Risk Assessment (Second iteration)
NFM	Natural Flood Management
NPPF	National Planning Policy Framework
Ordinary Watercourse	All watercourses that are not designated Main River. Local Authorities or, where they exist, IDBs have similar permissive powers as the Environment Agency in relation to flood defence work. However, the riparian owner has the responsibility of maintenance.
OS NGR	Ordnance Survey National Grid Reference
PFRA	Preliminary Flood Risk Assessment
PPG	Planning Policy Guidance
Resilience Measures	Measures designed to reduce the impact of water that enters property and businesses; could include measures such as raising electrical appliances.
Resistance Measures	Measures designed to keep flood water out of properties and businesses; could include flood guards for example.
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.
Return Period	Is 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.
RoFSW	Risk of Flooding from Surface Water
Sewer flooding	Flooding caused by a blockage or overflowing in a sewer or urban drainage system.
SHLAA	Strategic Housing Land Availability Assessment - The Strategic Housing Land Availability Assessment (SHLAA) is a technical piece of evidence to support local plans and Sites & Policies Development Plan Documents (DPDs). Its purpose is to demonstrate that there is a supply of housing land in the district which is suitable and deliverable.
SFRA	Strategic Flood Risk Assessment
SIRF Register	A water-company held register of properties which have experienced sewer flooding due to hydraulic overload, or properties which are 'at risk' of sewer flooding more frequently than once in 20 years.
SoP	Standard of Protection - Defences are provided to reduce the risk of flooding from a river and within the flood and defence field standards are usually described in terms of a flood event return period. For example, a

	flood embankment could be described as providing a 1 in 100-year standard of protection.
SIRF	Sewer Incident Report Form
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.
SuDS	Sustainable Drainage Systems - Methods of management practices and control structures that are designed to drain surface water in a more sustainable manner than some conventional techniques
Surface water flooding	Flooding as a result of high intensity rainfall when water is ponding or flowing over the ground surface (surface runoff) before it enters the underground drainage network or watercourse, or cannot enter it because the network is full to capacity.
SWMP	Surface Water Management Plan - The SWMP plan should outline the preferred surface water management strategy and identify the actions, timescales and responsibilities of each partner. It is the principal output from the SWMP study.
TMBC	Tonbridge and Malling Borough Council
WFD	Water Framework Directive

1 Introduction

1.1 Purpose of the Strategic Flood Risk Assessment

“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.”

(National Planning Policy Framework (February 2025), paragraph 171)

This 2025 SFRA document supersedes the previous Tonbridge and Malling Borough Council's Level 1 SFRA (2016)¹.

The main purpose of this SFRA update is to prepare a document that provides up to date, comprehensive supporting evidence for the emerging Local Plan. Tonbridge and Malling Borough Council is currently in the process of preparing a new Local Plan for adoption by 2026, with a time horizon of 2024-2042. As part of the Local Plan, Tonbridge and Malling Borough Council have identified that the objectively assessed need is 19,746 (gross) across the plan period.

The SFRA update was required to be compliant with the latest guidance described in the updates to the National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG), updates to Environment Agency climate change guidance and support the selection of site allocations in the Local Plan and to provide information and guidance to be used in the preparation of Flood Risk Assessments (FRAs) in support of site-specific planning applications.

The **NPPF**² was published on 27 March 2012 and revised in 2018, 2019, 2021 2023, 2024 and most recently February 2025. The NPPF sets out Government's planning policies for England and how these are expected to be applied. The **PPG (Flood Risk and Coastal Change)**³ was first published in March 2014 with updates in 2021 and most recently in September 2025.

1.2 SFRA objectives

The key objectives of the 2025 SFRA are:

- To provide a robust evidence base to inform the application of the Sequential, and if necessary, Exception Tests for developers and planners.
- To assess the flood risk to and from the study area from all sources, now and in the future (accounting for climate change).
- To assess the potential effects of cumulative land use changes and development in the area on flood risk.
- To identify and provide recommendations on opportunities to reduce the causes and impacts of flooding to existing communities and developments.
- To identify land usage for flood risk management.

¹ Tonbridge and Malling Borough Council Level 1 SFRA. (2016) <https://www.tmbc.gov.uk/downloads/file/987/level-1-strategic-flood-risk-assessment-report-sfra-august-2016->

² Revised National Planning Policy Framework. Ministry of Housing, Communities, and Local Government. (2024). <https://www.gov.uk/government/collections/planning-practice-guidance>

³ Updated Planning Practise Guidance. <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

The SFRA has been completed in line with the guidance from DEFRA and the Environment Agency titled '**How to prepare a strategic flood risk assessment**'⁴ (last updated April 2025).

1.3 Levels of SFRA

The Planning Practice Guidance advocates a tiered approach to risk assessment and identifies the following two levels of SFRA:

1. Level 1: where flooding is not a major issue and where development pressures are low. The assessment should be sufficiently detailed to allow application of the Sequential Test.
2. Level 2: where allocations are proposed in flood risk areas (i.e. from any source now and in the future), or where future windfall pressures in flood risk areas are expected. The L2 SFRA should be detailed enough to identify which development sites have the least risk of flooding and the application of the Exception Test, if relevant. The above text suggests that the Level 2 SFRA will only be used to assess whether the Exception Test can be passed, and not the Sequential Test.

This report fulfils the Level 1 SFRA requirements.

1.4 SFRA outputs

To meet the objectives, the following outputs have been prepared:

- Appraisal of all potential sources of flooding, including Main River, Ordinary Watercourse, surface water and groundwater.
- Updated review of historical flooding incidents.
- Mapping of location and extent of functional floodplain.
- Reporting on the standard of protection provided by existing flood risk management infrastructure.
- Areas at risk from other sources of flooding, for example surface water or reservoirs.
- An assessment of the potential increase in fluvial, tidal and surface water flood risk due to climate change.
- An assessment of existing flood warning and emergency planning procedures, including an assessment of safe access and egress during an extreme event.
- Recommendations of the criteria that should be used to assess future development proposals and the development of a Sequential Test and sequential approach to flood risk.

1.5 Structure of this report

Table 1-1: SFRA report contents

Section	Contents
1. Introduction	Provides a background to the study, defines objectives, outlines the approach adopted and the consultation performed.
2. Flood Risk Policy and Strategy	Includes information on the implications of recent changes to planning and flood risk policies and legislation, as well as documents relevant to the study.

⁴ How to prepare a strategic flood risk assessment. DEFRA. (2020) <https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>

3. Roles and Responsibilities for Flood Risk Management	The roles and responsibilities of Risk Management Authorities (RMAs) in Tonbridge and Malling Borough.
4. How Flood Risk is Assessed	Outlines the definitions of flood risk, flood zones, residual risk and possible responses to flooding
5. Planning Policy for Flood Risk Management	Describes the Sequential Approach and application of Sequential and Exception Tests. Outlines cross-boundary issues and considerations.
6. Climate change	Outlines climate change guidance and the implications for the study area.
7. Sources of information used in preparing the SFRA	Outlines what information has been used in the preparation of the SFRA.
8. Understanding Flood Risk in Tonbridge and Malling Borough	Introduces the assessment of flood risk and provides an overview of the characteristics of flooding affecting Tonbridge and Malling Borough. Provides a summary of responses that can be made to flood risk, together with policy and institutional issues that should be considered.
9. Flood Defences	Assessment of existing flood defences and flood risk management measures
10. FRA requirements and flood risk management guidance	Identifies the scope of the assessments that must be submitted in FRAs supporting applications for new development. Provides guidance for developers and outlines conditions set by the LLFA that should be followed
11. Surface water management	Advice on managing surface water run-off and flooding and the application of SuDS.
12. Flood Warning and Emergency Planning	Outlines the flood warning service in the Local Plan area and provides advice for emergency planning, evacuation plans and safe access and egress.
13. Strategic Flood Risk Solutions	Overview of possible strategies to reduce flood risk.
14. Level 1 summary assessment of potential development locations	Overview of the allocation proposals
15. Summary and recommendations	Review of the Level 1 SFRA. Identifies recommendations for the council to consider as part of Flood Risk Management policy based on finding of the study to date.
Appendices	Appendix A: Flood risk mapping in Tonbridge and Malling Borough Appendix B: Site screening Appendix C: Sequential Test Methodology Appendix D: Drainage and Wastewater Management Plan Review

1.6 Consultation

The following stakeholders have been consulted during the preparation of this Level 1 SFRA:

- Tonbridge and Malling Borough Council (LPA)
- Kent County Council (LLFA)
- Environment Agency
- Southern Water
- Thames Water
- Upper Medway Internal Drainage Board and Lower Medway Internal Drainage Board (IDB)
- Neighbouring Authorities (Maidstone Borough Council, Tunbridge Wells Borough Council, Sevenoaks District Council, Gravesham Borough Council, Medway Council).

1.7 Use of SFRA data

Level 1 SFRAs are high-level strategic documents and do not go into detail 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 will still be required to undertake site-specific Flood Risk Assessments to support Planning Applications. Developers will be 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.

A Sequential Test Methodology agreed with the Environment Agency and Kent County Council is outlined in Appendix C.

Advice to users have been highlighted in **Amber** boxes throughout the SFRA.

Hyperlinks to external documents/guidance have been provided in **Green** throughout the SFRA.

On the date of publication, the SFRA contains the latest flood risk information. Over time, new information will become available to inform planning decisions, such as updated hydraulic models (which then update the Flood Map for Planning), flood event information, new defence schemes and updates to policy and legislation. Developers should check the online Flood Map for Planning in the first instance to identify any major changes to the Flood Zones.

1.8 Study area

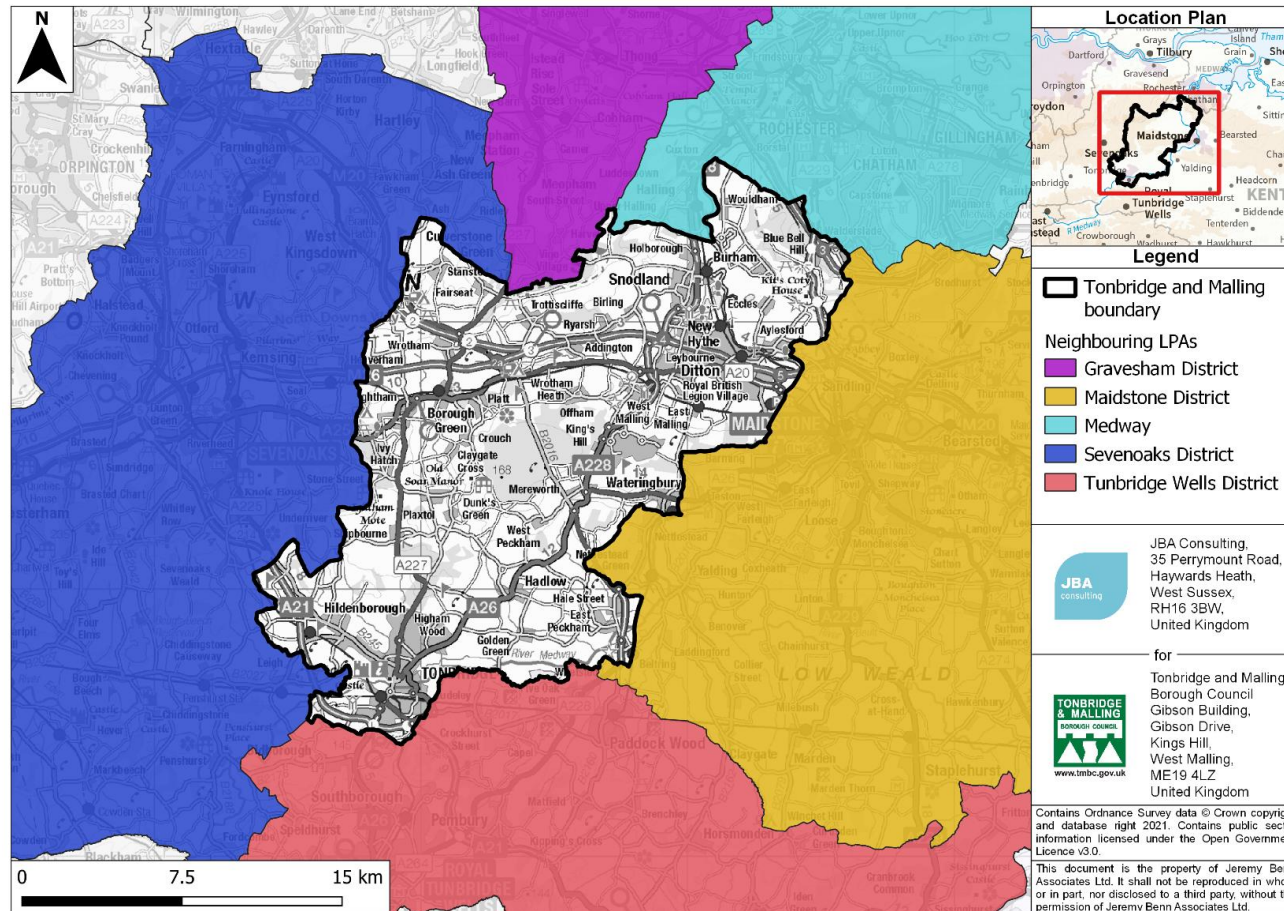
Tonbridge and Malling Borough covers an area of approximately 240km² and has a population of approximately 132,200⁵. There are 19 wards in the borough.

Tonbridge and Malling Borough is located in the north of Kent and to the south east of London. The unitary authority area was created in 1972 and accommodated the Tonbridge Urban District, Malling Rural District and parts of Tonbridge Rural District. The district received borough status in 1983 and the council was renamed Tonbridge and Malling Borough Council. The location of Tonbridge and Malling Borough and surrounding local authorities can be found in Figure 1-1.

The Lead Local Flood Authority for the area is Kent County Council. The water and sewerage provision of the area is administered by Southern Water and Thames Water. The Internal Drainage Boards (IDB) for the area are the Upper Medway IDB and the Lower Medway IDB, as shown in Appendix A.

⁵ <https://www.ons.gov.uk/visualisations/censuspopulationchange/E07000115/>

Figure 1-1: Tonbridge and Malling Borough and neighbouring authorities



The main river catchments that fall within Tonbridge and Malling Borough are:

- River Medway
- River Bourne
- Snodland Millstream
- Coult Stream
- Tonbridge Mill Stream
- Pen Stream
- Hilden Brook
- Hawden Stream

There are several other notable rivers and minor rivers within Tonbridge and Malling Borough including Aylesford Stream, East Malling and Ditton Stream, Alder Stream, Southborough Stream, Botany Stream, and the Gas Works Stream. The watercourses have been mapped in Appendix A.

2 Flood Risk Policy and Strategy

This section sets out the relevant legislation, policy, and strategy for flood risk management in Tonbridge and Malling Borough.

2.1 Introduction

The overarching aim of development and flood risk planning policy in the UK is to ensure that the potential risk of flooding is taken into account at every stage of the planning process. This section of the SFRA provides an overview of the planning framework, flood risk policy and flood risk responsibilities. In preparing the subsequent sections of this SFRA, appropriate planning and policy amendments have been acknowledged and taken into account.

A diagram showing strategic planning links and key documents for flood risk can be found in Figure 2-1.

2.2 Key Legislation for flood and water management

2.2.1 Floods Directive (2007) and Flood Risk Regulations (2009)

The **Flood Risk Regulations**⁶ as had previously translated the **EU Floods Directive**⁷ into UK law and have been discontinued since 31 December 2023. Many of the provisions overlapped with those in the Flood & Water Management Act and so the “sunsetting” of the Regulations has little direct effect, however, the flood risk and risk management information prepared under the Regulations is of material value and could provide useful support in the assessment of flood risk.

Legacy information that could be used includes identification of areas where there is a significant risk of flooding, Flood Risk and Hazard Mapping and relevant content in Flood Risk Management Plans. It is likely that over time this information will become less useful as it will not be updated.

The **Kent County Council PFRA (2011)** provided information on significant past and future flood risk from localised flooding in Kent, including Tonbridge and Malling Borough.

In 2011 indicative Flood Risk Areas were identified nationally by LLFA's. The exercise was repeated in 2018 and a further national study prepared to identify potential areas of significant flood risk (“Flood Risk Areas”) – **‘Review of preliminary flood risk assessments (Flood Risk Regulations 2009): guidance for lead local flood authorities in England – 25th Jan 2017’**. However, there were no indicative Flood Risk Areas identified within Tonbridge and Malling Borough.

2.2.2 Flood and Water Management Act (2010)

The **Flood and Water Management Act (FWMA)**⁸ was passed in April 2010. It aims to improve both flood risk management and the way we manage our water resources.

The FWMA has created clearer roles and responsibilities and helped to define a more risk-based approach to dealing with flooding. This included the creation of a lead role for upper tier authorities, as LLFAs, designed to provide a strategic overview of local flood risk (from

6 Flood Risk Regulations. UK Government. (2009). <https://www.legislation.gov.uk/ukSI/2009/3042/contents/made>

7 EU Floods Directive. European Commission. (2007) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060>

8 UK Government, Flood and Water Management Act 2010, available at <https://www.legislation.gov.uk/ukpga/2010/29/contents>, [Accessed 10/07/2020]

surface water, ground water and ordinary watercourses) and to provide a national overview role of all flood risk for the EA.

The content and implications of the FWMA provide opportunities for improved and integrated land use planning and flood risk management by LAs and other key partners. The integration and synergy of strategies and plans at national, regional and local scales, is increasingly important to protect vulnerable communities and deliver sustainable regeneration and growth.

2.2.3 Water Framework Directive (2000) & Water Environmental Regulations (2017)

The purpose of the **Water Framework Directive**⁹ (WFD), which was transposed into English Law by the **Water Environment Regulations**¹⁰ (first published in 2003 and updated in 2017), is to deliver improvements across Europe in the management of water quality and water resources. This is enforced through a series of plans called River Basin Management Plans (RBMP) (see section 2.3.3), which were last published in 2015 and are currently being updated.

2.2.4 Environmental permitting

The **Environmental Permitting Regulations**¹¹ (2016, amended 2018) set out where developers will need to apply for additional permission (as well as Planning Permission) to undertake works to an Ordinary Watercourse (pollution related works only) or Main River. This includes flood risk activities, for example:

- on or within 8 metres of a main river (16 metres if tidal);
- on or within 8 metres from the landward toe of a flood defence structure or culvert ;
- on or within 16 metres of the landward toe of a sea defence;
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert; and
- in a floodplain more than 8 metres from the riverbank, culvert or flood defence structure (16 metres if it is a tidal main river) and you do not already have planning permission.

Environmental permits may also be required from the Environment Agency to discharge runoff, trade effluent or sewage into a main river. They may also be required in relation to groundwater activities, where there may be a risk of groundwater contamination.

An Ordinary Watercourse consent may be required where work is carried out which could affect the flow of water within a watercourse which is not main river. These should be acquired from **Kent County Council**¹².

2.2.5 Land Drainage Act (1991)

Under the **Land Drainage Act (1991)**¹³ Internal Drainage Boards were also given the power to implement their own Byelaws. The act also outlines riparian responsibilities to maintain the flow of water and sets out Local Authority powers to regulate works that may alter the flow of water in a watercourse.

9 Water Framework Directive. European Commission. (2000) https://ec.europa.eu/environment/water/water-framework/index_en.html

10 Water Environment Regulations. UK Government. (2003) <https://www.legislation.gov.uk/uksi/2003/3242/contents/made>

11 Environmental Permitting Regulations. UK Government. (2016) <https://www.legislation.gov.uk/uksi/2016/110/contents/made>

12 Land drainage. Kent County Council <https://www.kent.gov.uk/environment-waste-and-planning/flooding-and-drainage/sustainable-drainage-systems/owning-and-maintaining-a-watercourse>

13 Land Drainage Act. UK Government. (1991). <https://www.legislation.gov.uk/ukpga/1991/59/contents>

2.2.6 Byelaws

Land Drainage Byelaws outline legal obligations and responsibilities when undertaking works on or close to a watercourse, for the purpose of preventing flooding, or mitigating any damage caused by flooding.

Southern Region Land Drainage Byelaws

The Local Plan area is covered by the **Southern Region Land Drainage Byelaws**¹⁴ and enforced by the Environment Agency. These Byelaws have effect on functions relating to land drainage in the Southern Water Authority for any Main River or sea and tidal defences.

Byelaws relating to Main Rivers within the Southern Region cover river control works, the flow of water in rivers, the duties of riparian owners, operations in rivers/ on banks and the placing of vessels in rivers. Byelaws relating to sea and tidal defences within the region cover the prevention of interference with defences, the maintenance and alteration of defences and the control of animals, vessels or acts affecting sea defences (e.g. erections and excavations).

Compliance to these standards must be demonstrated by any developer planning works within proximity of a Main River or sea/tidal defence within the Local Plan area.

Medway Internal Drainage Board Byelaws

The **Upper Medway Internal Drainage Board Land Drainage Byelaws**¹⁵ help secure the efficient working of the drainage system. The byelaws set out what can and cannot be done adjacent to IDB adopted watercourses within the drainage district without the Board permission.

2.2.7 Additional legislation

Additional legislation relevant to development and flood risk in Tonbridge and Malling Borough include:

- The **Town and Country Planning Act**¹⁶ (1990) and the **Water Industry Act**¹⁷ (1991). These set out the roles and responsibilities for organisations that have a role in Flood Risk Management (FRM).
- Other environmental legislation such as the **Habitats Directive**¹⁸ (1992), **Environmental Impact Assessment Directive**¹⁹ (2014) and **Strategic Environmental Assessment Directive**²⁰ (2001) also apply as appropriate to strategic and site-specific developments to guard against environmental damage.

It should be noted that some of the environmental directives listed are from European Union (EU) legislation, due to the UK leaving the EU these may be subject to change in the future.

¹⁴ Environment Agency, Thames land drainage and sea defence byelaws, available at: <https://www.gov.uk/government/publications/environment-agency-land-drainage-and-sea-defence-byelaws> [Accessed 09/06/2020]

¹⁵ Upper Medway Internal Drainage Board, Upper Medway Internal Drainage Board Land Drainage Byelaws, available at <http://www.medwayidb.co.uk/wp-content/uploads/2018/12/Upper-Medway-Byelaws.pdf> [Accessed 09/06/2020]

¹⁶ Town and Country Planning Act. UK Government. (1990) <https://www.legislation.gov.uk/ukpga/1990/8/contents>

¹⁷ Water Industry Act. UK Government. (1991) <https://www.legislation.gov.uk/ukpga/1991/56/contents>

¹⁸ Habitats Directive. European Commission. (1992) https://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

¹⁹ Environmental Impact Assessment Directive. European Commission. (2014) <https://ec.europa.eu/environment/eia/eia-legalcontext.htm>

²⁰ Strategic Environmental Assessment Directive. European Commission. (2001) <https://ec.europa.eu/environment/eia/sea-legalcontext.htm>

2.3 Relevant national, regional and local policy documents and strategies

Table 2-1 summarises key national, regional and local flood risk policy and strategy documents and how these apply to development and flood risk. Hyperlinks are provided to external documents.

These documents may:

- Provide useful and specific local information to inform Flood Risk Assessments within the local area.
- Set the strategic policy and direction for Flood Risk Management (FRM) and drainage – they may contain policies and action plans that set out what future flood mitigation and climate change adaptation plans may affect a development site. A developer should seek to contribute in all instances to the strategic vision for FRM and drainage in the Borough.
- Provide guidance and/or standards that informs how a developer should assess flood risk and/or design flood mitigation and SuDS

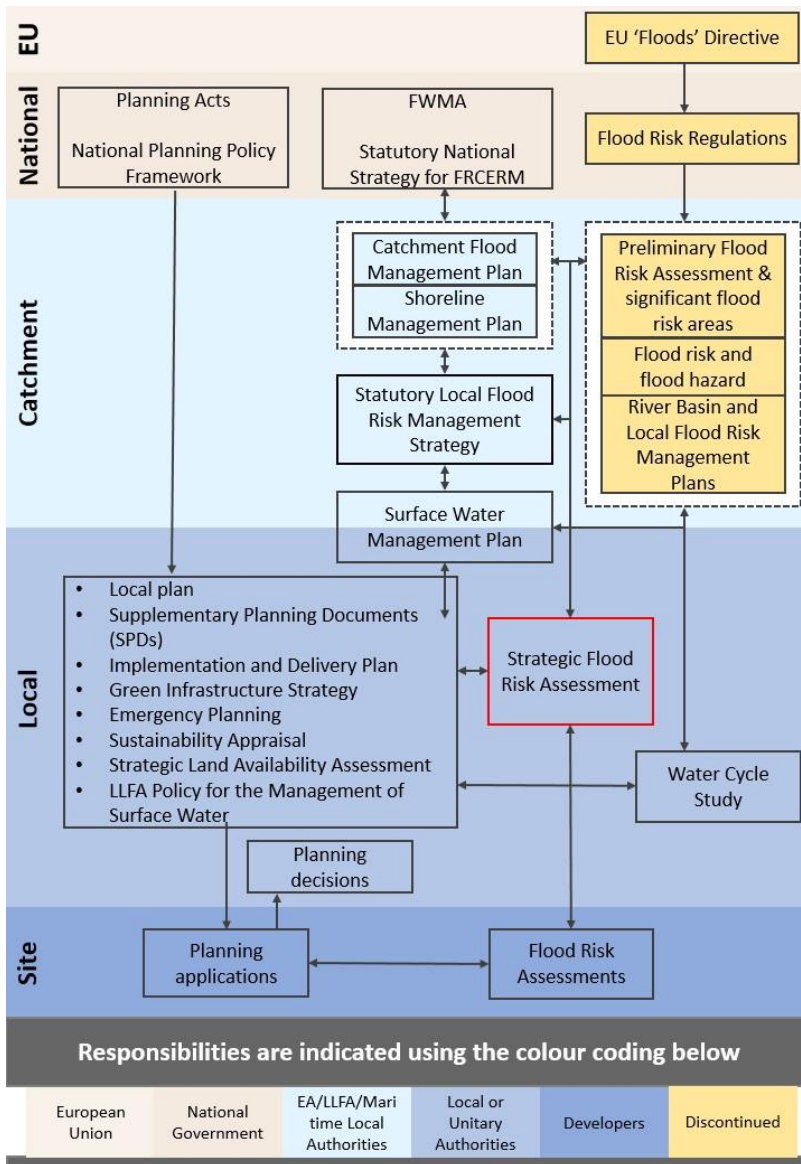
The following section outlines the existing flood risk management policies and guidance for Tonbridge and Malling Borough.

Table 2-1: Summary of legislation, policies and strategies

Document, lead author, and date		Relevant direct legislation	Information	Policy and measures	Development design requirements	Next update due
National	National Flood and Coastal Erosion Risk Management Strategy (Environment Agency) 2020	Flood and Water Management Act (2010)	No	Yes	No	2026
	Natural Flood Management Plans (Environment Agency)	N/A	Yes	No	No	-
	National Planning Policy Framework (MHCLG) 2025	Planning and Compulsory Purchase Act 2004 as amended & The Town and Country Planning (Local Planning) (England) Regulations 2012 as amended	No	Yes	Yes	-
	Planning Practice Guidance – Flood Risk and Coastal Change (MHCLG) 2022		Yes	No	Yes	-
Regional	Thames River Basin District Management Plan (Environment Agency) 2022	WFD (Section 2.2.3)	No	Yes	No	-
	Thames River Basin District Flood Risk Management Plan (Environment Agency) 2023	Flood Risk Regulations (Section 2.2.1)	No	Yes	No	2027
	Medway Flood Action Plan (Environment Agency) 2022	N/A	Yes	Yes	No	
	Medway Estuary and Swale flood and coastal risk management strategy (Environment Agency) 2024	N/A	Yes	No	No	
	River Medway Catchment Flood Management Plan and North Kent Rivers Catchment Flood Management Plan (Environment Agency) 2012, 2009	N/A	Yes	Yes	No	-
	Climate change guidance for development and flood risk (Environment Agency) 2022	N/A	No	No	Yes	-
	Southern Water Drainage and Wastewater Management Plan (Southern Water) 2023	Environment Act 2021	Yes	Yes	No	

Local	Thames Water Drainage and Wastewater Management Plan (Thames Water) 2023	Environment Act 2021	Yes	Yes	No	
	Drainage and Planning Policy (Kent County Council)	N/A	Yes	No	Yes	-
	Kent County Council Local Flood Risk Management Strategy 2024 - 2034 (Kent County Council) 2024	FWMA	Yes	No	Yes	2034
	Medway Estuary and Swale Flood and Coastal Erosion Risk Management Strategy (Environment Agency) 2019	FWMA	Yes	No	Yes	-
	Tonbridge and Malling Stage 1 Surface Water Management Plan (JBA Consulting) 2013	N/A	Yes	No	No	

Figure 2-1: Strategic planning links and key documents for flood risk



2.4 The National Flood and Coastal Erosion Risk Management Strategy for England (2020)

The **National Flood and Coastal Erosion Risk Management Strategy**²¹ (FCERM) for England provides the overarching framework for future action by all risk management authorities to tackle flooding and coastal erosion in England. The new strategy has been in preparation since 2018. The Environment Agency brought together a wide range of stakeholders to develop the strategy collaboratively. The Strategy is much more ambitious than the previous one from 2011 and looks ahead to 2100 and the action needed to address the challenge of climate change.

The Strategy has been split into 3 high level ambitions: climate resilient places; today's growth and infrastructure resilient in tomorrow's climate; and a nation ready to respond and adapt to flooding and coastal change. The strategy outlines strategic objectives relating to these ambitions, with specific measures to achieve these.

The Strategy was laid before parliament in July 2020 for formal adoption and published alongside a **New National Policy Statement for Flood and Coastal Erosion Risk Management**²². The statement sets out five key commitments which will accelerate progress to better protect and better prepare the country for the coming years:

1. Upgrading and expanding flood defences and infrastructure across the country,
2. Managing the flow of water to both reduce flood risk and manage drought,
3. Harnessing the power of nature to not only reduce flood risk, but deliver benefits for the environment, nature, and communities,
4. Better preparing communities for when flooding and erosion does occur, and
5. Ensuring every area of England has a comprehensive local plan for dealing with flooding and coastal erosion.

2.5 Natural Flood Management (NFM) Plans

The Environment Agency has developed **Natural Flood Management (NFM) mapping**²³ which displays opportunities for NFM. These maps are to be used as a guide and supplemented with local knowledge to provide a starting point for discussions about NFM. NFM aims to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. NFM should be used on a catchment wide scale and is the linking of blue and green infrastructure.

The maps identify NFM opportunities on different catchment scales:

- National River Basin Districts
- River Basin Districts showing Management Catchments
- Management Catchments showing Water Body Catchments
- Water Body Catchments.

These catchments cross boundaries between the Tonbridge and Malling Borough and other neighbouring authorities. Discussions about NFM should be had with catchment stakeholders in combination with local knowledge.

²¹ National Flood and Coastal Erosion Risk Management Strategy. Environment Agency. (2020).

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf

²² New National Policy Statement for Flood and Coastal Erosion Risk Management <https://www.gov.uk/government/publications/flood-and-coastal-erosion-risk-management-policy-statement>

²³ Working with Natural Processes. Environment Agency. wnp.jbahosting.com

2.6 River Basin Management Plans

River Basin Management Plans (RBMPs) are prepared under the Water Framework Directive (WFD) and assess the pressure facing the water environment in River Basin Districts. The Tonbridge and Malling Borough area falls within the **Thames River Basin District RBMP** ²⁴ (2022). The plan describes the challenges that threaten the water environment and how these challenges can be managed.

2.7 Flood Risk Management Plans

Flood Risk Management Plans (FRMPs) are part of the six-year cycle of assessment, mapping and planning required under the Flood Risk Regulations. Under the Regulations, it is a requirement for the Environment Agency to prepare and publish a Flood Risk Management Plan (FRMP) for risk from rivers, reservoirs and the sea. The FRMP process adopts the same catchments as used in the preparation of River Basin Management Plans, in accordance with the Water Framework Directive.

Accordingly, more detailed strategic information on proposed strategic measures and approaches can be found in the **Thames River Basin District Flood Risk Management Plan** ²⁵ (FRMP) (2023).

Flood Risk Management Plans have now been updated for the second cycle of implementation of the Flood Risk Regulations.

2.8 Medway Flood Action Plan – Year 4 Report

The Medway Flood Partnership is a 'living document' that was first published in 2017 as part of the measures taken following the 2013 flood event that flooded approximately 1000 homes in the Medway Catchment. The partnership brings together local partners, national agencies, non-governmental organisations and community representatives to identify and develop actions which can help reduce the impact of flooding in future.

The latest update to the Medway Flood Partnership at the time of this document's writing was that of June 2022²⁶.

2.9 Catchment Flood Management Plans

Catchment Flood Management Plans (CFMPs) are high-level strategic plans providing an overview of flood risk across each river catchment. The Environment Agency use CFMPs to work with other key-decision makers to identify and agree long-term policies for sustainable flood risk management.

There are six pre-defined national policies provided in the CFMP guidance and these are applied to specific locations through the identification of 'Policy Units'. These policies are intended to cover the full range of long-term flood risk management options that can be applied to different locations in the catchment.

The six national policies are:

- No active intervention (including flood warning and maintenance). Continue to monitor and advise

²⁴ Thames River Basin District RBMP. Environment Agency. (2016) <https://www.gov.uk/government/publications/thames-river-basin-district-river-basin-management-plan>

²⁵ Thames River Basin District Flood Risk Management Plan. Environment Agency. (2015). <https://www.gov.uk/government/publications/thames-river-basin-district-flood-risk-management-plan>

²⁶ Medway flood action plan - year 4 report. (2017). <https://www.gov.uk/government/publications/the-river-medway-partnership-objectives-members-and-action-plan/medway-flood-action-plan-year-3-report#:~:text=The%20flood%20action%20plan%20was,risk%20in%20the%20Medway%20catchment.>

- Reducing existing flood risk management actions (accepting that flood risk will increase over time)
- Continue with existing or alternative actions to manage flood risk at the current level (accepting that flood risk will increase over time from this baseline)
- Take further action to sustain the current level of flood risk (responding to the potential increases in risk from urban development, land use change and climate change)
- Take action to reduce flood risk (now and/or in the future)
- Take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment.

Tonbridge and Malling Borough sits within the **Medway CFMP**²⁷ and the **North Kent Rivers CFMP**²⁸.

2.10 Kent County Council Local Flood Risk Management Strategy

Local Flood Risk Management Strategies set out how Lead Local Flood Authorities such as Kent County Council will manage local flood risk i.e. from surface water runoff, groundwater and ordinary watercourses, for which they have a responsibility as LLFA and the work that other Risk Management Authorities are doing to manage flood risk in Kent.

The Local Flood Risk Management Strategy 2024– 2034²⁹ sets out the LLFA's plan for managing local flood risk.

2.11 Surface Water Management Plans

Surface Water Management Plans (SWMPs) outline the preferred surface water management strategy in a given location. SWMPs are undertaken, when required, by LLFAs in consultation with key local partners who are responsible for surface water management and drainage in their area. They are produced to understand the flood risks that arise from local flooding, which is defined by the Flood and Water Management Act 2010 as flooding from surface runoff, groundwater, and Ordinary Watercourses. SWMPs establish a long-term action plan to manage surface water in a particular area and are intended to influence future capital investment, drainage maintenance, public engagement and understanding, land-use planning, emergency planning and future developments. The action plan from SWMPs should be reviewed and updated as a minimum every six years.

Kent County Council published the **Tonbridge and Malling Stage 1 SWMP**³⁰ in 2013.

2.12 Drainage and Wastewater Management Plans (DWMPs)

Water companies were required to publish Drainage Water Management Plans (DWMPs) for river basin catchments across England as part of the Environment Act. Southern Water and Thames Water have published their DWMPs (**Southern Water DWMP** and **Thames Water DWMP**).

This is a risk-based catchment screening where existing data is used to identify where there is a current and/or potential risk or vulnerability in the sewer catchment to future

27 Medway Catchment Flood Risk Management Plan. Environment Agency. (2012) <https://www.gov.uk/government/publications/medway-catchment-flood-management-plan>

28 North Kent Rivers Catchment Flood Risk Management Plan. Environment Agency. (2009) <https://www.gov.uk/government/publications/north-kent-rivers-catchment-flood-management-plan>

29 Kent County Council Local Flood Risk Management Plan 2024-2034. (June 2024) https://www.kent.gov.uk/_data/assets/pdf_file/0016/205621/Local-Flood-Risk-Management-Strategy-2024-2034.pdf

30 Tonbridge and Malling Stage 1 SWMP (2014): https://www.kent.gov.uk/_data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

changes. This will enable Southern Water's and Thames Water's detailed assessment of risk for high priority areas for investment.

This provides 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.

JBA reviewed the information within the DWMPs (Appendix D) and convened meetings with Southern Water and Thames Water to discuss the findings. It was confirmed by Southern Water and Thames Water that the mapping provided within the DWMP is not suitable for use in the Sequential Test as the data and mapping is prepared to prioritise investment priorities and the resolution of the data does not enable comparative risk at different sites to be evaluated appropriately.

It was noted that water companies carry out capacity assessments as a matter of course when consulted on the Local Plan.

2.13 Risk Areas for Local Planning Authorities in England

The Association of British Insurers (ABI) and the National Flood Forum have published guidance for Local Authorities with regards to planning in flood risk areas³¹. The guidance aims to assist Local Authorities in England in producing local plans and dealing with planning applications in flood risk areas. The guidance complements the National Planning Policy Framework. The key recommendations from the guidance are:

- Ensure strong relationships with technical experts on flood risk.
- Consider flooding from all sources, taking account of climate change.
- Take potential impacts on drainage infrastructure seriously.
- Ensure that flood risk is mitigated to acceptable levels for proposed developments.
- Make sure Local Plans take account of all relevant costs and are regularly reviewed.

³¹ Guidance on Insurance and Planning in Flood Risk Areas for Local Planning Authorities in England (Association of British Insurers and National Flood Forum, April 2012)

3 Roles and Responsibilities for Flood Risk Management

This section sets out the Flood Risk Management roles and responsibilities for different organisations in Tonbridge and Malling Borough.

3.1 Environment Agency

The Environment Agency is responsible for protecting and enhancing the environment and contributing to the government's aim of achieving sustainable development in England and Wales. In terms of flood risk, the Environment Agency has a strategic overview of all sources of flooding and coastal erosion. Examples of this strategic overview role include:

- Setting the direction for managing the risks through strategic plans;
- Providing evidence and advice to inform Government policy and support others;
- Working collaboratively to support the development of risk management skills and capacity; and
- Providing a framework to support local delivery.

The Agency also has operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea.

The Environment Agency has powers to carry out flood and coastal risk management work and to regulate the actions of other flood risk management authorities on the coast. These powers are permissive, which means they are not a duty.

The Environment Agency also has powers to regulate and consent works. You must follow the environmental permitting rules if you want to do work:

- on or near a main river
- on or near a flood defence structure
- in a flood plain
- on or near a sea defence

Further details on Environment Agency permits can be found on the **Environment Agency's Flood risk activities: environmental permits**³² website.

3.2 Lead Local Flood Authority

The Lead Local Flood Authority (LLFA) for the area is Kent County Council.

Kent County Council have the duty to develop a Local Flood Risk Management Strategy (LFRMS). LLFAs must develop, maintain, apply and monitor a LFRMS to outline how they will manage flood risk, identify areas vulnerable to flooding and target resources where they are needed most.

When appropriate and necessary LLFAs have a duty to investigate and report on flooding incidents (Section 19 investigations).

LLFAs have a duty to establish and maintain a register of structures or features which, in their opinion, are likely to have a significant effect on flood risk in the LLFA area.

LLFAs also have a statutory consultee duty for the Planning Authority on the review of design of surface water drainage submitted for major development sites.

³² Flood risk activities environmental permits. Environment Agency. <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

When appropriate, LLFAs have the duty to perform consenting of works on ordinary watercourses. Further details can be found on the Kent County Council land drainage website³³.

LLFAs may exercise powers, as all RMAs can, to designate structures and features that affect flood risk, requiring the owner to seek consent from the authority to alter, remove or replace it.

The LLFA has enforcement powers under the Land Drainage Act 1991 and FWMA 2010.

3.3 Local Planning Authority

As a Local Planning Authority, Tonbridge and Malling Borough Council assess, consult on and determine whether development proposals are acceptable, ensuring that flooding and other similar risks are effectively managed.

The council will consult relevant statutory consultees as part of planning application assessments and may, in some cases, also contact non-statutory consultees, such as Southern Water, that have an interest in the planning application.

3.4 Water and wastewater providers

Southern Water and Thames Water are the sewerage undertakers for the SFRA study area. They have the responsibility to maintain surface, foul and combined public sewers to ensure the area is effectually drained. When flows (foul or surface water) are proposed to enter public sewers, Southern Water or Thames Water will assess whether the public system has the capacity to accept these flows as part of their pre-application service. If there is not available capacity, they will provide a solution that identifies the necessary mitigation. Southern Water or Thames Water can also comment on the available capacity of foul and surface water sewers as part of the planning application process although this is not a statutory role.

For further details about developer services and relevant application forms please see **Southern Water's Developer Services website**³⁴ or **Thames Water's developer Services website**.³⁵

3.5 Upper Medway and Lower Medway Internal Drainage Boards (IDBs)

Under the Land Drainage Act 1991 the Upper Medway IDB and Lower Medway IDB exercise general powers of supervision over all matters relating to water level management within their district. Key watercourses are adopted by both Boards for maintenance purposes and the Boards also have responsibility for the operation and maintenance of assets used to manage water levels.

³³ Kent County Council Land Drainage (2021). <https://www.kent.gov.uk/environment-waste-and-planning/flooding-and-drainage/sustainable-drainage-systems/owning-and-maintaining-a-watercourse>

³⁴ Southern Water. <https://www.southernwater.co.uk/developing>

³⁵ Thames Water <https://www.thameswater.co.uk/developers>

4 How Flood Risk is Assessed

4.1 Definitions

4.1.1 Flood

Section 1 (subsection 1) of the Flood and Water Management Act (FWMA) (2010)³⁶ defines a flood as:

'any case where land not normally covered by water becomes covered by water'

Section 1 (subsection 2) states that 'it does not matter for the purposes of subsection (1)' whether a flood is caused by

- a) heavy rainfall;
- b) a river overflowing or its banks being breached;
- c) a dam overflowing or being breached;
- d) tidal waters;
- e) groundwater; or
- f) anything else (including any combination of factors).

Note: Sources of flooding under this definition do not include excess surface water from any part of a sewerage system, unless caused by an increase in the volume of rainwater entering or affecting the system, or a flood caused by a burst water main.

4.1.2 Flood risk

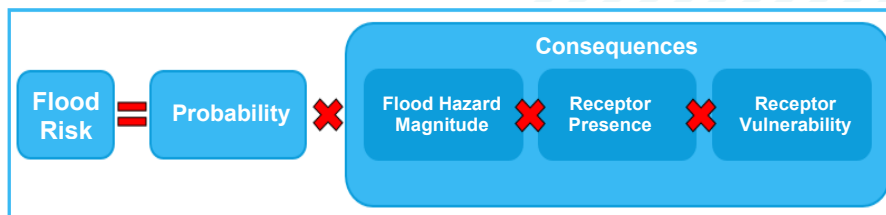
Section 3 (subsection 1) of the FWMA defines the risk of a potentially harmful event (such as flooding) as:

'a risk in respect of an occurrence is assessed and expressed (as for insurance and scientific purposes) as a combination of the probability of the occurrence with its potential consequences.'

Thus, it is possible to summarise flood risk as:

Flood Risk = (Probability of a flood) x (Scale of the consequences)

On that basis it is useful to express the definition as follows:



Using this definition it can be seen that:

Increasing the probability or chance of a flood being experienced increases the flood risk: In situations where the probability of a flood being experienced increases

³⁶ Flood and Water Management Act (2010): http://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga_20100029_en.pdf

gradually over time, for example due to the effects of climate change, then the severity of the flood risk will increase (flooding becomes more frequent or has increased effect).

The potential scale of the consequences in a given location can increase the flood risk:

- **Flood Hazard Magnitude:** If the direct hazard posed by the depth of flooding, velocity of flow, the speed of onset, rate of risk in flood water or duration of inundation is increased, then the consequences of flooding, and therefore risk, is increased.
- **Receptor Presence:** The consequences of a flood will be increased if there are more receptors affected, for example with an increase in extent or frequency of flooding. Additionally, if there is new development that increases the probability of flooding (for example, increase in volume of runoff due to increased impermeable surfaces) or increased density of infrastructure then consequences will also be increased.
- **Receptor Vulnerability:** If the vulnerability of the people, property or infrastructure is increased then the consequences are increased. For example, old or young people are potentially more vulnerable in the event of a flood.

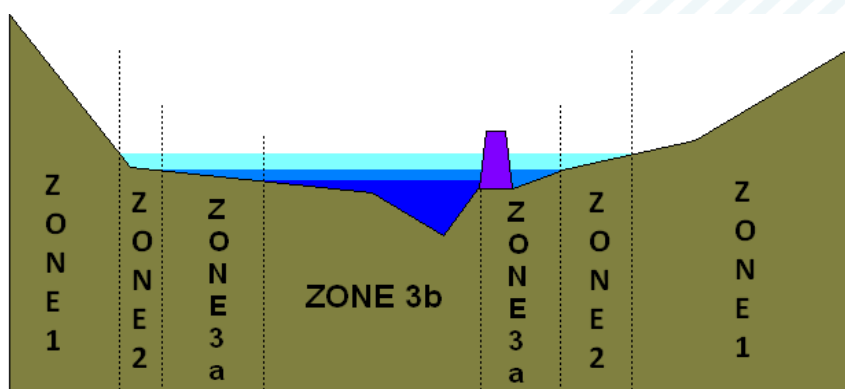
4.2 Flood Zones

4.2.1 Fluvial and tidal

The SFRA includes maps of river and sea flood risk that show the Flood Zones. These zones describe the land that would flood from rivers or the sea if there were no defences present. A concept diagram showing the classification of Flood Zones graphically is included in Figure 4-1. These apply to both Main River and Ordinary Watercourses.

The preference when allocating land is, whenever possible, to place all new development on land in Zone 1. Since the Flood Zones identify locations that are not reliant on flood defences, placing development on Zone 1 land means there is no future commitment to spending money on flood banks or flood alleviation measures. It also does not commit future generations to costly long-term expenditure that would become increasingly unsustainable as the effects of climate change increase.

Figure 4-1: Concept of flood zones



The Flood Zones are:

- Flood Zone 1: Low probability - less than a 0.1% chance of river and sea flooding in any given year
- Flood Zone 2: Medium probability - between a 1% and 0.1% chance of river flooding in any given year or 0.5% and 0.1% chance of sea flooding in any given year
- Flood Zone 3a: High probability - greater or equal to a 1% chance of river flooding in any given year or greater than a 0.5% chance of sea flooding in any given year. Excludes Flood Zone 3b.
- Flood Zone 3b: Functional Floodplain - land where water has to flow or be stored in times of flood or has a high risk of flooding from the sea. SFRA's identify this Flood Zone in discussion with the LPA and the Environment Agency. The identification of functional floodplain takes account of local circumstances. Only water compatible and essential infrastructure are permitted in this zone and should be designed to remain operational in times of flood, resulting in no loss of floodplain or blocking of water flow routes. Flood Zone 3b is primarily based on the defended 3.3% AEP flood extent combined with flood storage areas.

Excluding Flood Zone 3b, the Flood Zones do not take flood defences into account. This is important for planning long term developments as long-term policy and funding for maintaining flood defences over the lifetime of a development may change over time.

The Flood Zones do not take into account surface water, sewer or groundwater flooding or the impacts of canal or reservoir failure or climate change. Hence there could still be a risk of flooding from other sources and the level of flood risk will change over time during the lifetime of a development.

Actual flood risk

If it has not been possible for all future development to be situated in Zone 1 or land is affected by actual flood risk from other sources then a more detailed assessment is needed to understand the implications of locating proposed development in Zones 2 or 3 or in a location affected by flood risk. This is accomplished by considering information on the "actual risk" of flooding. The assessment of actual risk takes account of the presence of flood defences and other assets and provides a picture of the safety of existing and proposed development. It should be understood that the standard of protection afforded by flood defences or other assets is not constant and it is presumed that the required minimum standards for new development are:

- residential development should be protected against flooding with an annual probability of river and surface water flooding of 1% (1 in 100-year chance of flooding) in any year;
- residential development should be protected against flooding with an annual probability of tidal (sea) flooding of 0.5% (1 in 200-year chance of flooding) in any year and
- The above minimum standards should also make an allowance at the design stage for increased flood levels as a result of climate change.

The assessment of the actual risk should take the following issues into account:

- The level of protection afforded by existing defences and assets might be less than the appropriate standards and hence may need to be improved if further growth is contemplated.
- The flood risk management policy for the defences and assets will provide information on the level of future commitment to maintain existing standards of protection. If there is a conflict between the proposed level of commitment and the future needs to support growth, then it will be a priority for the Flood Risk Management Strategy to be reviewed.

- The standard of safety must be maintained for the intended lifetime of the development (assumed to be 100 years for residential development and 75 years for commercial development). Over time the effects of climate change will erode the present day standard of protection afforded by defences and assets, so an assessment is needed to ensure new development considers an increased risk of flooding irrespective of flood defences. Commitment is needed to invest in the maintenance and upgrade of defences and assets if the present day levels of protection are to be maintained and where necessary land secured that is required for affordable future flood risk management measures.
- The assessment of actual risk can include consideration of the magnitude of the hazard posed by flooding. By understanding the depth, velocity, speed of onset, duration and rate of rise of floodwater it is possible to assess the level of hazard posed by flood events from the respective sources. This assessment will be needed in circumstances where consideration is given to the mitigation of the consequences of flooding or where it is proposed to place lower vulnerability development in areas that are at risk from inundation.

For information on river and sea defences reference should be made to the Environment Agency's Asset Information Management System (AIMS) which contains details on the standard of protection of defences.

Residual risk

The residual risk refers to the risks that remain in circumstances after measures have been taken to alleviate flooding (such as flood defences). It is important that these risks are quantified to confirm that the consequences can be safely managed. The residual risk can be:

- The effects of a flood with a magnitude greater than that for which the defences or management measures have been designed to alleviate (the 'design flood'). This can result in overtopping of flood banks, failure of flood gates to cope with the level of flow or failure of pumping systems to cope with the incoming discharges.
- Failure of the defences or flood risk management measures to perform their intended duty. This could be breach failure of flood embankments, failure of flood gates to operate in the intended manner or failure of pumping stations.

The assessment of residual risk demands that attention be given to the vulnerability of the receptors and the response to managing the resultant flood emergency. In this instance, attention should be paid to the characteristics of flood emergencies and the roles and responsibilities during such events. Additionally, in the cases of breach or overtopping events, consideration should be given to the structural safety of the dwellings or structures that could be adversely affected by significant high flows or flood depths.

4.2.2 Surface Water

Paragraph 174 of the NPPF states that the Sequential Test must now "steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach (as described in Para 173) should be used in areas known to be at risk now or in the future from any form of flooding."

As there is no standardised risk mapping for all sources of flood risk a Sequential Test Methodology has been prepared based on the content of the September 2025 PPG. This approach has been prepared in consultation with Kent County Council and the Environment Agency and agreement obtained to the method described. Details of this method can be found in Appendix C.

The Environment Agency's 0.1% AEP Risk of Flooding from Surface Water flood extent mapping has been used to define a simple zoning scheme that identifies a high risk and low risk zone to use in the Sequential Test. It should be noted that the Risk of Flooding from Surface Water includes an allowance for drainage (a flood risk management feature), so this is not strictly the same conceptual risk zone as defined for river and sea flooding (even though it is associated with the same probability). However, it does create a product that can accommodate sequential testing, as it "steers" development to land in a "low risk surface water flood zone".

4.2.3 Reservoirs

The Sequential Test Methodology (Appendix C) also outlines how reservoir flooding should be included in the Sequential Test. The latest available Environment Agency Risk of Flood from Reservoirs mapping now shows "wet day" and "dry day" reservoir inundation extents. The "wet day" being a reservoir breach at the same time as a 1 in 1000 river flood (as this is a likely time when a reservoir might fail) and the dry day shows the failure just from the water retained by the dam. Neither set of mapping describes a risk-based scenario as it does not provide the probability of a dam failure but are intended to describe a "worst credible case". The Risk of Flooding from Reservoir dataset is not conceptually similar to the risks pertaining to river and sea flooding.

However, a high risk zone has been prepared for reservoir flood risk which identifies where reservoir flooding is predicted to make fluvial flooding worse or where development could be subject to high hazard levels in circumstances where there was a breach. If allocated sites are located in such zones then the implications should be addressed in a Level 2 SFRA.

4.2.4 Other sources of flooding

Groundwater

The JBA groundwater emergence map does not provide the confidence or certainty required to undertake the Sequential Test on its own as it only shows likely area of risk of emergence and does not show where the groundwater is likely to flow or cause a risk of flooding. The risk of emergence mapping has been combined with supplementary GIS analysis to understand where the groundwater is likely to flow once it has emerged. This supplementary assessment has been performed using the 1 in 1,000-year Risk of Flooding from Surface Water mapping (pre-2025 dataset) to provide an indication of the likely flow paths as the generalised modelling is based on the topography of the area. Where a surface water flow path intersects and is downstream of, a groundwater emergence zone this has been highlighted as an area potentially at-risk from groundwater flooding. If the flow path is also associated with a watercourse, this has not been identified as an at-risk area as this would already be considered in the base flow of the watercourse and therefore fluvial flooding.

Using GIS techniques, the JBA Groundwater Emergence Map high and medium risk areas has been merged with the likely flow paths. This has provided a zone map to show areas which are potentially at higher risk of groundwater flooding than other areas and create a product that can accommodate an appropriate level of sequential testing.

If a site is identified as being potentially at risk from groundwater flooding a more detailed assessment should be undertaken within the Level 2 SFRA and will consider local conditions on a site-by-site basis using available historic, borehole, geological and LIDAR data.

Further information can be found in Appendix C.

Sewer flooding

Historic sewer flood data is only available at a postcode level and does not define spatial extent or location of sewer flooding. There is no mapping available to enable execution of risk-based sequence.

Southern Water's and Thames Water's DWMPs do not provide mapping to enable execution of a risk-based sequence. On this basis, Flood Zones for sewer flooding have not been prepared and the available information is not appropriate for use in the Sequential Test.

Further information can be found in Appendix C.

4.3 Possible responses to flooding

4.3.1 Assess

The first response to flooding must be to understand the nature and frequency of the risk. The assessment of risk is not just performed as a "one off" during the process, but rather the assessment of risk should be performed during all subsequent stages of responding to flooding.

4.3.2 Avoid

The sequential approach requires that the first requirement is to avoid the hazard. If it is possible to place all new growth in areas at a low probability of flooding, then the flood risk management considerations will include provisions so that proposed development does not increase the probability of flooding to others. This can be achieved by implementing Sustainable Drainage Systems (SuDS) and other measures to control and manage run-off.

In some circumstances it might be possible to include measures within proposed growth areas that reduce the probability of flooding to others and assist existing communities to adapt to the effects of climate change. In such circumstances the growth proposals should include features that can deliver the necessary levels of mitigation so that the standards of protection and probability of flooding are not reduced by the effects of climate change. In Tonbridge and Malling Borough, consideration should be given not only to the peak flows generated by new development but also to the volumes generated during longer duration storm events as well as the cumulative impacts of development.

4.3.3 Substitute control and mitigate

These responses all involve management of the flood risk and thus require an understanding of the consequences (the magnitude of the flood hazard and the vulnerability of the receptor).

There are opportunities to reduce the flood risk by lowering the vulnerability of the proposed development. For instance, changing existing residential land to commercial uses will reduce the risk provided that the residential land can then be located on land in a lower risk flood zone.

Flood risk management responses in circumstances where there is a need to consider growth or regeneration in areas that are affected by a medium or high probability will include:

- Strategic measures to maintain or improve the standard of flood protection so that the growth can be implemented safely for the lifetime of the development (this must include firm commitments to invest in infrastructure that can adapt to the increased chance and severity of flooding presented by climate change).
- Design and implement measures so that the proposed development includes features that enables the infrastructure to adapt to the increased probability and severity of flooding so that new communities are safe and the risk to others is not increased (preferably reduced).

Flood resilient measures that reduce the consequences of flooding to infrastructure so that the magnitude of the consequences is reduced. Such measures would need to be considered alongside improved flood warning, evacuation and welfare procedures so that occupants affected by flooding could be safe for the duration of a flood event and rapidly return to properties after an event had been experienced.

4.4 Cumulative impacts

When allocating land for development, consideration must be given to the potential cumulative impact of development on flood risk. The loss of the natural storage and infiltration capacity of undeveloped land, potential loss of surface water storage capacity, the increase in impermeable surfaces and resulting rise in runoff increases the chances of surface water flooding if suitable mitigation measures, such as SuDS, are not put in place. Additionally, the increase in runoff may result in more flow entering watercourses, increasing the risk of fluvial flooding at locations further downstream that are potentially sensitive to increases in the volume or flow of flood water.

Consideration must also be given to the potential cumulative impact of the loss of floodplain as a result of development. The effect of the loss of floodplain storage should be assessed, at both the development and elsewhere within the catchment and, if required, the scale and scope of appropriate mitigation should be identified.

Whilst the increase in runoff, or loss in floodplain storage, from individual developments may only have a minimal impact on flood risk, the cumulative effect of multiple developments may be more severe without appropriate mitigation measures.

For windfall sites which have not yet been allocated, the NPPF requires that the cumulative impact of development should be considered at the application stage and the appropriate mitigation measures undertaken to ensure flood risk is not exacerbated, and in many cases the development should be used to improve the flood risk.

5 Planning Policy for Flood Risk Management

5.1 National Planning Policy Framework

The revised **National Planning Policy Framework** (NPPF) was last updated in February 2025, replacing the previous versions published in 2024, 2023, 2021, 2019, 2018, 2016 and 2012. The NPPF sets out Government's planning policies for England. It must be taken into account in the preparation of local plans and is a material consideration in planning decisions. The NPPF defines Flood Zones, how these should be used to allocate land and flood risk assessment requirements.

Planning Practice Guidance (PPG) on flood risk was published in March 2014 (and has since been revised / updated in August 2022 and September 2025) and sets out how the policy should be implemented. Diagram 1 (007 Reference ID: 7-007-20220825) in the PPG sets out how flood risk should be considered in the preparation of Local Plans.

5.1.1 The sequential risk-based approach

This SFRA has considered the February 2025 NPPF changes to the Sequential Test, requiring a sequential approach for all sources of flood risk. In the August 2022 and September 2025 updates to the Planning Practice Guidance the definition of the flood zones was not changed, meaning that the term "Flood Zones" still refers to flooding from rivers and the sea where flood defences are not taken into account. This is important for planning long-term developments as long-term policy and funding for maintaining flood defences over the lifetime of a development may change over time.

Diagrams 2 and 3 in the PPG demonstrate how the Sequential Test (Figure 5-1) and Exception Test (Figure 5-2) should be performed.

This is a stepwise process, but a challenging one, as a number of the criteria used are qualitative and based on experienced judgement. The process must be documented, and evidence used to support decisions recorded. Please refer to the Sequential Test Methodology in Appendix C for further details.

Figure 5-1: Application of the Sequential Test for plan preparation

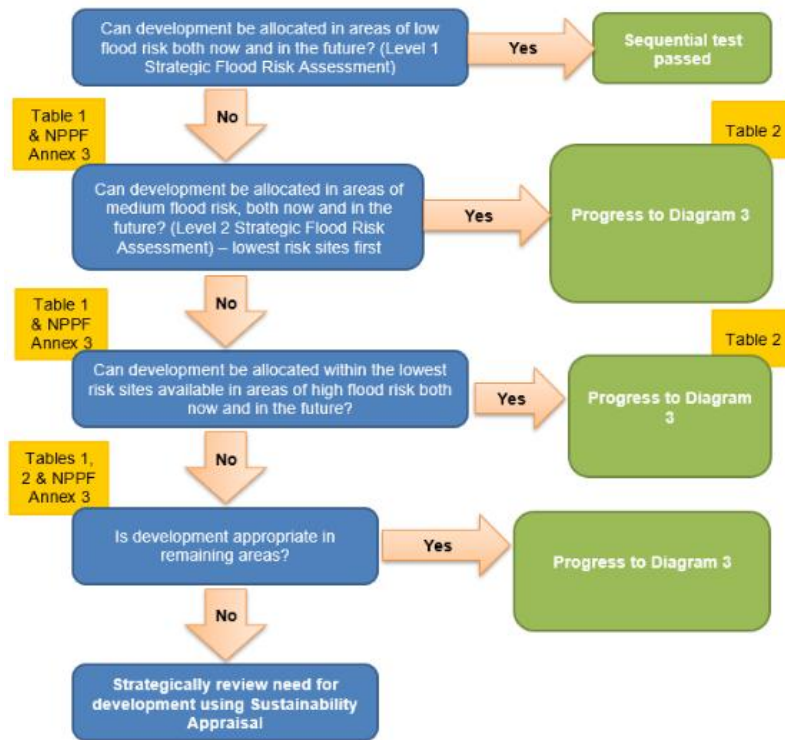
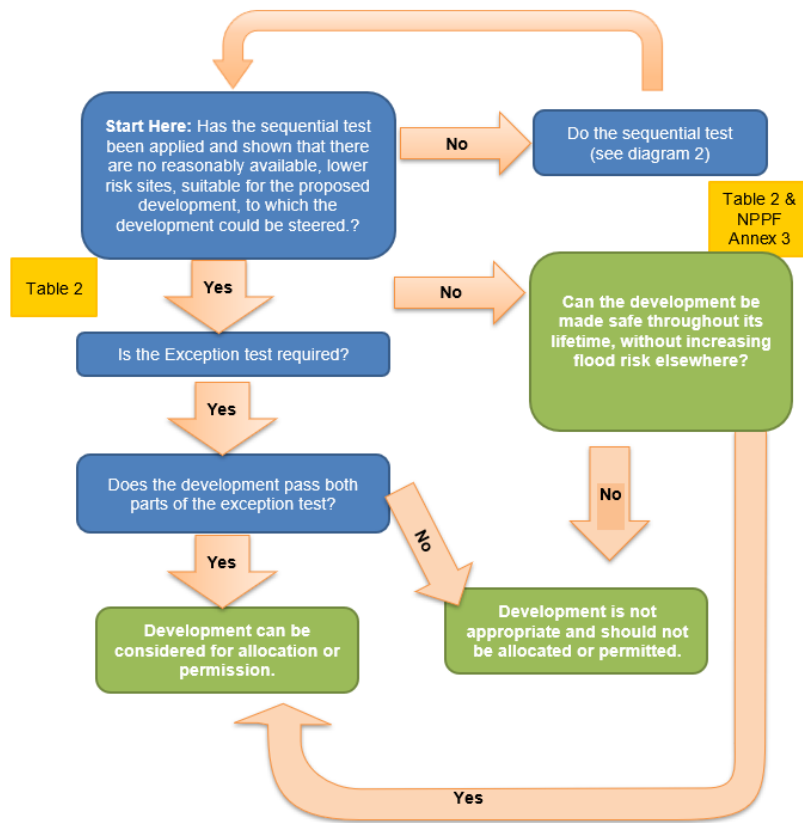


Figure 5-2: Application of the Exception Test to plan preparation



5.1.2 The Exception Test

It will not always be possible for all new development to be allocated on land that is not at risk from flooding. To further inform whether land should be allocated, or Planning Permission granted, a greater understanding of the scale and nature of the flood risks is required. In these instances, the Exception Test will be required.

The Exception Test should only be applied following the application of the Sequential Test.

Figure 5-2 summarises the Exception Test. An LPA should apply the Exception Test to allocations. For all developments, developers must supply evidence to the LPA, with a Planning Application, that the development has passed the test. This is because when a site-specific Flood Risk Assessment is done, more information on the exact measures that can manage the risk is available.

There are two parts to demonstrating a development passes the Exception Test:

1. (a) *Demonstrating that the development would provide wider sustainability benefits to the community that outweigh the flood risk.*

Local planning authorities will need to consider what criteria they will use to assess whether this part of the Exception Test has been satisfied and give advice to enable applicants to provide evidence to demonstrate that it has been passed. If the application fails to prove this, the Local Planning Authority should consider whether the use of planning conditions and / or planning obligations could allow it to pass. If this is not possible, this part of the Exception Test has not been passed and planning permission should be refused.

2. (b) *Demonstrating that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*

A Level 2 SFRA is likely to be needed to inform the Exception Test in these circumstances for allocations. At Planning Application stage, a site-specific Flood Risk assessment will be needed. Both would need to consider the actual and residual risk and how this will be managed over the lifetime of the development.

5.1.3 Making a development safe from flood risk over its lifetime

Local Planning Authorities will need to consider the actual and residual risk of flooding and how this will be managed over the lifetime of the development:

- The actual risk is the risk to the site considering existing flood mitigation measures. The PPG defines the design standard for new development to consider the suitability of development and any mitigation measures. The 1% fluvial and surface water, and the 0.5% tidal, annual probabilities of flooding with a suitable allowance for climate change should be used as a design standard when assessing the suitability of development and any mitigation measures.
- Safe access and egress should be available during the design flood event. Firstly, this should seek to avoid areas of a site at flood risk. If that is not possible then access routes should be located above the design flood event levels. Where that is not possible, access through shallow and slow flowing water that poses a low flood hazard may be acceptable.
- Residual risk is the risk that remains after the effects of flood defences have been taken into account and / or from a more severe flood event than the design event. The residual risk can be:
 - The effects of an extreme 0.1% chance flood in any year event. Where there are defences this could cause them to overtop, which may lead to failure if this causes them to erode; and/or
 - Structural failure of any flood defences, such as breaches in embankments or walls.

Flood resistance and resilience measures should be considered to manage any residual flood risk by keeping water out of properties and seeking to reduce the damage it does, should water enter a property. Emergency plans should also account for residual risk, e.g. through the provision of flood warnings and a flood evacuation plan where appropriate.

In line with the NPPF, the impacts of climate change over the lifetime of the development should be taken into account when considering actual and residual flood risk. The climate change guidance can be found on the Government website³⁷.

37 <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

5.2 Applying the Sequential Test and Exception Test to individual planning applications

5.2.1 The Sequential Test

Tonbridge and Malling Borough Council, taking account of views from other relevant parties, is responsible for considering whether the Sequential Test has been passed. The Environment Agency may be invited by Tonbridge and Malling Borough Council to provide comment in respect of the accuracy of the data the test is based on.

Developers are required to apply the Sequential Test to all development sites, unless the site is either:

- an allocation and the test has already been carried out by the LPA
- a change of use (except to a caravan, camping or chalet site, or to a mobile home or park home site)
- a minor development (householder development, small non-residential extensions with a footprint of less than 250m²); or
- a development in flood zone 1 unless there are other flooding issues in the area of the development (i.e. surface water, ground water, sewer flooding).

The SFRA contains information on all sources of flooding and taking into account the impact of climate change. This should be considered when a developer undertakes the Sequential Test, including the consideration of reasonably available sites at lower flood risk.

Local circumstances must be used to define the area of application of the Sequential Test (within which it is appropriate to identify reasonably available alternatives). The criteria used to determine the appropriate search area relate to the catchment area for the type of development being proposed. For some sites this may be clear e.g. school catchments, in other cases it may be identified by other Local Plan policies. For some sites e.g. regional distribution sites, it may be suitable to widen the search area beyond LPA administrative boundaries.

The sources of information on reasonably available sites may include:

- Site allocations in Local Plans
- Site with Planning Permission but not yet built out
- Strategic Housing and Economic Land Availability Assessments (SHELAA's)/ five-year land supply/ annual monitoring reports
- Locally listed sites for sale.

It may be that a number of smaller sites or part of a larger site at lower flood risk form a suitable alternative to a development site at high flood risk.

Ownership or landowner agreement in itself is not acceptable as a reason not to consider alternatives.

The SFRA guide to using technical data in Appendix C shows where the Sequential and Exception Test may be required for the datasets assessed in the SFRA, and how to address the differences in the data used to prepare mapping from the respective sources, recommending what development might be appropriate in what situations.

It should also be noted that for "small catchments" (approximately less than 3 square kilometres) or the upper extremity of larger catchments the nationally available fluvial flood mapping might not have been prepared. This potentially gives the incorrect impression that a site is in fluvial Zone 1, when in fact it might be affected by flood risk from an adjacent watercourse. In such circumstances an initial assessment should be performed to identify the extent of the flood zones to understand the implications with respect to applying the Sequential Test.

5.2.2 The Exception Test

If, following application of the Sequential Test, it is not possible for the development to be located in areas with a lower probability of flooding the Exception Test must then be applied if required (as set out in Diagram 3 of the PPG). Developers are required to apply the Exception Test to all applicable sites (including strategic allocations).

The applicant will need to provide information that the application can pass both parts of the Exception test:

- *Demonstrating that the development would provide wider sustainability benefits to the community that outweigh the flood risk*

Applicants should refer to wider sustainability objectives in Local Plan Sustainability Appraisals. These generally consider matters such as biodiversity, green infrastructure, historic environment, climate change adaptation, flood risk, green energy, pollution, health, transport etc.

Applicants should detail the sustainability issues the development will address and how these will outweigh the flood risk concerns for the site e.g. by facilitating wider regeneration of an area, providing community facilities, infrastructure that benefits the wider area etc.

- *Demonstrating that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*

The site-specific Flood Risk Assessment should demonstrate that the site will be safe, and the people will not be exposed to hazardous flooding from any source. The FRA should consider actual and residual risk and how this will be managed over the lifetime of the development, including:

- the design of any flood defence infrastructure and asset performance;
- access and egress;
- operation and maintenance;
- design of the development to manage and reduce flood risk wherever possible;
- resident awareness;
- flood warning and evacuation procedures, including whether the developer would increase the pressure on emergency services to rescue people during a flood event; and
- any funding arrangements required for implementing measures

5.3 Cumulative impacts

When allocating land for development, consideration must be given to the potential cumulative impact of development on flood risk. The increase in impermeable surfaces and resulting rise in runoff increases the chances of surface water flooding if suitable mitigation measures, such as SuDS, are not put in place. Additionally, the increase in runoff may result in more flow entering watercourses, increasing the risk of fluvial flooding at locations further downstream that are potentially sensitive to increases in the volume or flow of flood water.

Consideration must also be given to the potential cumulative impact of the loss of floodplain as a result of development. The effect of the loss of floodplain storage should be assessed, at both the development and elsewhere within the catchment and, if required, the scale and scope of appropriate mitigation should be identified.

Whilst the increase in runoff, or loss in floodplain storage, from individual developments may only have a minimal impact on flood risk, the cumulative effect of multiple developments may be more severe without appropriate mitigation measures.

For windfall sites which have not yet been allocated, the NPPF requires that the cumulative impact of development should be considered at the application stage and the appropriate mitigation measures undertaken to ensure flood risk is not exacerbated, and in many cases the development should be used to improve the flood risk.

5.4 Cross boundary considerations

Situations may occur where a development site is situated across Local Authority boundaries, or where the development in one district or borough may impact flood risk elsewhere. Tonbridge and Malling Borough Council should consider the impacts of development on flood risk elsewhere even if the impact of this is not within their area. In situations where cross-boundary developments are proposed, Tonbridge and Malling Borough Council should work closely with other Local Planning Authorities to satisfy the requirements of policies in their respective Local Plans, in consultation with statutory consultees such as the Environment Agency and Lead Local Flood Authority.

6 Climate Change

The NPPF sets out that flood risk should be managed over the lifetime of a development, taking climate change into account. This section sets out how the impact of climate change should be considered.

6.1 Climate change, the NPPF and PPG

The NPPF (updated in February 2025) sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. NPPF and PPG describe how FRAs should demonstrate how flood risk will be managed over the lifetime of the development, taking climate change into account.

The 2025 NPPF also states that the 'A sequential risk-based approach should also be taken to individual applications in areas known to be at risk now or in future from any form of flooding' (para 173). In accordance with the PPG, the SFRA seeks to take account of climate change for 100 years, therefore this shall commence at the beginning of the plan period, which is 2024.

The Environment Agency published **climate change guidance**³⁸ on 19 February 2016 (further updated in February 2019, December 2019, July 2021 and May 2022), which supports the NPPF and must now be considered in all new developments and planning applications. The document contains guidance on how climate change should be accounted for when considering development, specifically how allowances for climate change should be included with FRAs. The Environment Agency can give a free preliminary opinion to applicants on their proposals at pre-application stage. There is a charge for more detailed pre-application planning advice.

The PPG has been updated alongside the NPPF to incorporate all sources of flooding when assessing flood risk with a greater emphasis on the impacts of climate change. The sequential test now seeks to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account both now and in the future (as set out in **diagram 2 of the PPG**).

6.2 Climate change guidance and allowances

Making an allowance for climate change helps reduce the vulnerability of the development and provides resilience to flooding in the future.

The climate change guidance includes climate change predictions of anticipated change for peak river flow, sea level rise and peak rainfall intensity. These allowances are based on climate change projections and different scenarios of carbon dioxide emissions to the atmosphere.

Due to the complexity of projecting the effects of climate change, there are uncertainties attributed to climate change allowances. As a result, the guidance presents a range of possibilities to reflect the potential variation in the impact of climate change.

The **UK Climate Predictions 2018**³⁹ (UKCP18) were published on 26 November 2018. The UKCP18 projections replace the UKCP09 projections and are the official source of information on how the climate of the UK may change over the rest of this century. The Environment Agency has updated their climate change guidance in line with the findings of UKCP18.

³⁸ Flood Risk Assessments: climate change allowances. Environment Agency (2016, last updated 2022) <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

³⁹ UK Climate Predictions: Headline Findings. Met Office. (2019) <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp-headline-findings-v2.pdf>

6.3 Peak river flows

Climate change is expected to increase the frequency, extent and impact of flooding, reflected in peak river flows. Wetter winters and more intense rainfall may increase fluvial flooding and surface water runoff and there may be increased storm intensity in summer. Rising river levels may also increase flood risk.

The **peak river flow allowances**⁴⁰ provided in the guidance show the anticipated changes to peak flow for the river basin district within which a watercourse is located.

For each management catchment, guidance on uplift in peak flows are provided for three allowance categories, Central, Higher Central and Upper End which are based on the 50th, 70th and 95th percentiles respectively. The allowance category to be used is based on the vulnerability classification of the development and the Flood Zones within which it is located.

Table 6-1: Guidance on the use of peak river flow allowances based on flood zone and vulnerability classification

Vulnerability classification	Flood Zone 2 or Flood Zone 3a	Flood Zone 3b
Essential Infrastructure	Higher Central	Higher Central
Highly Vulnerable	Central (development should not be permitted in FZ3a)	Development should not be permitted
More Vulnerable	Central	Development should not be permitted
Less Vulnerable	Central	Development should not be permitted
Water Compatible	Central	Central

An allowance based on the 50th percentile is exceeded by 50% of the projections in the range. At the 70th percentile it is exceeded by 30%. At the 95th percentile it is exceeded by 5%.

These allowances (increases) are provided, in the form of figures for the total potential change anticipated, for three climate change epochs:

- The '2020s' (2015 to 2039)
- The '2050s' (2040 to 2069)
- The '2080s' (2070 to 2115)

The time period used in the assessment depends upon the expected lifetime of the proposed development. Residential development should be considered for a minimum of 100 years. For non-residential uses a starting point of 75 years should be considered unless there are specific reasons for a different development lifetime to be used. Further information on what is considered to be the lifetime of development is provided in the **PPG**.

Land within the Tonbridge and Malling Borough area is located within the Medway Management Catchment and partially within the Darent and Cray Management Catchment which both form part of the Thames River Basin District, as indicated by mapping **published by the Environment Agency**⁴¹. However, the modelled watercourses are only

⁴⁰ Flood Risk Assessments - climate change allowances (2021): <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#Select-the-peak-river-flow-allowances-to-use-for-your-assessment>

⁴¹ Climate change allowances for peak river flow in England: <https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=363522b846b842a4a905829a8d8b3d0c>

located within the Medway Management Catchment. The allowances for the Medway Management Catchment are provided in Table 6-2. Climate change scenarios have been run for the 3.3%, 1%, and 0.1% AEP events in line with the PPG requirements to assess high, medium and low risk both now and in the future.

Table 6-2: Climate change 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%

Developers will also need to use these allowances to assess off-site impacts and calculate floodplain storage compensation depends on land uses in affected areas. The central allowance should be used in most cases, with the higher central allowance used when the affected area contains essential infrastructure. This guidance also applies with consideration to safe access, escape route and places of refuge.

Developers should also consider likely future land uses shown by local plan allocations or unimplemented extant planning permissions. The Environment Agency will want to see evidence from the developer to prove they have done this.

6.3.1 Upper End allowance

Current guidance published in May 2022, is that Strategic Flood Risk Assessments should use the Central and Higher Central allowances to assess the impacts of climate change on flood risk. The updates for peak river flows place increased emphasis on the Central and Higher Central scenarios, using the Upper End in a similar way to the former H++ allowances. The new guidance states that the Upper End allowances for peak river flows should be used to assess the following:

- Nationally Significant Infrastructure Projects;
- New settlements;
- Significant urban extensions.

This SFRA has assessed climate change for the 1% AEP fluvial event for the '2080s' central, higher central and upper end allowances. Please note for the Level 1 SFRA the undefended outputs have been assessed.

6.4 Peak rainfall intensity allowance

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.

For development with a lifetime beyond 2100, the EA guidance states that FRAs and SFRA's should assess the upper end allowances. This should be undertaken for both the 1% and 3.3% AEP events for the 2070s epoch (2061 to 2125).

As discussed in Section 6.3, Tonbridge and Malling Borough is located within the Medway Management Catchment and partially within the Darent and Cray Management Catchment. The Environment Agency's **peak rainfall climate change allowances by management catchment mapping** provides the allowances that should be used.

In some locations the allowance for the 2050s epoch is higher than that for the 2070s epoch. If so, and development has a lifetime beyond 2061, the Environment Agency guidance outlines that the higher of the two allowances should be used.

The allowances for Tonbridge and Malling Borough are outlined in the tables below:

Table 6-3: Darent and Cray Management Catchment peak rainfall allowances - 3.3% AEP event

Epoch	Central allowance	Upper End allowance
2050s	20%	35%
2070s	20%	35%

Table 6-4: Darent and Cray Management Catchment peak rainfall allowances - 1% AEP event

Epoch	Central allowance	Upper End allowance
2050s	20%	45%
2070s	25%	40%

Table 6-5: Medway Management Catchment peak rainfall allowances - 3.3% AEP event

Epoch	Central allowance	Upper End allowance
2050s	20%	35%
2070s	20%	35%

Table 6-6: Medway Management Catchment peak rainfall allowances - 1% AEP event

Epoch	Central allowance	Upper End allowance
2050s	20%	45%
2070s	20%	40%

6.5 Sea level rise allowance

Climate change is predicted to result in higher sea levels caused by melting ice sheets and more extreme storm events which will create higher storm surges. Although Tonbridge and Malling Borough is not coastal, the River Medway is tidally influenced.

The **Environment Agency's sea level allowances**⁴² have been used in the preparation of this report as confirmed by the Environment Agency (Table 6-7). These are based on coastal regions and Tonbridge and Malling Borough is within the South East region. In situations where it is appropriate to apply the credible maximum scenario, the H++ allowance for sea level rise beyond 2100 should be used, this represents an increase of 1.9m.

Table 6-7: Peak sea level allowances for South East region

Allowance category	Cumulative sea level rise allowance for the epoch 2000 to 2035	Cumulative sea level rise allowance for the epoch 2036 to 2065	Cumulative sea level rise allowance for the epoch 2066 to 2095	Cumulative sea level rise allowance for the epoch 2096 to 2125	Cumulative rise 2000 to 2125
Upper end	242mm	339mm	474mm	546mm	1.60m
Higher central	200mm	261mm	348mm	393mm	1.20m

6.6 Groundwater

The effect of climate change on groundwater flooding problems, and those watercourses where groundwater has a large influence on winter flood flows, is much more uncertain. 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. The effect of climate change on groundwater levels for sites in areas where groundwater is known to be an issue should be considered at the planning application stage.

6.7 The impact of climate change in the Local Plan Review area

The **UKCP18**⁴³ climate projections provide a number of future projections for different variables across the UK.

South East England

With an increase in global temperature between 2 – 4 degrees, the UKCP18 allowances estimate that⁴⁴:

- Increased mean summer temperature of between 2° - 7°C by 2099.
- Increased mean winter temperatures of up to 2°C or a decrease of up to -1°C by 2099.
- Summer rainfall could decrease by over 80% or it could increase up to 10% by 2099.
- Winter rainfall could decrease by up to 10% or it could increase over 30% by 2099.

42 Flood risk assessments: climate change allowances – sea level allowances. Environment Agency. (2016, updated 2020) <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#sea-level-allowances>

43 UKCP18 Climate Projections. Met office (2018). <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index>

44 UKCP18 Overview Report: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Overview-report.pdf>

Whilst changes in trends and mean values is important, the more influential effect of climate change with respect to flood risk and drought is to increase the chance of occurrence and severity of more extreme wet and dry events.

6.7.1 Adapting to climate change

The **PPG Climate Change guidance**⁴⁵ contains information for how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change. Examples of adapting to climate change include:

- Considering future climate risks when allocating development sites to ensure risks are understood over the development's lifetime
- Considering the impact of and promoting design responses to flood risk and coastal change for the lifetime of the development
- Considering availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality
- Promoting adaptation approaches in design policies for developments and the public realm for example by building in flexibility to allow future adaptation if needed, such as setting new development back from watercourses

⁴⁵ Climate change guidance. Ministry of Housing, Communities, and Local Government. (2014, updated 2019) <https://www.gov.uk/guidance/climate-change>

7 Sources of information used in preparing the SFRA

This chapter describes the key sources of flood risk information used within this SFRA. Refer to the SFRA guide to using technical data in Appendix C for recommendations and details on how to apply the Sequential and Exception tests using the data set out in this section.

7.1 Historic flooding

The historic flood risk in the Local Plan area has been assessed using point information of recorded incidents provided by Kent County Council, the Environment Agency's recorded flood outline dataset and Southern and Thames Water's Sewer Incident Report Form (SIRF) dataset. This has been supplemented with other information from the Kent County Council's Flood Investigation reports and news reports.

The Environment Agency's historic flood mapping for Tonbridge and Malling Borough can be found in Appendix A. Please note that the Environment Agency's recorded flood outlines dataset is not exhaustive. Where areas are not shown within the historic flood outline it does not necessarily mean there are no records of flooding. For example, the Environment Agency are aware of flooding recorded at West Malling and to land south of Peters Village, neither of which are shown in the dataset.

Guidance on how this information should be used to inform the Sequential and Exception Tests can be found in Appendix C.

7.2 Flood Map for Planning

Flood Zones 2, 3a and 3b have been compiled for Tonbridge and Malling Borough as part of this SFRA.

The following categories have been used to define each Flood Zone:

- Flood Zone 1: Comprised of land having a less than 1 in 1,000 annual probability of river or sea flooding in any year (<0.1% AEP)
- Flood Zone 2: Comprised of land having between a 1 in 100 (1% AEP) and 1 in 1,000 annual probability of river flooding or 1 in 200 (0.5% AEP) and 1 in 1,000 (0.1% AEP) annual probability of sea flooding.
- Flood Zone 3a: This zone comprises land assessed as having a greater than 1 in 100 (>1% AEP) annual probability of river flooding or land having a 1 in 200 or greater annual probability of sea flooding.
- Flood Zone 3b (the Functional Floodplain): This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters.

Flood Zones 2 and 3a are based on the Environment Agency's Flood Map for Planning (The latest flood maps, known as NaFRA2 which are available from DEFRA data services have been used). Flood Zone 3b comprises land where water from rivers or the sea has to flow or be stored in times of flood. The functional floodplain is defined as part of an SFRA and the methods used to define 3b in this SFRA are described below.

7.2.1 Flood Zone 3b

Flood Zone 3b has been based on the 3.3% AEP defended extents from detailed modelling, where this is available. These are detailed in Table 7-1. In areas not covered by detailed modelling, the Environment Agency's Risk of Flooding from Rivers and Sea with Defences-present day 1 in 30-year dataset (taken from the latest NAFRA2 data from DEFRA data

services) has been used to define Flood Zone 3b. Furthermore, the Environment Agency's Water Storage Areas has been used to define areas which are designed to store water during a flood event.

A review of these datasets has noted that parts of the Risk of Flooding from Rivers and Sea dataset appeared to be inaccurate due to the extent of flooding stopping mid-way down a channel. Where this has occurred, the extent of the previous Flood Map for Planning has been used to provide an indicative extent of flooding. It is believed the Environment Agency are in the process of identifying these areas on the national scale mapping and will be rectifying these errors. Once resolved, the national datasets should be used.

Table 7-1: Fluvial and tidal flood risk modelling used to inform this SFRA

Model name	Year	Software	Source of Flooding
River Bourne and Coult Stream	2022	Flood Modeller / TUFLOW	Fluvial
River Medway models 1, 2 and 3	2022	Flood Modeller / TUFLOW	Fluvial
North Kent Coast	2024	Flood Modeller / TUFLOW	Tidal
Upper Bourne Stream	2019	ESTRY-TUFLOW	Fluvial

If existing development or infrastructure is shown in Flood Zone 3b, additional consideration should be given to whether the specific location is appropriate for designation as 'Functional' with respect to the storage or flow of water in time of flood.

Flood Zone mapping for the Tonbridge and Malling Borough can be found in Appendix A. Guidance on how this information should be used to inform the Sequential and Exception Tests can be found in Appendix C.

7.3 Fluvial and Tidal Climate Change

Climate Change uplifts have been applied in line with those described in Section 6 for the 3.3%, 1%, 0.5% and 0.1% AEP events for flooding from fluvial and tidal sources respectively.

The resulting flood extents have been based on detailed modelling where available; these are detailed in Table 7-2. In areas not covered by detailed modelling, the Environment Agency's Risk of Flooding from Rivers and Sea without Defences-Climate Change Extents (Rivers and sea without defences) datasets (taken from the latest NAFRA2 data from DEFRA data services) have been used to derive the extent of flooding for the 1%, 0.5% and 0.1% AEP events. For the 3.3% AEP event the Environment Agency's Risk of Flooding from Rivers and Sea with Defences-Climate Change Extents (Rivers and sea with defences) dataset has been used to derive the extent of flooding. This has been applied as the 2080's Central climate change uplifts for fluvial flood risk and 2125 Upper End climate change uplifts for tidal flood risk.

Table 7-2: Fluvial and Tidal Climate Change Uplifts Applied in Modelling Data

Model name	Year	Software	Uplifts Employed
River Bourne and Coult Stream	2022	Flood Modeller / TUFLOW	27% - 2080s Climate Central
River Medway models 1, 2 and 3	2022	Flood Modeller / TUFLOW	27% - 2080s Climate Central
North Kent Coast	2024	Flood Modeller / TUFLOW	70 th Percentile - 2100s Upper End
Upper Bourne Stream	2019	ESTRY-TUFLOW	27% - 2080s Climate Central

7.4 Surface water flood risk

Flooding from surface water runoff (or 'pluvial' flooding) is caused by intense short periods of rainfall. It often occurs where the natural (or artificial) drainage system is unable to cope with the volume of water. Surface water flooding problems are linked to issues of poor drainage (or drainage blockage by debris) and sewer flooding.

Mapping of surface water flood risk in the Local Plan area has been taken from **the Risk of Flooding from Surface Water**⁴⁶ (RoFSW) published online by the Environment Agency. These maps are intended to provide a consistent standard of assessment for surface water flood risk across England and Wales in order to help LLFAs, the Environment Agency and any potential developers to focus their management of surface water flood risk. The different surface water risk categories used in the RoFSW mapping are defined in Table 7-3.

The RoFSW is derived primarily from identifying topographical flow paths and isolated ponding locations in low lying areas. They provide a map which displays different levels of surface water flood risk depending on the annual probability of the land in question being inundated by surface water. The RoFSW mapping is generally based on national modelling and therefore should be used as an indication of flood risk only. As a result, more detailed site-specific surface water modelling may be required. It is recommended that developers consult Kent County Council as the LLFA at the earliest opportunity.

Table 7-3: Surface water risk categories used in the RoFSW mapping

Category	Definition
High	Flooding occurring as a result of rainfall with a greater than 1 in 30 chance in any given year (3.3% AEP)
Medium	Flooding occurring as a result of rainfall of between 1 in 100 (1% AEP) and 1 in 30 (3.3% AEP) chance in any given year.
Low	Flooding occurring as a result of rainfall of between 1 in 1,000 (0.1% AEP) and 1 in 100 (1% AEP) chance in any given year.
Very low	Flooding occurring as a result of rainfall with less than 1 in 1,000 (0.1% AEP) chance in any given year.

7.4.1 Surface Water Climate Change

The risk of flooding from surface water mapping with climate change is considered insufficient at present due to the time horizon being too short for most development types as well as the climate change scenario employed being insufficiently precautionary. As the

⁴⁶ Risk of flooding from surface water. Environment Agency. <https://check-long-term-flood-risk.service.gov.uk/map>

appropriate mapping is expected to become available by Summer 2026, the 0.1% AEP present day surface water extent has been employed as a proxy for the 1% AEP plus climate change in the intervening period as part of this SFRA. Once available, the surface water flood risk data with the apocope climate change uplift should be used.

7.4.2 Critical Drainage Areas

Critical drainage areas are defined by the Town and Country Planning (General Development Procedure Amendment No. 2, England) Order 2006 as *"an area within Flood Zone 1 which has critical drainage problems and which has been notified [to] the local planning authority by the Environment Agency"*. These can cover wide areas within both rural and urban environments and are typically where manmade drainage infrastructure has been identified as at critical risk of failure, resulting in flooding. An absence of critical drainage areas does not mean there are no areas with potential drainage problems.

No formal critical drainage areas have been identified within Tonbridge and Malling Borough by the Environment Agency.

7.5 Groundwater flood risk

JBA has developed a range of Groundwater Emergence Map products at the national scale. The 5m resolution JBA Groundwater Emergence map has been used within the SFRA. The modelling involves simulating groundwater levels for a range of return periods (including 75, 100 and 200-years). Groundwater levels are then compared to ground surface levels to determine the head difference in metres. The JBA Groundwater Emergence Map categorises the head difference (m) into five feature classes based on the 100-year model outputs which are outlined in Table 7-4.

Table 7-4: JBA Groundwater Emergence map categories

Flood depth range during a 1% AEP flood event	Groundwater flood 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.
Low Risk	This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.

It is important to note that the modelled groundwater levels are not predictions of typical groundwater levels. Rather they are flood levels i.e. groundwater levels that might be expected after a winter recharge season with 1% AEP, so would represent an extreme scenario. The map also shows where groundwater is predicted to emerge, but it does not show where the flooding is likely to occur, or to what depths, velocity or hazard.

It should be noted that as the JBA Groundwater Emergence Map is based on national modelling it should only be used for general broad-scale assessment of the groundwater flood hazard in an area, and it is not explicitly designed for the assessment of flood hazard at the scale of a single property. In high-risk areas a site-specific risk assessment for groundwater flooding is recommended to fully inform the likelihood of flooding. Kent County Council should be consulted at the earliest opportunity to understand local groundwater issues around development sites and developers should prioritise groundwater monitoring to further understand local impacts.

The JBA Groundwater Emergence Map high and medium risk areas have been merged with areas of the 1,000-year RoFSW extent to understand where emerging water may flow and can be found in Appendix A. Further information about the methodology and guidance on how this information should be used to inform the Sequential and Exception Tests can be found in Appendix C.

7.6 Sewer flooding

Historical incidents of flooding are detailed by Southern Water and Thames Water through their Sewer Incident Report Form (SIRF). This database records incidents of flooding relating to public foul, combined or surface water sewers and displays properties that both internal and external flooding. For confidentiality reasons, this data has been supplied on a postcode basis from the SIRF for incidents recorded in the study area. The database covers reported incidents of sewer flooding in the last 17 years.

Thames Water covers a small area of the borough with no history of hydraulic flooding or cross boundary issues. The area is served by a foul sewer network only which discharges to Ham Hill sewage treatment works which belongs to Southern Water. There are currently no planned growth schemes for this area covered by Thames Water.

The SIRF data indicating quantities of recorded flood incidents per postcode for the Tonbridge and Malling Borough area, is shown in Table 8-3.

7.7 Reservoir flood risk

The risk of inundation due to reservoir breach or failure of reservoirs within the area has been assessed using the **Environment Agency's Risk of Flooding from Reservoirs dataset**⁴⁷ for a wet and dry day. A wet day assumes that there is also a 0.1% AEP flood event (Flood Zone 2). If a site is affected by reservoir breach outside of Zone 2 then the implications of this can be considered in a Level 2 SFRA. These sites are highlighted in the site screening spreadsheet (Appendix B).

The Risk of Flooding from Reservoirs mapping for the Local Plan area can be found in Appendix A. Guidance on how this information should be used to inform the Sequential and Exception Tests can be found in Appendix C.

⁴⁷ Risk of Flooding from Reservoirs. Environment Agency. (2020) <https://data.gov.uk/dataset/44b9df6e-c1d4-40e9-98eb-bb3698ecb076/risk-of-flooding-from-reservoirs-maximum-flood-extent-web-mapping-service>

8 Understanding Flood Risk in Tonbridge and Malling Borough

8.1 Topography

The topography of the borough is displayed in Figure 8-1 and is primarily comprised of higher elevations and steeper slopes located in the centre and the north-west of the borough. The highest elevation reaches approximately 234 metres Above Ordnance Datum (m AOD) near Labour-in-vain. Elevations decrease in a north-east and southern direction towards Snodland and East Peckham respectively. In these regions, average elevations are approximately 15m AOD. The main watercourse originating from the higher ground is the River Bourne, while the River Medway occupies the lower elevations in the borough.

8.2 Geology and soils

The geology of the catchment can be an important influencing factor in the way that water runs off the ground surface. This is primarily due to variations in the permeability of the surface material and bedrock stratigraphy.

The borough consists of mainly Wealden Group and Hythe Formations that were deposited in the Cretaceous period 112 to 134 million years ago. The Wealden Group comprise sandstone, mudstone and siltstone while the Hythe Formation comprise sandstone and limestone deposits (interbedded). Land underlain by Wealden Group deposits may be expected to be more responsive to rainfall compared with areas underlain by Hythe Formation deposits, which are more permeable as a result of the limestone composition. In these areas flood volumes are likely to be slightly more critical for this area.

North of these formations, the borough is underlain by Folkestone (sandstone), Gault (clay), Chalk (undifferentiated) and Lewes Nodular Chalk Formations. These formations comprise sandstone, mudstone and chalk. This area, dominated by permeable chalk and sandstone formations, is likely to have a slower response and flood volumes are likely to more be critical for this area. It is expected that these areas will be more susceptible to flooding from long duration rainfall events.

The remainder of the borough (south of the Wealden Group Formation) is underlain by Ashdown Formation and Wadhurst Clay Formation. The Ashdown Formation comprises sandstone, siltstone and mudstone, whereas the Wadhurst Clay Formation comprises mudstone. Sandstone formations are typically associated with well-draining soils, whereas clay rich formations are associated with poorly drained soils. It is likely that these areas of mixed geology will exhibit different catchment responses depending on the local geology. Where the area is dominated by sandstone formations, it is expected that the areas will have a slower catchment response compared with those areas dominated by mudstone and siltstone deposits. Figure 8-2 shows the arrangement of the various bedrock formations throughout the borough.

Superficial (at the surface) deposits in Tonbridge and Malling Borough consist of River Terrace, Alluvium and Head deposits, all of which comprise a mixture of sand, silt, clay and gravel. It is expected that areas underlain by superficial deposits will have a relatively slower response to rainfall due to underlying permeable sand and gravel deposits. Figure 8-3 shows the arrangement of the various superficial deposits throughout the borough.

Figure 8-4 and Figure 8-5 show the bedrock and superficial Aquifer designation maps for the borough. The bedrock layers and superficial deposits are classified as the following aquifers:

- **Principal:** layers of rock or drift deposits with high permeability and, therefore, provide a high level of water storage
- **Secondary A:** rock layers or drift deposits capable of supporting water supplies at a local level and, in some cases, forming an important source of base flow to rivers

- **Secondary B:** lower permeability layers of rock or drift deposits which may store and yield limited amounts of groundwater
- **Secondary undifferentiated:** rock types which do not fit into either category A or B.
- **Unproductive Strata:** rock layers and drift deposits with low permeability and, therefore, have a negligible impact on water supply or river base flow.

The bedrock geology in the Tonbridge and Malling borough is classified as a mixture of predominantly Principal aquifers and unproductive strata, with small areas of Secondary A and B aquifers. The superficial deposits in the borough are primarily classified as Secondary A and undifferentiated aquifers and unproductive strata.

Figure 8-1: Topography of Tonbridge and Malling Borough

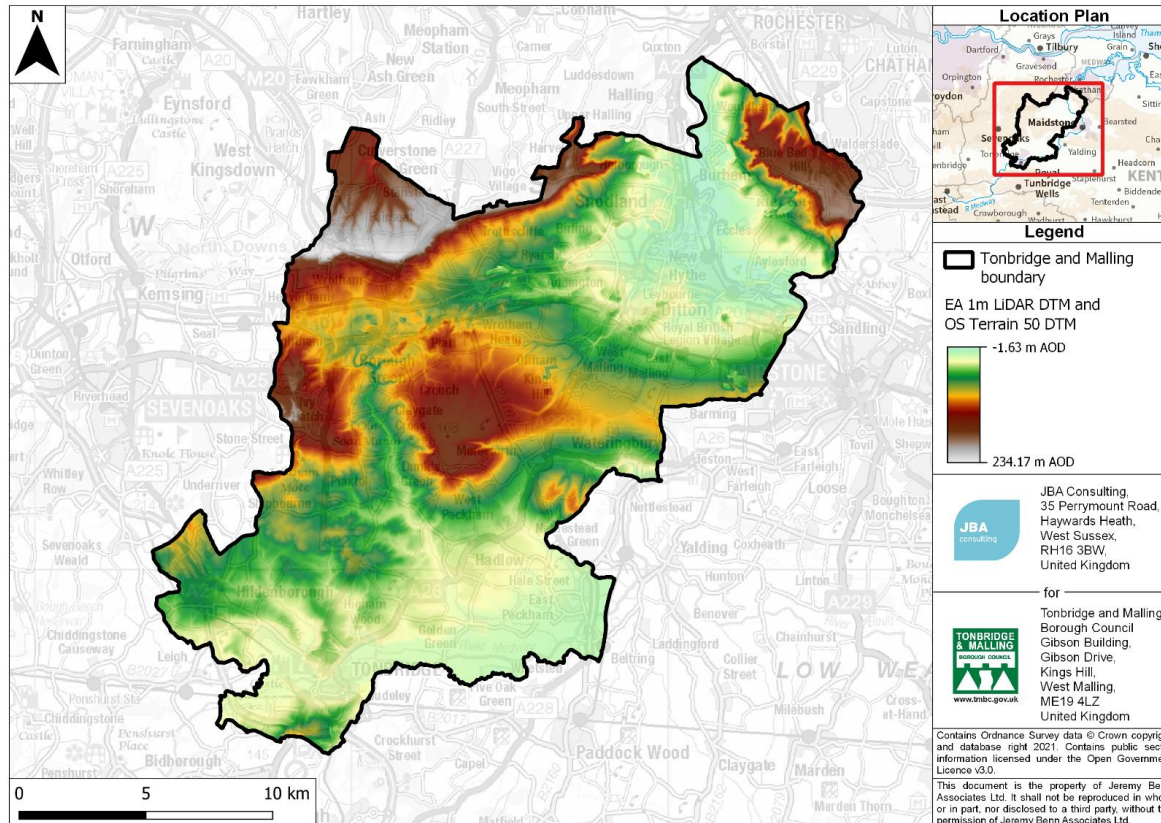


Figure 8-2: Bedrock geology of Tonbridge and Malling Borough

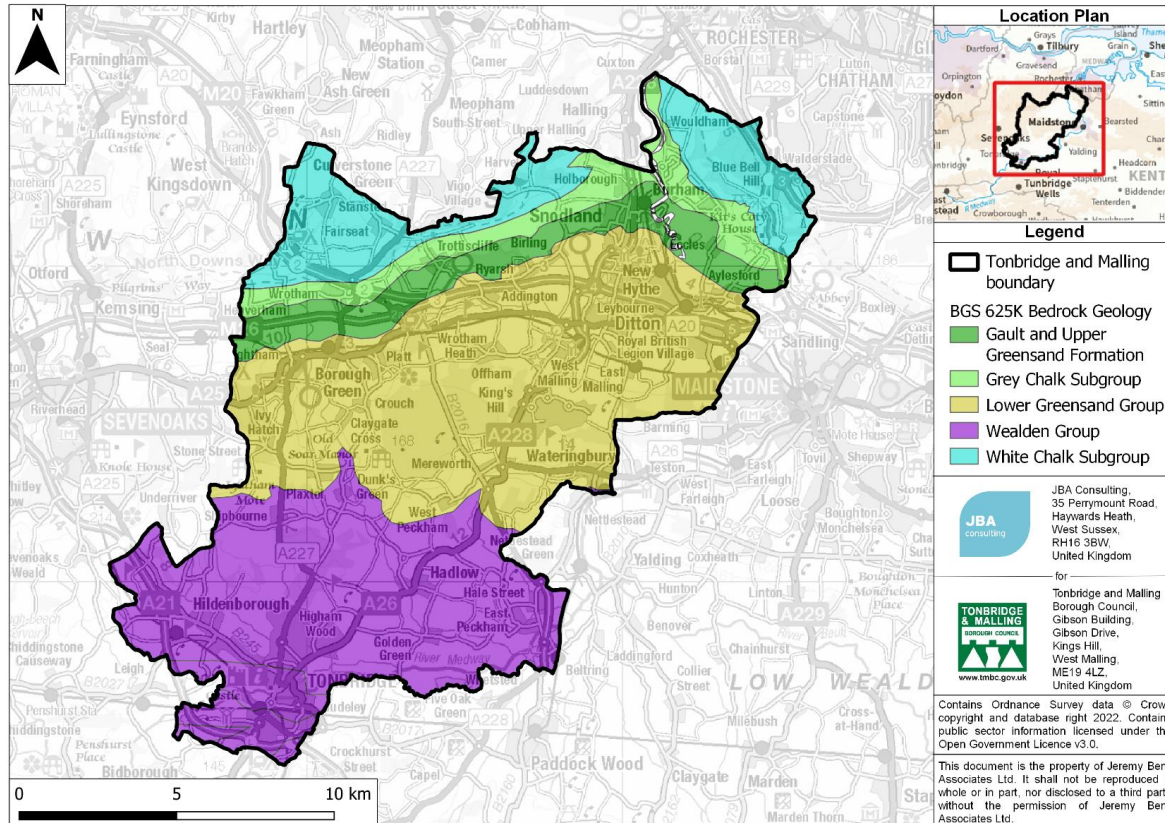


Figure 8-3: Superficial geology of Tonbridge and Malling Borough

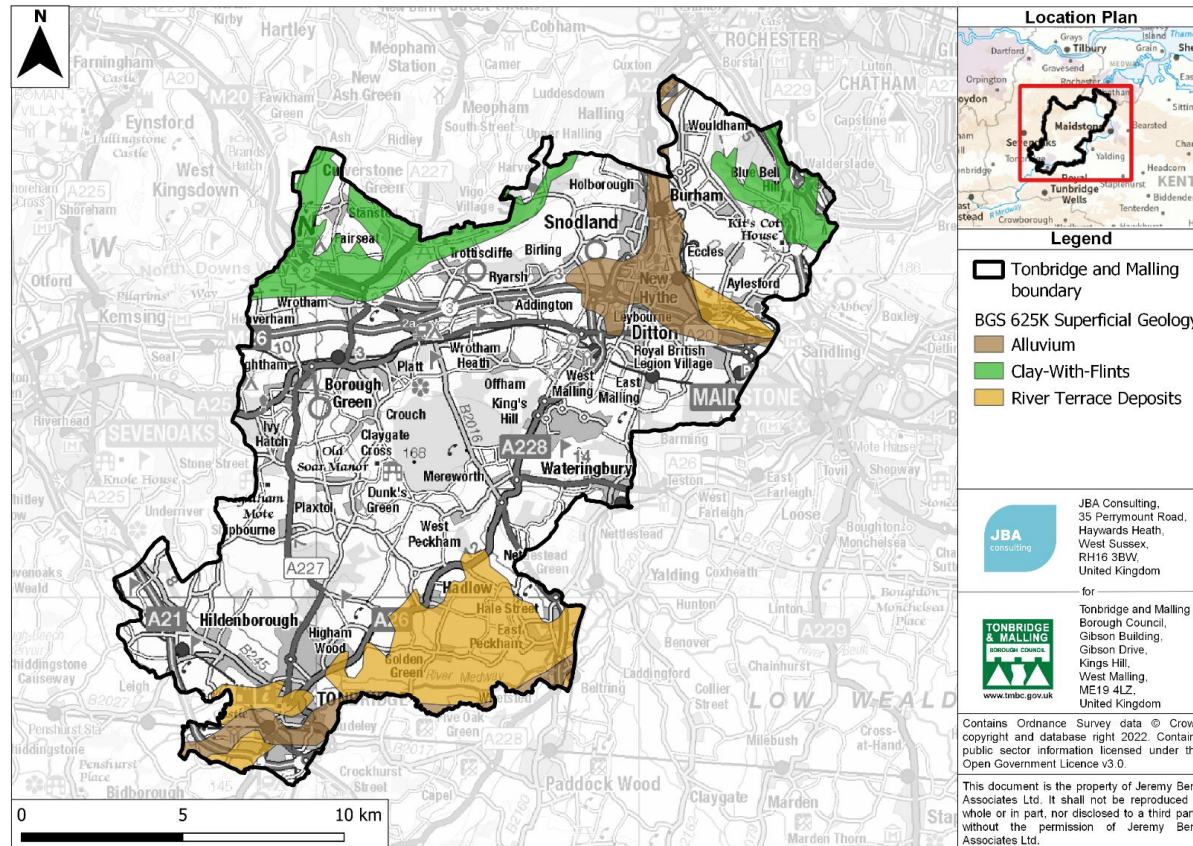


Figure 8-4: Aquifer Designation Map for Tonbridge and Malling Borough (Bedrock Geology)

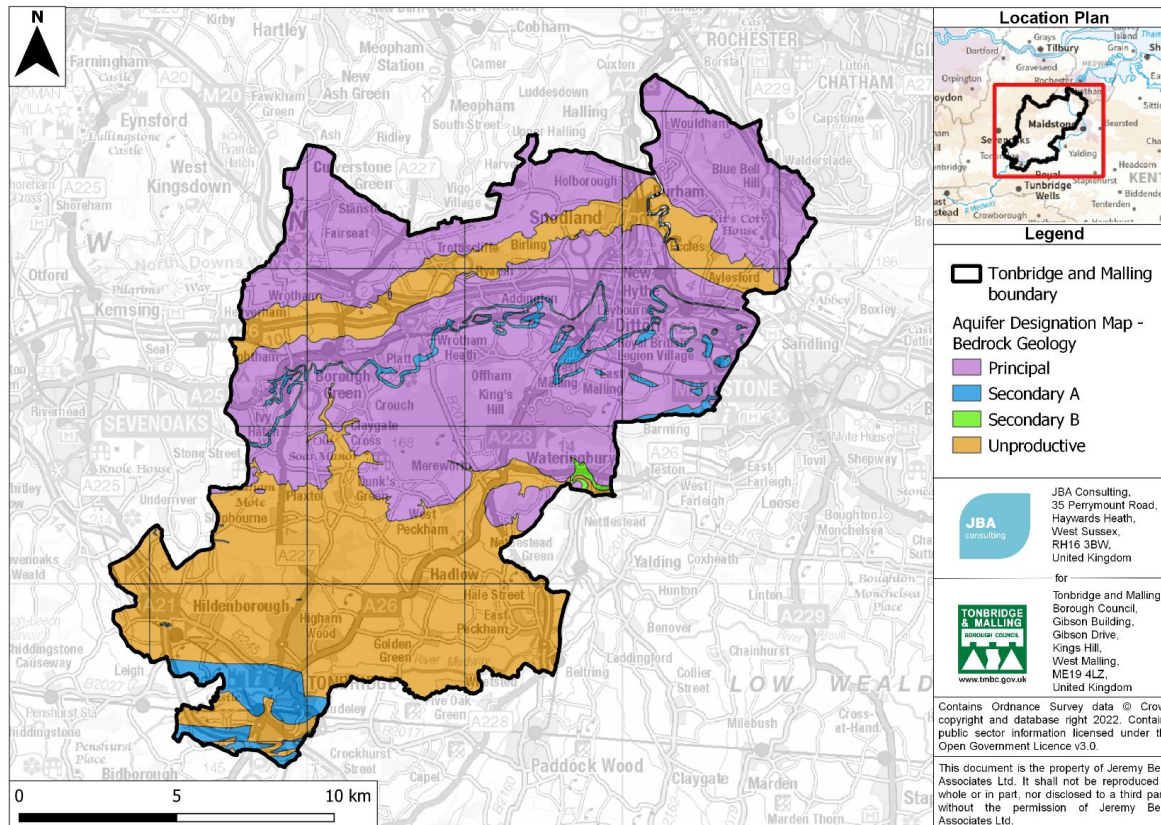
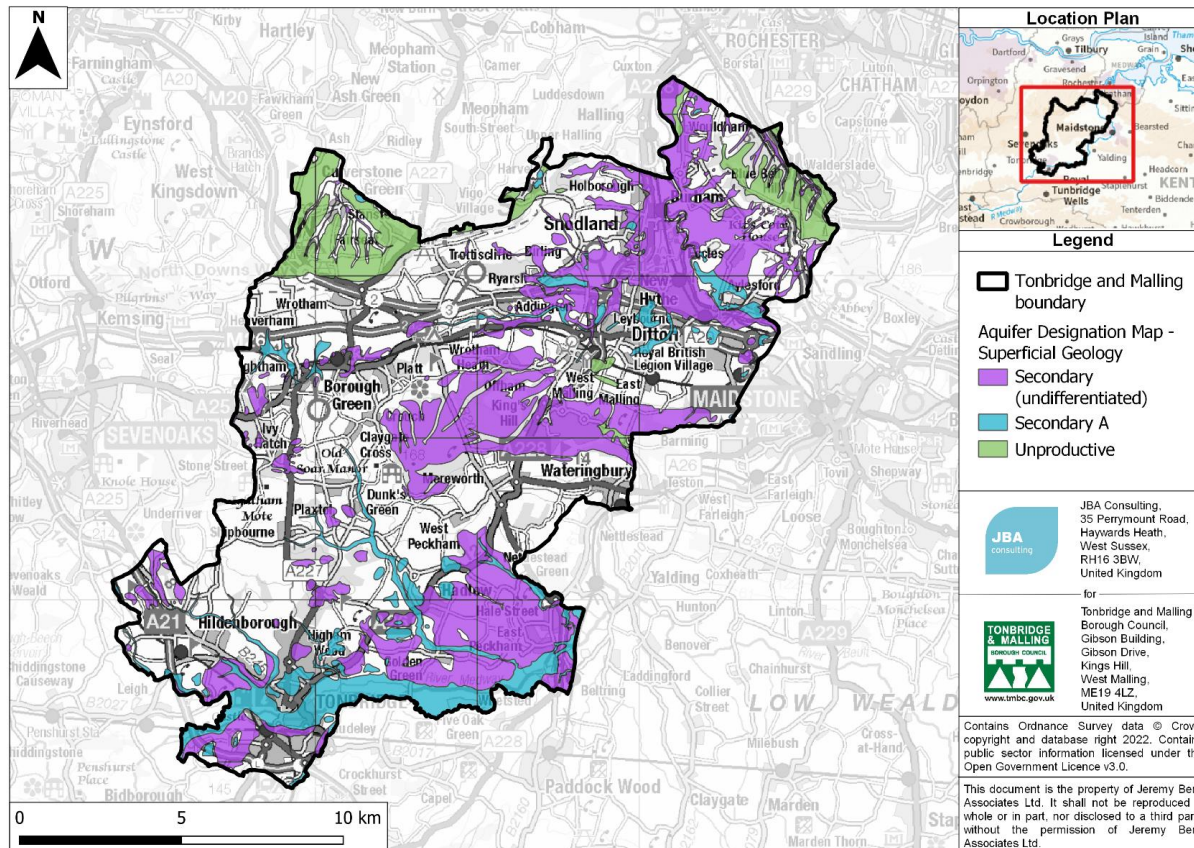


Figure 8-5: Aquifer Designation Map for Tonbridge and Malling Borough (Superficial Geology)



8.3 Historic flood risk

The Local Plan area has a history of recorded flood events, with multiple sources of flooding. The most notable fluvial flood events occurred in 1953, 1968, 2000, and 2013/2014. These events caused widespread flooding across the borough after heavy rainfall over a prolonged period.

Information collated from the Environment Agency's historic flood map, Kent County Council recorded flood incidents data sets and Section 19 reports, and Southern Water and Thames water SIRF data were assessed to understand the historic flooding in the Local Plan area.

8.3.1 Fluvial events

The data shows that there have been a number of fluvial floods in the area including along the Alder Stream, Coult Stream, Hawden Stream, Hilden Brook, River Medway, Pen Stream, Snodland Mill Stream and Hildern Brook.

Details of the significant fluvial flood events noted to affect Tonbridge and Malling are summarised as follows:

- February 1953: a major storm surge, high tides and hurricane-force winds resulted in the failure of flood defences and severe flooding along the coast of England⁴⁸. New Hythe and parts of Snodland were the areas noted to have been primarily affected by the flooding in the borough.
- September 1968: prolonged heavy rainfall associated with a slow-moving depression and thunderstorms caused severe flooding across the south-east of England. Between the 14th and 15th of September, 150mm-200mm of rainfall was recorded across Kent⁴⁹ and caused the River Medway to exceed its channel capacity. This resulted in widespread flooding and damage in the borough between East Peckham and Tonbridge.
- October 2000: the autumn of 2000 was the wettest on record and many river catchments were subjected to multiple flood events. Large areas of Kent and Sussex were left under water as rivers, including the River Medway, burst their banks⁵⁰. Although this resulted in flooding between East Peckham and Tonbridge, the Leigh Flood Alleviation Scheme (constructed in 1981) is noted to have been instrumental in saving Tonbridge from severe flooding and damage.
- December 2013: During the winter of 2013-14 a series of Atlantic depressions brought heavy rainfall and stormy conditions to much of England and Wales, including the River Medway catchment, where the largest flood of the period occurred on 23 December 2013. Flows seen in the Medway rivers were amongst the highest ever recorded, in several cases larger than the previous largest gauged event in 1968. Drivers for the notable events were the very wet antecedent conditions, combined with an intense storm on 23 December. The **SWIMS Event Summary Report for Kent & Medway**⁵¹ and **The Leigh Flood Storage Area**

48 <https://www.bbc.co.uk/news/uk-england-kent-21262231>

49 http://www.tonbridge-weather.org.uk/wx_notes.htm

50 <https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/interesting/2000/the-wet-autumn-of-2000---met-office.pdf>

51 https://www.kent.gov.uk/_data/assets/pdf_file/0006/15783/Monitoring-the-impacts-of-severe-weather-for-winter-2013-14-full-report.pdf

Review⁵² provide further details about the event. The latest SWIMS Report at the time of writing was published in 2020⁵³.

- June 2016: Heavy localised rainfall occurred on the 25th June 2016 generated flash flooding in the Busty Stream near Igtham. 33.4mm of rain was recorded between 17:15 and 19:15 at the Sevenoaks rain gauge, of which 17.3mm fell in less than half an hour (from 17:15). This followed heavy rain earlier in the day that would have wetted the catchment. This caused internal flooding to a number of residential properties. As reported in **Kent County Council's Flood Investigation**⁵⁴, a blockage of the watercourse or culvert could not be ruled out, but there is no conclusive evidence that this occurred and was sufficient to cause the flooding.

8.3.2 Surface water events

Tonbridge and Malling Borough has experienced a number of surface water flood incidents. A large proportion of surface water flood incidents are noted to have occurred in the Tonbridge, Hildenborough, and West Malling areas, areas historically known to suffer from surface water flooding.

In June 2019, the county experienced widespread flooding due to heavy rainfall. 20 properties are known to have been flooded in Snodland by surface water during this event, promoting a **Flood Investigation report** produced by Kent County Council⁵⁵. Kent County Council's recorded flood incidents database also indicates that flooding occurred in Ryarsh, Eccles, Birling, Aylesford and Larkfield during this time, although the source of flooding has not been recorded.

8.3.3 Other sources

Other incidents of historical flood records are summarised as follows:

- Regular groundwater flooding at Leigh Road, Hildenborough. Although the record does not specify property flooding, 17 gardens are recorded to be affected due to groundwater and an overflowing pond.
- Groundwater flooding in 2001 at St, Leonards Street, West Malling. Records indicate approximately 3 properties were affected by the flooding due to an exceptionally high water table.
- Groundwater flooding has been observed at West Malling and East Malling, both from the Hythe Beds Formation of the Lower Greensand aquifer. Impacts have been observed in 2000/2001, 2014 and also 2022/2023.
- Multiple records of sewer flooding from 2011 to 2021, supplied by Southern Water. Thames Water do not note any recorded events within the Local Plan area.
- The Kent County Council's recorded flood incidents database indicates that during February 2020 there were recorded incidents in Tonbridge, Hadlow and West Malling. The source of the flooding has not been provided.

Appendix A shows the recorded historic flood extents provided by the Environment Agency.

52 <https://democracy.tonbridgewells.gov.uk/documents/s45907/9%20Appendix%20C%20-%20Leigh%20Flood%20Storage%20Area%20Review.pdf>

53 https://www.kent.gov.uk/_data/assets/pdf_file/0016/131470/Monitoring-the-Impacts-of-Severe-Weather-2020.pdf

54 https://www.kent.gov.uk/_data/assets/pdf_file/0008/79442/Igtham-S.19-Flood-Report-Final.pdf

55 https://www.kent.gov.uk/_data/assets/pdf_file/0015/110526/Snodland-section-19-flood-investigation-report.pdf

8.4 Fluvial flood risk

8.4.1 Watercourses

Watercourses flowing through Tonbridge and Malling Borough include:

- The River Medway
- Hilden Brook
- Hawden Stream
- Pen Stream
- The River Bourne
- Coult Stream
- Alder Stream
- Snodland Mill Stream

Each of the watercourses listed above forms a tributary watercourse to the River Medway. Tributaries to these watercourses include primarily smaller Ordinary Watercourses and unnamed drains.

8.4.2 River Medway

In the borough, the River Medway is of fluvial influence in the south, and tidal/estuarine influence in the north. There is a long history of flooding from the River Medway. The town of Tonbridge has experienced severe flooding on several occasions from the River Medway, most recently in December 2013 when the river capacity was exceeded causing the town centre to flood. Flooding within the town centre (upstream of the weir) predominantly originates from Botany stream, which floods Avenue du Puy via the highway drainage before spreading to the Sainsbury's car park⁵⁶. The problem is exacerbated when the outfalls of drains into the rivers in Tonbridge are submerged, causing them to not freely discharge, resulting in ponding of low topographic areas such as the River Centre Industrial Estate and the area in and around Avebury Avenue⁵⁷.

8.4.3 River Bourne and Hawden Stream

Other fluvial flood risk areas identified in the borough are from the main rivers of River Bourne and Hawden Stream. Hawden Stream was last recorded to have flooded in December 2013 and caused extensive flooding of Hilden Park, although the main driver for this flooding was elevated water levels on the River Medway propagating upstream. In addition to parts of the River Bourne flooding in December 2013 due to elevated River Medway levels, flood flows along the watercourse itself contributed to flooding. The watercourse has also been reported to have flooded significantly in 1958 when the drains were over-capacity after heavy rainfall and during Autumn 2000, which saw widespread flooding in the south east. During this period nearly 40 properties were reported to have flooded on the River Bourne and neighbouring Coult Stream⁵⁸.

56 Kent County Council: Flood Risk to Communities – Tonbridge and Malling Borough (2016): https://www.kent.gov.uk/_data/assets/pdf_file/0003/71670/Flood-risk-to-communities-in-Tonbridge-and-Malling.pdf

57 Kent County Council: Flood Risk to Communities – Tonbridge and Malling Borough (2016): https://www.kent.gov.uk/_data/assets/pdf_file/0003/71670/Flood-risk-to-communities-in-Tonbridge-and-Malling.pdf

58 River Bourne and Coult Stream Flood Modelling and Mapping Study, Environment Agency, August 2011.

8.4.4 Ordinary watercourses

Ordinary watercourses that have flooded previously in the borough have affected the areas of Watlingbury, Pizien Well and Mereworth⁵⁹. These incidents have occurred due to the known issues with unmaintained watercourses and riparian owners not being aware of their duty to maintain the watercourse⁶⁰. Another cause of Ordinary Watercourse flooding has occurred historically from where flows have exceeded the channel capacity. This has caused Birling and West Malling to have previously flooded⁶¹. The Busty Ordinary Watercourse has also been cited to regularly flood in Ightham⁶².

In addition to flood risk shown by the flood risk mapping, there are a number of small watercourses and field drains which may pose a risk to development. Generalised Flood Zone mapping (where more detailed modelling investigations are not available) is only available for watercourses with a catchment greater than 3km². Therefore, whilst these smaller watercourses may not be shown as having flood risk on the flood risk mapping, it does not necessarily mean that there is no flood risk. As part of a site-specific flood risk assessment it will be necessary to assess the risk from these smaller watercourses where these may influence the site.

Given the widespread flooding recorded historically within the borough (particularly along the River Medway floodplain as evidenced in Appendix A) particular areas (e.g. roads, settlements) of the borough susceptible to fluvial flooding have not been listed here. It should be noted that defences are present within the borough, particularly upstream of, and within Tonbridge, and downstream of Maidstone which act to reduce flooding. This may be particularly important when considering the functional floodplain (Flood Zone 3b) for development proposals. Further details on defences in Tonbridge and Malling Borough is presented in Section 9.

The delineation of the fluvial Flood Zones and the areas of Tonbridge and Malling Borough which are within fluvial Zones are shown in Appendix A. Consideration of how climate change may influence flood risk the future is indicated within mapping in Appendix A. An important consideration when assessing fluvial flood risk is the probability of a failure of river defence occurring or being exceeded. Risk of defence failure is reduced by the actions of the defence owners in maintaining the defences, but there remains a residual risk of breach of exceedance. The necessity for assessment of the 'residual' risk of defence failure (e.g. breach) should be considered on a site by site basis. This requirement also applies to tidal flood risk within the borough.

59 Tonbridge and Malling Stage 1 Surface Water Management Plan: https://www.kent.gov.uk/__data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

60 Environment Agency: "Living on the Edge" report, 5th edition (2014). Available at: <https://blob.scrf.co.uk/wp-content/uploads/sites/3/2016/12/EA-Living-on-the-Edge.pdf>

61 Tonbridge and Malling Stage 1 Surface Water Management Plan: https://www.kent.gov.uk/__data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

62 Tonbridge and Malling Stage 1 Surface Water Management Plan: https://www.kent.gov.uk/__data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

Table 8-1: List of Main Rivers within Tonbridge and Malling Borough

Watercourse name	Classification	Description
River Medway	Main River	The River Medway is 113km in length and rises from its spring-fed source in Turners Hill, West Sussex. From its source, the river flows north-east through mainly agricultural land before entering the district boundary approximately 1.37km south-west of Fordcombe (NGR: TQ 51260 39782). The river then flows in a northern direction towards Penshurst where it joins its confluence with the River Eden (NGR: TQ 52820, 43447). From here, the river flows in a north-east direction towards Leigh where it passes through 3 steel radial gates which form the Leigh Flood Storage Area. The river then flows in an eastern direction across the Tonbridge By-pass and into the Tonbridge and Malling Borough (NGR: TQ 57001 46081).
Hawden Stream	Main River	Hawden Stream originates near Hildenborough and flows in a south easterly direction in the southern area of the borough. The stream converges with the Hilden Brook to the west of Tonbridge.
Hilden Brook	Main River	Hilden Brook flows south from its source in Underriver into the borough at Great Hollendan Farm (NGR: TQ 563 506). The river then flows south towards Watt's Cross before flowing in a south-east direction towards Hildenborough and Tonbridge. The river converges with the River Medway at Tonbridge Recreation Ground (NGR: TQ548 468).
Tonbridge Mill Stream	Main River	Tonbridge Mill Stream flows from the River Medway (NGR: TQ 593 464) in a north-easterly direction through the Tonbridge Golf Centre and Course. The stream re-joins the River Medway at the point where the Pen Stream converges with the river near Hadlow Stair Farm (NGR: TQ 607 474).
Pen Stream	Main River	Pen Stream originates near Horns Lodge Farm (NGR: TQ 593 501) and flows in a south-easterly direction through Higham Wood in the southern area of the borough. The stream converges with the River Medway at the point where the Tonbridge Mill Stream re-joins the river near Hadlow Stair Farm (NGR: TQ 607 474).
River Bourne	Main River	The River Bourne rises near Borough Green and Igtham in the western area of the borough. The river flows in generally a south-easterly direction through Plaxtol and Hadlow and is joined by several Ordinary Watercourses along its course. The River Bourne converges with the River Medway south of East Peckham (NGR: TQ 664 477).
Coult Stream	Main River	The Coult Stream flows south-east from its source near Leavers Farm (NGR: TQ 646 505) through East Peckham and Hale Street in the south-eastern area of the borough. The stream converges with the River Medway just outside of the borough at Stoneham Lock (NGR: TQ 681 490).
Snodland Mill Stream	Main River	Several Ordinary Watercourses flow in an easterly direction from Addington, Ryarsh and Birling and converge to form the Snodland Mill Stream near the main A228 Road (NGR: TQ 693 600). The stream then follows the A228 and flows in a generally north-east direction through Leybourne Lakes County Park towards Snodland. The stream then converges with the River Medway near Burham Marshes (NGR: TQ 708 617).
NOTE: This table is based on information extracted from the Environment Agency's Statutory (Sealed) Main Rivers database. Ordinary Watercourses within the district are not included within this table.		

8.5 Tidal flood risk

Tidal flood risk can be assessed using Extreme Still Water Sea Levels (ESWSL). An ESWSL is the level the sea is expected to reach during a storm event for a particular magnitude tidal flood event as a result of the combination of tides and surges. As these levels are based on 'still' water, the effect of short-term fluctuations in sea level associated with wind and swell waves are not included in these predictions, but should be considered at locations where wind and wave effects are influential.

The tidal influence of the River Medway extends from the far north of the borough to beyond Allington, located at the border of the borough. Aylesford and Snodland have previously been flooded from overtopping of defences that line the river. The most significant event recorded occurred in 1953, evidenced by interrogation of the Environment Agency's historic flood map dataset. However, the improvements to coastal and tidal defences that have taken place following the flooding on 1953 should be kept in mind when viewing the data for this event.

Tidal flooding is caused by extreme tide levels exceeding ground and/or defence levels. Flood Zones 1, 2 and 3 delineate areas at low risk, medium risk and high risk respectively from both tidal and fluvial flooding. Flood Zones do not take into account the effects of flood defences, and as such provides a worst-case assessment of flood risk. The delineation of the tidal Flood Zones and the areas of Tonbridge and Malling Borough which are within tidal Zones are shown in Appendix A. Consideration of how climate change may influence the predicted Flood Zones in the future is indicated within mapping of Appendix A.

Flood Zones 2 and 3 represent the area that would be flooded in the 0.5% AEP and 0.1% AEP tidal events, respectively, in the absence of defences.

8.6 Surface water flooding

Flooding from surface water runoff (or 'pluvial' flooding) is usually caused by intense rainfall that may only last a few hours. Flooding usually occurs when rainfall fails to infiltrate to the ground or enter the drainage system. Ponding generally occurs at low points in the topography. The likelihood of flooding is dependent on not only the rate of runoff but also saturation of the receiving soils, the groundwater levels and the condition of the surface water drainage system (i.e. surface water sewers, highway authority drains and gullies, open channels, Ordinary Watercourses and SuDS). Surface water flooding problems are linked to issues of poor drainage, or drainage blockage by debris, and sewer flooding.

The Environment Agency's Risk of Flooding from Surface Water (RoFSW) dataset predominantly follows topographical flow paths of existing watercourses or dry valleys with some isolated ponding located in low lying areas. Mapping of the RoFSW throughout the borough is provided in Appendix A.

The **Tonbridge and Malling Borough SWMP**⁶³ identifies that historical records are dispersed throughout the borough, but notes that there are limited records of older events. Recorded flooding was attributed to a range of sources. The primary source of surface water flooding identified was attributed to heavy rainfall overloading carriageways, drains / gullies, but in other instances, causes of flooding were perceived to be from blocked drains and gullies or due to high water levels at receiving watercourses impeding free discharge from surface water drains and gullies. Identified as contributing to the reduced capacity of drains and gullies was surface water flows from agricultural land at higher levels silting these drainage features and causing blockages and subsequent surcharging during heavy

63 Tonbridge and Malling Stage 1 Surface Water Management Plan: https://www.kent.gov.uk/_data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

rainfall. The Environment Agency has also identified West Peckham to regularly flood due to poor/little drainage in place⁶⁴.

8.7 Groundwater flooding

Groundwater flooding is the term used to describe flooding caused by unusually high groundwater levels. It occurs as excess water emerging at the ground surface or within manmade underground structures such as basements. Groundwater flooding tends to be more persistent than surface water flooding, in some cases lasting for weeks or months, and it can result in significant damage to property.

JBA has developed a range of Groundwater Emergence Map products at national scale. The modelling involves simulating groundwater levels for a range of return periods (including 75, 100 and 200-years). Groundwater levels are then compared to ground surface levels to determine the head difference in metres. The JBA Groundwater Emergence Map categorises the head difference (m) into five feature classes based on the 100-year model outputs. It should be noted that the maps highlight where water is likely to emerge but does not account for where the water will flow on the surface.

It should be noted that the JBA Groundwater Emergence Map is suitable for general broad-scale assessment of the groundwater flood hazard in an area, but is not explicitly designed for the assessment of flood hazard at the scale of a single property. In high risk areas a site-specific risk assessment for groundwater flooding is recommended to fully inform on the likelihood of flooding. The JBA Groundwater Emergence map for the Local Plan area has been merged with areas of the 1,000-year RoFSW extent (pre-2025 data) to show areas which may be at higher risk of groundwater flooding. The extent can be found in Appendix A.

It is illustrated in Appendix A, that a large proportion of the northern Tonbridge and Malling Borough area is potentially at risk of groundwater flooding, particularly to the north of Oldbury and Ightham, Borough Green, to the north of Wrotham Heath, Addington, Ryash, Birling, Ham Hill New Hythe, Leybourne and Lunsford. This can be attributed to the bedrock geology of the area. In southern areas of the Borough, there are isolated areas of groundwater flood risk. The Environment Agency holds records of groundwater flooding from the Hythe Bed formation of the Lower Greensland. Specifically, in the St. Leonards and Frog Lane areas of West Malling and the Blacklands area of East Malling.

In addition, the Tonbridge and Malling SWMP identified two recorded events of groundwater flooding in the borough. In 2001 three properties were reported to have been flooded on St. Leonards Street in West Malling. It was observed that there was an exceptionally high water table during this event. The other area known to flood regularly is the residential curtilage of Leigh Road in Hildenborough. Reports suggest that at least 17 gardens were affected from this source of flooding. This event may have been caused by a burst underground pipe rather than flooding from hard rock aquifers or superficial deposits, as the direct source was not determined.

The Tonbridge and Malling SWMP also notes that it is difficult to ascertain if the source of flood event in other areas of the district is from groundwater. This is because certain historical flood events may have originated from a number of sources.

As a result, developers planning to build within any groundwater emergence zones should investigate whether groundwater flooding is likely to be a problem locally.

64 Tonbridge and Malling Stage 1 Surface Water Management Plan: https://www.kent.gov.uk/_data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

8.8 Reservoir flood risk

Reservoirs with an impounded volume greater than 25,000 cubic metres are governed by the Reservoir Act 1975 and are listed on a register held by the Environment Agency. The level and standard of inspection and maintenance required under the Act means that the risk of flooding from reservoirs is relatively low. Legislation under the Flood and Water Management Act requires the Environment Agency to designate the risk of flooding from these reservoirs. Reservoir flood mapping is provided in Appendix A and shows the risk of flooding during normal conditions (dry day scenario) and when a breach coincides with a severe fluvial flood event (wet day scenario).

Although there are no large reservoirs within Tonbridge and Malling Borough, outlines from the Risk of Flooding from Reservoirs dataset show worst case inundation extents of three reservoirs impacting the borough, as detailed in Table 8-2. Most notably, Leigh Flood Storage Area (FSA, formerly Leigh Barrier) is located immediately upstream of Tonbridge and Malling Borough to the west, meaning breach of this FSA could have notable implications for Tonbridge and the wider borough area.

Table 8-2: Reservoirs which may impact Tonbridge and Malling Borough in the event of failure

Reservoir	Location (grid reference)	Reservoir owner	Environment Agency area	Local authority
Weirwood	540713, 135333	Southern Water Services Ltd	Kent and South London	East Sussex County Council
Bough Beech	549168, 147292	Sutton & East Surrey Water Company	Kent and South London	Kent County Council
Leigh Barrier FSA	556408, 146112	Environment Agency	Kent and South London	Kent County Council

8.9 Sewer flooding

Sewer flooding occurs when intense rainfall overloads the sewer system capacity (surface water, foul or combined), and/or when sewers cannot discharge freely into watercourses due to high water levels. Sewer flooding can also be caused when problems such as blockages, collapses or equipment failure occur in the sewerage system. Infiltration, entry of soil or groundwater into sewer systems via faults within the fabric of the sewerage system, is another cause of sewer flooding. Infiltration is often related to shallow groundwater, and may cause high flows for prolonged periods of time. The Tonbridge and Malling SWMP⁶⁵ identifies that information supplied by Southern Water resulted predominantly from the hydraulic overload of sewers or an overloaded pumping station, with a number of sewer flood incidents recorded in Tonbridge Town and in Hildenborough.

Since 1980, the Sewers for Adoption⁶⁶ guidelines have meant that most new surface water sewers have been designed to have capacity for a rainfall event with a 1 in 30 chance of occurring in any given year, although until recently this did not apply to smaller private systems. This means that even where sewers are built to current specification, they are

⁶⁵ Tonbridge and Malling Stage 1 Surface Water Management Plan: https://www.kent.gov.uk/_data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

⁶⁶ Sewers for Adoption 7th Edition - A Design & Construction Guide for Developer. WRc plc. September 2012

likely to be overwhelmed by larger events of the magnitude often considered when looking at river or surface water flooding (e.g. a 1 in 100 chance of occurring in any given year). Existing sewers can also become overloaded as new development adds to their catchment, or due to incremental increases in roofed and paved surfaces at the individual property scale (urban creep). Sewer flooding is therefore a problem that could occur in many locations across the borough.

Southern Water provide records of incidents of flooding relating to public foul, combined or surface water sewers and identifies which properties suffered flooding. For confidentiality reasons, this data has been supplied on a postcode basis from the Sewer Incident Report Form (SIRF) hydraulic overload database. Data covers all reported incidents within the district between 2011 and 2021. The more frequently flooded postcodes are ME18, ME19, ME20, ME6, TN11, TN12, TN15, and TN9. However, it is important to recognise that the information does not present whether flooding incidences were caused by general exceedance of the design sewer system, or by operational issues such as blockages.

The information from the Southern Water SIRF database are shown in Table 8-3. As previously stated, Thames Water covers a small area of the borough with no history of hydraulic flooding or cross boundary issues.

Table 8-3: SIRF data from Southern Water

Year	Number of incidents
2011	234
2012	362
2013	372
2014	339
2015	211
2016	257
2017	192
2018	293
2019	307
2020	298
2021	205
Total	3070

In 2023, Southern Water's **Drainage and Wastewater Management Plan** and Thames Water's **Drainage and Wastewater Management Plan** were published. DWMPs are a risk-based catchment screening where existing data is used to identify where there is a current and/or potential risk or vulnerability in the sewer catchment to future changes. This will enable the water company's detailed assessment of risk for high priority areas for investment.

JBA reviewed the information within the DWMPs (Appendix D) and convened a meeting with Southern Water and Thames Water to discuss the findings. It was confirmed by Southern Water and Thames Water that the mapping provided within the DWMP is not suitable for use in the Sequential Test as the data and mapping is prepared to prioritise investment priorities and the resolution of the data does not enable comparative risk at different sites to be evaluated appropriately.

9 Flood Defences

A high-level review of flood defences was carried out for this SFRA, involving an interrogation of existing information on asset condition and standard of protection.

Defences are any assets that provide flood defences or coastal protection functions. An assessment of the Environment Agency Spatial Flood Defence dataset has been carried out. All defences within the dataset have been considered. The dataset includes manmade and natural defences which may arise for instance due to the presence of naturally high ground adjacent to a settlement. This dataset allocates a standard of protection (SoP) for all watercourses and even where no defences exist. In such cases, a nominal SoP of either 2 year or 5-year return period (50% or 20% AEP) is allocated, to indicate the point at which flow exceeds channel capacity and results in flooding.

The defences and their locations are summarised in the following sections.

9.1 Defence standard of protection and residual risk

One of the principal aims of this SFRA is to outline the present risk of flooding across the Tonbridge and Malling Borough Local Plan area including consideration of the effect of flood risk management measures (including flood banks and defences). The modelling that informs the understanding of flood risk within the Local Plan area is typically of a catchment wide nature, suitable for preparing evidence on possible site options for development. In cases where a specific site risk assessment is required, detailed studies should seek to refine the results used to provide a strategic understanding of flood risk from all sources. Developers should consider the standard of protection provided by defences when preparing detailed Flood Risk Assessments.

Standard of Protection

Flood defences are designed to give a specific standard of protection, reducing the risk of flooding to people and property in flood prone areas. For example, a flood defence with a 1% AEP standard of protection means that the flood risk in the defended area is reduced to a 1% chance of flooding in any given year. Although flood defences are designed to a standard of protection it should be noted that, over time, the actual standard of protection provided by the defence may decrease, for example due to deterioration in condition or increases in flood risk due to the increased magnitude of the flood hazard caused by climate change effects (e.g. rise in frequency and intensity of extreme weather over time). For raised flood defences (bunds or banks), a standard of protection can be straight forward to define. However, sometimes it is not possible to define the standard of protection for Flood Storage Areas as there are a number of factors that determine the protection that they can provide e.g. outflow rates, number of watercourses that flow into the Flood Storage Area.

For the purpose of this study, the standard of protection has been derived from the Environment Agency Spatial Flood Defence Dataset.

9.2 Defence condition

Formal structural defences are given a rating by the Environment Agency based on a grading system for their condition⁶⁷. A summary of the grading system used by the Environment Agency for condition is provided in Table 9-1.

⁶⁷ Condition Assessment Manual, Environment Agency (2012)

Table 9-1: Grading system for defence condition

Grade	Rating	Description
1	Very Good	Cosmetic defects that will have no effect on performance.
2	Good	Minor defects that will not reduce the overall performance of the asset.
3	Fair	Defects that could reduce the performance of the asset.
4	Poor	Defects that would significantly reduce the performance of the asset. Further investigation required.
5	Very Poor	Severe defects resulting in complete performance failure.

The condition of existing flood defences and whether they are planned to be maintained and/or improved in the future must be considered with respect to the safety and sustainability of development over its intended life and also with respect to the financial and economic commitment to the long-term provision of appropriate standards of protection. In some cases, the relevant strategy may suggest that it is not appropriate to maintain the condition of the assets, which may prove influential for the development over its intended life. In addition, detailed FRAs undertaken by developers (if a defence is influential to the proposed development) will need to thoroughly explore the condition of defences, especially where these defences are informal and demonstrate a wide variation of condition grades. It is important that all of these assets are maintained to a good condition and their function remains unimpaired in accordance with the policy and strategy for Flood Risk Management.

9.3 Flood defences in Tonbridge and Malling Borough

Much of the river Medway and its tributaries are banked by high natural high ground. Mapping showing the condition and design standards of more formal existing flood defences in Tonbridge and Malling Borough can be found in Figure 9-1 to Figure 9-6. This information is derived from the Environment Agency's Spatial Flood Defences dataset, which is regularly updated, and the latest information should be referred to when preparing an FRA.

9.3.1 Raised defences

Tonbridge

Within Tonbridge, raised flood defences are present alongside sections of channel or set back from the channel to protect certain areas from river flooding. The location of these is displayed in Figure 9-1. Raised walls are present along large parts of the River Medway channel notably adjacent to Avebury Avenue, Buleys Weir to Wharf Road and Tonbridge Town Walls and Town Lock defences between Wharf Road and Town Lock. These are in 'good' or 'fair' condition or have no condition grade assigned.

The standard of protection afforded by these defences is varies between 50% AEP and 0.5% AEP. If a defence is critical to a development or area of land, advice should be sought from the Environment Agency regarding the protection it provides.

Mapping showing the location, condition, and standard of protection of the Tonbridge defences is shown in Figure 9-1, Figure 9-2, and Figure 9-3.

North of Maidstone

Raised flood defences are present downstream of Maidstone and are displayed in Figure 9-4. Downstream of Allington Lock, where these defences are located, the predominant flood risk is from tidal ingress along the River Medway. Within the area defences are typically walls and embankments with areas of high ground. The majority of defences have

no condition assigned but for those with a condition grade they are primarily 'Good' or 'Fair'. However, defences to the north of the borough at Wouldham have lower condition grades. Defences which line the River Medway primarily have a standard of protection of 1% Annual Exceedance Probability (AEP) or higher, with the majority at 0.5% AEP or above.

Mapping showing the location, condition, and standard of protection of the defences south of Maidstone are shown in Figure 9-4, Figure 9-5 and Figure 9-6.

9.3.2 Flood Storage Areas

Leigh

The Leigh FSA is an online storage reservoir which was constructed in 1982 on the River Medway to reduce the risk of flooding in Tonbridge and the southern part of the Borough. Under normal flow conditions, the FSA is kept empty. However, during times of increased flows, the FSA attenuates floods from the Upper Medway catchment (River Medway and River Eden) and aims to reduce the flow passing downstream through Tonbridge and beyond. The flood storage area sits between the villages of Leigh and Penshurst in Kent. When full, it covers approximately 278 hectares. It is formed of a 1.3 kilometre long, 5 metre high earth embankment across the Medway valley. The River Medway itself passes through 3 steel gates built into the embankment. These gates control the amount of water flowing downstream by either letting the river flow normally, or restricting the flow to hold water in the storage area. The FSA is an 'online' storage reservoir, which means that the river is always flowing through it. The Environment Agency is responsible for maintaining and operating the Leigh FSA.

Assigning a single standard of protection for the FSA is not possible as the inflows to the FSA, volume of water stored and reduced outflows (leading to reductions in flooding) vary on an event-by-event basis. The FSA has been regulated under the Reservoirs Act 1975 (now under the Flood and Water Management Act 2010) and has a condition grade of 2 (Good). This data is updated frequently, however, reference should be made to the latest available data via the [Asset Information and Maintenance Programme website](https://environment.data.gov.uk/asset-management/index.html)⁶⁸.

Leigh expansion and Hildenborough embankment scheme

In order to increase the capacity of the Leigh FSA and to protect a greater number of homes from flooding in Tonbridge and Hildenborough, Tonbridge and Malling Borough Council, in partnership with the Environment Agency and Kent County Council, are supporting works to develop the Leigh FSA and Hildenborough embankment. The scheme will reduce the fluvial risk of flooding from the Medway backing up into the Hilden Brook and Hawden Stream.

The principal flood management elements of the scheme include the following:

- A new flood defence embankment and steel sheet piled wall south-east of Hawden Lane, tying into existing high ground north-east of Hawden Stream and extending south-west towards Hawden Farm.
- A new pumping station and penstock in the Hawden Stream, comprising a river intake, a penstock, a wet well, a fish-friendly discharge dissipation chamber, and a control kiosk. The pumps will have a maximum capacity of 1m³/s flow rate each (2m³/s combined pump capacity);
- An access route to the west of the embankment, allowing vehicular access to the pumping station;
- A new reinforced concrete flood defence wall protecting grade II listed residential properties (the Oast House and Granary).

⁶⁸ <https://environment.data.gov.uk/asset-management/index.html>

The Leigh FSA was implemented under the River Medway (Flood Relief) Act 1976 and the scheme to increase the storage capacity was performed in accordance with the procedures set out in Section 17(3) of the 1976 Act. Subsequently a public inquiry was held during April and May 2021 relating to the Environment Agency's application under the 1976 Act to change the maximum permitted impounding level of flood water in the Leigh FSA from 28.05m AOD to 28.60m AOD. It is understood from the Environment Agency that the scheme will better protect over 1,400 homes and businesses in Tonbridge and Hildenborough from flooding⁶⁹.

The work is currently being undertaken by the Environment Agency in stages. Current works at the LFSA are forecast to be completed during 2026. Please contact the Environment Agency for further information and updates for the scheme.

Mapping showing the locations of the above flood alleviation scheme can be found in Figure 9-7.

East Peckham

East Peckham FSA is an online storage reservoir located on Coult Stream (a tributary of the River Medway) approximately 600m upstream of East Peckham and was constructed in 2006. The flood storage area, located on farmland which is normally empty of flood water, reduces flows passing downstream by the presence of an orifice plate which limits the flow passing downstream via the culvert under the embankment. The FSA can hold up to 90,000m³ of floodwater behind the dam⁷⁰.

The standard of protection provided by the FSA will be variable based on the duration and volume of a given flood event even if the peak flows remain the same (e.g. FSA will be more likely to become full if flood volumes are larger). On this basis and single standard of protection cannot be assigned. The FSA has been regulated under the Reservoirs Act 1975 (now under the Flood and Water Management Act 2010) and has a condition grade of 2 (Good). This data is updated frequently, however, reference should be made to the latest available data via the Asset Information and Maintenance Programme website⁷¹.

9.4 Other recent and proposed flood management schemes

Ightham Property Flood Resilience (PFR) Scheme.

Following on from the Ightham Flood Investigation Report a PFR scheme was commissioned by Kent County Council for Ightham village. PFR measures were installed in 2019.

East Peckham Property Flood Resilience (PFR) Scheme

In 2023, the Environment Agency completed installation of PFR measures to 119 properties in East Peckham and Little Mill.

Medway Estuary and Swale flood and coastal risk management strategy

An indicative program of works are proposed as part of the Medway Estuary and Swale flood and coastal risk management strategy. This includes undertaking works in the Aylesford to Wouldham Tidal Defences between 2029 and 2034.

69 <https://www.tmbc.gov.uk/news/article/31/project-underway-to-protect-homes-from-future-flooding-in-tonbridge-and-hildenborough>

70 Kent County Council Flood Risk to Communities – Tonbridge and Malling Borough (2017)

71 <https://environment.data.gov.uk/asset-management/index.html>

Figure 9-1: Location and type of raised defences in Tonbridge

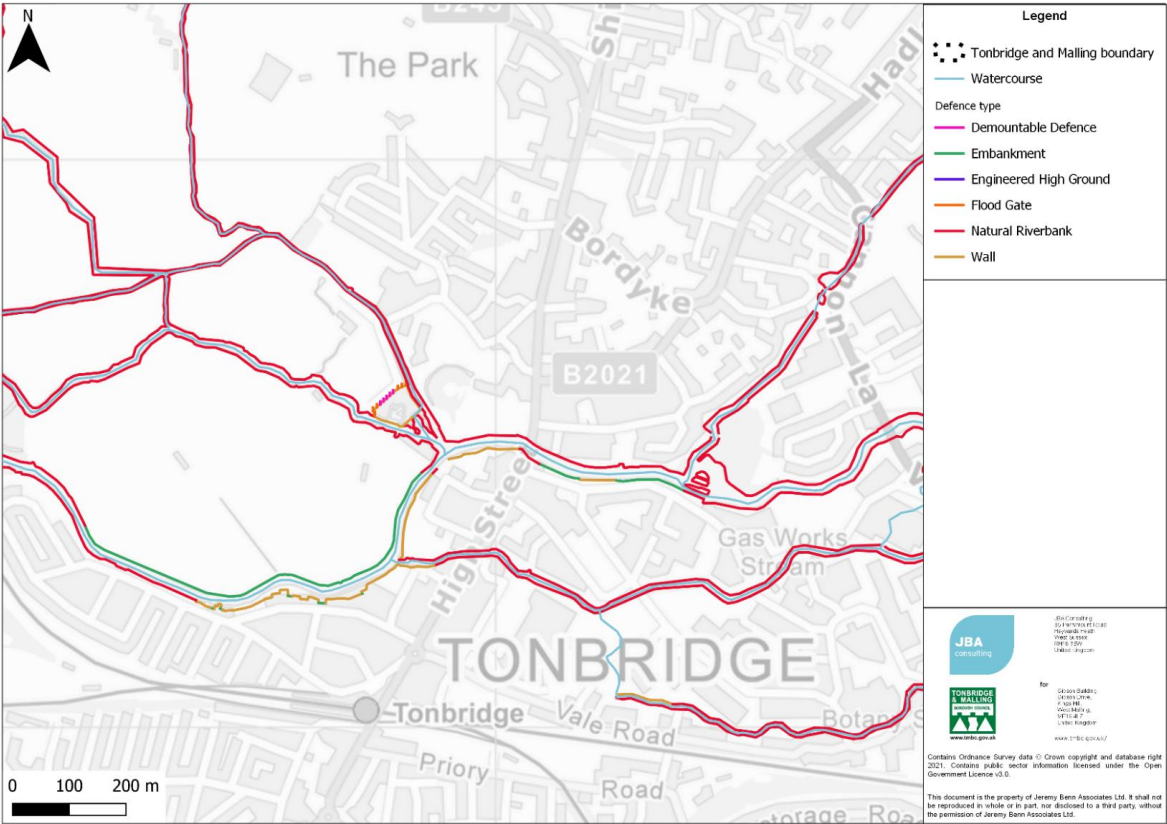


Figure 9-2: Condition of raised defences in Tonbridge

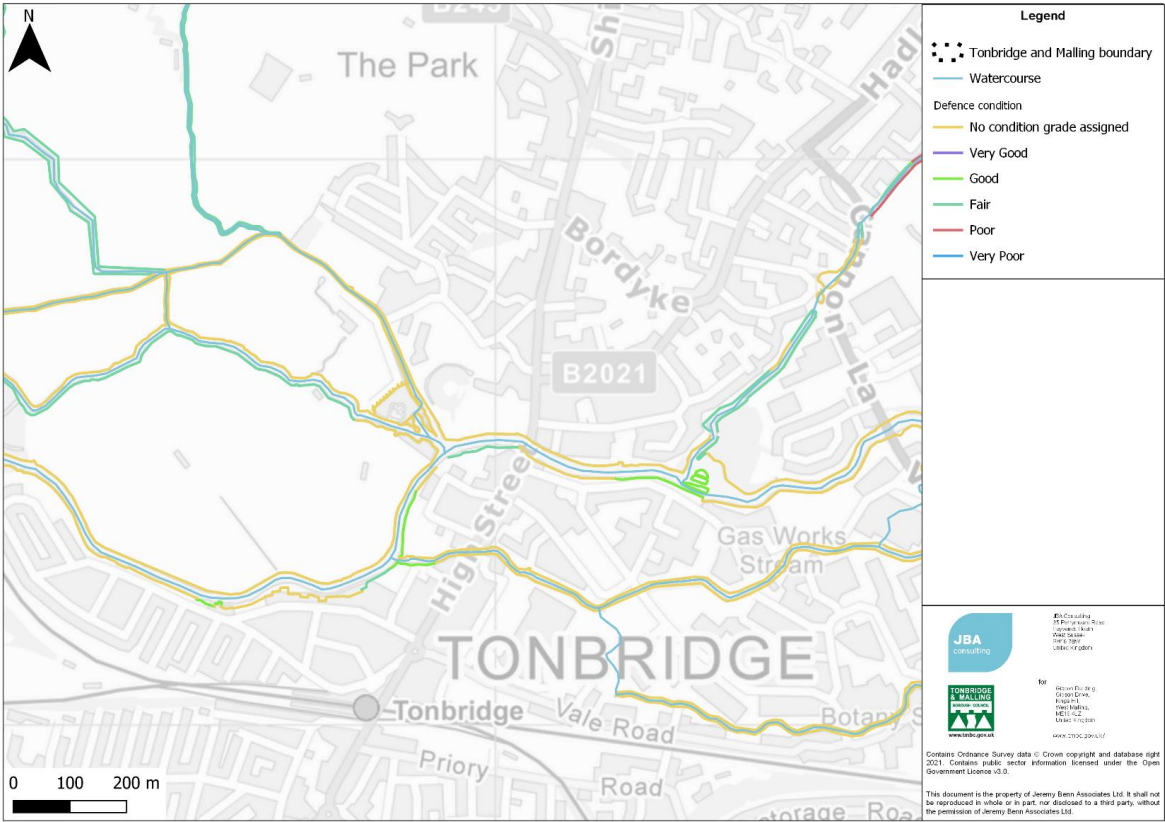


Figure 9-3: Standard of protection of raised defences in Tonbridge

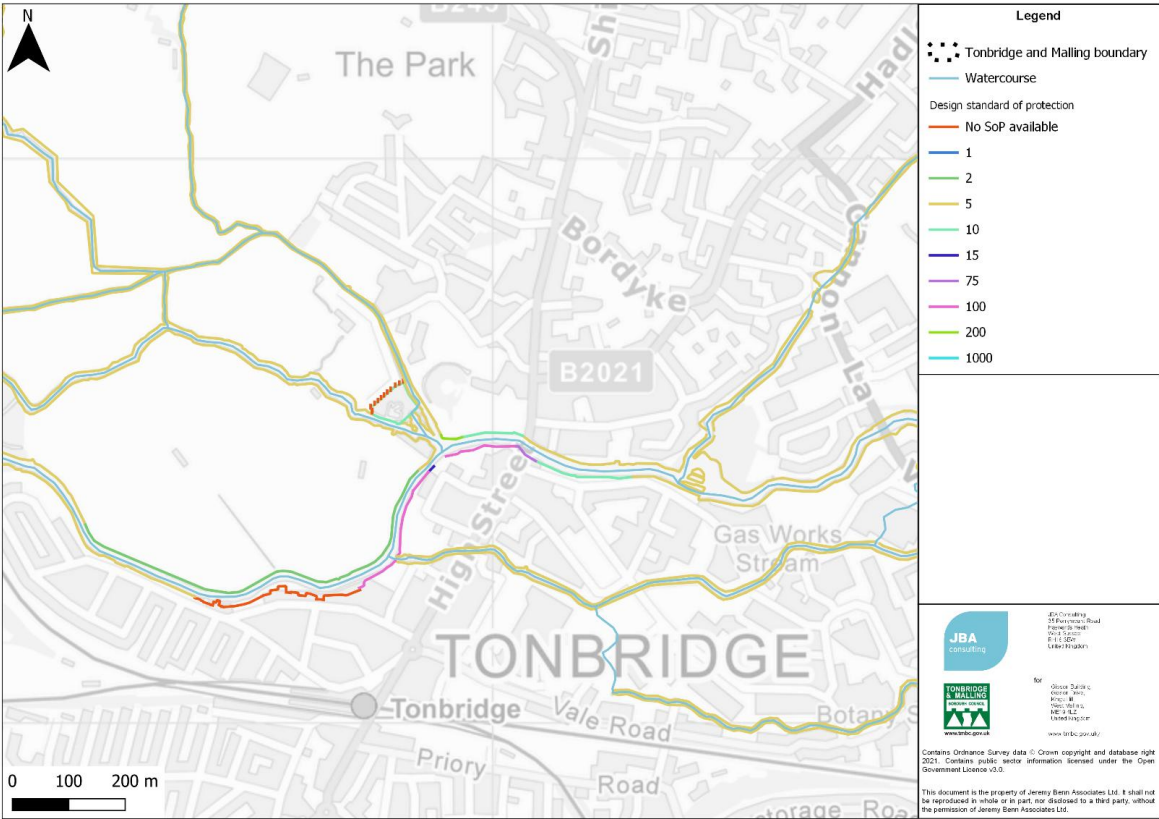


Figure 9-4: Location of defences downstream of Maidstone

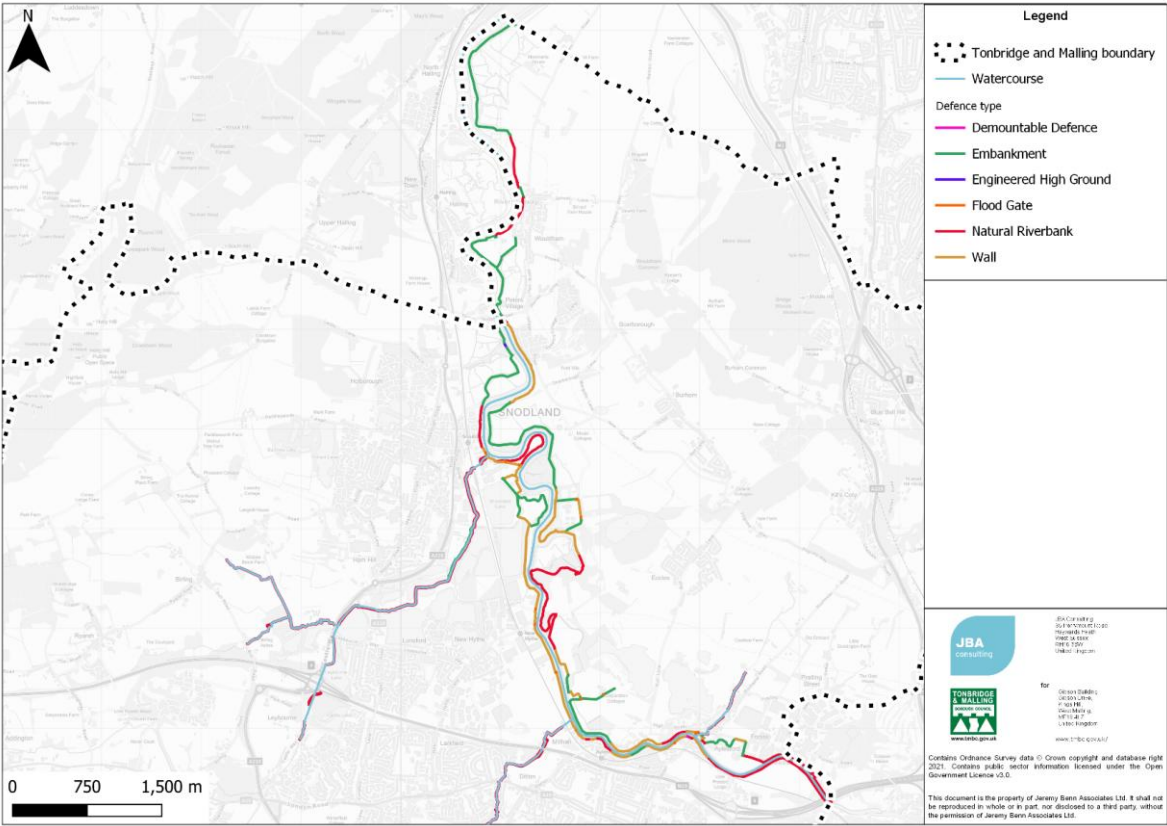


Figure 9-5: Condition of raised defences downstream of Maidstone

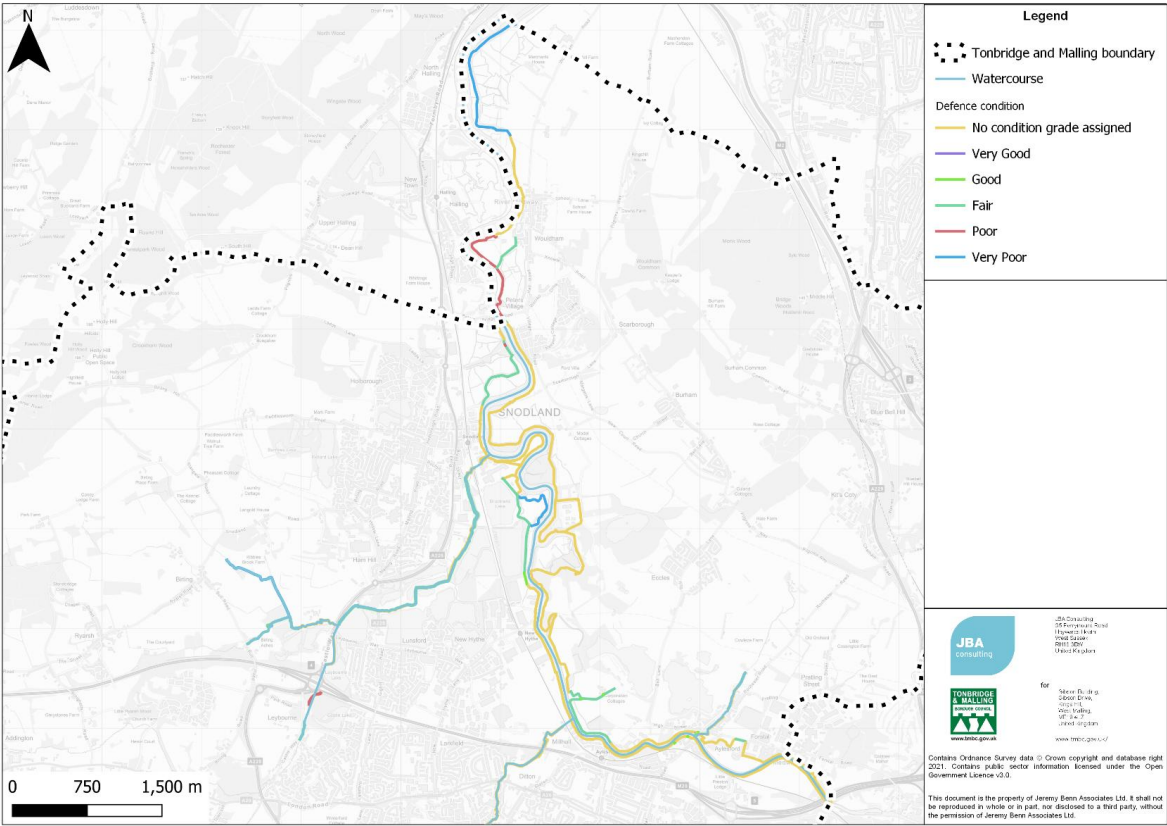


Figure 9-6: Standard of protection of raised defences downstream of Maidstone

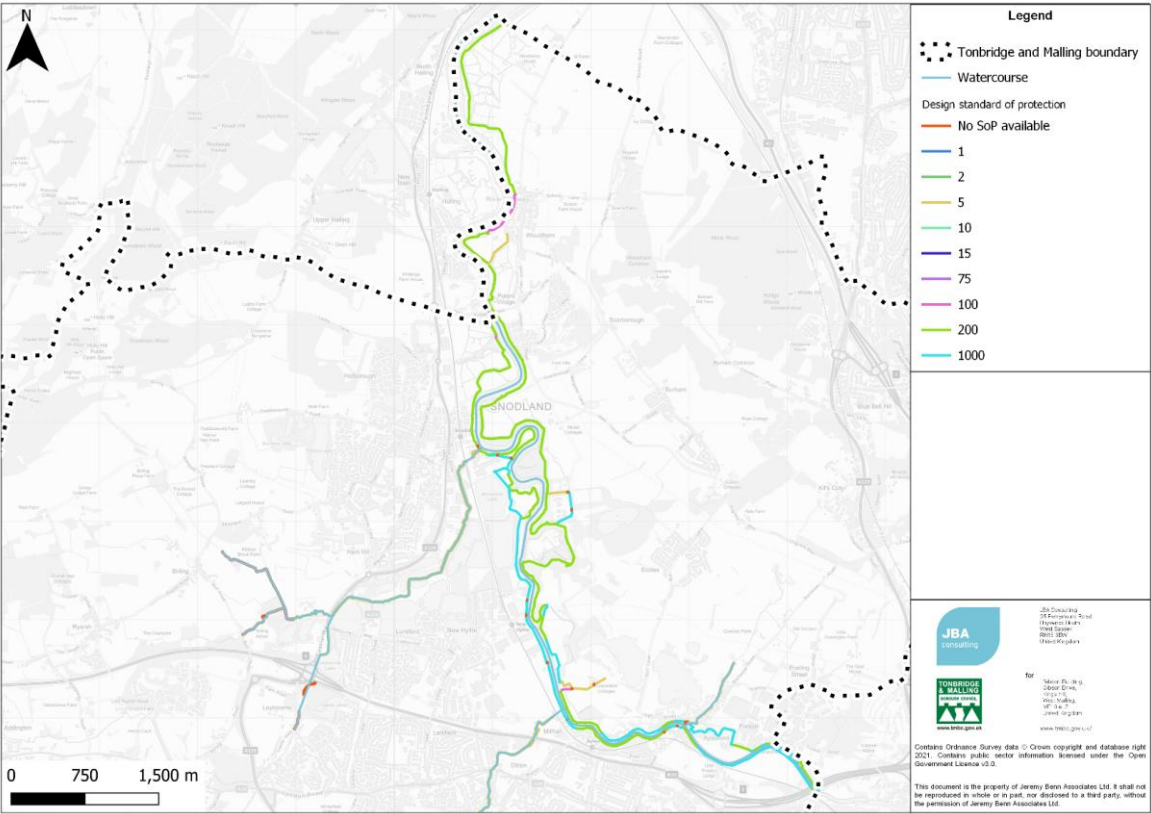
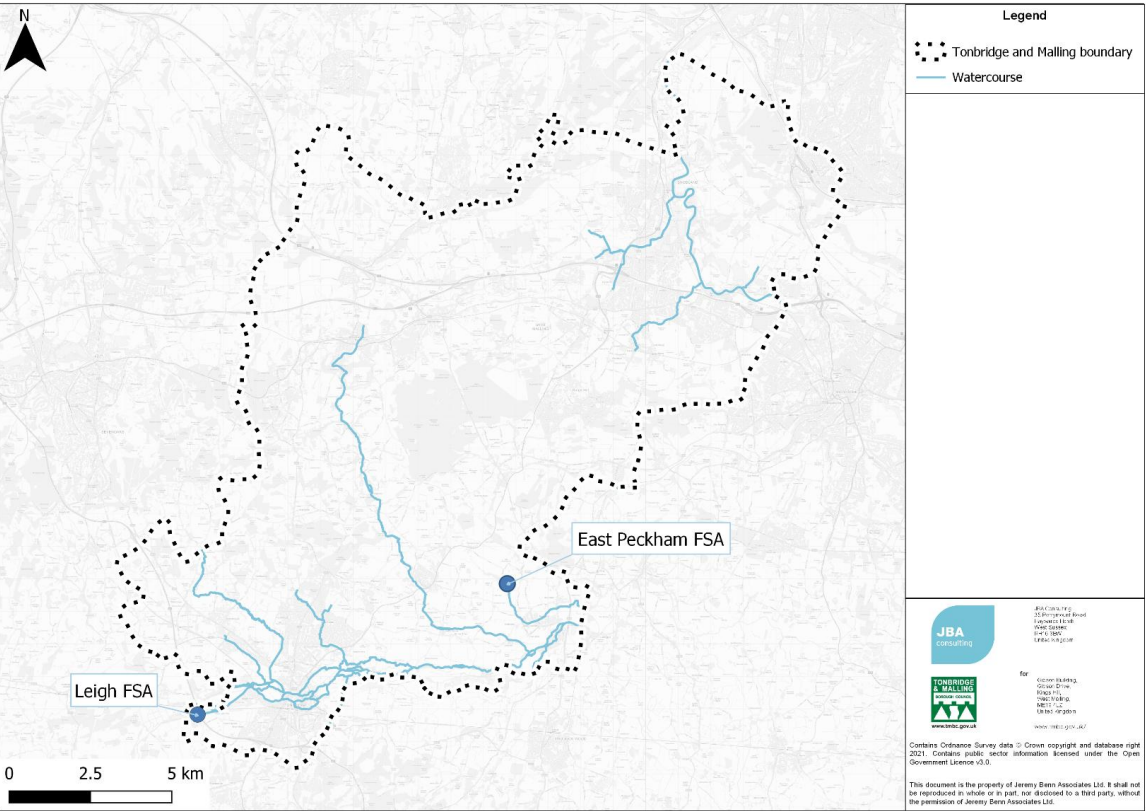


Figure 9-7: Location of Flood Alleviation Schemes in Tonbridge and Malling Borough



10 FRA requirements and flood risk management guidance

This section provides guidance on site-specific Flood Risk Assessments (FRAs). These are carried out by (or on behalf of) developers to assess flood risk to and from a site. They are submitted with Planning Applications and should demonstrate how flood risk will be managed over the development's lifetime, considering climate change and vulnerability of users.

10.1 Over-arching principles

This SFRA focuses on delivering a strategic assessment of flood risk within Tonbridge and Malling Borough. To support planning applications and prior to any construction or development, site-specific assessments will need to be undertaken so all forms of flood risk at a site are fully addressed. In addition, at some sites the FRA must include evidence that demonstrates the proposals satisfy the Sequential and Exception Tests in accordance with the NPPF requirements (the Sequential Test must be performed for sites not allocated in the plan). In these circumstances, further assessment should be performed and described in a detailed Flood Risk Assessment (FRA). Any site that does not pass the Exception Test should not be allocated for development.

It is the responsibility of the developer to provide an FRA with an application.

It should be acknowledged that a detailed FRA may show that a site is not appropriate for development of a particular vulnerability or even at all. Where the FRA shows that a site is not appropriate for a particular usage, a lower vulnerability classification may be appropriate.

10.2 Requirements for site-specific flood risk assessments

10.2.1 What are site specific FRAs?

Site specific FRAs are carried out by (or on behalf of) developers to assess flood risk to and from a site. They are submitted with planning applications and should demonstrate how flood risk will be managed over the development's lifetime, taking into account climate change and vulnerability of users.

The **Flood Risk and Coastal Change Guidance** sets out a checklist for developers to assist with site specific flood risk assessments.

10.2.2 When are site specific FRAs required?

Site specific FRAs are required in the following circumstances:

- Proposals for new development (including minor development and change of use) in Flood Zones 2 and 3
- Proposals for new development (including minor development and change of use) in an area within Flood Zone 1 which has critical drainage problems (as notified to the LPA by the Environment Agency)
- Proposals of 1 hectare or greater in Flood Zone 1 due to their surface water impact which will be dealt with through a surface water drainage strategy.
- Where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding
- Proposals of less than one hectare in Flood Zone 1 where they could be affected by sources of flooding other than rivers and the sea (e.g. surface water)

An FRA may also be required for some specific situations:

- If the site may be at risk from the breach of a local defence (even if the site is actually in Flood Zone 1)
- Where the site is intended to discharge to the catchment or assets of a water management authority which requires a site-specific FRA
- Where evidence of historical or recent flood events have been passed to the LPA
- On land in the vicinity of small watercourses or drainage features that might not have been demarcated as being in a flood zone on the national mapping
- At locations where proposals could affect or be affected by substantial overland surface water flow routes
- At locations where cumulative effects might result in flood risk being increased elsewhere

A Surface Water Drainage Strategy is also required when submitting any planning application for 'major development', as defined under the **Town and Country Planning Act (1990)**⁷².

10.3 Reducing flood risk

10.3.1 Site layout and design

Flood risk from all sources should be considered at an early stage in deciding the layout and design of a site to provide an opportunity to reduce flood risk within the development.

The NPPF states that a sequential, risk-based approach should be applied to try to locate more vulnerable land use away from flood zones, to higher ground, while more flood-compatible development (e.g. vehicular parking, recreational space) can possibly be located in higher risk areas. However, vehicular parking in floodplains should be based on the nature of parking, flood depths and hazard including evacuation procedures and flood warning and should not compromise floodplain storage or obstruct floodplain flows.

Waterside areas, or areas along known flow routes, can act as Green Infrastructure, being used for recreation, amenity and environmental purposes, allowing the preservation of flow routes and flood storage, and at the same time providing valuable social and environmental benefits contributing to other sustainability objectives. Landscaping should ensure safe access to higher ground from these areas, and avoid the creation of isolated islands as flood water levels rise.

10.3.2 Raised floor levels

The raising of internal floor levels within a development avoids damage occurring to the interior, furnishings and electrics in times of flood.

According to the government's guidance on '**Preparing a flood risk assessment: standing advice**', it is recommended that floor levels are set at least 600 millimetres (mm) above the estimated flood level. It may be possible to reduce this to 300mm if there is a high level of certainty about your estimated flood level. If there is a particularly high level of uncertainty it may need to be increased.

Flood water can put pressure on buildings, causing structural issues. If the building design aims to keep out a depth of more than 600mm of water, advice from a structural engineer should be sought.

If the floor levels cannot be raised, extra flood resistance and resilience measures will need to be incorporated into the development. These measures should protect the property to at least 600mm above the estimated flood level.

⁷² Town and Country Planning Act (1990): <https://www.legislation.gov.uk/ukpga/1990/8/contents>

Development plans also need to show how the development is not flooded by surface water or groundwater.

This could be by:

- diverting water away from buildings but safely managing it within the site
- raising floor levels above the estimated flood depths of surface and groundwater flooding

Prior to diverting or protecting property from surface water, the LLFA would expect all efforts to have been made to place property outside of known areas of flood risk in line with the sequential approach.

Allocating the ground floor of a building for less vulnerable, non-residential, use is an effective way of raising living space above flood levels.

Single storey buildings such as ground floor flats or bungalows are especially vulnerable to rapid rise of water (such as that experienced during a breach). This risk can be reduced by use of multiple storey construction and raised areas that provide an escape route. However, access and egress can still be an issue, particularly when flood duration covers many days. Similarly, the use of basements should be avoided.

10.3.3 Development and raised defences

Construction of localised raised floodwalls or embankments to protect new development is not a preferred option, as a residual risk of flooding will remain if they are overtopped or breached. Compensatory storage must be provided where raised defences remove storage from the floodplain. It would be preferable for schemes to involve an integrated flood risk management solution.

Temporary or demountable defences are not acceptable forms of flood protection for a new development but might be appropriate to address circumstances where the consequences of residual risk are severe. In addition to the technical measures the proposals must include details of how the temporary measures will be erected and decommissioned, responsibility for maintenance and the cost of replacement when they deteriorate.

10.3.4 Resistance and resilience measures

There may be instances where flood risk to a development remains despite implementation of such planning measures as those outlined above. For example, where the use is water compatible, where an existing building is being changed, where residual risk remains behind defences, or where floor levels have been raised but there is still a risk at the 0.1% AEP scenario. In these cases, (and for existing development in the floodplain), additional measures can be put in place to reduce damage in a flood and increase the speed of recovery. These measures should not normally be relied on for new development as an appropriate mitigation method.

Resistance and Resilience measures will be specific to the nature of flood risk, and as such will be informed and determined by the FRA. Further guidance relating to appropriate resistance and resilience measures can be found at:

- Environment Agency's **Flood risk assessment in flood zones 1, 2, 3 and 3b**⁷³ webpage.
- Kent Resilience Forum provides information and advice for individuals on **preparing for flooding**⁷⁴.

⁷³ Flood risk assessment in flood zones 2 and 3. Environment Agency. (2012, updated 2017) <https://www.gov.uk/guidance/flood-risk-assessment-in-flood-zones-2-and-3#extra-flood-resistance-and-resilience-measures>

⁷⁴ Prepare for flooding: <https://www.kentprepared.org.uk/flooding>

Resistance measures are suitable for existing development in the floodplain. Most of these measures should be regarded as reducing the rate at which flood water can enter a property during an event and considered an improvement on what could be achieved with sandbags. They are often deployed with small scale pumping equipment to control the flood water that does seep through these systems. The effectiveness of these forms of measures is often dependant on the availability of a reliable forecasting and warning system, so the measures are deployed in advance of an event. The following resistance measures are often deployed:

- **Permanent barriers:** Permanent barriers can include built up doorsteps, rendered brick walls and toughened glass barriers.
- **Temporary barriers:** Temporary barriers consist of moveable flood defences which can be fitted into doorways and/or windows. The permanent fixings required to install these temporary defences should be discrete and keep architectural impact to a minimum. On a smaller scale temporary snap on covers for airbricks and air vents can also be fitted to prevent the entrance of flood water.

Resilience measures are suitable for new developments where there is a residual flood risk. These measures should be regarded as reducing the impact the flood water has once it has entered a property. These typically include:

- **Water resistant materials:** Floors, walls and fixtures can be finished with water resistant materials to help reduce the damage and greatly shorten the recovery time after a flood. Materials can include waterproof plaster, solid concrete floors and tiled floor coverings.
- **Electrical installation:** Electrical circuitry can be installed at a higher level with power cables being carried down from the ceiling rather than up from the floor level to reduce the likelihood of the circuitry being affected by flood water.

10.3.5 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 can also be made to maintenance and provision of flood risk management assets, flood warning and the reduction of surface water flooding (i.e. SuDS).

For strategic flood defence schemes, contributions towards them could potentially be raised through the Community Infrastructure Levy (CIL) but it is understood that TMBC do not intend to instigate CIL. Monetary contributions through Section 106 planning obligations could be requested by TMBC. Sums raised could be used to fund a wide range of infrastructure projects needed to support development in the locality. This includes the MEAS area between Aylesford and Wouldham.

In some cases, and following the application of the sequential test, it may be necessary for the developer to make a contribution to the improvement of flood defence provision that would benefit both proposed new development and the existing local community. Developer contributions can also be made to maintenance and provision of flood risk management assets, flood warning and the reduction of surface water flooding (i.e. SuDS).

Operating authorities can make requests for contributions to activities including flood risk management schemes through DEFRA's Flood and Coastal Risk Management Grant in Aid (FCERM GiA)⁷⁵. However, the availability of such funding is limited by the priorities for public spending and thus linked to the anticipated requirements set out in the Local Flood Risk Management Strategy (LFRMS). The available funding is based on the projected benefits and it is often the case that the cost of providing flood risk management measures

⁷⁵ Flood and coastal erosion risk management projects and funding. (Environment Agency, September 2021)

is greater than the benefits that can be obtained by reducing the flood frequency. Often schemes are only partly funded by FCERM GiA and the shortfall in funds has to be found from elsewhere. For example, local levy funding, local businesses or other parties benefitting from the scheme or contributions from developers or other parties that benefit from the provisions.

For new development in locations without existing defences, or where the development is the only beneficiary, the full costs of appropriate risk management measures for the life of the assets proposed must be funded by the developer and should include the cost of maintenance.

10.4 Buffer strips

The provision of a buffer strip to 'make space for water', allows additional capacity to accommodate climate change and ensure access to the watercourse, structures and defences is maintained for future maintenance purposes. It also enables the avoidance of disturbing riverbanks, adversely impacting ecology and having to construct engineered riverbank protection. Building adjacent to riverbanks can also cause problems to the structural integrity of the riverbanks and the building itself, making future maintenance of the river much more difficult.

Various buffer strip Byelaws are in place within Tonbridge and Malling Borough. Under the **Environmental Permitting (England and Wales) Regulations 2016⁷⁶**, the Environment Agency specifies that no development is permitted within 8m either side of a Main River or within 15m of the foot of the landward side of any sea defences or between the low water mark of medium tides and the seaward side of any sea defence. No byelaws are in place for ordinary watercourses outside of IDB areas, however the provision for a buffer zone is expected by the LLFA, it is recommended that this is the same as those of Main Rivers.

Appendix A shows the buffer areas for different watercourses within Tonbridge and Malling Borough. This map should be consulted when allocating new development.

10.5 Making space for water

Locations identified as being at a disproportional risk of flooding such as the functional floodplain, where hard development may further increase this level of risk, should be allocated as a site of priority for soft development practices.

The updated **PPG** establishes the purposes and impacts of utilising Natural Flood Management as a method to restore and maintain the natural functions of the environment including the functional floodplain, channels and coastlines. Proposed techniques from the PPG include the restoration of the functional floodplain, to mitigate the impact of floods on populated urban spaces. Generally, future development should be directed away from these areas.

All new developments close to rivers should consider the opportunity to improve and enhance the river environment. Details within the PPG highlights the importance of river restoration, where future developments should be looking for opportunities to improve and enhance rivers in the area. Options include backwater creation, de-silting, in-channel habitat enhancement and removal of structures such as culverts. When designed properly, such measures can have benefits such as reducing the costs of maintaining hard engineering structures, improving water quality, increasing biodiversity, and the overall reduction in flood risk through removal of obstructions at river structures.

Increasing green space and access to the river will also bring additional social benefits and improving local natural amenity.

⁷⁶ The Environmental Permitting (England and Wales) Regulations 2016. UK Government. (2016)

10.6 Reducing flood risk from other sources

10.6.1 Groundwater

Groundwater flooding has a very different flood mechanism to any other and for this reason many conventional flood defence and mitigation methods are not suitable. The only way to fully reduce flood risk would be through building design (development form), ensuring floor levels are raised above the water levels caused by a 1% AEP plus climate change event. Site design would also need to preserve any flow routes followed by the groundwater overland to ensure flood risk is not increased downstream.

Infiltration SuDS can cause increased groundwater levels and subsequently may increase flood risk on or off the site. Developers should provide evidence and ensure that this will not be a significant risk.

When redeveloping existing buildings, it may be acceptable to install pumps in basements as a resilience measure. However, for new development this is not considered an appropriate solution.

10.6.2 Surface water and sewer flooding

For new developments where there are existing surface water or sewer flooding issues, developers should discuss public sewerage capacity with the water utility company (Southern Water / Thames Water) at the earliest possible stage. The development must improve the drainage infrastructure to reduce flood risk on site and the wider area. In accordance with the Sequential Approach proposed development should be situated so as to avoid interference with existing surface water flow routes and where it is not possible to avoid surface water risk areas then early consultation with the LLFA (Kent County Council is essential). It is important that a drainage impact assessment shows that development will not increase flood risk elsewhere both now and in the future and that the drainage requirements regarding runoff rates and SuDS for new development are met.

If residual surface water flood risk remains, the likely flow routes and depths across the site should be modelled and Kent County Council should be consulted. If the natural surface water flow regime cannot be preserved then the site should be designed so that the capacity of flow routes is preserved and building design should provide resilience against this residual risk.

When redeveloping existing buildings, the installation of some permanent or temporary flood-proofing and resilience measures could protect against both surface water and sewer flooding. Non-return valves prevent water entering the property from drains and sewers. These can be installed within gravity sewers or drains in a property's private sewer upstream of the public sewerage system. They need to be carefully installed and must be regularly maintained. Consideration must also be given to attenuation and flow ensuring that flows during the 1% AEP plus climate change storm event are retained within the site if any flap valves shut. This must be demonstrated with suitable modelling techniques.

When designing SuDS systems consideration should be given to the potential effect on groundwater levels and flows, particularly in circumstances where the proposals are in locations where ground levels are high or where neighbouring properties have basements or are otherwise sensitive to increases in groundwater levels.

10.6.3 Cumulative impacts of development

At some locations it will be necessary to include consideration in an FRA of not only the flood risk at a particular site, but also the cumulative effects of all proposed plan allocations within a defined catchment. Reference should be made to Section 14.4 with respect to the consideration that should be given in these circumstances.

11 Surface water management

11.1 Role of the LLFA and LPA in surface water management

The NPPF released in December 2024 requires that all development which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal.

The Local Planning Authority must satisfy themselves that clear arrangements are in place for future management of the maintenance arrangements and the LLFA (Kent County Council), as statutory consultee is required to review the drainage and Sustainable Urban Drainage (SuDS) proposals to confirm they are appropriate.

When considering planning applications, Local Planning Authorities should seek advice from the relevant flood risk management bodies, principally the LLFA on the management of surface water (including what sort of SuDS they would consider to be reasonably practicable), satisfy themselves that the proposed minimum standards of operation are appropriate and ensure, through the use of planning conditions or planning obligations, that there are clear arrangements for on-going maintenance over the development's lifetime. Judgement on what SuDS system would be reasonably practicable should be through reference to Defra's **National standards for sustainable drainage systems (SuDS)** document.

In its role as LLFA Kent County Council:

- promotes the use of SuDS for the management of run-off;
- ensures their policies and decisions on applications support and compliment the NSSDS on sustainable rainwater drainage, giving priority to infiltration over watercourses and then sewer conveyance;
- incorporates favourable policies within development plans;
- adopts policies for incorporating SuDS requirements into Local Plans; and

11.2 Sustainable Drainage Systems (SuDS)

It is essential that developers consider sustainable drainage at an early stage of the development process – ideally at the design brief or master-planning stage. This will assist with the delivery of well designed, appropriate and effective SuDS. Proposals should also comply with the key SuDS principles (the four pillars of SuDS design - Figure 11-1) enabling solutions that deliver multiple long-term benefits. These principles are:

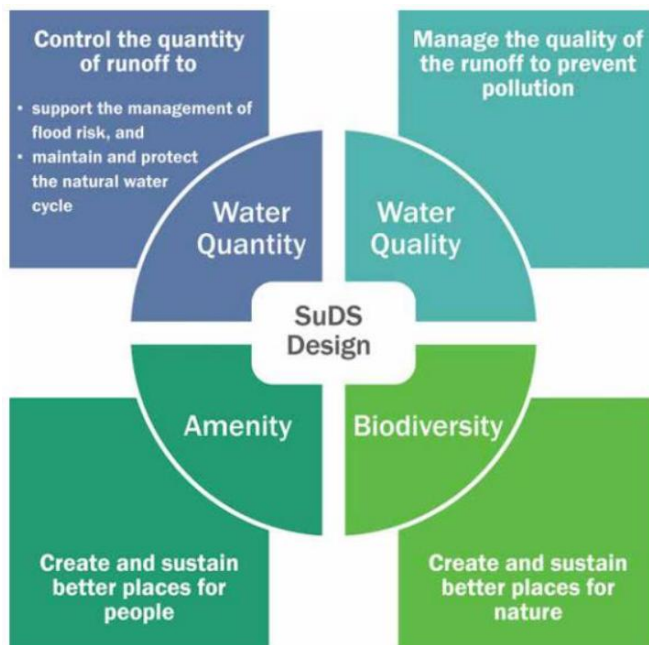
- **Quantity:** should be able to cope with the quantity of water generated by the development at the agreed greenfield rate and volume with due consideration for climate change via a micro-catchment based approach. Where frequency of flood risk, steepness of topography or permeability of geology has a significant impact on the volume or rate of surface water being discharged from a site, the LLFA should be contacted, as a review of the greenfield runoff rate to be achieved may be needed.
- **Quality:** should utilise SuDS features in a "treatment train" that will have the effect of treating the water before infiltration or passing it on to a subsequent water body.
- **Amenity:** should integrate greenery or water features to improve the visual characteristics of the area. These can be incorporated within "open space" or "green corridors" within the site and designed with a view to performing a multifunctional purpose.
- **Biodiversity:** should include a range of natural features such as plants, trees and other vegetation which will provide additional filtration of surface water runoff. These can be designed to complement and improve the ecology of the area.

There are a number of ways in which SuDS can be designed to meet surface water quantity, climate change resilience, water quality, biodiversity and amenity goals. Given this flexibility, SuDS are generally capable of overcoming or working alongside various constraints affecting a site, such as restrictions on infiltration, without detriment to achieving these goals.

SuDS must be considered at the outset and during preparation of the initial conceptual site layout to ensure that enough land is given to design spaces that will be an asset to the development as opposed to an ineffective afterthought. For SuDS to work effectively appropriate techniques should be selected based on the objectives for drainage and the site-specific constraints. It is recommended, that on all developments, source control is implemented as the first stage of a management train allowing for improvements in water quality and reducing or eliminating runoff from smaller, more frequent, rainfall events.

All new development proposals should ensure that sustainable drainage systems for management of run-off are put in place. The developer is responsible for ensuring the design, construction and future/ongoing maintenance of such a scheme are carefully and clearly defined, and a clear and comprehensive understanding of the existing catchment hydrological processes and existing drainage arrangements is essential.

Figure 11-1: The four pillars of SuDS design from the CIRIA SuDS Manual C753 (2015)



11.3 Types of SuDS Systems

There are many different SuDS techniques that can be implemented in attempts to mimic pre-development drainage (Table 11-1). Techniques can include soakaways, infiltration trenches, permeable pavements, grassed swales, green roofs, ponds and wetlands and these do not necessarily need to take up a lot of space. The suitability of the techniques will be dictated in part by the development proposal and site conditions. Advice on best practice is available from the Environment Agency and the Construction Industry Research and Information Association (CIRIA) e.g. **the CIRIA SuDS Manual C753 (2015)**⁷⁷.

Table 11-1: Examples of SuDS techniques and potential benefits

SuDS Technique	Flood Reduction	Water Quality Treatment & Enhancement	Landscape and Wildlife Benefit
Living roofs	✓	✓	✓
Basins and ponds	✓	✓	✓
Constructed wetlands	✓	✓	✓
Balancing ponds	✓	✓	✓
Detention basins	✓	✓	✓
Retention ponds	✓	✓	✓
Filter strips and swales	✓	✓	✓
Infiltration devices	✓	✓	✓
Soakaways	✓	✓	✓
Infiltration trenches and basins	✓	✓	✓
Permeable surfaces and filter drains	✓	✓	
Gravelled areas	✓	✓	
Solid paving blocks	✓	✓	
Porous pavements	✓	✓	
Tanked systems	✓		
Over-sized pipes/tanks	✓		
Storm cells	✓		

11.3.1 SuDS management train

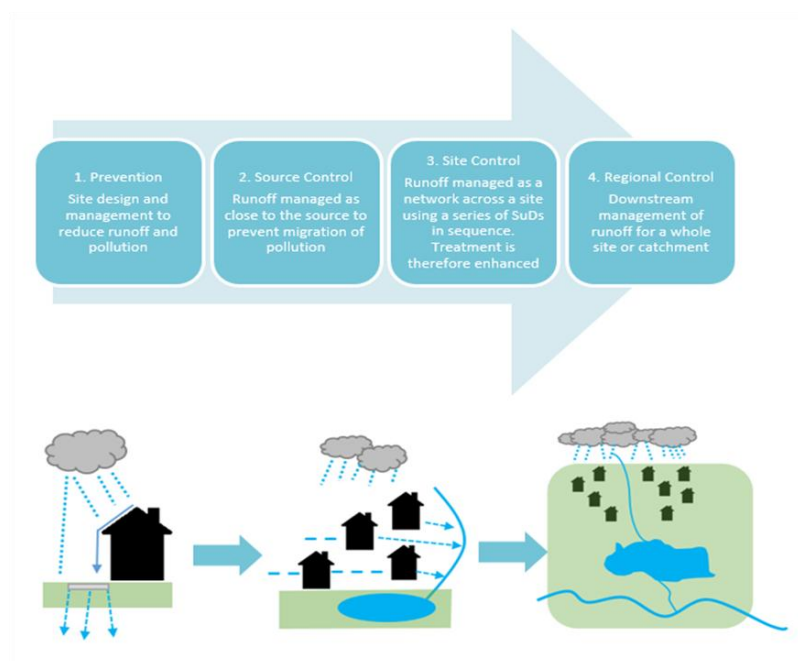
SuDS should not be used individually but as a series of features in an interconnected system designed to capture water at the source and convey it to a discharge location. Collectively this concept is described as a SuDS Management Train (see Figure 11-2). The number of treatment stages required within the Management Train depends primarily on the source of the runoff and the sensitivity of the groundwater or receiving waterbody. A

77 CIRIA SuDS Manual C753. The Construction Industry Research and Information Association. (2015)
<https://www.ciria.org/ItemDetail?ProductCode=C753F&Category=FREEPUBS>

drainage strategy will need to demonstrate that an appropriate number of treatment stages are delivered.

SuDS components should be selected based on design criteria and how surface water management is to be integrated within the development and landscaping setting. By using a number of SuDS features in series it is possible to reduce the flow and volume of runoff as it passes through the system as well as minimising pollutants which may be generated by a development.

Figure 11-2: SuDS Management Train



11.3.2 Treatment of runoff

A key part of the four pillars of SuDS is to provide the maximum improvement to water quality through the use of the "SuDS Management Train". To maximise the treatment within SuDS, CIRIA recommends the following good practice is implemented in the treatment process:

1. **Manage surface water runoff close to source:** This makes treatment easier due to the slower velocities and also helps isolate incidents rather than transport pollutants over a large area.
2. **Treat surface water runoff on the surface:** This allows treatment performance to be more easily inspected and managed. Sources of pollution and potential flood risk is also more easily identified. It also helps

with future maintenance work and identifying damaged or failed components.

3. **Treat a range of contaminants:** SuDS should be chosen and designed to deal with the likely contaminants from a development and be able to reduce them to acceptably low levels.
4. **Minimise the risk of sediment remobilisation:** SuDS should be designed to prevent sediments being washed into receiving water bodies or systems during events greater than what the component may have been designed.
5. **Minimise the impact of spill:** Designing SuDS to be able to trap spills close to the source or provide robust treatment along several components in series.

The number of treatment stages required depends primarily on the source of the runoff. A drainage strategy will need to demonstrate that an appropriate number of treatment stages are delivered. This involves determining a pollutant hazard score for each pollutant type. An index is then used to determine the treatment potential of different SuDS features for different pollutant types. This is known as the mitigation index. The Total SuDS mitigation index should be equal or greater than the pollution hazard score to deliver adequate treatment.

11.3.3 Overcoming SuDS constraints

The design of a SuDS system will be influenced by a number of physical and policy constraints. These should be taken into account and reflected upon during the conceptual, outline and detailed stages of SuDS design. Table 11-2 details some possible constraints and how they may be overcome.

Table 11-2: Example SuDS design constraints and possible solutions

Considerations	Solution
Land availability	SuDS can be designed to fit into small areas by utilising different systems. For example, features such as permeable paving and green roofs can be used in urban areas where space may be limited.
Contaminated soil or groundwater below site	SuDS can be placed and designed to overcome issues with contaminated groundwater or soil. Shallow surface SuDS can be used to minimise disturbance to the underlying soil. The use of infiltration should also be investigated as it may be possible in some locations within the site. If infiltration is not possible linings can be used with features to prevent infiltration.
High groundwater levels	Non-infiltrating features can be used. Features can be lined with an impermeable liner or clay to prevent the egress of water into the feature. Additional, shallow features can be utilised which are above the groundwater table.
Steep slopes	Check dams can be used to slow flows. Additionally, features can form a terraced system with additional SuDS components such as ponds used to slow flows.
Shallow slopes	Use of shallow surface features to allow a sufficient gradient. If the gradient is still too shallow pumped systems can be considered as a last resort.
Ground instability	Geotechnical site investigation should be done to determine the extent of unstable soil and dictate whether infiltration would be suitable or not.
Sites with deep backfill	Infiltration should be avoided unless the soil can be demonstrated to be sufficiently compacted. Some features such as swales are more adaptable to potential surface settlement.

Considerations	Solution
Open space in floodplain zones	Design decisions should be done to take into consideration the likely high groundwater table and possible high flows and water levels. Features should also seek to not reduce the capacity of the floodplain and take into consideration the influence that a watercourse may have on a system. Facts such as siltation after a flood event should also be taken into account during the design phase.
Future adoption and maintenance	Local Planning Authority should ensure development proposals, through the use of planning conditions or planning obligations, have clear arrangements for on-going maintenance over the development's lifetime.

11.4 Local policy and guidance on surface water management

11.4.1 Water. People. Places

The South East Seven is a collaboration of upper tier authorities that has produced a regional guide (**Water, People, Places**) for master planning sustainable drainage in developments. The Southern Lead Local Flood Authorities (including KCC) expect this guide to be used during initial planning and design process for all types of development in accordance with the National Planning Policy Framework (NPPF) and the Flood and Water Management Act (2010).

The guidance identifies specific site characteristics and constraints that can limit the effectiveness of SuDS including (but not limited to) existing flood conditions, runoff characteristics, high groundwater levels and Groundwater Source Protection Zones (GSPZ), topography, soil type, geology, contaminated land, existing infrastructure, land ownership, ecology and space constraints.

11.4.2 C753 CIRIA SuDS Manual (2015)

The C753 CIRIA SuDS Manual (2015) provides the latest guidance and best practice on planning, design, construction and maintenance of SuDS. The document is designed to help the implementation of SuDS features into new and existing developments, whilst maximising the key benefits regarding flood risk and water quality. It is recommended that developers and the LPA utilise the information within the manual to help design SuDS which are appropriate for development.

11.4.3 National standards for sustainable drainage systems (SuDS)

Previously, SuDs guidance was developed to sit alongside PPG and provide non-statutory standards as to the expected design and performance for SuDS.

As of June 2025, the 'National standards for sustainable drainage systems (SuDS)⁷⁸ were introduced to comply with principles laid out in Section 11.2. Whilst remaining as a non-statutory specification, these now form a material consideration for LPAs when assessing planning applications. These standards aim to reflect and reinforce good practice and use of SuDs as detailed in Section 11.2; reflecting the four pillars of SuDs design.

The National Standards for Sustainable Drainage Systems (SuDS) contains two sets of standards. The first type; Standard 1, is known as the hierarchy standard and gives criteria for the prioritisation of final runoff destinations, whilst the other standards (2 – 7) detail the minimum requirements of design criteria that surface water drainage systems should satisfy alongside how they are to be appropriately built, maintained and operated.

78 National standards for sustainable drainage systems (SuDS). <https://www.gov.uk/government/publications/the-river-medway-partnership-objectives-members-and-action-plan/medway-flood-action-plan-year-3-report#:~:text=The%20flood%20action%20plan%20was,risk%20in%20the%20Medway%20catchment.>

11.4.4 Kent County Council's Drainage and Planning Policy (adopted December 2019)

KCC's **Drainage and Planning Policy** sets out the requirements for sustainable drainage and how drainage strategies and surface water management provisions will be reviewed for SuDS schemes specific to Kent.

The policy provides the following requirements for developments on greenfield and previously developed sites:

- For developments on greenfield sites peak runoff rates from the 1 in 1-year (100% AEP) to the 1 in 100-year (1% AEP) rainfall events should be limited to the peak greenfield runoff rates for the same events.
- For developments on brownfield sites, the peak runoff rate must be as close as reasonably practicable to the greenfield runoff rate but should never exceed the existing rate of discharge prior to redevelopment. Unless it can be demonstrated to be reasonably impracticable, a 50% reduction in the peak runoff rate is expected.
- The drainage system must be designed to operate without flooding on any part of the site during any rainfall event up to (and including) a 1 in 30-year (3.3% AEP) rainfall event.
- The drainage system must also be designed to operate without flooding in any building up to (and including) a 1 in 100-year (1% AEP) plus climate change rainfall event, without exacerbating off-site flood risk.
- Exceedance flows that cannot be managed within the drainage system must be managed via exceedance flow routes that minimise the risks to people and property.
- Attenuation storage volumes provided by drainage areas must half empty within 24 hours to enable runoff from subsequent storms to be received. If the time taken to drain from full to empty exceeds 24 hours long duration events should be assessed to ensure drainage is not negatively impacted by inundation.

11.4.5 Kent County Council: Sustainable drainage – making it happen guidance

A **guidance document** supports the KCC Drainage and Planning Policy statement and the Non-Statutory Technical Standards for Sustainable Drainage. The guidance consists of technical appendices advising on the construction and design of SuDS features. This should be used to assist in the preparation of drainage design for any new development in Kent. It sets out the procedures relating to the design and subsequent adoption of surface water drainage systems and sets out requirements that KCC may have both as a Highway Authority and LLFA.

11.5 Groundwater Vulnerability Zones

The Environment Agency published new groundwater vulnerability maps in 2015. These maps provide a separate assessment of the vulnerability of groundwater in overlying superficial rocks and those that comprise the underlying bedrock. The maps show the vulnerability of groundwater at a location based on the hydrological, hydrogeological and soil properties within a one-kilometre grid square.

Two maps are available:

- Basic groundwater vulnerability map: this shows the likelihood of a pollutant discharged at ground level (above the soil zone) reaching groundwater for superficial and bedrock aquifers and is expressed as high, medium and low vulnerability.

- Combined groundwater vulnerability map: this map displays both the vulnerability and aquifer designation status (principal or secondary). The aquifer designation status is an indication of the importance of the aquifer for drinking water supply.

The groundwater vulnerability maps should be considered when designing SuDS.

11.6 Groundwater Source Protection Zones

The Environment Agency also defines Groundwater Source Protection Zones in the vicinity of groundwater abstraction points. These areas are defined to protect areas of groundwater that are used for potable supply, including public / private potable supply, (including mineral and bottled water) or for use in the production of commercial food and drinks. **The Environment Agency's approach to groundwater protection**⁷⁹ document defines what restrictions are placed on infiltration in these zones.

The definition of each zone is shown below:

- **Zone 1 (Inner Protection Zone)** – Most sensitive zone: defined as the 50-day travel time from any point below the water table to the source. This zone has a minimum radius of 50 metres.
- **Zone 2 (Outer Protection Zone)** – Also sensitive to contamination: defined by a 400-day travel time from a point below the water table. This zone has a minimum radius around the source, depending on the size of the abstraction.
- **Zone 3 (Total Catchment)** – Defined as the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75. Individual source protection areas will still be assigned to assist operators in catchment management.
- **Zone 4 (Zone of special interest)** – A fourth zone SPZ4 or 'Zone of Special Interest' usually represents a surface water catchment which drains into the aquifer feeding the groundwater supply (i.e. catchment draining to a disappearing stream). In the future this zone will be incorporated into one of the other zones, SPZ 1, 2 or 3, whichever is appropriate in the particular case, or become a safeguard zone.

GSPZs in the Local Plan Review area

Several GSPZs of varying size have been identified within the northern half of Tonbridge and Malling Borough, as well as a small area in the south of the borough. This is shown in Figure 11-3.

11.7 Nitrate Vulnerable Zones

Nitrate Vulnerable Zones (NVZs) are areas designated as being at risk from agricultural nitrate pollution. Nitrate levels in waterbodies are affected by surface water runoff from surrounding agricultural land entering receiving waterbodies.

The level of nitrate contamination will potentially influence the choice of SuDS and should be assessed as part of the design process. The definition of each NVZ is as follows:

- **Groundwater NVZ** – an area of land where groundwater supplies are at risk from containing nitrate concentrations exceeding the 50mg/l level

⁷⁹ Environment Agency (2017) The Environment Agency's approach to groundwater protection, available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/692989/Environment-Agency-approach-to-groundwater-protection.pdf [Accessed 10/06/2020]

dictated by the EU's Surface Water Abstraction Directive (1975) and Nitrates Directive (1991).

- **Surface Water NVZ** – an area of land where surface waters (in particular those used or intended for the abstraction of drinking water) are at risk from containing nitrate concentrations exceeding the 50 mg/l dictated by the EU's Surface Water Abstraction Directive (1975) and Nitrate Directive (1991).
- **Eutrophic NVZ** – an area of land where nitrate concentrations are such that they could / will trigger the eutrophication of freshwater bodies, estuaries, coastal waters and marine waters.

The locations of the Nitrate Vulnerable Zones in the Local Plan Review area are shown in Figure 11-4.

Figure 11-3: Groundwater Source Protection Zones (GSPZs)

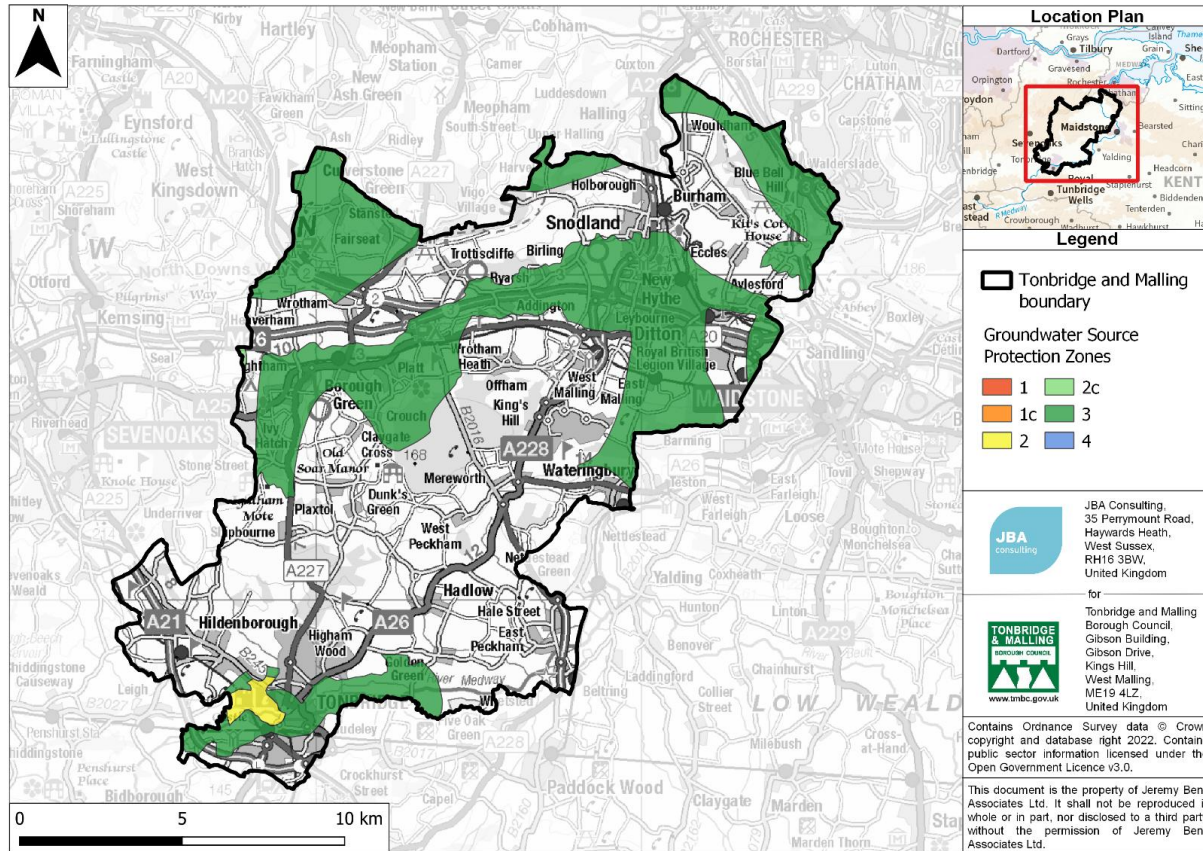
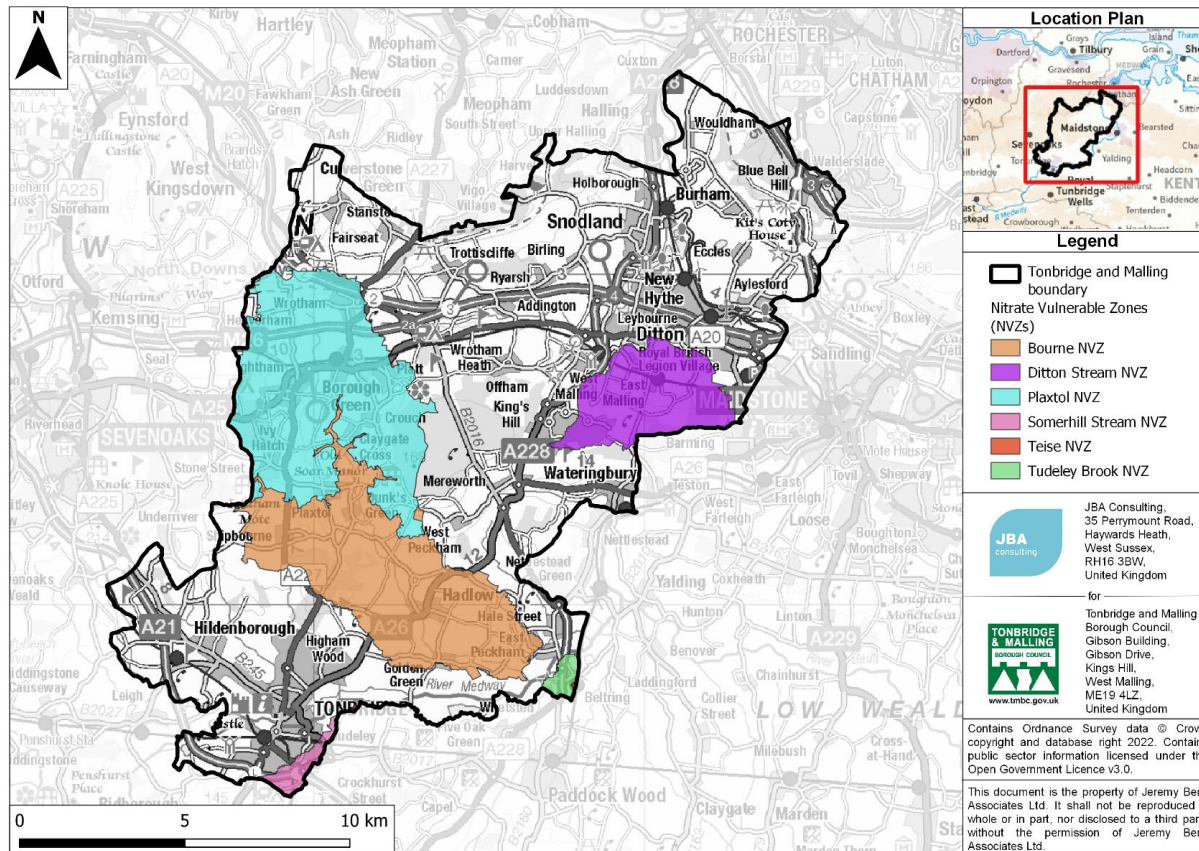


Figure 11-4 : Nitrate Vulnerable Zones (NVZs)



12 Flood Warning and Emergency Planning

This chapter provides guidance and advice on managing flood related incidents before, during and after flooding occurs.

12.1 Flood emergencies

Emergency planning is one option to help manage flood related incidents. From a flood risk perspective, emergency planning can be broadly split into three phases: before, during and after a flood. The measures involve developing and maintaining arrangements to reduce, control or mitigate the impact and consequences of flooding and to improve the ability of people and property to absorb, respond to and recover from flooding.

In development planning, a number of emergency planning activities are already integrated in national building control and planning policies e.g. the NPPF Flood Risk Vulnerability and Flood Zone 'Compatibility' table seeks to avoid inappropriate development in areas at risk from all sources of flooding. Flood warning and emergency planning is a last resort after using this SFRA to undertake the Sequential Test appropriately first.

However, safety is a key consideration for any new development and includes residual risk of flooding, the availability of adequate flood warning systems for the development, safe access and egress routes and evacuation procedures.

The Association of Directors of Environment, Economy, Planning and Transport (ADEPT) and the Environment Agency have published a **Flood Risk Emergency Plans for New Development**⁸⁰ document which provides guidance for Local Planning Authorities regarding their decisions over planning applications.

The Planning Practice Guidance (paragraph 005) outlines how developers can ensure safe access and egress to and from development in order to demonstrate that development satisfies the second part of the Exception Test. As part of an FRA, the developer should review the acceptability of the proposed access in consultation with the LPA and the Environment Agency.

There are circumstances where a flood warning and evacuation plan is required and / or advised:

- It is a **recommendation under the 2025 PPG** that safe access and escape routes are included in an FRA where appropriate, as part of an agreed emergency plan.
- The **Environment Agency and Defra's standing advice**⁸¹ for undertaking flood risk assessments for planning applications states that details of emergency escape plans will be required for any parts of the building that are below the estimated flood level.

It is recommended that Emergency Planners at Tonbridge and Malling Borough Council are consulted prior to the production of any emergency flood plan.

Tonbridge and Malling Borough Council will normally be expected to refuse an application if the emergency plan does not meet the requirements as recommended by Planning Practice Guidance or ADEPT Guidance.

⁸⁰ Flood Risk Emergency Plans for New Development. ADEPT, Environment Agency. (2019).

<https://www.adeptnet.org.uk/system/files/documents/ADEPT%20%26%20EA%20Flood%20risk%20emergency%20plans%20for%20new%20development%20September%202019....pdf>

⁸¹ Flood Risk Assessment Standing Advice. Environment Agency. (2021) <https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>

In addition to the **flood warning and evacuation plan considerations listed in the PPG**, it is advisable that developers also acknowledge the following:

- How to manage the consequences of events that are un-foreseen or for which no warnings can be provided e.g. managing the residual risk of a breach.
- Proposed new development that places additional burden on the existing response capacity of the Councils will not normally be considered to be appropriate.
- Developers should encourage those owning or occupying developments, where flood warnings can be provided, to sign up to receive these warnings. This applies even if the development is defended to a high standard.
- The vulnerability of site occupants.
- Situations may arise where occupants cannot be evacuated (e.g. prisons) or where it is safer to remain "in-situ" and / or move to a higher floor or safe refuge area (e.g. at risk of a breach). These allocations should be assessed against the outputs of the SFRA and where applicable, a site-specific Flood Risk Assessment to help develop emergency plans.

Further emergency planning information links:

- **2004 Civil Contingencies Act**⁸²
- **DEFRA (2014) National Flood Emergency Framework for England**⁸³
- **Sign up for Flood Warnings with the Environment Agency**⁸⁴
- **National Flood Forum**⁸⁵
- **GOV.UK Make a Flood Plan guidance and templates**⁸⁶
- **FloodRe**⁸⁷

12.2 Flood warning systems

Flood warnings can be derived and, along with evacuation plans, can inform emergency flood plans or flood response plans. The Environment Agency is the lead organisation for providing warnings of fluvial flooding (for watercourses classed as Main Rivers) and coastal flooding in England. Flood Warnings are supplied via the Flood Warning Service (FWS), to homes and business within Flood Zones 2 and 3. The different levels of warnings are shown in Table 12-1.

82 Civil Contingencies Act. UK Government. (2004). <https://www.legislation.gov.uk/ukpga/2004/36/contents>

83 National Flood Emergency framework for England. Defra, Environment Agency, Public Health England. (2014).

<https://www.gov.uk/government/publications/the-national-flood-emergency-framework-for-england>

84 Sign up for Flood Warnings. Environment Agency. <https://www.gov.uk/sign-up-for-flood-warnings>

85 National Flood Forum website. <https://nationalfloodforum.org.uk/>

86 Prepare for flooding. UK Government. <https://www.gov.uk/prepare-for-flooding/future-flooding>

87 FloodRe website. <https://www.floodre.co.uk/>

Table 12-1: Levels of flood warning issued by the Environment Agency's Flood Warning Service

Flood Warning Symbol	What it means	What to do
	Flood Alerts are used to warn people of the possibility of flooding and encourage them to be alert, stay vigilant and make early preparations. It is issued earlier than a flood warning, to give customers advance notice of the possibility of flooding, but before there is full confidence that flooding in Flood Warning Areas is expected.	• Be prepared to act on your flood plan • Prepare a flood kit of essential items • Monitor local water levels and the flood forecast on the Environment Agency website • Stay tuned to local radio or TV • Alert your neighbours • Check pets and livestock • Reconsider travel plans
	Flood Warnings warn people of expected flooding and encourage them to take action to protect themselves and their property.	• Move family, pets and valuables to a safe place • Turn off gas, electricity and water supplies if safe to do so • Seal up ventilation system if safe to do so • Put flood protection equipment in place • Be ready should you need to evacuate from your home • 'Go In, Stay In, Tune In'
	Severe Flood Warnings warn people of expected severe flooding where there is a significant threat to life.	• Stay in a safe place with a means of escape • Co-operate with the emergency services and local authorities • Call 999 if you are in immediate danger
Warning no longer in force	Informs people that river or sea conditions begin to return to normal and no further flooding is expected in the area. People should remain careful as flood water may still be around for several days.	• Be careful. Flood water may still be around for several days • If you've been flooded, ring your insurance company as soon as possible

12.2.1 Flood Alert and Warning Areas in Tonbridge and Malling Borough

There are currently four Flood Alert Areas and nine Flood Warning Areas covering Tonbridge and Malling Borough. The coverage of the Flood Alerts and Flood Warnings include the fluvial corridor of the River Medway, which can generally be spilt into two areas: those covering the lower River Medway and tributaries in the north of the Borough, and those covering the upper River Medway, River Bourne, and tributaries in the south of the Borough. Approximately 11% of the borough is located within a Flood Alert or Warning Area. Table 12-2 and Table 12-3 list the Flood Alert Areas and Flood Warning Areas within the Tonbridge and Malling Borough area respectively.

Appendix A shows the FWA coverage for Tonbridge and Malling Borough. If your home or business falls within the FWA coverage, this means that the Environment Agency can provide you with flood warnings.

Table 12-2: Flood Alerts in the Tonbridge and Malling area

Flood Alert Code	Flood Alert Name	Waterbody	Description
064WAF8Bourne	River Bourne from Hadlow to East Peckham	River Bourne	The River Bourne from Hadlow to East Peckham, including Golden Green and Little Mill
064WAF8LowMed	Lower River Medway	River Medway	The River Medway from Hampstead Lock at Yalding to Allington Lock, including East Farleigh, Watlingtonbury, Teston and Teston Park, Tovil and Maidstone including Millennium Park
064WAFMidMed	Middle River Medway	River Medway	The River Medway from Penshurst to Hampstead Lock at Yalding, including the Leigh Flood Storage area, the Ensfield Road, Tonbridge, Paddock Wood, the Hop Farm, East Peckham, Branbridges and Hale Street
064WATMedEst	Tidal Medway, Medway estuary and Isle of Grain	River Medway	Areas at risk of tidal flooding on the Tidal Medway, Medway estuary and Isle of Grain, including Aylesford, Medway Towns, Lower Halstow, Middle Stoke and Lower Stoke

Table 12-3: Flood Warning Areas within Tonbridge and Malling Borough

Flood Warning Code	Flood Warning Name	Waterbody	Description
064FWT1Medway	Tidal River Medway and Medway estuary	River Medway	Areas at risk of flooding from the tidal River Medway and the Medway Estuary, including Aylesford, Larkfield, Wouldham, Medway Towns, Upnor, Hoo and Lower Halstow
064FWT8TidalMed	Tidal River Medway from Allington to Cuxton	River Medway	Tidal River Medway between Allington and Cuxton
064FWF8Tonbridge	Tonbridge and Hildenborough	River Medway	River Medway at Tonbridge and Hildenborough including Tudeley, Golden Green, Whetsted and Hartlake
064FWF8A3	River Medway between Penshurst and Leigh	River Medway	River Medway between Penshurst and the Leigh Flood Storage area
064FWF8EastPeck	River Medway, Alder Stream, Coult Stream and River Bourne at East Peckham	River Medway, River Bourne	River Medway and The Bourne at East Peckham, including Little Mill and Hale Street

Flood Warning Code	Flood Warning Name	Waterbody	Description
064FWF8LowerMed	River Medway between Yalding and Maidstone	River Medway	River Medway between Yalding and Maidstone, including Watlingtonbury, West Farleigh, Teston and East Farleigh
064FWF8PaddWood	Paddock Wood and Laddingford	River Teise, River Medway	River Teise and Medway at Paddock Wood and Laddingford
064FWF8Hadlow	Hadlow and Golden Green	River Medway, River Bourne	Bourne at Hadlow and Golden Green
064FWF8Maidstne	River Medway at Maidstone	River Medway	River Medway at Maidstone, including Tovil, Allington, Allington Marina and Aylesford

12.2.2 Groundwater alerts

In selected areas, the Environment Agency can provide a groundwater alert / warning. These tend to be for communities located on chalk bedrock or known to have a history of groundwater flooding. If a groundwater alert is issued, this does not necessarily mean that properties within its coverage are definitely at risk. The Environment Agency note that the alerts cover large areas that could be affected if groundwater levels are high and that groundwater is difficult to predict as the location of the flooding is normally related to the local geology. The Environment Agency only provide a limited groundwater alert service and this does not currently cover the Tonbridge and Malling Borough area.

12.3 Lead times and onset of flooding

Flood alerts and warnings provide advanced notification that flooding is possible or expected. The time from when the alert or warning is issued to the onset of property flooding (termed the lead time) can provide time for people to prepare for flooding. The Environment Agency endeavour to give a two-hour lead time for issuing Flood Warnings; however, for fast responding catchments and areas at risk of flash flooding, this may not be possible.

A failure or breach of flood defences can cause immediate and rapid inundation to areas located near the vicinity of the breach or failure. Such incidents can pose a significant risk to life given the near lack of warning and lead time to prepare or respond.

For developers, it is therefore important to consider how to manage the consequences of events that are un-foreseen or for which no warnings can be provided. A typical example would be managing the residual risk of a flood defence breach or failure.

12.4 Managing flood emergencies

The **Kent and Medway Resilience Forum** (KMRF) is one of a number of Local Resilience Forums (LRFs) that have been set up across England. The overall aim of an LRF is to ensure that the various agencies and organisations plan and subsequently work together so that responses to emergencies are coordinated appropriately⁸⁸. The KMRF is made up of a number of different agencies and organisations that work together across a range of areas including planning for emergencies.

12.4.1 Kent County Council Flood Response Plan

The **Kent County Council Flood Response Plan** (Dec 2019)⁸⁹ sets out the principles that govern the Kent County Council's response to a significant flooding event within their local authority administrative area. The Plan was produced to meet the requirements of the Civil Contingencies Act 2004, and is built upon the existence and maintenance by Category 1 and 2 Responders of their own plans for response to flooding.

Category 1 Responders for Tonbridge and Malling Borough are:

- Kent County Council
- Tonbridge and Malling Borough Council
- Kent Police
- Kent Fire and Rescue Service
- South East Coast Ambulance Service
- Environment Agency

⁸⁸ Kent County Council: Flood Risk to Communities Tonbridge and Malling Borough (March 2016)

⁸⁹ Kent County Council Flood Response Plan (Dec 2019): https://www.kent.gov.uk/_data/assets/pdf_file/0019/12097/Flood-response-plan.pdf

The Category 2 Responders for Tonbridge and Malling Borough are utility and transport providers, such as Southern Water, Network Rail etc.

The response plan provided information on Kent County Council's actions, roles and responsibility in response to a flood emergency in their administrative area.

12.4.2 Tonbridge and Malling Borough Council's Emergency Plan

Tonbridge and Malling Borough Council work with Kent County Council, the emergency services and the Environment Agency to coordinate the response during severe flooding⁹⁰. Tonbridge and Malling Borough Council responsibilities include:

- To set up rest centres for people who are evacuated and unable to stay with family or friends, and to also arrange temporary housing.
- To support other Category 1 and 2 responders and provide resources (where required and in the remit of the local authority).
- When possible and where Tonbridge and Malling Borough Council resources permit, support a reasonable flood defence response by making sandbags available at the locations of high risk.

Sandbags have been traditionally used to block doorways, drains and other openings to properties. Sandbags are not waterproof and will be unable to permanently prevent the ingress of water to an area protected by them. The provision of sandbags is not a statutory function of Tonbridge and Malling Borough Council. The Council has a sandbag policy which outlines the criteria for providing sandbags, the decision making process used to determine the provision of sandbags, how the sandbags will be delivered and the means for their disposal. In the midst of a flood emergency it cannot be guaranteed that sandbags will be delivered in sufficient time or quantities to prevent/reduce damage to a property due to the limited stocks available⁹¹.

The Environment Agency has produced a guidance document on how to use sandbags properly for flood protection, downloadable from their website.

12.4.3 Parish Council Community Emergency Plans

Two Parish Councils, Hadlow and Hildenborough have set up their own Community Emergency Plans. Wouldham's, incorporating the new larger community of Peters Village is in development. These are understood to be the only emergency plans produced by parishes within the Tonbridge and Malling Borough, but it is advisable to check this remains the case when considering development within an area. If a community emergency plan is available, the content of this should be considered alongside the context of the proposed development.

The aim of the plans is to provide a local framework that will increase the readiness and resilience within parishes and communities. The plans enable Parish Councils and other community groups to support themselves when outside assistance from the emergency services or local authority is delayed or overwhelmed. Flooding has been included as one of the local risks to the community. The plan identifies local resources available, which include the use of rest centres. Tonbridge and Malling Borough Council Emergency Planning maintain a Welfare Centre Directory which contains details of 47 village and parish halls, community and leisure centres, secondary schools and churches with keyholders listed so that they can be contacted 24/7 if the facility is needed immediately as a rest centre. The Directory includes a flood map of each venue.

90 Tonbridge and Malling Borough Council: Prepare for Flooding

91 Kent County Council: Flood Risk to Communities Tonbridge and Malling Borough (March 2016)

12.5 Emergency planning and development

12.5.1 National Planning Policy Framework

The NPPF Flood Risk Vulnerability and Flood Zone 'Compatibility' table seeks to avoid inappropriate development in areas at risk from all sources of flooding. It is essential that any development which will be required to remain operational during a flood event is located in the lowest flood risk zones to ensure that, in an emergency, operations are not impacted on by flood water or that such infrastructure is resistant to the effects of flooding such that it remains serviceable/operational during 'Higher Central' and 'upper end' events, as defined in the Environment Agency's Climate Change allowances (updated May 2022). For example, the NPPF classifies police, ambulance and fire stations and command centres that are required to be operational during flooding as Highly Vulnerable development, which is not permitted in Flood Zones 3a and 3b and only permitted in Flood Zone 2 providing the Exception Test is passed. Essential infrastructure located in Flood Zone 3a or 3b must be operational during a flood event to assist in the emergency evacuation process. All flood sources such as fluvial, surface, groundwater, sewers and artificial sources (such as canals and reservoirs) should be considered. In particular, sites should be considered in relation to the areas of drainage critical problems highlighted in the relevant SWMPs.

The outputs of this SFRA should be compared and reviewed against any emergency plans and continuity arrangements. This includes the nominated rest and reception centres (and prospective ones), so that evacuees are outside of the high-risk Flood Zones and will be safe during a flood event.

12.5.2 Safe access and egress

The **Planning Practice Guidance** outlines how developers can secure safe access and egress to and from development in order to demonstrate that development satisfies the second part of the Exception Test. Access considerations should include the voluntary and free movement of people during a 'design flood' as well as for the potential of evacuation before a more extreme flood. A 'design flood' in this context is defined as a fluvial 1% AEP and tidal 0.5% AEP plus climate change flood event. The access and egress must be functional for changing circumstances over the lifetime of the development. The NPPF Planning Practice Guidance sets out that:

- Access routes should allow occupants to safely access and exit their dwellings in design flood conditions. In addition, vehicular access for emergency services to safely reach development in design flood conditions is normally required; and
- Where possible, safe access routes should be located above design flood levels and avoid flow paths including those caused by exceedance and blockage. Where this is unavoidable, limited depths of flooding may be acceptable providing the proposed access is designed with appropriate signage etc. to make it safe. The acceptable flood depth for safe access will vary as this will be dependent on flood velocities and risk of debris in the flood water. Even low levels of flooding can pose a risk to people in-situ (because of, for example, the presence of unseen hazards and contaminants in floodwater, or the risk that people remaining may require medical attention).

The depth, velocity and hazard mapping from hydraulic modelling should help inform the provision of safe access and egress routes.

As part of an FRA, the developer should review the acceptability of the proposed access in consultation with Kent County Council and the Environment Agency. Site and plot specific velocity and depth of flows should be assessed against standard hazard criteria to ensure safe access and egress can be achieved.

12.5.3 Potential evacuations

During flood incidents, evacuation may be considered necessary. The **NPPF** states practicality of safe evacuation from an area will depend on:

1. the type of flood risk present, and the extent to which advance warning can be given in a flood event;
2. the number of people that would require evacuation from the area potentially at risk;
3. the adequacy of both evacuation routes and identified places that people could be evacuated to (and taking into account the length of time that the evacuation may need to last); and
4. sufficiently detailed and up to date evacuation plans being in place for the locality that address these and related issues.

The vulnerability of the occupants is also a key consideration. The NPPF and application of the Sequential Test aims to avoid inappropriate development in flood risk areas. However, developments may contain proposals for mixed use on the same site. In this instance, the NPPF Planning Practice Guidance states that layouts should be designed so that the most vulnerable uses are restricted to higher ground at lower risk of flooding, with development which has a lower vulnerability (parking, open space etc.) in the highest risk areas, unless there are overriding reasons to prefer a different location. Where the overriding reasons cannot be avoided, safe and practical evacuation routes must be identified.

The Environment Agency and Defra provide standing advice for undertaking flood risk assessments for planning applications. Please refer to **the government website**⁹² for the criteria on when to follow the standing advice. Under these criteria, you will need to provide details of emergency escape plans for any parts of the building that are below the estimated flood level. The plans should show;

- single storey buildings or ground floors that do not have access to higher floors can access a space above the estimated flood level, e.g. higher ground nearby;
- basement rooms have clear internal access to an upper level, e.g. a staircase; and
- occupants can leave the building if there is a flood and there is enough time for them to leave after flood warnings⁹³.

You will also need to comply with relevant Building Regulations in Part B. They require you to provide suitable access for the fire service.

Situations may arise where occupants cannot be evacuated (e.g. prisons) or where it is safer to remain "in-situ" and / or move to a higher floor or safe refuge area (e.g. developments located immediately behind a defence and at risk of a breach). These allocations should be assessed against the outputs of the SFRA and where applicable, a site-specific Flood Risk Assessment to help develop appropriate emergency plans.

12.5.4 Flood warning and evacuation plans

Flood warning and evacuation plans are potential mitigation measures to manage the residual risk, as stated in the NPPF Planning Practice Guidance. It is a requirement under the NPPF that a flood warning and evacuation plan is prepared for sites at risk of flooding

92 Flood risk assessments if you're applying for planning permission. Defra and the Environment Agency. (2025). <https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

93 Environment Agency and DEFRA (2025) Flood Risk Assessment: Standing Advice: <https://www.gov.uk/guidance/flood-risk-assessment-standing-advice>

used for holiday or short-let caravans and camping and are important at any site that has transient occupants (e.g. hostels and hotels).

A flood warning and evacuation plan should detail arrangements for site occupants on what to do before, during and after a flood as this will help to lessen its impact, improve flood response and speed up the recovery process. The Environment Agency provides practical advice and templates on how to prepare flood plans for individuals, communities and businesses (see text box below for useful links).

It is recommended that emergency planners at Tonbridge and Malling Borough Council are consulted prior to the production of any emergency flood plan. The council will provide guidance to help local communities to protect their home and valuables and understand what to do before, during and after a flood.

Once the emergency flood plan is prepared, it is recommended that it is distributed to emergency planners at Tonbridge and Malling Borough Council and the emergency services. When developing a flood warning and evacuation plan, it is recommended that it links in with any existing parish / community level plan. Local Parish Councils should be contacted to establish if a community level plan exists for an area.

Guidance documents for preparation of flood response plans

- **Environment Agency (2023) Flooding – minimising the risk, flood plan guidance for communities and groups**
- **Environment Agency (2023) Community Flood Plan template**
- **Environment Agency Personal flood plans**
- **ADEPT and the Environment Agency (2019) - Flood Risk Emergency Plans for New Development**

13 Strategic Flood Risk Solutions

This chapter provides information on strategic flood risk solutions (for example flood storage schemes and natural flood management) and how these could be implemented.

13.1 Introduction

Strategic flood risk solutions may offer a potential opportunity to reduce flood risk in Tonbridge and Malling Borough. The following sections outline different options which could be considered for strategic flood risk solutions. Any strategic solutions should ensure they are consistent with wider catchment policy and the local policies. It is important that the ability to deliver strategic solutions in the future is not compromised by the location of proposed development. When assessing the extent and location of proposed development consideration should be given to the requirement to secure land for flood risk management measures that provide wider benefits.

Not all measures will be appropriate for all development sites, however this is intended as a guide to identify some of the more common solutions. Discussions should be held with Kent County Council as the LLFA and the Environment Agency where strategic solutions are being considered to confirm their appropriateness. Design guides for many of these solutions are published by **CIRIA**⁹⁴.

13.2 Flood storage schemes

Flood storage schemes aim to reduce the flows passed downriver to mitigate downstream flooding. Development increases the impermeable area within a catchment, creating additional and faster runoff into watercourses. Flood storage schemes aim to detain this additional runoff, releasing it downstream at a slower rate, to avoid any increase in flood depths and/or frequency downstream. According to the **Environment Agency's Fluvial Design Guide**⁹⁵, methods to provide these schemes include:

- enlarging the river channel;
- raising the riverbanks; and/or
- constructing flood banks set back from the river.

Flood storage schemes have the advantage that they generally benefit areas downstream, not just the local area.

Two flood storage areas are present within the Borough, Leigh FSA and East Peckham FSA. The Leigh Flood Storage Area is partially located within Tonbridge and Malling Borough to the south west of the district and across the boundaries of Tunbridge Wells Borough Council and Sevenoaks District Council.

13.3 Natural Flood Management

Natural Flood Management utilises floodplains, rivers and the coast to reduce flood and erosion risk, benefit the natural environment and reduce costs of schemes. Natural flood management requires integrated catchment management and involves those who use and shape the land. It also requires partnership working with neighbouring authorities, organisations and water management bodies. The Environment Agency has developed **Natural Flood Management (NFM) mapping**⁹⁶ which displays opportunities for NFM.

94 CIRIA website. <https://www.ciria.org/>

95 Environment Agency: Fluvial Design Guide – Chapter 10. (2010).

https://assets.publishing.service.gov.uk/media/60549b7a8fa8f545cf209a29/FDG_chapter_10_-_Flood_storage_works.pdf

96 Working with Natural Processes. JBA Consulting, Defra, Environment Agency. (2021) www.jbahosting.com

Conventional flood prevention schemes may be preferred, but consideration of 're-wilding' rivers upstream could provide cost efficiencies as well as considering multiple sources of flood risk; for example, reducing peak flows upstream such as through felling trees into streams or building earth banks to capture runoff, could be cheaper and smaller-scale measures than implementing flood walls for example. With flood prevention schemes, consideration needs to be given to the impact that flood prevention has on the WFD status of watercourses. It is important that any potential schemes do not have a negative impact on the ecological and chemical status of waterbodies.

A number of the different NFM approaches and techniques are summarised in the following sections.

13.3.1 Catchment and floodplain restoration

Compared to flood defences and flood storage, floodplain restoration represents the most sustainable form of strategic flood risk solution, by allowing watercourses to return to a more naturalised state, and by creating space for naturally functioning floodplains working with natural processes.

Although the restoration of floodplain is difficult in previously developed areas where development cannot be rolled back, the following measures should be adopted:

- Promoting existing and future brownfield sites that are adjacent to watercourses to naturalise banks as much as possible. Buffer areas around watercourses provide an opportunity to restore parts of the floodplain.
- Removal of redundant structures to reconnect the river and the floodplain
- Apply the Sequential Approach to avoid new development within the floodplain.

For those sites considered within the Local Plan Review and/or put forward by developers, that also have watercourses flowing through or past them, the sequential approach should be used to locate development away from these watercourses. This will ensure the watercourses retain their connectivity to the floodplain. Loss of floodplain connectivity could potentially increase flooding

13.3.2 Re-naturalisation

There is potential to re-naturalise a watercourse by re-profiling the channel, removing hard defences, re-connecting the channel with its floodplain and introducing a more natural morphology (particularly in instances where a watercourse has historically been modified through hard bed modification). Detailed assessments and planning would need to be undertaken to gain a greater understanding of the response to any proposed channel modification.

13.4 Structure removal and/ or modification

Structures, both within watercourses and adjacent to them can have significant impacts upon rivers including alterations to the geomorphology and hydraulics of the channel through water impoundment and altering sediment transfer regime, which over time can significantly impact the channel profile including bed and bank levels, alterations to flow regime and interruption of biological connectivity, including the passage of fish and invertebrates.

Many artificial in-channel structures (examples include weirs and culverts) are often redundant and/or serve little purpose and opportunities exist to remove them where feasible. The need to do this is heightened by climate change, for which restoring natural river processes, habitats and connectivity are vital adaptation measures. However, it also must be recognised that some artificial structures may have important functions or

historical/cultural associations, which need to be considered carefully when planning and designing restoration work.

In the case of weirs, whilst removal should be investigated in the first instance, in some cases it may be necessary to modify a weir rather than remove it. For example, by lowering the weir crest level or adding a fish pass. This will allow more natural water level variations upstream of the weir and remove a barrier to fish migration.

13.5 Bank stabilisation

Bank erosion should be avoided, and landowners encouraged to avoid using machinery and vehicles close to or within the watercourse except where required for maintenance.

There are several techniques that can be employed to restrict the erosion of the banks of a watercourse. In an area where bankside erosion is particularly bad and/or vegetation is unable to properly establish, ecologically sensitive bank stabilisation techniques, such as willow spiling, can be particularly effective. Live willow stakes thrive in the moist environment and protect the soils from further erosion allowing other vegetation to establish and protect the soils.

13.6 Green Infrastructure

According to Natural England, Green Infrastructure (GI) is a network of multi-functional green and blue spaces and other natural features, urban and rural, which is capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities and prosperity⁹⁷.

Green Infrastructure provides an opportunity to link with Biodiversity Net Gain, Local Nature Recovery Strategies, Nature Recovery Network, and Natural Capital. The identification and planning of GI is critical to sustainable growth. It merits forward planning and investment as much as other socio-economic priorities such as health, transport, education and economic development. GI is also central to climate change action and is a recurring theme in planning policy. With regards to flood risk, green spaces can be used to manage storm flows and free up water storage capacity in existing infrastructure to reduce risk of damage to urban property, particularly in city centres and vulnerable urban regeneration areas. Green infrastructure can also improve accessibility to waterways and improve water quality, support regeneration and improving opportunity for leisure, economic activity and biodiversity as well as support health and wellbeing.

13.7 Reducing surface water discharges

Minimising the discharge of surface water from sites to below those required by regulations presents a feasible strategy for mitigating flood risk. This would be particularly beneficial in locations at risk of cumulative impacts. This approach could also help with the local approval process for development projects.

13.8 Engaging with key stakeholders

Flood risk to an area or development can often be attributed to a number of sources such as fluvial, surface water and/or groundwater. In rural areas the definition between each type of flood risk is more distinguished. However, within urban areas flooding from multiple sources can become intertwined. Where complex flood risk issues are highlighted it is important that all stakeholders are actively encouraged to work together to identify issues and provide suitable solutions.

Engagement with riparian owners is also important to ensure they understand their rights and responsibilities including:

⁹⁷ Natural England, Green Infrastructure Home - Green Infrastructure (esdm.co.uk)

- maintaining river bed and banks;
- allowing the flow of water to pass without obstruction; and
- controlling invasive alien species e.g. Japanese knotweed.

More information about riparian owner responsibilities can be found in the Environment Agency's guidance on Owning a Watercourse (2018).

14 Level 1 summary assessment of potential development locations

This section details the site screening of potential development sites that was carried out as part of the Level 1 SFRA, as well as the cumulative impact assessment. Refer to Appendices C for recommendations and details on how to apply the Sequential and Exception tests using the data set out in this section.

14.1 Introduction

A total of 475 sites were provided by Tonbridge and Malling Borough Council.

These sites were identified through Tonbridge and Malling Borough Council's Land Availability Assessment, and were screened against a suite of available flood risk information and spatial data to provide a summary of risk to each site (see Appendix B).

The information considered includes the flood risk datasets listed below:

- Flood Zones 2, 3a and 3b
- 3.3% AEP, 1% AEP, 0.5% AEP and 0.1% AEP plus climate change flood extents
- Environment Agency Risk of Flooding from Surface Water extents
- Environment Agency 0.1% AEP Risk of Flooding from Surface Water which was used as a proxy for climate change
- Environment Agency Reservoir Flood Extent for a dry and wet day
- Environment Agency Historic Flood Map
- Kent County Council recorded flood incidents
- JBA Groundwater Flood Emergence Map
- Potentially higher risk of groundwater flooding

A site screening spreadsheet has been prepared which identifies the proportion of each site that is affected by the different sources of flooding. The information provided is intended to enable a more informed consideration of the sites when applying the sequential approach in line with the Sequential Test methodology outlined in Appendix C. The site screening spreadsheet will be used to determine whether more detailed assessment of sites is needed to further identify those that should be taken forward as potential development allocations for a Level 2 assessment.

14.2 Overview of flood risk at identified sites

A summary of flood risk at each of the sites in light of the screening is provided below:

- The majority of the sites have Flood Zone 1 comprising the largest proportion of their area, with 351 sites completely located within Flood Zone 1.
- 105 sites are partially located in Flood Zone 2.
- 104 sites are partially located in Flood Zone 3a.
- 85 sites are partially located in Flood Zone 3b.
- 353 sites are predicted to be at risk during the present day 0.1% AEP surface water flood event ('High' surface water flood zone).
- 50 sites include an area within Flood Zone 1 which is affected by a wet day reservoir breach.
- 114 sites are potentially at risk (high or moderate risk) of groundwater flooding.

14.3 Sequential Testing

The SFRA does not include the Sequential Test of the development sites that were screened. However, Appendix B summarises the flood risk to the potential and confirmed development sites and provides evidence for use in the completion of the Sequential Test.

The assessments undertaken for this SFRA will assist Tonbridge and Malling Borough Council in the preparation of the Sequential Test as outlined in the methodology.

14.4 Cumulative impacts of development on flood risk

Cumulative impacts are defined as the effects of past, current and future activities on the environment. Under the 2025 NPPF, strategic policies and their supporting SFRAs, are required to 'consider cumulative impacts in, or affecting, local areas susceptible to flooding' (para 171).

When allocating land for development, consideration should be given to the potential cumulative impact on flood risk within a catchment. Development increases the impermeable area within a catchment, which if not properly managed, can cause loss of floodplain storage, increased volumes and velocities of surface water runoff, and result in heightened downstream flood risk. Whilst individual development with appropriate site mitigation measures should not result in measurable local effects with respect to hydrology and flood risk, the cumulative effect of multiple development may be more severe at sensitive downstream locations in the catchment. Locations where there are existing flood risk issues with people, property or infrastructure will be particularly sensitive to cumulative effects.

The cumulative impact should be considered throughout the planning process, from the allocation of sites within the Local Plan, to the planning application and development design stages.

The cumulative impacts will be considered in more detail on an individual site basis within the Level 2 SFRA, if this is required. In addition, site-specific FRAs must consider the cumulative impact of the proposed development on flood risk within the wider catchment area if there are potentially material effects.

As part of the Level 1 SFRA, an assessment of the cumulative effects within catchments in Tonbridge and Malling Borough has been undertaken. The cumulative impacts assessment was also done in partnership with Sevenoaks District Council.

14.4.1 Approach and methodology

The approach is based on providing an assessment of catchments where the allocation of more than one site could result in effects that increase the flood risk to third parties. At a strategic level this involves comparison of catchments, to assess the quantum of proposed development and the sensitivity of the catchment to changes in flood risk. Historic flooding incidents are also included in the assessment, as these are an indicator of the actual sensitivity of locations within a catchment to flood events.

The methodology deploys a range of metrics to assess the potential cumulative impacts, which provide a balance between predicted and observed flooding data recorded by Tonbridge and Malling Borough Council and the Environment Agency. In addition, it was considered important to identify those catchments where an increase in flows (as a result of development) would potentially have the greatest impact upon downstream flood risk.

14.4.2 Datasets

Catchments

The WFD river catchments defined in the River Basin Management Plans and LIDAR data were used to divide Tonbridge and Malling Borough and surrounding local authorities into

manageable areas on which to base a cumulative impact assessment. The surrounding local authorities included in the CIA are:

- Gravesham District
- Maidstone District
- Medway
- Sevenoaks District
- Tunbridge Wells District

Current developed area

OS Open Zoomstack data buildings layer was used to assess the current developed area in each catchment.

Proposed level of growth

To understand areas of Tonbridge and Malling Borough that are likely to experience the greatest pressure for future growth, all potential future development sites received for consideration have been analysed. The sites allocated through the Local Plans of neighbouring authorities have also been taken into account within the proposed level of growth for each catchment.

This allowed the calculation of the overall increase in development from the existing scenario to identify catchments likely to be under the greatest pressure for development. The context for this being that in circumstances where the proportion of proposed new development is greater, then it is more likely to give rise to cumulative effects.

It should be noted that it was assumed that all sites will be developed, and that the entire site footprint would be developed.

Historic Flood Risk

A historic flood risk score was derived for each catchment within the study area using the total area of 'buildings' from the OS Open Zoomstack data within the Environment Agency's historic flood map extent for each catchment.

Properties sensitive to increased flood risk

It is important to understand which catchments are most sensitive to increases in flood flows which may theoretically be caused by new development. Predicted flood risk was assessed using the following datasets:

- Total number properties within the merged 1% AEP surface water flooding extent and Flood Zone 3a for each catchment
- Total number properties within the merged 0.1% AEP surface water flooding extent and Flood Zone 2

The difference in the number properties at risk in these two datasets has then been used as an indicator to identify which catchments are more sensitive to increases in flood flows.

14.4.3 Ranking of catchments

To identify which catchments are more sensitive to cumulative impacts, each catchment was given a ranking for each of the three metrics (proposed level of growth, historic flood risk and properties sensitive to growth). These rankings were then combined to give an overall ranking which was divided into three categories - high, medium, and low according to how sensitive each catchment is to cumulative impacts relative to one another.

14.4.4 Conclusions of the Cumulative Impact Assessment

A summary of the Cumulative Impacts Assessment results is shown in Figure 14-1 and Appendix E. The Cumulative Impact Assessment highlights areas where there is a high chance of encountering cumulative effects from planned development. In these

catchments this should be considered by developers and specifically addressed within FRAs for proposed development.

Including consideration of cumulative effects requires that FRAs should assess:

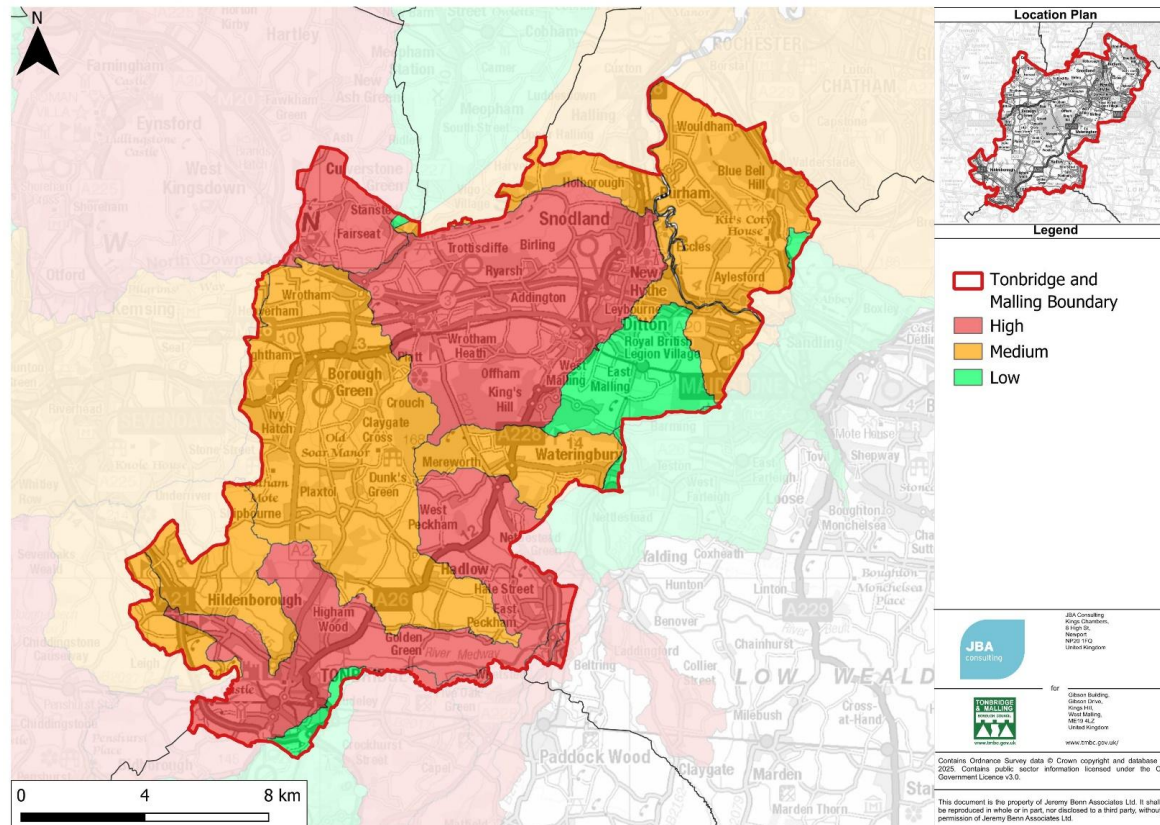
- The location and sensitivity of receptors to cumulative effects and the mechanisms that potentially result in flooding (e.g. locations that are reliant on the performance of pumped drainage systems to manage flood risk, locations where existing flooding is experienced and can be exacerbated by relatively small changes in flood flow magnitude, volume or flood duration, etc).
- The potential quantum of proposed cumulative development within a River Basin and assessment of the effect on sensitive receptors of the cumulative benefit afforded by piecemeal mitigation at the respective allocation sites.
- The requirement for measures to address potential cumulative effects (these can be both 'on-site' measures and contributions to strategic 'off-site' measures).
- The opportunity to integrate site mitigation measures with strategic flood risk management measures planned in the River Basin.
- The long-term commitments to management and maintenance.

14.4.5 Next steps

The Cumulative Impact Assessment is used in the following ways:

- The assessment highlights the catchments in Tonbridge and Malling Borough where the cumulative impacts of development on flood risk could potentially be greatest. Developers and Tonbridge and Malling Borough Council should take the assessment into consideration when identifying appropriate sites for development.
- For sites in catchments identified as being at high or medium risk of cumulative impacts FRAs should contain an assessment of the potential cumulative impacts of development further.
- If sites are taken forward to a Level 2 SFRA, the cumulative impacts of development will be considered in further detail.

Figure 14-1: Cumulative Impact Assessment of WFD Catchments within Tonbridge and Malling Borough



Commented [JL1]: If possible I would like to have a second map with a tighter scale to allow more detail and be a little bit more zoomed in. This is because we are proposing a SuDS policy that is based on this map. So it needs to show greater detail - abit larger - if possible.

15 Summary Recommendations

15.1 Overview

This Level 1 SFRA delivers a strategic assessment of all sources of flooding in the Local Plan area. It also provides an overview of policy and provides guidance for planners and developers.

The study area comprises the administration area of Tonbridge and Malling Borough.

15.2 Sources of flood risk

The following section outlines the sources of flood risk which have been identified.

15.2.1 Historic flooding

Tonbridge and Malling Borough has a history of documented flood events from several sources of flood risk. Flood records indicate that the main source of risk is from fluvial sources across the River Medway, and its tributaries, notably the River Bourne, Botany Stream, Mill Stream, Alder Stream and Busty Stream.

The most significant flood events reported to have affected Tonbridge and Malling Borough occurred in 1953, 1968, 2000 and 2013/2014, each of which included notable flooding from the River Medway. When looking at the River Medway, areas commonly affected by flooding include East Peckham, Beltring, Tonbridge, Aylesford, New Hythe, Leybourne, and Snodland. In 2016, Ightham suffered flooding from the overtopping of the Busty Stream.

Historic records also indicate that Tonbridge and Malling Borough has experienced several surface water / drainage related flood events, which have been attributed to a range of sources.

15.2.2 Fluvial flood risk

The main watercourses flowing through Tonbridge and Malling Borough are the River Medway and its tributaries, which include the Hilden Brook, Hawden Stream, Pen Stream, River Bourne, Coult Stream, Alder Stream and Snodland Mill Stream. The main source of fluvial flood risk is associated with the River Medway, caused by runoff and catchment inflows in the south and estuarine/tidal water levels in the north.

Flood Zone mapping of the fluvial flood risk in the Local Plan area has been prepared as part of the Level 1 SFRA and can be found in Appendix A. Flood zone mapping indicates a high level of fluvial flood risk is situated around the River Medway. The key settlements identified to be at risk from fluvial flooding include Tonbridge, East Peckham, Beltring in the south. Further north, Flood Zone Mapping indicates a high level of fluvial flood most notably around Snodland, East Malling, West Malling, Leybourne, Aylesford, and Lunsford. This therefore reflects where the majority of historic flooding has occurred in Tonbridge and Malling Borough.

15.2.3 Surface water flood risk

Flooding from surface water runoff (or 'pluvial' flooding) is caused by intense short periods of rainfall and usually affects lower lying areas, often where the natural (or artificial) drainage system is unable to cope with the volume of water. Surface water flooding problems are inextricably linked to issues of poor drainage or drainage blockage by debris, and sewer flooding.

The Risk of Flooding from Surface Water dataset shows a number of surface water flow paths which predominantly follow topographical flow paths along existing watercourses or dry valleys with some isolated ponding located in low lying areas. The Tonbridge and

Malling Borough SWMP⁹⁸ identifies that historical records of surface water flooding are dispersed throughout the borough. The primary source of surface water flooding is attributed to heavy rainfall overloading highway carriageways and paved areas, drains and gullies, but other sources of flooding were perceived to be from blockages and high water levels impeding free discharge from surface water drains and gullies.

15.2.4 Groundwater flood risk

The JBA Groundwater Emergence Map identifies that the majority of Tonbridge and Malling Borough is considered to be at 'no risk' or have a 'low likelihood' of groundwater flooding. Susceptibility to groundwater flooding is greatest in the north of the borough, specifically in the areas of Birling, New Hythe, Leybourne, Holborough, and Ightham. The northern most areas of the borough, including to the north of Oldbury and Ightham, Borough Green, to the north of Wrotham Heath, Addington, Ryash, Birling, Ham Hill New Hythe, Leybourne and Lunsford. This groundwater flood potential is consistent with the location of more permeable strata to the north of the borough. Only two groundwater flood events have been recorded across the borough. The causes of these are thought to be related to high water tables and burst underground pipes rather than flooding from hard rock aquifers of superficial deposits.

15.2.5 Sewer flood risk

The Sewer Incident Report Form data supplied by Southern Water indicates a total of 3,070 recorded flood incidents within Tonbridge and Malling Borough. Thames Water has reported no history of hydraulic flooding or cross boundary issues. The more frequently flooded postcodes are ME18, ME19, ME20. ME6, TN11, TN12, TN15, and TN9. However, it is important to recognise that the information does not present whether flooding incidences were caused by general exceedance of the design sewer system, or by operational issues such as blockages.

15.2.6 Flooding from reservoirs

In relation to artificial sources of flooding, there are no records of flooding from reservoirs impacting properties inside the borough. The Environment Agency's Risk of Flooding from Reservoir's flood extent mapping indicates that reservoirs in or outside of the borough could affect properties in the event of a breach. This includes the Leigh Flood Storage Area, located at the south-west extent of the borough, and a breach of which could have notable implications for Tonbridge and the wider borough area.

15.2.7 Flood defences

A high-level review of formal flood defences was carried out using existing information to provide an indication of their condition and standard of protection. Details of the flood defence locations and condition were provided by the Environment Agency for the purpose of preparing this assessment.

Alongside the current flood risk management infrastructure within the borough, the Environment Agency are considering additional flood risk management measures. However, it is uncertain whether and in what form these will proceed at this time. When considering proposed development consideration must be given to the status and timing of FRM measures and schemes to provide evidence on whether a proposed development may benefit from, hinder, adjust or facilitate delivery and implementation.

98 Tonbridge and Malling Stage 1 Surface Water Management Plan: https://www.kent.gov.uk/_data/assets/pdf_file/0016/50038/Tonbridge-and-Malling-Stage-1-SWMP-Report.pdf

15.2.8 Key policies

There are many relevant regional and local key policies which have been considered within the SFRA (Section 2), such as the River Medway and North Kent Rivers Catchment Flood Management Plan, Thames River Basin District Management Plan and Kent Local Flood Risk Management Strategy. Other policy considerations have also been incorporated, such as sustainable development principles, climate change and flood risk management.

16 Recommendations

A review of national and local policies has been conducted against the information collected on flood risk in this SFRA. Following this, several recommendations have been made for Tonbridge and Malling Borough Council to consider as part of Flood Risk Management in the study area.

16.1 Policy recommendations

Tonbridge and Malling Borough Council shall take account of the following recommendations with respect to flood risk management when preparing appropriate policy.

16.1.1 Development and planning considerations

Sequential and Exception tests

A Sequential Test methodology has been prepared in consultation with the Environment Agency, Kent County Council and Tonbridge and Malling Borough Council. The methodology is outlined in Appendix C.

Proposed development sites at locations at risk of flooding will be required to satisfy the Sequential and, where necessary, Exception Tests in accordance with the NPPF. Tonbridge and Malling Borough Council will use the information in this SFRA when deciding which development sites to take forward in the emerging Local Plan.

Site-specific Flood Risk Assessments

Site specific FRAs are required by developers to provide a greater level of detail on flood risk and any protection provided by defences or other assets and, where necessary, demonstrate the development satisfies part b of the Exception Test.

Where required, developers should undertake more detailed hydrological and hydraulic assessments of the watercourses and tidal areas to verify flood extents (including latest climate change allowances) and appropriate modelling or analyses for flooding from other sources. The modelling will inform the level of risk, floodplain and development zoning within the site and provide evidence that the Exception Test is satisfied if required. Where a site-specific FRA has produced modelling outlines which differ from the Environment Agency's Flood Map for Planning a full evidence-based review would be required. Where the watercourses are embanked, the effect of overtopping and breach must be considered and appropriately assessed.

All new development within the 1% AEP fluvial flood extent including an allowance for climate change (for the lifetime of the development) must not normally result in a net loss of flood storage capacity to avoid cumulative effects. Where possible, opportunities should be sought to achieve an increase in the provision of floodplain storage. Where proposed development results in a change in building footprint, the developer should normally ensure that it does not impact upon the ability of the floodplain to store or convey water and seek opportunities to provide floodplain betterment. Similarly, where ground levels are elevated to raise the development out of the floodplain, compensatory floodplain storage within areas that currently lie outside the floodplain should normally be provided so the total volume of the floodplain storage is not reduced. Any flood risk management measures should be consistent with the wider catchment policies set out in the Catchment Flood Management Plan, Flood Risk Management Plan, Local Flood Risk Management Strategy and other relevant strategies.

An updated NPPF was published on February 2025 setting out the Government's planning policies for England and how these are expected to be applied.

There are also several guidance documents which provide information on the requirements for site-specific Flood Risk Assessments:

- **Standing Advice on Flood Risk (Environment Agency)**
- **Flood Risk Assessment for Planning Applications (Environment Agency)**
- **Site-specific Flood Risk Assessment: CHECKLIST (PPG, Defra)**

The **UKCP18** projections replace the UKCP09 projections and is the official source of information on how the climate of the UK may change over the rest of this century. This resulted in the Environment Agency climate change allowances being updated with the latest in May 2022. When undertaking an FRA, reference should be made to the most up to date climate change allowances provided by the Environment Agency.

Developers should consult with Tonbridge and Malling Borough Council, Kent County Council, Upper or Lower Medway Internal Drainage Board, the Environment Agency and Southern Water or Thames Water at an early stage to discuss flood risk including requirements for site-specific FRAs, detailed hydraulic modelling, and drainage assessment and design.

16.1.2 Review of planning applications

The Council should consult the Environment Agency's '**Flood Risk Assessment: Local Planning Authorities**', (last updated 1 February 2022) and any subsequent updates when reviewing planning applications for proposed developments at risk of flooding.

The Council will consult the relevant statutory consultees as part of the planning application process and they may, in some cases, also contact non-statutory consultees (e.g. Southern Water) that have an interest in the planning application. The Council will, when appropriate consult with Lower and Upper Medway Internal Drainage Boards with respect to flood related and water level management aspects. The Internal Drainage Boards can have more detailed local knowledge on the performance and characteristics of particular water features in the authority area.

16.1.3 Infrastructure and safe access

According to the government's guidance on '**Preparing a flood risk assessment: standing advice**', it is recommended that floor levels are set at least 600 millimetres (mm) above the estimated flood level. It may be possible to reduce this to 300mm if there is a high level of certainty about your estimated flood level. If there is a particularly high level of uncertainty it may need to be increased.

Flood water can put pressure on buildings, causing structural issues. If the building design aims to keep out a depth of more than 600mm of water, advice from a structural engineer should be sought.

If the floor levels cannot be raised, extra flood resistance and resilience measures will need to be incorporated into the development. These measures should protect the property to at least 600mm above the estimated flood level.

Development plans also need to show how the development is not flooded by surface water or groundwater.

This could be by:

- diverting water away from buildings but safely managing it within the site
- raising floor levels above the estimated flood depths of surface and groundwater flooding
- use of SuDS

Prior to diverting or protecting property from surface water, the LLFA would expect all efforts to have been made to place property outside of known areas of flood risk in line with the sequential approach.

Where development is located behind, or in an area benefitting from defences, consideration should be given to the potential safety of the development, finished floor levels and for safe access and egress in the event of rapid inundation of water due to a defence breach with little warning.

Resilience measures will be required if buildings are situated in the flood risk area, and opportunities to enhance green infrastructure and reduce flood risk by making space for water should be sought.

16.1.4 Residual risk

Residual risk is the risk that remains after the effect of mitigation measures is taken into account. The residual risk includes the consideration of flood events that exceed the design thresholds of the flood defences or circumstances where there is a failure of the defences, e.g. flood banks collapse. Residual risks should be considered as part of site-specific Flood Risk Assessments.

Further, any developments located within an area protected by flood risk management measures, where the condition of those defences is 'fair' or 'poor', where the standard of protection is not of the required standard or where the failure of the intended level of service gives rise to unsafe conditions should be identified by the developer as part of an FRA.

The risk to development from reservoirs is residual but developers should consider reservoir flooding during the planning stage. They should seek to contact the reservoir owner to obtain information and should apply the sequential approach to locating development within the site. Developers should also consult with relevant authorities regarding emergency plans in case of reservoir breach.

16.1.5 Future flood management

Developments should demonstrate opportunities to create, enhance and link green assets. This can provide multiple benefits across several disciplines including flood risk and biodiversity / ecology and may provide opportunities to use the land for an amenity and recreational purposes. Development that may adversely affect green infrastructure assets should not normally be permitted.

The information provided in the SFRA should be used as a basis for investigating potential strategic flood risk solutions within the study area. Opportunities could consist of the following:

- Catchment and floodplain restoration;
- Buffer strips;
- Flood storage areas;
- Opening up culverts, weir removal, and river restoration;
- The Regional Habitat Creation Programme;
- Green infrastructure; and
- Preserving the function of surface water flood routes where appropriate.
- Water reuse.

For successful future flood risk management, it is recommended that the Council adopts a catchment partnership working approach in tackling flood risk and environmental management.

16.1.6 Surface water management and SuDS

Planners should be aware of the conditions and requirements set by Kent County Council as the Lead Local Flood Authority for surface water management and ensure development

proposals and applications are compliant with the **Kent County Council Drainage and Planning Policy**.

16.2 Technical recommendations

The Environment Agency regularly reviews its flood risk mapping, and it is important that they are approached to determine whether updated (more accurate) information is available prior to commencing a site-specific FRA.

16.2.1 Climate change modelling

This SFRA is based on the best available data at the time of publication. However, please refer to the latest Environment Agency guidance when preparing and FRA.

16.2.2 Updates to SFRA

SFRAs are high level strategic documents and, as such, do not go into detail on an individual site-specific basis. This SFRA has been developed using the best available information, supplied at the time of preparation. This relates both to the current risk of flooding from a range of sources, and the potential impacts of future climate change. Other datasets used to inform this SFRA may also be periodically updated and following the publication of this SFRA, new information on flood risk may be available from Risk Management Authorities. It is recommended that the SFRA is reviewed internally, in line with the Environment Agency'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 for any new information available from RMAs, including the Environment Agency and Tonbridge and Malling Borough Council.

Appendices

- A Flood risk mapping in Tonbridge and Malling Borough**
- B Site screening**
- C Sequential Test Methodology**
- D Southern Water and Thames Water DWMP reviews**
- E CIA Mapping**

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