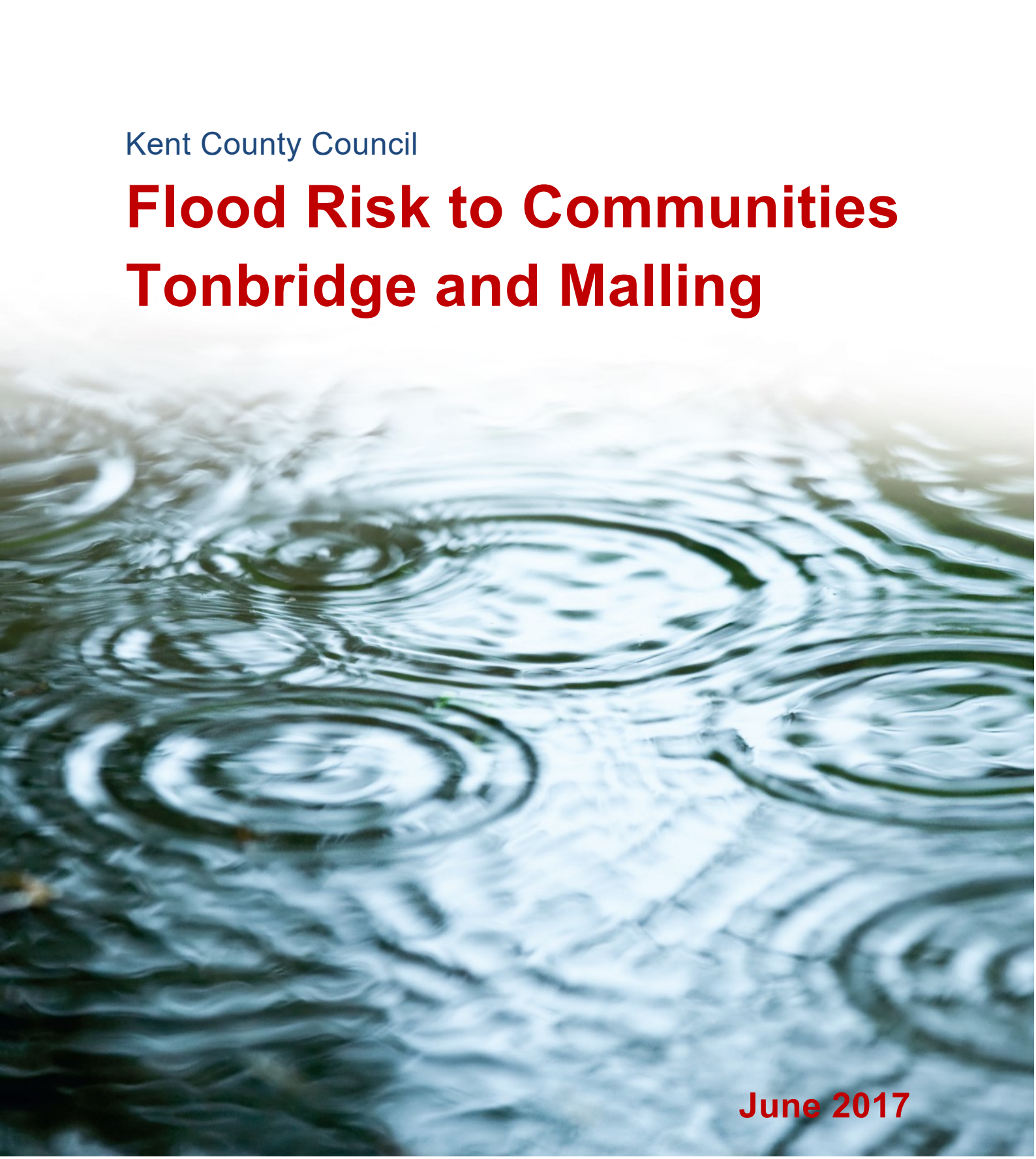
Kent County Council

Flood Risk to Communities
Tonbridge and Malling



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www.kent.gov.uk

In partnership with:

Environment Agency

TONBRIDGE & MALLING BOROUGH COUNCIL

This document has been prepared by Kent County Council, with the assistance of:

- **The Environment Agency**
- **Tonbridge & Malling Borough Council**
- **The Upper & Lower Medway Internal Drainage Boards**
- **Southern Water**

For further information or to provide comments, please contact us at flood@kent.gov.uk

Introduction to Flood Risk to Communities

This document has been prepared for the residents and businesses of the Tonbridge and Malling Borough Council area. It provides information on the nature and magnitude of the flood risk across the district, and outlines the existing and proposed approaches to manage the risk identified.

It has been developed with the help and support of the other Risk Management Authorities (RMAs) that operate in Tonbridge and Malling. These include the Environment Agency, Kent County Council, Tonbridge and Malling Borough Council, Southern Water, and the Upper and Lower Medway Internal Drainage Boards.

This document aims to provide a summary of:

- the main flood risks to the area,
- the key flood risk management assets/structures,
- any flood risk management plans or strategies that are in place and,
- where to find further information.

All links to plans, strategies and other pertinent information have been shortened to facilitate the use of non-electronic versions of this document.

This is a living document and will be periodically reviewed and revised as any relevant new information or plans become available.

Tonbridge and Malling overview

The administrative boundaries of Tonbridge and Malling Borough Council are shown in Figure 1 below.

The district covers an area of 241sqkm. It does not have any coastline, but to the north of the borough and downstream of Maidstone, the River Medway is tidally influenced. In total, 24.4sqkm (10.1 percent) of the district lies within Flood Zone 3 and is considered to be at high risk from flooding from the sea or rivers.

The River Medway and its tributaries are a significant contributory factor to the flood risk throughout Tonbridge and Malling. The River Medway flows from east to west through Tonbridge along the southern part of the borough; it then turns northwest downstream of East Peckham and flows out of the borough. The Medway flows back into the borough again to the north of Maidstone at Aylesford, at which point it becomes tidally influenced. It flows north from here to Wouldham.

Upstream of Tonbridge, the River Eden meets the Medway at Penshurst. This section of the river network typically flows through relatively deep channels cut through the underlying Hastings Beds (comprised of layers of clay, silt, sandstone and sand). The floodplains associated with the river channels in these upper areas are relatively narrow, and generally less than 500m wide.

As it flows through Tonbridge, the Medway is joined by the Hawden Stream and the Hilden Brook.

Below Tonbridge the fluvial floodplain of the River Medway widens and often exceeds 1km in width; this is a result of the widespread presence of heavily eroded and relatively impermeable Weald Clay. Throughout this area the River Medway is joined by numerous other rivers and watercourses, the most significant of which are the River Bourne and the Coult Stream near East Peckham.

In combination with rainfall runoff and groundwater emergence, the various rivers and watercourses throughout the district give rise to differing levels and mechanisms of flood risk. For example, some areas near the tidally influenced Medway will only be at risk from tidal flooding, while other areas upstream of the tidal limit will be predominantly at risk from fluvial, groundwater or surface water flooding. There will be some areas at a combined risk from more than one of the above sources.

Managing the flood risk throughout the district can therefore be a complex and challenging task.

The River Medway and its tributaries throughout the district have been subject to many flood events throughout its history. Although detailed information for many events is hard to come by, notable flood events include:

- 1814 The Little Bridge is swept away during severe flooding following a long frost and a sudden thaw.
- 1816 Severe flooding.
- 1829 Fatal flooding.
- 1836 Largest recorded flooding for ‘many years’.
- 1872 The Little Bridge is swept away by floods again.
- 1879 Severe flooding.
- 1880 Flooding affecting Tonbridge High Street.
- 1881 Tonbridge High Street flooded again.

- 1886 Tonbridge flooded.
- 1891 Water ‘2 feet deep’ on Tonbridge High Street.
- 1894 Flooding experienced following extreme summer thunderstorm (August).
- 1894 Heavy floods on the High Street (November). Stated to be the ‘greatest floods’ ever.
- 1899 Flooding recorded.
- 1900 Heavy flooding following sudden thaw of snow followed by heavy rain.
- 1911 Medway valley seriously flooded.
- 1925 Serious flooding reported.
- 1928 Flooding reported in Tonbridge over Christmas.
- 1947 Worst flooding for 20 years as deep snow thawed and heavy rain fell.
- 1953 Tidal flooding affected tidal water-bodies throughout Kent.
- 1958 Flooding and landslides following heavy thunderstorms.
- 1960 Significant flooding in and around Tonbridge.
- 1965 Tidal flooding affected tidal water-bodies throughout Kent
- 1968 Devastating flooding throughout the entire Medway catchment.
- 1982 Leigh FSA completed in response to 1968 flooding.
- 2000/01 Leigh FSA operated 13 times to prevent flooding to Tonbridge and areas downstream.
- 2013/14 The Environment Agency operated the Leigh FSA to substantially reduce the flows in the River Medway and protect 938 homes. However, the Christmas 2013 flood was bigger than the Leigh FSA was designed to manage and properties flooded.

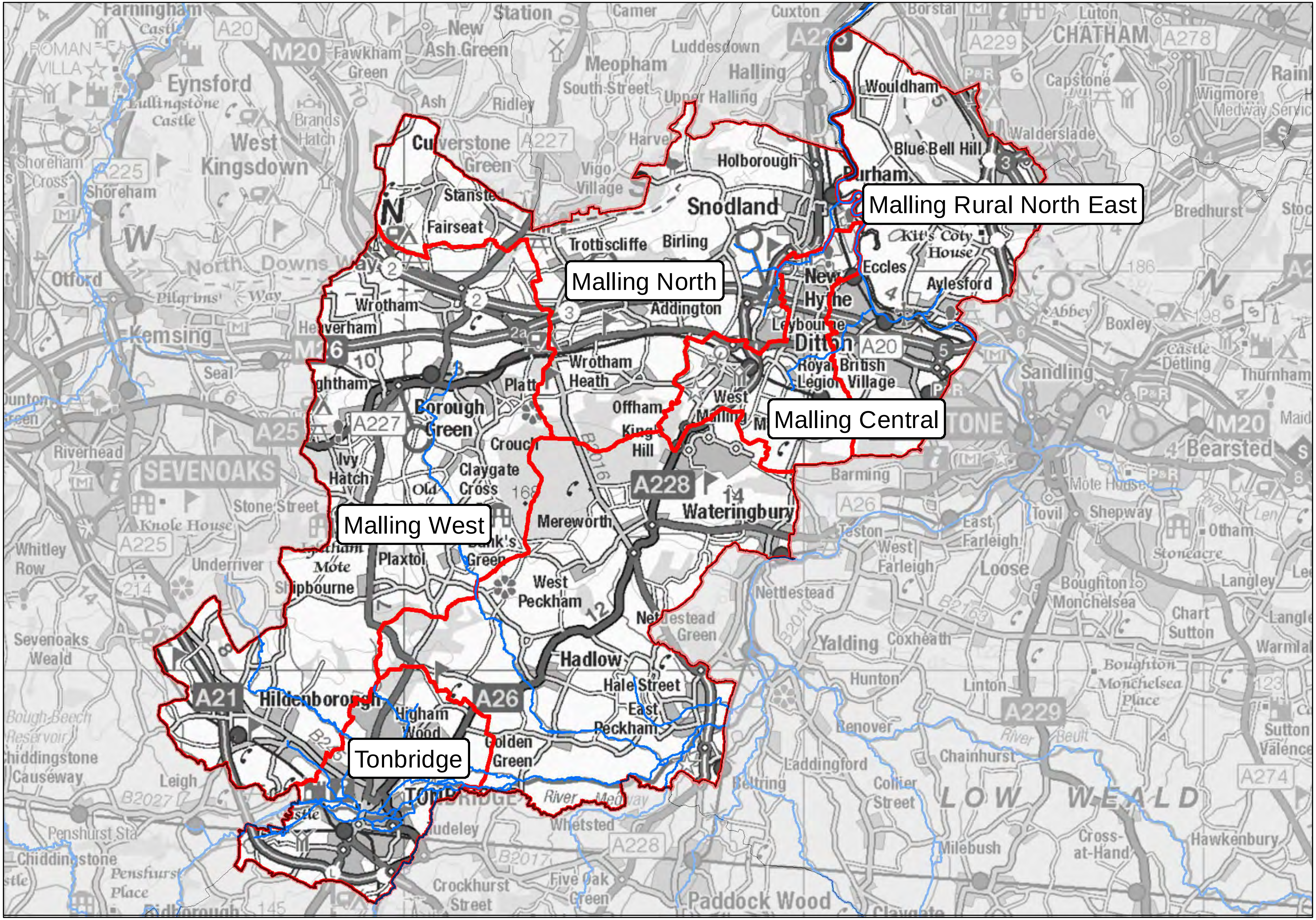
The district is not considered to be particularly susceptible to groundwater flooding, but there have been a few recorded incidents in and around West Malling, East Malling and Hildenborough.

The main rivers in this district are the River Medway, Snodland Millstream, Aylesford Stream, East Malling and Ditton Stream, River Bourne, Coult Stream, Alder Stream, Southbrough Stream, Tonbridge Mill Stream, Pen Stream, Hilden Brook, Botany Stream, Gas Works Stream and the Hawden Stream.

Tidal flooding and any flooding from the district’s main rivers is overseen and managed by the Environment Agency. The Environment Agency is also responsible for defining the extent of the tidal/fluvial flood zones, which are usually derived from detailed computer models.

Flooding from ordinary watercourses, surface water and groundwater across the borough is recorded and overseen by Kent County Council in their role as Lead Local Flood Authority.

Figure 1. Tonbridge and Malling Borough Council


Malling Rural North East
Malling North
Malling Central
Malling West
Tonbridge
Farningham
Eynsford
West Kingsdown
Shoreham
Otford
Kemsing
Seal
Riverhead
SEVENOAKS
Stone Street
Knole House
Underriver
Whitley Row
Sevenoaks Weald
Bough Beech Reservoir
Chiddingstone Causeway
Leigh
Penshurst Sta
Chiddingstone
Penshurst Place
Fawkham Green
New Ash Green
Ash
Culverstone Green
Stansted
Fairseat
Wrotham
Heaverham
Borough Green
Ivy Hatch
Plaxtol
Shipbourne
Hildenborough
Higham Wood
Golden Green
Meopham
South Street
Ridley
Vigo Village
Harvel
Luddesdown
Halling
Upper Halling
Cuxton
Holborough
Snodland
Trottiscliffe
Birling
Addington
Wrotham Heath
Platt
Offham
Kings Hill
West Malling
Crouch
Claygate Cross
Old
Mereworth
West Peckham
Hadlow
Hale Street
East Peckham
Nettlestead Green
Wateringbury
Wouldham
Blue Bell Hill
Burham
Kit's Coty House
Eccles
Aylesford
New Hythe
Leybourne
Ditton
Royal British Legion Village
Borstal
Luton
CHATHAM
Capstone
Walderslade
Wigmore
Medway Services
Bredhurst
Boxley
Detling
Sandling
Thurnham
Bearsted
Barming
Teston
East Farleigh
West Farleigh
Tovil
Shepway
Otham
Loose
Boughton Monchelsea
Langley
Chart Sutton
Coxheath
Yalding
Nettlestead
Hunton
Linton
Boughton Monchelsea Place
Sutton Valence
Laddingford
Beltring
Collier Street
Chainhurst
Milebush
LOW WEALD
Cross-at-Hand
Hawkenbury
Whetsted
Five Oak Green
Paddock Wood
Crockhurst Street
River Medway
River Beult
M20
M26
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Roles and functions in the management of flood risk

This section sets out the roles, responsibilities and functions of the main bodies that have a part to play in managing flood risk. Further information on the nature of these Risk Management Authorities is set out in Section 3.1 and Annex A of Kent County Council's Local Flood Risk Management Strategy.

The Local Flood Risk Management Strategy can be found at http://goo.gl/hpw021

The Environment Agency

The Environment Agency (https://goo.gl/ohv7Jv) is a non-departmental public body, responsible to the Secretary of State for Environment, Food and Rural Affairs.

They are responsible for taking a strategic overview of the management of all sources of flooding and coastal erosion. This includes, for example:

- setting the direction for managing the risks through strategic plans,
- providing evidence and advice to inform Government policy and to support other RMAs,
- working collaboratively to support the development of risk management skills,
- capacity and providing a framework to support local delivery.

The Environment Agency also have operational responsibility for managing the risk of flooding from main rivers, reservoirs, estuaries and the sea (as well as being a coastal erosion risk management authority).

As part of its strategic overview role, the Environment Agency is producing Flood Risk Management Plans with partner Risk Management Authorities (RMAs). Flood Risk Management Plans will highlight the hazards and risks of flooding from rivers, the sea, surface water, groundwater and reservoirs, and will set out how RMAs work together with communities to manage flood risk.

The Environment Agency have also prepared the National Strategy for Flood and Coastal Erosion Risk Management to clarify their role and to outline the principles that guide flood risk management in the UK (please see the following Plans and Strategies section for further information).

Their legal powers relating to FCRM are *permissive* and are largely set out in the Water Resources Act 1991 and the Flood and Water Management Act 2010. The term *permissive* means that they have the power to undertake flood and coastal risk management works but are not legally obliged to undertake such activity. The maintenance of a main river channel and its banks is ultimately the responsibility of the riparian landowner. The Environment Agency has powers of enforcement to ensure that riparian landowners keep any main rivers flowing through their land clear of obstruction.

As with any RMA, when they use their permissive powers they must comply with European legislation (particularly the Habitats and Birds Directives, the Floods Directive and the Water Framework Directive) and any other legal requirements.

They prioritise their investment in flood and coastal risk management works according to Government policy (and in line with Treasury guidance on economic appraisal). They implement Government policy such that public money is:

- spent on the works that provide the greatest benefits to society,
- is spent efficiently and effectively, and
- reflects a partnership approach.

They assess the costs, economic benefits, environmental impact and flood risk to set their spending priorities.

The Environment Agency also have a regulatory role to consent works carried out by others in, under, over or within eight metres of a main river or any associated flood defence (unless a watercourse is tidally influenced, in which case their permission must be sought for all works within 15 metres). The Environment Agency has statutory byelaws specifying the range of operations that are either precluded from occurring, or that require the Environment Agency's formal consent, within this area.

Their formal permission is required to ensure that those works do not adversely affect the operation of the drainage system or cause unnecessary environmental damage.

The local Environment Agency office should be contacted in advance of any planned works taking place. For further information on any of the above, please contact KSLE@environment-agency.gov.uk

Maintenance Protocol (2013)

Maintaining some assets that have been maintained in the past may no longer be economically justifiable or the work may not have a high enough priority for central government FCRM funding over the longer term. In these circumstances, they might decide not to maintain them in the future.

The River Medway and its tributaries are split by communities according to the risk of flooding and its economic impact, these are known as asset systems. Each system has a System Asset Management Plan (SAMP); this is a long-term plan covering a collection of assets. The SAMP includes information on the costs for maintaining and replacing assets over their life as well as details of the economic benefits within the system. The available maintenance budget is then directed to areas with the greatest need

Kent County Council

Kent County Council has two main functions that affect flood risk management. They are both the **Lead Local Flood Authority** and the County's **Highway Authority**.

Additionally, and as with any riparian land owner, they are responsible for any land they own, and should maintain all ordinary watercourses and assets in their ownership.

The functions and associated responsibilities of the Lead Local Flood Authority and the Highway Authority are explained below:

Lead Local Flood Authority

Kent County Council (KCC) was made the Lead Local Flood Authority for Kent by the Flood & Water Management Act 2010; this means Kent County Council has a

strategic overview role for **local** flooding (which is defined as flooding from surface water, groundwater and ordinary watercourses). As part of their role as Lead Local Flood Authority, KCC has produced a Local Flood Risk Management Strategy (please see the following Plans and Strategies section).

Kent County Council also has a duty to:

- Maintain a register and record of structures and features
- Undertake flood investigations
- Regulate proposals which affect ordinary watercourses
- Act as a statutory consultee within the planning process to ensure surface water management and local flood risk are fully considered within development planning.

As Lead Local Flood Authority, Kent County Council are required to oversee the management of local flood risk; this includes the management of risk of flooding from ordinary watercourses. As such, Kent County Council's formal written consent is required prior to undertaking any works which may obstruct the passage of water within an ordinary watercourse. Such works can include culverting, diversion and the construction of new dams/weirs, etc. They have powers of enforcement over any works which have been undertaken without consent and should be contacted in advance of the commencement of any proposed works. They can be contacted at flood@kent.gov.uk.

Highways Authority

Under the Highways Act 1980, Kent County Council has a duty to maintain the highways in Kent (other than those managed by the Highways Agency). One of their responsibilities is to ensure that the highways are appropriately drained.

The Kent County Council Highways and Transportation department maintains the roadside surface water drains (also known as gullies) which allow rain water to run away freely from roads, pavements and cycleways. Table 1 shows the frequency of gully cleansing, according to the type of road.

Table 1. Highways drainage maintenance schedule.

Type of road	Description	Frequency
Flood routes	Roads known to flood frequently	Every 6 months
High speed roads	Roads with a speed limit of 70mph	Every 12 months
Strategic routes	Roads that are the main connection between towns and villages	Every 12 months
Urban and rural routes	All other roads	Targeted maintenance

The map in Appendix 1 shows the major and strategic routes across the Tonbridge and Malling Borough Council area, along with the highways which receive more

frequent maintenance owing to known drainage problems. Any road not depicted in red or green should be assumed to be a normal road that receives targeted maintenance, as required (as outlined in Table 1).

Other forms of drainage (catchpits, soakaways, pipes, highway ditches etc.) are checked and cleaned or repaired when required, or when problems are reported to us.

Highways drainage problems should be reported at http://goo.gl/9qgjEe or by phone on 03000 41 81 81.

Tonbridge and Malling Borough Council

Tonbridge and Malling Borough Council have powers under the Land Drainage Act 1991 to carry out flood risk management work on ordinary watercourses. They also have the responsibilities of a riparian owner for any land they own, and should maintain all ordinary watercourses and assets in their ownership.

They are a key partner in planning local flood risk management works, and have powers to carry out flood risk management works on minor watercourses within their district.

They also work with Kent County Council and the other Risk management Authorities to ensure that the risks to/from any new development are effectively managed through making decisions on planning applications. They are ultimately responsible for ensuring that any new development does not exacerbate the flood risk to the area in which it is proposed.

The Upper and Lower Medway Drainage Boards

The Upper Medway Internal Drainage Board are the operating drainage authority within their designated drainage district. They manage and directly maintain approximately 250km of watercourses in the Upper Medway catchment, 37km of which lie within the Tonbridge and Malling Borough Council area. Approximately 11km of the 196km of watercourses managed and maintained by the Lower Medway Internal Drainage Board lies within the district's boundary.

Internal Drainage Boards use their powers to maintain watercourses within their district for land drainage, flood risk management, environmental protection/enhancement and water level management purposes.

In-channel weed cutting is currently carried out annually on most of the Upper and Lower Medway Internal Drainage Board watercourses within the Tonbridge and Malling Borough Council area. This work is undertaken to maintain the conveyance capacity within the watercourse, to facilitate drainage, to manage local flood risk and to control water levels.

Approximately 10% of the Internal Drainage Board watercourses are de-silted each year (carried out on a 10 year rolling programme). Tree and shrub maintenance is carried out to allow free-flow and to maintain adequate access for routine channel maintenance. In-channel obstructions are cleared prior to and during periods of heavy rainfall (mainly from bridges, culverts and other in-channel structures). Routine activities also include the operation and maintenance of water level control structures (feeds and stopboard weirs).

Although they undertake routine maintenance of adopted ordinary watercourses, pumping stations, and other critical water control infrastructure under permissive powers, the overall responsibility for maintenance still lies with the riparian owner.

They also have a general supervisory duty over all drainage matters within their districts and have consenting and enforcement powers for works carried out by others in or adjacent to ordinary watercourses within their operational district.

This is done by reasonable application of the board's byelaws and the Land Drainage Act 1991 to ensure that any development has regard to secure the efficient working of the drainage system now and in the future and does not cause unnecessary adverse environmental impact as a consequence, including increased risk of flooding.

If you are planning to undertake works on an ordinary watercourse within their district, please phone **01622 693665** or email enquiries@medwayidb.co.uk.

The map at Appendix 2 shows the extent of the IDB areas within Tonbridge and Malling District and shows the watercourses for which they are responsible.

Southern Water

Southern Water are responsible for the maintenance of foul and surface water public sewers. These are usually in roads or public open spaces, but may run through private gardens. They have a right of access to these sewers for maintenance. If they wish to carry out work on sewers on your land they must follow a code of practice; this is available from them upon request.

To report a problem or for general enquiries, please contact them here:

http://goo.gl/FrP68N

Southern Water is a risk management authority and has the following flood risk management functions:

- To respond to flooding incidents involving their assets;
- To maintain a register of properties at risk of flooding due to a hydraulic overload in the sewerage network;
- To undertake capacity improvements to alleviate prioritised sewer flooding problems;
- To provide, maintain and operate systems of public sewers and works for the purpose of effectually draining their operative area;
- To co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions;
- To have a regard to national and local flood and coastal erosion risk management strategies.

Parish councils

Parish councils are involved in managing local issues, and the management of local flooding may be one of the problems they help coordinate. They can also be a source of local information about flood risk and are likely to know which areas are prone to flooding (particularly from local flooding incidents). They may have records of flooding, which may not be recorded by other authorities.

Parish Councils are involved in responding to emergencies and have a consultation role in local planning applications, and can influence how local developments are delivered.

They are also working with the RMAs to prepare Parish Emergency Plans and train Community Flood Wardens. These wardens will act as a link between the Environment Agency and the communities at risk; they will disseminate information to local residents, and will assist with the preparation for flooding and management of incidents when they occur.

Land owners

If you own land or property next to a river, stream or ditch you are a riparian owner. Under common law, riparian owners possess rights and responsibilities pertaining to any stretch of watercourse which falls within or follows the boundaries of their property. It is normally presumed that a riparian owner owns land up to the centre line of a non-tidal watercourse, where the watercourse itself forms a boundary (even if this is not denoted on the Land Registry plan for the property).

Riparian owners have a duty of care towards their neighbours upstream and downstream. This means they must avoid any action likely to cause flooding of their neighbour's land or property; they are therefore responsible for accepting water from the section of watercourse owned by their upstream neighbour and then transferring this, together with drainage from their own property, to their neighbour immediately downstream.

The ultimate responsibility for the maintenance of a watercourse and its banks always lies with the riparian owner, regardless of whether such works have been carried out by any other Authority at its own expense in the past. Such maintenance works can include clearing obstructions, repairing the banks, and the management of vegetation or trees.

It is important that riparian owners preserve access to the banks of rivers and streams for maintenance and safety purposes. Access to the watercourse should therefore be considered when erecting any fencing, and undergrowth and vegetation on and around the banks should be appropriately controlled.

Further information on riparian rights and responsibilities can be found in the Environment Agency's document 'Living on the Edge'.

If you are a riparian owner and planning works on a watercourse (or in the vicinity of flood defences) you must contact the relevant authority to discuss whether you need formal consent for your works. This is to ensure that you do not increase flood risk or damage watercourses and flood defences. The relevant consenting authority has powers to remove works that are not consented.

If you are not sure whose consent you may require, please contact the Kent County Council Flood Risk team at flood@kent.gov.uk, or phone 03000 414141.

It should be noted that the abstraction of water from (and the discharge of water to) any watercourse is also regulated by the Environment Agency. They should be contacted prior to the commencement of any such activity.

Flood and Coastal Risk Management investment

The government provides an annual grant to invest in flood defence works; this is known as Flood Defence Grant in Aid. The government offers funding to projects based on the outcomes they will deliver. Whilst the number of homes protected from flooding is the primary consideration, the amount of habitat created and other economic benefits are also taken into account. Any risk management authority can apply for funds from this source.

Flood defence schemes which provide a significant reduction in risk to a large number of properties may occasionally be funded in their entirety by FDGIA; however, smaller schemes which provide a smaller benefit will usually require additional contributions from elsewhere to proceed.

Any other body, organisation or person may make a contribution to meet the shortfall. This process has been established by the government to encourage the communities that benefit from these schemes to invest directly in them. This is known as partnership funding.

Each year risk management authorities from each region are invited to submit details of any proposed flood or coastal erosion management works which will require funding over the next six years. The proposals are captured in a report known as the Medium Term Plan (MTP) by the Environment Agency. Each regional MTP is combined into one national plan to give an indication of investment needs across the entire country.

Projects on the MTP are ranked according to the benefits provided divided by the remaining cost (once partnership funding contribution have been taken into account). The highest ranked schemes receive the greatest proportion of government allocation. The lower ranked schemes typically require a greater contribution from other concerned parties.

Figure 2. shows how this mechanism of flood defence funding differs from how flood defence investment was allocated in the past.

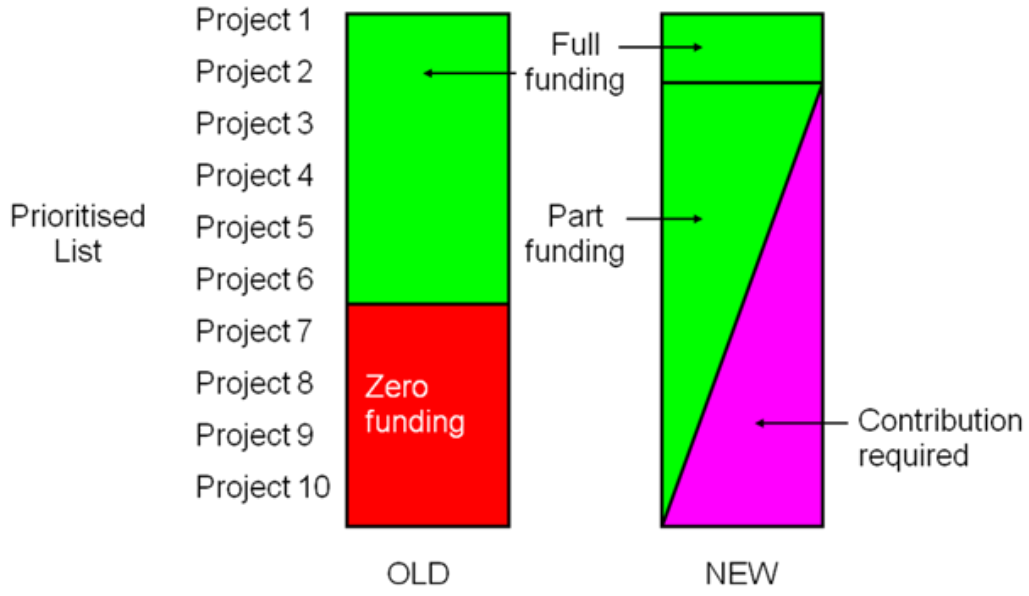


Figure 2. Flood defence investment.

Flood risk management plans and strategies

There are a number of flood risk management plans and strategies that affect how flood risk in Tonbridge and Malling is managed. More detailed information about flood risk management in the district can be found in these documents.

This section aims to give you an overview of the most important of these documents and tells you where to find them.

National Flood and Coastal Erosion Risk Management Strategy

The National Flood and Coastal Erosion Risk Management Strategy provides a national framework for managing the risk of flooding and coastal erosion in England.

It has been prepared by the Environment Agency with input from Defra, and sets out the objectives and six guiding principles on how flood risk management should be delivered by all risk management authorities in England

The National Strategy can be found here:

http://goo.gl/27nZp0

Flood Risk Management Plans

By law the Environment Agency and Natural Resources Wales must produce flood risk management plans (FRMPs) for each River Basin District. These FRMPs must cover flooding from main rivers, the sea and reservoirs.

Lead Local Flood Authorities must also produce FRMPs for all Flood Risk Areas covering flooding from local sources (surface water, ordinary watercourses and groundwater). LLFAs may either prepare a separate FRMP or contribute to a joint partnership FRMP for the River Basin District.

Kent County Council do not have any Flood Risk Areas under their jurisdiction, but they may contribute to a joint partnership FRMP. Other RMAs can also contribute to developing the joint partnership FRMP for the River Basin District. Such contributions are carried out on a voluntary basis and will result in better co-ordinated flood management.

The preferred approach to completing a FRMP

The preferred approach to FRMPs is for Environment Agency and Natural Resources Wales to prepare joint FRMPs in partnership with others, in particular LLFAs and other RMAs. Information about all sources of flood risk is combined to form a single FRMP. This approach co-ordinates flood risk management planning with river basin management planning under the Water Framework Directive, in particular the statutory consultation on proposed updates of River Basin Management Plans (RBMPs) and draft FRMPs.

LLFAs preparing separate FRMPs must co-ordinate the activities of interested parties with those developing RBMPs in England and Wales.

What FRMPs contain

Flood Risk Management Plans must include:

- a map showing the boundaries of the Flood Risk Area
- the conclusions drawn from the flood hazard and risk maps
- objectives for the purpose of managing the flood risk
- proposed measures for achieving those objectives
- a description of the proposed timing and manner of implementing the measures including details of who is responsible for implementation
- a description of the way implementation of the measures will be monitored
- a report of the consultation
- where appropriate, information about how the implementation of measures under the FRMP and RBMP area will be co-ordinated

'Flood Risk Management Plans (FRMPs): how to prepare them' provides more guidance for RMAs.

https://goo.gl/LzkfUM

Local Flood Risk Management Strategy

Kent County Council's Local Flood Risk Management Strategy (the Local Strategy) sets out a countywide strategy for managing the risks of local flooding; this is defined as flooding from surface water, groundwater and ordinary watercourses. The Local Strategy is prepared by Kent County Council to fulfil part of their role as Lead Local Flood Authority. The aims of the local strategy are:

- To coordinate the work of the management authorities to improve the understanding of these risks
- To ensure that the RMAs work together to aim to provide effective solutions to problems
- To improve the public's understanding of the risks in Kent and how everyone can play a part in reducing them.

Part of the Local Strategy sets out how KCC prioritises the management of local flooding in the county. The county is divided into areas with similar local flooding issues. These areas are given a policy for the management of this risk according to its complexity. The local flood risk management policies are shown on the map in Appendix 3, although it should be noted that the entire district is covered by a single policy (Policy 3).

Policy 3 is applied to areas where local flooding risks are currently not significant. That does not mean that these areas are not at risk of local flooding, but the risks can be managed by each risk management authority undertaking its duties effectively.

The Local Strategy can be found here:

http://goo.gl/hpw021

Catchment Flood Management Plans

Catchment Flood Management Plans (CFMPs) are produced by the Environment Agency; they set policies for how inland flood risk should be managed within the

catchment (coastal flooding is considered in Shoreline Management Plans, see below). Catchment Flood Management Plans pre-date the Flood and Water Management Act and were not prepared with the input of the Lead Local Flood Authorities (or with the additional data that is now available about local flooding).

Catchment flood management plans (CFMPs) consider all types of inland flooding, from rivers, groundwater, surface water and tidal flooding. Shoreline management plans consider flooding from the sea.

CFMPs also include:

- the likely impacts of climate change
- the effects of how we use and manage the land
- how areas could be developed to meet our present day needs without compromising the ability of future generations to meet their own needs

CFMPs help the Environment Agency and their partners to plan and agree the most effective way to manage flood risk in the future.

Tonbridge and Malling is in the River Medway Catchment Flood Management Plan. The policies, along with an explanation of what each of the 6 policies mean, are shown on the map in Appendix 4.

The River Medway Catchment Flood Management Plan can be found here:

http://goo.gl/S6KHXF

Shoreline Management Plans

Shoreline Management Plans (SMPs) set policies for the management coastal flooding and erosion risk for sections of the coastline. They are developed by Coastal Groups, which are groups of appropriate risk management authorities that coordinate coastal works regionally. Shoreline Management Plans identify the most sustainable approach to managing the coastal flood and erosion risks to the coastline for three epochs:

- short-term (0 to 20 years)
- medium term (20 to 50 years)
- long term (50 to 100 years)

The tidal Medway that lies within Tonbridge and Malling's boundary is covered by the Medway Estuary and Swale Shoreline Management Plan. This can be found here:

Shoreline Management Plans

Surface Water Management Plans

Surface Water Management Plans (SWMPs) are prepared by Kent County Council in partnership with the other Risk Management Authorities. They provide an overview of local flood risk for the study area and usually cover the risks from various and combined sources of flooding (despite their name).

Surface water management plans can vary in scope and detail. Some provide an overview of historic flooding and a general review of existing information. Other surface water management plans will use complex rainfall modelling to determine the flood risk from a range of storm with different durations and intensities in order to

quantify the risks (usually in high risk areas). These plans identify the areas of significant local flood risk and seek to identify options to address the identified risks.

There are two surface water management plans that cover the Tonbridge and Malling area. Combined, they provide an overview of the historic local flood risk in whole district and identify areas where further investigation may be required and outlines the actions that could be taken to reduce the flood risk.

The Maidstone and Malling Surface Water Management Plan, which covers the north east of the borough, can be found at:

Maidstone and Malling surface water management plan

The rest of the district, including the town of Tonbridge, is covered by the Tonbridge and Malling Stage 1 Surface Water Management Plan. This document can be found here:

Tonbridge and Malling surface water management plan

Strategic Flood Risk Assessment (SFRA)

Strategic Flood Risk Assessments (SFRAs) are prepared by Local Authorities and are primarily used to influence local planning policy decisions to ensure future development in the borough are appropriately located and sustainably constructed with respect to drainage and flood risk. They provide a general assessment of the flood risk from all sources across a borough (tidal, fluvial, surface water, groundwater, impounded water bodies and sewers) and should take full account of the likely impact of predicted climate change.

Tonbridge and Malling's Strategic Flood Risk Assessment is available here:

Strategic flood risk assessment

River Basin Management Plan

River Basin Management Plans are a requirement of the Water Framework Directive; they provide an overview of how water framework directive objectives (achieving the protection, improvement and sustainable use of the water environment) will be met for the water bodies in the river basin that the plan covers. They are not flood risk management documents, but they can influence how rivers and other water bodies are managed.

Tonbridge and Malling falls within the area covered by the Thames River Basin Management Plan, which can be found here:

http://goo.gl/6aUiTb

Middle Medway Strategy

The main flood risk to the Middle Medway area is posed by the River Medway itself, particularly at its confluence with the Rivers Beult and Teise. The flooding mechanisms are complex and interdependent as a result of the flat topography at the confluence and the associated backwater effect of these rivers under spate conditions. In order to appraise options for flood risk management, a strategic

approach has been necessary to take account of environmental impacts and the interconnected benefit areas.

The Middle Medway Strategy investigates flood risk management options for the Middle Medway catchment through modelling, economic assessment and strategic environmental assessment. The strategy is intended to guide those involved in flood defence planning and management. It presents a business case to justify future works and investment in flood risk management. The strategy follows the recommendations of the Medway Catchment Flood Management Plan and is available on request from the Environment Agency.

Medway Flood Partnership

The Medway Flood Partnership was established in January 2017 and is bringing together local partners, national agencies, non-governmental organisations and community representatives to develop and deliver a Medway Flood Action Plan. Support for the partnership was announced in Parliament by the Defra Minister Dr Thérèse Coffey MP, on 22 November 2016.

The partnership will focus on immediate collaborative actions and long term strategies to reduce the risk of flooding from non-tidal rivers and surface water in the Medway catchment, which includes all the land draining into the rivers Medway, Beult, Teise and Eden as well as their tributaries.

For further information about the Medway Flood Partnership, please contact: KSLE@environment-agency.gov.uk

Southeast Rivers Trust

In partnership with the Environment Agency and Kent County Council is undertaking Natural Flood Management modelling and implementing Natural Flood Management measures in the Medway Catchment, as part of a Defra funded project to explore the opportunities for Natural Flood Management.

Sources of flooding

Flooding sources

Groundwater

Occurs when water stored in the ground rises to the surface. This is most likely in areas with porous underlying rocks (like chalk).

Risk Management Authority
- KCC As the Lead Local Flood Authority.

Reservoirs

Reservoir flooding is extremely unlikely to occur. When the amount of water entering the reservoir is greater than the amount the reservoir is designed to discharge, floodwaters may overtop the crest of the reservoir and flow downstream (some reservoirs are designed to manage excess flows in this way). Occasionally, where a reservoir has been poorly designed, the structure can fail, releasing water.

Risk Management Authority
- EA - regulator.
- Reservoir owner - managing on-site risks.
- KCC/KRT - off-site emergency plan.

Surface water

Occurs when the rate of rainfall is higher than the rate at which water can drain into the ground or enter a drainage system, creating runoff, running down hill and pooling in low points.

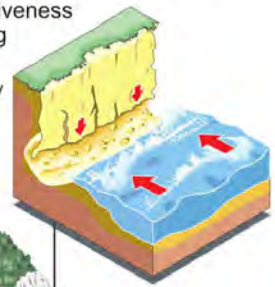
Risk Management Authority
- KCC as the Lead Local Flood Authority and Highway Authority.

Authorities responsible
- KCC: Kent County Council
- EA: Environment Agency
- SW: Southern Water
- TW: Thames Water
- IDB: Internal Drainage Boards
  - o Lower Medway Internal Drainage Board
  - o Upper Medway Internal Drainage Board
  - o Romney Marshes Area Internal Drainage Board
  - o River Stour (Kent) Internal Drainage Board
  - o North Kent Marshes Internal Drainage Board
- DB: District and Borough Councils
- KRT: Kent Resilience Team
- RO: Reservoir Operators

Coastal Erosion

Occurs when the coastline is eroded by the action of the sea, leading to loss of land. Whilst coast protection works are not the same as coastal flood defences, they can contribute to the effectiveness of flood defences along a shoreline.

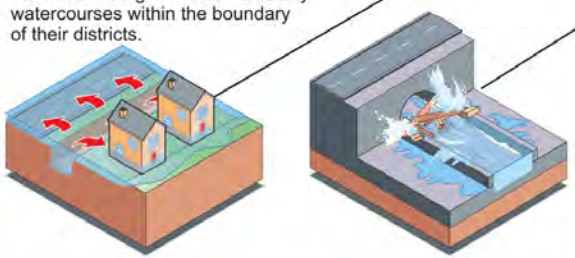
Risk Management Authority
- DB



Main river and ordinary watercourses

Occurs when the water flowing in a watercourse (which may be in a culvert), exceeds the capacity of the channel and goes over its banks. The capacity of the watercourse maybe reduced by blockages and debris in the channel. There are two categories of watercourse: main rivers (those which present the greatest risk to life and property), and ordinary watercourses, which cover all other watercourses, including streams, drains and ditches.

Risk Management Authority
- EA - main rivers.
- KCC - ordinary watercourses, outside the boundaries of Internal Drainage Districts.
- Internal Drainage Boards – ordinary watercourses within the boundary of their districts.



Sewer flooding (including foul sewers)

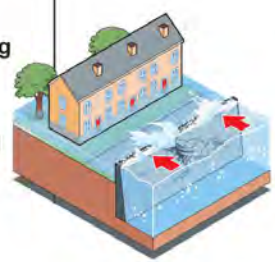
May occur when the sewerage system fails due to blockages or it is overwhelmed by surface water.

Risk Management Authority
- SW and TW for public sewers
- Sewer owner for a private system.

Coastal Flooding

Occurs when the coastline and/or coastal flood defences are either overwhelmed or breached by high tides or a storm surge.

Risk Management Authority
- EA



Understanding flood risk

There are a number of maps available that show the risk of flooding to areas from various sources. This section explains what the easily available maps are and what form of flooding they show.

Flood risk mapping

Not all flood risk is nationally modelled and mapped. For instance, the flood risk arising from ordinary watercourses has not been specifically investigated and depicted on a national scale. It is also important to note that many types of flood map only include one type of flood risk. For example, a flood map of the River Medway in Tonbridge would not include the potential for sewer flooding that might occur at the same time (although this does not mean to say that Tonbridge is necessarily at risk from this combination of flooding).

Combining the different types of flooding into one model (and one map) is very difficult. The mechanisms involved in combining the different types of flooding are extremely complex and the scales are different, consequently it is not easily computable in one model. However, in some areas where a significant risk from combined sources of flooding has been identified, KCC has investigated flooding collectively and produced mapping to depict this within their Surface Water Management Plans. Unfortunately it is not yet possible to produce a map to show this risk for the whole county.

How flood risk is expressed

The terms Annual Exceedance Probability (AEP) and Return Period are common ways to describe the likelihood of a flood of a certain magnitude happening in any given year.

An AEP is the *probability* of a certain size of flood occurring in any one year. For example, a 1% AEP flood event has a 1% (or 1 in 100) chance of occurring in any one year.

A Return Period is a way of expressing how often a flood of a given magnitude might reoccur over a long period of time. For example, a flood described as having a 1 in 100 year return period is likely to occur, on average, ten times every 1000 years (or once every 100 years).

A 1 in 100 year Return Period flood and 1% AEP flood event are different terms to describe the same event.

It is important to note that while a 1% AEP flood may occur once every 100 years on average, the probability of a flood of that size occurring in any particular year does not change. If a 1% AEP flood was recorded this year, the probability of another flood of that magnitude being recorded in the following year (or any other subsequent year) would still be 1%. Accordingly, it is statistically possible to have several 1% AEP floods over a period of 100 years. Similarly, it is equally statistically possible have a period of 100 years without a single 1% AEP flood being recorded.

Table 2 shows AEP and their equivalent Return Periods for some commonly used storm frequencies.

Table 2. Annual Exceedance Probabilities and their equivalent Return Periods.

AEP (%)	Equivalent return period (yrs)	Magnitude
0.1	1000	Less frequent/more extreme events.
1	100	
1.33	75	
2	50	
3.33	30	
5	20	
10	10	
20	5	
50	2	
100	1	More frequent/less extreme events.

Flood Map for Planning

The Flood Map for Planning is the Environment Agency's original format for flood mapping and depicts the three flood zones used to define areas of risk of flooding from rivers and the sea. It is important to note that these maps show the predicted extent of flooding **if there were no defences or buildings present** to affect the flow of water into and through the natural floodplain.

The three flood zones are:

Flood Zone 3

Flood Zone 3 is the area deemed to be at the highest risk from flooding; it is sub-divided into two categories:

Flood Zone 3a - In the absence of defences, this is an area that would be considered to be at risk from:

- the sea during a flood event that has an AEP of 0.5% (i.e. a Return Period of 200 years)
- a river during a flood event that has an AEP of 1% (i.e. a Return Period of 100 years)

Flood Zone 3b – This zone is also known as the functional floodplain. The functional floodplain is defined as the area that would be susceptible to flooding from rivers or the sea during any event up to and including the 5% AEP event (i.e. the 1 in 20yr event, or more frequently). Unlike the other Flood Zones, Flood Zone 3b takes full account of any defences which may offer protection to the area. **The functional floodplain is the area that would flood despite the presence of defences.**

Flood Zone 2 - This shows the additional extent of an extreme flood from rivers or the sea. In the absence of defences, these outlying areas would be affected by an extreme flood, with an AEP of up to 0.1% (i.e. an area at risk from flooding from an event with a 1000 year Return Period). This is also known as the Extreme Flood Outline.

Flood Zone 1 – This shows all areas not covered by the other two flood zones, it is an area considered to be a negligible risk of flooding from rivers or the sea. However, areas in this flood zone may still be at risk from other forms of flooding.

The primary use of this map is for planning purposes to ensure that new developments can take account of the risk of flooding as they are being planned. It is important to understand that there remains a flood risk, even if there are defences that protect the area from flooding. Flood defences can only reduce the risk from flooding. No matter how well constructed a flood defence may be, there will always be a risk of its overtopping or failure. This residual risk must be taken into account when considering new development to ensure it is appropriately constructed, and to ensure the users, inhabitants or emergency services are not placed in unnecessary danger in the unlikely event of flooding.

The Flood Map for Planning is available on the Environment Agency's website:

http://goo.gl/8YyW8k

National Flood Risk Assessment

The Environment Agency's National Flood Risk Assessment (NaFRA) mapping provides an assessment of the likelihood of flooding from rivers and the sea during an extreme 0.1% AEP event. Unlike the Flood Map for Planning (as described above), the NaFRA mapping **takes full account of the flood defences protecting an area**. It considers the likelihood of the defences being breached or overtopped during a flood event. This likelihood depends on the type of defence, its location, its condition and the designed standard of protection.

The mapped flood risk is presented as a grid of 50m² squares. The likelihood of flooding is determined for each 50m² square within the entire area of the Extreme Flood Outline (i.e. Flood Zone 2).

Each 50m² area within the Extreme Flood Outline is then assigned one of four categories:

- High – At risk from an event with an AEP of 3.3% or greater (i.e. at risk from floods with a Return Period of 30 years, or more frequently)
- Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1% (i.e. at risk from flooding events with a Return Period of between 30 years and 100 years)
- Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1% (i.e. at risk from flooding events with a Return Period of between 100 years and 1000 years)
- Very Low – At risk from events with an AEP of less than 0.1% (i.e. at risk from floods with a Return Period of 1000 years or greater).

The NaFRA mapping is generally considered to present a more accurate representation of the flood risk to an area than the Flood Map for Planning provides owing to its incorporation of existing flood defences.

Properties at risk

In the Tonbridge and Malling district, there is a total of 5171 dwellings in areas considered to be at risk from tidal or fluvial flooding (this figure is taken from the

Environment Agency's NaFRA mapping, which takes the presence of flood defences into account); 2784 of these are at a medium-high risk of flooding.

Table 3 (below) outlines the level of this risk within each parish

Table 3. Dwellings at tidal/fluvial flood risk within the parishes of Tonbridge and Malling.

Parish	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Addington	0	1
Aylesford	488	579
Birling	6	8
Borough Green	102	117
Burham	0	0
Ditton	182	203
East Malling and Larkfield	547	1006
East Peckham	612	827
Hadlow	73	80
Hildenborough	103	800
Ightham	49	53
Kings Hill	0	0
Leybourne	14	20
Mereworth	0	0
Offham	0	0
Platt	9	30
Plaxtol	11	11
Ryarsh	10	10
Shipbourne	4	5
Snodland	3	34
Stansted	0	0
Tonbridge	475	1206
Trottiscliffe	0	0
Wateringbury	12	34
West Malling	34	34
West Peckham	4	7
Wouldham	46	106

Surface Water Mapping

The Environment Agency's surface water flood mapping gives a broad indication of the areas likely to be at risk from surface water flooding. These are areas where surface water would be expected to flow or pond if the capacity of the drainage networks and ground were exceeded.

The Flood and Water Management Act 2010 defines surface runoff, and the type of flooding shown by the updated Flood Map for Surface Water fits with the definition given within the Act. It shows the extent of flooding that could occur from any form of precipitation (including melted snow), which:

- is on the surface of the ground (whether or not it is moving), and
- has not yet entered a watercourse, drainage system or public sewer.

In 2013, the Environment Agency produced the updated Flood Map for Surface Water (uFMfSW). The aim of the uFMfSW is to provide the best single source of information on surface water flooding for England and Wales which includes local information and knowledge. It is a separate, single, mapping product that draws together:

- the Environment Agency's national scale surface water flood mapping,
- appropriate locally produced mapping from LLFAs.

The uFMfSW should not be used to identify the flood risk to individual properties, and should only serve to give a more general indication of an area's susceptibility to surface water flooding.

Planning and Flood Risk

The National Planning Policy Framework sets strict tests to protect people and property from flooding which all local planning authorities are expected to follow. Where these tests are not met, national policy is clear that new development should not be allowed. The main steps to be followed are set out below; these are designed to ensure that the most vulnerable forms of development are located in the areas least susceptible to flooding. Where, exceptionally, development in flood risk areas is considered unavoidable, it must be demonstrated that the proposals are 'safe'.

Assess flood risk

Local planning authorities should undertake a Strategic Flood Risk Assessment to fully understand the flood risk in the area to inform Local Plan preparation.

In areas at risk of flooding (FZs 2 or 3) or for sites of 1 hectare or more, developers should undertake a site-specific flood risk assessment to accompany applications for planning permission (or prior approval for certain types of permitted development).

Avoid flood risk

In plan-making, local planning authorities apply a sequential approach to site selection so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future uses to flood risk. In plan-making this involves applying the 'Sequential Test' to Local Plans and, if needed, the 'Exception Test' to Local Plans.

In decision-taking local planning authorities also apply the 'sequential approach'. In decision-taking this involves applying the Sequential Test for specific development proposals and, if needed, the Exception Test for specific development proposals, to steer development to areas with the lowest probability of flooding.

Further information on the Sequential Test is available here:

http://goo.gl/KMj5Io

Further information on the Exception Test is available here:

http://goo.gl/HEcd9F

Manage and Mitigate flood risk

Where development needs to be in locations where there is a risk of flooding as alternative sites are not available, local planning authorities and developers should ensure development is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk overall.

Local planning authorities and developers should seek flood risk management opportunities (e.g. safeguarding land), and reduce the causes and impacts of flooding (e.g. through the use of sustainable drainage systems in developments).

The requirements to consult the Environment Agency on applications where there is a risk of flooding are available here:

http://goo.gl/YNGxPs

Planning and Sustainable Drainage (SuDS)

Planning authorities must take flood risk from all sources into consideration when they are preparing their local development plans or during their determination of planning applications. This requirement is clearly laid out in Section 10 of the National Planning Policy Framework (NPPF) and within its associated Planning Practice Guidance.

Permission for new development or redevelopment of sites in areas at risk from flooding will not necessarily be withheld, but the planning authorities have a duty to ensure flooding is materially taken into account within any development proposal. Applications are likely to be refused if it cannot be demonstrated that the identified risks can be appropriately managed.

Sustainable drainage systems (SuDS) are an important flood risk management measure to consider when advancing development plans; they aim to manage surface water runoff from developments in a natural way by replicating natural processes and should be considered from the outset and included wherever possible.

Since 15 April 2015, the provision of sustainable drainage within new development has been a material consideration in the planning process. There is an associated requirement for Kent County Council to be consulted by each of the county's twelve Local Planning Authorities whenever they receive an application for major development within their districts.

They will also be consulted on applications for minor development in areas where there are known drainage problems.

Kent County Council's statutory consultee role

Kent County Council are required to provide technical advice and guidance on the surface water drainage strategies, designs and maintenance arrangements put forward by developers for any new major development (as per the definition provided below). Existing planning policies, National Planning Practice Guidance, and the recently published national '*non-statutory technical standards for the design, maintenance, and operation of SUDS*' will provide the guidance upon which their consultation responses will be based.

As statutory consultees, KCC will be seeking to assist the delivery of requirements of the Government's National Planning Policy Framework (NPPF). This framework promotes sustainable development and makes specific recommendations for the incorporation of SuDS into new development.

This role fits with their existing role of Lead Local Flood Authority (LLFA) for the county, in which they develop a strategies to manage local flooding (flooding from surface water, groundwater and ordinary watercourses).

Major development

Major development is defined in planning as any development involving any one or more of the following:

a) the winning and working of minerals or the use of land for mineral-working deposits;
b) waste development;
c) the provision of dwellinghouses where -
    i. the number of dwellinghouses to be provided is ten or more; or
    ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph (c)(i);
d) the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
e) development carried out on a site having an area of one hectare or more.

(The Town and Country Planning (Development Management Procedure) (England) Order 2010).

Sustainable Drainage Systems

Kent County Council encourages the use of Sustainable Drainage Systems (SuDS) to manage surface water in a sustainable way in all development. For all new major development it should be demonstrated that:

- an appropriate SuDS system will be incorporated (unless it is clearly demonstrated and agreed that they would inappropriate),
- the minimum standards of operation proposed by the applicant are appropriate,
- that there are clear arrangements in place for the ongoing maintenance of any SuDS scheme over the lifetime of the associated development (through the use of planning conditions or planning obligations, where appropriate).

Further information:

The National Planning Policy Framework can be found at:

http://goo.gl/KlbX9p

The Government's Planning Practice Guidance can be found at:

http://goo.gl/K5i5gz

The associated NPPF guidance related to surface water management can be found at:

http://goo.gl/W4ePfy

The non-statutory technical standards for the design, maintenance, and operation of SUDS can be found at:

http://goo.gl/5pcA7f

Emergency Planning

Planning for and managing flooding emergencies

Severe weather and any associated flooding can lead to an emergency being declared. It is important that plans are maintained to outline the actions that should be taken to both reduce the likelihood of an emergency occurring, and to reduce its impact far as possible if an emergency does occur. Regular training and exercising supports this planning.

The Civil Contingencies Act 2004 designates response agencies as either Category 1 or 2 responders, and sets out their roles and responsibilities. Category 1 responders are known as 'core responders', and they include the emergency services and local authorities. Category 2 responders are 'key co-operating responders' acting in support of Category 1 responders; they include utility companies and transport organisations.

There are a number of bodies responsible for planning for and responding to a flood emergency, their roles and responsibilities are summarised below:

Category 1 Responders

Kent County Council

- Coordinate emergency support within their own functions.
- Establish multi-agency command and control systems (County Emergency Centre).
- Coordinate emergency support from the voluntary sector.
- Mobilise and chair Severe Weather Advisory Group.
- Mobilise military aid to the civil community.
- Liaise with central and regional government departments.
- Liaise with essential service providers.
- Open and support survivor reception and rest centres.
- Manage the local transport and traffic networks.
- Mobilise social care interventions.
- Provide emergency assistance.
- Coordinate the recovery process.
- Provide advice and management of public health.
- Assist with business continuity.

Tonbridge and Malling Borough Council

- Assist with emergencies on ‘non main rivers'.
- Establish multi-agency command and control systems (District Emergency Centre).
- Liaise with central and regional government departments.
- Co-ordinate the response to any homelessness issues which may arise.
- Assist with environmental health issues, such as contamination and pollution.
- Coordinate emergency support within their own functions.

Kent Police

- Save life.
- Establish multi-agency command and control systems.
- Coordination and communication between emergency services and organisations providing support.
- Coordinate the preparation and dissemination of public warning and informing.
- Establish and maintain a Casualty Bureau.

Kent Fire and Rescue Service

- Save life rescuing people and animals.
- Carry out other specialist work, including flood rescue services.
- Where appropriate, assist people where the use of fire service personnel and equipment is relevant.

South East Coast Ambulance Service

- Save life.
- Provide treatment, stabilisation and care at the scene.

Environment Agency

- Issue Flood Alerts and Warnings and ensure systems display current flooding information.
- Provide information to the public on what they can do before, during and after a flood event.
- Work with professional partners and stakeholders and respond to requests for flooding information and updates.
- Mobilise and chair Severe Weather Advisory Group.
- Receive and record details of flooding and related information.
- Operate water level control structures within its jurisdiction and in line with permissive powers.
- Flood event data collection.
- Arrange and take part in flood event exercises.
- Respond to pollution incidents and advise on disposal.
- Assist with the recovery process, for example, by advising on the disposal of silt, attending flood surgeries.

Category 2 Responders

Utility providers

- Attend emergencies relating to their services putting life at risk.
- Assess and manage risk of service failure.
- Assist with the recovery process, including the management of public health considerations.

Kent Resilience Forum

The Kent Resilience Forum (KRF) 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 to ensure a co-ordinated response to any emergency that could have a significant impact on any community.

LRFs are partnerships made up of a number of different organisations and agencies (although they are not legal organisations in themselves). The areas covered by a LRF align with the local police area boundaries.

The various agencies that form the KRF work together in a range of areas including:

- Assessing risks across the county and developing the Kent Community Risk Register
- Planning for emergencies
- Planning for Business Continuity Management
- Producing multi-agency plans
- Carrying out training and exercising
- Warning and informing the public - before, during and after emergencies.

Member organisations of the LRFs are the Category 1 and 2 responders (as outlined above). The KRF is required to meet at least every six months.

Further information:

The National Flood Emergency Framework for England can be found at:

http://goo.gl/vkeV3O

Kent County Council's Flood Response Plan can be found at:

KCC flood response plan

Tonbridge and Malling Borough Council's Emergency Planning information can be found at:

Prepare for flooding

Sandbags

Sandbags have traditionally been used to block doorways, drains and other openings to properties. They are also frequently used to weigh down manhole covers, garden furniture and can be used to block sinks, toilets and bath drains to prevent water back-flowing through the drains.

Sandbags are not waterproof and will be unable to permanently prevent the ingress of water to an area protected by them. However, whilst purpose built, property specific flood defences will usually be more effective than sandbags, they can be useful for diverting shallow flowing water that has somewhere else to go (or for deflecting waves caused in shallow water by passing vehicles).

Tonbridge and Malling Borough Council do not have a statutory duty to provide sandbags, but they will endeavor to provide sandbags to locations at highest risk and to the most vulnerable residents. In liaison with Kent County Council and the other

Risk management Authorities, they will focus their limited resources on areas of need.

Where appropriate, sandbags will be provided free of charge in response to flood emergencies, and on a 'needs' basis

The priority is to try and prevent internal flooding to resident's homes. No priority is given to garages, sheds, greenhouses, outbuildings, gardens, allotments, agricultural land, recreation land, parks, private driveways, paths, etc.

In the midst of a flood emergency in cannot be guaranteed that sandbags will be available in sufficient time, or in sufficient quantities to prevent or reduce damage to property owing to the limited stocks available.

Further information:

Prepare for flooding

Personal flood planning and assistance

The Government has produced a guide on what to do before, during and after a flood. It features advice such as how to check whether you are at risk of flooding, checklists to help you prepare and practical advice should flooding occur.

According to this advice, you should initially:

- Find out if you're at risk,
- Make a Flood Plan,
- Improve your property's protection,
- Get insurance,
- Get help during a flood,
- Get help after a flood.

Further guidance on each of these steps is available at:

http://goo.gl/qPRnP1

Flood advice for businesses

The Government has also produced advice and guidance specifically aimed at businesses at risk from flooding. This guidance can be found at:

http://goo.gl/oyrbfA

Flood Warnings

The Environment Agency provides a free Flood Alert and Warning service in many areas at risk of flooding from rivers or the sea.

Flood warnings give advanced notice of potential flooding by phone, text, email, pager or fax.

To find out if you live within a Flood Warning area and to sign up, please visit flood warnings or call **0345 988 1188**.

The Environment Agency's live Flood Warning map identifies areas where Flood Alerts, Flood Warnings or Severe Flood Warnings are in force. The map is updated

with information from the Flood Warning service every 15 minutes; it can be found here: Live flood map.

It should be noted that the Environment Agency's Floodline Warnings Direct service only pertains to flooding from rivers and the sea.

Table 4. Flood Alert and Warnings

Symbol	Status	Action
	A Flood Alert means that flooding is possible and that you need to be prepared	Residents should make some low impact preparations (e.g. move small / valuable items upstairs) check travel plans and remain vigilant.
	A Flood Warning means that flooding is expected. You should take immediate action and not wait for a severe flood warning.	Put in place home flood defences. Move valuables and people upstairs. Turn off utilities.
	A Severe Weather Warning means that there is severe flooding and danger to life.	These are issued when flooding is posing significant risk to life or disruption to communities.
There is no symbol for this stage.	Warnings no longer in force	This message will be issued when no further flooding is currently expected in your area.

Key contacts

Main sewers (foul and surface water)
Southern Water
0330 303 0368, customerservices@southernwater.co.uk

Private connections to the main sewer
Householders responsibility.

Domestic drainage in social housing properties
Clarion Housing
0300 500 8000,
Website

Main rivers
Environment Agency
0345 988 1188 (Floodline 24-hour service),
0800 80 70 60 (24-hour emergency hotline),
Website,
E-mail: enquiries@environment-agency.gov.uk

Ditches, watercourses and land drainage
Kent County Council
03000 41 81 81 (9am - 5pm),
03000 41 91 91 (out of office hours),
Website,
E-mail: flood@kent.gov.uk

Tonbridge and Malling Borough Council
01732 844 522,
Website,
E-mail: **customer.services@tmbc.gov.uk**

Upper and Lower Medway Internal Drainage Board
0162 269 3665,
Website,
E-mail: enquiries@medwayidb.co.uk

Highway flooding, including blocked gullies (kerbside gratings)
Kent County Council Highways
03000 41 81 81,
Website

Environmental Services
Tonbridge and Malling Borough Council
Website

Environment Agency
0800 80 70 60 (24-hour emergency hotline)

Tonbridge

In the Tonbridge area there is a total of 1206 properties at risk from fluvial flooding (taking the existing defences into account); 475 of these are at medium to high risk.

Table 5. Number of dwellings at risk from fluvial/tidal flooding in Tonbridge

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Cage Green	182	214
Castle	47	372
Higham	161	202
Judd	7	180
Medway	71	229
Trench	5	5
Vauxhall	2	4

The main flood risk to the town of Tonbridge comes from the River Medway and its tributaries (the most notable of which are the Hawden Stream, the Botany Stream, the Gas Works Stream and the Tonbridge Mill Stream); however the other watercourses and drains throughout the ward could also pose a significant flood risk.

The flooding of September 1968 caused extensive damage to the town. As a direct result, flood defences were constructed to mitigate the effects of similar future events.

High flows in the River Medway are now controlled and restricted by a flood storage area and sluice gates upstream of the town at Leigh. Within the town itself there are flood walls which are built along the banks of the Medway to keep the water within its channel.

The Leigh Flood Storage Area (FSA) was constructed in 1981 to alleviate flooding to an estimated 1,200 properties in the Tonbridge area. It was instrumental in reducing the extent of the severe flooding that took place in Tonbridge during the autumn of 2000 and over the Christmas period in 2013. The barrier is built on the River Medway upstream of Tonbridge, and is comprised of an earth embankment and concrete control structure (with three radial gates); these can be opened and closed to control the outflow from the storage reservoir behind the embankment. The Leigh FSA control gates are operated to reduce the flow in the River Medway in times of flood. In order to reduce the risk of flooding in Tonbridge and neighbouring settlements, the excess flow (the difference between flow into the reservoir and maximum safe flow outflow from it) is stored temporarily in the reservoir up to a maximum storage level of 28.05m AOD. The operators of the structure have to carefully balance the quantity of water leaving the FSA against the water entering to ensure the available volume is most efficiently used without overflowing.

The flood defence walls along the right bank of the Medway restrict flood water entering the town of Tonbridge during periods of significant flow within the river.

However, during particularly severe events, water can approach the top of the defences along Medway Wharf Road, leading to the possibility of the walls being overtopped by waves.

Flooding within the town centre (upstream of the weir) predominantly originates from the Botany Stream, which floods Avenue du Puy via the highway drainage. The flooding then spreads across the Sainsbury's car park.

The general topography of the area means that there is also a possibility of water either coming out of the drains during a flood event, or the drains not being able to freely discharge to the river when the outfalls are submerged. This water has the potential to form pools in low-lying areas such as the River Centre Industrial Estate and the area in and around Avebury Avenue.

Another tributary of the River Medway, the Pen Stream, flows south through the north of the ward. The relative impermeability of the underlying soils throughout its catchment means that it generally responds quickly to rainfall events and can pose a risk to adjacent property during periods of intense rainfall or prolonged wet weather.

The NaFRA mapping for the Tonbridge area (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 5.

Further information:

- Tonbridge and Malling Surface Water management plan: Tonbridge and Malling surface water management plan
- Tonbridge and Malling Strategic Flood Risk Assessment: Strategic flood risk assessment

Planned Flood Defence Works in the Tonbridge Area

Increasing the capacity of the Leigh Flood Storage Area (FSA)

Prior to the floods that occurred over winter 2013/14, the Environment Agency had planned to carry out works to extend the life of the Leigh FSA to 2035. Since this event, the Environment Agency has been working in partnership with Kent County Council and Tonbridge and Malling Borough Council to bring forward plans to increase the capacity of the Leigh FSA.

The Environment Agency are planning to enlarge the capacity of the Leigh Flood Storage Area from 5.5 million m^3 to 7.6 million m^3, which will improve the standard of protection to Tonbridge, and also to build embankments to protect Hildenborough.

It is anticipated that a design will be in place by 2018 to enable preliminary works to commence; this should allow the main construction to be completed by 2022.

These planned works will be of direct benefit to communities and businesses in Tonbridge and Hildenborough, and should also reduce the risk of flooding further downstream in East Peckham.

Other Flood Defence Works

The Environment Agency has secured £200,000 of funding from the Regional Flood and Coastal Committee to design a scheme to reduce the risk from the Medway flowing up the Hilden Brook and Hawden Stream.

The scheme will store water from the Hawden Stream on the meadows next to Hawden Farm, but it is likely that a facility to pump water from the Hawden Stream

onto the sports pitches will need to be included. Design will take place over the winter and spring 2014/15. Construction is planned to take place in summer 2015.

A new, targeted, flood warning system for Hildenborough has been implemented. In combination with trained local Flood Wardens, the Risk Management Authorities anticipate that the quality of information to and from the community will improve when flooding is threatened.

The Environment Agency has also secured funding from the Regional Flood and Coastal Committee (RFCC) for a project to build a defence in the Avebury Avenue area of Tonbridge. The flood defence is likely to comprise of a low level flood wall behind the footpath. This project is in the planning stages but the Environment Agency hope to start construction in early 2015.

In the meantime, a contingency plan is in place to protect the community around the Avebury Avenue area if there are high river levels before the permanent scheme is constructed. An exercise was run in September 2014 to test this contingency plan.

Repair Projects

Throughout Tonbridge the floods of winter 2013/14 caused extensive damage to the retaining walls and defences. The Environment Agency is carrying out repair projects at Buleys Weir, upstream of the Big Bridge and just below the castle. Collectively the projects will cost £1.7million. The works have started and will continue through to March 2015.

Malling West

In the Malling West area there is a total of 1016 properties at risk from fluvial flooding (taking the existing defences into account); 278 of these are at medium to high risk.

Table 6. Number of dwellings at risk from fluvial/tidal flooding in Malling West

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Borough Green and Long Mill	126	163
Hildenborough	103	800
Ightham	49	53
Wrotham	0	0

The Hawden Stream and River Bourne pose the greatest flood risk to the Malling West area.

Flooding in Hildenborough from the Hawden Stream and Hilden Brook occurs in direct response to raised water levels in the River Medway. During periods of high flow in the Medway, water can flow back up these watercourses as a result of the generally low lying and flat topography of the area. The combined effect of additional water in these channels, along with their associated inability to freely discharge to the Medway, can result in flooding of lower lying properties and agricultural land in Hildenborough.

The River Bourne is initially fed by springs to the north of Borough Green and Igtham and then generally flows in a southerly direction towards its confluence with the River Medway at East Peckham.

The relatively steep catchment of the River Bourne and its underlying clay results in the watercourse being reasonably fast-flowing and flashy in nature; while this made it a suitable power source for the 13 watermills along its course (historically used for the production of flour and paper), the rapid response to rainfall means that residential property and agricultural land along its course can be at risk from flooding during particularly intense downpours.

There have been several cases of flooding throughout the ward which have been attributed to surface water; however, the likelihood of surface water flooding is dependent on not only the rate and duration of a rainfall event, but also on the condition of the surface water drainage system. When there are instances of heavy rainfall and water fails to infiltrate to the ground or enter the drainage system, there is increased risk of surface water flooding (especially at low points in the topography where ponding can occur).

The NaFRA mapping for the Malling West area (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 6.

Further information:

- Tonbridge and Malling Surface Water management plan: Tonbridge and Malling surface water management plan
- Tonbridge and Malling Strategic Flood Risk Assessment: Strategic flood risk assessment

Planned Flood Defence Works in Malling West Area

As flooding in Hildenborough is driven by the River Medway, the Environment Agency has secured £200,000 of funding from the Regional Flood and Coastal Committee to design a scheme to reduce the risk of the Medway flowing up the Hildenbrook and the Hawden Stream.

The scheme will store water from the Hawden Stream on the meadows next to Hawden Farm, but it is likely that a facility to pump water from the Hawden Stream onto the sports pitches will need to be included. Design will take place over the winter and spring 2014/15. Construction is planned to take place in summer 2015.

A new, targeted, flood warning system for Hildenborough has been implemented. In combination with trained local Flood Wardens, it is anticipated that the quality of information to and from the community will improve.

The Environment Agency are planning to enlarge the capacity of the Leigh Flood Storage Area from 5.5 million m^3 to 7.6 million m^3, which will improve the standard of protection to Tonbridge, and also to build embankments to protect Hildenborough.

Malling North

In the Malling North area there is a total of 73 properties at risk from fluvial flooding (taking the existing defences into account); 33 of these are at medium to high risk.

Table 7. Number of dwellings at risk from fluvial/tidal flooding in Malling North

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Downs	16	19
Snodland East	3	34
Snodland West	0	0
West Malling and Leybourne	14	20

The area to the west of the River Medway and east of the railway line in Snodland is potentially susceptible to tidal flooding from the River Medway; however, there are defences protecting the area so there is only a relatively low risk to a relatively small number of houses.

Further south, the Leybourne Stream (an ordinary watercourse) winds its way west through the countryside to the south of Addington and to the north of West Malling. As it approaches the River Medway it poses a risk to several properties in and around Leybourne and Lunsford before it enters the Snodland Mill Stream near the Leybourne Lakes Country Park.

There have been several cases of flooding throughout the ward which have been attributed to surface water; however, the likelihood of surface water flooding is dependent on not only the rate and duration of a rainfall event, but also on the condition of the surface water drainage system. When there are instances of heavy rainfall and water fails to infiltrate to the ground or enter the drainage system, there is increased risk of surface water flooding (especially at low points in the topography where ponding can occur).

The NaFRA mapping for the Malling North area (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 7.

Further information:

- Tonbridge and Malling Surface Water management plan: Tonbridge and Malling surface water management plan
- Tonbridge and Malling Strategic Flood Risk Assessment: Strategic flood risk assessment
- Maidstone and Malling Surface Water Management Plan: Maidstone and Malling surface water management plan

Planned Flood Defence Works in Malling North Area

There are presently no plans to increase the standard of protection offered by the tidal defences on the River Medway in and around Snodland. There are also no plans to install any formal defences on the Leybourne Stream.

Malling Rural North East

In the Malling Rural North East area there is a total of 1038 properties at risk from fluvial flooding (taking the existing defences into account); 718 of these are at medium to high risk.

Table 8. Number of dwellings at risk from fluvial/tidal flooding in Malling Rural North East

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Aylesford	488	579
Bluebell Hill and Walderslade	0	0
Burham, Eccles and Wouldham	46	106
Ditton	182	203
Larkfield North	2	150

The areas of Malling Rural East at greatest risk from flooding are in and around the settlements of Aylesford and Ditton.

Aylesford is at risk from both the tidal River Medway and from the Aylesford Stream, a relatively flashy watercourse which flows in a southerly direction through the village, joining the River Medway upstream of the Aylesford Bridge.

The village experienced flooding in 1958, 1961, 1976, 1986, 2000 & 2001.

A series of concrete walls, embankments and flood gates protect Aylesford from tidal flooding; the standard of protection offered to the village by these various structures would protect the village from a 0.5% AEP event (i.e. from a 1 in 200yr magnitude flood).

There are presently no defences in place to protect the village from flooding from the Aylesford Stream, with flooding anecdotally experienced during 10% AEP rainfall events (i.e. 1 in 10yr). The Environment Agency and Kent County Council have undertaken management works along the length of the watercourse to clear culverts and improve the capacity within the channel. These maintenance works have improved the watercourse's ability to convey flow, and may have consequently reduced the risk of flooding from the Aylesford Stream.

Low lying areas of Ditton are at risk from fluvial flooding from the East Malling and Ditton Stream as it flows east to meet the River Medway at Ditton.

There have also been several cases of flooding throughout the ward which have been attributed to surface water; however, the likelihood of surface water flooding is dependent on not only the rate and duration of a rainfall event, but also on the condition of the surface water drainage system. When there are instances of heavy rainfall and water fails to infiltrate to the ground or enter the drainage system, there is

increased risk of surface water flooding (especially at low points in the topography where ponding can occur).

The NaFRA mapping for the Malling Rural North East area (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 8.

Further information:

- Maidstone and Malling Surface Water Management Plan: Maidstone and Malling surface water management plan
- Tonbridge and Malling Strategic Flood Risk Assessment: Strategic flood risk assessment

Planned Flood Defence Works in Malling Rural North East Area

An outline flood defence scheme for Aylesford has been developed. However, under current flood defence funding arrangements the plans will not be progressed unless significant savings can be found or contributions from other parties secured. Please see the previous section on Flood Defence Investment for an explanation on funding mechanisms.

Until such time as the formal defence scheme can be considered financially viable, the Environment Agency, Kent County Council and Tonbridge and Malling Borough Council are assisting residents to implement their own schemes of Property Level Protection. Such measures can include (but are not limited to):

- raising the ground floor slab level further,
- bringing the electrical supply in at the first floor,
- placing boilers and meter cupboards on the first floor,
- water-resistant plaster/tiles on the walls of the ground floor,
- solid stone or concrete floors with no voids underneath,
- covers for doors and airbricks,
- non-return valves on new plumbing works,
- avoidance of studwork partitions on the ground floor.

A guide advising industry how to reduce damage to new buildings in flood risk areas has been published by Communities and Local Government, Defra and the Environment Agency. It can be found at:

http://goo.gl/3wHrEz

Malling Central

In the Malling Central area there is a total of 882 properties at risk from fluvial flooding (taking the existing defences into account); 579 of these are at medium to high risk.

Table 9. Number of dwellings at risk from fluvial/tidal flooding in Malling Central

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
East Malling	298	324
Larkfield North	247	524
Larkfield South	0	0
West Malling and Leybourne	34	34

The East Malling and Ditton Stream poses the most significant flood threat to the Malling Central area. It is groundwater fed, with its source to the south of East Malling in the appropriately named area around Spring Hill at Well Street. During periods of prolonged or heavy rainfall, it poses a potential risk to the low lying villages of East Malling and Ditton as it flows north east to meet the River Medway at Aylesford.

The area is also prone to the occasional emergence of groundwater during periods of prolonged rainfall; this generally occurs when the water level in the underlying aquifers rises above the surrounding ground level.

The Snodland Millstream is designated main river, fed by the lake at Manor Country Park, that flows in a generally north easterly direction towards it confluence with the Leybourne Stream, west of Leybourne. During periods of heavy or prolonged rainfall, it can pose a risk to a relatively small number of properties around Frog Lane towards the east of West Malling.

There have also been several cases of flooding throughout the ward which have been attributed to surface water; however, the likelihood of surface water flooding is dependent on not only the rate and duration of a rainfall event, but also on the condition of the surface water drainage system. When there are instances of heavy rainfall and water fails to infiltrate to the ground or enter the drainage system, there is increased risk of surface water flooding (especially at low points in the topography where ponding can occur).

The NaFRA mapping for the Malling Central area (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 9.

Further information:

- Maidstone and Malling Surface Water Management Plan: Maidstone and Malling surface water management plan
- Tonbridge and Malling Surface Water management plan: Tonbridge and Malling surface water management plan

- Tonbridge and Malling Strategic Flood Risk Assessment: Strategic flood risk assessment

Planned Flood Defence Works in Malling Central Area

There are presently no plans to increase the standard of protection offered by the tidal defences on the River Medway in and around Larkfield and New Hythe. There are also no plans to install any formal defences on the East Malling and Ditton Stream.

Malling Rural East

In the Malling Rural East area there is a total of 948 properties at risk from fluvial flooding (taking the existing defences into account); 701 of these are at medium to high risk.

Table 10. Number of dwellings at risk from fluvial/tidal flooding in Malling Rural East

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
East Peckham and Golden Green	671	887
Hadlow, Mereworth and West Peckham	18	27
Kings Hill	0	0
Wateringbury	12	34

In the Malling Rural East area, the village of East Peckham is at the greatest risk from flooding. Whilst the interaction of the River Medway with its tributary (the Coult Stream) is a key driver behind this risk, the risks associated with the separate watercourses vary in magnitude depending on which of the individual catchments receives the most significant rainfall.

Following the floods experienced in 2000 and 2002 a flood alleviation scheme for East Peckham was completed in 2005; it consists of a 300m long, 4m high dam and associated flood storage area. It offers protection to approximately 50 residential properties, and is designed to reduce the flows in the Coult Stream through the village during extreme rainfall events. Prior to construction a 100yr rainfall event could have resulted in up to 4m³/s flowing through the village. This defence now restricts the flow to around 0.6m³/s, with up to 90,000m³ of flood water storage being provided behind the dam.

There have also been several cases of flooding throughout the ward which have been attributed to surface water; however, the likelihood of surface water flooding is dependent on not only the rate and duration of a rainfall event, but also on the condition of the surface water drainage system. When there are instances of heavy rainfall and water fails to infiltrate to the ground or enter the drainage system, there is increased risk of surface water flooding (especially at low points in the topography where ponding can occur).

The NaFRA mapping for the Malling Central area (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 10.

Further information:

- Maidstone and Malling Surface Water Management Plan: Maidstone and Malling surface water management plan
- Tonbridge and Malling Surface Water management plan: Tonbridge and Malling surface water management plan

- Tonbridge and Malling Strategic Flood Risk Assessment: Strategic flood risk assessment

Planned Flood Defence Works in Malling Rural East Area

The Coult Stream dam has been in place for nearly 10 years. There was therefore sufficient data available for the Environment Agency to review its design. Early results from the review suggest that the dam can be upgraded to increase the standard of protection offered to East Peckham. The Environment Agency hopes to be able to progress this project in 2015/16.

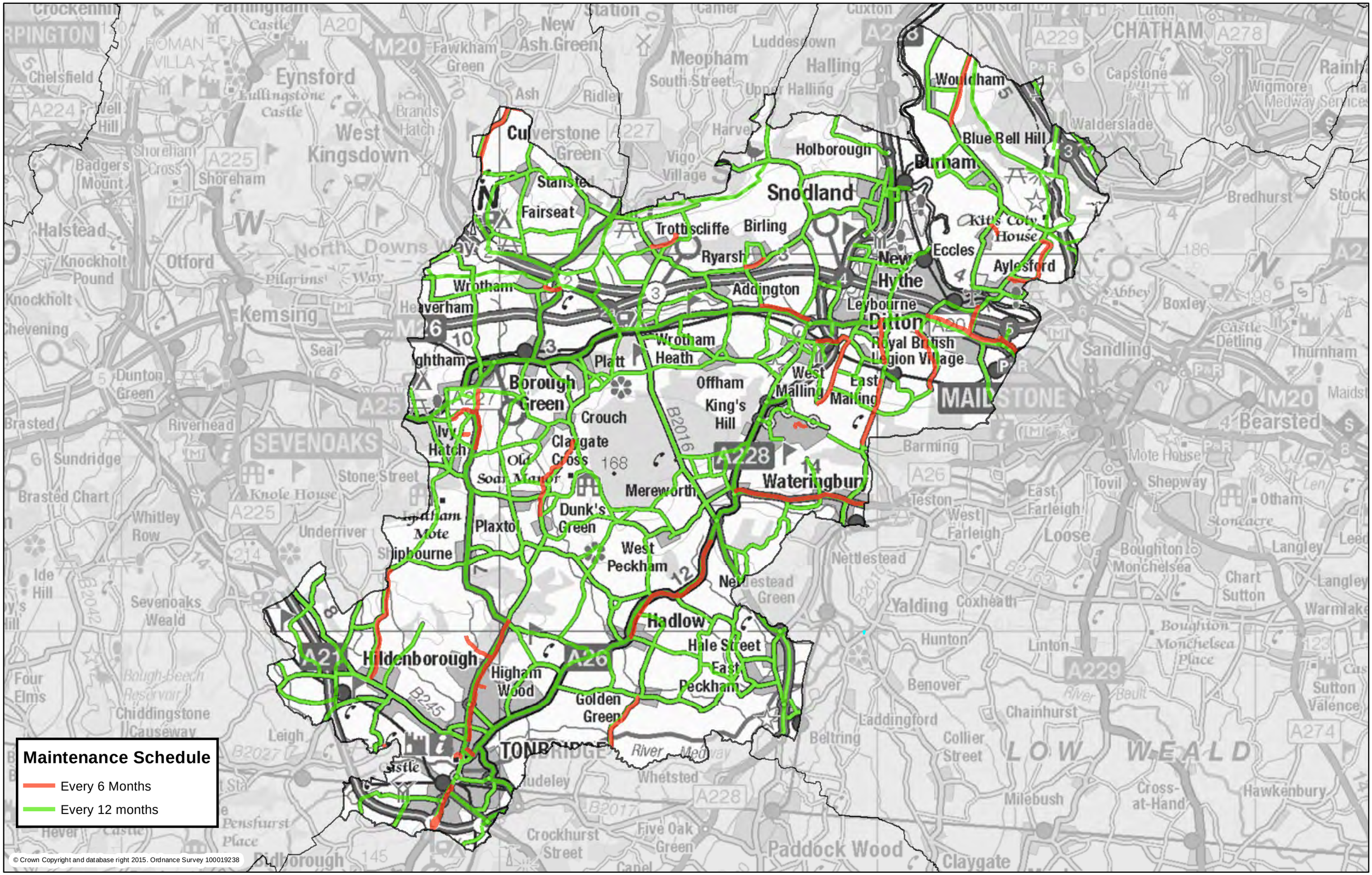
The Environment Agency has secured funding from Defra Flood Defence Grant in Aid to progress the construction of an embankment to reduce the risk of flooding to homes in the village. However, additional funds are being sought to extend the area protected to the businesses in the Branbridges industrial estate and to the Little Mill area (both of which were badly affected over Christmas 2013).

In the area around Little Mill substantial blockages have been removed from the River Bourne.

The proposals to increase the capacity of the Leigh Flood Storage Area will provide a reduction in flood risk to the East Peckham area if the scheme goes ahead as presently planned.

Appendix 1

Highways drainage maintenance schedules



KCC Highways are responsible for keeping water off the highway making it safe for drivers and other road users.

They look after drains, ponds and lagoons, pumping stations and soakaways.

They DO NOT look after sewers, water leaks or ditches on private land.

Roads known to flood frequently - Every 6 months

High speed roads (roads with a speed limit of 70mph) - Every 6 months

Strategic routes (roads that are the main connection between towns and villages) - Every 12 months

Urban and rural routes (all other roads) - Every 18 to 24 months

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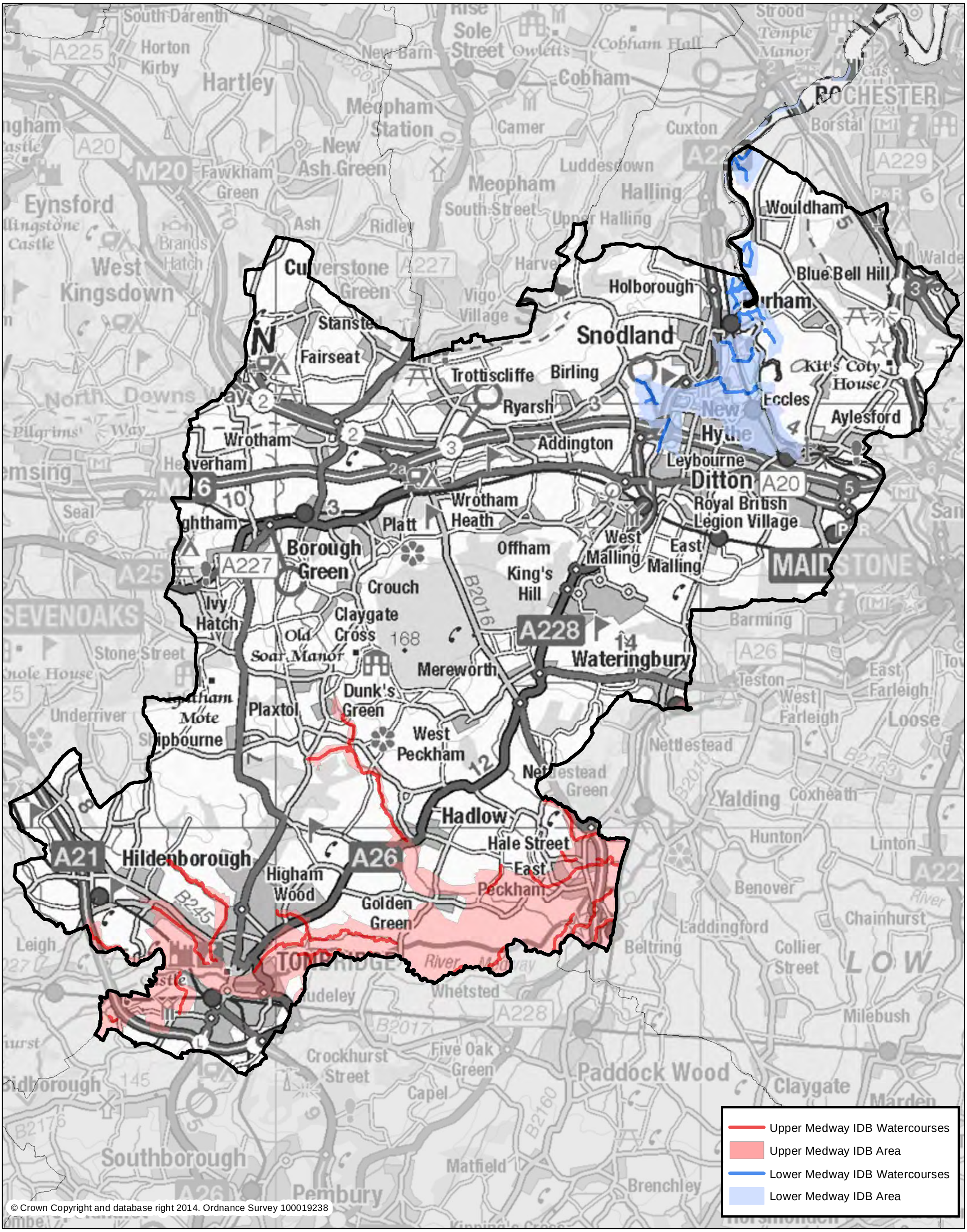
TONBRIDGE & MALLING BOROUGH COUNCIL

Environment Agency

Appendix 2

Internal Drainage Board Areas and Watercourses



Each IDB has permissive powers to undertake work to provide water level management within their Internal Drainage District (IDD), undertaking works to reduce flood risk to people and property and manage water levels for local needs. Much of their work involves the maintenance of rivers, drainage channels, outfalls and pumping stations, facilitating drainage of new developments and advising on planning applications. They also have statutory duties with regard to the environment and recreation when exercising their permissive powers.

Environment Agency

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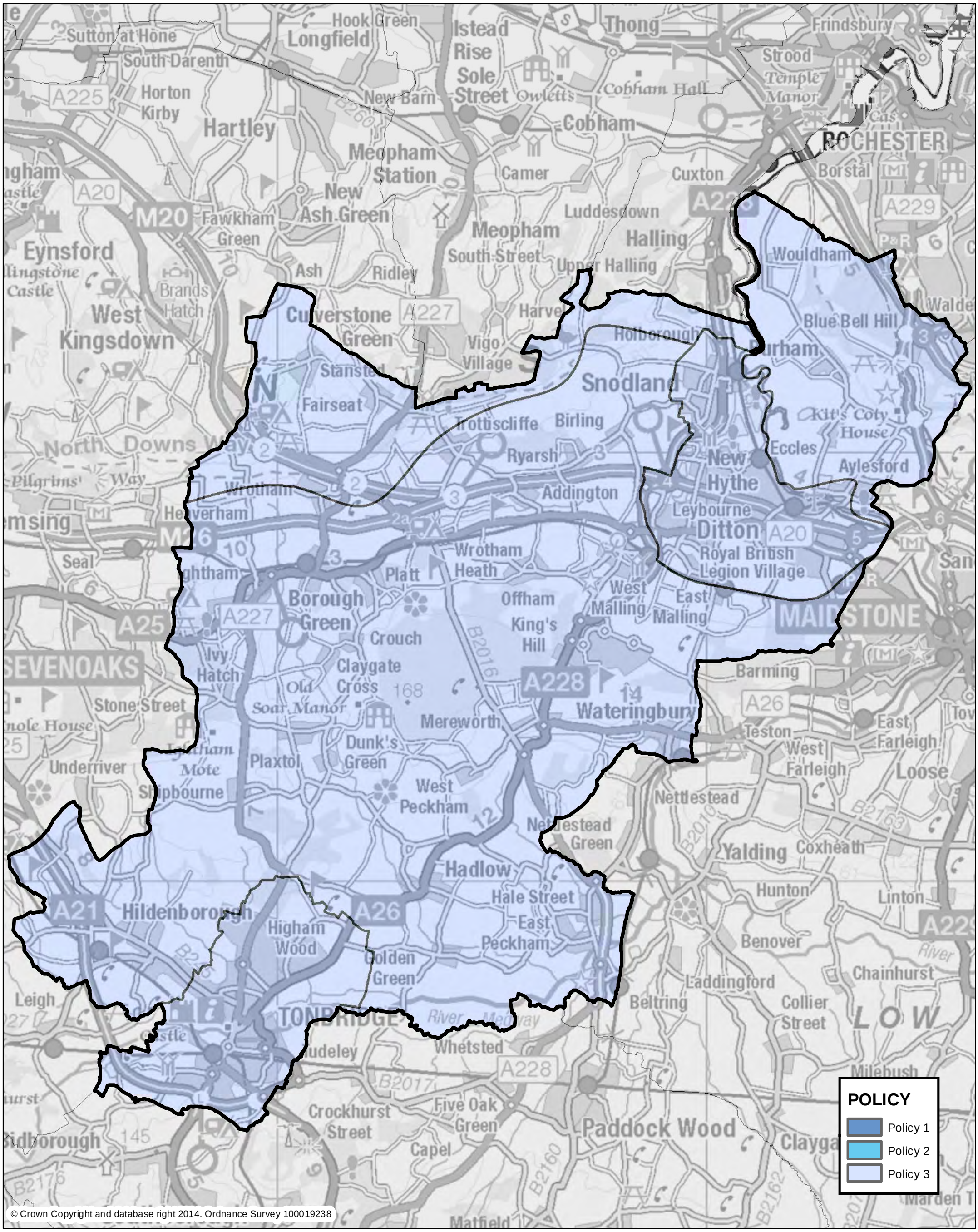
Tonbridge & Malling Borough Council

Appendix 3

Tonbridge and Malling Local Flood Risk Management Policy areas



Local Flood Risk Management Policies:

Policy 1
Areas with complex local flood problems.
This policy will be applied to areas where we are aware of flood risk issues that are complex. These are the problems which are technically challenging to understand or where a number of different risk management authorities may be involved in their resolution. These areas will typically have local flood risks that affect large areas, for instance a town centre or suburb. An action plan of feasible options to manage the identified risks will be developed and delivered by the relevant risk management authorities.

Policy 2
Areas with moderate local flood problems.
This policy will be applied to areas where there are known local flood problems which need to be investigated but are relatively straight-forward. These areas will typically have local flood risks that affect localised areas, for instance one or two roads, that require more indepth assessment and interventions than have been used in the past. These areas may not need an in depth assessment of the risks and may be dealt with by ensuring the relevant risk management authorities work togethe effectively to investigate the problems although in some instances these may be necessary.

Policy 3
Areas with low local flood risk which are being managed effectively
This policy will be applied to areas where local flooding risks are currently not significant. That does not mean that these areas are not at risk of local flooding, but the risks can be managed by each risk management authority undertaking its duties effectively.

Policy 3 applies throughout the TMBC area.

Environment Agency

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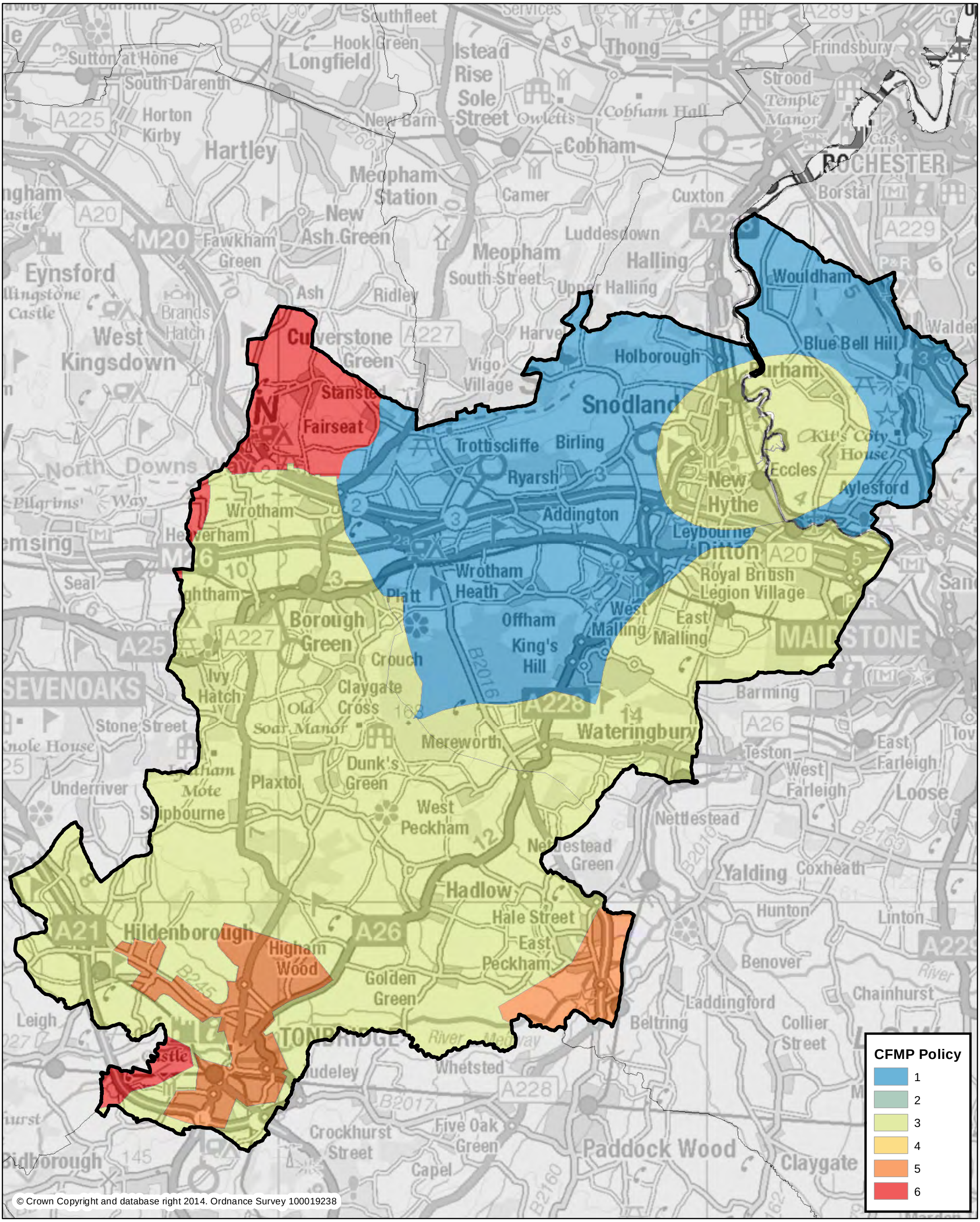
TONBRIDGE & MALLING BOROUGH COUNCIL

Appendix 4

Catchment Flood Management Plan and Shoreline Management Plan policy areas



Environment Agency Catchment Flood Management Plans

Policy 1
Areas of little or no flood risk. The situation will continue to be monitored.

Policy 2
Areas of low to moderate flood risk where the existing flood risk management actions can be generally reduced.

Policy 3
Areas of low to moderate flood risk where the existing flood risk is generally being managed effectively.

Policy 4
Areas of low, moderate or high flood risk where the existing flood risk is already being effectively managed, but where further actions may be needed to keep pace with climate change.

Policy 5
Areas of moderate to high flood risk where further action can be taken to reduce flood risk.

Policy 6
Areas of low to moderate flood risk where further action will be taken to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.

Environment Agency

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TONBRIDGE & MALLING BOROUGH COUNCIL

Appendix 5

Tonbridge: NaFRA mapping

Tonbridge

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

NaFRA:

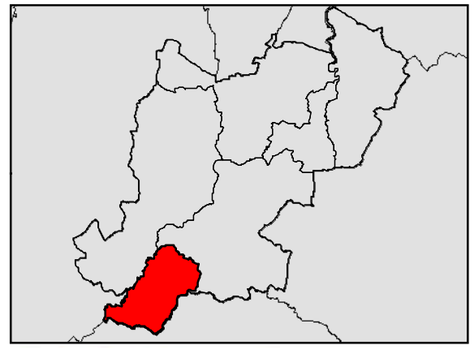
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%



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TONBRIDGE & MALLING BOROUGH COUNCIL

Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the liklihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping of failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

Appendix 6

Malling West: NaFRA mapping

Malling West (North)

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

NaFRA:

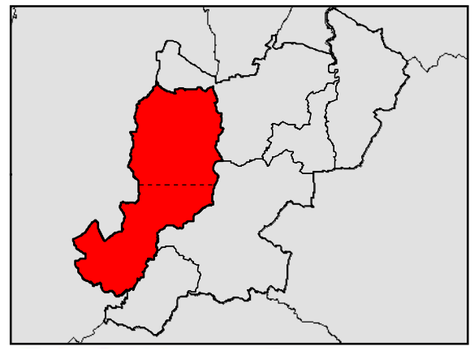
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%



Environment Agency

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TONBRIDGE & MALLING BOROUGH COUNCIL

Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the liklihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping of failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

Malling West (South)

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

NaFRA:

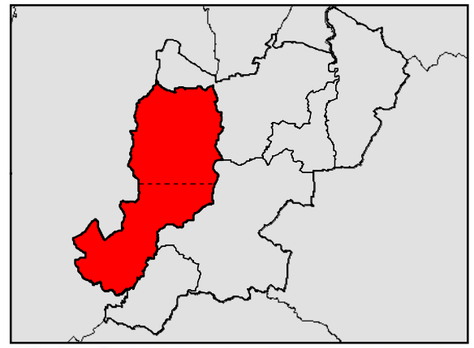
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%



Environment Agency

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TONBRIDGE & MALLING BOROUGH COUNCIL

Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the liklihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping of failing during a flood event. This data is DRAFT, and subject to further checks to verify the information. This should be used as a guide only.

River Bourne

Hilden Brook

Pen Stream (upper)

Hawden Stream

River Medway

Appendix 7

Malling North: NaFRA mapping

Malling North

- Main Rivers
- Very Low
- Low
- Medium
- High
- District Wards

Medway Tidal

Snodland Millstream

NaFRA:

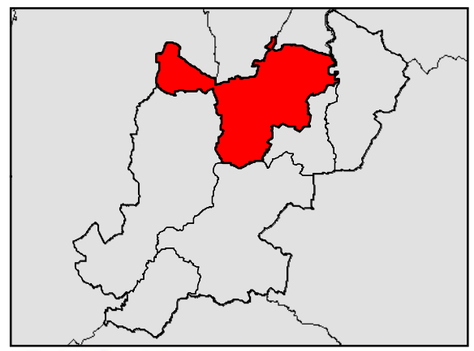
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

High – At risk from an event with an AEP of 3.3% or greater

Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

Very Low – At risk from events with an AEP of less than 0.1%



Environment Agency

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TONBRIDGE & MALLING BOROUGH COUNCIL

Caveats:
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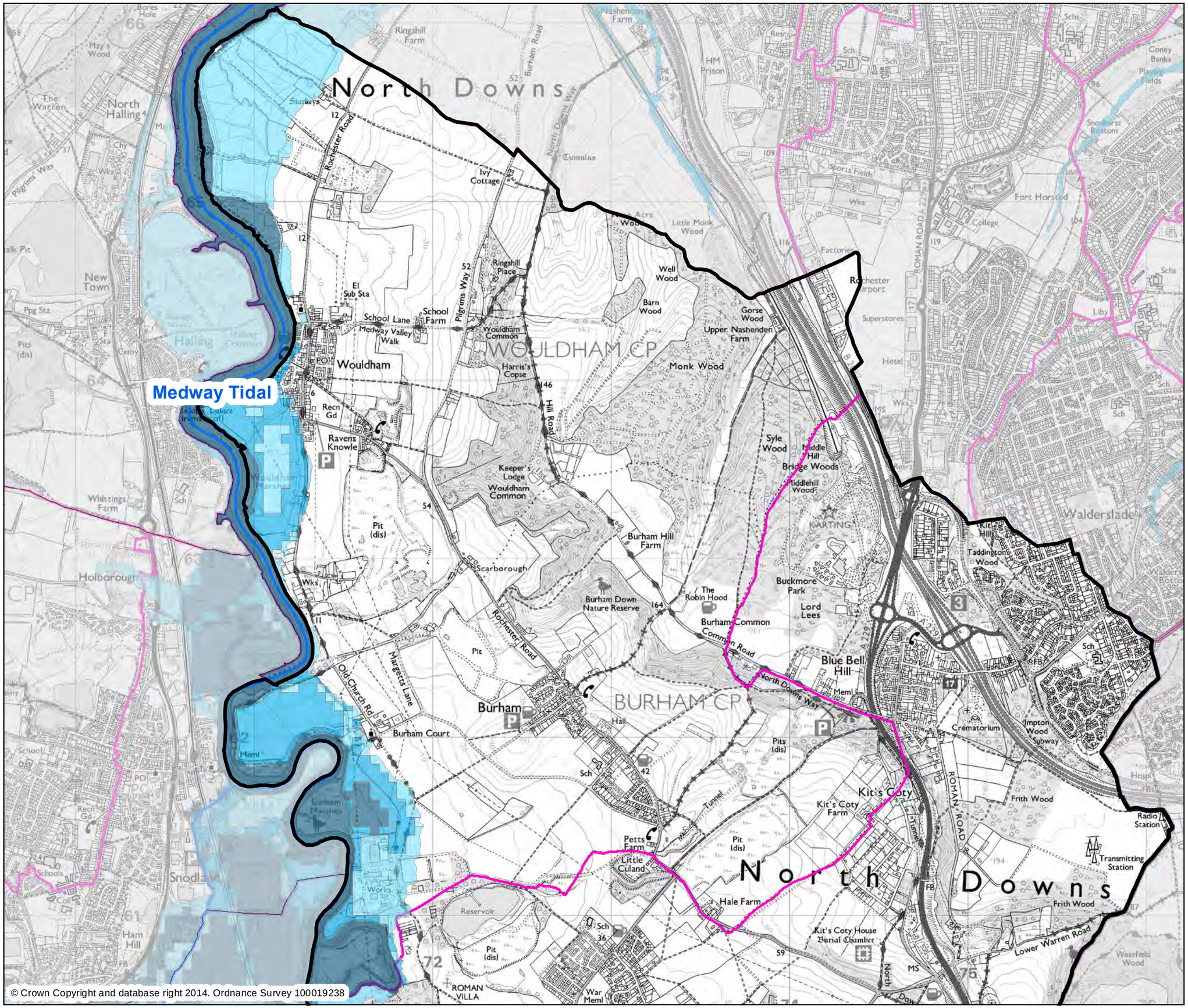
Appendix 8

Malling Rural North East: NaFRA mapping



Malling Rural North East (North)

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

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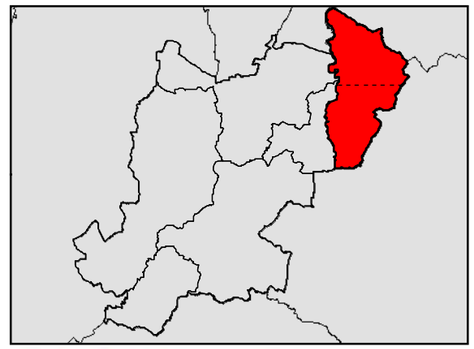

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Malling Rural North East (South)

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

NaFRA:

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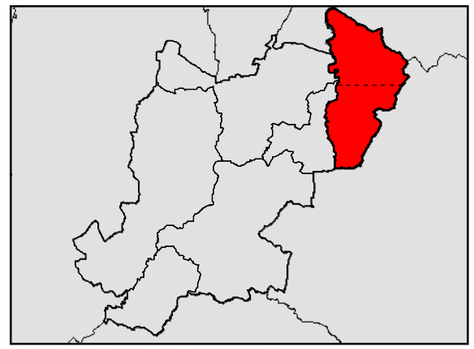

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Appendix 9

Malling Central: NaFRA mapping

Malling Central

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

NaFRA:

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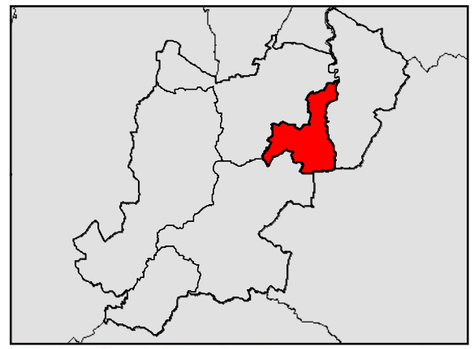

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Caveats:
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Snodland Millstream

East Malling and Ditton Stream

Appendix 10:

Malling Rural East: NaFRA mapping

Malling Rural East

- District Wards
- Main Rivers
- High
- Medium
- Low
- Very Low

NaFRA:

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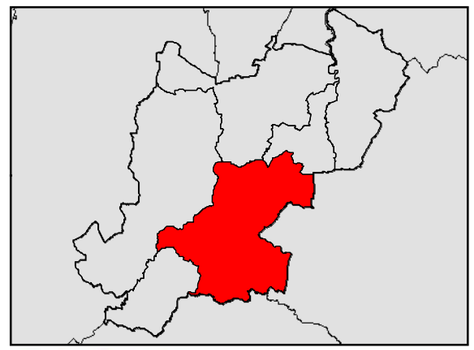

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Glossary

Aquifer	A source of groundwater compromising water-bearing rock, sand or gravel capable of yielding significant quantities of water.
Attenuation	Attenuation is the process of water retention on site and slowly releasing it in a controlled discharge to a surface water or combined drain or watercourse. The amount of discharge will vary depending whether it is a brown or greenfield site. For brownfield sites the developer must determine the likely run off and agree an acceptable discharge with the LLFA, environment agency or water authority.
Brownfield site	Any land or site that has been previously developed.
Catchment	The area contributing surface water flow to a point on a drainage or river system.
CIRIA	Construction Industry Research and Information Association. www.ciria.org
Climate change	Long-term variations in global temperature and weather patterns both natural and as a result of human activity (anthropogenic) such as greenhouse gas emissions
Culvert	A structure which fully contains a watercourse as it passes through an embankment or below ground.
Development	The undertaking of building, engineering, mining or other operations in, on, over or under land or the making of any material
	any buildings or other land.
EA	Environment Agency. Government Agency responsible for flooding issues from main river, and strategic overview of flooding.
Flood event	A flooding incident usually in response to severe weather or a combination of flood generating characteristics.
Flood risk	The combination of the flood probability and the magnitude of the potential consequences of the flood event.
Flood Risk Assessment	An appraisal of the flood risks that may affect development or increase flood risk elsewhere
Flood Zones	Flood Zones provide a general indication of flood risk, mainly used for spatial planning.
Floodplain	An area of land that would naturally flood from a watercourse, an estuary or the sea.
Freeboard	A vertical distance that allows for a margin of safety to account for uncertainties.
Flood and Water Management Act	The Flood and Water Management Act clarifies the legislative framework for managing surface water flood risk in England.
Flow control device	A device used to manage the movement of surface water into and out of an attenuation facility.

Geocellular storage systems	Modular plastic systems with a high void ratio, typically placed below ground which allow for storage of storm water to infiltrate or discharge to another system.
Gravity drainage	Drainage which runs through pipework installed to a fall, and not therefore under pressure.
Greenfield	Undeveloped land.
Greenfield runoff rate	The rate of runoff which would occur from a site that was undeveloped and undisturbed.
Groundwater	Water that exists beneath the ground in underground aquifers and streams.
Groundwater flooding	Flooding caused by groundwater rising and escaping due to sustained periods of higher than average rainfall (years) or a reduction in abstraction for water supply.
Impermeable	Will not allow water to pass through it.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.
Infiltration	Infiltration or soakaway is the temporary storage of water to allow it to naturally soak away into the ground. Because water soaks into the ground gradually, reduces the risk of flooding downstream. Infiltration may be used where
	there is no surface water sewer or where existing systems are at full capacity. Infiltration helps to recharge natural ground water levels.
Local Flood Risk Management Strategy	Strategy outlining the Lead Local Flood Authority's approach to local flood risk management as well as recording how this approach has been developed and agreed.
Main River	A watercourse designated on a statutory map of Main rivers, maintained by Department for Environment, Food and Rural Affairs (Defra).
Mitigation measure	A generic term used in this guide to refer to an element of development design which may be used to manage flood risk to the development, or to avoid an increase in flood risk elsewhere.
National Planning Policy Framework	Framework setting out the Government's planning policies for England and how these are expected to be applied. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.
Overland Flow	Flooding caused by surface water runoff when rainfall intensity exceeds the infiltration capacity of the ground, or when the soil is so saturated that it cannot accept any more water.
Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium.

Pitt Review	An independent review of the 2007 summer floods by Sir Michael Pitt, which provided recommendations to improve flood risk management in England.
Rainwater harvesting	Collection and Re-use or recycling of rainwater for the purpose of garden irrigation, car washing, toilet flushing etc.
Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Source Protection Zone	Defined areas showing the risk of contamination to selected groundwater sources used for public drinking water supply.
Strategic Flood Risk Assessment	A study to examine flood risk issues on a sub-regional scale, typically for a river catchment or local authority area during the preparation of a development plan.
Surface water flooding	Flooding caused by the combination of pluvial flooding, sewer flooding, flooding from open channels and culverted urban watercourses and overland flows from groundwater springs
Surface Water Management Plan	A study undertaken in consultation with key local partners to understand the causes and effects of surface water flooding and agree the most cost effective way of managing surface water flood risk for the long term.
SUDS	Sustainable (urban) drainage systems. A sequence of management practices and control structures that are designed to drain surface water in a more sustainable manner.
Watercourse	A term including all rivers, streams, ditches drains cuts culverts dykes sluices and passages through which water flows.