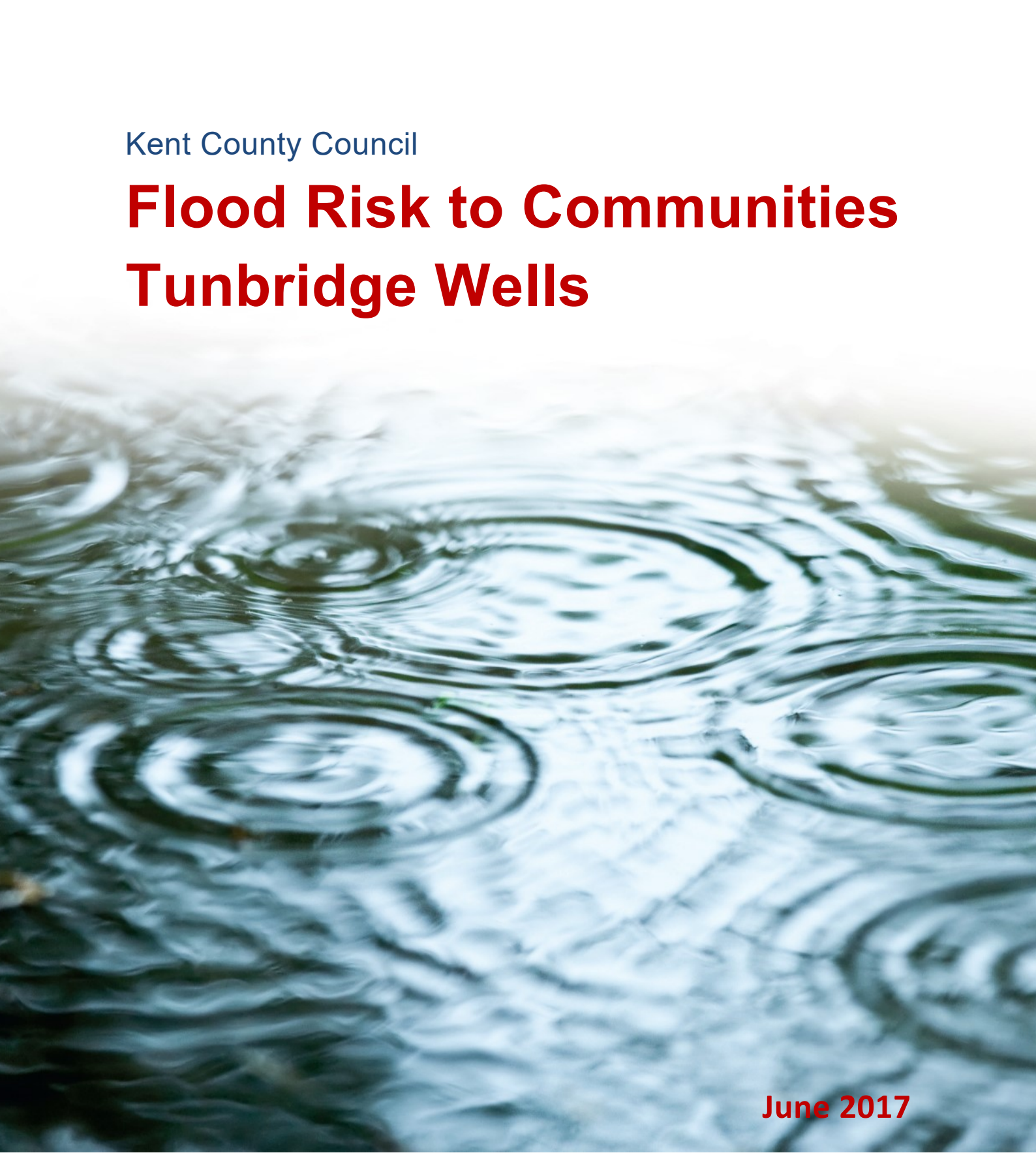
Kent County Council

Flood Risk to Communities
Tunbridge Wells



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www.kent.gov.uk

In partnership with:

Environment Agency

Tunbridge Wells Borough Council

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

- **The Environment Agency**
- **Tunbridge Wells Borough Council**
- **The Upper Medway and Romney Marsh 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 Tunbridge Wells 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 Tunbridge Wells. These include the Environment Agency, Kent County Council, Tunbridge Wells Borough Council, Southern Water, and the Upper Medway and Romney Marsh 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.

Tunbridge Wells Overview

The district of Tunbridge Wells is lies in west Kent and is bordered by Sevenoaks, Tonbridge and Malling, Maidstone, and Ashford, along with Wealden and Rother in East Sussex. The District is predominantly rural, interspersed with towns and villages; it covers an area of approximately 331sqkm. The main urban areas are Royal Tunbridge Wells, Paddock Wood, Southborough, Hawkhurst and Cranbrook.

The predominant flood risk throughout the borough arises from the main rivers and their tributaries that drain the area and flow towards the River Medway in the north and the River Rother to the south. However, this fluvial flood risk can be exacerbated by excess surface water runoff and the emergence of groundwater during periods of prolonged or intense rainfall.

The tributaries of the River Medway that flow through the borough are the Alder Stream, Somerhill Stream, River Teise, Lesser Teise and the River Bewl. The River Rother forms the boundary to the borough to the south east.

Tunbridge Wells Borough comprises two distinct areas based on landform; the High Weald, and the Low Weald.

- The High Weald lies at the core of the Wealden anticline, an arching of rocks that has been faulted and folded, exposing a succession of clays and sandstones derived from the Ashdown Beds, Wadhurst Clay and Tunbridge Wells Sand. Geomorphological processes have acted on this geology to produce an area characterised by a topography of ridges (rising to 152m above sea level) and incised valleys.
- In contrast, the Low Weald is a relatively flat, low lying area developed on the Weald Clay. The clay has been overlain in many places by thick deposits of brickearth and sporadic patches of terrace gravels. The general elevation is below 40m above sea level. The landscape is a patchwork of woodland, permanent grassland and hedgerows. The clay soils and naturally high groundwater table results in poor soil drainage; this restricts agricultural use and increases the risk of flooding.

Meteorological records suggest the High Weald is wetter and slightly cooler than the Low Weald.

There are recorded instances of flooding from the River Medway and its tributaries in 1960, 1963, 1968, 2000 and during the winter of 2013/14.

The Environment Agency has funded two property level protection (PLP) schemes for properties at risk of flooding from the River Teise and the Brewer Stream at Lamberhurst. The Environment Agency's flood warning service is relied upon for their successful operation.

The Tunbridge Wells town urban area is at most significant risk of flooding during periods of extremely intense rainfall, when excess surface water is either unable to discharge to (or be readily accommodated within) the town's sewer network.

The Paddock Wood Stream flows towards the north through the centre of Paddock Wood and is largely culverted south of the railway line. The Tudely Brook and Gravely Ways Stream flow towards the north on the western side of the town. The two Rhoden watercourses (the East Rhoden and West Rhoden) lie to the east of the town and also flow north within predominantly open channels (apart from where they flow through the culverts or bridges under the railway).

These local watercourses flow into the Rivers Medway and Teise (large regional rivers to the north of Paddock Wood), and present a risk of fluvial flooding to the town on both sides of the railway line. The larger regional main rivers do not pose a direct threat to the urban area south of the railway line.

Paddock Wood is also at risk from surface water flooding during periods of prolonged or extreme rainfall, when the amount of runoff becomes too much for the sewers and watercourse network to cope with.

The catchment of the Alder Stream through Five Oak Green is described as flashy, with regular flooding having been recorded from this watercourse. Water impounded by the railway embankment can exacerbate flooding in this area, with roads and property having been historically affected. When water levels are high in the Alder Stream a knock-on effect of raised water levels with local highway drains and gullies and local sewer networks can be observed.

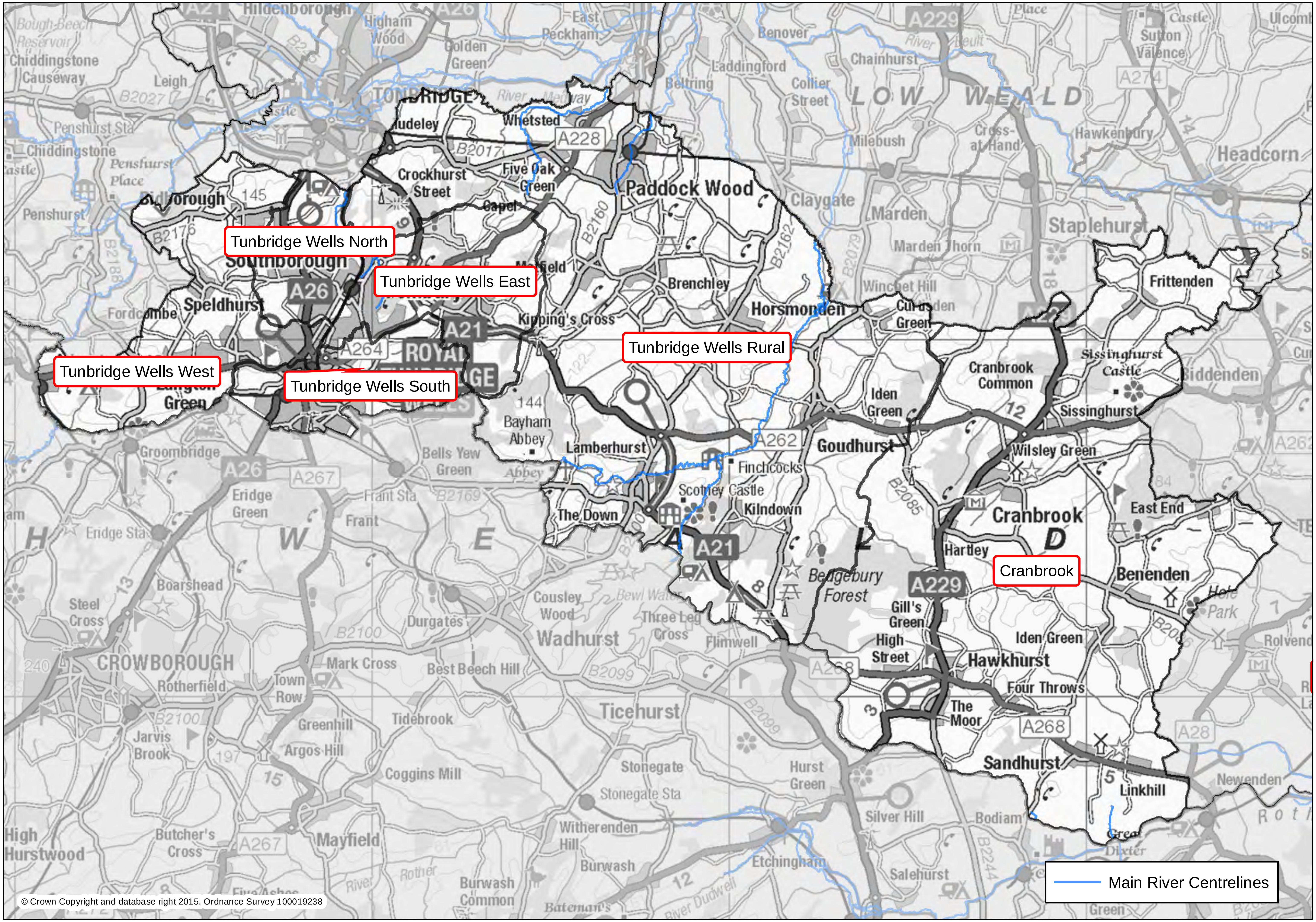
Flooding from the district's main rivers is overseen and managed by the Environment Agency. The Environment Agency is also responsible for defining the extent of the tidal/fluvial flood zones, which are usually derived from detailed computer models.

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.

The Upper Medway and Romney Marsh Internal Drainage Boards have a general supervisory duty over all drainage matters within their districts. Within their district they have consenting and enforcement powers for works carried out by others in or adjacent to ordinary watercourses.

The administrative boundaries of Tunbridge Wells are shown in Figure 1 below.

Figure 1. Tunbridge Wells Borough Council



Tunbridge Wells North
Tunbridge Wells East
Tunbridge Wells Rural
Tunbridge Wells West
Tunbridge Wells South
Cranbrook
Main River Centrelines
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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.

Kent's 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 role includes:

- 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,
- providing a framework and capacity 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 associated with flooding from rivers, the sea, surface water, groundwater and reservoirs; they 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 Risk Management Authority, 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,
- Provide advice and guidance on the provision of Sustainable Drainage within new development as a statutory consultee within the planning process.

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 (apart from those managed by Highways England). 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 Tunbridge Wells 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 a problems are reported to us.

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

Tunbridge Wells Borough Council

Tunbridge Wells Borough Council has 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.

Tunbridge Wells Borough Council also have a general responsibility to oversee all matters relating to drainage within the district and to provide information and advice to the public, including specific advice on land drainage. They should be contacted about watercourse alterations, disputes and maintenance of land drainage within council-owned land, and about emergency works elsewhere.

They are a key partner in planning local flood risk management works, and are able 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 Medway and Romney Marsh Internal Drainage Boards

The map at Appendix 2 shows the extent of the IDB areas within the Tunbridge Wells district and shows the watercourses for which they are responsible.

The Upper Medway Internal Drainage Board is the operating drainage authority within their designated drainage district. They manage and maintain approximately 49km of watercourses within the Tunbridge Wells area; 26sqkm of the Tunbridge Wells area is under their jurisdiction, 8% of the borough's total land cover.

The Romney Marsh Internal Drainage Board is the operating drainage authority within their designated drainage district; this lies towards the south-east of the borough. They manage and maintain approximately 18km of watercourses within the Tunbridge Wells area; 2.8sqkm of the Tunbridge Wells area is under their jurisdiction, approximately 1% of the borough's total land cover.

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 all River Stour (Kent) Internal Drainage Board designated watercourses, where necessary, in order to maintain conveyance capacities to allow drainage, 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).

Whilst 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 the **Upper Medway Internal Drainage Board** District, please phone **01622 693665** or email enquiries@medwayidb.co.uk.

If you are planning to undertake works on an ordinary watercourse within the **Romney Marsh Internal Drainage Board** District, please phone **01797 227000** or email info@rmaidb.co.uk.

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 have also been working with the Risk Management Authorities 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 that is crossed by (or 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.

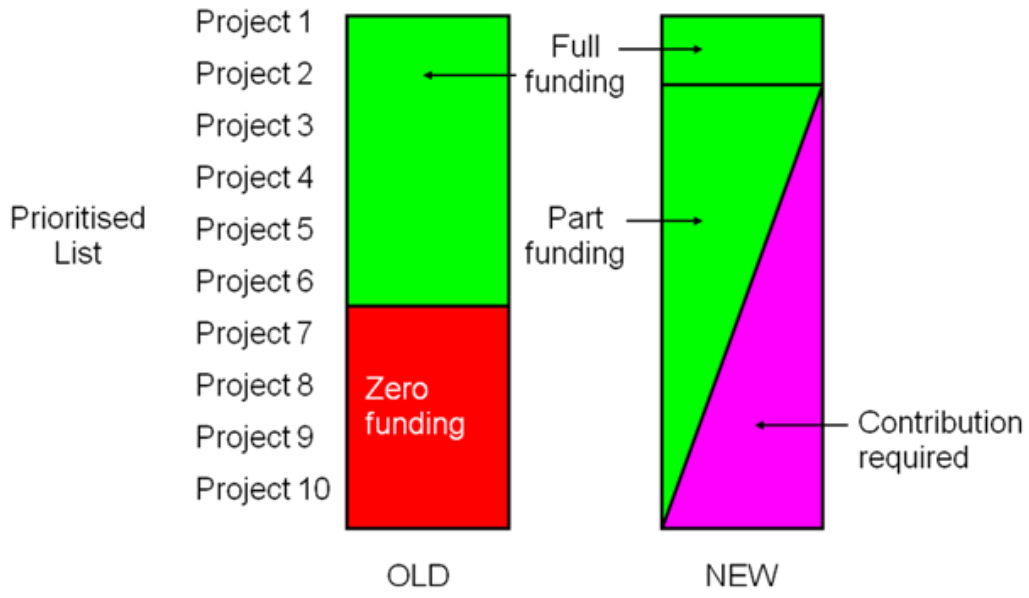


Figure 2. Flood defence investment.

Flood risk management plans and strategies

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

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

National Flood and Coastal Erosion Risk Management Strategy

The National Flood and Coastal Erosion Risk Management Strategy (the National 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 designated 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 Risk Management Authorities.

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 as part of its 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 Risk Management Authorities 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.

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 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.

Tunbridge Wells 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

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 (despite their name) and may cover the risks from other sources of flooding, including where there are combined risks of flooding.

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 use complex rainfall modelling to determine the flood risk from a range of storm durations and intensities 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.

The Tunbridge Wells Surface Water Management Plan can be found at:

Tunbridge Wells surface water management plan

The Paddock Wood Surface Water Management plans can be found at:

Paddock Wood 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. 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.

Tunbridge Wells Borough Council's SFRA can be read here:

Strategic flood risk assessment

Tunbridge Wells Borough Council's SFRA concentrates on the issues in and around Paddock Wood; it can be read here:

Paddock Wood strategic flood risk assessment - technical note

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.

Tunbridge Wells falls within the area covered by the Thames River Basin Management Plan; this 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.

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.

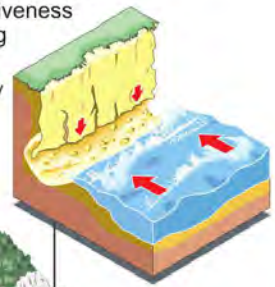
Risk Management Authority
- KCC as the Lead Local Flood Authority and Highway Authority.

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.

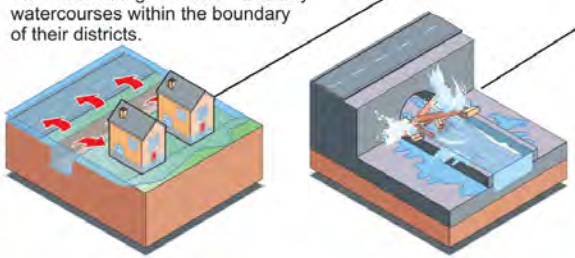
Risk Management Authority
- DB



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)

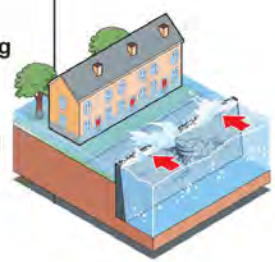
May occur when the sewerage system fails due to blockages or it is overwhelmed by surface water.

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 Paddock Wood would not include the potential for any groundwater or surface water flooding that might occur at the same time as fluvial 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. 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. 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 20 yr event, or more frequently). Unlike the other Flood Zones, 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 a major 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

The Environment Agency are statutory consultees for all development at risk of flooding from rivers and the sea, defined as Flood Zones 2 and 3. They should be consulted as early in the development planning process as possible.

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 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 Tunbridge Wells district, there are a total of 1864 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); 1328 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 in Tunbridge Wells.

Parish	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Benenden	0	0
Bidborough	0	0
Brenchley	3	5
Capel	321	592
Cranbrook & Sissinghurst	14	15
Frittenden	50	53
Goudhurst	16	25
Hawkhurst	9	9
Horsmonden	26	34
Lamberhurst	62	100
Paddock Wood	756	960
Pembury	3	3
Rusthall	0	0
Sandhurst	0	0
Southborough	0	0
Speldhurst	16	16
Tunbridge Wells	52	52

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, and
- 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 alternative sites are not available and development needs to be in locations where there is a risk of flooding, 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 Technical 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 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.

Tunbridge Wells Borough Council

- Deal 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.
- Deal 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 a 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

Tunbridge Well Borough Council's Emergency Plan can found at:

Emergency planning

Sandbags

Tunbridge Wells Borough Council do not supply sandbags to residents and businesses. However they will try to assist in the response to the flooding defence of Tunbridge Wells, including making sandbags available to the highest risk locations. Their supply of sandbags is limited and they cannot guarantee that sandbags will be available in sufficient time, or in sufficient quantities to prevent or reduce damage to properties. If you live in a known flood risk area, you should adopt a self-help approach.

Further information:

Flooding in Tunbridge Wells

Storage of Sandbags

Sandbags will disintegrate with exposure to the weather so they are not recommended for use after long periods of time. However, they can be stored in a dry place to use again in the near future, as more than one flooding incident can occur in quick succession. Wherever possible store sandbags dry, as wet bags will decay quicker. If you are unable to store full sandbags, please empty the dry bags and store the pile of sand in a dry place, keeping the bags so that they can be re-filled.

If you are not storing sandbags for future use, double wrap them (bin liners can be used), and take them to your nearest household waste recycling centre for disposal. Alternatively, the bags can be split open, with the spread over your garden, and the empty bags put in your refuse bin. Please do not place full sandbags or sand in your bin for collection, and do not allow any sand to be washed into drains as this will block them. Wash your hands thoroughly in warm soapy water afterwards.

Never allow children to play with the sand from sandbags, or place it in sand pits; the type of sand used in sandbags is not suitable for this purpose, and it may also be contaminated.

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
Kent Homechoice
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

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

Romney Marsh Area Internal Drainage Board
0179 7227 000,
Website,
E-Mail: info@rmaidb.co.uk

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

Environmental Services
Tunbridge Wells Borough Council
Website

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

Tunbridge Wells West

In the Tunbridge Wells West area there are a total of 16 properties at risk from fluvial flooding (taking the existing defences into account), all of which are at medium to high risk.

Table 3. Number of dwellings at risk from fluvial/tidal flooding in Tunbridge Wells West.

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Culverden	0	0
Rusthall	0	0
Speldhurst and Bidborough	16	16

The River Grom, a tributary of the River Medway, forms the southern boundary to the Tunbridge Wells West area. Although there is a fluvial flood risk associated with this watercourse, it flows through a predominantly rural and sparsely populated area; the risk to people and property arising from this stream is therefore relatively low.

To the north and east of Speldhurst, the NaFRA mapping identifies another flow route along the course of a spring-fed ordinary watercourse that follows the valley floor. There is a higher risk from this watercourse owing to the presence of property constructed in association with its historical use to power various mills that will have been converted to residential use in more recent times.

During periods of heavy or prolonged rainfall, there is a chance that the capacity of both of these narrow watercourses will be exceeded, increasing the likelihood of water coming out of the channel to cause localised flooding.

To the south of Speldhurst, the underlying geology predominantly comprises relatively permeable and freely drainage chalk and sand formations; for new development in this area, there would therefore be a presumption in favour of drainage systems that are designed to dispose of surface water through infiltration.

The area to the north of Speldhurst is largely underlain by more impermeable clays and mudstones, which may reduce the efficacy of drainage systems designed to drain via infiltration. While permeability testing should be undertaken before discounting infiltration, an attenuated off-site discharge may be required (in agreement with the relevant and receiving authorities).

As with the rest of the district, surcharging of sewers and highways gullies can be expected during periods of prolonged or extreme wet weather.

The NaFRA mapping for the Tunbridge Wells West area (which shows the locations at risk from flooding with any defences in place) is shown in Appendix 5.

Further information:

- Tunbridge Wells Surface Water Management Plan - Tunbridge Wells surface water management plan
- Tunbridge Wells' Strategic Flood Risk Assessment - Strategic flood risk assessment

Planned flood defence works in the Tunbridge Wells West area

Tunbridge Wells Urban

In the Tunbridge Wells area there are a total of 55 properties at risk from fluvial flooding (taking any existing defences into account), all of which are at a medium to high risk.

Table 4. Number of dwellings at risk from fluvial/tidal flooding in Tunbridge Wells North

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Southborough and High Brooms	0	0
Southborough North	0	0
St. John's	0	0

Table 5. Number of dwellings at risk from fluvial/tidal flooding in Tunbridge Wells East

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Pembury	3	3
Sherwood	13	13
St. James'	0	0

Table 6. Number of dwellings at risk from fluvial/tidal flooding in Tunbridge Wells South

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Broadwater	38	38
Pantiles and St. Mark's	1	1
Park	0	0

The Tunbridge Wells town urban area is at most significant risk of flooding during periods of extremely intense rainfall, when excess surface water is either unable to discharge to (or be readily accommodated within) the town's sewer network.

The largely impermeable urban area drains to either combined sewers (carrying both foul and surface water) or to dedicated surface water sewers where available.

These public sewers are owned and maintained by Southern Water; however they also receive highway drainage via road gullies and pipework owned and maintained by Kent County Council as the Highway Authority.

Much of the more recently constructed areas to the north, south and east of the town have separate surface water and foul water drainage, with combined drainage being

prevalent in older parts of the town. The town centre area to the north east of The Pantiles is generally drained by combined sewers. The surface water sewers generally discharge to watercourses which ultimately flow into the River Grom.

When the capacity of the sewers is exceeded, any water that cannot be contained by the network accumulates in topographical low points, with additional water surcharging from the network serving to exacerbate the problem. This has historically posed more of a risk to those older parts of the town that are served by combined sewers, most notably the areas around Tunbridge Wells Station, The Pantiles and the topographically lower area to the south of Tunbridge Wells Common.

The Environment Agency's updated Flood map for Surface Water depicts several potential flow routes for runoff throughout the town, many of which converge in areas where flooding has been historically experienced.

The Tunbridge Wells Surface Water Management Plan indicates that hydraulic overload of foul and surface water sewers was recorded at Warwick Park in 2009 and 2012. KCC received reports of flooding affecting properties throughout the town centre in November 2013, December 2013, February 2014, October 2014 and August 2015.

The north of the main Tunbridge Wells urban area ultimately drains via the Greggs Wood Stream and the Southborough Stream; the Greggs Wood Stream joins the Southborough Stream adjacent` to the sewage treatment works on Dowding Way before flowing north towards its confluence with the River Medway, east of Tonbridge.

The River Grom is an ordinary watercourse that drains the south and western sides of Tunbridge Wells. It conveys water away from the town centre towards its confluence with the River Medway to the west of Groombridge, upstream of Tonbridge. Its upper reaches have been heavily modified and culverted to enable development to occur along its former and existing route. There is a debris screen on the upstream entrance to the culvert to prevent large objects from blocking it further down; however, during periods of high flow, smaller objects can accumulate on the screen, reducing the flow into the culvert and increasing the risk from water surcharging from the structure's entrance.

The relatively steep topography of the northern part of the town results in a relatively low fluvial flood risk from the Greggs Wood and Southborough Streams, with the majority of residential property being situated above the maximum extreme flood levels predicted to occur within the watercourses. There is a small amount of fluvial flooding predicted around the lower lying industrial areas at the confluence of the rivers, but this would be generally well confined with limited impact expected.

The underlying geology of this area is variable, with bands of both relatively permeable and freely draining sand, and impermeable and poorly draining clay and mudstone. The drainage associated with any new development should be carefully designed to take full account of the site-specific conditions. Areas underlain with by the more impermeable clays and mudstones may experience problems with drainage systems designed to drain through soakage. While permeability testing should be undertaken before discounting infiltration, an attenuated off-site discharge may be required (in agreement with the relevant and receiving authorities).

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

Further information:

- Tunbridge Wells Surface Water Management Plan - Tunbridge Wells surface water management plan
- Tunbridge Wells' Strategic Flood Risk Assessment - Strategic flood risk assessment

Planned flood defence works in the Tunbridge Wells area

Tunbridge Wells Rural

In the Tunbridge Wells Rural area there 1716 properties at risk from fluvial flooding (taking the existing defences into account); 1184 of these are at medium to high risk.

Table 5. Number of dwellings at risk from fluvial/tidal flooding in the Tunbridge Wells Rural area

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Brenchley and Horsmonden	29	39
Capel	321	592
Goudhurst and Lamberhurst	78	125
Paddock Wood East	217	383
Paddock Wood West	539	577

Paddock wood faces the greatest risk of flooding in the Tunbridge Wells Rural area.

Paddock Wood is situated on the Low Weald, a relatively flat area underlain by largely impermeable Weald Clay. This impermeability means that rainwater cannot easily drain into and through the soil, with the flat topography meaning that runoff cannot flow away from the area quickly. This leads to widespread and frequent ponding of surface water across the area's rural landscape.

The two highest contributing factors to flooding are the over land flows that affect residential properties in the north west and north east and the ability of the surface water network to discharge into the watercourses that flow through and away from the town.

The Paddock Wood Stream flows from south to north through the centre of Paddock Wood; it is largely culverted through the town south of the railway line. To the west of Paddock Wood are the Tudely Brook and Gravely Ways Stream. To the east are the two Rhoden watercourses (the East Rhoden and West Rhoden); these open watercourses flow from south to north through culverts or bridges under the railway line.

These local watercourses ultimately flow into the Rivers Medway and Teise to the north of Paddock Wood and present a fluvial flood risk to Paddock Wood. However, these large regional main rivers do not directly flood the land south of the railway line and have little influence over the flow in the watercourses that flow through the town.

The town is also at risk from surface water flooding during periods of prolonged or extreme rainfall when the amount of runoff overwhelms the town's sewers and watercourses.

The Alder Stream is a main river that flows through Five Oak Green; the catchment of this watercourse is responds quickly to rainfall events, with regular flooding being recorded from this stream. The railway embankment to the north of the village prevents the free flow ow water from the south and can exacerbate flooding, with

roads and property having been historically affected. When water levels are high in the Alder Stream, highway drains, gullies and local sewer networks may be prevented from discharging; this can cause surface water to accumulate in topographical low-points until the water level in the watercourse recedes.

The village of Lamberhurst is located on the River Teise to the south of the ward. Within the village there are low lying properties that are at risk of flooding from the River Teise and the Brewer Stream during periods of prolonged or extreme rainfall. The Brewer Stream is a small tributary of the River Teise that flows in a southerly direction underneath and around Brewer Street. When flooding occurs, the River Teise comes out of its banks in the centre of the village and can cause flooding as it flows overland.

The Environment Agency has funded two property level protection (PLP) schemes for properties at risk of flooding from the River Teise and the Brewer Stream.

The underlying geology of this area is variable, with bands of both relatively permeable and freely draining sand, and impermeable and poorly draining clay and mudstone. The drainage associated with any new development should be carefully designed to take full account of the site-specific conditions. Areas underlain with by the more impermeable clays and mudstones may experience problems with drainage systems designed to drain through soakage. While permeability testing should be undertaken before discounting infiltration, an attenuated off-site discharge may be required (in agreement with the relevant and receiving authorities).

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

Further information:

- Tunbridge Wells Surface Water Management Plan - Tunbridge Wells surface water management plan
- Paddock Wood Surface Water Management plans - Paddock Wood surface water management plan
- Tunbridge Wells Strategic Flood Risk Assessment - Strategic flood risk assessment
- Paddock Wood Strategic Flood Risk Assessment - Paddock Wood strategic flood risk assessment - technical note

Planned flood defence works in the Tunbridge Wells Rural area

Cranbrook

In the Cranbrook area there are a total of 77 properties at risk from the sea (taking the existing defences into account), 73 of which are at medium to high risk.

Table 6. Number of dwellings at risk from fluvial flooding in Cranbrook

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Benenden and Cranbrook	5	5
Frittenden and Sissinghurst	59	63
Hawkhurst and Sandhurst	9	9

There is a relatively low risk of fluvial flooding in the Cranbrook area. However, there remains a risk of surface water flooding in the event of prolonged or extreme rainfall throughout the area, particularly where the sewers become overloaded, or where gullies or drains become blocked and are unable to drain freely. Such issues can arise from the drainage systems in residential areas, or as a result of runoff from areas of agricultural land.

The Environment Agency's updated Flood map for Surface Water depicts potential surface water flow-routes that follow the routes of ordinary watercourses from the higher ground around Hawkhurst, Sandhurst, Frittenden and Sissinghust towards the lower lying land beyond. This indicates that during periods of prolonged and/or extreme rainfall, there is an increased likelihood of runoff causing potential problems with these watercourses.

The underlying geology of this area is variable, with bands of both relatively permeable and freely draining sand, and impermeable and poorly draining clay and mudstone. The drainage associated with any new development should be carefully designed to take full account of the site-specific conditions. Areas underlain with by the more impermeable clays and mudstones may experience problems with drainage systems designed to drain through soakage. While permeability testing should be undertaken before discounting infiltration, an attenuated off-site discharge may be required (in agreement with the relevant and receiving authorities).

The NaFRA mapping for Cranbrook (which shows the areas at risk from flooding with the defences in place) is shown in Appendix 8.

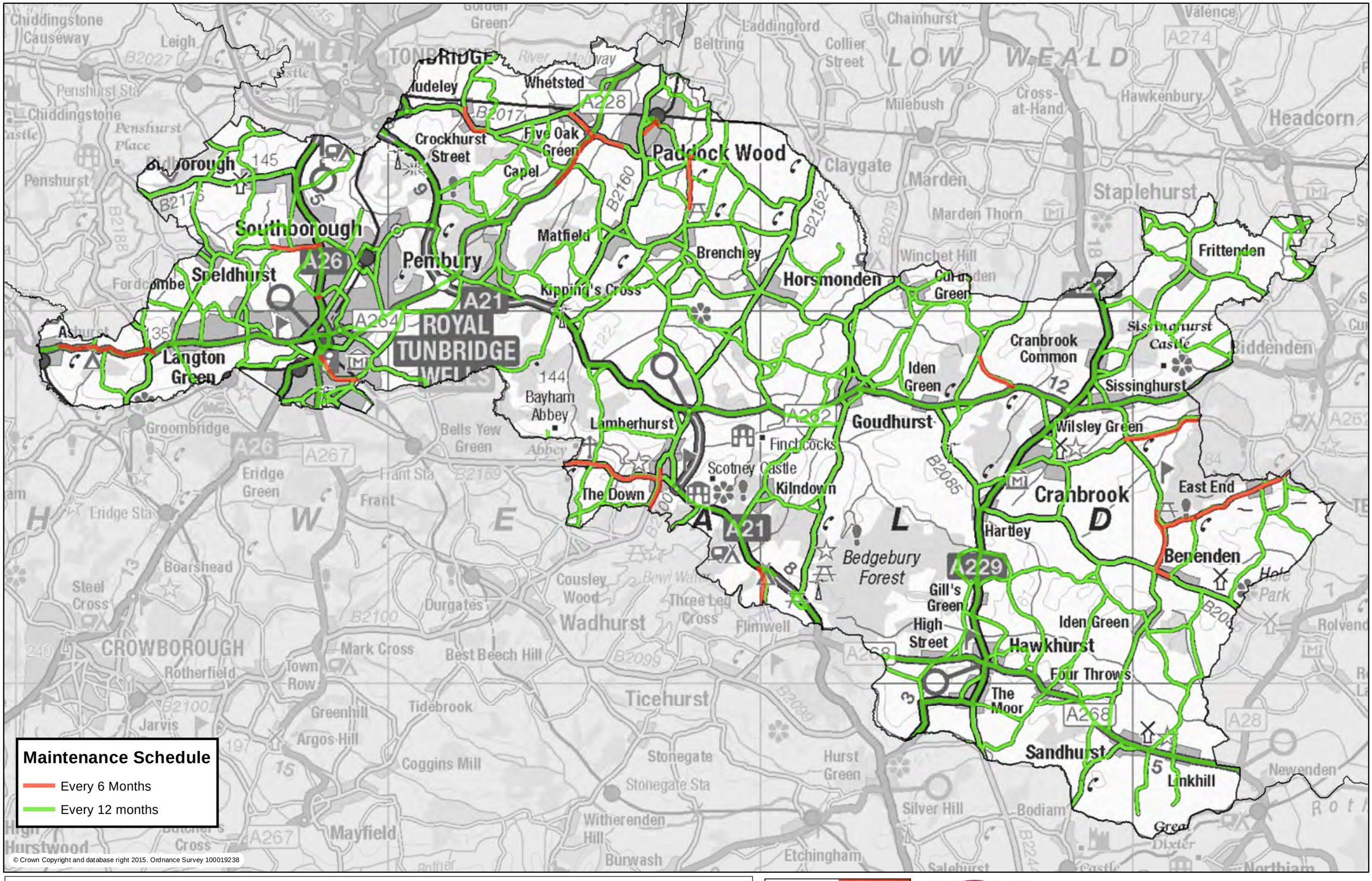
Further information:

- Tunbridge Wells Surface Water Management Plan - Tunbridge Wells surface water management plan
- Tunbridge Wells' Strategic Flood Risk Assessment - Strategic flood risk assessment

Planned flood defence works in the Cranbrook area

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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Appendix 2

Internal Drainage Board Areas and Watercourses

Romney Marsh Drainage District Watercourses

Upper Medway IDB Watercourses

Romney Marsh IDB Drainage District

Upper Medway IDB Drainage District

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.

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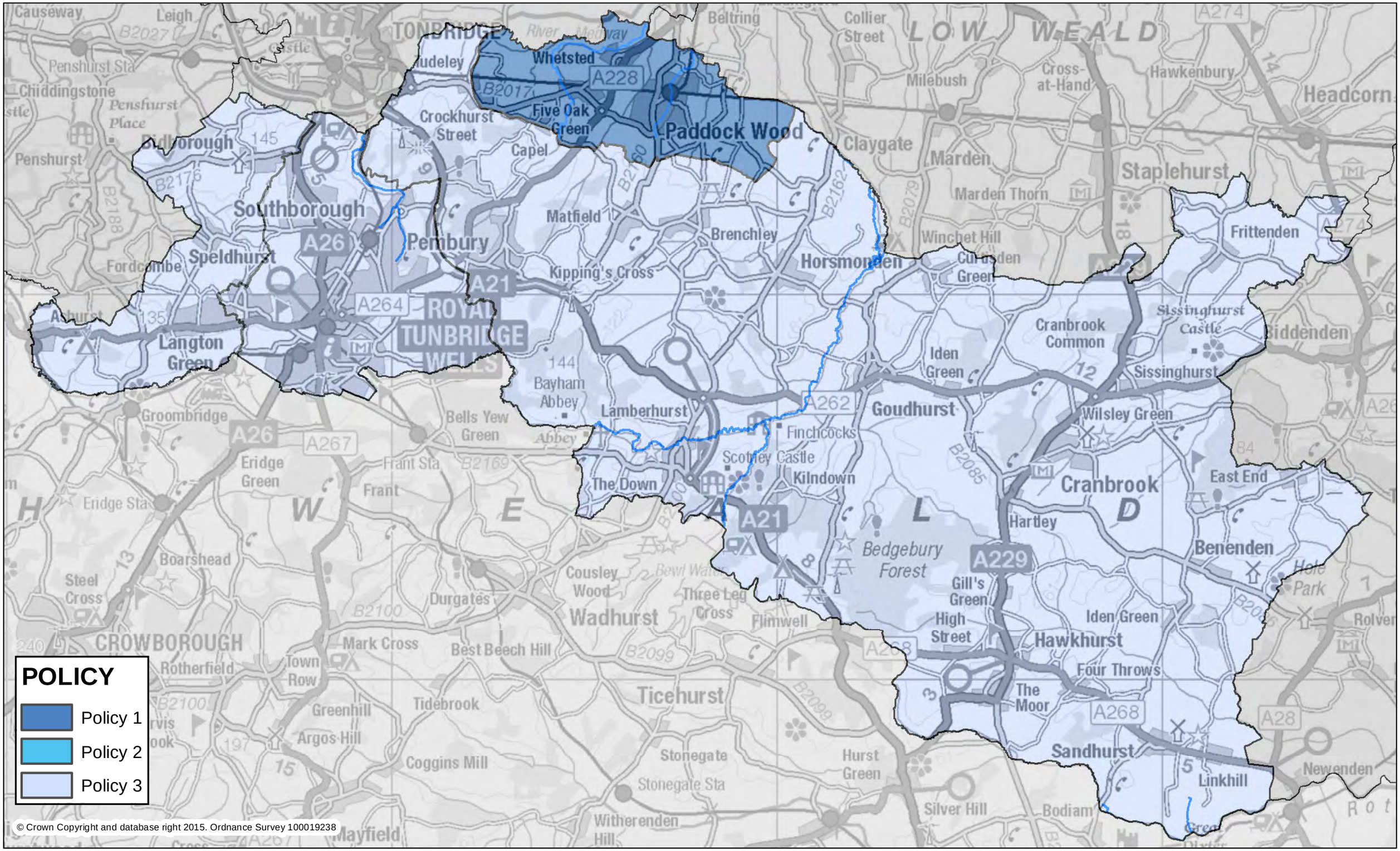
Appendix 3

Tunbridge Wells Local Flood Risk Management Policy areas



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 ogether 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.

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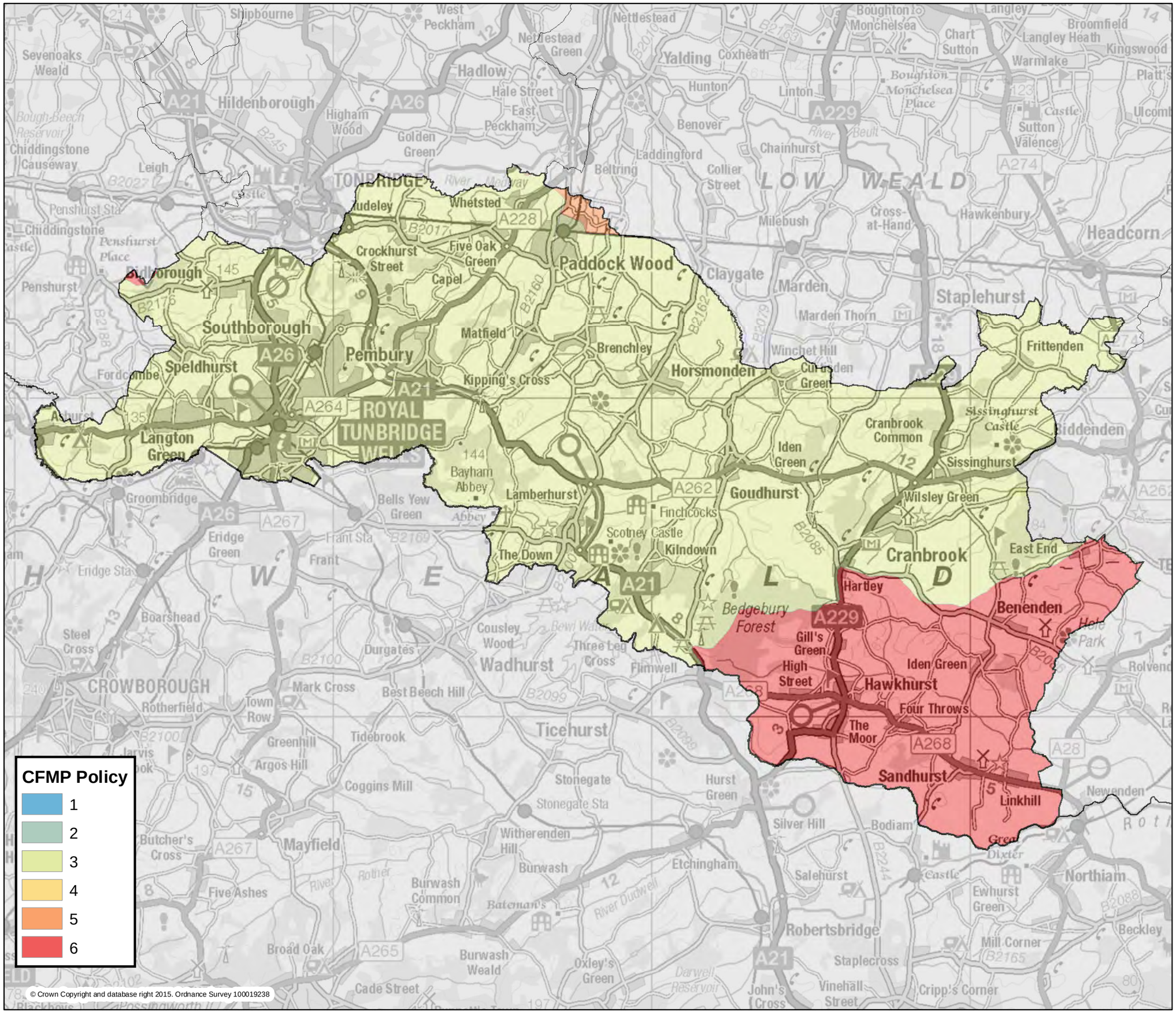
Appendix 4.

Catchment Flood Management Plan and Shoreline Management Plan policy areas



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.

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Appendix 5

Tunbridge Wells West: NaFRA mapping

Tunbridge Wells West

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:

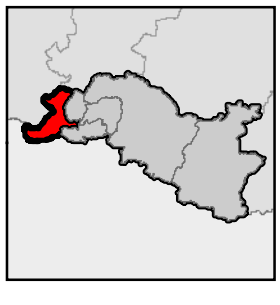
High – At risk from an event with an AEP of 3.3% or greater

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%

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



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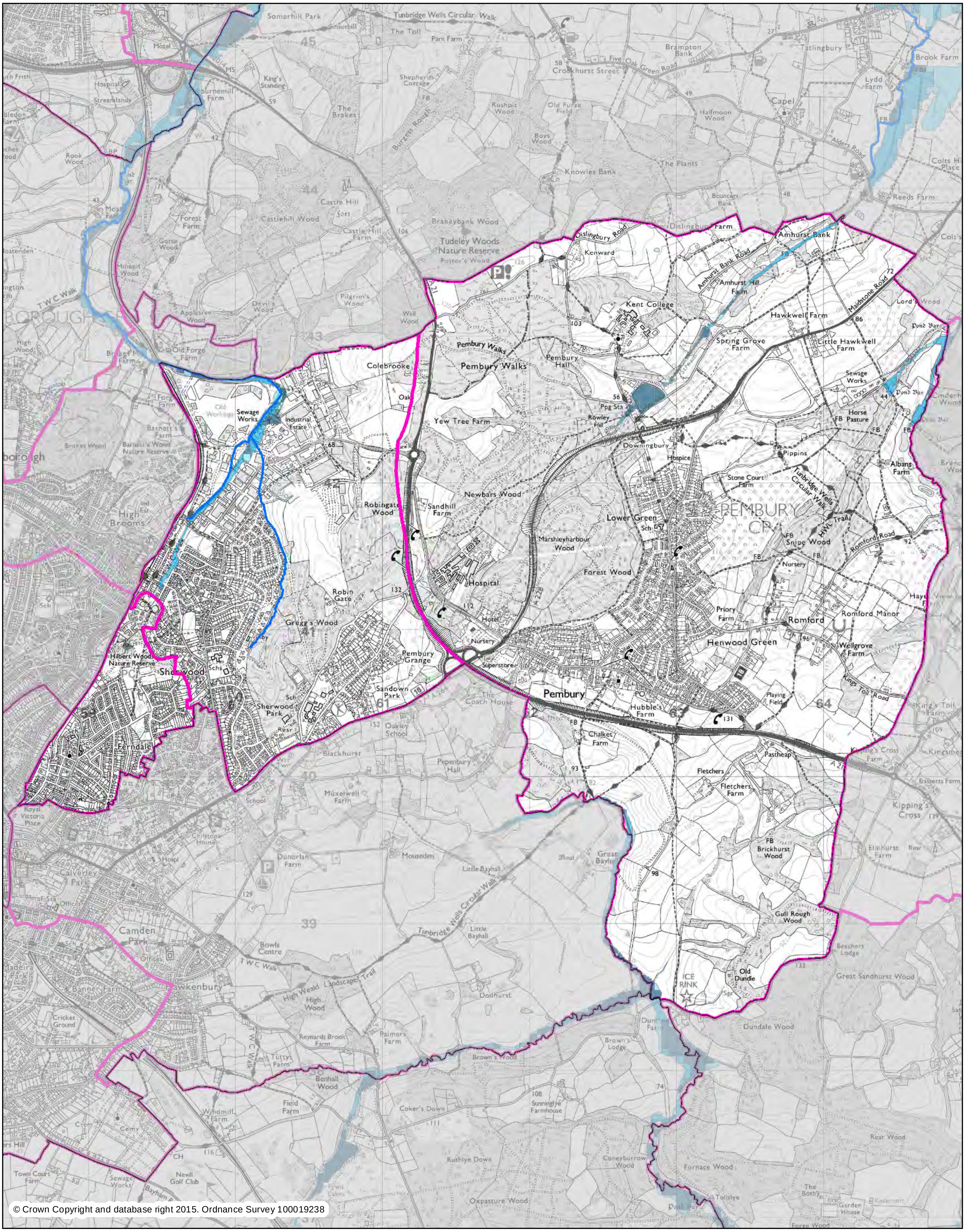
Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the liklihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping of 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

Tunbridge Wells Urban: NaFRA mapping



Tunbridge Wells East

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:

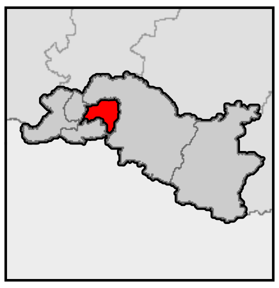
High – At risk from an event with an AEP of 3.3% or greater

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%

Main Rivers
Very Low
Low
Medium
High
District Wards



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 7

Tunbridge Wells Rural: NaFRA mapping

Tunbridge Wells North

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:

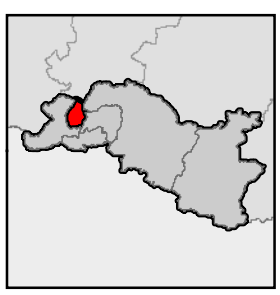
High – At risk from an event with an AEP of 3.3% or greater

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%

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



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Caveats:
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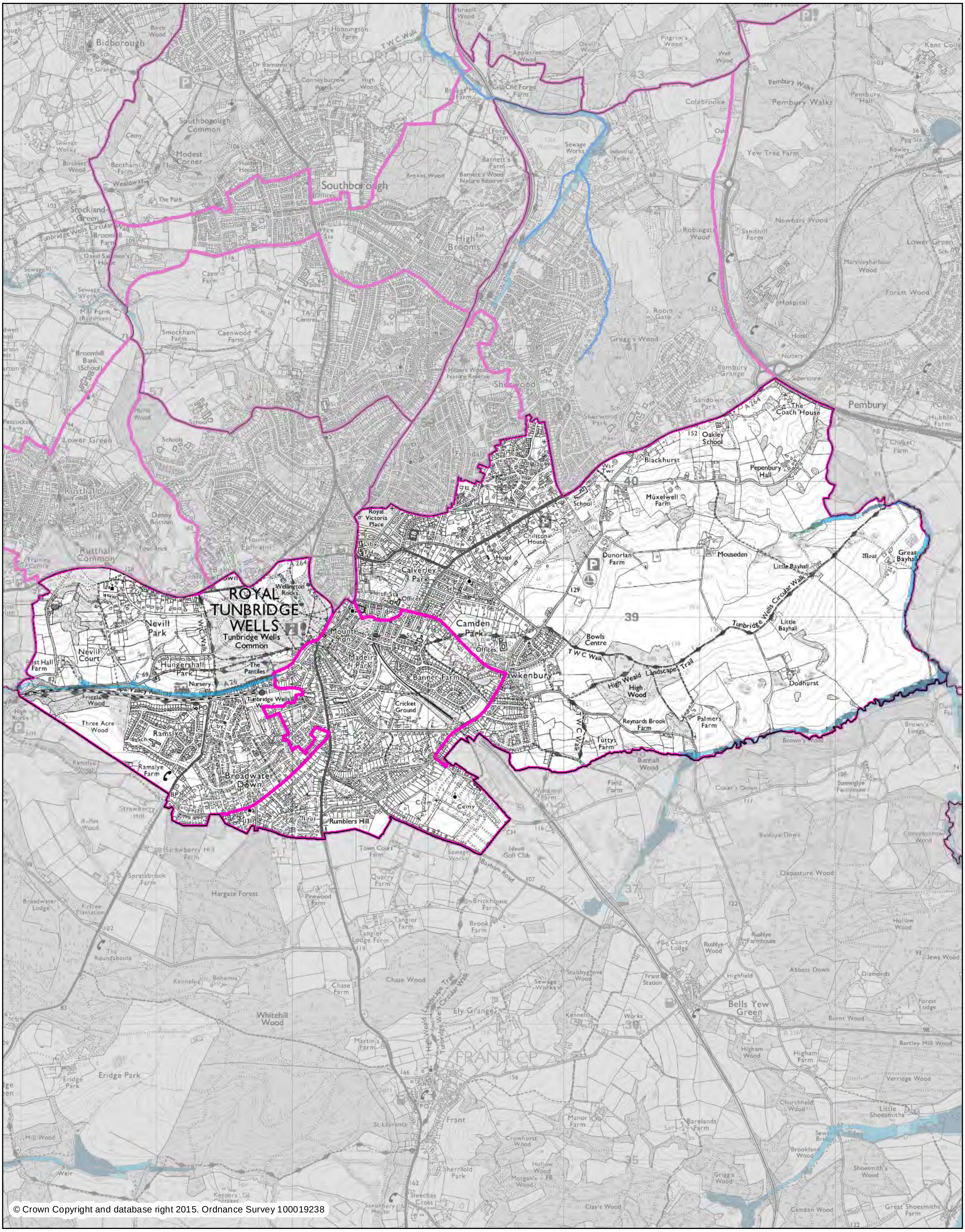


Tunbridge Wells South

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:

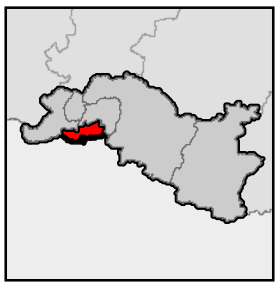
High – At risk from an event with an AEP of 3.3% or greater

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%

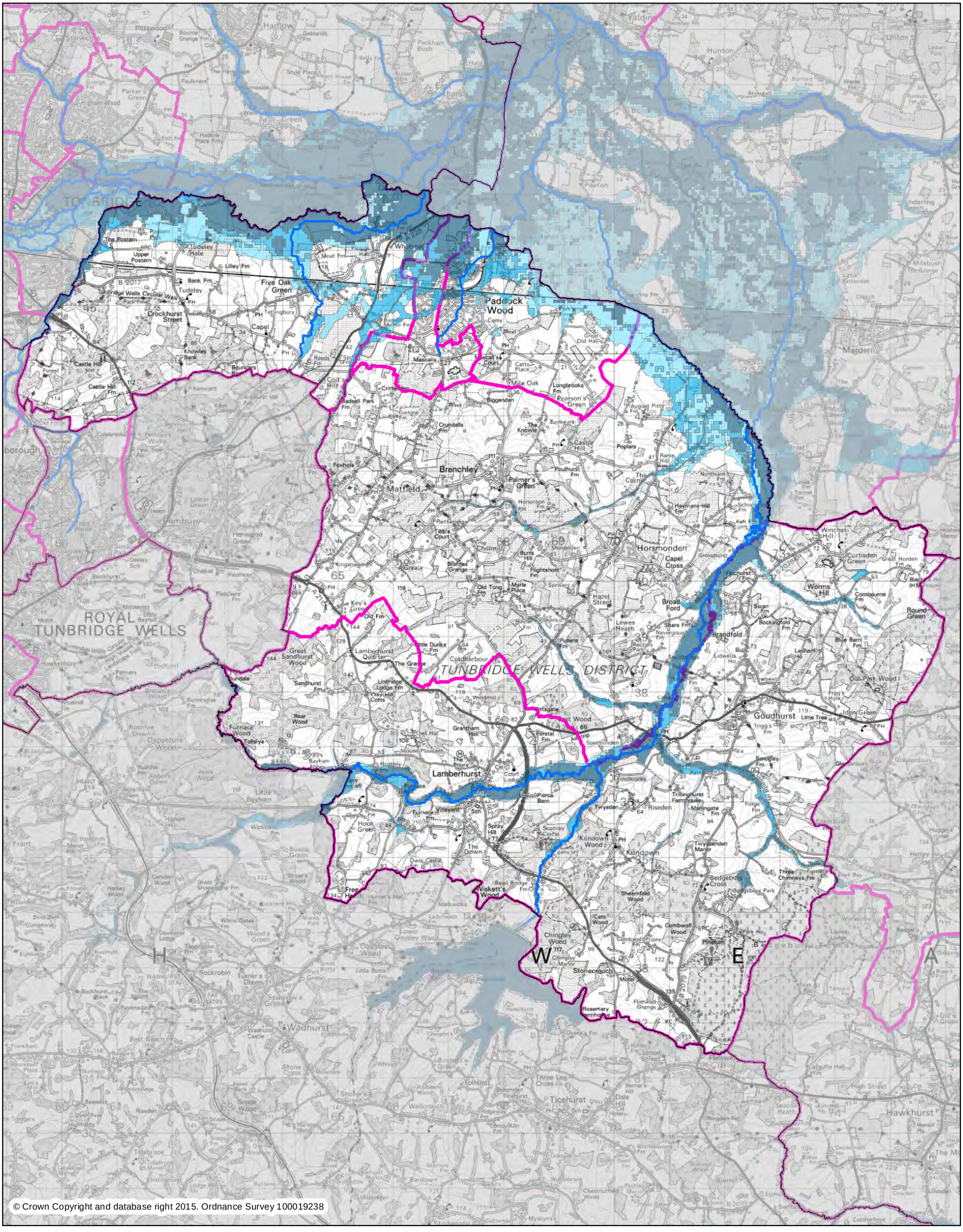
Main Rivers
Very Low
Low
Medium
High
District Wards



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 8

Cranbrook: NaFRA mapping



Tunbridge Wells Rural

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:

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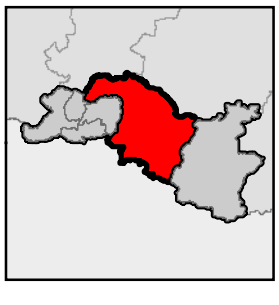
Very Low – At risk from events with an AEP of less than 0.1%

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



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Appendix 9

Summary of planned works in the Tunbridge Wells District

Cranbrook

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

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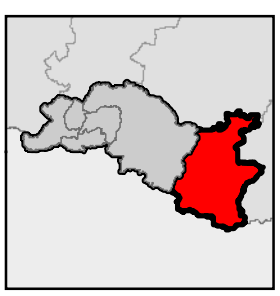
- Very Low
- Low
- Medium
- High
- District Wards



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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.

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.