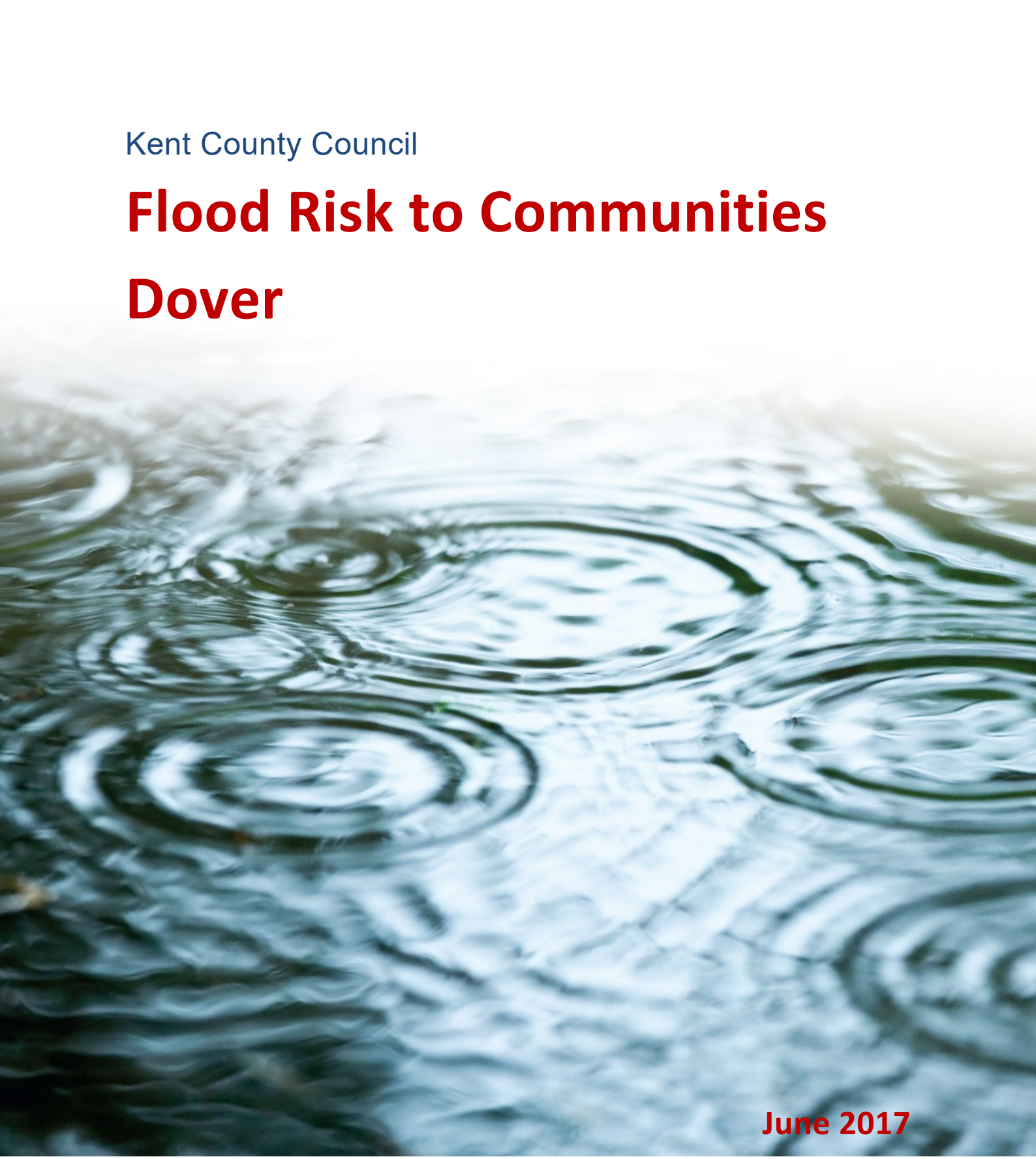
Kent County Council

Flood Risk to Communities

Dover



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In partnership with:

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

- **The Environment Agency**
- **Dover District Council**
- **The River Stour (Kent) Internal Drainage Board**
- **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 Dover District 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 Dover. These include the Environment Agency, Kent County Council, Dover District Council, Southern Water, and the River Stour (Kent) Internal Drainage Board.

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.

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.

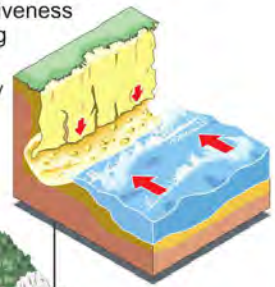
Risk Management Authority
- KCC as the Lead Local Flood Authority and Highway Authority.

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.

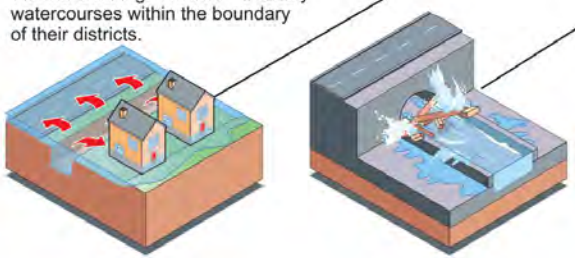
Risk Management Authority
- DB



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)

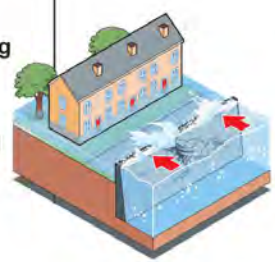
May occur when the sewerage system fails due to blockages or it is overwhelmed by surface water.

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



Dover overview

The District of Dover is situated on the eastern coast of Kent. It covers an area of 315sq km and has a coastline of approximately 35 km long, which stretches from the Stour estuary at Pegwell Bay to the north, down to Capel-le-Ferne in the south; it is bordered by Thanet to the north, Canterbury to the north-west and Shepway to the south west. The administrative boundaries are shown in Figure 1 below.

A large proportion of the Dover District is arable agricultural land, managed grassland and forestry. There are two large towns, Dover and Deal and some smaller towns, Sandwich, Aylesham and Kingsdown, and a number of villages and other small settlements.

The north of the district is characterised by large, flat floodplains around the River Stour and the Coastal areas around Pegwell Bay. The central and southern parts of the district at characterised by the North Downs, with steep-sided ‘u-shaped’ valleys and very few watercourses due to the permeability of the underlying chalk.

The two key watercourses within the district are the River Stour which flows from the District boundary at Stourmouth to the sea at Sandwich Bay, and the River Dour which rises in the Alkham Valley and flows through the urban centre of Dover to the sea at Wellington Dock

The Stour runs through the low-lying northern part of the district towards and through Sandwich; this area is at or near sea level, with the river flowing through a very flat and wide floodplain. The Stour is tidal up to Fordwich (to the east of Canterbury) with the widespread use of embankments throughout its lower reaches to prevent flooding to the abundant agricultural land.

The River Dour is characterised by a steep sided valley, with the floodplain widening towards the coast. It flows almost entirely through the urban areas of Dover town and the villages to the north. It is a groundwater fed chalk river, and is affected by water abstractions for public water supply. The channel of this watercourse has been historically heavily modified and poses a significant flood risk to the town of Dover as a result of its rapid response to run-off from the urban area.

The Dover District coastline is vulnerable to the effects of high tides, storm surges, and the action of large waves during severe storm events. During such events, the risk of both tidal flooding and coastal erosion increases.

The joint impacts of high river and elevated tidal levels also pose a risk to the Lower Stour estuary, with the town of Sandwich being at particular risk. Of the District’s 35 km of coastline, 26 km is defended against erosion. The remaining frontage consists of natural cliff.

The coastal defences within the District are managed by a variety of parties although Dover District Council retains certain legal powers as the operating authority for the area. The defended sections are managed as follows:

- Folkestone Warren to Abbots Cliff - **National Rail**
- Shakespeare Beach - **National Rail**
- Dover Harbour - **Dover Harbour Board**
- St. Margaret's Bay - **Dover District Council**
- Kingsdown Rifle Range - **Ministry of Defence**
- Kingsdown to Sandown Castle, Deal - **Dover District Council**
- Sandown Castle, Deal to Sandwich Bay - **Environment Agency**

The most significant flood risk to the urban areas of Deal and Sandwich is from a breach or overtopping of the tidal defences constructed to protect the areas behind. Recent improvements to the defences in and around Sandwich and Deal will have served to reduce the flood risk to the urban areas they have been built to protect.

The town of Dover is also at risk of surface water flooding caused by intense rainfall before it enters the river or sewer networks, overland flow resulting from high groundwater levels and exceedance of the capacity of the surface water or combined sewer networks. Due to the step nature of the town of Dover, the onset of surface water flooding can be relatively sudden and can lead to both high velocity flows in steep areas and deep ponding of flood water.

In the lower lying areas of the district, groundwater is another primary source of flooding, a result of the predominantly chalk geology and the limited depth to the underlying water table.

Notable recent flood events across the district include:

- **February 1953** – Significant tidal flood event affecting east coast of UK
- **January 1978** – Fluvial flooding of drains in Stour marshes;
- **February 1983** – Tidal surge overtopped right bank of Stour through Sandwich. This is thought to have affected 16 properties in total;
- **February 2001** – Fluvial flooding in Dover as a result of elevated groundwater levels following a wet winter;
- **September 2003** – Excess runoff caused flooding in the London Road area of Dover following intense storm;
- **June 2007** – surface water flooding affected parts of Sandwich, Deal and Dover following a period of intense rain.

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

The District's main rivers are the River Stour and the River Dour, with the North Stream, South Stream, Delf Stream, Goshall Stream and Ash Levels also forming part of the Environment Agency managed main river network.

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 River Stour (Kent) Internal Drainage Board have a general supervisory duty over all drainage matters within their district, much of which lies within the Dover area. Within their district they have consenting and enforcement powers for works carried out by others in or adjacent to ordinary watercourses.

Figure 1. Dover District Council

Sandwich

Deal

Dover North

Dover West

Dover Town

River Stour (Tidal)

Main River Centrelines

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 Dover District 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.**

Dover District Council

Dover District Council is a coastal district authority; as such they have powers to undertake works to prevent coastal erosion and flooding.

They are directly responsible for the following areas of coastline and beaches:

- St. Margaret's Bay
- Kingsdown to Sandown Castle, Deal

The Environment Agency are normally responsible for managing the other sea defences; however, within Dover District there are some privately owned or managed frontages, notably:

- Folkestone Warren to Abbots Cliff - **National Rail**
- Shakespeare Beach - **National Rail**
- Dover Harbour - Dover Harbour Board
- Kingsdown Rifle Range - **Ministry of Defence**

For the management of erosion of the land above sea level, the responsibility normally lies with Dover District Council as Coast Protection Authority under the Coast Protection Act 1949.

Due to the enormous expense such works incur, they are normally only undertaken where it can be demonstrated that the benefits outweigh the costs. It is likely therefore that any further works apart from routine maintenance will be of a limited nature.

Dover District Council monitor coastal protection and undertake important groyne repairs and beach replenishment works every year. Please contact propertyservices@dover.gov.uk if you require further information.

Dover District Council also 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.

They 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 River Stour (Kent) Internal Drainage Board

The River Stour (Kent) Drainage Board is the operating drainage authority within their designated drainage district. They manage and maintain approximately 80km of watercourses within their drainage district within Dover; this covers 13% of the borough's total land cover (42sqkm).

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 River Stour (Kent) 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 their district, please phone **01227 462377** or email enquiries@riverstouridb.org.uk.

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

Southern Water

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

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

http://goo.gl/FrP68N

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

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

Parish councils

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

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

They 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.

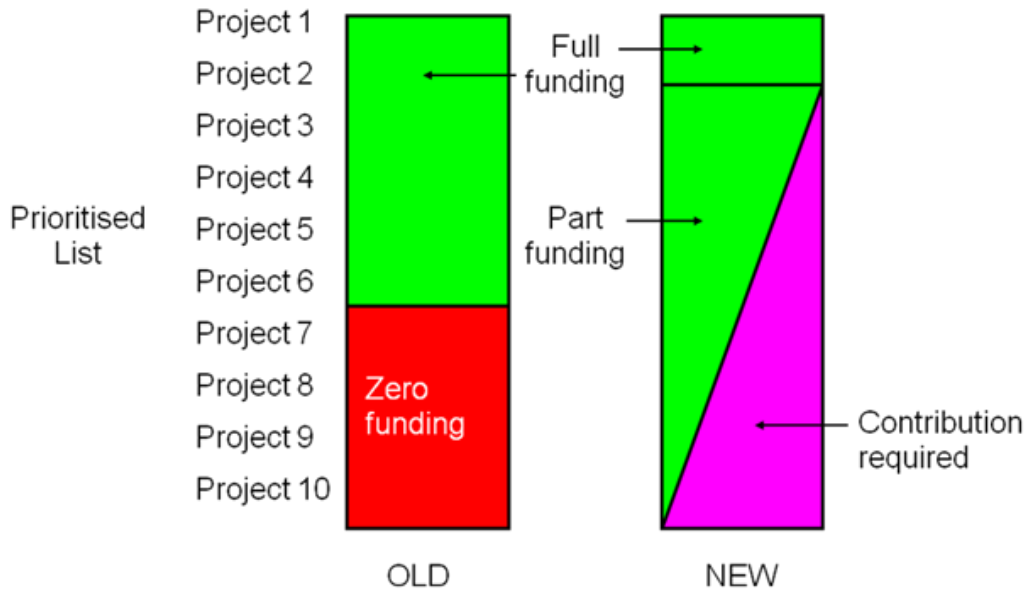


Figure 2. Flood defence investment.

Flood risk management plans and strategies

There are a number of flood risk management plans and strategies that affect how flood risk in Dover is managed. More detailed information about flood risk management in Dover 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.

Dover District is in the River Stour 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 Stour Catchment Flood Management Plan can be found here:

http://goo.gl/JdlEN8

Shoreline Management Plans

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

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

Dover District lies within the:

- Isle of Grain to South Foreland Shoreline Management Plan (Isle of Grain to South Foreland Shoreline Management Plan), and
- South Foreland to Beachy Head Shoreline Management Plan (South Foreland To Beachy Head Shoreline Management Plan)

The policies for the first epoch can also be found on the map in Appendix 4.

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 Dover Surface Water Management Plan can be found at:

Dover Surface Water Management Plan

The Deal Surface Water Management Plan can be found at:

Deal 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.

Dover District Council's SFRA can be read here:

Dover Strategic Flood Risk Assessment

River Basin Management Plan

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

Dover District falls within the area covered by the South East River Basin Management Plan; this can be found here:

https://goo.gl/LwuPab

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 Deal would not include the potential for any groundwater or surface water flooding that might occur at the same time as tidal 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.

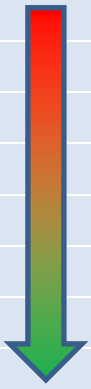
A Return Period is a way of expressing how often a flood of a given magnitude might reoccur over a long period of time. For example, a flood described as having a 1 in 100 year return period is likely to occur, on average, ten times every 1000 years (or once every 100 years).

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 Dover district, there are a total of 8444 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); 1646 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 Dover.

Parish	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Alkham	26	26
Ash	4	16
Aylesham	0	0
Capel-le-Ferne	0	0
Deal	402	5171
Denton with Wootton	0	0
Dover	0	731
Eastry	4	5
Eythorne	0	0
Goodnestone	0	0
Great Mongeham	0	1
Guston	0	0
Hougham Without	0	0
Langdon	0	0
Lydden	0	0
Nonington	0	0
Northbourne	93	101
Preston	1	3
Ringwould with Kingsdown	1	3
Ripple	0	0
River	58	99
Sandwich	599	1632

Shepherdswell with Coldred	0	0
Sholden	54	114
St. Margaret's At Cliffe	0	1
Staple	1	1
Stourmouth	16	23
Sutton	0	0
Temple Ewell	93	100
Tilmanstone	0	0
Walmer	19	347
Whitfield	0	0
Wingham	15	16
Woodnesborough	5	6
Worth	30	48

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.

Dover District 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

Dover District Council's Major Emergency Plan can be found at:

http://goo.gl/8ZRl0k

Sandbags

Dover District Council recognises that the primary responsibility for protecting property from the risk of flooding rests with the property owner. It is also aware of the considerable efforts put in by the Environment Agency to notify property owners in flood risk areas of the risks they face and encourage them to plan their own arrangements to protect themselves and their properties.

Dover District Council supports this approach and urges those living within areas identified as being at risk from flooding to follow the advice of the Environment Agency. Dover District Council is concerned that, in the event of the threat of flooding to a large number of properties in the District, it may not have the resources to protect every property and that priorities will have to be made. This could inevitably lead to some flooding to properties that, with some pre planned preventative measures by the occupant, could have been avoided or minimised.

However, as a responsible authority, Dover District Council recognises that the level of individual preparedness will vary enormously and it is prudent to plan for some additional support to the local community. With this in mind the Dover District Council has developed the following policy:

In the event of deteriorating weather or tidal conditions leading to the issue of severe weather warnings or riparian or tidal flooding alerts that could potentially affect any part of the Dover District Council administrative area, their officers will monitor the threat.

Risk assessments will be undertaken and regularly updated. These assessments could be wide area or site specific. They could include information obtained from site visits by Dover District Council Officers or other Professional Partners.

In the event of Dover District Council's risk assessment for a defined area identifying the use of sandbags to be appropriate to minimise or mitigate the risk of flooding to residential, utility or commercial properties, Dover District Council may set up local sandbag collection centres.

The allocation of sandbags to individuals will depend upon a number of factors including the total number of sandbags available, an assessment of the viability of protecting the particular property with sandbags, demands from other emergency flood defence measures involving the use of sandbags that would protect a greater number of properties. The need to protect infrastructure assets e.g. Roads, Energy Distribution Sites, Communication Network Sites, Hospitals and the Council's own Public Buildings etc. are also likely to make demands on the Council's limited resources.

Occupants of properties where protection from the risk of flooding using sandbags is assessed as viable but lack the physical ability to do so e.g. elderly or infirm may, subject to availability of manpower and the assessed priorities at the time, be provided with assistance from Dover District Council.

It must be emphasised that residents of Dover District who live in identified flood risk areas should not rely upon the Dover District Council to respond to a threat of flooding to their property but should have in place their own flood protection plan.

Further information can be found on the Dover District Council website: Sandbags Policy.

Personal flood planning and assistance

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

According to this advice, you should initially:

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

Further guidance on each of these steps is available at:

http://goo.gl/qPRnP1

Flood advice for businesses

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

http://goo.gl/oyrbfA

Flood Warnings

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

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

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

The Environment Agency's live Flood Warning map identifies areas where Flood Alerts, Flood Warnings or Severe Flood Warnings are in force. The map is updated with information from the Flood Warning service every 15 minutes; it can be found here: Live flood map.

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

Table 4. Flood Alert and Warnings

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

Key contacts

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

Private connections to the main sewer
Householders responsibility.

Domestic drainage in social housing properties
Mears Group
0800 313 4740, 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

River Stour (Kent) Internal Drainage Board
0122 7462 377,
Website,
E-mail: enquiries@rsidb.org.uk

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

Environmental Services
Dover District Council
01304 87 24 28,
E-mail: envprotection@dover.gov.uk

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

Sandwich

In the Sandwich area there are a total of 1864 properties at risk from rivers or the sea (taking the existing defences into account); 729 of these are at medium to high risk.

Table 3. Number of dwellings at risk from fluvial/tidal flooding in Sandwich

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Eastry*	4	5
Little Stour and Ashstone	37	59
Middle Deal and Sholden*	54	114
Sandwich	634	1686

* Note: flood risk for parish within this ward

The Sandwich area is at risk from tidal and fluvial flooding from the Lower Stour, an Environment Agency maintained river. The Lower Stour comprises the lower reaches of the Great Stour, which is joined by the Little Stour at its confluence at Pluck's Gutter on the northern boundary of the ward. Throughout this area the river is tidally influenced, with the tide having more of an impact as the river approaches it's estuary at Pegwell Bay.

Although tidal inundation poses the most significant risk to the area, the risk from flooding directly from the sea is relatively low. The main risk arises from elevated tidal levels propagating up the channel of the River Stour during abnormally high astronomical tides, significant storm surges, or a combination of the two. This flood risk can be greatly exacerbated if the river levels are elevated following periods of prolonged or extreme rainfall throughout the River Stour's wider catchment.

The town of Sandwich sits on the outside of a loop in the Lower Stour, where it meanders and changes direction from a generally southerly to a northerly flow. The Stonar Cut provides a 'short cut' for the Lower Stour, allowing fluvial floodwater to bypass the loop of the Sandwich urban area to reach the sea more directly. This structure is crucial in protecting Sandwich from fluvial flooding.

The presence of the Stonar Cut and the general capacity of the channel in this tidally influenced area mean that the river can usually accommodate the fluvial flow from upstream during even the most extreme rainfall events. However, the inflow of the tide from Pegwell Bay can restrict the river's ability to freely discharge to the sea; this can result in combined tidal and fluvial flooding when the capacity of the channel is exceeded.

To reduce and manage this combined risk, the Sandwich Town Tidal Defence scheme was designed and built to improve the standard of the defence to the town of Sandwich, the Discovery Park (formerly the Pfizer site) and some of the surrounding area. Prior to its completion in September 2015, some of the areas now defended would have been potentially inundated during a '1 in 20 year' event; this standard of defence should now provide protection from a '1 in 200 year' event.

Away from its main channel, the historical floodplain of the Lower Stour is a very low and flat area, drained by a complex network of interconnecting main rivers and Internal Drainage Board maintained watercourses. This low lying area is widely covered by valuable agricultural land which needs to be appropriately drained or irrigated, depending on the conditions. Much of the area is below sea-level; this has resulted in a heavily modified system that requires a careful balance of pumping and water-level control, overseen by the River Stour (Kent) Internal Drainage Board and the Environment Agency, to operate successfully.

The area from Pegwell Bay to the Sandwich Bay Estate is protected from tidal flooding by a dune system that offers a good standard of protection to the area behind; throughout this area there are no formal man-made defences.

Further inland, the Wingham River flows west from its source near Ash, through Wingham and onwards to its confluence with the Little Stour to the north east of Wickhambreaux. Along the course of this groundwater fed chalk-stream there are several properties at risk from flooding during periods of prolonged rainfall when the groundwater level in the underlying aquifer rises to increase the flow in the channel.

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

Further information:

- Deal Surface Water Management Plan - Deal Surface Water Management Plan
- Dover District Council's Strategic Flood Risk Assessment - Dover Strategic Flood Risk Assessment
- Sandwich Town Tidal Defences - https://goo.gl/aDs5jU

Planned flood defence works in the Sandwich area

Dover North

In the Dover North area there are a total of 106 properties at risk from rivers or the sea (taking the existing defences into account), 94 of which are at a medium to high risk.

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

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Aylesham	0	0
Eastry*	93	102
Eythorne and Shepherdswell	0	0
Ringwould	1	3
St. Margarets-at-Cliffe	0	1

* Note: flood risk for parish within this ward

The low lying land to the north east of Finglesham is the area at most significant risk of flooding in the Dover North ward. The North and South Streams are the source of this risk, along with the various drains and ditches that connect to them. These Environment Agency managed main rivers form part of a complex and interconnected network of engineered and pumped watercourses that serve to drain and irrigate the neighbouring agricultural land.

Much of the lower lying parts of this area are below sea level; the River Stour (Kent) Internal Drainage Board manages the water levels throughout the wider area to control this flood risk, particularly during periods of prolonged or intense rainfall, or during high astronomical tides or storm surges which will restrict the network's ability to freely discharge.

The greatest risk will arise from a coincidence of excessive rainfall with elevated tide levels, which can combine to put the drainage network at considerable strain.

The general topography of the northern part of the ward means that low lying highways and drainage infrastructure can be prone to inundation during significant rainfall event.

Any new development that increases the rate and volume of surface water run-off from a site will have the potential to increase the burden on this heavily managed network of watercourses. If surface water run-off in these areas is not managed appropriately then there is a risk that the capacity of the pumps and tidal outlets that are used to drain the marshes will be exceeded. This will exacerbate the risk flooding and therefore it is imperative that surface water drainage in these areas is managed responsibly.

The NaFRA mapping for the Dover North area (which shows the locations at risk from flooding with the defences in place) is shown in Appendix 6.

Further information:

- Deal Surface Water Management Plan - Deal Surface Water Management Plan

- Dover District Council's Strategic Flood Risk Assessment - Dover Strategic Flood Risk Assessment

Planned flood defence works in the Dover North area

Deal

In the Deal area there 5518 properties at risk from rivers or the sea (taking the existing defences into account); 421 of these are at medium to high risk.

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

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Middle Deal and Sholden*	399	1112
Mill Hill	0	0
North Deal	3	4304
Walmer	19	102

* Note: flood risk for parish within this ward

Flood risk in Deal arises from a complex combination of tidal, fluvial, ordinary watercourse, surface water and groundwater sources. According to the NaFRA mapping in Appendix 7, this risk would appear to be predominantly tidal in nature, although this risk is generally low and well managed owing to the presence of tidal defences that protect the majority of the urban area.

The tidal defences to the north of the town have recently been upgraded; a new 200m long rock barrier has been created north of Sandown Castle, which has improved the standard of protection and reduced the risk of a breach during extreme tidal events. Before the scheme was completed, some areas of Deal would have been at risk of flooding during a 1 in 20 year tidal event. The standard of defence has been improved and the town is now protected from a 1 in 300 year event.

Deal also benefits from a new 410-metre wave wall, which has been designed to reduce wave energy and direct waves back into the sea. It also reduces the amount of shingle that is thrown up onto the road. The overlapping design reduces the power of the waves while still maintaining public access to the promenade.

As a result of the reduction in tidal food risk, the highest risk within the town centre (and a number of areas within Mill Hill, Walmer and Middle Deal) results from prolonged or extreme rainfall events that rapidly drain off the urban area, overloading the town's sewer system. This flood risk is exacerbated by the large area of the town that is served by a combined sewer system, particularly in the northern and central areas of Deal. This combined system's capacity is overwhelmed more rapidly than the system designed to convey surface water alone. Both the surface water and combined systems can also be susceptible to overload from spray overtopping the defences along the town's frontage.

In June 2007, August 2010 and May 2014 Deal experienced significant surface water flooding, with flood water entering numerous residential and commercial properties.

There are numerous basement premises throughout Deal with entrances at or near road level where surface water could readily flow into the basement if it overtops the kerbs. There is evidence of deep flooding in some of these basements which poses a significant hazard to the occupants.

There is an area of lower lying, marshy land to the north west of the town that is drained by a network of Internal Drainage Board managed watercourses and an Environment Agency managed Main River (the Penfield Sewer). This area forms part of the wider, complex system that drains the agricultural levels that lie between Deal and Sandwich. This area is susceptible to flooding from a number of sources, and can be affected by groundwater, surface water and fluvial flooding, either in isolation or combined.

The drainage from any new development in Deal needs to be carefully considered to ensure the existing capacity problems in the sewer network are not exacerbated, and to ensure the underlying ground conditions are fully investigated before infiltration is utilised.

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

Further information:

- Deal sea defence scheme **-** https://goo.gl/2tL9GS
- Deal Surface Water Management Plan - Deal Surface Water Management Plan
- Dover District Council's Strategic Flood Risk Assessment - Dover Strategic Flood Risk Assessment

Planned flood defence works in the Deal area

Under the Shoreline Management Plan (SMP) for this frontage, it is recommended that the beach is maintained through regular beach management works (known as 'holding the line'). The main reason is largely to reduce flood risk and protect the other sea defences, such as the sea walls.

Every year beach monitoring surveys are carried out along the whole coastline to indicate any beach erosion – this helps us ascertain quantities of accretion and deposition, i.e. areas of eroded beach or areas that have accumulated too much beach. Movement of the beach and more importantly erosion of the beach mainly takes place during the winter months when the weather is at its worst (the combination of high spring tides and on shore winds cause the most erosion in this case).

Following the winter storms of 2016 (and more recently after storm Katie), the beach has moved significantly. Post storm surveys have been carried out and works have been arranged to bring back the shingle lost from vulnerable parts of the beach.

Southern Water are currently investing in the pumping station at Golf Road to improve the pumping capacity and resilience of the combined sewer network it serves. They are also investigating recent flooding on the combined sewer that cannot be explained by the capacity of this pump.

Southern Water have recently improved the surface water sewer outfall at Wellington Parade, which should reduce the risk of flooding in a number of areas of Deal.

Southern Water and KCC are investigating opportunities to reduce sewer flooding and surface water in the sewer in a number of locations in Deal.

Dover West

In the Dover West area there are a total of 225 properties at risk from fluvial flooding (taking the existing defences into account), 177 of which are at medium to high risk.

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

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Eythorne and Shepherdswell	0	0
Whitfield	0	0
Lydden and Temple Ewell	93	100
River	84	125
Capel-le-Ferne	0	0

The flood risk to the Dover West area predominantly arises from the River Dour and its tributaries as they pass through the smaller settlements above Dover.

The catchment of the River Dour is relatively small and steeply sided, with its upper reaches being predominantly rural. The main river source drains the Lydden Valley and rises in Watersend Pond, Temple Ewell; it receives most of its flow through this area from groundwater springs.

The Alkham Bourne drains the Alkham Valley and receives flow from perennial springs at Bushy Ruff and Kearnsey Abbey Lake.

These tributaries meet at Kearnsey Abbey Lake before flowing in a southeast direction and draining into the English Channel at the Western Docks, Dover.

The geology of the catchment ensures that there is a permanent baseflow in the river, whilst the topography and urbanised nature of the lower valley results in a rapid response to extreme rainfall events.

The urban areas along its course are largely undefended from the River Dour as it progresses towards Dover town centre and its outfall to the sea. The lower reaches around River, towards Buckland are have been extensively modified over the years by concrete channels, mills, culverts and weirs. These modifications and structures can restrict the free flow of water in the river, and can be prone to blockage.

Drainage in this area is via the Southern Water surface water and combined sewer networks; the surface water sewers discharge directly to the River Dour at several locations. As a result of the relatively steep topography of the valley sides and the largely impermeable nature of the urban area, the sewer network can be placed under considerable strain during extreme rainfall events; this can lead to surface water flooding if the sewers surcharge. There is an associated risk of flooding if elevated levels in the Dour prevent the free flow of water from the sewer network.

The drainage from any new development in Dover West needs to be carefully considered to ensure the existing capacity problems in the sewer network are not exacerbated, and to ensure the water from any development site is attenuated and discharged at a rate that will not contribute to the catchments generally rapid response to rainfall events. Drainage from previously developed sites should ideally be designed to reduce the rate from that of the existing use, with a view to incrementally improving the situation downstream.

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

Further information:

- Flood Risk Appraisal of the River Dour - Flood Risk Appraisal of the River Dour
- Deal Surface Water Management Plan - Deal Surface Water Management Plan
- Dover District Council's Strategic Flood Risk Assessment - Dover Strategic Flood Risk Assessment

Planned flood defence works in the Dover West area

Dover Town

In the Dover Town area there are a total of 731 properties at risk from fluvial flooding (taking the existing defences into account), 225 of which are at medium to high risk.

Table 7. Number of dwellings at risk from fluvial/tidal flooding in Dover Town

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Buckland	0	3
Castle	48	145
Maxton, Elms Vale and Priory	1	3
St. Radigunds	54	372
Tower Hamlets	122	181
Town and Pier	0	27

As with the Dover West area, the interaction of the River Dour with surface water, groundwater and the inflow from the town's sewer network represent the greatest risk of flooding to this ward.

The underlying geology of the wider catchment ensures that there is a permanent baseflow in the river, whilst the topography and urbanised and impermeable nature of the valley sides results in a rapid response to extreme rainfall events, the effects of which are most significantly felt in the lower lying parts of the town centre.

The urban areas along its course are largely undefended from the River Dour as it progresses towards its outfall to the sea. The channel has been extensively modified over the years by concrete channels, mills, culverts and weirs associated with Dover's industrial past. These modifications and structures can restrict the free flow of water in the river, and can be prone to blockage.

The heavily engineered channel of the river influences the nature and magnitude of flooding throughout the town. Although there are no formal flood defences along its course that provide a recognised standard of protection, there are a number of small raised walls which can have a localised flood risk management effect.

Drainage in this area is via the Southern Water surface water and combined sewer networks; the surface water sewers discharge directly to the River Dour at several locations. As a result of the relatively steep topography of the valley sides and the largely impermeable nature of the urban area, the sewer network can be placed under considerable strain during extreme rainfall events; this can lead to surface water flooding if the sewers surcharge. There is an associated risk of flooding if elevated levels in the Dour prevent the free flow of water from the sewer network.

There are numerous basement premises throughout Dover with entrances at or near road level where surface water could readily flow into the basement if it overtops the

kerbs. There is evidence of deep flooding in some of these basements which poses a significant hazard.

Although the outfall from River Dour into the Wellington Docks is through a completely submerged culvert which does not include any structures to prevent tidal waters entering the river, the main residential and commercial areas are sufficiently high above sea level for the tidal influence of the sea not to have an impact on the water levels in the Dour. The Wellington Dock gates are left open during high tide and closed during low tide in order to maintain a minimum water level within the dock.

The drainage from any new development in Dover Town needs to be carefully considered to ensure the existing capacity problems in the sewer network are not exacerbated, and to ensure the water from any development site is attenuated and discharged at a rate that will not contribute to the catchments generally rapid response to rainfall events. Drainage from previously developed sites should ideally be designed to reduce the rate from that of the existing use, with a view to incrementally improving the situation downstream.

The NaFRA mapping for Dover Town (which shows the areas at risk from flooding with the defences in place) are shown in Appendix 9.

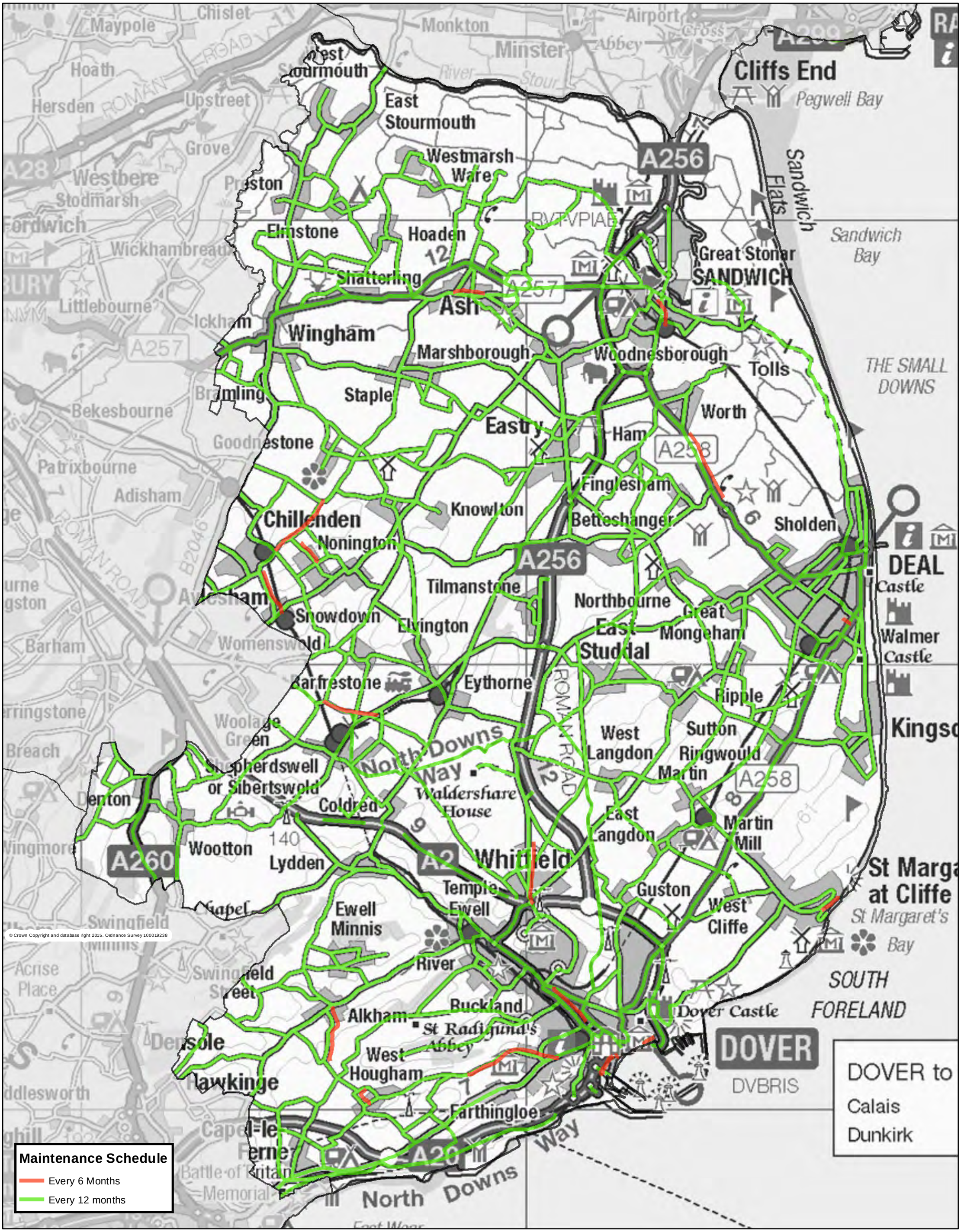
Further information:

- Flood Risk Appraisal of the River Dour - Flood Risk Appraisal of the River Dour
- Deal Surface Water Management Plan - Deal Surface Water Management Plan
- Dover District Council's Strategic Flood Risk Assessment - Dover Strategic Flood Risk Assessment

Planned flood defence works in the Dover Town 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

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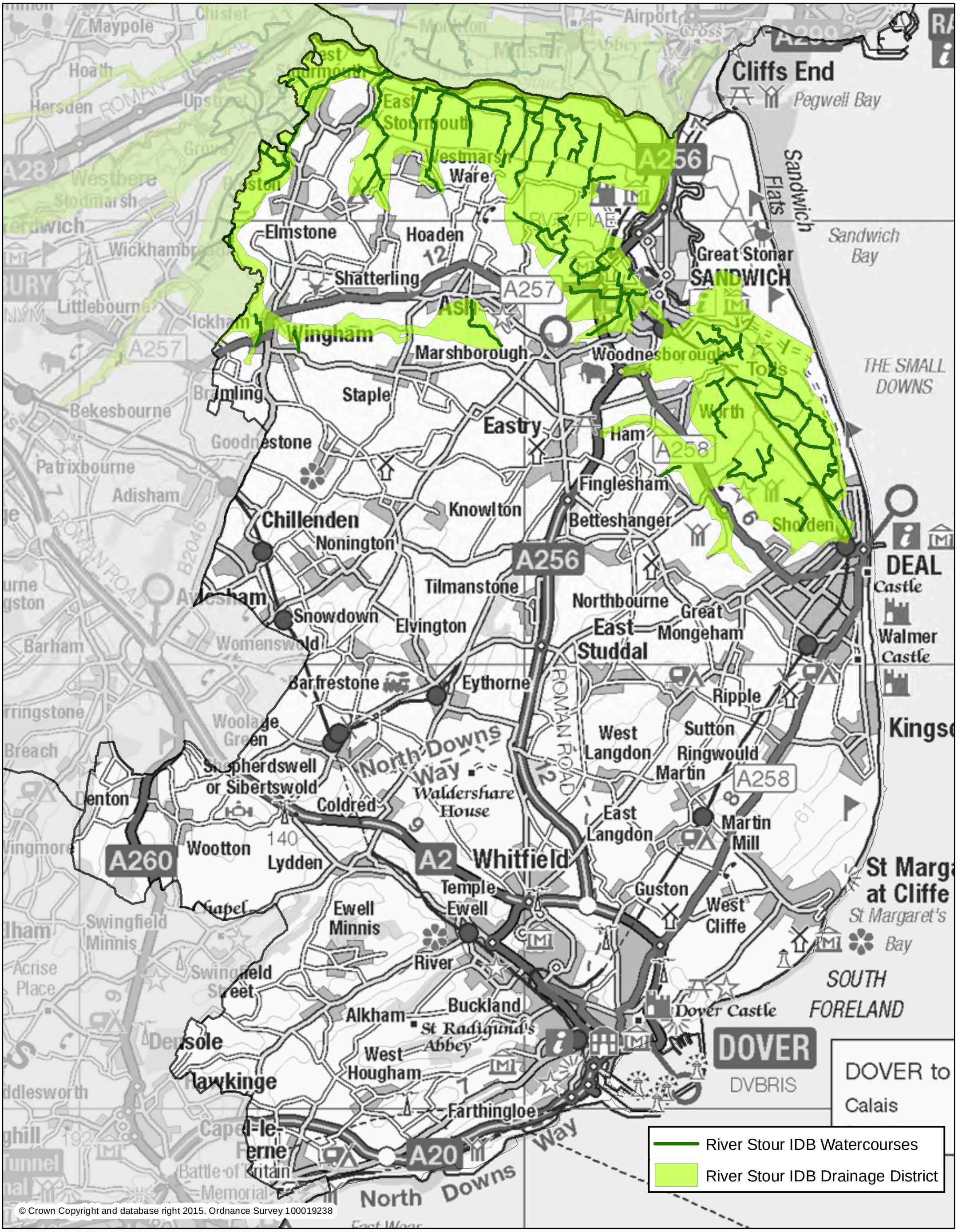
Appendix 2

Internal Drainage Board Areas and Watercourses



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

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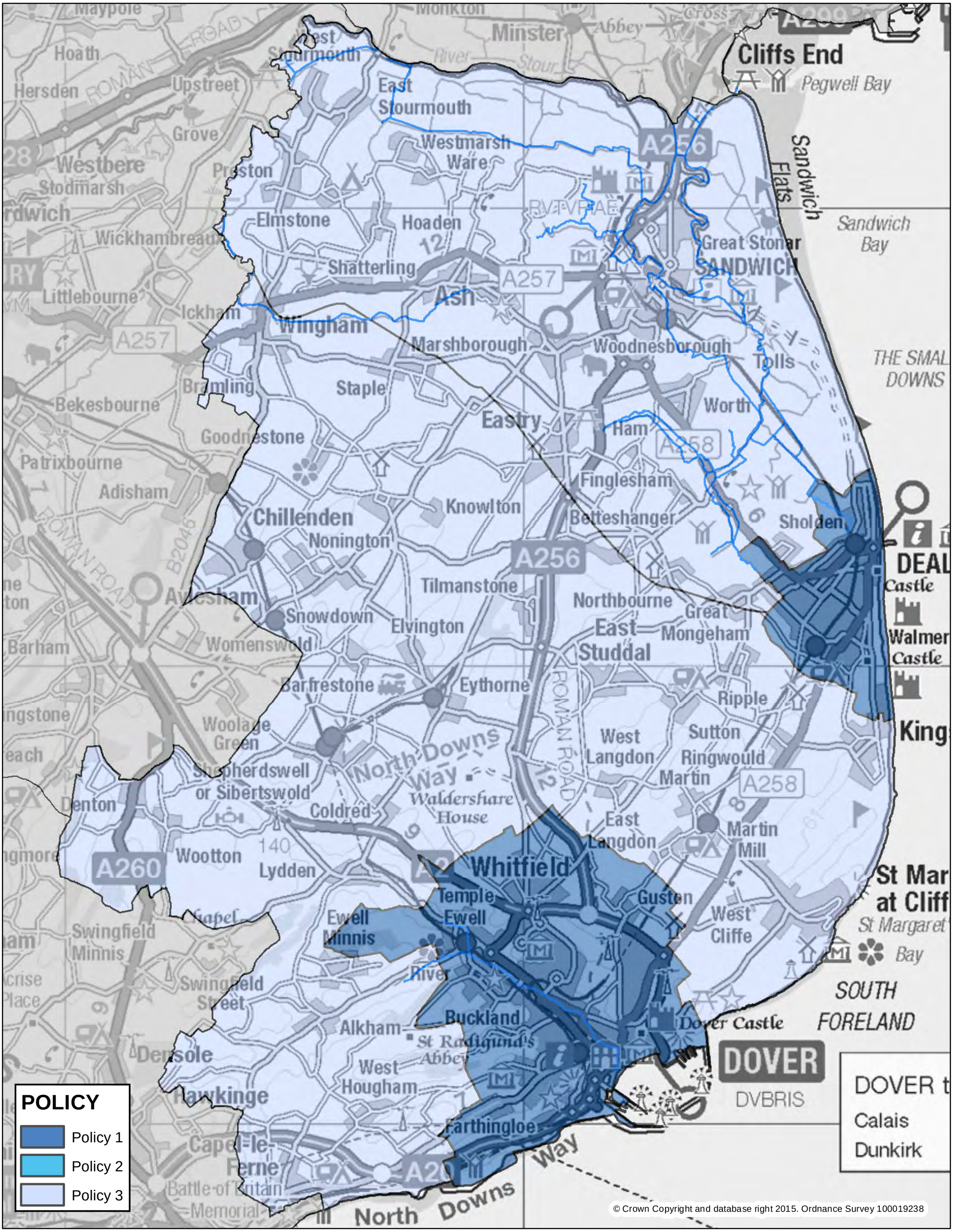
Appendix 3

Dover Local Flood Risk Management Policy areas



POLICY

- Policy 1
- Policy 2
- Policy 3

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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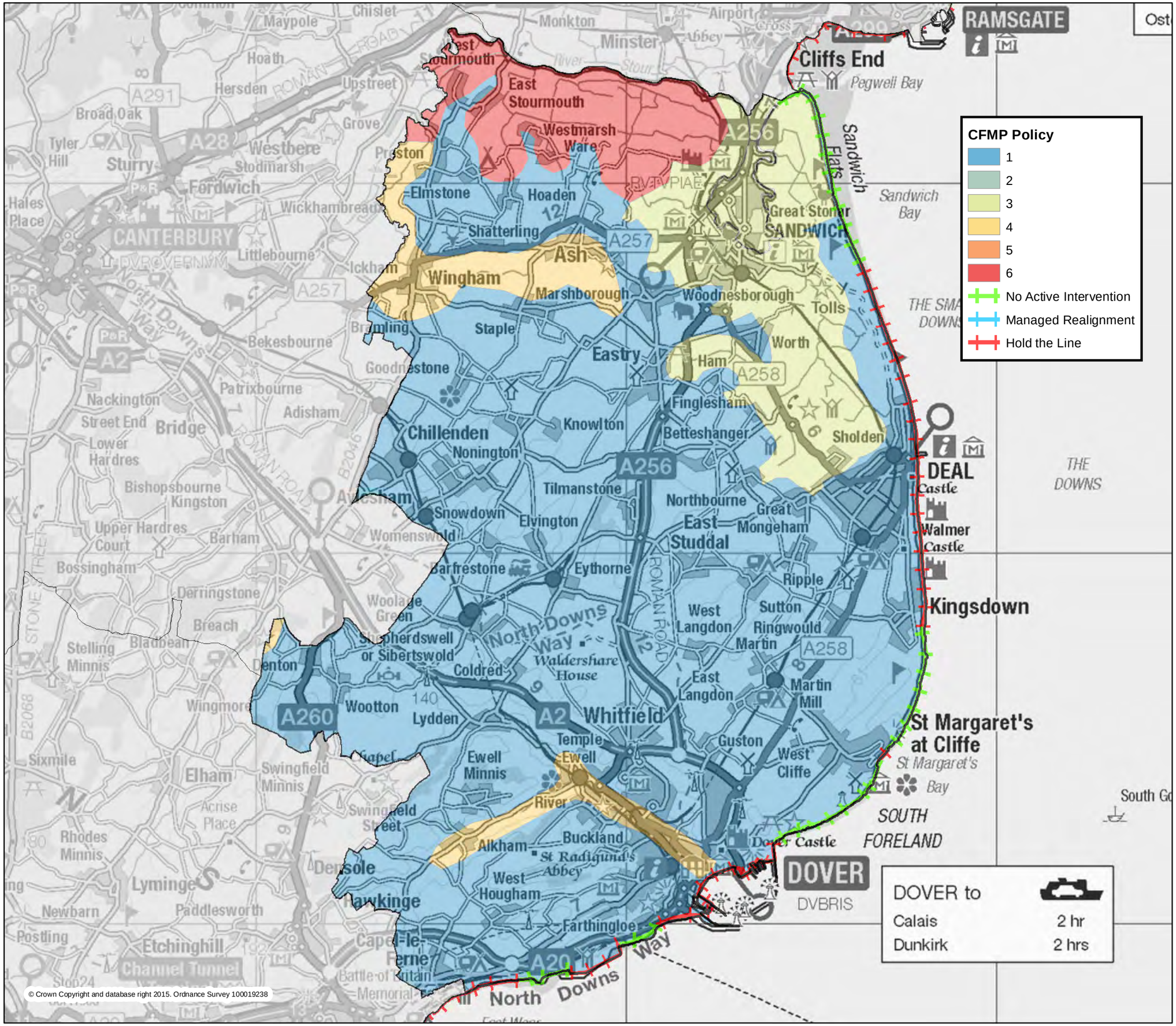
Appendix 4.

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.

Isle of Grain to South Foreland Shoreline Management Plan (next 20 years)

Hold the line
Maintain or improve the existing standard of protection

No active intervention
There is no planned investment in defending against flooding or erosion, whether or not an artificial defence has existed previously.

Managed Realignment
Allowing the shoreline to move naturally, but managing the process to direct it in certain areas. This is usually done in low-lying areas, but may occasionally apply to cliffs.

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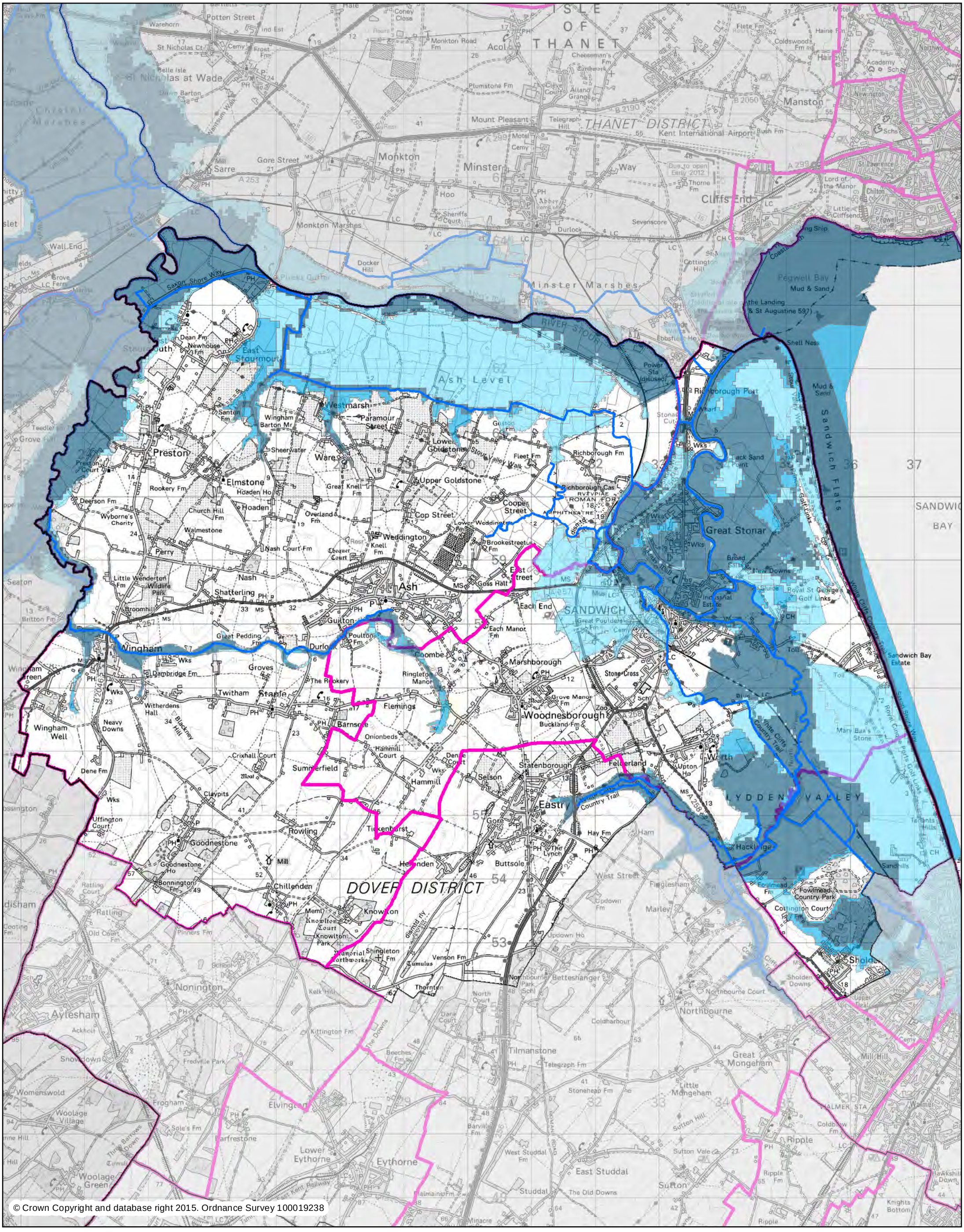
Appendix 5

Sandwich: NaFRA mapping



Sandwich

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:

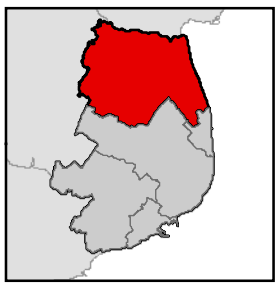
High – At risk from an event with an AEP of 3.3% or greater

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

Dover North: NaFRA mapping

Dover 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:

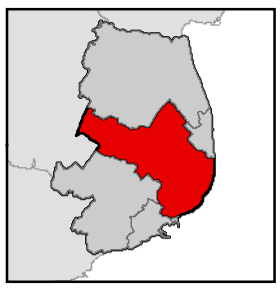
High – At risk from an event with an AEP of 3.3% or greater

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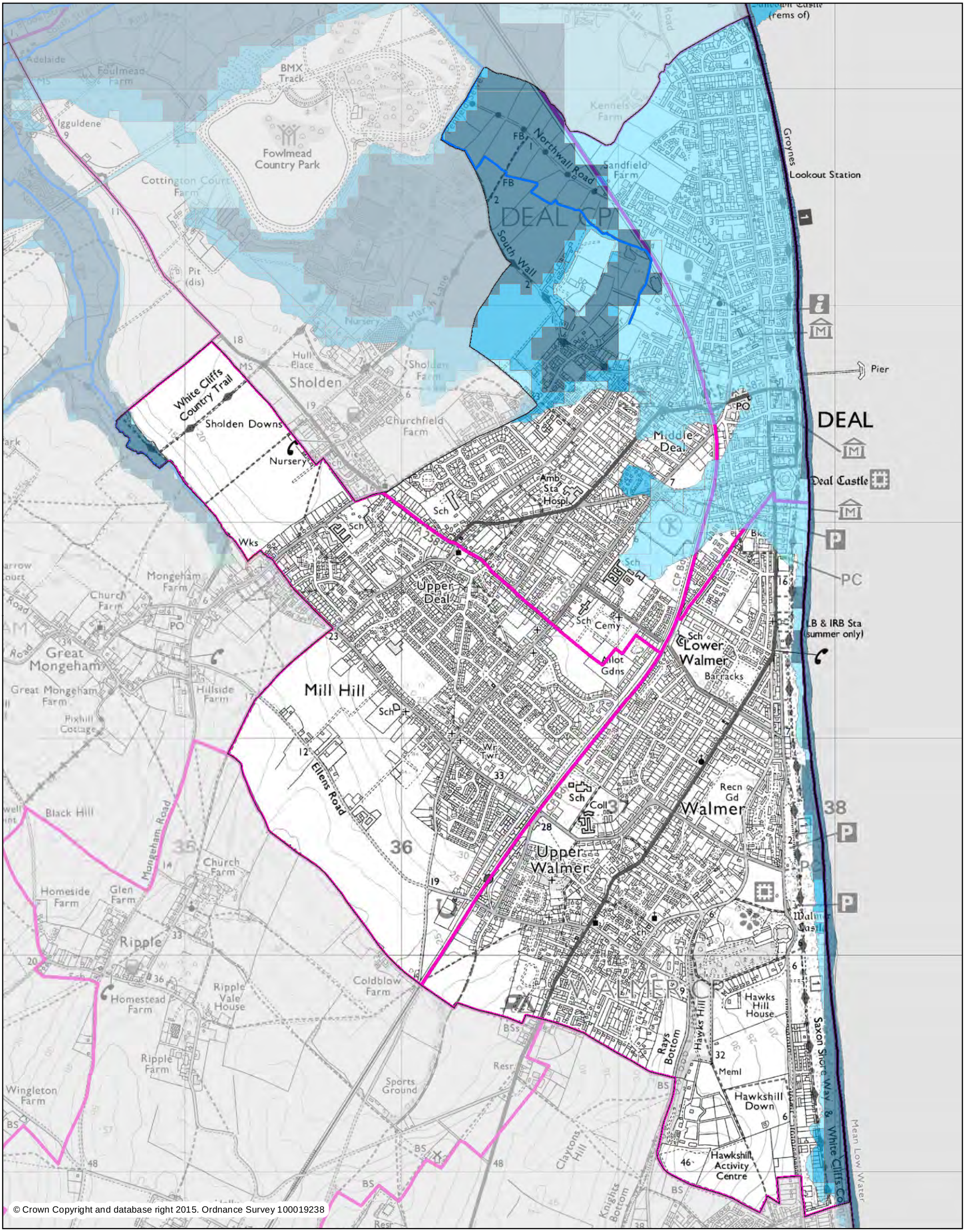
Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the liklihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping of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

Deal: NaFRA mapping



Deal

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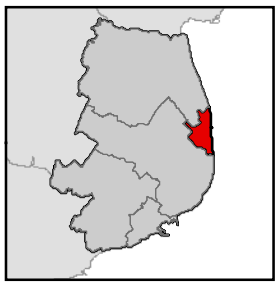
Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

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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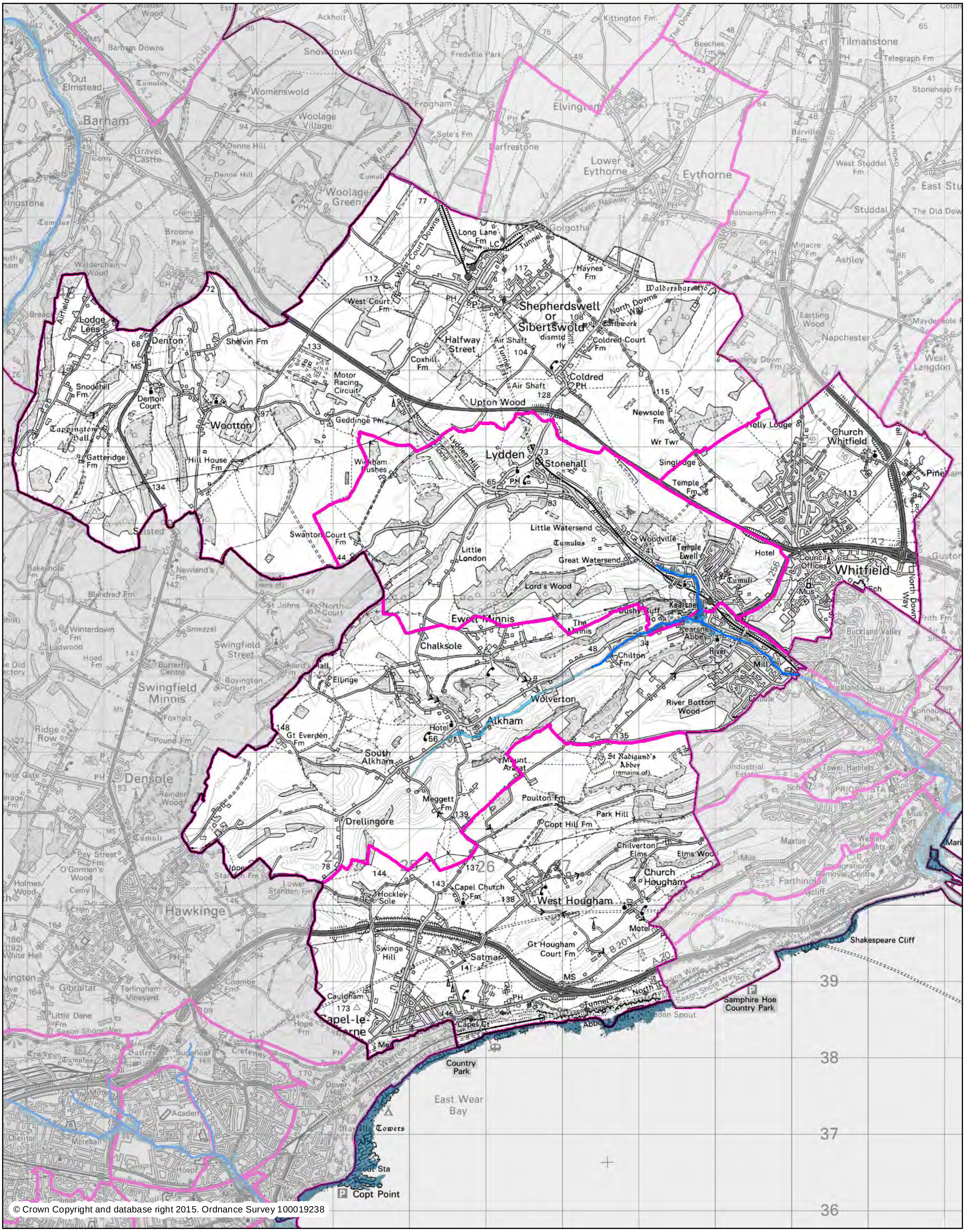
Caveats:
Properties at risk have been defined using the National Flood Risk Assessment data (NaFRA), which calculates the liklihood of flooding from rivers or the sea. The assessment takes into account the type, location and condition of flood defences, and the chance of these defences overtopping of 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 8

Dover West: NaFRA mapping



Dover 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:

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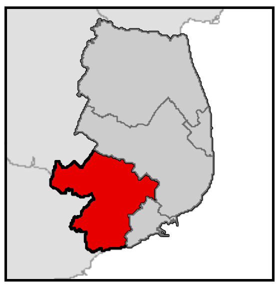
Medium – At risk from an event with an AEP of less than 3.33% AEP but greater than or equal to 1%

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 9

Dover Town: NaFRA mapping

Dover Town

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

Environment Agency

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DOVER DISTRICT COUNCIL

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

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.