Kent County Council

Flood Risk to Communities

Swale

June 2017

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In partnership with:

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

- **The Environment Agency**
- **Swale Borough Council**
- **The Lower Medway 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 Swale Borough Council area. It provides information on the nature and magnitude of the flood risk across the district, and outlines the existing and proposed approaches to manage the risk identified.

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

Swale overview

The district of Swale sits on the north Kent coast, formed of part of the mainland of Kent and the Isle of Sheppey. It covers an area of 364sqkm, with a coastline of 111km, the longest of any district in Kent. Medway lies to the west, Canterbury to the east, Maidstone to the south west and Ashford to the south east of the borough. The administrative boundaries are shown in Figure 1 below.

The Medway, Swale and Thames estuaries present the principal source of flooding in the borough. The Swale is a tidal water body separating the Isle of Sheppey from the rest of the district. It comprises a combination of water from the Thames Estuary, to the north of the Isle of Sheppey, and the Medway Estuary, to part of the western boundary of the borough and to the west of the Isle of Sheppey. The Swale is bordered by brackish and freshwater floodplain, grazing marsh, ditches, and intertidal saltmarsh and mud-flats.

The northern, coastal, part of the mainland of the borough and the southern part of the Isle of Sheppey, laying either side of the Swale, are low-lying and predominantly underlain by impermeable London Clay. The flat topography and saturated clayey soil of the marshlands has led to the formation of wetlands, creeks and small streams (rather than the larger rivers you might find in steeper catchments). Throughout Swale, many of the creeks and drainage ditches are manmade or engineered to aid drainage and facilitate the use of land for farming.

The northern part of the Isle of Sheppey is predominantly raised on clay hills. These form cliffs on the northern side of the isle and are subject to erosion from the sea.

Large areas of the south of the borough overlie Chalk bedrock, much of which is covered by clay and flints deposits; these deposits result in the chalk being only commonly exposed in valleys. Chalk is usually highly permeable; under normal conditions it is able to absorb most of any incident rainfall. However, this chalk can become saturated during periods of prolonged rainfall, which can limit its ability to accommodate further rainfall. During particularly wet periods the water table may rise to the surface, causing groundwater flooding or the appearance of ephemeral springs.

The most significant recorded flood events within the borough occurred in 1953, 1978 and 2013; these events were primarily from tidal flooding.

On the night of 31 January 1953, a significant storm surge propagated down the North Sea caused flooding and overtopping of tidal defences, notably at:

- Sheerness and along the western border of the Isle of Sheppey,
- Faversham Creek,
- Milton Creek, Sittingbourne,
- Warden, and
- around the Isle of Harty (although the Island itself was not flooded).

Sheerness and the surrounding countryside were extensively flooded. The centres of the towns of Queenborough and Rushenden were not flooded during this event (although some of the outskirts were).

In January 1978, the tidal defences along the western marshes (Barksore, Chetney and Horsham) were overtopped, along with the defences north of Faversham. In addition the tidal defences around the Isle of Harty were breached/failed resulting in

flooding around the Isle. The 1978 flood did not affect Queenborough or Rushenden, but Sheerness was partially affected..

The tidal surge of December 2013 overtopped the defences to the north of Faversham and also resulted in numerous flooded properties bordering Faversham Creek within low lying areas of the town.

Faversham Creek, Milton Creek, the Iwade Drain, Windmill Creek, the Scrapsgate Drain, the Capel Fleet Drain and the Warden Bay Stream are the designated main rivers in the district.

Faversham Creek runs through the centre of Faversham, with a floodplain typically 100m to 200m wide. Three tributaries of the creek also run through the outskirts of the town. The centre of Faversham is subject to tidal flooding from the Creek, which can also indirectly cause flooding from the sewer system as water back-flows through the system, emerging from structures constructed at a lower height than the peak of any surge.

Milton Creek runs through Sittingbourne, where the engineered embankments tend to prevent large-scale inundation of the town. The Iwade Drain runs into and through Iwade. Windmill Creek, the Scrapsgate Drain, the Capel Fleet Drain and the Warden Bay Stream are located on the Isle of Sheppey.

There are no recorded incidents of solely fluvial flooding from any of these main rivers. While the rivers will contribute to a flood, any fluvial contribution from these watercourses is likely to be negligible owing to the large volume of water propagating up their channels during a tidal flooding event. ‘Tide-locking’ of their outfalls can also restrict the free-flow of water from the watercourses to the sea.

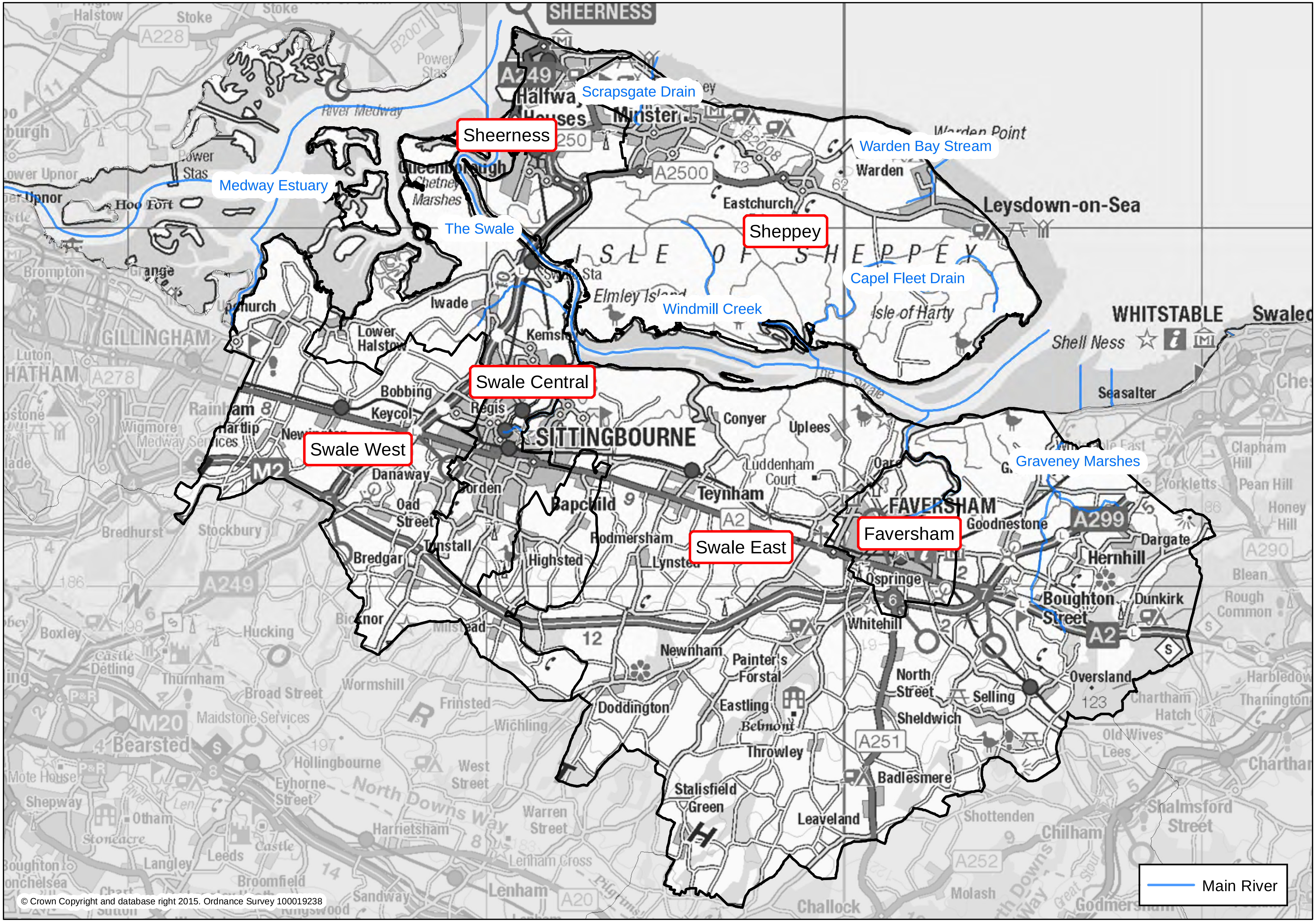
Tide-locking has affected several of the watercourses across the district, most notably impacting the Scrapsgate Drain and watercourses at Warden Bay on the Isle of Sheppey. Tide-locking occurs when the outfall from a watercourse or sewer becomes overwhelmed by tidal waters in a receiving water-body. When the outfall becomes submerged, its ability to freely discharge the water from upstream can be severely reduced, causing water to back-up behind the structure. Further problems can be caused if tide flaps fail, causing tidal ingress into the fluvial watercourse.

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

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

The Lower Medway Internal Drainage Board have a general supervisory duty over all drainage matters within their district, much of which lies within the Swale borough area. Within their district they have consenting and enforcement powers for works carried out by others in or adjacent to ordinary watercourses.

Figure 1. Swale Borough Council


Sheerness
Scrapsgate Drain
Warden Bay Stream
Medway Estuary
The Swale
Sheppey
Capel Fleet Drain
Windmill Creek
Swale Central
Swale West
Graveney Marshes
Faversham
Swale East
Main River
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Roles and functions in the management of flood risk

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

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

The Environment Agency

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

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

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

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

As 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 16 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 is 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 Swale Borough Council area, along with the highways which receive more frequent maintenance owing to known drainage problems. Any road not depicted in red or

green should be assumed to be a normal road that receives targeted maintenance, as required (as outlined in Table 1).

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

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

Swale Borough Council

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

With the Environment Agency, they uses their permissive powers to maintain flood defences which provide benefits to people and property at risk of flooding. They use a risk-based approach to assess the need and justification for this work and invest in those activities that will contribute most to reducing flood risk per pound of funding.

For the management of erosion of the land above sea level, the responsibility normally lies with Swale Borough 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.

The Engineering Services Unit (part of the wider Leisure and Technical Services Unit) monitors coast protection and monitor and carry out regular inspections and required repairs. Please phone **01795 417850** if you require further information.

Swale Borough 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.

Swale Borough Council has 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 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 Lower Medway Internal Drainage Board

The Lower Medway Internal Drainage Board is the operating drainage authority within their designated drainage district. They manage and maintain approximately

162km of watercourses across their district, which covers 44% of the total land cover within Swale (160sqkm).

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 Lower Medway 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 **0162 269 3665** or email enquiries@medwayidb.co.uk.

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

Southern Water

Southern Water is 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' – this can be found at:

http://goo.gl/4Wta5r

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.

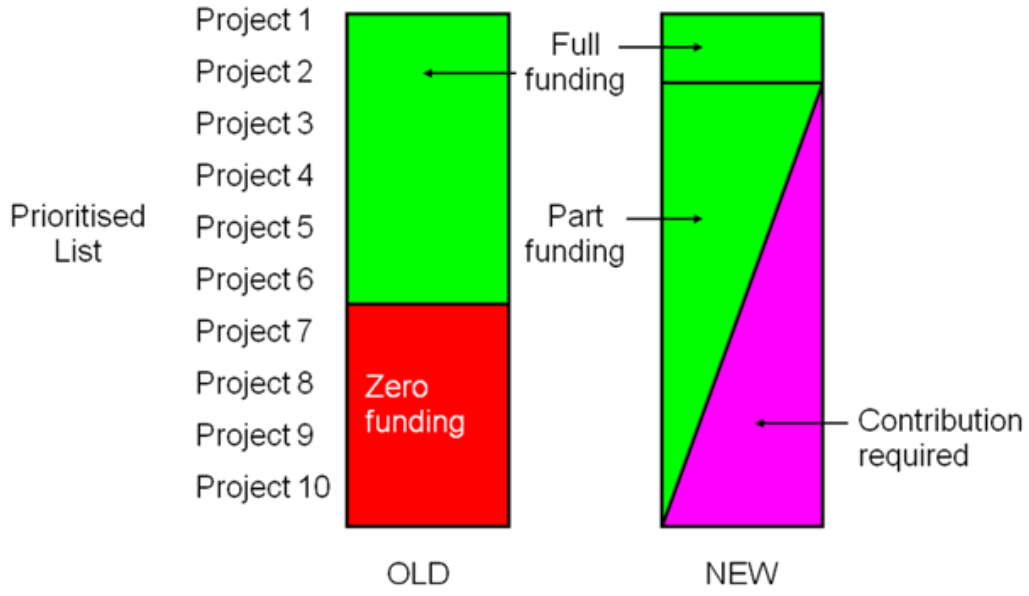


Figure 2. Flood defence investment.

Flood risk management plans and strategies

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

Swale is in the North Kent Rivers 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 North Kent Rivers Catchment Flood Management Plan can be found here:

https://goo.gl/Za60b7

Shoreline Management Plans

Shoreline Management Plans (SMPs) set policies for the management of 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)

Swale lies within the:

- Isle of Grain to South Foreland Shoreline Management Plan (Isle of Grain Shoreline Management Plan), and
- Medway Estuary and Swale Shoreline Management Plan (Medway Estuary and Swale Shoreline Management Plan)

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

Medway Estuary and Swale Coastal Defence Strategy

Aging flood defences, rising sea levels and climate change mean that flood risk to people, properties and agricultural land will significantly increase in the coming years. The Environment Agency is currently developing the Medway Estuary and Swale Coastal Defence Strategy. The plan is will set out the approach for the next 100 years and it is expected to be completed during 2017. It will describe how the Environment Agency and the other Coastal Protection Authorities how to implement the SMP policies in the short, medium and long term to reduce flood and erosion risk

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 Swale Surface Water Management Plan can be found at:

Swale 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.

A summary of Swale Borough Council's SFRA can be read here:

Swale Borough Council's 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.

Swale falls within the area covered by the Thames River Basin Management Plan; this can be found here:

http://goo.gl/6aUiTb

Sources of flooding

Flooding sources

Groundwater

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

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

Reservoirs

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

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

Surface water

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

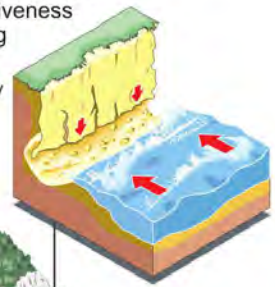
Risk Management Authority
- KCC as the Lead Local Flood Authority and Highway Authority.

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

Coastal Erosion

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

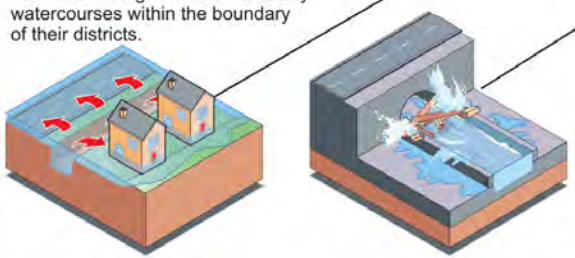
Risk Management Authority
- DB



Main river and ordinary watercourses

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

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



Sewer flooding (including foul sewers)

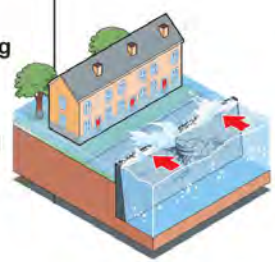
May occur when the sewerage system fails due to blockages or it is overwhelmed by surface water.

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

Coastal Flooding

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

Risk Management Authority
- EA



Understanding flood risk

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

Flood risk mapping

Not all flood risk is nationally modelled and mapped. For instance, the flood risk arising from ordinary watercourses has not been specifically investigated and depicted on a national scale. It is also important to note that many types of flood map only include one type of flood risk. For example, a flood map of Milton Creek 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.

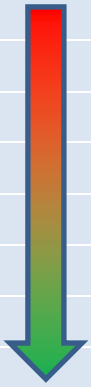
A Return Period is a way of expressing how often a flood of a given magnitude might reoccur over a long period of time. For example, a flood described as having a 1 in 100 year return period is likely to occur, on average, ten times every 1000 years (or once every 100 years).

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

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

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

Flood Map for Planning

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

The three flood zones are:

Flood Zone 3

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

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

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

Flood Zone 3b – This zone is also known as the functional floodplain**.** The functional floodplain is defined as the area that would be susceptible to flooding from rivers or the sea during any event up to and including the 5% AEP event (i.e. the 1 in 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 Swale district, there are a total of 16110 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); 9382 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 Swale.

Parish	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Bapchild	0	0
Bobbing	166	167
Borden	91	91
Boughton Under Blean	4	4
Bredgar	3	3
Doddington	0	0
Dunkirk	0	0
Eastchurch	0	0
Eastling	0	0
Faversham Town	1049	1295
Graveney with Goodnestone	20	29
Hartlip	40	49
Hernhill	1	3
Iwade	108	139
Leysdown	7	34
Lower Halstow	22	28
Luddenham	2	12
Lynsted and Kingsdown	0	0
Milstead	5	5
Minster on Sea	26	1494
Newington	2	2
Newnham	0	0
Norton	0	0

Oare	8	13
Ospringe	2	2
Queenborough Town	0	1252
Rodmersham	8	9
Selling	0	0
Sheerness	5185	6789
Sheldwich	0	0
Sittingbourne	2532	4398
Stalisfield	0	0
Teynham	56	79
Throwley	0	0
Tonge	21	24
Tunstall	0	0
Upchurch	24	79
Warden	0	110

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.

Swale Borough Council

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

Kent Police

- Save life.
- Establish multi-agency command and control systems.

- Coordination and communication between emergency services and organisations providing support.
- Coordinate the preparation and dissemination of public warning and informing.
- Establish and maintain a Casualty Bureau.

Kent Fire and Rescue Service

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

South East Coast Ambulance Service

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

Environment Agency

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

Category 2 Responders

Utility providers

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

Kent Resilience Forum

The Kent Resilience Forum (KRF) is one of a number of Local Resilience Forums (LRFs) that have been set up across England. The overall aim of a LRF is to ensure that the various agencies and organisations plan and subsequently work together to ensure a co-ordinated response to any emergency that could have a significant impact on any community.

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

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

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

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

Further information:

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

http://goo.gl/vkeV3O

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

KCC flood response plan

Information on Swale Borough Council's Major Emergency Plan can be found at:

Major emergency plan

Sandbags

Concerned residents are urged to be proactive in sourcing sandbags from local suppliers and to take necessary precautions to protect their property from flooding or weather damage.

Swale Borough Council only provide sandbags during a major emergency to residents who are vulnerable and can't get their own sandbags to protect homes.

Further information:

Major Emergencies - Sandbags

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
Kent Homechoice
Website

Swale Borough Council
Website

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

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

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

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

Environmental Services
Swale Borough Council
Website

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

Faversham

In the Faversham area there are a total of 1295 properties at risk from rivers or the sea (taking the existing defences into account); 1049 of these are at medium to high risk.

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

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Abbey	298	329
Priory	124	164
St. Ann's	312	433
Watling	315	369

Faversham Creek runs close to the centre of the town, with a floodplain typically around 100m to 200 m wide. Oare Creek enters Faversham Creek to the north of the town before they meet the main Swale estuary. These tributaries present the most significant risk to the town. Low lying areas around the centre of Faversham and Oare are prone to tidal flooding during particularly high astronomical tides or storm surges when significant volumes of water propagate up their channels.

Most recently, the low lying areas around the creek have experienced tidal flooding in 1953, 1978 and 2013.

The creek can also indirectly cause flooding from the sewer system when water either backflows up the infrastructure to emerge through gullies and grates, or when the outfalls are tide-locked and unable to freely discharge accumulated rainwater.

The Lower Medway Internal Drainage Board note that there is a potential for the creek systems to silt-up, reducing their ability to convey water whilst increasing the risk of blockage.

A significant proportion of Faversham town centre and the surrounding areas are raised above the extreme tidal flood level; however, there are a number of sewer flooding records which are likely to be related to blockages or insufficient capacity within the drainage network.

The geology under Faversham and the surrounding area is variable, predominantly comprising chalk, brickearth, sand and alluvium. Impermeable development over the areas underlain by the permeable chalk could significantly increase flood risk from surface runoff if suitable Sustainable Drainage provisions are not provided. Whilst these systems are usually effective in chalk areas, it should be ensured that the groundwater table is sufficiently far below the surface to allow room for infiltration, and also that the area is not within a Source Protection Zone and that the risk of groundwater pollution is not increased.

There is anecdotal and photographic evidence of historic groundwater emergence to the south of the area, notably around the Water Lane area of Ospringe. It is possible that groundwater levels may be generally close to the surface.

The Faversham Creek Area Action Plan sets out the proposed redesignation of previously developed areas around the creek to Flood Zone 3ai; this is a special

zone introduced by the Environment Agency to deal with the conflict that can arise from regeneration in the functional flood plain (FZ3b). This redesignation would permit carefully designed residential development in former FZ3b, with the proviso that appropriate safeguards are included within any development plans. For example, residential accommodation should be provided on the first floor and higher. Under the proposed reclassification, previously undeveloped areas would remain as FZ3b and exempt from all but 'water compatible' development.

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

Further information:

- Swale Surface Water Management Plan - Swale surface water management plan
- Swale Borough Council's Strategic Flood Risk Assessment Swale Borough Council's Strategic flood risk assessment
- Faversham Creek Area Action Plan - http://goo.gl/MPaU3y

Planned flood defence works in the Faversham area

In the early hours of 6 December 2013, the largest tidal surge for 60 years resulted in internal flooding of approximately 30 homes and businesses in the Faversham area. This served to highlight that the affected properties are in one of the most vulnerable areas to tidal flooding in Kent, and do not have adequate flood defences to protect them from the effects of extreme sea levels.

In partnership with Swale Borough Council, Kent County Council, Southern Water and Faversham Town Council, the Environment Agency have developed plans for a tidal defence scheme to protect the low-lying properties on the northern side of Faversham Creek. Please see the briefing note at Appendix 5.

Sheerness

In the Sheerness area there are a total of 8041 properties at risk from rivers or the sea (taking the existing defences into account), 5185 of which are at a medium to high risk.

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

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Queenborough and Halfway	16	1889
Sheerness East	2580	2806
Sheerness West	2589	3346

Sheerness is a predominantly urban and industrial area located on the north western tip of the Isle of Sheppey. The town is well defended by a shingle beach (with timber groynes), a rock revetment and a prominent seawall. However, whilst these defences protect the area to a 1 in 200yr standard, the potential over-topping or failure of these structures presents the greatest risk of flooding to the residents.

Prior to the completion of these now-significant defences in 1983, Sheerness and the surrounding area experienced occasional tidal flooding, most notably in 1953 and 1978. The town's upgraded tidal defences prevented inundation during the significant storm surge of December 2013.

Like much of the area, Sheerness is underlain by London Clay overtopped with alluvial deposits. The relative impermeability of this geology can lead to waterlogging and surface water accumulation during periods of prolonged or heavy rainfall. Notwithstanding this, the urban area appears to be generally well served by a combined sewer network, with few reported incidents of flooding from blockage or under-capacity.

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

Further information:

- Swale Surface Water Management Plan - Swale surface water management plan
- Swale Borough Council's Strategic Flood Risk Assessment Swale Borough Council's Strategic flood risk assessment

Planned flood defence works in the Sheerness area

Sheppey

In the Sheppey area there 1638 properties at risk from rivers or the sea (taking the existing defences into account); 33 of these are at medium to high risk.

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

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Leysdown and Warden	7	144
Minster Cliffs	26	1494
Sheppey Central	0	0

As with Sheerness, the most significant risk to the Sheppey area arises from the overtopping or breach of the tidal defences constructed to protect the low lying land behind them. This risk is highest to the north west of the area (to the west of Minster, east of Sheerness).

Many watercourses on the Isle of Sheppey rely on gravity outfalls which may not provide sufficient capacity to transmit flow in higher order fluvial events.

There are 26 flood gates on the island which help form the primary defence for coastal flooding. They provide access points to the sea front for operational authorities and members of the public and are only closed during periods of tidal flood risk.

There in an associated risk to properties and land located alongside watercourses throughout the area. During particularly high tides, the outfalls from these watercourses can become submerged and rendered incapable of free discharge (known as tide-locking).

When the surface and river waters are unable to discharge to the sea, they can overwhelm the banks of their channels to cause flooding inland. During extreme tidal events, water from the sea can propagate back through the outfalls to cause flooding to the land behind; it is important that where non-return valves have been fitted to vulnerable watercourses, they are subsequently properly maintained.

Any flooding caused by these ‘tide-locked’ scenarios would tend to be short-lived, with any raised water levels quickly receding once the tide falls back to its normal levels.

The northern coastline between Minster and Warden is susceptible to coastal erosion and land-slip. The risk of collapse will be exacerbated by wave action during extreme storm events, or following periods of prolonged or intense rainfall when the ground becomes saturated. Whilst these areas are not considered to be at a significant direct flood risk, the indirect effects on the coastline means that new development should be avoided where there is an identified risk of subsidence. Where development is exceptionally permitted, soakaways should be avoided to prevent exacerbating the risk of collapse caused by saturated subsoils.

The general risk from ground water, surface water and sewer flooding in Sheppey’s residential areas is generally low, with few recorded instances of problems.

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

Further information:

- Swale Surface Water Management Plan - Swale surface water management plan
- Swale Borough Council's Strategic Flood Risk Assessment Swale Borough Council's Strategic flood risk assessment
- North Sheppey Erosion Study - http://goo.gl/bjZq8o

Recent flood defence works in the Sheppey area

Swale Borough Council secured funding from DEFRA through the EA for a £260,000 to carry out repairs to groynes and sea defences along The Leas in Minster on the Isle of Sheppey. This work was complete in April 2017.

Swale Central

In the Swale Central area there are a total of 3962 properties at risk from the sea (taking the existing defences into account), 2071 of which are at medium to high risk.

Table 6. Number of dwellings at risk from tidal flooding in Swale Central

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Chalkwell	251	261
Iwade and Lower Halstow	130	167
Kemsley	128	1574
Milton Regis	870	1210
Roman	457	473
St. Michaels	134	168
Woodstock	101	108

Like much of this coastal district, the most significant flood risk to the Swale Central area is from tidal inundation. Swale Central comprises the southern and western sides of Sittingbourne, along with the villages of Iwade, Lower Halstow and the Chetney Marshes. Milton Creek runs from the centre of Sittingbourne, with the Iwade Drain passing through Iwade.

In February 2001 there was serious flooding in Iwade. This was due to the inadequacy of the culverts in the village to cope with the high flow. Flooding also occurred at Lower Halstow as a result of high flows and a blocked outfall; two houses and a road were flooded.

The 1953 tidal flood that affected much of the eastern coast of the UK was mostly contained within the engineered embankments and low-lying land around Milton Creek, with most of Sittingbourne being spared significant flooding. Similarly, the 1978 tidal flood event that badly affected parts of Sheppey did not have a significant effect on Sittingboune. However, with extreme tidal levels forecast to increase in-line with predicted climate-change, future flooding is a possibility.

The risk from groundwater flooding to the area is thought to have increased following the closure of Sittingbourne Paper Mill. Following the cessation of groundwater abstraction, it is possible that the groundwater levels in the surrounding area may eventually recover to their natural level. However, there is unfortunately very little information as to what this level may have been prior to the mill's construction. When the mill's abstraction was active, the depth to the groundwater table at the application site may have been as little as 1 metre. There is therefore a possibility that the recovery of the groundwater level may cause infrequent localised groundwater flooding.

The centre of Sittingbourne is predominantly located over chalk, but the surrounding area has sand, brickearth, gravel, alluvium and clay beds. As with Faversham and the surrounding area, inappropriate impermeable development over the areas underlain by the permeable chalk could significantly increase flood risk from surface runoff if suitable Sustainable Drainage provisions are not provided. Whilst these systems are usually effective in chalk areas, it should be checked that the groundwater table is sufficiently far below the surface to allow room for infiltration, and also that the area is not near enough to a Source Protection Zone to cause pollution. The area underlain by the impermeable London Clay are likely to be poorly draining, and potentially susceptible to surface water ponding during periods of prolonged or intense rainfall.

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

Further information:

- Swale Surface Water Management Plan - Swale surface water management plan
- Swale Borough Council's Strategic Flood Risk Assessment Swale Borough Council's Strategic flood risk assessment

Planned flood defence works in the Swale Central area

Swale East

In the Swale East area there are a total of 317 properties at risk from flooding from the sea (taking the existing defences into account), 258 of which are at medium to high risk.

Table 7. Number of dwellings at risk from fluvial/tidal flooding in Swale East

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Boughton and Courtenay	25	36
East Downs	2	2
Murston	144	151
Teynham and Lynsted	87	128

The most significant flood risk to the Swale East area is from tidal inundation. The relatively sparsely inhabited low lying land around Conyer Creek and the Teynham Levels in the west, and the Nagden and Graveney Marshes areas to the east would be particularly susceptible to a breach in the sea walls that otherwise offer protection to the area.

These tidal defences were improved in the aftermath of the 1953 storm surge that caused extensive flooding and damage all along the east coast. However, the surge associated with another storm in 1978 overtopped the improved defences and caused flooding around Conyer Creek and to the north of Faversham. With extreme tidal levels forecast to increase in-line with predicted climate-change, future flooding remains a possibility.

The White Drain, a designated main river, receives the runoff from the elevated areas around Boughton and Dargate before passing through the Graveney and Cleve Marshes and into the Swale estuary. Associated with this watercourse is a relatively localised floodplain that presents a risk to a limited number of properties.

Much of the south of the area is located over chalk, with the coastal areas being largely underlain by more impermeable clays and silts. Inappropriately drained impermeable development over the areas underlain by the permeable chalk could significantly increase flood risk from surface runoff if suitable Sustainable Drainage provisions are not provided. Whilst these systems are usually effective in chalk areas, it should be confirmed that the groundwater table is sufficiently far below the surface to allow infiltration, and also that the area is not in a Source Protection Zone. The area underlain by the impermeable London Clay and silts are likely to be poorly draining, and potentially susceptible to surface water ponding during periods of prolonged or intense rainfall.

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

Further information:

- Swale Surface Water Management Plan - Swale surface water management plan
- Swale Borough Council's Strategic Flood Risk Assessment Swale Borough Council's Strategic flood risk assessment

Planned flood defence works in the Swale East area

Swale West

In the Swale West area there are a total of 857 properties at risk from flooding from the sea (taking the existing defences into account), 786 of which are at medium to high risk.

Table 8. Number of dwellings at risk from fluvial/tidal flooding in Swale West

Ward	Number of dwellings at medium-high risk (up to 1% AEP)	Number of dwellings at overall risk (up to 0.1% AEP)
Borden	91	91
Grove	613	619
Hartlip, Newington and Upchurch	66	130
West Downs	16	17

The Swale West area has the smallest proportion of coastline that would be susceptible to tidal flooding in the district. The northernmost tip around the Upchurch and Otterham Quay area is shown to partially vulnerable to flooding during an extreme event, but much of this area is low-lying and uninhabited.

Throughout the rest of the area there are numerous narrow band of flood risk associated with topographical low-point at the base of valleys. Whilst these areas are ordinarily dry and free from flow, there is a small risk of flooding during periods of particularly prolonged or intense rainfall (when the valley sides become saturated, or when intense rainfall results in sheet runoff). These ordinarily dry-valleys are only depicted because of the potential for ponding or flow in the most extreme circumstances.

Much of the southern area is located over chalk, with the coastal areas being largely underlain by more impermeable clays and silts. Inappropriately drained impermeable development over the areas underlain by the permeable chalk could significantly increase flood risk from surface runoff if suitable Sustainable Drainage provisions are not provided. Whilst these systems are usually effective in chalk areas, it should be checked that the groundwater table is sufficiently far below the surface to allow room for infiltration, and also that the area is not near enough to a Source Protection Zone to cause pollution. The area underlain by the impermeable London Clay and silts are likely to be poorly draining, and potentially susceptible to surface water ponding during periods of prolonged or intense rainfall.

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

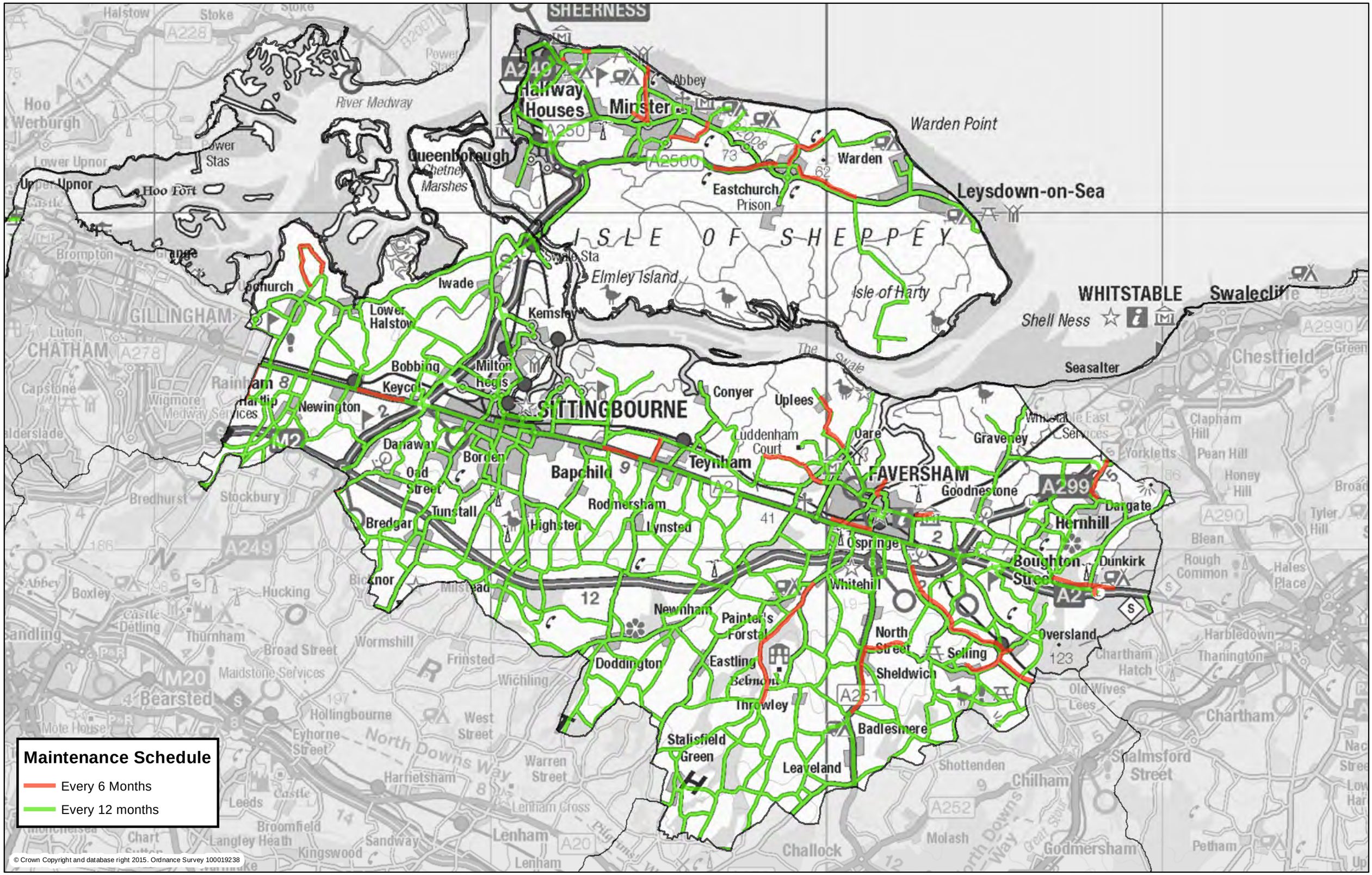
Further information:

- Swale Surface Water Management Plan - Swale surface water management plan
- Swale Borough Council's Strategic Flood Risk Assessment Swale Borough Council's Strategic flood risk assessment

Planned flood defence works in the Swale West area

Appendix 1

Highways drainage maintenance schedules



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

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

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

Roads known to flood frequently - Every 6 months

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

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

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

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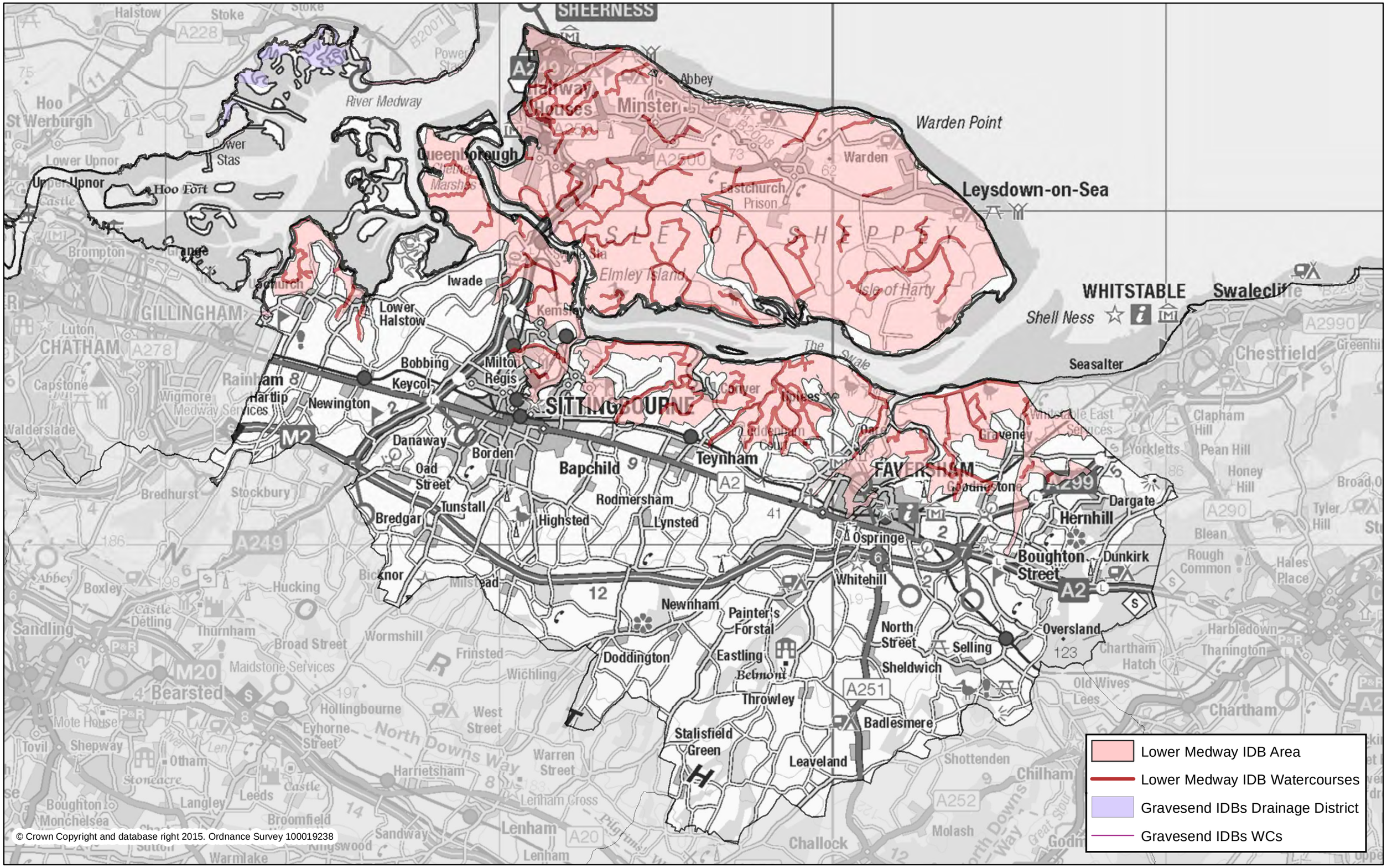
Appendix 2

Internal Drainage Board Areas and Watercourses



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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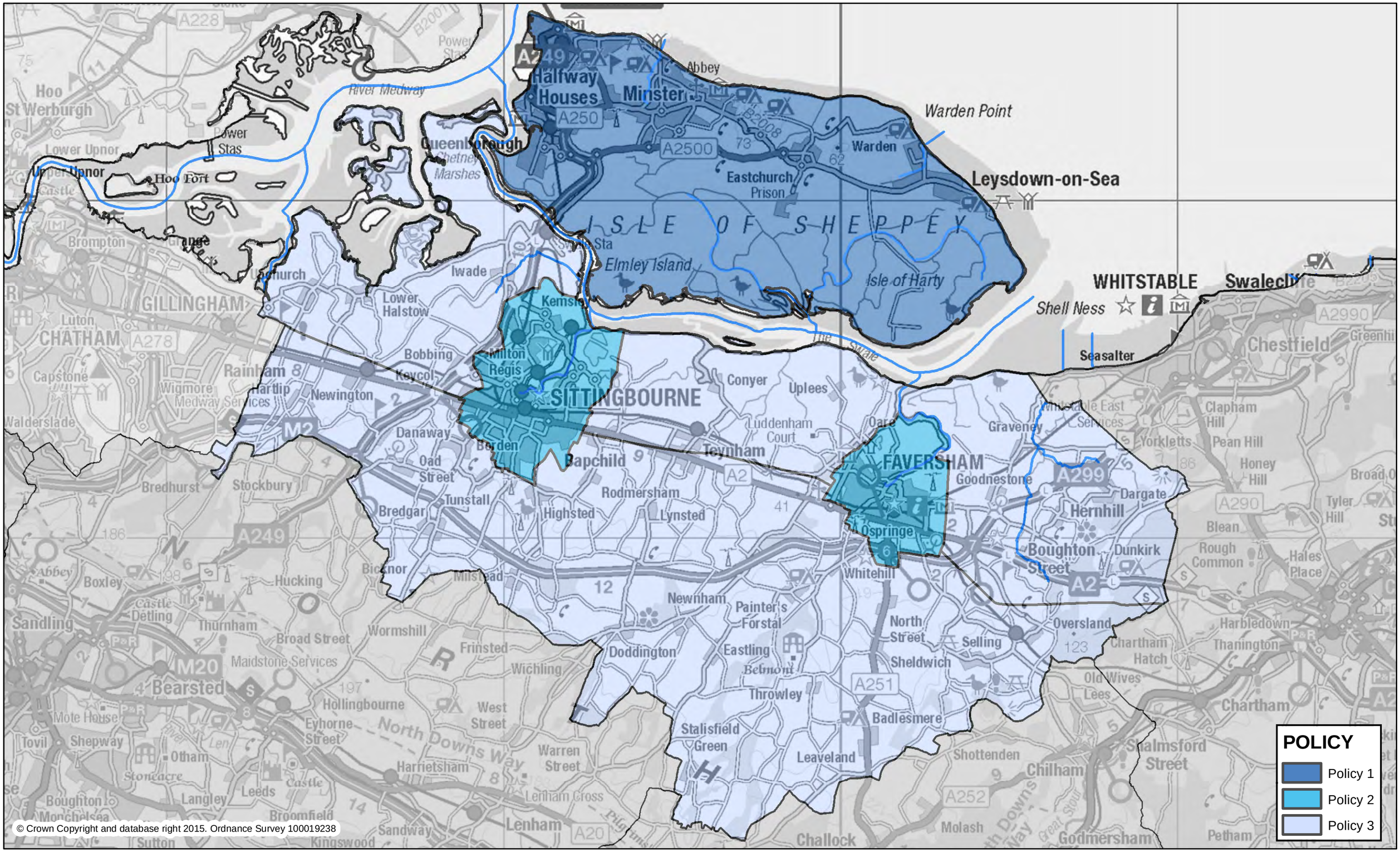
Appendix 3

Swale Local Flood Risk Management Policy areas



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

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

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

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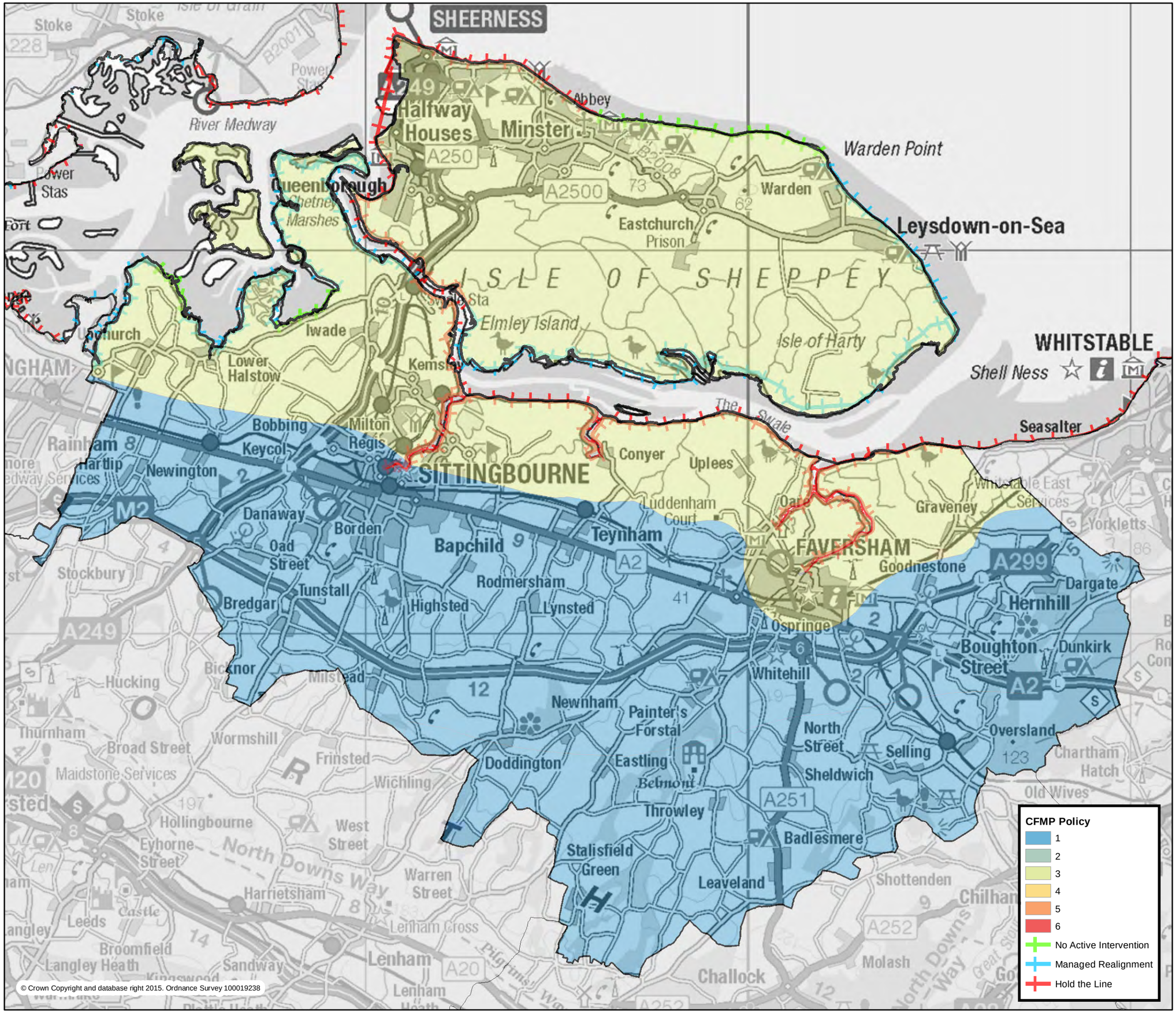
Appendix 4.

Catchment Flood Management Plan and Shoreline Management Plan policy areas



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

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

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

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

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

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

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.

Environment Agency

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Appendix 5

Faversham: NaFRA mapping

Faversham

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

NaFRA:

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

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

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

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

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

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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

Sheerness: NaFRA mapping

Sheerness

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

NaFRA:

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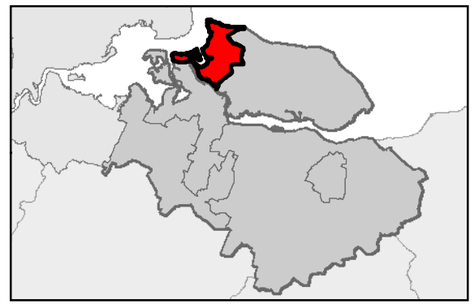
Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

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



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Swale Borough Council

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Sheppey

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

NaFRA:

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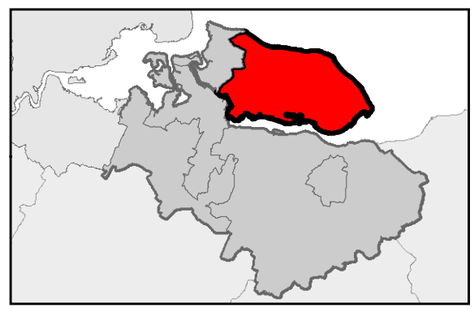
Low - At risk from an event with an AEP of less than 1% AEP but greater than or equal to 0.1%

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



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Swale Borough Council

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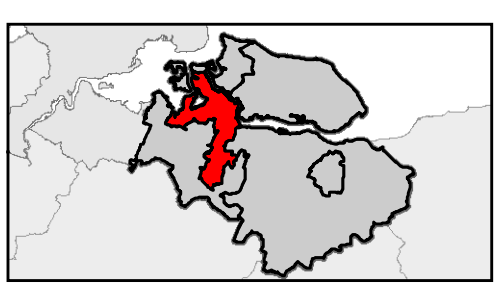
Appendix 7

Sheppey: NaFRA mapping

Swale Central



District Wards

High

Medium

Low

Very Low

Main Rivers

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

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

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Caveats:
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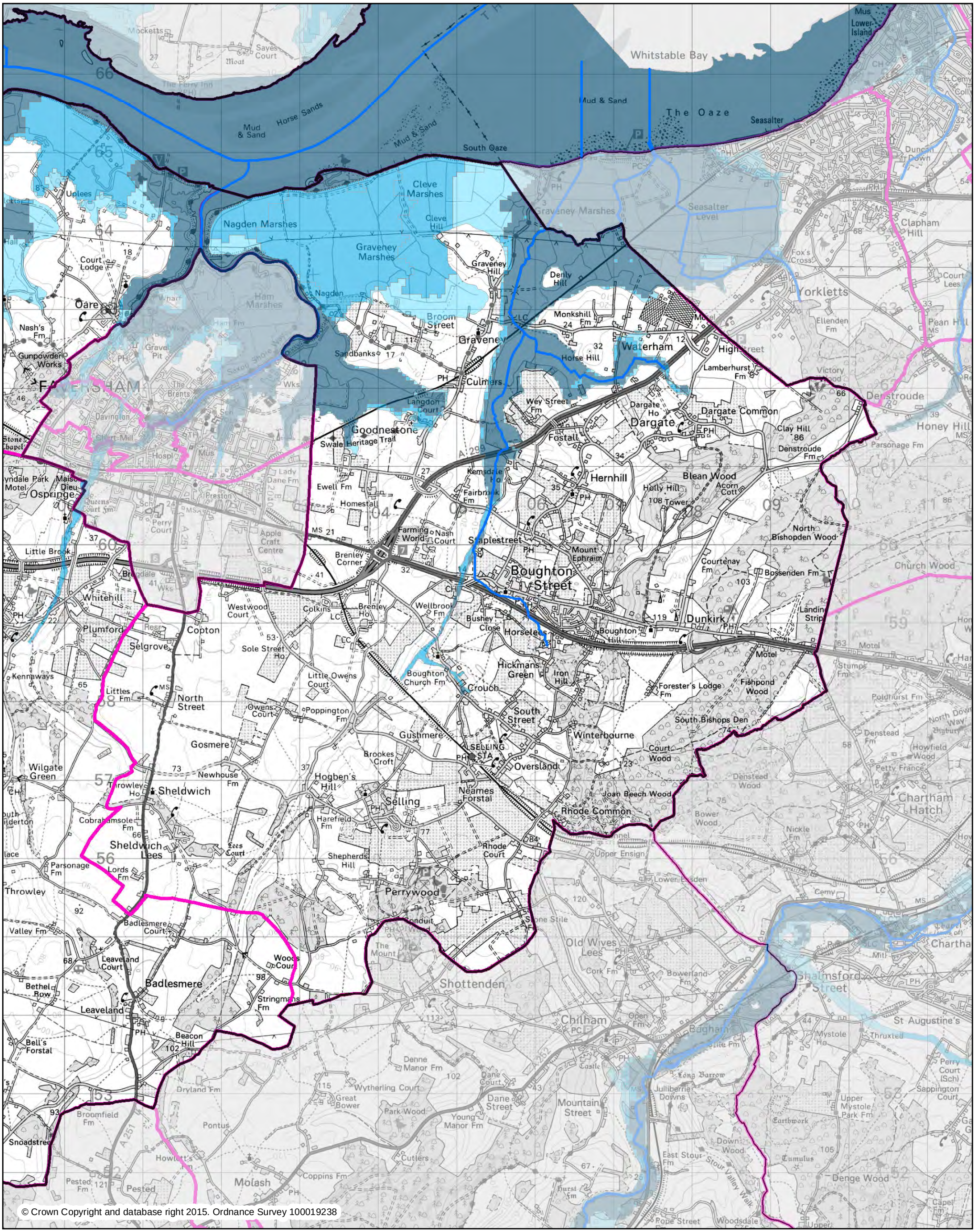
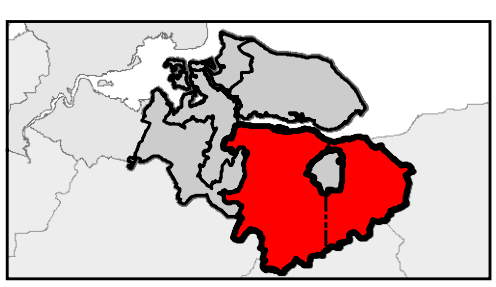
Appendix 8

Swale Central: NaFRA mapping



Swale East (East)



District Wards

High

Medium

Low

Very Low

Main Rivers

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

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

Environment Agency

Kent County Council kent.gov.uk

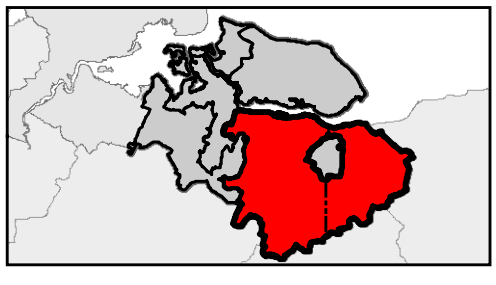
Swale Borough Council

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

Appendix 9

Swale East: NaFRA mapping

Swale East (West)



District Wards

High

Medium

Low

Very Low

Main Rivers

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

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

Environment Agency

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Swale Borough Council

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

Appendix 10

Swale West: NaFRA mapping

Swale West (North)

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

NaFRA:

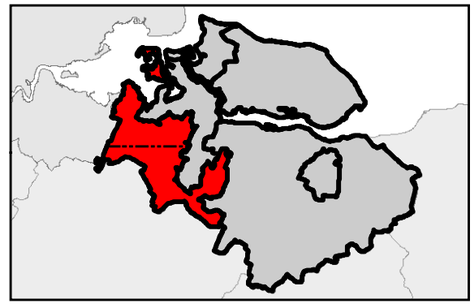
National Flood Risk Assessment (NaFRA) is a national assessment of flood risk across England and Wales which shows the likelihood of flooding in any year from rivers and the sea. It considers the location, type and condition of defences, mapped on a 50m x 50m grid in four probability bandings:

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

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

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

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



Environment Agency

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Swale Borough Council

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

Swale West (South)

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

NaFRA:

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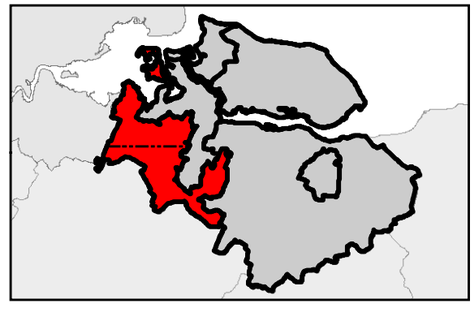
High – At risk from an event with an AEP of 3.3% or greater

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

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

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



Environment Agency

Kent County Council kent.gov.uk

Swale Borough Council

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

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.