

Pembrokeshire County Council



Local Flood Risk Management Strategy

February 2015

Document Control Sheet

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Executive Summary

We can only manage flood risk. It is not possible to prevent all flooding even if we had the money because there will always be storm events that exceed the design capacity of any drainage system. What we need to do is work together to find sustainable solutions to local problems, being guided by the following principles:

- Embrace a collaborative, local approach to managing the risks and consequences of flood and coastal erosion, and the provision and funding of innovative schemes to reduce those risks.
- Increase the understanding of the risks of flooding and ensure everyone in Pembrokeshire is aware of these risks, and understands their responsibility to protect their own property from flooding.
- Ensure better, more frequent, communication between everyone involved in the management of flood risk.
- Ensure new development fully embraces sustainable drainage principles and does not increase flood risk.
- Develop and maintain effective emergency plans and responses to flood incidents.
- Encourage effective maintenance of all structures and watercourses.

These principles are expanded in this Strategy, which will provide the information to enable the local delivery of reducing local flood risk, in partnership with the people of Pembrokeshire and those organisations tasked with providing services and support to them.

The Strategy details the roles and responsibilities of the organisations in Pembrokeshire which contribute to managing flood risk and explains the duties of the public to protect themselves from the consequences of flooding.

1.0 Introduction

Local Authorities have always had certain responsibilities in relation to ordinary watercourses, and in practice most took the lead in dealing with surface water flooding incidents prior to the changes contained within the Flood and Water Management Act 2010 (The Act). Under the terms of the Act, they now become Lead Local Flood Authorities (LLFA) and are responsible for what are termed 'local flood risks'. These include the risks of flooding from ordinary watercourses, surface runoff and ground water. The reference to ordinary watercourses includes a lake, pond or other area of water which flows into an ordinary watercourse. This is the first time responsibility for the risks of flooding from surface runoff has been allocated to any particular body in law.

Managing local flood risk is the responsibility of each LLFA. The Local Strategy must set out who the Risk Management Authorities are in the area and their relevant functions. In developing Local Strategies a LLFA **must** consult with the public and the other Risk Management Authorities who are affected by the strategy.

Section 6(15) of the Act makes specific reference to the Welsh Risk Management Authorities and lists them as follows:-

- Natural Resources Wales;
- a Lead Local Flood Authority;
- a Highway Authority;
- a District Council for an area for which there is no unitary authority for an area that is wholly or mainly in Wales;
- an Internal Drainage Board for an internal drainage district that is wholly or mainly in Wales;
- and
- a Water Company that exercises functions in relation to an area of Wales;

For Wales, this means that there are 31 Risk Management Authorities, as listed below.

- Natural Resources Wales;
- the 22 Lead Local Flood Authorities;
- the three Internal Drainage Boards that are wholly or mainly in Wales;
- the one water and sewerage company which serves Wales and the borders;
- the one water and sewerage company that serves parts of mid Wales;
- the one water and sewerage company wholly in Wales;
- the one water supply only company wholly in Wales;
- and
- the one water supply only company , which serves Wales and the borders,

The contact details, together with a brief definition and an explanation of their activities, for those relevant to Pembrokeshire, are given in Section 2 Risk Management Authorities.

The Act places a number of statutory duties on Local Authorities in their new role as LLFA such as the preparation of a local flood strategy, the maintenance of a register of structures and features likely to affect flood risk and co-operation with other authorities,

In addition to these duties, each LLFA has a number of what are called permissive powers. These are powers that allow them to do something, but do not compel them to, such as powers to request information and powers to designate certain structures or features that affect flood or coastal erosion risk. They also have the ability to cause flooding or coastal erosion under certain conditions.

The Local Flood Risk Management Strategy must specify:-

- a) the risk management authorities in the authority's area,
- b) the flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area,
- c) the objectives for managing local flood risk (including any objectives included in the authority's flood risk management plan prepared in accordance with the Flood Risk Regulations 2009),
- d) the measures proposed to achieve those objectives,
- e) how and when the measures are expected to be implemented,
- f) the costs and benefits of those measures, and how they are to be paid for,
- g) the assessment of local flood risk for the purpose of the strategy,
- h) how and when the strategy is to be reviewed,
and
- i) how the strategy contributes to the achievement of wider environmental objectives.

The local strategy must be consistent with the National Strategy for Flood and Coastal Erosion Risk Management in Wales, published in November 2011.

The following must be consulted about the local flood risk management strategy—

- other risk management authorities that may be affected by the strategy, and
- the public.

A summary of the local flood risk management strategy (including guidance about the availability of relevant information), must be published and a draft of the strategy and any guidance submitted to the Welsh Ministers for review.

Strategic Environmental Assessments

Strategic Environmental Assessments (SEA) involve the appraisal of the potential environmental impacts of plans and programmes (including strategies) prior to their approval and formal adoption. This local strategy is considered to be a statutory plan and so an SEA is required.

Habitats Regulations Assessments

Due to the potential of this strategy to have a significant effect on sites of international nature conservation, namely Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites, a Strategic Habitats Regulations Assessment (HRA) will need to be undertaken in parallel with the SEA. The HRA will be integrated with the SEA process and the conclusions of the HRA will be provided as a summary to the SEA Environmental Report.

The Strategies are to be completed by January 2013 for submission to, and approval by, the Welsh Government.

2.0 Risk Management Authorities

The Risk Management Authorities covering the Pembrokeshire County Council administrative area are:-

Pembrokeshire County Council

County Hall
Freemen's Way
Haverfordwest
SA61 1TP

Contact centre: 01437 764 551

Out of hours emergency: 0845 601 5522

Fax: 01437 775 303

Email address: enquiries@pembrokeshire.gov.uk

Website: www.pembrokeshire.gov.uk

Natural Resources Wales

South West Area Office
Maes Newydd
Llandarcy
Neath Port Talbot
SA10 6JQ

Phone Number: 08708 506506

Email: enquiries@naturalresourceswales.gov.uk

Website: naturalresourceswales.gov.uk

Floodline

Phone Number: 0345 988 1188 (24 hour service)

Type Talk: 0345 602 6340

Dŵr Cymru - Welsh Water

Pentwyn Road
Nelson
Treharris
CF46 6LY

Head office phone number: 01443 452300

Customer services: 0800 052 0140

Website: www.dwrcymru.co.uk

South Wales Truck Road Agency

Unit 12

Llandarcy House

The Courtyard

Llandarcy

Neath

SA10 3EJ

Phone number 01792 325900
Website www.swtra.co.uk

3.0 Risk Management Authority Functions

3.1 Pembrokeshire County Council is the Lead Local Flood Authority for its administrative area as well as being the Highways Authority, Coast Protection Authority and Civil Contingencies Authority.

Under the Flood and Water Management Act 2010, Pembrokeshire Council became the Lead Local Flood Authority, with the role of overseeing the management of flood risk from local sources in Pembrokeshire. Local sources of flooding include surface water, ordinary watercourses (including lakes and ponds or other areas of water flowing into an ordinary watercourse) and groundwater and where there is interaction between these sources with main rivers and the sea.

Pembrokeshire Council has always had certain responsibilities in relation to ordinary watercourses, and in practice most Local Authorities took the lead in dealing with surface water flooding incidents prior to the changes contained within the Flood and Water Management Act 2010. This is, however, the first time responsibility for managing the risks of flooding from surface runoff have been allocated to any body in law.

The Flood and Water Management Act 2010 places a number of statutory duties on Local Authorities in their new role as LLFA including:

- the preparation of local flood risk management strategies;
- a duty to comply with the National Strategy;
- to co-operate with other authorities, including sharing data;
- a duty to investigate all flooding within its area, insofar as a LLFA consider it necessary or appropriate;
- a duty to maintain a register of structures and features likely to affect flood risk;
and
- a duty to contribute to sustainable development.

In addition to these, each LLFA has a number of what are called permissive powers. These are powers that allow them to do something, but do not compel them to and include:

- powers to request information;
- powers to designate certain structures or features that affect flood or coastal erosion risk;
- the expansion of powers to undertake works to include broader risk management actions;
- the ability to cause flooding or coastal erosion under certain conditions;
and
- the power to undertake works to manage flood risk from surface runoff or groundwater, consistent with the local flood risk management strategy.

LLFA in Wales will also take on the role of the Sustainable Drainage System (SuDS) Approving Body (SAB) in relation to sustainable drainage systems. In this role they will be responsible for both approving the original design of the SuDS and adopting and maintaining the finished system. The consenting of works in ordinary

watercourses (Section 23 Land Drainage Act 1991) is also transferred to the LLFA from Natural Resources Wales.

The allocation of responsibility for local flood risks is replicated in the Flood Risk Regulations 2009. These Regulations allocate specific responsibility for conducting assessments in relation to, and mapping and planning (for flood risk areas identified in the assessment) for the risks of, flooding from everything other than main rivers, the sea and reservoirs to Lead Local Flood Authorities.

Additionally, some local authorities in Wales, including Pembrokeshire County Council, are designated coastal erosion risk management authorities under the Coast Protection Act 1949, providing them with certain responsibilities in respect of coastal erosion and coastal protection. Formally referred to as Coastal Protection Authorities they may also be referred to as Coastal Local Authorities or Maritime Authorities and retain their current permissive powers in relation to coastal erosion risk management. These powers are amended under Schedule 1 of the Act

3.2 Investigation of Flood Incidents

The decision whether or not to investigate a flood is at the discretion of the Lead Local Flood Authority and the comprehensiveness of the investigation will be adjusted to reflect the significance of the incident and the resources available.

An investigation will normally be carried out where any of the following criteria are met:

- Where there was a risk to life as a result of the flood
- Where internal flooding of one property (domestic or business) has occurred
- Where critical infrastructure was affected by the flooding

The investigations will examine which flood risk authorities have a risk management function in a flood incident, and a report will outline their responsibility or actions, if any. Investigations will involve consultation with the relevant risk management authorities, landowners and private organisations involved, all of whom we expect to cooperate with us and provide comments.

The aim is for Flood Investigation Reports to bring all useful information together in one place, providing an understanding of situations, outlining possible causes of flooding and potential long-term solutions. Further recommendations will also be made to highlight potential flood risk management actions. Reports will provide a clear and thorough understanding of flooding situations, but our duty to investigate does not guarantee that problems will be resolved and cannot force other authorities into action.

Flood Investigation Reports will be published, as required by the Act.

3.3 Asset Register

Flood Risk Assets are structures or features which are considered to have a significant effect on flood risk. An example could be a trash screen protecting the entrance to a culvert in a residential area.

Pembrokeshire County Council is required to ensure there are records of all significant assets available for inspection by the public at all reasonable times. This register will be constantly updated in the light of flood incidents and changes to infrastructure.

Unlike major assets associated with fluvial or tidal flooding or coastal erosion, there has often been much confusion over the ownership and maintenance responsibility of local flood risk assets. This is likely to be due to local drainage infrastructure commonly being hidden underground or along land boundaries, where landowners either do not realise or acknowledge that they have any responsibility.

There are no set criteria for what defines an asset as significant but the most important consideration is its location and the consequences of its failure. Future flood risk mapping and the flood history at a site will be used to analyse the 'significance' of each flood risk asset.

3.4 Designation of Assets

Under the Flood and Water Management Act, Pembrokeshire Council and Natural Resources Wales will be 'designating authorities'. That is, they have the permissive powers to 'designate' features or structures where the following four conditions are satisfied:

- The existence or location of the structure or feature affects a flood risk
- The designating authority has flood or coastal erosion risk management functions in respect of the risk which is affected
- The structure or feature is not designated by another authority
- The owner of the structure or feature is not a designating authority.

If an asset becomes 'designated' its owner cannot alter or remove it without first consulting the designating risk management authority. The aim of designating flood risk assets is to safeguard them against unchecked works which could increase flood risk in the area. Designating of features or structures is not something that will be done regularly but only when there are concerns about the asset.

Note: designation of an asset does not mean there is a duty on anyone to maintain it in its current condition.

3.5 Consenting in respect to Ordinary Watercourses

Anyone wishing to culvert or insert any obstruction in an ordinary watercourse needs permission to do so. Natural Resources Wales has been responsible for granting these permissions. However, Natural Resources Wales powers have been transferred to the Lead Local Flood Authority from the beginning of April 2012. An

ordinary watercourse is defined as any watercourse, including lakes and ponds, that is not a main river.

The clear guiding principles will be to ensure that obstructions in watercourses are kept to a minimum and must not increase the risk of flooding.

Pembrokeshire County Council is generally opposed to the culverting of watercourses because of the adverse ecological, flood risk, human safety and aesthetic impacts. Watercourses are important linear features of the landscape and should be maintained as continuous corridors to maximise their benefits to society.

Pembrokeshire County Council will consider each application to culvert a watercourse on its own merits and in accordance with our risk-based approach to consenting. We will only approve a culvert if there is no reasonably practicable alternative, or if we think the detrimental effects would be so minor that a more costly alternative would not be justified. In all cases where it is appropriate to do so, applicants must provide adequate mitigation measures, and accept sole ownership and responsibility for future maintenance.

We will normally object to proposals to build over existing culverts because of health and safety considerations, increased maintenance costs, and because this would preclude future options to restore the watercourse.

Where appropriate we will encourage the restoration of culverted watercourses to open channels.

The consenting of works in main rivers and Internal Drainage Districts remains with Natural Resources Wales.

3.6 SuDS Approving Body (SAB)

The aim of a sustainable drainage system is to prevent new developments causing surface water runoff to flow from a site faster than the natural drainage of the site. This prevents possible flooding problems arising downstream of the development. Integral with this flood prevention aspect is the opportunity to ensure that water quality, sustainability, biodiversity and habitat issues become part of the design process when considering the drainage of a site.

The Flood and Water Management Act 2010 will make, when implemented, Pembrokeshire Council the SuDS Approving Body (SAB) with the duty to

- Approve the drainage system for all construction work.
- Adopt all SuDS schemes involving more than one property.
- Maintain adopted SuDS schemes

This part of the Act has not yet been enacted, but it is likely that the SuDS approval process will be integrated with the planning process.

3.8 Power to carry out works

The Flood and Water Management Act amends the Land Drainage Act 1991 to allow Pembrokeshire County Council, to carry out works to manage flood risk from surface runoff and groundwater. These works must be carried out in accordance with the principles of this local flood risk management strategy.

3.9 Pembrokeshire County Council as the Highway Authority

Pembrokeshire County Council is the Highway Authority, responsible for the network of non-trunk roads in the County, including responsibility for highway drainage. Under the Highways Act, the Highway Authority has a duty to maintain the Highway, which includes ensuring highway drainage systems are clear. As part of this duty, all roads in the county are regularly inspected and maintained, in accordance with Pembrokeshire County Council's highway asset maintenance policy document currently under preparation. Problems with highway drainage systems are dealt with as they arise.

3.10 Pembrokeshire County Council - Emergency Planning

Pembrokeshire County Council's Emergency Planning Unit is responsible for co-ordinating Pembrokeshire County's response to any emergency affecting the county. The Council has done this by preparing The Flood Response Plan that meets the statutory requirements, trained staff in their emergency roles and prepared staff and resources to assist the emergency services during an emergency.

Under the Civil Contingencies Act (2004) the Council's main duties include:

- risk assessment
- emergency planning
- maintaining public awareness and establishing arrangements to warn, inform and advise the public
- co-operating with the emergency services and other agencies
- sharing information with the emergency services and other agencies
- Business Continuity management – ensuring the Council continues to provide essential services if an incident disrupts the Council's business
- providing advice and assistance to the commercial sector and voluntary organisations

The Council provides practical support for the emergency services. This primarily includes caring for the welfare of the affected public and providing technical and resource assistance at the scene of an emergency. The Council also co-ordinates the work of the voluntary agencies that respond to an emergency.

In the event of a major emergency, the Council should be able to:

- provide temporary accommodation, including emergency feeding and rest centres
- provide social and welfare requirements for persons suffering from stress or shock

- assist in the provision of body holding areas and a temporary mortuary in liaison with Dyfed Powys Police and the Coroner
- arrange temporary or permanent re-housing
- deal with and provide advice on health hazards and environmental issues
- assist in the response to public health matters
- ensure safety of highways and traffic and structural engineering related matters
- provide any other services that normally fall within the day-to-day responsibilities of the Council

The Council is responsible for co-ordinating the recovery phase of the area affected by assisting the community to recover and supporting those affected. The Council will do its best, in conjunction with the statutory undertakers, to maintain vital services during an emergency and to restore normality to the community as soon as possible.

3.11 Planning Authorities

Pembrokeshire County Council is the local planning authority for the majority of Pembrokeshire, excluding the Pembrokeshire Coast National Park for which The Pembrokeshire Coast National Park Authority is the local planning authority. The Welsh Government provides a strategic framework for planning policies to be developed locally by these two authorities.

TAN 14 – Coastal Planning

Technical Advice Note 14 (TAN14) sets out the Welsh Government’s advice on key issues relating to planning for the coastal zone, including recreation and heritage and shoreline management plans.

TAN 15 - Development and Flood Risk

Technical Advice Note 15 (TAN15) sets out the Welsh Government’s policy on development and flood risk. It identifies that flood risk should be taken into account at all stages of the planning process. It sets out a precautionary approach that seeks to avoid inappropriate development in areas at risk of flooding and to direct new development away from the areas of highest risk shown on Development Advice Maps (DAM). Where new development is, exceptionally, necessary in such areas, the policy objective is to mitigate flood risk to an acceptable level for the lifetime of the development without increasing flood risk elsewhere, taking into account the impacts of climate change.

Both authorities seek to minimise the effect of development on flood risk and coastal erosion within Pembrokeshire.

3.12 Pembrokeshire Coast National Park Authority

In September 2010 the Pembrokeshire Coast National Park Local Development Plan replaced the Joint Unitary Development Plan (JUDP) as the adopted development plan for the National Park. The following extracts of the Local Development Plan set out policies relevant to flood prevention and flood risk within the National Park.

Policy 8: Special Qualities (Strategy Policy)

The special qualities of the Pembrokeshire Coast National Park will be protected and enhanced.

The priorities will be to ensure that [inter-alia]:

- i) Development of the undeveloped coast is avoided and sites within stretches of the developed coast are protected for uses that need a coastal location – see Policy 17 and Policy 18,¹

Policy 17: Shore-based facilities

Development of shore based facilities including those linked to proposals below mean low water, will be permitted within the developed areas of the coast where compatible with adjacent uses.

Marina developments are not considered appropriate on the sensitive coast of the National Park.

Policy 18: Porthgain, Saundersfoot, Solva and Tenby Harbours

Development within the identified harbour areas as shown on the Proposals Map, will be permitted provided that:

- a) it sustains working harbour activities; and
- b) it conserves or enhances the existing character of the harbour.

Policy 29: Sustainable Design

All proposals for development will be expected to demonstrate an integrated approach to design and construction, and will be required to be well designed in terms of [inter-alia]:

- h) Water and drainage (see policy 32)
- j) Resilience to climate change²

Policy 32: Surface Water Drainage

Development will be required to incorporate sustainable drainage systems for the disposal of surface water on site.

Policy 34: Flooding and Coastal Inundation

In planning for the future development of the National Park;

- a) Development will be directed away from those areas which are at risk from flooding now, or as predicted for the future by Natural Resources Wales Development Advice Maps or Shoreline Management Plan 2³ unless there are

¹ Chapter 5, paragraph 5.7.2 Planning Policy Wales, Edition 3, Welsh Assembly Government, July 2010 refers.

² Includes robustness to flooding, coastal risk and other pressures arising for climate change.

³ The Development Advice Maps (2009) identify areas liable to flood based on historic events (Zone B) and the Environment Agency's flood zone 2 (Zones C1 and C2). The Environment Agency's flood maps zones 2 and 3 identify the probability of areas flooding based on modelled data. The emerging Shoreline Management Plan 2s will identify areas liable to flood from the sea, with a long timescale. The data from all three sources will be used to identify areas liable to flooding for the purposes of this policy. Flood Zone 2 means land which has — (i) between a one in 100 and 1 in 1000 annual probability (chance) of river flooding (1% -0.1%); or (ii) between a one in 200 and 1 in 1000 annual probability (chance) of sea flooding (0.5%-0.1%).

Flood Zone 3 means land which has — (i) a 1 in 100 or greater annual probability (chance) of river flooding (>1%) ; or (ii) a 1 in 200 or greater annual probability (chance) of sea flooding (>0.5%)
Shoreline Management Plan 2s are anticipated to be completed in 2012.

sound social or economic justifications in accordance with the advice set out in Technical Advice Note 15.

- b) Sustainable defence of the coast will be permitted to protect existing communities or assets where practicable and where they do not jeopardise the longer term and natural evolution of the coast.

3.13 Pembrokeshire County Council

The Development Plan for Pembrokeshire County Council's planning area is the PCC Local Development Plan (LDP), which was adopted on 28th February 2013 following public consultation and independent examination. The LDP runs to 2021, although there is an expectation of full plan review every four years and it is possible that the outcomes annual monitoring might require partial or full review at an earlier date. In National Park locations, the Pembrokeshire Coast National Park Authority is the Local Planning Authority and adopted an LDP for National Park locations on 29th September 2010.

LDP policies

There are several references to flooding in the adopted PCC LDP, as summarised below:

Chapter 3 – Key Trends and Issues

Page 33, section 4 – identifies flooding as one of a number of environmental issues addressed by the Plan.

Page 34, paragraph 3.31 – refers to various rivers prone to flooding, to properties built on floodplains and to Welsh Government Technical Advice Note (Wales) 15 (TAN15).

Chapter 4 – Vision and Objectives

Page 40, paragraph 4.10 – identifies flooding as an issue to consider when seeking appropriate locations for new development (a footnote refers to the Stern Report, 2006).

Page 42, key issues Environment (4) and Infrastructure, Transport and Accessibility (3) – includes a sub-objective 'to minimise development on areas of land at flood risk'.

Chapter 5 – Plan Strategy

Page 64, paragraph 5.58 – confirms that site allocations have taken into account deliverability and have been informed by flood risk advice from Dwr Cymru Welsh Water and the Environment Agency Wales (now Natural Resources Wales).

Page 68, paragraph 5.66 – indicates that Haverfordwest Town Centre is constrained by flood risk and topography, but that nonetheless there is an opportunity to regenerate and build on the strength of the Town Centre.

Chapter 6 – General Policies

Page 75 – policy GN.1 – General Development Policy (criterion 7) and page 78, paragraph 6.8 (reasoned justification to policy GN.1).

Policy GN.1 says that development will be permitted where a number of criteria can be satisfied, one of which requires that there is no unacceptable harm to health and safety.

Paragraph 6.8 of the reasoned justification indicates that where there are concerns that a proposal would cause harm to health and safety through (amongst other things) flooding, professional advice will be sought from the relevant authority. It adds that 'where such concerns relate to fluvial or coastal flooding and / or erosion, the provisions of the relevant Shoreline Management Plan and / or Catchment Flood Management Plan will inform consideration of the health and safety issues'.

On or off site problems may, in some instances, make development inappropriate, but in other cases development may be possible if suitable mitigation is available. There are no housing allocations within the C1 and C2 flood zones, but there are a small number of non-housing allocations which extend into these zones. The Plan indicates that where allocations are at risk of fluvial or surface water flooding, this is identified in the Development Sites Supplementary Planning Guidance (SPG).

Page 79 – policy GN.2 – Sustainable Design (criterion 3) and page 81, paragraph 6.16 (reasoned justification to policy GN.2).

Policy GN.2 requires development to incorporate ‘a resource efficient and climate responsive design through (amongst other things) water conservation and the use of sustainable drainage systems.

Paragraph 6.16 of the reasoned justification says that designs will need to incorporate responses to the likely impact of climate change, including the implications of storms and flooding.

Page 82 – policy GN.3 – Infrastructure and New Development, page 83, paragraph 6.23 and page 84, paragraph 6.25 (reasoned justification to policy GN.3).

Paragraph 6.23 of the reasoned justification refers to contributions for flood alleviation schemes and to Sustainable Drainage Systems (SuDS), with a footnote referencing the Flood and Water Management Act, 2010.

Paragraph 6.25 records that the policy allows for relocation of critical infrastructure, were it is adversely affected by fluvial or coastal flooding.

Chapter 7 – Implementation and Monitoring

Page 138, paragraph 7.5 – success in Plan delivery will amongst other things improve the resilience of new development to climate change impacts, such as extreme weather events and flooding.

Page 138, paragraph 7.6 – records Pembrokeshire County Council as a Lead Local Flood Authority.

Page 141, paragraph 7.18 – includes a key monitoring outcome to ‘ensure that no additional flood risk arises from development’ (outcome 2).

Appendix 5 – The Monitoring Framework

Page 159, Strategic Objective A – key monitoring outcome 2 refers to ‘no significant additional flood risks arising from development. The related indicator, policy target and trigger for further investigation refers to the C1 and C2 flood zones and to the provisions of Welsh Government TAN15.

3.14 Natural Resources Wales is a Welsh Government Sponsored Public Body, whose principal aims are to protect and improve the environment, and to promote sustainable development. Historically Natural Resources Wales has led on the management of the risks of flooding from main rivers and the sea. However, as a consequence of the Flood and Water Management Act 2010 certain changes have been made to the role and remit of the Natural Resources Wales. In addition to flooding from rivers and the sea, Natural Resources Wales has new operational responsibilities in relation to coastal erosion and a wider oversight role for all flood and coastal erosion risk management in Wales.

This change means that Natural Resources Wales has a dual role:-

- operational responsibilities for flooding from main rivers, the sea and coastal erosion;
- oversight responsibilities in relation to all flood and coastal erosion risk management in Wales.

Furthermore, as the Welsh Government moves to introduce a national policy in relation to coastal change, including erosion, accretion, squeeze and managed realignment, allocating operational responsibility to Natural Resources Wales is intended to enhance existing partnership arrangements such as those seen in coastal groups and through the establishment of the Shoreline Management Plans.

The oversight change is integral to the delivery of national policy on flooding and coastal erosion risk management and has been taken forward to ensure that Natural Resources Wales has the remit to support the Welsh Government across the full range of flood and coastal erosion risks affecting Wales.

As part of their oversight role Natural Resources Wales will lead on the provision of technical advice and support to the other Risk Management Authorities. They will also lead on national initiatives such as Flood Awareness Wales, the national raising awareness programme, and the single point of contact for enquiries and information on flood risk, currently being piloted via their Floodline Warning Service.

The Flood and Water Management Act 2010 places a number of statutory duties on Natural Resources Wales including:

- co-operating with other authorities, including sharing data;
- reporting to the Minister on flood and coastal erosion risk in Wales including the application of the National Strategy; and
- the establishment of Regional Flood and Coastal Committees.

Natural Resources Wales will be the sole Risk Management Authority charged with monitoring and reporting on the National Strategy's implementation. In undertaking this role they will:

- collect data on progress from Risk Management Authorities using existing avenues wherever possible;
- report factual information to Welsh Government; and
- as requested, provide interpretive advice to the Welsh Government.

It will be for the Welsh Government to determine what, if any, action should be taken if the reports from Natural Resources Wales suggest the National Strategy is not being implemented or that actions being taken are increasing levels of risk.

Natural Resources Wales (NRW) also has responsibility for the enforcement of reservoir safety in Wales and they will be responsible for identifying the reservoirs that are at risk. High risk reservoirs are those where human life would be in danger should there be an uncontrolled release of water.

In addition to their statutory duties, Natural Resources Wales has a number of what are called permissive powers. These are powers that allow them to do something, but do not compel them to, and include:

- powers to request information;
- the ability to raise levies for local flood risk management works, via the Regional Flood and Coastal Committees;

- powers to designate certain structures or features that affect flood or coastal erosion risk;
- the expansion of powers to undertake works to include broader risk management actions;
and
- the ability to cause flooding or coastal erosion under certain conditions.

This new allocation of responsibilities is also consistent with Natural Resources Wales's role in relation to the Flood Risk Regulations 2009, which allocates specific responsibility for conducting assessments in relation to mapping and planning the risks of flooding from main rivers, the sea and reservoirs to Natural Resources Wales as well as providing guidance to Local Authorities on these matters for flooding from other sources.

Under the Regulations Natural Resources Wales also take on an assessment and coordination role at a national level, ensuring the correct information is passed back to the European Commission.

3.15 Water and sewerage companies, (which in Pembrokeshire is Dwr Cymru – Welsh Water) are responsible not only for the provision of water but also for making appropriate arrangements for the drainage of foul water, the treatment of waste, surface water sewers and combined sewers. They have primary responsibility for floods from water and sewerage systems, which can include sewer flooding, burst pipes or water mains or floods caused by system failures.

No changes have been made to the operational arrangements for water and sewerage companies in respect of flood risk. However the Flood and Water Management Act 2010 places a number of statutory duties on Water and sewerage companies including:

- a duty to act consistently with the National Strategy;
- a duty to have regard to the content of the Local Flood Risk Management Strategies;
and
- co-operation with other Risk Management Authorities, including sharing data.

3.16 South Wales Trunk Road Agency is the Highway Authority, responsible for the network of trunk roads in the County, including responsibility for highway drainage. Under the Highways Act, the Highway Authority has a duty to maintain the Highway, which includes ensuring highway drainage systems are clear. As part of this duty, all trunk roads in the county are regularly inspected and maintained, in accordance with South Wales Trunk Road Agency's highway asset maintenance policies. Problems with highway drainage systems are dealt with as they arise.

4.0 Responsibilities of Businesses, Landowners and Local Households

4.1 Utility and Infrastructure Providers

Utility and infrastructure providers such as Network Rail, energy companies and telecommunication companies are not risk management authorities. However they have a crucial role to play in flood risk management as their assets can be important in planning for flooding. Moreover, they may have assets such as culverts, information about which needs to be shared with flood risk management authorities. They already maintain plans for the future development and maintenance of the services they provide and it is important that they factor in flood risk management issues into this planning process.

This will ensure that their assets and systems are resilient to flood and coastal risks and that the required level of service can be maintained in the event of an incident. Utility and infrastructure providers may wish to invest time and resources into developing and delivering the local flood risk management strategy, to realise the significant benefits for them and their customers that follow from flood risks being effectively managed.

4.2 Property Owners and Residents

It is the responsibility of householders and businesses to look after their home or business, including protecting it from flooding.

While in some circumstances other organisations or property owners may be liable due to neglect of their own responsibilities, there will be many occasions when flooding occurs despite all parties meeting their responsibilities. Consequently it is important that householders whose homes are at risk of flooding, take steps to ensure that their house is protected.

These steps include:

- checking whether their household is at risk of flooding from the river, coast or local flood sources
- ensure that preparations have been made in case a flood occurs
- taking measures to ensure that their house is protected from flooding, either through permanent or temporary measures
- taking measures to make sure the house is resilient to flooding so that if internal flooding does occur it does not cause too much damage
- where possible, take out flood insurance.

Information on whether households are at risk can be provided by Natural Resources Wales.

Information about surface water flood risk is available on the Natural Resources Wales website:- <http://naturalresourceswales.gov.uk/alerts/whats-my-flood-risk/?lang=en>

Natural Resources Wales provides information on what to do to prepare a household for emergencies. This includes how to make a flood plan which will help to decide what practical actions to take before and after a flood. They have also developed a pamphlet which provides advice on how to make houses more resilient.

Another valuable document for householders to refer to is The National Flood Forum's Blue Pages Directory which provides information and advice on what products are available to help protect homes or businesses against flooding.

4.3 Riparian Owners

Landowners, householders and businesses whose property is adjacent to a river or a stream or a ditch are likely to be riparian owners, owning the land up to the centre of the watercourse with recognised legal rights and responsibilities. The Land Registry details should confirm this.

Riparian owners have a right to protect their property from flooding and erosion (*as long as they do not exacerbate the situation for others elsewhere*) but in most cases will need to discuss the method of doing this with Natural Resources Wales or Pembrokeshire County Council. They also have responsibility for maintaining the bed and banks of the watercourse and ensuring there is no obstruction, diversion or pollution to the flow of the watercourse. Full details can be found in the EA document 'Living on the Edge' and in Appendix B.

5.0 Objectives for Flood Risk Management

5.1 Low ecological footprint - all flood risk management should not overuse, but seek to work in harmony with, natural resources and processes, promote resource efficiency, and minimise waste, so we are clear that flood and coastal erosion risk management will help us reduce Pembrokeshire's ecological footprint;

5.2 Full costs and benefits - Whole system thinking and whole life costing are key approaches that will be used. Taking account of risks - especially to the economic, social and environmental wellbeing of our communities - and uncertainties associated with action and inaction should also be part of the decision-making process. In particular, we will consider the uncertainties associated with climate change, particularly sea level rise and the implications for the efficiency of any drainage scheme for the design life of that scheme;

5.3 Evidence base - An evidenced-based approach to decision-making will be used, but where there are threats of serious or irreversible damage, lack of full scientific certainty will not be used as a reason for postponing cost-effective measures to promote sustainable approaches to flood and coastal erosion risk management;

5.4 Polluter pays - Social and environmental costs of development should fall on those who impose them;

5.5 Reflecting distinctiveness - Approaches to sustainable flood and coastal erosion risk management will reflect and respond to the particular needs and issues of our communities, and the differing economic, social and environmental circumstances in different communities.

5.6 Climate Change - One of the purposes of this document is to ensure that an economically credible appraisal, taking account of the uncertainties associated with climate change, can be made to support investment decisions and Welsh Government grant support. This is necessary to ensure that a fair comparison can be made between investment in projects in different locations that compete for investment by Pembrokeshire County Council and for Welsh Government grant, as well as ensuring that the most appropriate means of reducing risk is investigated in any one place.

Given the long lifetime and high cost of the built environment and many flood risk management measures, it is imperative that plans and investment projects take into account, in an appropriate way, the changing risks over the coming century. This includes accommodating adaptation to a changing climate where appropriate.

The Welsh Government recommends a "managed adaptive approach" where possible. A managed adaptive approach is one based on taking action when particular trigger points are observed. It is most likely to be appropriate in cases where periodic review can track the change in flood or coastal risk, and the changing risk can be managed through pre-determined interventions. This provides flexibility to manage future uncertainties associated with climate change. We will adopt this approach where it is possible and appropriate to do so.

The Council will manage the risks posed by sea level rise and changing weather patterns that are likely to include increased frequency of intense rainfall events as a

result of climate change by implementing the policies included in the Shoreline Management Plans for the coastline of Pembrokeshire, the Western Wales Flood Risk Management Plan and the River Basin Management Plan.

5.7 Local Objectives – The County Council has specific objectives to meet the four overarching objectives set out in the National Flood Strategy for Flood and Coastal Erosion Risk Management in Wales.

- a) Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion
We will provide strategic leadership and direction at a local level. By developing policies for effective land use management and enhance development control procedures where appropriate. We will also establish regular maintenance schedules for flood and coastal risk management assets.
- b) Raising awareness of and engaging people in the response to flood and coastal erosion risk
We will endeavour to ensure that by December 2016 everyone who lives in a flood risk area understands the flood risk they are subject to, the consequences of their risk and how to live with that risk.
- c) Providing an effective and sustained response to flood and coastal erosion events
We will prepare and test Emergency Plans which will guide a timely and appropriate response to events and facilitate recovery from flooding within the shortest possible timescales.
- d) Prioritising investment in the most at risk communities
We will endeavour to identify and utilise alternative sources of funding for flood and coastal erosion risk management.
- e) Establishing effective routine maintenance regimes.
Pembrokeshire County Council will establish a regime of regular maintenance of flood defence assets in our ownership such as culverts and trash screens, to minimise the risk of blockage causing flooding from those assets. We will also take enforcement action where necessary to ensure that assets in private ownership are also maintained or repaired if they pose a flood risk due to their condition.

5.8 Sources of Flooding – Flooding can occur from several different sources such as Fluvial (from rivers), Pluvial (overground flows such as run-off from fields) Ground Water (where the water table reaches the ground surface) and Tidal. Of these, Ground Water is not a significant risk for Pembrokeshire.

Flooding can, and indeed usually does, occur from a combination of sources. In times of heavy rain, significant amounts of water run off fields and either reaches watercourses or roads as a result of which rivers rise and burst their banks and road drainage systems are overwhelmed. This can be exacerbated in the autumn when leaves and other debris is washed into gullies and ditches decreasing their capacity. High river flows add to the level of the tide in estuaries

6.0 Measures Proposed

The National Strategy for Flood and Coastal Erosion Risk Management in Wales, prepared under the terms of the Flood and Water Management Act 2010, sets four overarching objectives for the management of flood and coastal erosion risk in Wales:

- **reducing the consequences** for individuals, communities, businesses and the environment from flooding and coastal erosion;
- **raising awareness of and engaging people in the response** to flood and coastal erosion risk;
- **providing an effective and sustained response** to flood and coastal erosion events;
- **prioritising investment** in the most at risk communities

Pembrokeshire County Council is committed to ensuring that our citizens are healthy people living productive lives in a more prosperous and innovative economy; that there are safer and more cohesive communities, with lower levels of poverty and greater equality; that the environment is resilient, with more sustainable use of natural resources and that our society has a vital sense of its own culture and heritage.

By managing the frequency and consequences of flooding we can improve the safety of our communities. Raising awareness of the risks communities face will not only mean that the individuals who live and work there are better prepared for the risks they face, but that communities are brought together and involved in the decisions on how to address those risks, fostering community cohesion. Investment in flood risk management schemes will provide economic opportunities, with new, sustainable and innovative approaches required to ensure that in future we move beyond defence and drainage alone, and find ways to work with natural processes.

Historically the traditional approaches to managing the risks of flooding have been centred on the principles of prediction of drainage and defence need and then meeting that predicted need. Communities have been protected from flooding by a combination of river defences in the form of embankments and walls and local piped drainage systems.

As communities have developed so has a significant network of flood defences and drainage infrastructure to help reduce the risks faced. Although these arrangements have generally worked well in the past, and are still working, the effects of climate change impacts mean that the pressure on our existing infrastructure will increase significantly. Indeed, no matter how efficient the drainage system, there is always a risk that its capacity will be exceeded, and no matter how big the defence structure, there is always a risk that it can be breached or over-topped. Therefore, there will always be a residual risk that drainage and defence alone cannot address.

Drainage and defence still have a place within a flood system based on the principles of risk management, but we also need to consider other options that could reduce both the likelihood of an event occurring and the consequences of those events.

Other options could include:

- making more use of the natural environment, like wetlands;
 - deploying sustainable drainage systems much more widely;
 - Incorporating greater resilience into the design of developments (houses, buildings, roads and paved areas);
 - identifying areas suitable for inundation and water storage;
 - enabling those at risk of flooding to play a proactive role in shaping the flood risk management service they receive;
 - supporting people in taking actions to make their buildings, land and activities more resilient to flooding;
- and
- ensuring wider awareness of individual risk to increase levels of preparedness and planning for flooding events.

Adopting a risk management approach is about recognising that drainage and defence may not always be the most appropriate solution, and that some circumstances may require a complex and interlinked approach combining several different options.

So, for example, for a community that often experiences localised flooding that affects streets and gardens, but rarely homes, the solution may be about reducing the amount of hard paved surfaces or increasing drainage capacity by improving the maintenance of gullies and culverts. The forecast effects of climate projections means the shift to managing risk now needs to be adopted across all aspects of flood and coastal erosion.

Simply constructing more and higher defences is not a sustainable solution environmentally, economically or socially and in some cases can increase the risk to life and injury should they fail. The location of defences can sometimes harm the wider environment and constructing and maintaining defences is becoming more expensive, leaving less money available to protect other communities.

Both the *Foresight: Future Flooding Study* and the *Stern Review on the Economics of Climate Change* recommended a move towards a risk management approach to flood and coastal erosion risk, which goes further than defence alone. Working with natural processes can contribute to a more sustainable ecosystem management approach, as promoted by the Welsh Government's Natural Environment Framework, and also help deliver the requirements of the Water Framework Directive.

A risk management approach encompasses a range of measures to help communities as well as the wider environment. By working with natural processes and applying the ecosystem approach, risk management measures can also be more sustainable, providing a holistic and flexible system suitable for the needs of Pembrokeshire in the 21st century.

Examples of risk management measures, which in many cases would also be deployed alongside defence structures, include but are not limited to:

- developing better flood forecasting and warning systems;
- ensuring effective emergency plans are in place for flood events;
- improving the response to events by the emergency response organisations, as well as individuals and businesses;
- ensuring effective recovery arrangements are in place and supported by all relevant parties;
- considering and implementing measures to ensure appropriate development is designed to be safe and resilient to flood risk in the preparation of Local Development Plans and the assessment of all planning applications;
- avoiding inappropriate development in flood risk areas;
- speeding up the recovery process by incorporating greater resilience measures into the design of new buildings;
- increasing approaches that utilise the natural environment, like adopting soft engineering in place of traditional solutions, managing of the land to reduce storm runoff or creating more wetlands to store water;
- deploying the sustainable drainage systems (SuDS) approach for surface water management for both new and existing developments;
- identifying and protecting areas suitable for inundation and water storage to prevent flooding elsewhere;
- increasing levels of awareness of flood risks among individuals and communities;
- increasing individual and community preparedness for flood events;
- supporting the actions of individuals and communities and infrastructure providers to build their resilience to the consequences of a flood event;
and
- ensuring accessibility to buildings and contents insurance for those at flood risk.

7.0 Implementation of Measures

Pembrokeshire County Council as the LLFA will deliver their flood risk management functions in a manner that:

- embeds sustainable development as the central organising principle informing decisions and enhancing the economic, social and environmental wellbeing of people and communities, achieving a better quality of life for our own and future generations;
- is focussed on the needs of individuals, communities and businesses and which recognises that different groups have different needs and varying capacity to deal with flood risk and that the service they receive must be tailored accordingly;
- supports the wider economic renewal programme, ensuring investment in infrastructure is sustainable from a flood risk perspective and investing in developing the skills required to implement effective and innovative risk management measures;
- promotes equality and does not exacerbate poverty;
- is based upon a holistic understanding of the risks and consequences;
- considers the full range of risk management responses including broader potential environmental, economic or social opportunities;
- contributes to the holistic management of our water, land and marine resources reflecting the ecosystem approach set out in the Natural Environment Framework;
- facilitates long term resource and investment planning;
- enables effective prioritisation of investment, resources and actions;
- maximises opportunities to adapt to climate change;
and
- takes account of the requirement of relevant European and domestic legislation including the Flood Directive, the Water Framework Directive and the Habitats Directive

7.1 Policy on Culverts

Pembrokeshire County Council is generally opposed to the culverting of watercourses because of the adverse ecological, flood risk, human safety and aesthetic impacts. Watercourses are important linear features of the landscape and should be maintained as continuous corridors to maximise their benefits to society.

- the ecology of the watercourse is likely to be degraded by culverting;
- culverting introduces an increased risk of blockage (with consequent increase in flood risk);
- it can complicate maintenance because access into the culvert is restricted (in some cases being classified as a confined space and requiring trained operatives and specialist equipment).

A blockage in a culvert can be very difficult to remove and likely to result in a severe flood risk. For these reasons the provision of a screen at the entrance to the culvert is often considered. Such a screen reduces the risk of a blockage inside a culvert,

but introduces a significant maintenance obligation (to ensure that the screen is kept clean) which far exceeds the typical maintenance requirements of an open watercourse.

7.2 Impacts of Culverting

Ecology Culverts can be impassable to riverine fauna and can create barriers to the movement of fish.

Culverting results in the loss of natural in-stream and bankside habitats through direct removal and loss of daylight.

Pollution In urban areas, culverted watercourses are often highly polluted due to misconnected foul sewers, overflows from blocked sewers or discharges of contaminated surface water.

Morphology Culverted sections may create or exacerbate downstream or upstream bank and bed erosion or promote sediment deposition, as a result of altered water velocities and disruption to the natural transport of sediment

Restoration Culverts can hinder future restoration options. This is particularly significant where urban development results in the burial of once open watercourses beneath housing or commercial centres, or where new development is placed on top of existing culverted watercourses which otherwise might be available for restoration

Landscape and amenity Culverting of urban waters leads to the loss and degradation of distinctive components of the local landscape.

Culverting leads to the loss of green amenity space along river banks and reduced access for recreational opportunities such as angling, walking or canoeing.

We will consider each application to culvert a watercourse on its own merits and in accordance with our risk-based approach to permitting. We will only approve a culvert if there is no reasonably practicable alternative, or if we think the detrimental effects would be so minor that a more costly alternative would not be justified. In all cases where it is appropriate to do so, applicants must provide adequate mitigation measures and accept sole ownership and responsibility for future maintenance. We will normally object to proposals to build over existing culverts because of health and safety considerations, increased maintenance costs, and because this would preclude future options to restore the watercourse .

Where appropriate we will encourage the restoration of culverted watercourses to open channels.

7.3 How the measures will be implemented

Pembrokeshire is fortunate in the generally low incidence of flooding experienced. Most events are due to short duration, very intense rainfall events. Such events have very low probabilities (also known as “return periods”) of 1% (1:100 years). Clearly

planning for such events is difficult, if not impossible, as they are unpredictable. However, where there are instances of flooding that show some evidence of recurrence, Pembrokeshire County Council will undertake a study to try to identify any amelioration measures that may be effective.

| Measures Objectives | developing better flood forecasting systems | ensuring effective emergency plans are in place | improving the response to events | ensuring recovery arrangements are in place | ensuring appropriate development | avoiding inappropriate development | incorporating greater resilience measures | utilise the natural environment | deploying sustainable drainage systems | protecting areas suitable for inundation | increasing awareness of flood risks | increasing preparedness for flood events | supporting actions to build resilience | ensuring accessibility insurance |
|---|---|---|----------------------------------|---|----------------------------------|------------------------------------|---|---------------------------------|--|--|-------------------------------------|--|--|----------------------------------|
| Reducing the consequences from flooding and coastal erosion | X | X | X | X | X | X | X | | | X | X | X | X | X |
| Raising awareness of the response to flood and coastal erosion risk | X | X | | X | | | | | | | | | | |
| Providing an effective and sustained response to flood and coastal erosion events | X | X | X | X | | | | | | | | | | |
| Prioritising investment in the most at risk communities | | | | | X | X | X | X | X | X | | | | |
| Establishing effective routine maintenance regimes | X | | X | | X | | X | X | X | | | | | |

Objectives and Measures

8.0 Costs and Benefits of Measures

The risk and consequences of flooding and coastal erosion present a significant financial cost, both to individuals affected and to the wider Welsh economy. As the climate changes, that risk and associated cost is expected to increase. As the level and nature of risk changes in the future, Pembrokeshire County Council, in collaboration with the at risk communities, will need to find other sources of funding to ensure people receive the levels of support they need to manage the risks they face.

At present Pembrokeshire County Council receives funding from Welsh Government in different ways:

- An annual unhypothecated settlement through the Revenue Support Grant (RSG),
- By bidding for Flood Alleviation Grants (FAG), on a scheme by scheme basis, under the Land Drainage Act 1991. The current FAG rate is 85%, and
- By bidding for grant aid under the Coast Protection Act 1949. The current grant rate is 45%.
- Annual award of funding in relation to our duties under the Flood Risk Regulations 2009, and the Flood & Water Management Act 2010.

Existing flood risk maintenance measures, for example highway drainage, and land drainage and coastal structures, are funded by the Council departments charged with their upkeep. The long term funding for SuDS systems has yet to be clarified with the Welsh Government.

8.1 Flood Alleviation Grants

The system for bidding for Flood Alleviation Grants for community flood relief schemes is set out in the Memorandum relating to Flood Alleviation Grants for Local Authorities under the Land Drainage Act 1991 published in August 2006.

When considering a scheme a Preliminary Study must be undertaken to determine the options or feasibility of the proposals. The cost of the Study may be considered for grant as a separate entity but it must be approved before commencing.

Before proceeding, the Study must be submitted to Welsh Government for the proposals to be accepted. If they are accepted then a request for an Agreement in Principle can be made and an application made to undertake a Project Appraisal Report (PAR) which again may be considered for grant. The PAR is the process of identifying and evaluating all feasible options of addressing a flood risk problem. The purpose of the PAR is to provide a clear and comprehensive record of the appraisal process and a well argued justification for the selection of the preferred option.

To qualify for grant it is important that the PAR is undertaken in accordance with Annex IIIA of the Memorandum by a person competent to do so. It should be appropriate to the level and scale of the situation being addressed and should provide the information necessary for the Welsh Government Flood and Coastal Erosion Risk Management team to make considered technical, economic and environmental judgements about the proposals and the decisions that have been made in choosing the preferred option. When the PAR has been approved a formal grant approval must be applied for to carry out the works before works commence.

8.2 Flood Defence Maintenance

The costs of current flood defence maintenance are met from revenue budget. Where such costs become significant, consideration will be given to the promotion of a capital scheme. However any capital scheme will be assessed in a Project Appraisal Report as discussed above and, if shown to be cost beneficial, submitted for inclusion in the Pembrokeshire County Council capital expenditure budget and a grant funding application to the Welsh Government. It should be noted that such funding is limited and may not be available for such schemes. As such, all proposed schemes must be regarded as aspirational until funding is secured. In appropriate cases, partnership funding will be sought which could increase the availability of funding. There is also a potential for synergy with other aspirations for the enhancement or redevelopment of an area so that several sources of funding combined may be available.

9.0 Assessment of Flood Risk

There are three types of flooding experienced in Pembrokeshire. They are:-

- **Tidal inundation** - when a high spring tide, usually combined with a surge, floods low-lying areas adjacent to the shore. It can also cause flooding when the spring tide and surge coincide with high river levels which heavy rain has produced.
- **Fluvial flooding** - which occurs when intense rain causes high river levels.
- **Surface Water flooding** - caused by inadequacies in the surface water drainage system either by insufficient design capacity or reduced capacity from lack of maintenance or from blockages caused by debris carried into the drainage system by surface water flows.

The Pembrokeshire County Council Flood Plan prepared by the Civil contingencies Unit has identified the following groups of properties at risk:-

Flood risk communities which are serviced with EAW Flood Warnings

| Flood Risk Community | Flooding Source | Properties at risk | Risk Category |
|-----------------------------|------------------------|---------------------------|----------------------|
| Haverfordwest | W Cleddau | 209 | High |
| Haverfordwest Tidal | Tidal | 62 | High |
| Tenby | Ritec | 29 | High |
| Amroth Tidal | Tidal | 7 | Medium |
| Angle Tidal | Tidal | 12 | Medium |
| Dale Tidal | Tidal | 42 | Medium |
| Llechryd | Teifi | 3 | Medium |
| Lower Town Fishguard Tidal | Tidal | 7 | Medium |
| Newgale Tidal | Tidal | 3 | Medium |
| Pembroke Dock Tidal | Tidal | 31 | Medium |
| Solva | Solva | 40 | Medium |
| Solva Tidal | Tidal | 25 | Medium |

All these are flooded either directly by the tide or as a result (in the case of the Ritec) of the tidal locking of an outfall at times of heavy rain. As such, they are within the remit of Natural Resources Wales to address. These areas are all covered by Natural Resources Wales flood warning service and therefore receive a warning automatically provided they subscribe to that service.

All other flooding in Pembrokeshire is as a result of lack of capacity in surface water drainage systems. Where such flooding occurs, an investigation will ascertain the mechanism of flooding and identify potential remedial actions. However there is no identified source of funding and so if substantial capital investment is required, a

feasibility study will be undertaken to identify potentially viable schemes and funding sought. It is anticipated that most events will be the result of blockages of inlet structures as a result of a lack of maintenance or of debris washed in by surface water. In these cases, remedial action will be undertaken as needed from existing revenue budgets and, if appropriate, the relevant structure put onto a regular maintenance schedule at higher frequency of inspection. The maintenance schedules for all drainage infrastructure will regularly reviewed and amended as needed.

10.0 Environmental Objectives

The Water Framework Directive (WFD) sets a number of different objectives. In summary the environmental objectives for surface waters are:

- Prevent deterioration in status for water bodies
- Aim to achieve good ecological and good surface water chemical status in water bodies by 2015
- For water bodies that are designated as artificial or heavily modified, aim to achieve good ecological potential by 2015
- Comply with objectives and standards for protected areas where relevant
- Reduce pollution from priority substances and cease discharges, emissions and losses of priority hazardous substances.

In summary the environmental objectives for groundwater are:

- Prevent deterioration in the status of groundwater bodies
- Aim to achieve good quantitative and good groundwater chemical status by 2015 in all those bodies currently at poor status
- Implement actions to reverse any significant and sustained upward trends in pollutant concentrations in groundwater
- Comply with the objectives and standards for protected areas where relevant
- Prevent or limit the input of pollutants into groundwater.

The delivery of these objectives are contained in the River Basin Management Plan and any works proposed as a result of a flooding incident will be assessed to ensure that where possible, it makes a positive contribution to the improvement of water quality. In all cases, we will ensure that there is no detriment to a water body.

A Strategic Environmental Assessment has been undertaken and accompanies this document. The Assessment may be summarised as follows:-

The implementation of the LFRMS has particularly strong, positive environmental effects on SEA objectives concerning:

- Minimising the risk of flooding - implementing the range of measures proposed by the LFRMS should result in a minimised risk of flooding.
- Maintenance and enhancing of water resources and quality - through a number of measures to investigate maintenance of culverts and various watercourses and implementing flood risk management plans;
- Protection of critical infrastructure – measures which reduce the occurrence of flooding or give early warning of flooding outlined in the LFRMS will help to protect critical infrastructure within PCC, in the short, medium and long term.
- The adaption of development to the impacts of climate change – in the long term, the combined measures of the LFRMS will ensure that development is adapted to cope with climate change and related incidents of flooding linked to climate change.
- The impact of flooding on human health and wellbeing – the measures outlined by the LFRMS should help to reduce the stress and anxiety related to flooding incidents, as well as reducing the impact of flood occurrence.

As none of the measures proposed by the LFRMS result in a negative impact on SEA objectives, then it is not proposed that any mitigating measures need to be formed or implemented.

An Appropriate Assessment under the Habitats Regulations has also been undertaken which also accompanies this document. It has concluded that that the LFRMS itself is not likely to have any significant negative effects on any European sites, alone or in combination with other plans or projects. If there is a potential negative impact, further HRAs conducted on lower tier plans and projects will ensure that this is identified and managed.

11.0 Agreement and Review of the Strategy

In order to achieve the widest possible agreement to the Strategy the Council will publicise and consult with interested parties; this will be undertaken in various ways including local media, the Council's website, briefing notes and discussions with Local Members and Community Councils, other risk partners and through public meetings if required.

It is believed that through open consultation and discussion interested parties will be able to contribute to and take ownership of the Strategy. It is inevitable that there will be areas of conflict; however, by ensuring that all items are debated and explained then consensus should be possible.

The Strategy will be reviewed in relation to the effects that it may have on the environment to ensure that there are no adverse effects, or that where these cannot be avoided appropriate mitigation is carried out.

It will never be possible to remove all risk of flooding; therefore it is important that the Strategy also communicates residual risks and likelihoods of flooding so that expectations can be managed.

Once the final draft Strategy has been prepared, consulted upon and internally reviewed, it will be submitted to the Council for acceptance and then submitted to the Welsh Government.

The Strategy will be reviewed at a frequency to coincide with the review of the National Strategy for Flood and Coastal Erosion Risk Management in Wales. It will also be necessary to undertake minor reviews should there be any changes in legislation, or, other factors which add to or alter existing information (such as review of EA Flood Risk Maps).

The Strategy will also be regularly reviewed against objectives set to assess whether measures have been actioned and should incorporate monitoring to identify any positive or negative effects and that mitigation measures proposed are carried out.

Appendix A

Sources of Flooding and Coastal Erosion

The main sources of flooding in Wales today are:

- sea flooding;
- river flooding, including main rivers and ordinary watercourses; and
- surface water flooding.

Sea Flooding

Flooding from the sea usually occurs through a combination of high tides and waves and severe weather. The most severe storm conditions occur when an atmospheric depression and high onshore wind speeds coincide with a high astronomical tide, to cause an increase in the tide level known as a tidal surge. Such conditions can damage defences, cause defences to fail, or result in wave overtopping throwing sea water and boulders into coastal communities.

The flooding of Towyn in North Wales in 1990 is an example of this sort of event, where around 2800 properties were affected, as a result of a failure of the sea wall during severe storms.

River Flooding

River flooding is probably the most commonly recognised and understood source of flood risk. It usually occurs when the capacity of a river channel cannot contain the volume of water entering it, and water overflows its banks. This is a natural event. When a river does overflow, the resultant flood water can be both deep and fast flowing and can cause widespread inundation of the flood plain. It may also carry debris, which can increase the damage.

The impact can be even worse if a flood defence, built to contain high river flows, fails suddenly, often called a breach, causing a risk to life or injury with little warning.

Surface Water Flooding

Surface water flooding is common in built up areas where development, including roads, buildings and multiple other hard surfaces, may result in a lack of open spaces and permeable surfaces able to absorb rainfall. It can also be a problem in rural areas where during heavy rainfall water tends to run off fields into roads and properties.

Where rainfall cannot be absorbed by the soil, rain is directed into the drainage systems instead. Typically piped drainage systems are designed to deal with frequent, relatively short duration rainfall events. They are not designed to deal with longer storms or more intense rainfall, and surface water flooding occurs when those systems are unable to cope with the volume of water entering them and are more likely to become blocked with debris and silt.

Other Sources of Flooding

While the three sources of flooding listed above are the most commonly experienced there are however other sources of flood risk including:

- the failure of dams;
- the failure of defence structures;
- canal breaches;
- groundwater and other water sources; and
- sewer flooding.

The likelihood of failure of a dam is very low. Strict monitoring, maintenance and safety regimes are in place for dams retaining over 25,000 m³ of water and recent legislative changes (under the Flood and Water Management Act 2010) to further strengthen arrangements are being implemented. However, if a dam failure occurred there would be a risk of significant amounts of water being released from any associated reservoir.

While not a traditional source of flooding in the same way as a river or a dam, the failure of a defence structure could significantly increase the impacts or consequences of a flood or coastal erosion event. An area previously considered to be protected could be placed at a level of risk residents are unprepared for.

There are also some risks of flooding from lakes and other water bodies. Groundwater levels can also impact on other sources of flooding, reducing capacity to absorb surface water for example. Groundwater flooding is not a widespread issue in Wales, but can occur in some areas, with consequences for land use and access. For example, Cardiff Bay has a pumping station to stop basements flooding from ground water levels.

From time to time other local flood risks involving water held within the ground occur. An example is the event at Parys Mountain, where water was held within the mountain in mine workings; flooding occurred when the water levels within the workings increased following the closure of local mines. There is separate legislation governing the management of water levels in mines.

Flooding from Sewers

Sewers come in three types:

- foul sewers, which are designed to carry soiled water that has been used for washing and cooking purposes, as well as the contents of toilets and trade effluent;
- surface water sewers, which are designed to carry rainwater runoff from roofs, yards and roads; and
- combined sewers, which receive a mixture of foul sewage and surface water.

Flooding from foul sewers is generally caused by blockages or the failure of pumped systems and usually affects only limited numbers of properties. Flood water

containing foul sewage means that it does cause significant distress to those affected

Flooding from surface water and combined sewers occurs when any of these types of sewer becomes overloaded due to heavy rainfall (or sometimes snow melt), when sewers become blocked, or more rarely, when mechanical or electrical equipment breaks down. The likelihood and severity of sewer flooding caused by overloading depends on the capacity of the sewerage system of sewers in question, which can be affected by a range of factors, including pipe size and weather conditions. Sewers are not designed to deal with floodwater.

Coastal Erosion Risk

Coastal erosion is the term used to describe the loss of land on the coast due to the action of the sea. The shoreline is constantly changing shape due to the action of waves, tides and currents. These processes are causing long term changes but during coastal storms there can be dramatic loss of land due to cliff falls.

The level of beaches can be lowered by waves and tidal currents moving sand and shingle along the coast. This sediment transportation can expose the landmass behind the beach to bigger waves and increased erosion.

The very shape of Wales has been determined by the sea. Since the last Ice Age ended 10,000 years ago, sea levels have risen some 60 metres, flooding lowland plains and valleys. Coastal erosion is progressive, and causes permanent irreversible loss to property and infrastructure. Such losses can undermine the viability of coastal communities and have significant impacts on the local economy.

The rate at which the coast erodes depends on a number of factors including the prevailing sea conditions, the frequency and severity of coastal storm events, the amount of sand and shingle on the beach and as well as the geology and topography of the coast and near shore zone. Hard rocks erode slowly, with impacts being more gradual. In contrast, softer rock formations or sand dunes will erode faster, and this speed of erosion can pose a risk to coastal communities.

In some areas the risk of erosion is compounded by unstable coastal land. Coastal erosion at the bottom of an unstable coastal slope may lead to a landslip affecting land further inland.

The rate of coastal erosion in Wales is generally low compared with some parts of England. However, evidence from the Shoreline Management Plans suggests that in the next 100 years we could see an increasing number of our coastal communities at risk from rising sea levels and eroding land.

The location of some of these communities will become unsustainable in the longer term, forcing those who live there to move.

Natural Resources Wales has a coastal erosion map on their website giving details of the management policies in the SMP.

It is estimated that erosion is occurring along 346km (23%) of the Welsh coast. While the construction of defences allows us to delay erosion in certain areas for the life of the structure, this approach needs to be considered and balanced against impacts to

other parts of the coast and the wider environment. Protecting one section of the coast may increase erosion in another part.

Combined Risk

Detailing individual sources of risk does not imply that flooding can only ever occur for one reason, or that coastal erosion only ever has one outcome. Any and all of these sources and facets can come together to produce what are called combination events.

An example of a combination flood is one occurring during a period of intense or prolonged rainfall. The rain would increase water levels in watercourses, saturate ground, increase flow through the drainage system and could enter the public sewerage system, increasing pressure. As all of these factors combine, watercourses, drains and sewers could all reach maximum capacity and with nowhere else to go the water could overflow from all of them, resulting in a combination of river, sewer and surface water flooding.

On the coast, a combination event could involve flooding from the sea where a storm delivers intense rainfall on the land and a storm surge and stormy seas, at the same time as a high tide. This results in an increase in tide and wave levels at the same time as flow from rivers to the sea increases. If the two meet, coastal communities could experience a mix of flooding from the sea and a river.

Depending on the intensity of the rainfall and the waves, such an event could also cause an increase in coastal erosion, resulting in long term damage to the coast, which could exacerbate future flood risks.

Appendix B

A Guide to your Rights and Responsibilities if you Live by a Watercourse

The purpose of this guide is to explain the rights and responsibilities of property owners and residents whose property is adjacent to a watercourse.

What is a Watercourse?

A watercourse is defined as all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices, and passages, through which water flows.

A watercourse is thus any channel through which water flows and may be open or enclosed underground as a culvert. In some situations the watercourse may be a dry channel which only carries water during storm conditions.

Watercourses are classified as either 'main rivers' or 'ordinary watercourses'. An ordinary watercourse is a watercourse that does not form part of a main river. Main rivers come under the jurisdiction of Natural Resources Wales .

Riparian Owners and the Law

Your rights and responsibilities as a riparian owner are based on the following legislation:

- The Public Health Act 1936
- The Land Drainage Acts of 1991 & 1994
- Water Resources Act 1991
- National Rivers Authority (now Natural Resources Wales) Land Drainage bylaws 1981.

Rights and responsibilities as a property owner / landowner

You have certain rights and responsibilities if you own land adjoining a watercourse. In legal terms, you are a 'riparian owner', and are presumed to own the land up to the centre of the watercourse unless it is known to be owned by someone else. When a watercourse is situated on the boundaries of separate land ownerships, each adjoining owner shares responsibility.

You have the right

- To receive a flow of water in its natural state, without undue interference in its quantity or quality.
- To protect your property against flooding from the watercourse, without causing any flood risk to other people or properties.

You have the duty

- To pass on water flow without obstruction, pollution or diversion which would affect the rights of others

- To maintain the banks and bed of the watercourse (including any trees and shrubs growing on the banks) and any flood defences that exist on it.
- To maintain any structures on your stretch of the watercourse. These may include culverts, weirs and trash screens.
- Riparian owners must not build a new structure that encroaches upon the watercourse or alters the flow of water without first obtaining land drainage consent from Pembrokeshire County Council or Natural Resources Wales.
- You are required to clear debris from the watercourse, including litter, even if it did not originate on your property.

Before carrying out any works to a watercourse such as altering the banks, building a retaining wall or laying pipes, you should contact Pembrokeshire County Council.

What is the Council's Role?

In order to reduce the risk of flooding, Pembrokeshire County Council aims to maintain an effective watercourse system through a process of co-operation with riparian owners, together with advice and assistance wherever possible.

Under the Land Drainage Act 1991, Pembrokeshire County Council is the “operating authority” for ordinary watercourses in Pembrokeshire.

Whilst riparian owners are responsible for maintaining their watercourses, the Council have the power to carry out work to prevent flooding and recharge the cost to the riparian owner. The Council may therefore:

- Inspect ordinary watercourses.
- Contact riparian owners where maintenance is required and, if necessary, serve notice to require maintenance where water flow is seriously impaired.
- Co-ordinate work along a watercourse where a number of residents are involved.
- Take action to prevent unauthorised piping or culverting of watercourses.

Pembrokeshire County Council will regularly inspect and maintain any structures for which it is responsible.

Appendix C

Natural Resources Wales Flood Forecasting and Warning

Natural Resources Wales operates a Flood Warning service, to help the public and emergency responders take timely and effective action to reduce the impact of flooding. This includes the monitoring of rainfall, river levels and sea levels and making forecasts of river and coastal flooding using local forecasting models. This information is used by local Natural Resources Wales duty officers to make decisions on the issuing of flood warnings to professional partners, the media and the general public.

They publish forecasts on flood risk for up to three days ahead on their website. Forecasts are at county level and use the latest weather forecasts from the Flood Forecasting Centre in Exeter along with river and coastal forecasts provided by their own forecasting team in Wales. The forecasts cover flooding from rivers, the sea, surface water and groundwater (high risk chalk catchments in England only).

A colour coded map is used along with supporting text indicating the risk status at a county level. The 3 day flood risk forecast can be found on the Natural Resources Wales website.

Visit: www.environment-agency.gov.uk/homeandleisure/floods/125305.aspx

New Flood Warning Codes

| | | |
|---|---|---|
|  |  |  |
| LLIFOGYDD – BYDDWCH YN BAROD FLOOD ALERT | RHYBUDD LLIFOGYDD FLOOD WARNING | RHYBUDD LLIFOGYDD DIFRIFOL SEVERE FLOOD WARNING |
| <small>MAE LLIFOGYDD YN BOSIBL. FLOODING IS POSSIBLE. BE PREPARED.</small> | <small>DISGWYLIR LLIFOGYDD. MAE ANGEN GWEITHREDU AR UNWAITH. FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.</small> | <small>LLIFOGYDD DIFRIFOL. PERGYL I FYWYD. SEVERE FLOODING. DANGER TO LIFE.</small> |

Typical message/advice

- | | | |
|---------------------|--------------------------------------|---|
| ⇒ Stay alert | ⇒ Flooding expected | ⇒ Significant risk to life |
| ⇒ Stay vigilant | ⇒ Take action | ⇒ Significant disruption to communities |
| ⇒ Early precautions | ⇒ Protect yourselves & your property | ⇒ Protect yourselves |

Natural Resources Wales operates Floodline Warnings Direct, which is a free service that provides flood warnings direct to you by telephone, mobile, email, SMS text message, pager and fax. The service currently covers designated Flood Warning Areas in England and Wales at risk from river or tidal flooding. Flood Warnings are generally issued for specific communities, Flood Alerts generally cover

larger areas e.g. catchments or lengths of coastline .Natural Resources Wales are able to provide direct warning messages in the designated areas, using the following codes: Flood Alert, Flood Warning, and Severe Flood Warning.

Visit:- <http://naturalresourceswales.gov.uk/alerts/flood-warnings/floodline-warnings/?lang=en>

The Environment Agency's online Flood Warning Service shows the current Flood Warning situation throughout England and Wales. It is automatically updated every 15 minutes, 24 hours a day, 7 days a week. It is available on the Environment Agency's website

Visit: <http://apps.environment-agency.gov.uk/flood/31618.aspx>

The Environment Agency provide web based information on river and sea levels so people living in flood risk areas are better informed and can decide what actions to take as the water levels change. The Environment Agency does this by publishing the latest data from their network of monitoring stations across England and Wales that measure the levels of rivers, lakes, sea and groundwater in real time. This data is published on the Environment Agency's website.

Visit:
<http://apps.environment-agency.gov.uk/river-and-sea-levels/120503.aspx>

Appendix D

Sources of Further Information

Legislation

Flood and Water Management Act 2010

<http://www.legislation.gov.uk/ukpga/2010/29/contents/>

The Flood Risk Regulations 2009

<http://www.legislation.gov.uk/uksi/2009/3042/contents/made>

Water Framework Directive:

<http://www.wales.gov.uk/topics/environmentcountryside/epq/waterflooding/waterframework/?lang=en>

Welsh Government

National Strategy for Flood and Coastal Erosion Risk Management in Wales

<http://wales.gov.uk/docs/desh/publications/111114floodingstrategyen.pdf>

Local Flood Risk Management Strategies - Guidance

<http://wales.gov.uk/docs/desh/publications/111130floodinglocalstrategyen.pdf>

Planning Policy Wales

<http://wales.gov.uk/topics/planning/policy/ppw/;jsessionid=rnpSPzwBK7GxdPrTzqz1JG0KJfdzL1jRkVkk1tTrPVGyyCByHyQT>

TAN 14:

<http://wales.gov.uk/topics/planning/policy/tans/tan14/;jsessionid=M2LVP9tXykhDsF9VNh9cnhxsktGJrNtnQbGrMkc7Qs4GgPzXH6vR>

TAN 15:

<http://wales.gov.uk/topics/planning/policy/tans/tan15/?lang=en>

Community engagement toolkit

<http://wales.gov.uk/topics/environmentcountryside/epq/waterflooding/flooding/communities/toolkit/;jsessionid=gpbMP9nhMqBC6qBL8Z1xPcPpJ5zyYgP7yBm547pVWCqcD16Zykhb!1858592419?lang=en>

One Wales: One Planet

<http://wales.gov.uk/topics/sustainabledevelopment/publications/onewalesoneplanet/?lang=en>

Sustainable Development: – Guidance to Risk Management Authorities

<http://wales.gov.uk/docs/desh/publications/111231floodingsustainableen.pdf>

Flood Risk Management toolkit

<http://wales.gov.uk/topics/environmentcountryside/epq/waterflooding/flooding/?lang=en>

Climate Change

United Kingdom Climate Projections 2009 (UKCP09)

<http://ukclimateprojections.defra.gov.uk/>

The Stern Review on the Economics of Climate Change

http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/sternreview_index.htm

Learning Lessons from the 2007 Floods (The Pitt Review)

<http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/thepittreview.html>

EA Publications

River Basin Management Plans

<http://www.environment-agency.gov.uk/research/planning/33106.aspx>

Catchment Flood Management Plans

<http://www.environment-agency.gov.uk/research/planning/33586.aspx>

Flooding in Wales:

<http://www.environment-agency.gov.uk/research/library/publications/108958.aspx>

Future Flooding in Wales: Flood Defences

<http://www.environmentagency.gov.uk/research/library/publications/116654.aspx>

Natural Resources Wales Flood Map

www.environment-agency.gov.uk/homeandleisure/floods/31650.aspx

Working with natural processes to manage flood and coastal erosion risk

<http://www.environment-agency.gov.uk/research/planning/116707.aspx>

'Living on the Edge'

<http://publications.environment-agency.gov.uk/dispay.php?name=GEHO0407BMFL-E-E>

Community Flood Plans

www.environment-agency.gov.uk/homeandleisure/floods/38329.aspx

Personal Flood Plan

www.environment-agency.gov.uk/homeandleisure/floods/38329.aspx

Prepare your property for flooding - A guide for householders and small businesses

<http://publications.environment-agency.gov.uk/PDF/GEHO1009BRDL-E-E.pdf>

Natural Resources Wales Working at Construction and demolition sites

PPG6 Pollution Prevention Guidelines

<http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx>

Coastal erosion mapping

<http://www.environment-agency.gov.uk/homeandleisure/134808.aspx>

National Flood Forum: Website 'blue pages' - a directory of flood protection products and services

<http://www.bluepages.org.uk/>

West of Wales Shoreline Management Plan

http://www.westofwalesmp.org/content.asp?nav=23&parent_directory_id=10

South Wales Shoreline Management Plan

<http://www.southwalescoast.org>

Appendix E

Glossary of Terms

Reproduced from the National Strategy

A

Act – a Bill approved by both the House of Commons and the House of Lords and formally agreed to by the reigning monarch (known as Royal Assent).

Accretion – The gradual extension of land by natural forces, as in the addition of sand to a beach by the sea, or the extension of a floodplain through the deposition of sediments by repeated flooding.

Assets – structures or a system of structures used to manage flood risk.

B

Bill – a proposal for a new law, or a proposal to change an existing law that is presented for debate before Parliament.

Building Regulations – The UK Building Regulations are rules of a statutory nature to set standards for the design and construction of buildings. Primarily to ensure the safety and health for people in and around those buildings, but also for the purposes of energy conservation and access to and about other buildings.

C

Catchment – An area that serves a river with rainwater; that is, every part of land where the rainfall drains to a single watercourse is in the same catchment.

CFMP – Catchment Flood Management Plans – plans that provide an overview of the flood risk across each river catchment and estuary. They recommend ways of managing those risks now and over the next 50-100 years.

Climate Change – any change in climate over time (usually decades or longer), whether due to natural variability or as a result of human activity.

Coastal erosion – the wearing away of coastline, usually by wind and/or wave action.

Coastal erosion risk – measures the significance of potential coastal erosion in terms of likelihood and impact.

Coastal erosion risk management – anything done for the purpose of analysing, assessing and reducing a risk of the wearing away of coastline.

Coastal Flooding – Occurs when coastal defences are unable to contain the normal

predicted high tides that can cause flooding, possibly when a high tide combines with a storm surge (created by high winds or very low atmospheric pressure).

Coastal Squeeze – Where the coast is protected by engineering structures, the rising sea level results in a steepening of the intertidal profile, known as coastal squeeze.

Community Infrastructure Levy – a mechanism for raising additional funding at the local level.

Critical National Infrastructure – Infrastructure that supplies essential services, e.g. water, energy, communications, transport etc.

Cultural Heritage – Buildings, structures and landscape features that have an historic value.

Culvert – a covered structure under road, embankment etc, to direct the flow of water.

D

Defences – A structure that is used to reduce the probability of floodwater or coastal erosion affecting a particular area.

Deposition – The process whereby sediment is placed on the sea bed, shoreline, river bed or flood plain.

Draft Bill – a Bill published in draft before introduction before Parliament.

E

Environment Agency – Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs in England

F

FCERM – Flood & Coastal Erosion Risk Management.

Flood – any case where land not normally covered with water becomes covered by water.

Flood and Water Management Act 2010 – an Act of Parliament updating and amending legislation to address the threat of flooding and water scarcity, both of which are predicted to increase with climate change.

Flood risk – product of the probability of flooding occurring and the consequences when flooding happens.

Flood risk management – the activity of understanding the probability and consequences of flooding, and seeking to modify these factors to reduce flood risk to

people, property and the environment. This should take account of other water level management and environmental requirements, and opportunities and constraints.

Flood risk management measures – The way in which flood risks are to be managed.

Flood risk management Wales – The Regional Flood and Coastal Committee (RFCC) for Wales.

Flood Risk Regulations 2009 – Regulations which transpose the EC Floods Directive (Directive 2007/60/EC on the assessment and management of flood risks) into domestic law and to implement its provisions.

Floodline Warnings Direct – is a free service that provides flood warnings direct to you by telephone, mobile, email, SMS text message and fax.

G

Groundwater – water held underground in the soil or in pores and crevices in rock.

Groundwater Flooding – Occurs when water levels in the ground rise above the natural surface. Low lying areas underlain by permeable strata are particularly susceptible.

H

I

IDB - Internal Drainage Board – Independent statutory bodies responsible for land drainage in areas of special drainage need in Wales and England. They are long established bodies operating predominantly under the Land Drainage Act 1991 and have permissive powers to undertake work to secure drainage and water level management of their districts.

Intertidal – The area between low and high water tides.

J

K

L

LLFA – Lead Local Flood Authority – (Local Authority) the County Council or the County Borough Council for the area.

Local Authority special levies – are paid to Internal Drainage Boards by local authorities within a drainage district in relation to the benefits of water level management for non-agricultural land.

Local Flood Risk: defined within the Flood and Water Management Act 2010 as including surface runoff, groundwater and ordinary watercourses.

Local Flood Risk Management Strategy: required in relation to Wales by Section 10 of the Flood and Water Management Act 2010 local flood risk strategies are to be prepared by lead local flood authorities and must set out how they will manage local flood risks within their areas.

LRF - Local Resilience Forum – a group required under the Civil Contingencies Act, 2004 who are responsible for the coordination of emergency planning in local areas.

M

Main River – A watercourse shown as such on the Main River Map, and for which Natural Resources Wales has responsibilities and powers.

Managed Realignment – A coastal defence technique which aims to achieve sustainable flood defence by recreating eroded salt marsh and mudflat habitats.

N

NRW – Natural Resources Wales - a Welsh Government sponsored Public Body responsible to the Welsh Ministers.

O

Ordinary Watercourse – all watercourses that are not designated Main River, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards.

P

Q

R

Recovery – The process of rebuilding, restoring and rehabilitating the community following an emergency.

Reservoir – an artificial lake where water is collected and stored until needed. Reservoirs can be used for irrigation, recreation, providing water for municipal needs, hydroelectric power or controlling water flow.

Residual risk – the risk that remains after risk control measures have been put in place. For example: a flood defence may reduce the likelihood of flooding, but if the flooding behind the defences is very deep, the residual risk to people is very high, and further action may be necessary to reduce the residual risk further.

Resilience – The ability of the community, services, area or infrastructure to avoid being flooded, lost to erosion or to withstand the consequences of flooding or erosion taking place.

RFCC – Regional Flood and Coastal Committee – An Natural Resources Wales committee, responsible for consenting medium and long term plans and operational plans to the Agency’s Board and Head Office. Monitors and reports on progress. In Wales there is only one RFCC and this is the FRMW (Flood Risk Management Wales) group.

Risk – measures the significance of a potential event in terms of likelihood and impact. In the context of the Civil Contingencies Act 2004, the events in question are emergencies.

Risk Assessment – A structured and auditable process of identifying potential significant events, assessing their likelihood and impacts and then combining these to provide an overall assessment of risk to inform further decisions and actions.

Risk Management – anything done for the purpose of analysing, assessing and reducing a risk.

Risk Management Authority – A Welsh risk management authority is defined in Section 6 of the Flood and Water Management Act 2010 as the Environment Agency, a lead local flood authority, a district council for an area for which there is no unitary authority, an IDB for an internal drainage district that is wholly or mainly in Wales and a water company that exercises functions in relation to an area in Wales.

Risk Management Schemes – a range of actions to reduce flood frequency and/or the consequences of flooding to acceptable or agreed levels.

River flooding – occurs when water levels in a channel overwhelms the capacity of the channel.

Roll Back – as natural defences fail the coast will ‘roll back’ naturally, creating an opportunity for the expansion of intertidal and coastal habitats.

S

Sewer – An artificial conduit, usually underground, for carrying off sewage (a foul sewer) or rainwater (a storm sewer) or both (a combined sewer).

Shoreline Management Plans (SMPs) – A large-scale assessment of the risks associated with coastal processes and helps reduce these risks to people and the developed, historic and natural environments.

Statement of Environmental Particulars – A statutory requirement under the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004. It sets out how the findings of the Environmental Report have been taken into account and how views expressed during the consultation period have been taken into account during the development of the National Strategy.

SuDS – Sustainable Drainage Systems – Approach to surface water management which helps to deal with excesses of water by mimicking natural drainage processes and patterns

Surface Water Flooding – In the urban context, usually means that surface water runoff rates exceed the capacity of drainage systems to remove it. In the rural context, it is where surface water runoff floods something or someone.

Surface water runoff – This occurs when the rate of rainfall exceeds the rate that water can infiltrate the ground or soil.

T

Technical Advice Note 14: Coastal Planning – TAN 14 supports Planning Policy Wales and covers all aspects of planning for new development and the coastal zone.

Technical Advice Note 15: Development & Flood Risk – TAN 15 supports Planning Policy Wales and makes it clear how local authorities should make decisions about different types of development on flood plains, providing clear tests for justification and acceptability of flooding consequences, and enabling the consideration of risks over the lifetime of the new development.

Third Sector – Voluntary and not-for-profit organisations.

U

V

W

Wales Flood Group – a sub group of a Wales Resilience Forum.

Water company – a company which holds an appointment under Chapter 1 of Part 2 of the Water industry Act 1991 or a licence under Chapter 1A of Part 2 of that Act.

Watercourse – A channel natural or otherwise along which water flows.

Welsh Local Government Association (WLGA) – represents the interests of Local Authorities in Wales. The three fire and rescue authorities, four police authorities and three national park authorities are associate members.

WFD – Water Framework Directive

