



Gwynedd Council Local Flood Risk Management Strategy



February 2013

Around 357,000 properties in Wales, or about one in six buildings, are at risk of flooding. More than 357,000 people live in 220,000 properties that are at risk of flooding from rivers or the sea, 97,000 of which are also at risk of surface water flooding. A further 137,000 properties are susceptible to surface water flooding alone.

Flooding in Wales



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 to attempt this. 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 flooding 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 Gwynedd 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 Gwynedd and those organisations tasked with providing services and support to them.

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

1. Introduction

Section Summary

- Flooding and coastal erosion are major hazards facing the people of Gwynedd.
- We must now take a risk management approach to dealing with these hazards. This will involve much greater collaboration between the risk management authorities and local communities.
- The Flood and Water Management Act provides details what flood risk management functions Gwynedd Council must exercise and the detail to be included within this Local Strategy.
- This Strategy requires a Strategic Environmental Assessment and a Habitats Regulations Assessment to appraise the impact it may have on the environment.

Flooding and coastal erosion are two of the biggest natural hazards affecting the safety and sustainability of communities across Wales.

Current estimates show that one in six properties in Wales is at risk of flooding from rivers, the sea and surface water, and in some communities all the properties are at risk. The number of properties at risk from coastal erosion is less well defined than those at risk of flooding, the second edition of the Shoreline Management Plans (SMP2) suggest that the numbers are significantly smaller, and that the majority of these would not be affected until the medium to long term, i.e. within the next 30-100 years.

Climate change projections suggest that Wales can expect to see different rainfall patterns in the future, along with rising sea levels. These projections suggest that we will experience more frequent and more severe flooding in the future, along with increased rates of coastal erosion. Communities at risk of flooding and coastal erosion can expect to see those risks realised more frequently.

Just as the risks presented by flooding and coastal erosion are changing, so is the response. It will not be possible to continue to build more and bigger drainage systems and defences. In recent years the Welsh Government has moved towards a response rooted in the principles of risk management, providing an holistic approach to managing the risks, their consequences and the wider impacts on our communities.

Floods can pose a real risk to life and we have seen deaths across the UK and Europe in the floods of the recent past. Beyond the risk to life, as we witnessed in Tewkesbury and Hull in 2007 and in Cumbria in 2009, a flood can destroy homes and businesses in minutes. Local economies can be devastated, residents made homeless and communities severely affected. The effects, and particularly the impacts on health, can last for months, years or decades depending on the severity of the flooding and the length of the recovery period.

In October 2011 the Welsh Government published the Programme for Government, detailing how they will make a difference to the lives of people in Wales. The Welsh Government is committed to ensuring that Wales has healthy people living productive lives in a more prosperous and innovative economy; that we have safer and more cohesive communities, with lower levels of poverty and greater equality; that our environment is resilient, with more sustainable use of our natural resources and that Welsh society has a vital sense of its own culture and heritage.

Managing the risks of flooding and coastal erosion is integral to delivering on these commitments.

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.

The three main sources of flood risk for Wales are the sea, rivers and surface water. A lot of information is available on the risks posed by the sea and rivers, and on the measures that can be used to reduce them. However, surface water flooding, to the extent that we are seeing now, has been

identified as a significant contributor to the flood risk we face, but there is less information available on how to manage the risks it poses.

Traditionally, approaches to both flood and coastal erosion risk management have focused on the construction of defences. These defences have provided communities with a certain level of protection from the impacts and consequences of both flooding and coastal erosion. However, no defence can remove the risk entirely and there will always be a residual risk. There is always the chance of a flood or erosion event that is sufficiently large to cause a defence to be overtopped or fail and as defences become higher the consequences of failure become greater.

As communities have developed so has a significant network of flood defences, coastal protection and drainage infrastructure to help reduce the risks faced. Although these arrangements have generally worked well in the past, the pressure on our existing infrastructure will increase significantly.

A risk management approach

As mentioned previously, simply constructing more and higher defences is not a sustainable solution environmentally, economically or socially and in some cases it 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. 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 and coastal erosion 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, or coastal erosion, risk in the preparation of Local Development Plans and the assessment of all planning applications;
- speeding up the recovery process by incorporating greater resilience measures into the design of new buildings;
- increasing approaches that utilise the natural environment in place of traditional solutions, for example, land management to reduce storm runoff, 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 and coastal erosion risks among individuals and communities;
- increasing individual and community preparedness for flood and coastal erosion events;
- supporting the actions of individuals, communities and infrastructure providers to build their resilience to the consequences of a flood event;
- ensuring accessibility to buildings and contents insurance for those at flood risk.

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.



The Flood and Water Management Act, 2010

Following the introduction of the Flood and Water Management Act 2010, Gwynedd Council has become the Lead Local Flood Authority (LLFA) for Gwynedd.

Section 10 of the Act states that a LLFA must develop, maintain, apply and monitor a strategy for local flood risk management in its area.

In the context of the Act, "local flood risk" means flood risk from:

- Surface runoff
- Groundwater
- Ordinary watercourses (including lakes, ponds or other areas of water)

What must be included within a local flood risk management strategy?

The Local Strategy must specify:

- the risk management authorities in the authority's area;
- the flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area;
- 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);
- the measures proposed to achieve those objectives;
- how and when the measures are expected to be implemented;
- the costs and benefits of those measures, and how they are to be paid for;
- the assessment of local flood risk for the purpose of the strategy;
- how and when the strategy is to be reviewed; and
- 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. We must consult the following about our local flood risk management strategy—

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

We must publish a summary of our local flood risk management strategy (including guidance about the availability of relevant information), and submit a draft of the strategy and any guidance to the Welsh Ministers for review.

Strategic Environmental Assessment and Habitats Regulations Assessment

Strategic Environmental Assessment (SEA) is a requirement of EC Directive 2001/42/EC *on the assessment of the effects of certain plans and programmes on the environment* and involves the appraisal of the potential environmental effects of plans and programmes (including strategies) so that they can be taken into account prior to their approval and formal adoption. In Wales, the SEA Directive is implemented by The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (SI 1656, 2004). Under these Regulations environmental assessment is a legal obligation for certain plans and programmes required by legislative, regulatory or administrative provisions that are either:

“subject to preparation and/or adoption by an authority at national, regional or local level; or prepared by an authority for adoption, through a legislative procedure by Parliament or Government”.

Local strategies are considered to be statutory plans and therefore the Gwynedd Local Flood Risk Management Strategy (GLFRMS) has been determined to require statutory SEA by meeting the aforementioned criteria. The requirement for environmental assessment particularly applies to plans or

programmes for specified key resources and industries (including water management) and which have been determined to require an assessment in accordance with the EU Habitats Directive (EU Council Directive 92/43/EC, as amended, on the Conservation of Natural Habitats and of Wild Flora and Fauna) as implemented in the United Kingdom by The Conservation of Habitats and Species Regulations 2010 (SI 490, 2010); generally known as a Habitats Regulations Assessment (HRA).

As the GLFRMS has the potential to result in significant effects on sites of international nature conservation importance (namely Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites) a HRA has been undertaken in parallel with the SEA.

2. Flood Risk Management Authorities and their Responsibilities

Section Summary

- The Flood and Water Management Act introduces risk management authorities and their functions.
- In Gwynedd, the authorities are:
 - The Environment Agency
 - The lead local flood authority – Gwynedd Council
 - The water company – Dŵr Cymru - Welsh Water
 - The highway authority – Gwynedd Council
- These authorities are given specific responsibilities under the Act.
- In addition to these responsibilities, Gwynedd Council has various functions that affect the way flood risk is managed.

There are a number of organisations with statutory responsibilities for managing flood and coastal erosion risk in Gwynedd, known as Risk Management Authorities.

The flood risk management authorities in Gwynedd are —

- Environment Agency Wales
- Gwynedd Council as lead local flood authority
- Dŵr Cymru – Welsh Water
- Gwynedd Council as the highway authority

It must be noted that although these organisations are responsible for managing flood risk from these sources, they are not liable for any damages caused by flooding. Property owners are responsible for protecting their property from flooding along with their rights and responsibilities as riparian owners.

Environment Agency Wales

Historically the Environment Agency 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 their role.

This change means that the Environment Agency 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.

The operational change has been undertaken in recognition of the links between coastal flooding and coastal erosion, particularly in terms of consequences.

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 the Environment Agency Wales is intended to enhance existing partnership arrangements such as those seen in coastal groups and through the establishment of the second edition 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 the Environment Agency 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 the Environment Agency 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 the Environment Agency 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 a Regional Flood and Coastal Committee.

The Environment Agency 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 the Environment Agency Wales suggest the National Strategy is not being implemented or that actions being taken are increasing levels of risk.

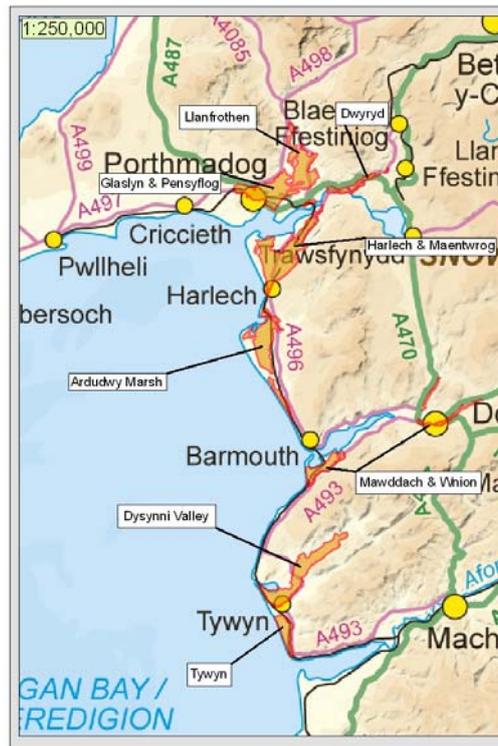
In addition to their statutory duties, the Environment Agency Wales has a number of permissive powers. These are powers that allow them to do something, but do not compel them to, and include:

- 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 the Environment Agency 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 the Environment Agency Wales as well as providing guidance to Local Authorities on these matters for flooding from other sources.

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

There are no Internal Drainage Boards in Gwynedd, however there are eight Internal Drainage Districts (IDD) in the County which are directly administered by the Environment Agency Wales, which is responsible for managing the flood risk from all sources within the IDD.



Internal Drainage Districts

Gwynedd Council

Gwynedd Council as the Lead Local Flood Authority

Under the Flood and Water Management Act 2010, Gwynedd Council became the Lead Local Flood Authority, with the role of overseeing the management of flood risk from local sources in Gwynedd. 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.

Gwynedd 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 act in a manner which is consistent 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 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;
- the power to undertake works to manage flood risk from surface runoff or groundwater, consistent with the local flood risk management strategy.

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 flood risk 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.

Gwynedd Council is also designated as a coastal erosion risk management authority under the Coast Protection Act 1949, providing the Council with certain responsibilities in respect of coastal erosion and coastal protection. Formally referred to as a Coastal Protection Authority, the Council retains its current permissive powers in relation to coastal erosion risk management.

Gwynedd Council as the Highway Authority

Gwynedd 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, including ensuring highway drainage systems are clear. As part of this duty, all roads in the county are subject to a programme of inspection and maintenance, in accordance with Gwynedd Council's Highway Asset Maintenance Plan. Problems with highway drainage systems are dealt with as they arise. Trunk roads are the responsibility of the North and Mid Wales Trunk Road Agent acting on behalf of the Welsh Government.

Gwynedd Council - Emergency Planning Unit

Gwynedd Council's Emergency Planning Unit is responsible for co-ordinating Gwynedd's response to any emergency affecting the county. The Council does this by preparing plans that meet statutory requirements, training staff in their emergency roles and preparing staff and resources to assist the emergency services during an emergency.

The North Wales Resilience Forum has developed a Multi-Agency Flood Plan, Version 5 (Apr 2010), commonly referred to as the MAFP and also a Multi-Agency Response Plan for Major Emergencies (June 2010).

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 North Wales 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 falls 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.

Gwynedd Council Planning Authority

Outside the National Park, the local planning authority is Gwynedd Council. The Welsh Government, through Planning Policy Wales, which is supported by a series of Technical Advice Notes, provides a strategic framework for planning policies to be developed locally by the authority.

Gwynedd Council's local planning policy is currently set out in the Gwynedd Unitary Development Plan 2001-2016, which was adopted in 2009.

Strategic policies

Introduction

1.4.1 The Strategic Policies of the Unitary Development Plan determine the land use context on issues such as housing, employment, retail and the environment. Policies in Part 1 of the Gwynedd Unitary Development Plan are relevant for the whole Plan area. These Strategic Policies are aimed at encouraging and enabling development which fulfils the needs of communities in a sustainable manner.

1.4.2 The Strategic Policies are divided into the 5 following categories:

- precautionary approach
- effective protection of the environment
- prudent use of natural resources
- social progress which recognises the needs of everyone
- promote appropriate economic growth and growth in employment

Precautionary approach

Taking a precautionary approach - strategic policy 1

Development proposals that would have an adverse or uncertain impact on the environment, the economy or cultural character (including the Welsh language) of the Plan area will be refused unless it can be conclusively shown by an appropriate impact assessment that this can be negated or mitigated in a manner acceptable to the Planning Authority.

Effective protection of the environment

Developments which create risk – strategic policy 5

Developments that are inconsistent with the need to safeguard floodplains or to minimise flood risk and developments that create a risk of unacceptable damage to health, property or the environment, will be refused.

These strategic policies are supported by a series of detailed policies, which include the following:

POLICY B28 – UNSTABLE LAND, which seeks to ensure that a proposal for new development or intensification of existing use considers the stability of land and sets out the Local Planning Authority's approach if a proposal involves unstable land.

POLICY B29 – DEVELOPMENT ON LAND AT RISK FROM FLOODING, which guides development away from areas that are at risk from flooding

POLICY B32 – INCREASING SURFACE WATER, which seeks to promote development that includes flood minimisation or mitigation measures to reduce the volume and rate at which run off reaches rivers and other watercourses.

Dŵr Cymru – Welsh Water

Dŵr Cymru Welsh Water has two key responsibilities: to provide a high quality water supply to customers and; to take away wastewater and return it to the environment safely. To meet these responsibilities the company has 40 impounding reservoirs, 66 water treatment works and a network of over 27,000km of water mains, 833 wastewater treatment works, 1861 sewage pumping stations and around 36,000km of sewers and lateral drains.

In providing their basic function of containing, carrying and treating water and wastewater, these assets may present flood risks which can result from system failures, burst pipes and mains, or similar escapes from the sewer network and other assets, for which Welsh Water are responsible.

In order to reduce the risks associated with these assets Welsh Water has a number of risk management systems in place, which include historical incident reviews, proactive risk capturing and prioritisation, catchment investment planning and emergency incident planning

Welsh Water has a core water supply duty, under Section 37 of the Water Industry Act 1991, to develop and maintain an efficient and economical system of water supply within its area and to ensure that all such arrangements have been made for maintaining, improving and extending its water mains and other pipes.

Welsh Water has a core sewerage duty, under Section 94 of the Water Industry Act 1991, to provide, improve and extend its system of public sewers and to cleanse and maintain those sewers and lateral drains to ensure that its area is and continues to be effectually drained.

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 relevant Local Strategy; and
- co-operate with other Authorities, including sharing data.

Water and sewerage companies often hold valuable information which could greatly aid the understanding of flood risks faced by communities across Wales. They are required to maintain a register of properties and areas that have suffered internal flooding, the DG5 register, but may have access to significantly greater information from incident records, previous investigations and hydraulic modelling.

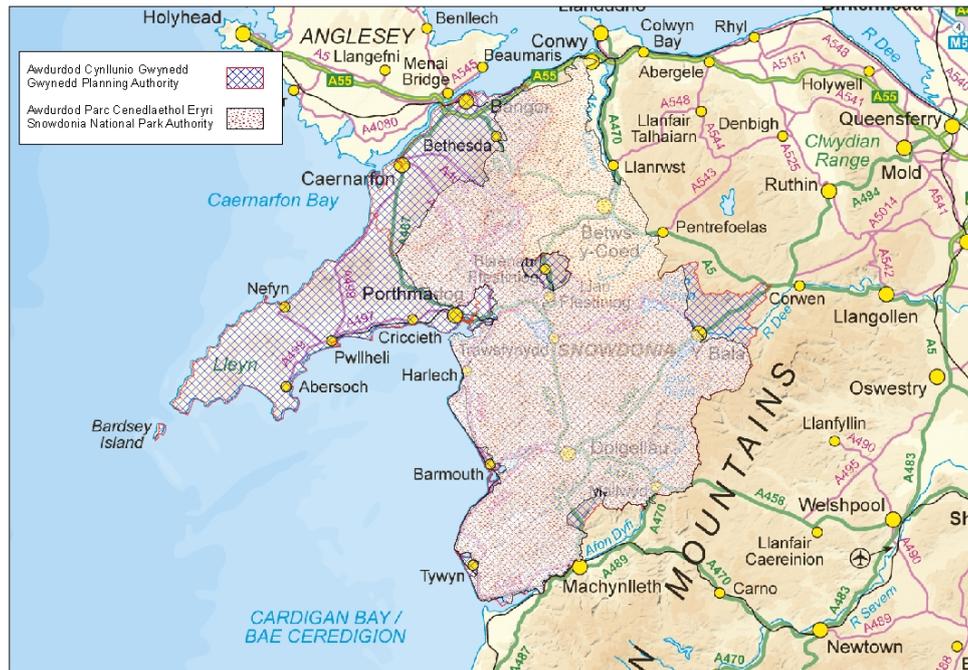
Welsh Water recognises that it has a joint role with other flood risk management authorities to meet the responsibilities of the Flood and Water Management Act and that this approach offers wider benefits in a shared understanding of issues and a wider understanding of the benefits of working in partnership to achieve the most effective and sustainable flood risk management solutions.

3. Other Public and Private Responsibilities

Section Summary

- Over and above the specific flood risk management roles set out in the Act, various other bodies are responsible for aspects of managing the risks and consequences of flooding and coastal erosion.
- The Snowdonia National Park Authority is the planning authority for the National Park within the County. They are guided by national policies regarding flood and coastal erosion risks and have plans in place to minimise the effects of development on flood and coastal erosion risk.
- The various utility and infrastructure providers within Gwynedd have plans to ensure the integrity of their assets with regard to flood risk.
- The public are responsible for ensuring that their own properties are protected from the effects of flooding and for carrying out their duties as riparian owners.

Planning Authorities



Planning Authorities

The Snowdonia National Park Authority is the local planning authority for the National Park area within the administrative boundaries of Gwynedd Council. The Welsh Government, through Planning Policy Wales, which is supported by a series of Technical Advice Notes, provides a strategic framework for planning policies to be developed locally by the authority.

TAN 14 – Coastal Planning – March 1998

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 – July 2004

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 local planning authorities seek to minimise the effect of development on flood risk and coastal erosion within Gwynedd.

Snowdonia National Park Authority

The Snowdonia National Park's land use planning policies are set out in the Eryri Local Development Plan 2007-2022, which was adopted in 2011.

Strategic Policy A: National Park Purposes and Sustainable Development (A)

The Local Development Plan seeks to ensure that new development promotes the principles of sustainable development in ways which further National Park purposes and duty whilst conserving and enhancing the National Park's 'Special Qualities'. Proposals which compromise National Park purposes will be refused. The following considerations should be taken into account to help deliver sustainable development in Snowdonia:

- i. Give the highest priority to the protection and enhancement of the natural beauty, wildlife and cultural heritage.
- ii. Promote opportunities for the understanding and enjoyment of the 'Special Qualities' of the area by the public.
- iii. Safeguarding and improvement of the health, safety, economic and social well being of local communities.
- iv. Conserve and enhance the characteristic biodiversity of Snowdonia.
- v. Respecting and enhancing the historic environment.
- vi. Efficient use of land and infrastructure.
- vii. Conservation of the quality and quantity of natural resources including water, air, soil and geodiversity.
- viii. Encourage the sustainable development of settlements in ways which respect their character and function within the settlement strategy.
- ix. Enablement of inclusive access to services, facilities and employment whilst minimising the environmental impact of transport.
- x. Provision of good quality sustainable design.
- xi. Promotion of development which meets the housing needs of local communities through a mix of dwelling types, and tenures predominantly through affordable housing to meet local need.
- xii. Encouragement of developments that conserve, promote and enhance the linguistic heritage of Snowdonia's communities.
- xiii. Securing development of previously developed land (brownfield land) where that land is in a sustainable location in preference to greenfield sites.
- xiv. Preventing inappropriate development in areas which are at risk from flooding or which contribute to the risk of flooding.

Development will be kept away from areas of flood risk and only allowed in accordance with the requirements of TAN 15: Development and Flood Risk.

Strategic Policy Dd: Climate Change (Dd)

The contribution that emissions of greenhouse gases from the National Park make to climate change will be reduced and the impacts of climate change on the National Park will be addressed in this Plan by:

- i. Ensuring that any coastal and flood protection works, including managed realignment, considered to be necessary have no adverse environmental impacts or that they can be satisfactorily mitigated.
- ii. Conserving and enhancing areas of woodland, upland soils and peatland areas to assist in carbon retention, water storage and flood prevention.
- iii. Facilitating species adaptation and migration through protecting habitat connectivity corridors and enhancing biodiversity.
- iv. Directing development to locations which reduces the need to travel, especially by private car.

Responsibilities of Businesses, Landowners and Local Households

Utility and Infrastructure Providers

Utility and infrastructure providers such as Network Rail, energy companies and telecommunication companies are not risk management authorities. However, 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.

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 flooding does occur it does not cause too much damage

- where possible, take out flood insurance
- arrange to receive Environment Agency Wales flood warnings, where available.

Information on whether households are at risk can be provided by the Environment Agency Wales.

Information about surface water flood risk is not yet publicly available and is much harder to map but some information can be found in the Gwynedd Preliminary Flood Risk Assessment.

The Environment Agency Wales provides information on what to do to prepare a household for emergencies. This includes how to make a flood plan which will help you decide what practical actions to take before and after a flood.

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

The Environment Agency Wales has also developed a pamphlet which provides advice on how to make your house more resilient.

<http://www.environment-agency.gov.uk/homeandleisure/floods/106769.aspx>

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.

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

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 the Environment Agency Wales or Gwynedd 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 C.

4. Assessment of Local Flood Risk

Section Summary

- Historically, data on flooding from surface water is sparse. Flooding incidents are now collated and will update our understanding of which areas are most at risk.
- The Environment Agency provides surface water flood risk mapping to Gwynedd Council. This is used to help determine at risk communities.
- Climate change is predicted to increase the intensity and frequency of rainfall. This will increase the frequency and severity of flooding.

Historic Flooding

The most recent significant flooding in Gwynedd was in June and November 2012. In June heavy rain fell on the night of Friday the 8th and the early hours of Saturday the 9th on the hills in southern Meirionnydd. 18 properties suffered internal flooding in Bryncreg, Pennal, Corris, Abergynolwyn and Llanfihangel y Pennant. A dam above Pennal was damaged and an emergency, controlled release of the impounded water was necessary to prevent worse flooding. It was considered necessary to evacuate the inhabitants of Pennal whilst the dam was made safe. On November the 22nd over 200 properties flooded in Dwyfor and Arfon, with the worst affected areas being Llanberis, Deiniolen, Mynydd Llandegai, Talybont, Pwllheli and Nantlle. The local school in Nantlle had to be evacuated.



Data on past surface water flooding is sparse. What is available was used as part of our Preliminary Flood Risk Assessment. There is now a system in place to collate all flooding incidents and this information will provide a better indication of where the main problem areas are in the County. This information, together with that derived from any flood investigations undertaken, will be reviewed on a regular basis to guide future work, in particular where we need to undertake more detailed investigations to understand flooding mechanisms and, working with the local community, determine the best solution to their problem.

Potential risk of flooding

Local flood risk, for which Gwynedd Council is the Lead Flood Risk Management Authority, is principally flooding from ordinary watercourses and surface water. The Environment Agency Wales supplies maps of areas considered to be at risk of flooding from these two sources.

- The Flood Map for Surface Water shows areas which could flood from surface water in storms with a 1 in 30 chance and 1 in 200 chance of occurring in any year.
- The Flood Map shows the extent of flooding from rivers with a catchment of more than 3 km² with a 1 in 100 and 1 in 1000 chance of occurring in any year. Most of these rivers are main rivers for which the Environment Agency, Wales has the lead flood risk management role.

The Preliminary Flood Risk Assessment (PFRA), undertaken by Gwynedd Council in March 2011 to satisfy obligations under the Flood Risk Regulations 2009, identified key areas in Gwynedd where the potential risk of surface water flooding is thought to be greatest.

The PFRA considered the Flood Map for Surface Water, with a 1 in 200 chance of occurring and a depth greater than 300mm, to be the locally agreed surface water information. It shows where surface water flooding is likely to be a problem. However, it is not possible to look at every potential flooding location immediately, nor will it be possible to reduce all flood risk. It is necessary to identify places which will derive the most benefit.

It must be emphasised that flooding from ordinary watercourses and surface water flow will not necessarily be confined to these areas – flooding may occur almost anywhere.

The PFRA identified the number of properties at risk of surface water flooding in Gwynedd as 9,100. The count of properties at risk of future flooding from surface water was made using the method for counting property footprints using the EA National Receptor Dataset version 1.0.

In order to prioritise areas where the consequences of flooding are greatest, the information from the Flood Map for Surface Water was used in the PFRA to identify individual 1km squares where the following criteria were satisfied in respect to potential flooding:

- Number of people affected >200
- or critical services affected >1
- or non-residential properties affected >20

Under the PFRA procedure, 'clusters' of these squares were checked. If the population considered at risk within a cluster was greater than 5,000, these clusters were considered to be 'indicative flood risk areas' within the meaning of the Flood Risk Regulations and further provisions of the Regulations would come into operation. However, the two clusters in Gwynedd, Bangor and Blaenau Ffestiniog, have less than 5,000 people at risk and hence are not 'indicative flood risk areas'.

Figure 4.1 illustrates this data. The identification of these clusters and other individual 'squares', together with the ongoing collation of information on flood incidents, provides a very useful starting point as to where particular effort should be focused in respect of further investigations and possible flood risk management measures.

As part of the follow up to the PFRA, the Environment Agency, Wales will produce Flood Hazard and Flood Risk maps, on behalf of the Welsh Government, for the areas identified as at risk in the PFRA.

When these become available they will provide further information on surface water flooding that can be used to prioritise investment in those areas that will benefit most.

However, It is not possible to look at every potential flooding location immediately, nor will it be possible to reduce all flood risk. It is necessary to identify places which will derive the most benefit. It must be emphasised that flooding from ordinary watercourses and surface water flow will not necessarily be confined to these areas – flooding may occur almost anywhere.



Fig 4.1 Places above the Flood Risk Threshold

The Pwllheli Pilot Climate Change Adaptation Strategy is a study looking at how floods can be managed in Gwynedd. The aim of the project is to draw a short, medium and long term flood management plan for Pwllheli and the surrounding area, as well as looking at different options to find a suitable flood risk reduction programme for the area which will be supported by the local residents.

During the next 100 years it is expected that we will see:

- almost 1 metre rise in the sea level
- an increase in the flow of the rivers
- changes in the rainfall pattern
- increase in the number of storms

Together, these factors are certain to have an effect on Pwllheli and the surrounding catchment area, and therefore this project is very important to minimise the risk of flooding and destruction in the area.

Groundwater flooding

Groundwater flooding is not considered to be significant source of flooding in Gwynedd, although there may be local issues.

Interactions between the different sources of flooding

This Strategy deals with flood risk from 'local' sources, being surface water, ordinary watercourses and groundwater. Flooding can arise, however, from a number of different sources in combination. For each source there may be a different flood risk management authority. In most cases the source of flooding can be easily identified, but where there is doubt over the source or where several sources are involved, Gwynedd Council as Lead Local Flood Authority will take the lead and work with our partners to investigate the flooding and produce a Report.

The Environment Agency Wales website provides details of the risk of flooding from main rivers and the sea and information on coastal erosion on their Flood Map which may be found at:

www.environment-agency.gov.uk/homeandleisure/floods/riverlevels/default.aspx

<http://www.environment-agency.gov.uk/homeandleisure/floods/31650.aspx>

Surface water flood risk mapping is not yet available on the website.

Climate change

Climate change projections suggest that weather patterns will continue to change and that we will experience an increase in the intensity of rainfall, the frequency of sudden storms, and a rise in sea levels. Taken together these factors are likely to increase the frequency and consequences of flooding and coastal erosion.

The evidence of the increasing risks from both flooding and coastal erosion is underpinned by a series of reports produced in the last few years including the *UK Climate Projections, 2009*, the *Foresight: Future Flooding Study*, the *Stern Review on the Economics of Climate Change* and most recently, the *Pitt Review into the Summer 2007 Floods*.

The key findings for Wales from the UK Climate Projections 2009 suggest that by 2050:

- average annual temperatures are projected to increase by 2.3°C;
- summer daily maximum temperatures are projected to increase by 3.4°C;
- winter daily minimum temperatures are projected to increase by 2.5°C;
- rainfall is projected to increase in winter on average by 14 per cent and decrease in summer by 16 per cent;
- sea levels around Wales are predicted to rise by approximately 20cm; and
- storm intensity in summer and winter will increase, leading to more severe storms and larger waves attacking our shores.

If the rate of climate change is faster than suggested in the medium emissions scenario set out above, then the impacts are likely to be more severe. For example, higher sea levels than those suggested could result in even greater rates of erosion to our coast. Likewise, if the rate is slower then the impacts are expected to be less severe.

The projections are based on the best available information but there are still uncertainties. It is important that we consider the range of possible future climates when proposing ways to manage the risks of flooding and coastal erosion. Building in an ability to adapt approaches to address future changes in risk should also be considered.

The Welsh Government is working with the Environment Agency Wales to develop updated guidance on what we should plan for in relation to climate change when undertaking flood or coastal erosion risk management works. Information and advice on how people can improve their resilience to flooding is also available from the Environment Agency Wales via their Floodline service.

<http://www.environment-agency.gov.uk/homeandleisure/floods/38289.asp>

The Welsh Government has produced a Climate Change Risk Assessment and a Climate Change Strategy for Wales. These documents present the risks and opportunities from climate change facing the country and how they intend to prepare Wales for the impacts of climate change.

<http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/strategy/?lang=en>

<http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/riskassess/?lang=en>

5. Objectives for Managing Local Flood Risk

Section Summary

- The Pitt Review gave recommendations to the Government for improving flood risk management.
- These form the basis of the Flood and Water Management Act and the National Strategy for Flood and Coastal Erosion Risk Management.
- Following from the Act and the National Strategy, this local strategy details Gwynedd Councils objectives for managing local flood risk and the costs and benefits of these objectives.

The Pitt Review

Following the severe floods in England in 2007, Sir Michael Pitt carried out a review for the Government of the floods and the actions of the various authorities and emergency services in responding to them. In June 2008 his final report, 'Learning Lessons from the 2007 Floods' (the Pitt Review), was published. It contained 92 recommendations for improving the service offered to the public. These recommendations formed the main driver for the measures contained in the Flood and Water Management Act and hence the Welsh National Strategy.

The National Strategy

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 out four overarching objectives for the management of flood and coastal erosion risk in Wales; they are:

1. Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion
2. Raising awareness of and engaging people in the response to flood and coastal erosion risk
3. Providing an effective and sustained response to flood and coastal erosion events
4. Prioritising investment in the most at risk communities

In order to implement these National objectives, Gwynedd Council has based this Local Strategy upon eight sub-objectives:

The Objectives	Sub-objectives	
1. Reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion	1	Provide strategic leadership and direction at a local level
	2	Develop policies for effective land use management and enhanced development control procedures where appropriate.
	3	Establish regular maintenance schedules for flood and coastal erosion risk management assets.
2. Raising awareness of and engaging people in the response to flood and coastal erosion risk	4	Ensure that by 2026 everyone who lives in a flood risk area understands the flood risk they are subject to, the consequences of this risk and how to live with that risk
3. Providing an effective and sustained response to flood and coastal erosion events	5	Ensure the preparation and testing of Emergency Plans
	6	Respond to events in a timely and appropriate manner
	7	Facilitate recovery from flooding within the shortest possible timescales
4. Prioritising investment in the most at risk communities	8	Increase the use of alternative sources of funding for flood and coastal erosion risk management

Sub-objective 1**Provide strategic leadership and direction at a local level.****1.1. *Delivery of the second round of Shoreline Management Plans by 2012 with proportionate implementation over the life of the Strategy.*****Shoreline Management Plans**

The West of Wales Shoreline Management Plan, which covers the coastline between St Anne's Head in Pembrokeshire and the Great Orme in Conwy, is complete. The Client was the Cardigan Bay and Ynys Enlli to the Great Orme Coastal Groups and the lead authority was Pembrokeshire County Council.

This 2nd Edition Shoreline Management Plan (SMP) provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. In doing so, the SMP is a high-level document that will form an important part of the strategy for flood and coastal defence for Gwynedd Council.

The plan provides both a broad scale assessment of these risks but also quite specific advice to operating authorities in their management of defences. In the development of the SMP, the aims of the Welsh Government's New Approaches Programme (2007) to reduce risks were also taken into consideration.

The SMP is a non-statutory policy document for coastal defence management planning. It takes account of other existing planning initiatives and legislative requirements, and is intended to inform wider strategic planning. It aims to provide the context to, and consequence of, management decisions in other sectors of coastal management and as such, should inform all aspects of flood risk management.

It must be noted that the coastal management policies of SMP2 are currently subject to internal governance procedures for adoption by Gwynedd Council but will be a material consideration for any future development proposals and flood and coastal management proposals.

Measure to achieve the Objective**Gwynedd Council will deliver the SMP2 by implementing the Action Plan following it's adoption by the Council and Welsh Government.**

1.2 Implementation of statutory responsibilities set out in the Flood and Water Management Act 2010 and the Flood Risk Regulations 2009.**Co-operation with other Bodies**

Section 13 of the Act imposes a duty on the Council to co-operate with other risk management authorities. Co-operation between public bodies and the public is central to the whole ethos of this local strategy. Gwynedd Council meets regularly with the Environment Agency and other risk management authorities throughout North Wales.

Sections 14 and 15 of the Act allow the Council to request information from a person and provides the power to enforce that request. A person means a legal person - any entity that has legal status and includes people, a company, a trust or a public body and hence includes a risk management authority.

Measure to achieve the Objective

Gwynedd Council will actively engage and co-operate with the public and all bodies involved in flood risk management.

In effect

Implementation of the Flood and Water Management Act, 2010

Under section 19 of the Act, flood investigations are now carried out by the Council and published on our website.

Under section 21 of the Act, an asset register and record has been created of all structures or features which, in the opinion of the Council, are likely to have a significant effect on a flood risk.

Schedule 1 of the Act gives Gwynedd Council and the Environment Agency the permissive power to designate a structure or feature that affects flood risk.

Schedule 2 of the Act amends the Land Drainage Act, 1991 and the consenting of works in ordinary watercourses is now the duty of Gwynedd Council. Together with our permissive powers under the Land Drainage Act, all local drainage issues are now gathered together and managed in a coherent manner.

Measure to achieve the Objective

Gwynedd Council will actively implement all provisions of the Flood and Water Management Act as they are brought into force by commencement orders.

Preliminary Flood Risk Assessment - Flood Hazard and Flood Risk Maps

Under the Flood Risk Regulations 2009, Gwynedd Council has completed a Preliminary Flood Risk Assessment (PFRA). No indicative flood risk areas were identified in Gwynedd. The Welsh Government and the Environment Agency Wales are producing flood hazard and flood risk maps to assist the revision of the PFRA. These will also increase our understanding of local flood risk in the County and, in conjunction with the outcome of flood reports, provide a means of prioritising areas at risk of flooding.

Measure to achieve the Objective

Gwynedd Council will use and apply new information provided by the Flood Risk and Flood Hazard maps and from any other suitable source to better understand local flood risk.

**PFRA complete
Flood hazard and flood risk mapping will be utilised when produced by the EA**

Consenting in Respect to Ordinary Watercourses

Schedule 2 of the Act amends the Land Drainage Act, 1991 and the consenting of works in ordinary watercourses is now the duty of Gwynedd Council. Together with our permissive powers under the Land Drainage Act, all local drainage issues are now gathered together and managed in a coherent manner. Anyone wishing to culvert or insert any obstruction in an ordinary watercourse needs permission to do so. An ordinary watercourse is defined as any watercourse, including lakes and ponds, that is not a main river.

Consultation is carried out with the Environment Agency Fisheries section, Gwynedd Council's Planning Department and the Biodiversity team before consent is granted. In addition, the relevant statutory body (currently the Countryside Council for Wales) are to be consulted regarding any works within designated protected sites for nature conservation. Any conditions required as a result of these consultations are attached to the consent.

The consenting of works in main rivers and any watercourses within Internal Drainage Districts remains with the Environment Agency Wales.

Measure to achieve the Objective

Gwynedd Council will consent works in ordinary watercourses, as long as the works have no adverse impact on flood risk or the environment.

Consenting procedures in effect

Culverting of Watercourses

Gwynedd Council is 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.

Gwynedd Council will consider each application to culvert a watercourse on its own merits, in consultation with the applicant and in accordance with a risk-based approach to consenting. The Council 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.

Gwynedd Council has permissive powers under the Public Health Act 1936 and the Land Drainage Act 1991 to require the restoration of unconsented works in watercourses. As it is policy not to culvert watercourses, it is essential that when unconsented works are discovered, action is taken to restore the watercourse.

Gwynedd Council's Policy Regarding Culverting may be seen at Appendix D.

Measure to achieve the Objective

Gwynedd Council will oppose the culverting of watercourses and take action against any unconsented works.

Culverting policy in effect and forms part of the consenting procedures

Sub-objective 2

Develop policies for effective land use management and enhanced development control procedures where appropriate.

2.1 *Development of local Development Plans that include adequate provisions in respect of flood and coastal erosion risk.*

Local Development Plans

Snowdonia National Park Authority has recently (2011) adopted its Local Development Plan. Chapter 3 above sets out its provisions regarding flood and coastal erosion risk. Gwynedd Council is currently working with the Isle of Anglesey County Council to prepare a Joint Local Development Plan (JLDP). When this is adopted (anticipated 2016) it will (in Gwynedd) replace the Gwynedd Unitary Development Plan, which is referred to in Chapter 3 above. The process of preparing the JLDP involves undertaking a Strategic Appraisal / Strategic Environmental Assessment (SA/SEA) of the Plan. The Draft SA Framework includes “safeguarding water quality, manage water resources sustainably and minimise flood risk” as well as “managing and reducing the impacts of climate change by promoting and supporting mitigation and adaptation measures” as SA objectives. The Framework will be used to evaluate the positive and negative effects of policies and proposals in the emerging JLDP.

Measure to achieve the Objective

Gwynedd Council will prepare an effective Local Development Plan, with the aim of minimising flood and coastal erosion risk.

**Local Development Plan in place and informing planning procedures within the Park.
Gwynedd JLDP due to be in place in 2016**

2.2 Compliance with the requirements of planning Policy Wales and relevant Technical Advice Notes.**Planning Policy Wales**

Both planning authorities in Gwynedd have the requirements of Planning Policy Wales and TAN 14 & 15 incorporated into their existing Development Plans. There is thus a presumption against building in flood risk areas unless adequate mitigation measures are in place. The JLDP's preparation is also required to consider the requirements of Planning Policy Wales and the TANs.

Measure to achieve the Objective

Gwynedd Council will continue to apply the requirements of Planning Policy Wales in the consideration of new development.

Planning Policy Wales and TAN 14 and 15 in effect now

2.3 Provision of appropriate advice on flood and coastal erosion risk in relation to planning applications.**Planning Application Advice**

The Flood and Coastal Risk Management Unit of Gwynedd Council have sight of most planning applications within the administrative boundaries of Gwynedd Council for comment regarding flooding, coastal erosion and the impacts on ordinary watercourses. The planning authorities are told if the proposed development will adversely impact on the risk of flooding or coastal erosion.

Measure to achieve the Objective

Gwynedd Council will continue to advise both the Snowdonia National Park Authority and Gwynedd Council Planning Authority on the likely impact new development will have on flood and coastal erosion risk.

Flood and coastal erosion advise in effect

2.4 *Appropriate undertaking of Strategic Flood Consequence Assessments and their use to inform Local Development Plans.*

Strategic Flood Consequence Assessments

The Joint Local Development Plan's Delivery Agreement sets out Gwynedd Council's intention to undertake a Strategic Flood Consequence Assessment (SFCA) (levels 1 and 2) to inform it's preparation of the JLDP. The SFCA will be discussed with the Environment Agency and other key stakeholders.

Measure to achieve the Objective

Gwynedd Council will undertake an SFCA to inform the preparation of the JLDP.

The SFCA will inform the JLDP which is due to be produced by 2016

2.5 *Approval and adoption of SuDS drainage systems by the SuDS Approving and Adopting Body.*

Sustainable Drainage Systems - SuDS

Gwynedd Council will become the SuDS Approving Body (SAB) when Section 32 and Schedule 3 of the Act are implemented in 2013. Applications from developers for SuDS drainage approval may accompany planning applications, but there may be stand alone applications to the SAB. This approving power for SuDS applications will complement the consenting power for works in ordinary watercourses making one body responsible for all local drainage issues. Upon satisfactory completion of the development, Gwynedd Council will adopt and maintain the SuDS system.

The Welsh Government is due to produce national standards for SuDS.

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.

Measure to achieve the Objective

Gwynedd Council will, when the relevant provisions of the Act are commenced, undertake the role of SuDS Approving Body and will adopt any SuDS system after approval and construction.

Will be implemented when the provisions are enacted

Sub-objective 3

Establish regular maintenance schedules for flood and coastal erosion risk management assets.

3.1 *Development of a register of natural and manmade structures or features likely to have an effect on flood risk.*

Land Drainage Asset Register

Gwynedd Council has prepared a register of all known land drainage assets 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. This register is available for inspection on the Council website. The 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 do not acknowledge that they have any responsibility.

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

Measure to achieve the Objective

Gwynedd Council will continue to develop it's land drainage asset register to ensure it remains an important tool in flood risk management.

Register in place

Coast Defence Asset Register

Gwynedd Council has a register of all coastal defence assets maintained by the Council. This register will be continually reviewed and updated as assets are improved or new ones constructed.

Measure to achieve the Objective

Gwynedd Council will continue to develop it's coast defence asset register to ensure it remains an important tool in coastal erosion risk management.

Register in place

Recording of all Drainage Assets

Gwynedd Council has partial records of drainage assets owned and maintained by the Council. It would be of benefit if all the records could be combined and records kept of the location and ownership of private assets, especially culverted watercourses and piped drainage. The drainage record so produced should include details of any archaeological and biodiversity designations. This would be an ongoing, long-term task, dependent on funding being made available.

Measure to achieve the Objective

Gwynedd Council will develop a record of all known drainage assets to assist in it's flood risk management role.

Record is in place and under continuous review

3.2 *Establishment of a programme of regular and appropriate maintenance for flood and coastal erosion risk management assets.***Inspection of Coastal and Land Drainage Assets**

There is an inspection schedule for all Council owned assets. These are maintained as necessary. Minor defects are noted and repaired as soon as possible. Major repairs are dependent on obtaining funds to carry out the works. Private assets are not inspected on a regular basis but when problems are known with land drainage assets we have powers under the Land Drainage Act to require the owner to maintain their structures and watercourses.

Measure to achieve the Objective

Gwynedd Council will continue to develop and refine their risk based inspection schedules for all Council land drainage and coast protection assets.

Inspection regime is in effect

Highway Drainage Assets

Gwynedd Council has a record of highway drainage assets, together with a programme of regular inspection and maintenance. This record will be continually reviewed and updated as assets are improved or new ones constructed

Measure to achieve the Objective

Gwynedd Council will develop it's highway drainage asset record to ensure it remains fit for purpose.

Inspection regime is in effect

3.3 Designation of natural and manmade structures or features likely to have an effect on flood or coastal erosion risk over the life of the Strategy.**Designation of Structures and Features**

Under the Flood and Water Management Act, Gwynedd Council and the Environment Agency Wales are 'designating authorities'. That is, they have the permissive power 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. The designation of features or structures is not something that will be done regularly but only when there are concerns about the asset or when a flood investigation highlights a private structure or feature as having a significant effect on mitigating flood risk.

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

Measure to achieve the Objective

Gwynedd Council will use its permissive powers where appropriate to designate structures or features which perform a significant flood risk function.

Designation powers will be used where necessary

Sub-objective 4

Ensure that by 2026 everyone who lives in a flood risk area understands the flood risk they are subject to, the consequences of this risk and how to live with that risk.

4.1 Programme of community based awareness and engagement activities, utilising the Flood Risk Management Community Engagement Toolkit.

Raising Awareness

Gwynedd Council in partnership with the Environment Agency Wales are committed to ensuring that everyone in Gwynedd is informed of the risks of local flooding and provided with information to enable households and businesses to adopt suitable resistance and resilience measures.

The Council has undertaken a pilot study involving six communities, of varying sizes and with different degrees of flood risk, to find out the extent of public awareness regarding flood risk. The results of the awareness raising will enable the Council to develop a more targeted flood awareness campaign.

Measure to achieve the Objective

Gwynedd Council will ensure that all the inhabitants of Gwynedd are made aware of the risks and consequences of flooding.

A programme of awareness raising is underway and will be completed by 2026

Assess property and community level resistance and resilience

It is acknowledged by Gwynedd Council that recovery from flooding, or even a 'near miss', may involve taking steps to prevent a recurrence. In the past this has generally involved some 'hard' engineering such as upgraded drainage systems or the provision of engineered defences, funded by grant aid from the Welsh Government. This response is becoming unsustainable. Defences and their future maintenance are getting more expensive and the funds available are shrinking.

The use of SuDS and the requirement for all works to have drainage approval will go some way to preventing an increase in drainage related problems. However, in responding to local needs for flood 'defence' all methods of flood relief including softer engineering and natural processes must be considered, including individual resistance and resilience measures.

Resistance measures can be described as those which prevent water getting into property. These could be flood boards protecting doorways or air brick.

Resilience measures can be described as those which make it easier and quicker to undertake a clear-up following flood water entering a property. Such measures could include for instance raising electrical sockets 1.5m above floor level and using water resistant cement rather than plaster on walls.

The use of alternative funding for the provision of these schemes will also have to be addressed. Gwynedd Council must work together with the local communities affected by flooding to determine the best solution for their problems and this will almost inevitably involve more local funding of schemes.

The Welsh Government will provide guidance on 'softer' engineering and local funding.

Measure to achieve the Objective

Gwynedd Council will advise on and promote flood resilience and resistance measures.

Advice is being given as part of the awareness campaign and in response to flooding incidents

Riparian Duties and Responsibilities

Gwynedd Council has produced a guide for the public about riparian rights and responsibilities. This is reproduced in Appendix C. Guidance is also given to individuals following flooding incidents and when advice is sought about land drainage issues. This advice should be made more widely available on the Council website and distributed to Community Councils with the flood reports prepared following flooding incidents in their area.

Measure to achieve the Objective

Gwynedd Council will ensure that riparian owners are made aware of their rights and responsibilities.

Advice given in this Strategy and as part of the land drainage work of the Council

Review Pre-Feasibility and Project Appraisal Studies

Gwynedd Council should seek funding from the Welsh Government to review the studies prepared for community flood relief schemes prepared before the recent changes to managing flood risk. Alternative engineering and funding solutions for these problems should be sought in consultation with the communities affected.

Measure to achieve the Objective

Gwynedd Council will review the situation regarding existing flood risk management applications.

Review will be carried out before next PFRA due in 2016

4.2 Identification of at risk groups within communities, including vulnerable individuals.**Identification of At Risk Groups**

The Cabinet Office has produced guidance for emergency planners and responders under the title “Identifying People Who Are Vulnerable in a Crisis” (Feb 2008).

Gwynedd Council’s Housing & Social Services department holds data on its clients, which they can access when information is required. Information on the residential care homes and day centres in Gwynedd is held by the Housing & Social Services and/or Provider & Leisure Services departments. The Research & Information unit within the Strategic & Improvement department has access to various data bases which can allow the population, age and gender of a particular area to be estimated. This information would be used in an emergency to ensure the safety of at risk groups.

Measure to achieve the Objective

Gwynedd Council will continue to review and update the information it holds regarding at risk groups.

In effect

Sub-objective 5**Ensure the preparation and testing of Emergency Plans.****5.1 Complete emergency plans for all sources of flood risk.****Emergency Plans**

Under the Civil Contingencies Act 2004 Gwynedd Council is a Category 1 responder as well as being the Lead Local Flood Authority.

The North Wales Local Resilience Forum has developed a Multi-Agency Flood Plan, Version 5 (April 2010), commonly referred to as the MAFP and also a Multi-Agency Response Plan for Major Emergencies (June 2010).

Gwynedd Council has general corporate plans for Responding to Major Emergencies and a Corporate Service Continuity Plan.

This Council has a Flood Plan, supported by Flood Response Plans for locations within the county where the Environment Agency issues flood warnings, namely Afon Dyfi and surrounding area; Bala and surrounding area; Dolgellau and surrounding area; Fairbourne, Barmouth and surrounding area; Porthmadog and surrounding area. Plans for other locations where a flood risk has been identified are to be developed.

These plans are updated as necessary to ensure that they remain fully fit for purpose.

Measure to achieve the Objective**Gwynedd Council will continue to review and update it's emergency plans.****Plans are in place and updated as necessary**

5.2 Local level emergency exercise to test response and recovery arrangements over the life of the Strategy.**Emergency Exercises**

Periodic exercises are undertaken and facilitated, corporately or by multi-agency collaboration, e.g. exercises Pwll Dŵr (Pwllheli) and Gwyniad (Bala) as part of the national flood response Exercise Watermark in March 2011.

Measure to achieve the Objective

Gwynedd Council will continue to hold emergency exercises to assist in the review of their emergency plans.

Emergency exercises are held regularly

Sub-objective 6**Respond to events in a timely and appropriate manner.****6.1 Early and appropriate response to emergency events for all events.****Response to Emergency Events**

There are emergency phone numbers that members of the public can use to report an incident or ask for help from Gwynedd Council. During working hours all calls are dealt with by the Council call centre in Penrhyndeudraeth and are passed to the appropriate department. An out-of-hours contact number is also provided by the Highways & Municipal Services, the Housing & Social Services, and the Public Protection departments of Gwynedd Council. Most flooding incidents will involve flooding on highways and so Gwynedd Highways and Municipal Department operatives are generally the first council representatives on the ground.

The council's legal duty is to ensure that the road network remains open. While carrying out this duty, it is council policy to help as many people as possible reduce their risk of flooding. Where possible, sandbags will be provided by the Highways Department, but their supply is limited.

The North Wales Local Resilience Forum has developed a Multi-Agency Response Plan for Major Emergencies. Gwynedd Council has a corporate plan for Responding to Major Emergencies and a Service Continuity Plan.

Gwynedd Council's Emergency Planning unit participates in an out-of-hours on call rota serving the three local authorities in North West Wales. The emergency services and key personnel hold the contact number.

Measure to achieve the Objective**Gwynedd Council will continue to provide assistance to the public at all times when called upon in emergencies.****In effect**

6.2 Development and implementation of effective evacuation protocols for emergency events.**Evacuation Protocols**

Gwynedd Council has developed evacuation arrangements which take account of the details provided in the Welsh Government's "Pan Wales Framework for Evacuation and In-Migration" (2010) and the North Wales "Shelter and Evacuation Arrangements" (Feb 2009).

Our Flood Response Plans contain details of the primary evacuation routes.

Measure to achieve the Objective

Gwynedd Council will review and update its evacuation plans to ensure they remain fit for purpose.

In effect

6.3 Development of mutual aid protocols for resources, equipment and respite for emergency events.**Mutual Aid Protocols**

Gwynedd Council is a signatory to the North Wales Local Authorities' Mutual Aid Plan and the North Wales Category 1 Responders' Mutual Aid Agreement. The Council has set in place arrangements to provide assistance and to receive assistance as necessary and requested in the event of any serious emergency and will ensure that these arrangements are regularly updated and in a state of preparedness.

Measure to achieve the Objective

Gwynedd Council will continue work with all local and national bodies to ensure assistance can be provided when requested.

In effect

6.4 Identification and provision of suitable respite accommodation as appropriate over the life of the Strategy.**Respite Accommodation**

Gwynedd Council has developed a Rest Centres Plan. The Housing & Social Services department leads on implementing the plan. Within the plan key buildings and facilities have been identified which can be used as rest centres to accommodate residents who may be evacuated from their homes due to flooding.

Gwynedd Council contributed to the development of the North Wales Resilience Forum's Humanitarian Assistance Guidance Document and Response Plan.

Measure to achieve the Objective

Gwynedd Council will review and update the rest centres plan as new information on flood risk becomes available.

Sub-objective 7

Facilitate recovery from flooding within the shortest possible timescales.

7.1 *Development of procedures for the effective clearance of debris.*

Clearance of Debris

The North Wales Resilience Forum has developed a document entitled “Multi Agency Response Guidance on Site Clearance”.

The Gwynedd Council Recovery Plan makes reference to site clearance and there is a Guidance document for Gwynedd Council ‘When Responding to an Incident Which Requires Site Clearance’, which outlines the responsibilities for implementation.

Following a flooding incident, Gwynedd Council Highways and Municipal Department will clear roads of debris and ensure all affected highway culverts and drainage systems are clear and functioning correctly.

Measure to achieve the Objective

Gwynedd Council will continue to ensure debris is cleared as quickly as possible following emergency incidents.

In effect

7.2 *Development of repair schedules including provision for the installation of resilient measures by 2015.*

Building Regulations

Section 40 of the Flood and Water Management Act amends the Building Act 1984. This allows for the Building Regulations to be amended to ensure that flood resistance and/or resilience is incorporated during any building works. These amendments to the Regulations would be made by Welsh Government and, when made, would be enforced by Gwynedd Council.

Measure to achieve the Objective

Gwynedd Council will apply the amendments to the Building Regulations when they come into force.

7.3 *Investigations into the causes of flooding to be undertaken where necessary within one month.*

Flood Investigations

The Flood and Water Management Act placed a new duty on Gwynedd Council, as Lead Local Flood Authority, to investigate flooding incidents to the extent it considers necessary or appropriate and determine which risk management authorities have relevant flood risk management functions and whether they are carrying out or intending to carry out those functions. These reports will be published on the Gwynedd Council website. www.gwynedd.gov.uk/floodinvestigations

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 or more properties (domestic or business) has occurred
- Where there has been a multiple near miss
- 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 are expected to cooperate 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.

Where a significant flooding incident has occurred, there should be a meeting involving all the Council departments and outside organisations involved, to ensure the efficient sharing of information and the dissemination of the lessons learnt.

Most flood incidents involve the Highways department of the Council, as most incidents involve the flooding of roads to some extent. A report of each incident is collated centrally and, together with the flood investigation reports, will over time provide information of where flooding incidents are most prevalent. This will help the Environment Agency Wales in the work of updating their flood mapping and assist the Council in their six yearly reviews of PFRAs.

As part of the follow up to the PFRA, the Environment Agency Wales will produce Flood Hazard and Flood Risk maps, on behalf of the Welsh Government, for the areas identified as at risk in the PFRA. When these become available in June/July 2013 they will, together with the record of flood incidents, provide further information on surface water flooding that can be used to prioritise investment in those areas considered most at risk.

Measure to achieve the Objective

Gwynedd Council will investigate the internal flooding of all properties and will publish the results of the investigation.

In effect

Sub-objective 8

Increase the use of alternative sources of funding for flood and coastal erosion risk management.

8.1 *Assist the Welsh Government to explore the use of alternative sources of funding for flood risk in individual communities flood relief schemes.*

Gwynedd Council will assist the Welsh Government to explore the use of alternative sources of funding for flood risk in individual communities flood relief schemes.

Other sources of funding could be:

- requiring developers to undertake works on site including flood and coastal erosion risk management works under Section 106 of the Town and Country Planning Act 1990.
- raising a Community Infrastructure Levy on developers to raise funds for flood and coastal erosion risk management.
- partnership approach involving Flood Risk Management Authorities, the private sector and local communities.
- Gwynedd Council allocating capital funding for flood and coastal erosion risk management.

Measure to achieve the Objective

Gwynedd Council will actively pursue alternative sources of funding for flood risk management.

Costs and Benefits.

Table 5.1 sets out the costs and benefits of the measures for managing local flood risk in Gwynedd. Many of the requirements of the Act can be met with the existing Council establishment which includes the existing Welsh Government hypothecated settlement (currently at £100k per year). Statutory duties take precedence over non-statutory functions and, in circumstances such as the exceptional flooding in November 2012, other Council work will not be fully addressed. It must be noted that the costs and benefits of many of the measures cannot be fully costed at this stage.

The table below summarises the current situation as follows:

	Work being funded within existing budget including the existing Welsh Government hypothecated settlement
	Work requiring additional funding. This will necessitate completing a business case and submitting a bid for additional finance
	Duties being performed by external bodies, for example, Environment Agency, Wales
	Requirements not yet implemented

Measures	Indicative Costs	Benefits
Implement SMP2 Action Plan - Raising Awareness	Included in the Welsh Government hypothecated settlement.	Increased resilience Reduced flood risk
Implement SMP2 Action Plan - Monitoring	To extend monitoring through Menai Strait and Traeth Hafan will incur additional costs of £2,000 - £3,000 pa Cliff stability monitoring is best carried out by laser scanning at approx. £4,000 per Km	Increase understanding of coastal conditions Inform long term planning Reduced flood risk
Implement SMP2 Action Plan - Studies/Strategies	Business case required and submit a bid for additional finance	Reduced flood risk
Co-operation with other Bodies	Delivered by Council's existing establishment	Ensures uniformity of policies and actions, and the exchange of information
Flood Hazard and Flood Risk Maps	NIL – Works are being undertaken by EA on behalf of Welsh Government	Increased understanding of flood risk
Consenting in Respect to Ordinary Watercourses	£225 per application (Under review)	£50 fee per application (Does not cover costs) Reduced flood risk
Culverting of Watercourses	NIL - Policy is in place. Any costs will be borne by the consenting procedures	Reduced flood risk Increased environmental benefits

Measures	Indicative Costs	Benefits
Local Development Plans	Delivered by Council's existing establishment within current revenue support grant	Increase sustainability Reduced flood risk Prevention of inappropriate development
Planning Policy Wales	Delivered by Council's existing establishment within current revenue support grant	Increase sustainability Prevention of inappropriate development Reduced flood risk Increased environmental benefits
Planning Application Advice	Delivered by Council's existing establishment within current revenue support grant	Prevention of inappropriate development Reduced flood risk
Strategic Flood Consequence Assessments	Business case required and submit a bid for additional finance	Reduced flood risk
Sustainable Drainage Systems - SuDS	Requirements not yet implemented	Reduced flood risk Increased environmental benefits
Land Drainage Asset Register	Delivered by Council's existing establishment	Manage flood risk
Coast Defence Asset Register	Delivered by Council's existing establishment	Manage flood and erosion risk
Recording of all Drainage Assets	Statutory asset register financed by the hypothecated grant. Cost of maintaining the register is unknown	Reduced flood risk
Inspection of Coastal and Land Drainage Assets	Delivered by Council's existing establishment	Reduced flood risk Early maintenance reduces costs
Highway Drainage Assets	Delivered by Council's existing establishment	Manage flood risk
Designation of Structures and Features	Unknown – reactive measure Appeals will incur legal costs	Reduced flood risk
Raising Awareness	£44,000 pa from hypothecated grant	Reduced repair costs Reduced flood risk
Advise on and promote flood resistance and resilience	Costs covered by Raising Awareness and Section 19 investigations	Reduced repair costs Reduced flood risk
Riparian Duties and Responsibilities	Costs covered by Raising Awareness, Section 19 Investigations and Land Drainage Act powers	Reduced flood risk
Review Pre-Feasibility and Project Appraisal Studies	Will be included with bids for grant aid on a scheme by scheme basis	Reduced flood risk
Identification of At Risk Groups	Delivered by Council's existing establishment	Efficient response to emergencies
Emergency Plans	Delivered by Council's existing establishment	More efficient response to flooding incidents
Emergency Exercises	Delivered by Council's existing establishment	More efficient response to flooding incidents
Response to Emergency Events	Delivered by Council's existing establishment	More efficient response to flooding incidents
Evacuation Protocols	Delivered by Council's existing establishment	More efficient response to flooding incidents
Mutual Aid Protocols	Delivered by Council's existing establishment	More efficient response to flooding incidents
Respite Accommodation	Delivered by Council's existing establishment	More efficient response to flooding incidents

Measures	Indicative Costs	Benefits
Clearance of Debris	Delivered by Council's existing establishment. Exceptional extra burden will be at the expense of other functions	Restores transport links and highway drainage systems Mitigates danger to the public
Building Regulations	Delivered by Council's existing establishment	Reduced repair costs
Flood Investigations	Delivered by Council's existing establishment. Exceptional extra burden will be at the expense of other functions	Increased knowledge of flood risk areas Reduce future flood risk Promote resilience
Alternative sources of funding	Unknown costs will be incurred on a scheme by scheme basis	Reduce costs for Gwynedd Council's match funding

Table 5.1 Costs and Benefits of the Measures

Summary of Objectives

Gwynedd Council's objectives for managing local flood and coastal erosion risks are summarised in Table 5.2, together with details of which council departments are involved in taking forward these measures.

Flood Risk Management Measures	Objective 1 Reducing Impacts	Objective 2 Raising Awareness	Objective 3 Effective Response	Objective 4 Prioritising Investment	Health Benefits	Economic Benefits	Environmental Benefits	Status	Department Leading
			✓						
Implement SMP2	✓	✓	✓	✓		✓	✓	Ongoing	FCRMU
Co-operation with other Bodies	✓	✓	✓	✓	✓	✓	✓	Ongoing	All
Implement the Flood and Water Management Act	✓	✓	✓	✓	✓	✓	✓	Ongoing	All
Flood Hazard and Flood Risk Maps	✓	✓	✓	✓	✓	✓	✓	Ongoing	FCRMU
Consenting in Respect to Ordinary Watercourses	✓	✓			✓	✓	✓	Ongoing	FCRMU
Culverting of Watercourses	✓	✓					✓	Ongoing	FCRMU
Local Development Plans	✓	✓			✓	✓	✓	Ongoing	Planning
Planning Policy Wales	✓	✓		✓	✓	✓	✓	Ongoing	Planning
Planning Application Advice	✓	✓			✓		✓	Ongoing	FCRMU
Strategic Flood Consequence Assessments	✓	✓	✓	✓	✓	✓	✓	Ongoing	Planning
Sustainable Drainage Systems - SuDS	✓	✓	✓		✓	✓	✓	Proposed	Building Control
Land Drainage Asset Register	✓	✓	✓		✓			Ongoing	FCRMU
Coast Defence Asset Register	✓	✓	✓		✓			Ongoing	FCRMU
Recording of all Drainage Assets	✓		✓	✓	✓	✓		Ongoing	FCRMU
Inspection of Coastal and Land Drainage Assets	✓		✓	✓	✓	✓		Ongoing	FCRMU
Highway Drainage Assets	✓	✓	✓	✓	✓	✓		Proposed	Highways
Designation of Structures and Features	✓		✓		✓	✓		Proposed	FCRMU
Raising Awareness	✓	✓		✓	✓	✓		Ongoing	FCRMU
Advise on and promote flood resistance and resilience	✓	✓		✓	✓	✓		Ongoing	Building Control
Riparian Duties and Responsibilities	✓	✓			✓	✓	✓	Ongoing	FCRMU
Review Pre-Feasibility and Project Appraisal Studies	✓		✓	✓	✓	✓	✓	Proposed	FCRMU
Identification of At Risk Groups	✓				✓			Ongoing	Social Services
Emergency Plans	✓	✓	✓		✓	✓		Ongoing	Emergency Planning
Emergency Exercises	✓	✓	✓		✓	✓		Ongoing	Emergency Planning
Response to Emergency Events	✓		✓		✓	✓	✓	Ongoing	Emergency Planning
Evacuation Protocols	✓		✓		✓	✓	✓	Ongoing	Emergency Planning
Mutual Aid Protocols	✓		✓		✓	✓	✓	Ongoing	Emergency Planning
Respite Accommodation	✓		✓		✓	✓	✓	Ongoing	Emergency Planning
Clearance of Debris	✓		✓		✓	✓	✓	Ongoing	Highways
Building Regulations	✓		✓	✓	✓	✓		Proposed	Building Control
Flood Investigations	✓	✓	✓		✓			Ongoing	FCRMU
Alternative sources of funding		✓		✓		✓		Proposed	FCRMU

Table 5.2

6. Funding

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, Gwynedd 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 Gwynedd 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%.

The way Flood and Coastal Risk Management is funded is currently being reviewed by Welsh Government. A task and finish group has been established to produce a Single Investment Programme to combine existing funding streams and produce new parameters for its allocation. Gwynedd Council has a representative on the task and finish group which is due to report at the end of the year with a view to consulting Lead Local Flood Authorities and the Environment Agency early in the new year.

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.

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.

Currently the grant rate is 85% and the two most recent community flood alleviation schemes at Llanrug and Bethel promoted by Gwynedd Council have an indicative cost of over £200k each, therefore the match funding contribution required from Gwynedd or the local community will be in the order of £30/40k per annum to continue delivering such schemes.

National Programme for Funding

Gwynedd Council have a representative working with the Welsh Government and the other Local Authorities to develop a national programme of investment for flood and coastal erosion risk management.

Gwynedd Council Funding

To assist Gwynedd Council, and all other Unitary Authorities in Wales, to comply with the requirements of the Flood Risk Regulations 2009 and the Flood and Water Management Act 2010, Welsh Government has allocated hypothecated grant in aid. The sum of £280,000 has been allocated over three financial years, 2011/12, 2012/13 and 2013/14.

The £280,000 was allocated for the three year period to fund the following statutory duties:

- To prepare the Preliminary Flood Risk Assessment (PFRA).
- To establish a register of structures or features.
- To investigate floods.
- To undertake consenting of works in ordinary watercourses.
- To prepare for the introduction of Sustainable Drainage Systems (SuDS)
- To become a SuDS Approving Body (SAB).
- To prepare a Local Flood Risk Management Strategy.

There will be an ongoing financial burden on Gwynedd Council from April 2014 to:

- Collect data for the revision of the PFRA in 2016.
- Maintain and update the register.
- Continue investigating floods.

- Continue consenting works in ordinary watercourses for a fee of £50 per application.
- SAB duties of checking, inspecting, approving, adopting and maintaining SuDS schemes.
- Reviewing and updating the Strategy.

There are also measures to meet the National Strategy such as Objective 2, community flood awareness activities, which need funding.

7. Contribution to Environmental Objectives

Section Summary

- The Water Framework Directive is designed to improve and integrate the way water bodies are managed.
- Gwynedd Council must aim to make a contribution towards sustainable development in all our flood and coastal erosion risk management functions.
- Catchment Flood Management Plans aim to reduce the risk of flooding and harm to people, the natural, historic and built environment caused by floods.

Water Framework Directive

The Water Framework Directive (WFD) is the most substantial piece of European water legislation to date and is designed to improve and integrate the way water bodies are managed throughout Europe. It came into force on 22 December 2000 and was transposed into UK law in 2003 via the Water Environment (Water Framework Directives) (England and Wales) Regulations 2003. Member States must aim to reach good chemical and ecological status in inland and coastal waters by 2015. It is designed to:

- Prevent deterioration in the classification status of aquatic ecosystems, protect them and improve the ecological condition of waters;
- Aim to achieve at least good status for all waters. Where this is not possible, good status should be achieved by 2021 or 2027;
- Promote sustainable use of water as a natural resource;
- Conserve habitats and species that depend directly on water;
- Progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment;
- Progressively reduce the pollution of groundwater and prevent or limit the entry of pollutants; and
- Contribute to mitigating the effects of floods and droughts.

The Water Framework Directive establishes new and better ways of protecting and improving rivers, lakes, groundwater, transitional (where freshwater and sea water mix) and coastal waters. In order to achieve this, in 2009 the Environment Agency, Wales produced three River Basin Management Plans in Wales setting out measures to protect and improve the water environment. These are currently being implemented and will be revisited in 2015, 2021 and 2027, to ensure that the water bodies status does not deteriorate from standards set in 2009 as part of the initial River Basin Management Plans.

It is important that measures to manage local flood risk do not cause deterioration of water bodies and should consider opportunities to improve water bodies in conjunction with local flood risk management.

Sustainable Development

Section 27 of the Flood and Water Management Act 2010 gives Lead Local Flood Authorities a requirement to aim to make a contribution towards the achievement of sustainable development when exercising flood or coastal erosion risk management functions.

It also requires the Welsh Ministers to issue guidance on how Risk Management Authorities are to discharge this duty and provide a meaning of “sustainable development” in this context.

The guidance provided, *Sustainable Development: Guidance to Risk Management Authorities Section 27 – Sustainable Development Nov 2011*, does not prescribe a single approach that must be followed,

rather it provides a variety of suggestions with the aim of making a contribution towards the achievement of sustainable development while carrying out Gwynedd Council's duty in managing local flood risk under the Act.

Sustainable development in the context of flood and coastal erosion risk management requires an approach which delivers four outcomes:

- 1) Maximises the long-term economic, social and environmental wellbeing of people and communities in Wales, whilst living within environmental limits;
- 2) Safeguards the continued provision of ecosystem services from our natural environment;
- 3) Avoids exposing current and future generation to increasing risk, and
- 4) Improves the resilience of communities, the economy and the natural, historic, and social environment to current and future risk.

In fulfilling its aims for achieving sustainable development the LLFA are committed to considering the conservation and enhancement of biodiversity when implementing the GLFRMS, especially regarding Sub-objectives 1 and 2. The SEA process identified the following examples of how the LLFA are committed to ensuring sustainable development through the implementation of the GLFRMS (many of which are also linked with statutory legal obligations):

- Adherence to the SMP2 objectives and the control measures identified in the SMP2 Habitats Regulations Assessment;
- The identification of sensitive features in advance of any works that may affect them;
- Adherence to the recommendations and requirements of project-level environmental assessments, surveys and reports before work commences (including HRA and EIA, where appropriate);
- Consultation with the relevant statutory environmental bodies at the feasibility and design phase of GLFRMS projects, especially those arising from the SMP2 but also those directly related to the GLFRMS;
- Maintaining good site practices during project-level schemes to reduce any negative effects on water quality (e.g. adhering to PPG5);
- Implementation of method statements and obtaining any relevant licences/consents prior to project-level work.

It is noted that Habitat Regulations screening is only necessary when a scheme is likely to affect a Natura 2000 site (and is usually carried out for Ramsars as part of WG policy). Assessing the potential impact of a scheme on a SSSI would be a separate process. Also it is noted that flooding and flood risk measures that affect areas outside the boundary of a Natura 2000/Ramsar site but which have the potential to either affect the site or mobile features would also need to be considered under the Habitats Regulations.

In addition, the SEA process identified that the GLFRMS has the potential to generate wider environmental benefits, including positive effects on biodiversity. Depending on the nature and location of their implementation, these could include (but are not limited to):

- The implementation of SMP2 schemes that may result in increased habitat provision;
- The opposition to culverting and support of 'softer' drainage engineering techniques;
- The increased use of SuDS, and;
- The establishment of regular maintenance schedules that include consideration of biodiversity and other environmental features.

Catchment Flood Management Plans

Catchment Flood Management Plans (CFMPs) are an essential component of the future flood risk management service and are key to delivering flood risk management outcomes.

A CFMP is a high level strategic planning tool that sets out the policies to be adopted to manage flood risk for the next 50 to 100 years. They include actions to take now and in the future to ensure that we all respond and adapt to the challenge of increasing and changing flood risk. They set the general direction of travel for flood risk management and outline the shape of the service by indicating who needs to do what action, where and when.

The CFMPs consider all types of flooding, whether from rivers, groundwater, surface water or sewers and are based on a standard approach to ensure they provide a consistent assessment of flood risk and policy options. They also cover tidal flooding from rivers and estuaries (flooding influenced by changes in sea levels as well as river flows) but not flooding from the sea, which is covered by Shoreline Management Plans. The two sets of plans meet at the coastline, with no gap between them.

The overall objective of the CFMP process is to develop sustainable policies to manage flood risk within the catchment both now and in the future. This will take account of the possible effects of changes in climate, land use and land management, and will help towards sustainable development and other benefits.

The aims of the CFMP are:

- to reduce the risk of flooding and harm to people, the natural, historic and built environment caused by floods;
- to maximise opportunities to work with natural processes and to deliver multiple benefits from flood risk management and make an effective contribution to sustainable development;
- to support the implementation of European Union directives, the delivery of Government and other partner organisation policies and targets (e.g. Environment Strategy for Wales);
- to promote sustainable flood risk management;
- to inform and support planning policies, statutory land use plans and implementation of the Water Framework Directive.

Gwynedd is covered by two CFMPs

- North West Wales
- River Dee

A summary of these may be found on the EA website.

It must be noted that, in dealing with surface water flooding, these plans were produced before the latest surface water flooding information became available.

A CFMP divides the catchment into discrete areas and assigns one of six policy options to each. These options spell out the preferred actions to deal with flood risk in each area. The methods of achieving the objectives in this strategy must align with the policies in the CFMPs.



7. North West Wales
9. River Dee

8. Reviewing the Strategy

There will be substantial changes in the next few years,

- with changes to the planning system;
- with requirements for sustainable drainage;
- in the provision of flood insurance;
- in the funding and design of flood prevention schemes;
- with improvements in our knowledge of where the greatest flood risk is.

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 alter our understanding of flood risk.

Appendix A Risk Management Authority Contact Details

Environment Agency, Wales	
Address	Head Office Tŷ Cambria House 29 Newport Road Cardiff CF24 0TP
	Northern Area Office Ffordd Penlan Parc Menai Bangor Gwynedd LL57 4DE
Telephone	08708 506 506
e-mail	enquiries@environment-agency.gov.uk
Website	www.environment-agency.gov.uk
Floodline - Phone Number	0845 988 1188 (24 hour service) Type Talk: 0845 602 6340

Gwynedd Council	
Address	Council Offices Shirehall Street Caernarfon Gwynedd LL55 1SH
Telephone	01766 771000
Fax	01286 673 993
Website	www.gwynedd.gov.uk

Dŵr Cymru-Welsh Water	
Address	Pentwyn Road Nelson Treharris CF46 6LY
Telephone	01443 452300
Customer Service	0800 052 0140
Website	www.dwrcymru.co.uk

Appendix B

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, where around 2800 properties were affected, was 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 landslide 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.

The Environment Agency has a coastal erosion map on their website giving details of the management policies in the SMP.

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

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 C

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 the Environment Agency, 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 the Environment Agency, 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 Gwynedd Council or the Environment Agency, 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 Gwynedd Council.

What is the Council's Role?

In order to reduce the risk of flooding, Gwynedd 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, Gwynedd Council is the "operating authority" for ordinary watercourses in Gwynedd.

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.

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

Appendix D

Policy Regarding Culverting

Gwynedd Council is 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 is 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.

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.

Appendix E

Flood Forecasting and Warning

The Met Office

The Met Office is the UK's National Weather Service.

They provide the Public Weather Service (PWS), which provides forecasts for the public to help them make informed decisions about their day-to-day activities. The National Severe Weather Warning Service is also a part of this, providing advance notice of weather which could affect public safety.

They issue warnings for rain, snow, wind, fog and ice. These warnings will be given a colour depending on a combination of both the likelihood of the event happening and the impact the conditions may have.

The UK map will show warnings which are in force for the selected day. Clicking on a warning area on the map will provide the text of the warning and the regions affected on the right hand side. By selecting a region from the table on the right hand side you can view all the warnings in force for that area, this will also zoom the map into that area.

Visit: www.metoffice.gov.uk/public/weather/warnings/

The Environment Agency

The Environment Agency 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 Environment Agency Flood Incident Duty Officers (FIDO) 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 Environment Agency website.

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

The Environment Agency 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. The Environment Agency are able to provide direct warning messages in the designated areas, using the following codes: Flood Alert, Flood Warning, and Severe Flood Warning.

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 website

Visit www.environment-agency.gov.uk/homeandleisure/floods/31618.aspx

New Flood Warning Codes



**LLIFOGYDD – BYDDWCH
YN BAROD
FLOOD ALERT**
MAE LLIFOGYDD YN BOSIBL
FLOODING IS POSSIBLE BE PREPARED



**RHYBUDD LLIFOGYDD
FLOOD WARNING**
DISGWYLIR LLIFOGYDD MAE ANGEN
GWEITHREDU AR UNWAITH
FLOODS EXPECTED, ACTION NEEDS
TO BE TAKEN IMMEDIATELY



**RHYBUDD
LLIFOGYDD DIFRIFOL
SEVERE FLOOD WARNING**
LLIFOGYDD DIFRIFOL. PERGYL I
FYWYD
SEVERE FLOODING. DANGER TO LIFE

Typical message/advice

- Stay alert
- Stay vigilant
- Early precautions

- Flooding expected
- Take action
- Protect yourselves & your property

- Significant risk to life
- Significant disruption to communities
- Protect yourselves

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 website.

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

Appendix F

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/11114floodingstrategyen.pdf>

Local Flood Risk Management Strategies - Guidance

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

Planning Policy Wales

<http://wales.gov.uk/docs/desh/publications/110228ppwedition4en.pdf>

TAN 14:

<http://wales.gov.uk/topics/planning/policy/tans/tan14/?lang=en>

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/?skip=1&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>

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/pittrevieww/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.environment-agency.gov.uk/research/library/publications/116654.aspx>

Environment Agency 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://www.environment-agency.gov.uk/homeandleisure/floods/31626.aspx>

Personal Flood Plan

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

Community Flood Plans

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

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

<http://www.environment-agency.gov.uk/homeandleisure/floods/106769.aspx>

Environment Agency 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

Appendix G

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 and coastal erosion.

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

EAW/EA – Environment Agency Wales and Environment Agency – Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs and a Welsh Government sponsored Public Body responsible to the Welsh Ministers.

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 the Environment Agency 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

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 Environment Agency 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
