Denbighshire Local Flood Risk Management- Strategy

Strategy Document

June 2014

Denbighshire County Council

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Denbighshire Local Flood Risk Management- Strategy

Consultation Strategy Document

2013 - 2017

Denbighshire County Council

Denbighshire County Council
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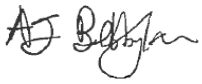
Issue and revision record

Document Title	Local Flood Risk Management Strategy – Consultation Document
Version	0.2
Status	Final

Document version	**Notes**	**Date**
0.1	Public Consultation	January 2014
0.2	Final Version	June 2014

	Signature	**Name**	**Date**
Prepared by		A. Bebbington	27/6/14
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Approved by		W. Hope	27/6/14

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Content

Glossary and Abbreviations of words and phrases commonly used in flood and coastal erosion risk management

Term	Meaning / Definition
Aquifer	A layer of porous substrate that contains and transmits groundwater.
AONB	Area of Outstanding Natural Beauty.
Asset Register	Register of structures or features which are considered to have an effect on flood risk.
Cadw	Cadw is the Welsh Government's historic environment service.
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.
Climate Change	The change in average conditions of the atmosphere near the Earth's surface over a long period of time.
Coastal Erosion	The wearing a way 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.
Consenting	Process of obtaining permission to add/amend structures in/near a watercourse or flood defence structure.
CRR	Community Risk Register.
CCW	Countryside Council for Wales – is the Government's statutory advisor on sustaining natural beauty, wildlife and the opportunity for outdoor enjoyment on Wales and its inshore waters. Natural Resources Wales now brings together the work of the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales, as well as some functions of Welsh Government.
Culvert	A covered structure under road, embankment etc, to direct the flow of water.
DCC	Denbighshire County Council.
Defences	A structure that is used to reduce the probability of floodwater or coastal erosion affecting a particular area.
Defra	Department for Environment, Food and Rural Affairs.

Term	Meaning / Definition
Deposition	The process whereby sediment is placed on the sea bed, shoreline, river bed or flood plain.
DCWW	Dŵr Cymru Welsh Water – supplies water, sewerage and trade effluent services in Wales
EA	Environment Agency - Executive Non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs.
EAW	Environment Agency Wales – The former Welsh Government sponsored Public Body responsible to the Welsh Ministers. Natural Resources Wales now brings together the work of the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales, as well as some functions of Welsh Government.
ESF	Environment Social Fund.
ERDF	European Regional Development Fund.
EU	European Union.
Flood	Any case where land not normally covered with water becomes covered by water.
FCERM	Flood & Coastal Erosion Risk Management.
FIR	Flood Investigation Report.
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.
FWMA	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.
Fluvial Flooding	Flooding from rivers including ordinary watercourses and main rivers.
FCW	Forestry Commission Wales – Government Body Responsible for managing Britain's public forests. Natural Resources Wales now brings together the work of the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales, as well as some functions of Welsh Government.

Term	Meaning / Definition
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.
LDP	Local Development Plan.
LDC	Land Drainage Consent.
Local Flood Risk	Defined within the Flood and Water Management Act 2010 as including surface runoff, groundwater and ordinary watercourses.
LFRMS	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.
LLFA	Lead Local Flood Authority - the County Council or the County Borough Council for the area (Local Authority).
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.
Main River	A watercourse shown as such on the Main River Map, and for which Natural Resources Wales has responsibilities and powers in Wales.
NMWTRA	North & Mid Wales Trunk Road Agency – responsible for the maintenance of the trunk roads in Denbighshire.
NRW	Natural Resources Wales. Natural Resources Wales brings together the work of the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales, as well as some functions of Welsh Government.
NWRF	North Wales Resilience Forum – made up of strategic level managers of each of the Category 1 responders (Local Authority, Emergency Services, and Local Health Boards) to ensure that there is an appropriate level of preparedness to enable an effective multi-agency response to an emergency.
Ordinary Watercourse	All watercourses that are not designated Main River, and which are the responsibility of riparian landowners.
PFRA	Preliminary Flood Risk Assessment.
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.
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.
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.

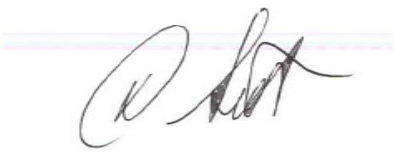
Term	Meaning / Definition
Risk Management	Anything done for the purpose of analysing, assessing and reducing a risk.
RMA	Risk Management Authority - A Welsh risk management authority is defined in Section 6 of the Flood and Water Management Act 2010 as the Environment Agency (now Natural Resources Wales), 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.
Sewer	An artificial conduit, usually underground, for carrying off sewage (foul sewer) or rainwater (storm or surface water sewer) or both (combined sewer).
SMP	Shoreline Management Plans **-** 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.
SEA	Strategic Environmental Assessment. An SEA is a system of incorporating environmental considerations into policies, plans, programmes and strategies.
SFRA	Strategic Flood Risk Assessment.
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 round or soil and flows over ground.
SWMP	Surface Water Management Plan.
SAB	SuDS Approval Body.
Wales Flood Group	A sub group of a Wales Resilience Forum.
WFD	Water Framework Directive.
WG	Welsh Government.
WLGA	Welsh Local Government Association - 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.
Welsh Risk Management Authorities	Risk Management Authorities as defined in Section 27 of the Flood and Water Management Act 2010.

Foreword

I am pleased to introduce the Denbighshire Local Flood Risk Management Strategy. The flooding experienced in Denbighshire in November 2012 has brought into sharp focus the need to prepare for and manage flood risk. The predictions of increased frequency and intensity of flooding as a consequence of climate change further underline the need for responsibilities to be identified and tightened.

This is the first Local Flood Risk Management Strategy for the County since we, Denbighshire County Council, received new flood risk management duties and powers under the Flood and Water Management Act 2010. The strategy will set out how we as a Lead Local Flood Authority will work with our at risk communities and alongside other risk management authorities to reduce flood risk

This strategy outlines the Council's objectives for managing flood and coastal erosion and describes the measures that we need to take over the coming years to bring about a better, more sustainable approach that works with nature. We look forward to using the strategy to help us target our efforts, make full use of our resources more efficiently, and reduce flood risk to the residents of Denbighshire.



Councillor David Smith

Executive Summary

Denbighshire County Council (DCC), as a Lead Local Flood Authority (LLFA) is required to prepare a Local Flood Risk Management Strategy. The purpose of the Local Strategy is to address potential flood risk arising from local sources within the boundaries of the Authority area. An important part of the Local Strategy will be to ensure that our communities are aware of what risks exist, aware of what the Council and other Risk Management Authorities[1]' responsibilities are in terms of flood risk and what communities can do to involve themselves.

The Local Strategy will complement and support the National Strategy published by Welsh Government, which outlines a national framework for flood and coastal risk management that aims to balance the needs of communities, the economy and the environment. *The National Strategy for Flood and Coastal Erosion Risk Management* (Wales) sets the following objectives:

1. **Reducing the impacts** on 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; and

4. **Prioritising investment** in communities most at risk.

The Local Strategy aims to pull together the existing policies and actions the Authority undertakes which have implications with regard to flood risk management. It also describes any new actions or policies introduced as a result of the Flood and Water Management Act 2010 and Flood Risk Regulations 2009 and also any proposed actions or policies to be introduced to further manage flood risk.

The LLFA must specify objectives to manage flood risk and suggest measures to achieve those objectives. The Local Strategy must show how and when any measures are to be introduced and how they will be funded. The implementation and funding of some of the proposed actions may not be clear at this stage, as they involve sections of the Flood and Water Management Act 2010 which have not yet been implemented.

The LLFA has a responsibility to consider the flood risk management functions that it may exercise to reduce the impact and risk from flooding. In support of the aim of a general reduction of flood risk across the district, the LLFA will prioritise investigations and works identified in this strategy to the best of its abilities, based on perceived and evidenced risk and with limited resources.

Considering the current pressures on public funding, the money available for addressing flood risk is unlikely to be adequate and pressures will only increase with rising future risk brought about by further development and a changing climate. As such, flood risk management will need to be supplemented by everyone working together and by those at risk from flooding taking responsibility to protect and help themselves.

[1] Further definition of Risk Management Authorities can be found in Section 6.

1. Introduction

> Around 220,000 properties in Wales, or about one in six buildings, are at risk of flooding, of which 64,000 are at significant risk. 97,000 of these are also vulnerable to surface water flooding with a further 137,000 properties susceptible to surface water flooding alone.
>
> *Flooding in Wales – National Assessment of Flood Risk*
> *Natural Resources Wales*

1.1 Introduction

The increase in occurrence and severity of flooding in recent years including that of summer 2007 sparked a government-commissioned investigation into the flooding, known as the Pitt Review[1]. It summarised the failings of historic flood management, resulting in an extensive set of recommendations which were transposed into the Flood and Water Management Act 2010[2] (FWMA). The FWMA created a responsibility for County and Unitary Councils to act as Lead Local Flood Authorities (LLFA's) which meant they were required to take leadership for the coordination and management of local flood risk.

Denbighshire County Council (DCC) has been designated as a LLFA in Wales, and is required under Section 10 of the FWMA to develop, maintain, apply and monitor a Local Flood Risk Management Strategy (LFRMS) in its area. The purpose of the LFRMS is to address potential flood risk arising from local sources within the boundaries of the Local Authority area. Local flood risk is defined as any flood risk from surface runoff, groundwater and ordinary watercourses. An ordinary watercourse is defined (in the Water Resources Act 1991) as any watercourse, including lakes and ponds that is not classified as a main river.

1.2 Lessons learnt from the November 2012 Floods

The significant and widespread flooding across Denbighshire at the end of November 2012 was a stark reminder of the challenges the Council faces in managing flood risk throughout the County. In particular, it has taught us that we, as a society, cannot afford to become complacent in our attitude to flood risk, particularly in light of the predicted increase in the frequency and magnitude of floods as a consequence of climate change.

In particular, the 2012 floods have taught us the importance of having plans in place to prepare for and respond to flooding, as well as the importance of working in partnership with other flood risk management authorities.

1.3 Structure of the Local Strategy

This flood risk management strategy begins a new chapter of Flood and Coastal Erosion Risk Management (FCERM) for Denbighshire. It highlights the steps that are to be taken to improve knowledge of flood risk in the county, to work better with organisations and the public towards reducing those risks whilst aiming to balance the needs of communities, the economy and the environment.

The strategy document starts with information on the legislation that underpins FCERM activities, the nature of flood risks in Denbighshire and what further information is needed to help build a better picture of local flood risks. It then identifies the authorities and organisations involved and what part each will play in

[1] The Pitt Review; Learning Lessons from the 2007 Floods - Full Report

[2] Her Majesty's (HM) Government (2010) Flood and Water Management Act

helping reduce the risk of flooding in Denbighshire. The next section will describe the strategic objectives for managing flood risk and the measures that might be implemented to achieve them. This will be supplemented by annual action plans in order to give a more detailed overview of what DCC want to achieve that year and how it will be undertaken.

1.4 Strategic Environmental Assessment

A Strategic Environmental Assessment (SEA) is being undertaken to ensure that any significant environmental effects arising from this strategy are identified, assessed, mitigated, communicated to decision-makers, monitored and that opportunities for public involvement were provided.

SEA is a generic tool that was introduced by the European Union Directive 2001/42/EC. The objective of the Strategic Environmental Assessment Directive is to "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development (Article 1)".

This requires national, regional and local strategic environmental assessment on certain plans and strategies that they promote, such as this strategy. Monitoring of the significant environmental effects of implementing the strategy will be undertaken to comply with Strategic Environmental Assessment Directive - Article 10.1, to ensure that any unforeseen adverse effects of the local strategy are recognised and dealt with.

The SEA for this strategy has been carried out as the document has developed. The SEA has been undertaken in line with Government Guidance. Statutory Consultees (Environment Agency Wales, Countryside Council for Wales [now Natural Resources Wales] and Cadw) have been consulted and the public have had an opportunity to comment, and these comments have been incorporated into the final Environmental Report.

1.5 Habitats Regulations Assessments

Under the European Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora (also known as the 'Habitats Directive'), and the resulting Conservation of Habitats and Species (Amendment) Regulations 2012, a Habitat Regulations Assessment (HRA) is required where a plan may give rise to potential significant effects on European designated sites, known as Natura 2000 sites.

Natura 2000 sites consist of Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites and also include potential SPA (pSPA) and candidate SAC (cSAC). Within and surrounding the county there are a number of SPA's and SAC's, and therefore a HRA Stage 1 'Test of Likely Significant' (Screening) has been undertaken to determine whether there are likely to be any significant effects on Natura 2000 sites from the LFRMS. A Screening Report was produced and will be consulted upon by Countryside Council for Wales (CCW). The screening has concluded that a Stage 2 'Appropriate Assessment' will not be required.

2. Legislative Context

2.1 History of Flood Risk Management

The responsibility for flood risk management has changed considerably over the past 30 years. Prior to 1989, the regulation of national environmental issues (including flood risk management, drainage and water quality) was carried out by ten Regional Water Authorities (RWAs). The Welsh National Water Development Authority (which came into existence by virtue of the Water Act 1973) covered the area which is now DCC. In 1989 the National Rivers Authority was set up, a national body that took over the roles and responsibilities for flood risk management, drainage and water quality in England and Wales. The Water Act 1989 privatised the Water Supply and Sewerage functions of the Water Authorities with Dŵr Cymru Welsh Water (DCWW) becoming a PLC (Since 2001 DCWW has been owned by Glas Cymru, a 'not for profit' company limited by guarantee). This was followed by the introduction of the Water Industry Act 1991, which set out the statutory obligations of water and sewerage undertakers and water companies responsibilities for effectively draining areas.

In December 1991, a number of additional pieces of legislation were enacted which aimed to consolidate existing water legislation. Most relevant in terms of flood risk management were the Land Drainage Act, which outlined the duties and powers to manage land drainage for a number of bodies including internal drainage boards and Local Authorities, and the Water Resources Act, which outlined the roles and responsibilities of the National Rivers Authority. The Statutory Water Companies Act and the Water (Consequential Provisions) Act were also enacted at the same time.

The Environment Agency[3] (EA) was established by the Environment Act in 1995. The EA came into existence on 1st April 1996 and took over the roles and responsibilities of the National Rivers Authority and also the responsibility for issuing flood warnings, a role previously held by the police. The management and operation of the Environment Agency is divided into a number of regions across the country; the county of Denbighshire falls within the Environment Agency Wales region.

Within England and Wales, recent flood risk management policy changes were accelerated by major flood events in 1998 and 2000, which led to the release of Planning Policy Guidance 25 (PPG25): Development and Flood Risk in England during 2001. Technical Advice Note 15 (TAN15), the Welsh equivalent of PPG25 was released in 2004 and aims to direct development away from areas of high flood risk with justification and assessment of consequences required if this cannot be achieved. TAN15 also encourages Sustainable Drainage Systems (SuDS) to be implemented for any development where they will be effective.

In England Planning Policy Statement 25 (PPS25) superseded PPG25 in 2006 and reinforced the requirement for sustainable surface water management in new developments. This has now been replaced by the National Planning Policy Framework (NPPF) which looks to rationalise the amount of planning legislation and bringing it all together in one coherent document. The Wales Office[4] has welcomed the changes to the English planning guidelines and encourages the Welsh Government to seek to adopt these measures.

[3] An Executive Non-departmental Public Body responsible to the Secretary for Environment, Food and Rural Affairs and in Wales a Welsh Government Sponsored Body responsible to the Minister for Environment and Sustainable Development

[4] The Wales Office supports the Secretary of State for Wales

More recently on 1st April 2013 Natural Resources Wales (NRW) was established to create one single environment body for Wales taking over the functions of the Environment Agency Wales (EAW), the Countryside Council for Wales (CCW) and the Forestry Commission Wales, as well as some functions of Welsh Government. This new body has taken on all of the responsibilities of the Environment Agency in relation to flood and coastal erosion risk management in Wales.

2.2 The Flood and Water Management Act 2010

Following Royal assent in April 2010 The Flood & Water Management Bill became an Act of Parliament. The Act reinforces the need to manage flooding in a holistic and sustainable manner and places a number of new roles and responsibilities on councils such as Denbighshire, which is designated as a Lead Local Flood Authority under the FWMA extending their previous responsibilities for flood risk management. The preparation of this LFRMS is just one of the duties placed upon DCC under this piece of legislation.

There are two key drivers behind the new legislation; one being the review in to the summer 2007 floods by Sir Michael Pitt, most often referred to as the Pitt Review. The other key driver behind the Act is the EU Floods Directive which has been transposed into UK law by the Flood Risk Regulations, 2009. Both of which are summarised in the following sections:

2.3 The Pitt Review

Sir Michael Pitt carried out an independent review of national FCERM practices after the widespread and catastrophic floods during the summer of 2007, in which over 55,000 households were affected and damages exceeded £4 billion[5]. The Pitt Review was published in June 2008 and called for urgent and fundamental changes to the way flood risk was being managed. The report contained 92 recommendations for the Government, Local Authorities, Local Resilience Forums and other stakeholders which were based around the concept of Local Authorities playing a major role in the management of local flood risk, through coordinating with all relevant authorities. Many of the recommendations contained in the Pitt Review have been enacted through the Flood and Water Management Act.

2.4 The Flood Risk Regulations 2009

The Flood Risk Regulations (FRR) came into force in December 2009 and transposes the EU Floods Directive into law for England and Wales. The Flood Risk Regulations require three main pieces of work:

Preliminary Flood Risk Assessment (PFRA) – This involves collecting information on past and future floods from surface water, groundwater and ordinary watercourses, assembling the information into a PFRA report and identifying Indicative Flood Risk Areas[6]. No Indicative 'Flood Risk Areas' were identified in Denbighshire County. The PFRA for Denbighshire County has been completed and can be found on the Natural Resources Wales website and Denbighshire County Council website.

Flood Hazard and Flood Risk Maps – Any authorities identifying an Indicative Flood Risk Area are required to produce hazard and risk maps for those areas by 22nd December 2013.

Flood Risk Management Plans – The final stage is for authorities with an Indicative Flood Risk Area to produce a Flood Risk Management Plan for those areas by 22nd December 2015.

[5] The Costs of the summer 2007 floods in England – Environment Agency (Project: SC070039/R1) Published January 2010

[6] Flood Risk Area is defined in the report as an affected population greater than 5,000 people at risk, as defined in the WG/ Defra guidance document 'Selecting and Reviewing Flood Risk Areas for local sources of flooding – Guidance for Lead Local Flood Authorities'.

The PFRA did not identify any indicative 'Flood Risk Areas' within Denbighshire County. Flood Risk Areas termed in the PFRA have been defined by Welsh Government guidance as an affected population greater than 5,000 people at risk. As such DCC is not required under the FRR to undertake the flood hazard and flood risk maps and flood risk management plans.

These pieces of work are to be reviewed on a six yearly cycle so DCC will revise the PFRA by 2017. Should this review identify a Flood Risk Area, flood hazard and flood risk maps and flood risk management plans will need to be completed during this cycle. It is proposed that a review of the Local Strategy should take place in 2017 following the review of the National Strategy in 2016, and to coincide with the review of the PFRA.

2.5 The National Strategy for Flood and Coastal Erosion Risk Management

The Flood and Water Management Act 2010 requires the Welsh Government (WG) to develop, maintain, apply and monitor a National Strategy for flood and coastal erosion risk management in Wales. It can be found at the following location:

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

The National Strategy sets four overarching objectives for the management of flood and coastal erosion risk in Wales, which are as follows:

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

Implementing these objectives will be the responsibility of everyone involved in or affected by flood and coastal erosion risk management, from the WG to the Welsh Risk Management Authorities and the people of Wales themselves.

The FWMA states that Local Strategies must be consistent with the National Strategy for Wales. Being consistent ensures that the strategic aims and objectives in the National Strategy are translated into meaningful objectives for their own particular area.

The WG have a wide range of measures which they propose will meet their objectives. The following measures have been assigned to LLFA to lead delivery on:

- Development of Local Flood Risk Management Strategies;
- Implementation of statutory responsibilities including those set out within the Flood and Water Management Act 2010 and the Flood Risk Regulations 2009;
- Approval and adoption of SuDS drainage systems by the SuDS Approving and Adopting Body;
- Development of a register of natural and manmade structures or features likely to have an effect on flood risk;

- Establishment of a programme of regular and appropriate maintenance for flood and coastal erosion risk management assets (for assets owned by the LLFA);
- 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;
- Programme of community based awareness and engagement activities, utilising the Flood Risk Management Community Engagement Toolkit (in partnership with Natural Resources Wales);
- Identification of at risk groups within communities, including vulnerable individuals;
- Development of procedures for the effective clearance of debris (following a flood event);
- Development of repair schedules including provision for the installation of resilient measures; and
- Investigations into the causes of flooding to be undertaken where necessary within one month.

There are additional measures for local authorities in their capacity as local planning authority and as Category 1 responder under the Civil Contingencies Act 2004.

2.6 Other Legislation

Flood Risk Management is affected by a range of other legislation. Which are considered to include (but not limited to) the following:

- The Climate Change Act 2008;
- The Civil Contingencies Act 2004;
- The Strategic Environmental Assessment (SEA) Directive 2001;
- The Conservation of Habitats and Species (Amendment) Regulations 2012;
- The Land Drainage Act 1991;
- The Water Framework Directive 2007;
- Wildlife and Countryside Act 1981;
- Countryside and Rights of Way Act 2000;
- Coast Protection Act 1949;
- Natural Environment and Rural Communities Act 2006;
- Public Health Act 1936; and
- Highways Act 1980.

3. Flood Risk in Denbighshire

3.1 Introduction

The European Union (EU) Floods Directive defines a flood as a covering by water of land not normally covered by water. It can occur from a number of sources, including rivers, the sea, small local watercourses, below ground drainage systems and direct surface water run-off. Understanding both the sources of and reasons for flooding ensures that Denbighshire County Council can take steps to manage and reduce the risks of flooding. Flood risk is the product of the likelihood or chance of flooding, multiplied by the consequences or impacts of flooding.

The likelihood (or chance) of flooding occurring in any one year can be expressed as a probability or an annual chance. For example:

- A 1% annual probability of flooding; or
- A 1 in 100 chance of flooding at a location in any year.

The consequences (or impacts) of flooding can have serious effects not only on people and property, but also on essential services, infrastructure and the environment.

3.2 Local Flood Risk

Denbighshire has experienced extensive flooding in the past. Recent notable events include extensive flooding across the county in October and November 2000 and during late November 2012.

For the purpose of this strategy, a locally significant event is defined as one where 5 or more residential properties are flooded. Below is a table illustrating examples of significant flood events that have occurred in Denbighshire over recent years. It should be noted that the list provided (Table 3.1) is not a comprehensive list of all flooding that has occurred in Denbighshire.

Denbighshire County is exposed to the combined potential risk from river, tidal and coastal flooding. Urban drainage and surface water problems have also contributed to the counties long history of flooding.

Denbighshire County Council covers a diverse demographic area, from the urban coastal resorts of Rhyl and Prestatyn in the north through significant rural areas to the smaller towns of Denbigh, Ruthin, Corwen and Llangollen.

The administrative area of Denbighshire County Council covers approximately 844 km². The county falls into two river basin districts, the Dee River Basin District and the Western Wales River Basin District and is served by two water companies, Dwr Cymru Welsh Water and Dee Valley Water.

Denbighshire is bordered to the north by the Irish Sea, to the east by Flintshire County Council and Wrexham County Borough Council, to the south by Powys County Council and to the west by Gwynedd County Council and Conwy County Borough Council.

Year of Flood	Area Effected	Type of Flood	Consequence
2013	East Rhyl	Coastal	120 residential properties flooded
2012	St Asaph, Rhuddlan, Ruthin,	Main River	550 residential properties flooded at various locations across the county
2007	Prestatyn	Surface water	13 residential properties flooded by surface water at various locations in Prestatyn
2000	Dyserth	Ordinary Watercourse	5 residential properties flooded from Afon Ffyddion
2000	St Asaph	Ordinary Watercourse	7 residential properties flooded from Glascoed Stream
2000	Llanbedr	Ordinary Watercourse	7 residential properties flooded from un-named watercourse.
2000	Corwen	Ordinary Watercourse	23 residential properties flooded from Afon Nant y Cawrddu
2000	Ruthin	Main River	20 residential properties, 6 business properties.
1990	Rhyl & Prestatyn	Coastal	108 residential properties

Table 3.1: Significant flood events in Denbighshire over the recent years

DCC is responsible for 11.2 km of coastline, which comprises the Foryd Harbour and the River Clwyd estuary to the west, a fully and partly developed middle section containing the resorts of Rhyl and Prestatyn, broken only by Rhyl Golf Course, extensive sand dunes, a golf course and open space to the east, low lying agricultural land and coastal defence works extending from Foryd Estuary to Barkby Beach.

The total resident population of Denbighshire County is c.94,000 with an estimated summer population in excess of 150,000 with the largest towns on the coast at Rhyl (c.25,000) and Prestatyn (c.18,000). Away from the coastal strip, the area is predominantly rural, and the inland towns are much smaller, Denbigh having a population of 8,500, Ruthin 5,000, and Llangollen 3,300.

The majority of historic flooding data collated by Denbighshire County Council relates to flooding from ordinary watercourses. Communities that have been affected in the past include Ruthin, Denbigh, Llangollen, Corwen, Gwyddelwern, St Asaph, Dyserth, Llanbedr Dyffryn Clwyd and Pwll Glas. The recent floods in November 2012 were due to the combination of a prolonged period of intense rainfall on already heavily saturated ground in the Clwyd and Elwy river catchment areas which led to these main rivers overtopping as well as some surface water flooding and flooding from ordinary watercourses.

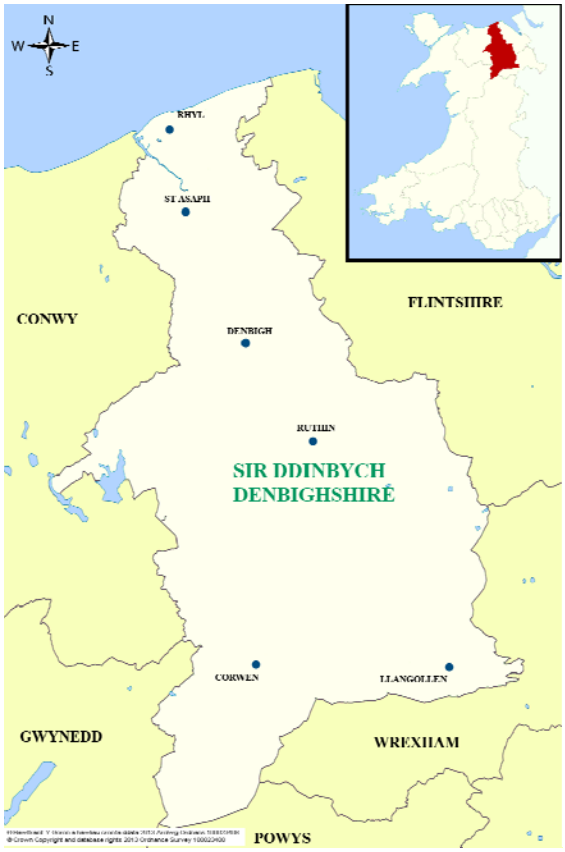


Figure 3.2: Map of Denbighshire showing surrounding Counties

3.3 Types of Flooding

Flooding can be caused from a wide variety of sources and interactions between those sources. The Flood and Water Management Act defines 'local flood risk' as being a flood risk from:

- Surface water runoff;
- Groundwater; and
- Ordinary water courses.

These sources are defined below. It should be noted that in many cases these sources can be interrelated and flooding can be caused by a combination of sources including those not considered local sources such as main rivers or the sea.

Although this strategy is directed at managing risk from flooding from local sources, this document takes into account the aims and objectives identified in the *National Strategy for Flood and Coastal Erosion Risk Management* in Wales, published by the Welsh Government in November 2011. As such, and for completeness, all types of flooding that may occur in the county and that are covered by both strategies (local and national) have been described in the following sections.

Flooding Type	Description	Responsible Authority
Coastal	Tidal flooding represents a significant problem in Denbighshire where the consequences are likely to be very serious, albeit infrequent	National Resources Wales
Reservoirs	Large water pounds which have embankments represent a potential flood risk	National Resources Wales
Main rivers	Principal watercourses and strategic smaller watercourses (Also known as Fluvial flooding)	National Resources Wales
Ordinary Water Courses	Local, generally smaller watercourses	Denbighshire County Council (LLFA)
Groundwater Flooding	Geological conditions can cause surface water which has infiltrated into the ground to emerge at certain points, leading to flooding	Denbighshire County Council (LLFA)
Surface Water Flooding	High intensity rainfall gives rise to overland flow of surface water which can pond in low lying areas giving rise to flooding. (Also known as Pluvial Flooding)	Denbighshire County Council (LLFA)
Sewer Flooding	Public sewer system have limited capacities and during heavy rainfall, surface water entering designated surface water sewers, combined sewers (ones which receive foul and surface water flows) and designated foul sewers which are subject to penetration of surface water through misconnections etc can become overloaded giving rise to surface flooding	Welsh Water Dwr Cymru
Highway Flooding	Highways have drainage systems although at times of heavy rainfall either hydraulic overload or blockage can lead to ponding or conveyance of water which can in turn have an impact on property, as well as making roads unsafe.	Denbighshire County Council (as a Highways Agency) North and Mid-Wales Trunk Road Agent (NWMTRA)

Table 3.2: Types of Flooding and Responsible Authorities

3.3.1 Surface Water Flooding (pluvial)

Surface water flooding or runoff is caused by water flowing overland following periods of prolonged or intense rainfall, leading to flows or ponding of water. Surface water flooding can happen anywhere with very little warning and can disappear with a similar speed. Areas which have been historically subject to this type flooding are likely to experience a higher probability of repeat flood events in the future according to climate change projections.

Surface water flooding is complex in nature and can be exacerbated by a number of factors. These include; poor infiltration rates where water is unable to (or slow to) discharge to ground including areas of impervious natural materials (for example Clay soils, non-porous rocks) or man-made materials (hard-standing, roofs); poorly maintained structures (blocked or silted gullies and pipe work) or under designed local drainage capacity allowing for insufficient attenuation of surface water runoff following periods of heavy rainfall; and obstructions in watercourses leading to overtopping and flows over land.

Significant work has been undertaken by DCC to identify the risk and the probability of flooding from surface water. As part of their responsibilities the LLFA produced a PFRA in 2011 to identify the areas within the county that are at risk from flooding.

Information on surface water flooding incidents tends to be less reliable than that for other causes of flooding, primarily because the source of flooding can be difficult to determine. In particular, some areas of Rhyl and Prestatyn have been prone to surface water flooding.

Modelling of future flood risk in Denbighshire using Natural Resources Wales national mapping datasets, estimates that 5,140 properties are at risk of surface water flooding to a depth of 0.1m and 1579 properties at a risk from flooding to a depth of 0.3m, of these properties 89% are residential properties.

3.3.2 Groundwater Flooding

Groundwater is the term used to describe water that is stored underground in permeable rocks which are known as aquifers. The aquifers are fed through the process of precipitation which percolates through the ground and includes all of the water that is not lost to surface water runoff and evapo-transpiration. Groundwater forms the foundation of the base-flows of rivers and streams which are topped up by surface run-off. Groundwater flooding occurs when the water held underground rises above these levels. It is important to note that the term groundwater does not include any water that is carried in buried pipes or held underground in containers.

Predicting groundwater flooding is often complex as groundwater levels are heavily influenced by the underlying geology and the topography of the surrounding catchment areas. Groundwater flooding can occur following extended periods of heavy rain (either local or within the aquifer catchment) and can occur many hours or even days after the precipitation has finished and can remain in-situ for long periods of time. Other factors that can influence groundwater levels can include reduced abstraction rates, or changes to underground flows.

In Denbighshire, flooding attributed directly to groundwater is extremely difficult to apportion as groundwater flooding usually occurs in combination with pluvial and fluvial flooding. As groundwater flooding occurs in low lying areas, basements of residential housing are usually impacted by this type of flooding.

Residents may not even be aware that their property has been flooded or they are aware that flooding has occurred previously (and do not store valuable goods in basements) and do not report incidents to the Council as limited damage to personal belongings has occurred. As such there is no recorded history of significant groundwater flooding in Denbighshire.

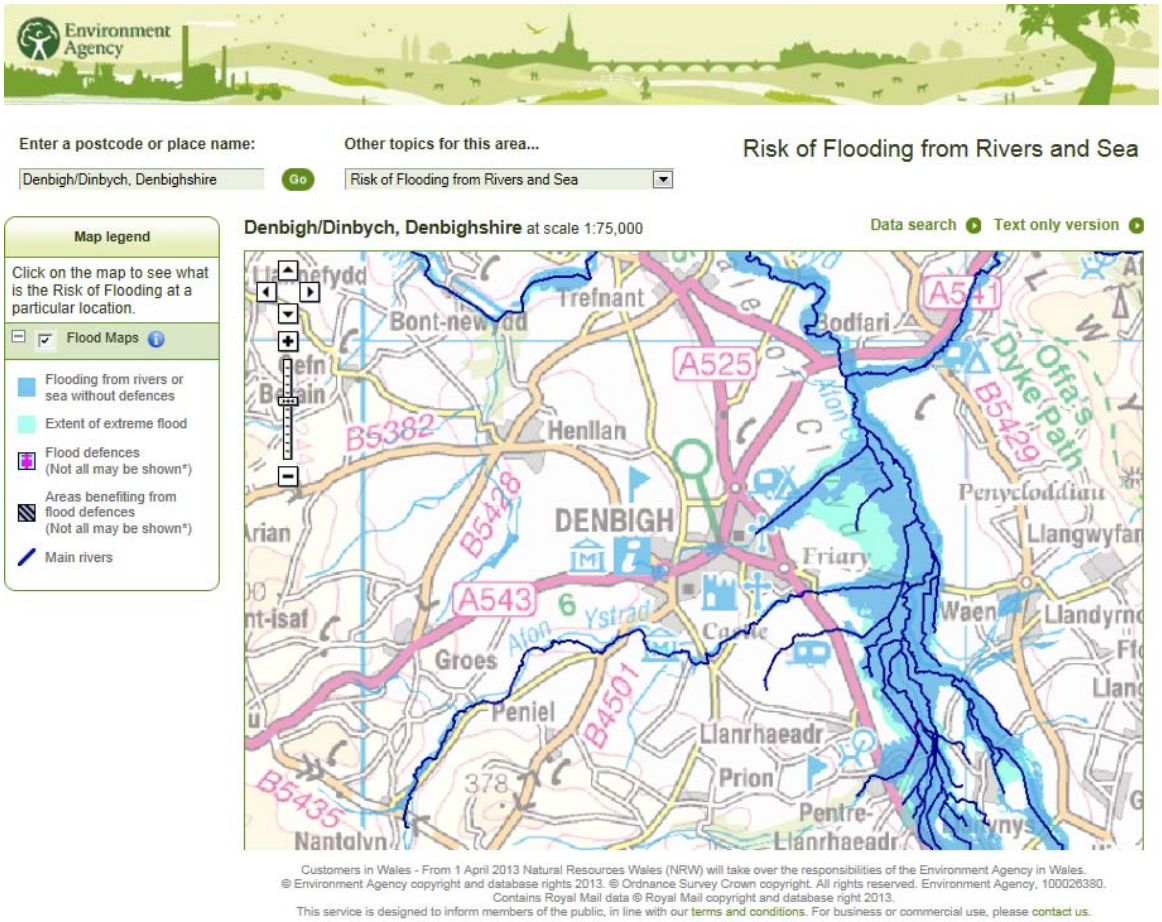


Figure 3.3: Environment Agency and Natural Resources Wales Main River Map – Main rivers and risk of flooding from rivers and sea

3.3.3 Fluvial Flooding

Fluvial flooding occurs when a river or ordinary watercourse reaches its capacity and overflows bursting its banks. This type of flooding can be influenced by a large number of factors, but usually occurs following prolonged and heavy rainfall within the rivers catchment area.

Under the Water Resources Act 1991, main rivers are defined on the main river map (see Figure 6.1 on page 30) and The Environment Agency and Natural Resources Wales have powers relating to them. Fluvial flooding from main rivers is outside the scope of this strategy, as it only deals with flooding from ordinary watercourses. However, as the main rivers have an impact on ordinary watercourses the strategy does take the flooding issues from main rivers into account where appropriate.

Overseeing the management of local flood risk from ordinary watercourses that are not designated Main River, are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards. In terms of ordinary watercourses the LLFA manages the risk from local flood under its responsibilities identified in the

Land Drainage Act 1991[7] and the FWMA. The roles and responsibilities of the partners, organisations and landowners that manage the different flood risks are detailed further in of this report.

Fluvial flood risk within Denbighshire is located along the main watercourses of the Clwyd, notably Ruthin, the Elwy, St Asaph and, in the south of the county, Corwen affected by flooding from the River Dee. In addition there is flood risk associated with numerous smaller watercourses throughout the county. Communities that have been affected in the past include Ruthin, Denbigh, Llangollen, Corwen, Gwyddelwern, St Asaph, Dyserth, Llanbedr Dyffryn Clwyd and Pwll Glas.

3.3.4 Sewer or Highway Flooding

Sewer or Highway flooding is caused when flows or volumes of surface water exceed the capacity of drainage infrastructure or where a blockage or collapse occurs, or where pumping equipment fails. This type of flooding generally occurs following periods of intense rainfall leading to the drainage systems being overwhelmed. This type of flooding can be exacerbated in autumn when drainage gullies become blocked with leaves or other detritus.

Dŵr Cymru Welsh Water (DCWW) and Dee Valley Water are the regional water and sewage treatment companies within Denbighshire County with the responsibility for managing and maintaining drainage systems (surface water and combined sewers) and flood risk from burst pipes within their operating areas. DCWW are responsible also for flooding from sewage. Both companies are required to record and report on property flooding within their management areas, as part of their service indicators known as Director General (DG) Registers. The register which records the flooding incidents within the county is~~are~~ known as ~~DG5~~the Flooding Register, which are provided to the Water Services Regulatory Authority, or Ofwat.

Flooding records provided by DCWW show that a total of 282 sewer flooding events have occurred throughout Denbighshire since 1999. There are currently fewer than 10 properties in Denbighshire at high risk of internal sewage flooding.

3.3.5 Reservoir Flooding

Flooding attributed to reservoirs occurs when a reservoir dam is overtopped or fails due to damage or collapse of the structure. The Pitt Review undertaken as a result of the floods in 2007 recommended that the Government should provide flood maps to identify areas that could be affected by a breach or overtopping to allow plans to be prepared for an emergency response. In 2008 the Department for Environment, Food and Rural Affairs (Defra) instructed Natural Resources Wales to assess the impact of dam breach flooding from all large raised reservoirs in England and Wales which were registered under the Reservoirs Act 1975.

The Reservoir Act classifies a registered reservoir as one that is capable of holding at least 25,000 cubic metres of water above the lowest natural ground level above the natural level of the surrounding land. More recently The Flood and Water Act 2010 classifies a raised structure or area that is “large” if it is capable of holding 10,000 cubic metres of water above the natural level of any part of the surrounding land.

Within Denbighshire County, there are 6 reservoirs that fall under the Reservoir Act and the maximum extent of flooding has been modelled by Natural Resources Wales to show the areas that would be impacted by a breach or failure of the dams. There are no records of reservoir failure occurring in Denbighshire County.

[7] Land Drainage Act 1991, schedule 2 paragraph 29

3.3.6 Coastal Flooding

Sea flooding occurs when water levels or waves overtop the crest of the coastal defences, or when defences are breached or collapse. The probability of breach is dependent on four main factors: weather conditions (generating large waves); wind direction (on-shore); high tides (particularly during spring tides) and the condition of the coastal defences. When these conditions combine the risk of flooding can be greatly enhanced as the predicted tide level can be raised by several metres.

Tidal flood risk affects much of the coastal frontage of Denbighshire including Rhyl and Prestatyn. Risk from tidal flooding also extends up the Clwyd estuary beyond Rhuddlan. The coastal frontage is defended from high tides but residual risk of overtopping or breaching of defences does remain. This heightened the need for understanding potential flooding from the sea in Denbighshire. At the time of writing, the Council is carrying out work to the coastal defences at West Rhyl to provide a 1 in 200 year standard of protection against tidal flooding.

3.4 Canal Flooding

These artificial watercourses rarely flood because they contain water control locks. Most canals have overflow sluices that run off into small rivers and streams. Canals are generally designed to enable them to cope with flood waters, however high intensity rainfall can cause canal flooding when draining canals do not have the necessary capacity to drain away the amount of falling rain.

The Llangollen Branch canal crosses the Denbighshire County border in the south east near to Trevor (see Figure 4.2 below) and extends west for 6 miles / 10 kilometres to the abstraction point at Horseshoe Falls near Llantysilio. The canal runs along the north side of the Vale of Llangollen.

There has been a history of breaches to the Llangollen Canal between 1945 and 1985. The 1945 breach washed away a section of railway which led to the death of an engine driver.

There is no available information on future flood risk from canals. However Canal and River Trust who are responsible for maintaining canals in England and Wales are currently working on a study to better understand the future flood risk from canals, which will be available to inform the second cycle of the PFRA process.

3.5 A Combination Event

Detailing individual sources of risk does not imply that flooding can only ever occur for one reason. Any and all of these sources mentioned above 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.

Where there are complicated interactions of different sources, the LLFA will take a lead to ensure that investigation, assessment and appropriate mitigation measures are carried out[8].

3.6 Coastal Squeeze

A Defra (2003) guidance note on managed realignment defined coastal squeeze as; the process by which coastal habitats and natural features are progressively lost or drowned, caught between coastal defences and rising sea levels[9].

As sea levels rise, increasing wave height and intensity, sea waters move further inland with the consequential loss of low lying habitats and damage to the features of the habitat and associated species within it. This loss of intertidal habitat is referred to as coastal squeeze, and while generally referred to in relation to habitat, it can also have an impact on flood and coastal erosion risk.

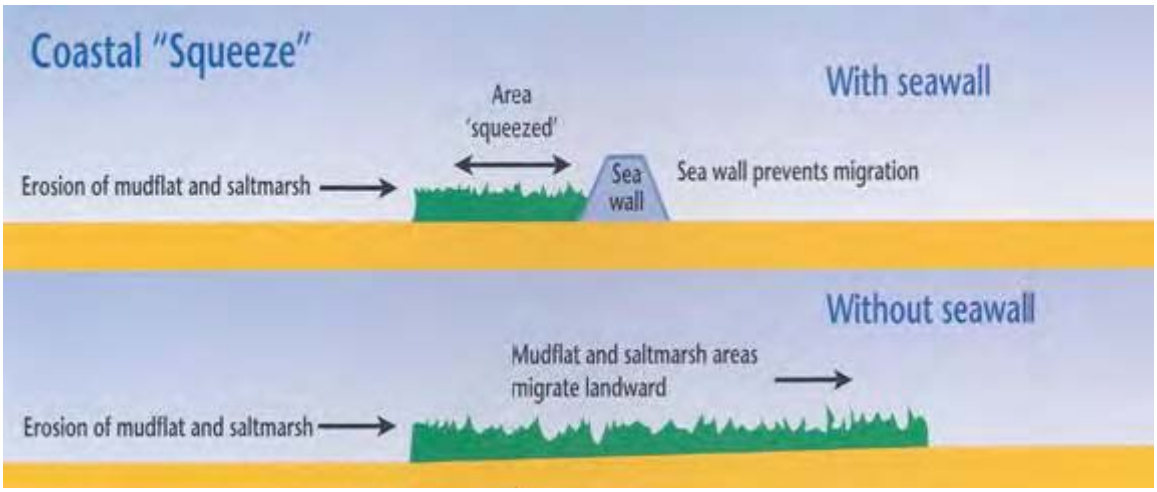


Figure 3.4: Coastal Squeeze (The National Strategy for Flood and Coastal Erosion Risk Management)

Decreasing the extent of foreshore in front of a defence, for example, can create deeper water with a consequent increase in wave size. This can undermine defences or make it more likely that defences are overtopped.

It is important to note the role that coastal features like beaches and sand dunes can play in wider coastal protection. They can be significant natural buffers to sea flooding if considered as part of an integrated management strategy using natural processes and through this potentially reduce the maintenance costs or increase the lifespan of structures protected by them.

They also provide important ecological benefits such as fish nurseries, as well as recreational and tourism opportunities for local communities. These habitats can provide multiple benefits to society, the economy, and the environment[10].

[8] Chapters 4.4 and 4.5; National Strategy for Flood and Coastal Erosion Risk Management in Wales

[9] Defra (2003) Guidance Note on Managed Realignment: Land Purchase, Compensation and Payment for Alternative Beneficial Land Use. Defra, London, UK.

[10] Chapter 4.5; National Strategy for flood and coastal erosion risk management in Wales

Under Section 40 of the Natural Environment and Rural Communities Act 2006 (NERC), Local Authorities must have regard to the conservation of biodiversity, which includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat.

3.7 Factors Increasing Flood Risk

Flood risk is a combination of probability and consequence, as there are a number of factors which will lead to higher probability of flooding in the future and more serious potential consequences, this will result in an increase in the risk of flooding in Denbighshire. There are many factors that can increase flood risk; some are included in table 4.2 below:

Factors which may increase flood risk in Denbighshire		
Weather	**Hydrological**	**Human**
Rainfall; Extensive storms; Small-scale storms; Temperature; and Snowfall and snowmelt.	Soil moisture level; Groundwater level prior to storm; Natural surface infiltration rate; Presence of impervious surfaces; Channel cross-sectional shape and roughness; Presence or absence of over bank flow; and Synchronization of run-offs from various parts of the catchment.	New development and changes in land use (e.g. hard standing surfaces due to urbanization) increase run-off; Building within the flood plain; Obstructions to flows within flood plain areas; Lack of maintenance on open watercourses and small culverts; Deterioration in the condition and performance of existing drainage infrastructure; Climate change - more frequent and more severe extreme weather; Diversion of watercourses; and Illegal connections to sewers.

Table 3.3: Factors which may increase flood risk in Denbighshire County

3.8 Methodology for Identifying Areas of Risk

As part of the Council's responsibilities as the LLFA under the FRR 2009, DCC produced a Preliminary Flood Risk Assessment (PFRA) in 2011. The purpose of this report was to identify areas within the county that were at risk of flooding with significant consequences which were termed as 'Flood Risk Areas'.

Significant consequences were defined by the Welsh Government (WG) and the Department for Environment, Food and Rural Affairs (Defra) within the guidance document '*Selecting and Reviewing Flood Risk Areas for local sources of flooding – Guidance for Lead Local Flood Authorities*' as:

'Clusters of areas above flood risk threshold with an affected population greater than 5,000 people at risk'

No clusters above this threshold were identified by NRW within Denbighshire County; and as such under this guidance, it is considered there are no Flood Risk Areas in Denbighshire.

As the population densities were unlikely to trigger the regulations for the majority of North Wales the LLFA's for each county derived new local thresholds to identify flood risk areas within their boundaries. A locally significant event was defined as:

- Where 5 or more residential properties have been flooded.

On this basis the LLFA undertook the preliminary study to provide an assessment of the flood risks using historical records held by the county overlain with flood modelling data provided by NRW, to identify the local Flood Risk Area's within the County.

The report determined that within the bounds of the county a total of **5 locations** were identified that exceeded the thresholds and had been subject to historical flooding incidents. For further details of these areas see Table 4.1 or the PFRA.

3.9 Limitations of data

The assessment of flood risk to date within Denbighshire County has been completed using the best information that is currently available. However, there are inherent limitations with this information and it is important that these are identified (See Table 4.3 below). The main data limitations were the consistency and reliability of the collection of past flooding information. DCC has no information currently available relating to predicted future flood risk other than that provided by the NRW.

Dataset	Main limitations	Future improvement
Flood Map for Surface Water	Modelling used a national methodology with a standard set of assumptions (such as storm duration, etc) which may not be suitable for the whole of Denbighshire.	Detailed surface water modelling within locally important flood risk areas will provide a better understanding of flood risk, mechanisms and consequences.
Areas Susceptible to Groundwater Flooding	This is a very high level dataset describing the proportion of each grid square that may be susceptible to groundwater flooding. It does not show the likelihood of groundwater flooding occurring.	Obtain the complete British Geological Survey (BGS) dataset for key areas, which provides a more accurate overview of areas where geological conditions suggest groundwater might emerge.
Flood History across Denbighshire	Flood history collected through the PFRA is generally poor and inconsistent. It is difficult to make a fair and accurate assessment of flood risk across Denbighshire based on this alone.	More comprehensive flood recording and flood investigation in the future is essential (this is currently underway, as a requirement of the FWMA and will provide a better level of flood history in the future).

Table 3.4: Limitations of main datasets used to prioritise locally important flood risk areas

4 . Climate Change

'Communities living behind good coastal defences currently protecting them against a flood with a chance occurrence of 1 in 100 each year would experience a drop in standard of protection by the end of the century to as low as 1 in 5 each year if we were to follow a business-as-usual flood management policy.'

Future flooding in Wales: Flood defence. Possible long-term investment scenarios Natural Resources Wales

4.1 Climate Change

Climate change is one of the most serious threats facing the world's economy and society. The devastating floods, droughts and storms that we have seen in the UK and across the world in recent years show all too clearly how vulnerable we are to climate extremes and how devastating the consequences can be.

There are no easy solutions and to achieve a long term response to climate change a fundamental shift is required in the way we conduct our lives, generate and use energy over the coming century. In the UK the government is committed to implementing a programme to reduce our emissions through legislation, education, substantial investment in clean technologies and green electricity generation.

Significant scientific research has been conducted on climate change by United Kingdom Climate Projections (UKCP09), which is funded by the Department for Environment, Food and Rural Affairs (Defra) on behalf of the UK Government and the Devolved Authorities. The research is based on sound science and projections provided by the Metrological Office (Met Office), which is focused on the UK. The aim of the research and projections are to assist those needing to plan how they will need to adapt to a changing climate.

To assess the potential impacts that climate change may have on extreme rainfall, river flood flows, sea level rise and storm surges, UKCP09 have provided a large toolkit of information and data including 'change factors' which have been developed to help Risk Management Authorities use the UKCP09 information in a timely and cost-effective way and to provide a consistent approach. The change factors quantify the potential change (as either mm or percentage increase, depending on the variable) to the baseline.

Guidance has been provided on Climate Change from WG; *Adapting to Climate Change: Guidance for Flood and Coastal Erosion Risk Management Authorities in Wales, December 2011'*. It is recommended here that options are developed, planning for the change factor covering the whole of the decision lifetime. Change factors for river flood flows, extreme rainfall, mean relative sea level rise and storm surges are provided in the guidance and are to assist in investment planning decisions.

Short term flood risk management decisions and actions should be set within a longer term strategic planning framework. In Wales there are plans in place to address the increasing flood risk and to guide adaptation to climate change. The strategic plans are:

- Catchment Flood Management Plans[11] – produced by Natural Resources Wales.
- Shoreline Management Plans[12] – Produced by Coastal Groups, composed of maritime Local Authorities, Natural Resources Wales and others.

[11] CFMPs are high level non statutory plans for inland flood risk produced by Natural Resources Wales

[12] SMPs are high level non statutory plans for coastal erosion and flooding produced by Coastal Groups

Catchment Flood Management Plans consider inland flood risk now and in the future, up to 100 years ahead, and assess the potential impacts of climate change and land use change on future flood risk. Similarly, Shoreline Management Plans assess the threat to the coast from erosion and flooding. These plans look at the current and future scenarios over a 100-year timeframe. Both Catchment Flood Management Plans and Shoreline Management Plans are subject to periodic review as new information becomes available. The policies and actions set out in the plans may change with time to reflect adaptation to increasing risks and climate change[13].

4.2 Climate Change in Wales

A climate change risk assessment for Wales was produced by Defra in January 2012 as part of the UK Climate Change Risk Assessment (CCRA), under the Climate Change Act 2008. The assessment reviewed all of the relevant and available data drawing on sector reports and recent research literature, to provide projections for climate change for the 2020s, 2050s and the 2080s compared with recorded weather data from 1961 to 1990. The document reviewed Low, Medium, and High Emissions scenarios for each of the time periods and produced predictions for changes and perceived impacts on variations in temperature and weather conditions.

The report states that there will be an increase in flooding events on the coast and inland, affecting people, property and infrastructure. It is predicted that flooding will increase from a combination of different sources which will cause increase in disruption to communities, the economy and employment. Flooding would also affect water supplies, waste water disposal, energy supplies and health services for areas not directly impacted by the flooding.

The key findings for Wales from the 2050's Medium Emissions scenario are:

- An increase in mean winter temperatures of 2.0 °C (very unlikely to be less than 1.1 °C and very unlikely to be more than 3.1 °C);
- An increase in mean summer temperatures of 2.5 °C (very unlikely to be less than 1.2 °C and very unlikely to be more than 4.1 °C);
- An increase in mean winter precipitation of 14% (very unlikely to be less than 2% and very unlikely to be more than 30%);
- A decrease in mean summer precipitation of 17% (very unlikely to be less than a 36% decrease and very unlikely to be more than a 6% increase); and
- Sea level rise is projected to increase by between 0.10 m and 0.32 m by the 2050's.

4.3 Key Projections for Western Wales River Basin District

- Winter precipitation increases of around 15% (very likely to be between 3 and 33%);
- Precipitation on the wettest day in winter up by around 12% (very unlikely to be more than 27%);
- Relative sea level at Swansea very likely to be up between 10 and 40cm from 1990 levels (not including extra potential rises from polar ice sheet loss);

[13] Future flooding in Wales: flood defences. Possible long-term investment scenarios

- Peak river flows in a typical catchment likely to increase between 12 and 20%; and
- Increases in rain are projected to be greater near the coast than inland.

4.4 Key Projections for Dee River Basin District

If emissions follow a medium future scenario, UKCP09 projected changes by the 2050s relative to the recent past are:

- Winter precipitation increases of around 10% (very likely to be between 2 and 21%);
- Precipitation on the wettest day in winter up by around 8% (very unlikely to be more than 21%);
- Relative sea level at Hoylake very likely to be up between 7 and 38cm from 1990 levels (not including extra potential rises from polar ice sheet loss); and
- Peak river flows in a typical catchment likely to increase between 7 and 12%.

4.5 Implications for Flood Risk

Climate changes can affect local flood risk in several ways. Impacts will depend on local conditions and vulnerability. Wetter winters and more of this rain falling in wet spells may increase river flooding along the Dee and its tributaries and in the steep, rapidly responding catchments typical of Western Wales. More intense rainfall causes more surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so we need to be prepared for the unexpected.

Rising sea or river levels may increase local flood risk inland or away from major rivers because of interactions with drains, sewers and smaller watercourses. Where appropriate, we need local studies to understand climate impacts in detail, including effects from other factors like land use. Sustainable development and drainage will help us adapt to climate change and manage the risk of damaging floods in future.

The Welsh Government is working with the Natural Resources 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.

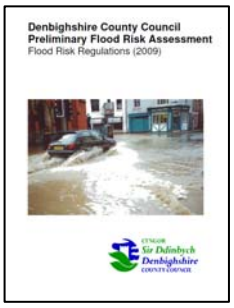
5 . Regional and Local Plans

There are a variety of publically available documents which identify flood risk within Denbighshire. These include:

- Denbighshire County Council Preliminary Flood Risk Assessment;
- Conwy and Clwyd Catchment Flood Management Plan;
- River Dee Catchment Flood Management Plan;
- North West England and North Wales Shoreline Management Plan SMP2;
- River Basin Management Plan – Western Wales River Basin District and Dee River Basin District;
- Denbighshire Strategic Flood Consequence Assessment;
- The Tidal Clwyd Flood Risk Management Strategy; and
- Rhyl – Prestatyn Coastal Defence Strategy Study Report.

A brief review of each document is provided in the following sections.

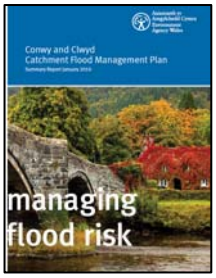
5.1 Denbighshire County Council Preliminary Flood Risk Assessment



The Denbighshire County Council Preliminary Flood Risk Assessment (PFRA) was published in June 2011. The purpose of the Preliminary Assessment Report is to provide an assessment of potential flood risk for areas for which Denbighshire County Council, as Lead Local Flood Authority, has responsibility. These include the risk of flooding from surface water, ground water, ordinary watercourses and small reservoirs.

The full report can be found on the Denbighshire County Council website or here: www.denbighshire.gov.uk/en-gb/DNAP-8PCC5B

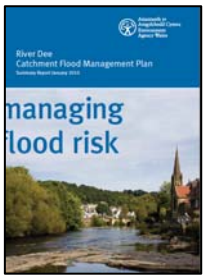
5.2 Conwy and Clwyd Catchment Flood Management Plan



The Conwy and Clwyd CFMP covers a total area of approximately 1,500 km^2 and contains around 90,000 properties. It includes the two major catchments of the River Conwy to the West and the River Clwyd to the East. Other minor rivers also drain small catchment areas along the coast. The plan covers the majority of the northern region of the county that is drained by the River Clwyd. Within the plan the areas identified most at risk from flooding are the Kinmel Bay area and Prestatyn.

The report can be found on Natural Resources Wales website and at the following www.publications.environment-agency.gov.uk/PDF/GEWA0110BRKU-E-E.pdf

5.3 River Dee Catchment Flood Management Plan



The River Dee Catchment Flood Management Plan looks at fluvial flood risk. The plan covers the majority of the Southern region of the county in which the upper River Dee flows east from Llandrillo and through Llangollen. The plan doesn't identify any significant flood risk areas within Denbighshire County. Existing flood risk management is considered appropriate for the Upper Dee Region which covers the county.

The report can be found on Natural Resources Wales website.

http://www.environment-agency.gov.uk/research/planning/64223.aspx

5.4 North West England and North Wales Shoreline Management Plan SMP2

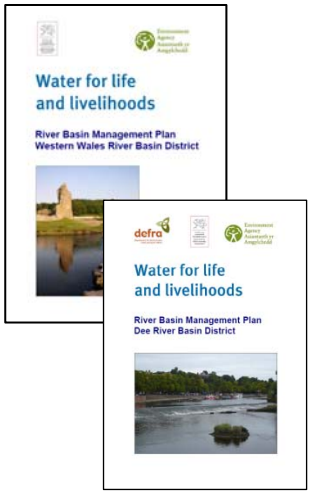
The North West England and North Wales Shoreline Management Plan SMP2 covers the coastline from the Great Orme in Llandudno, to the Scottish Border on the Solway Firth. It covers the major estuary within Denbighshire, the River Clwyd estuary.

Sub-Cell 11a – Great Orme's Head to Southport contains all of the Denbighshire Shoreline that is covered within this SMP. The SMP provides high level policies for management of the coast in relation to flood risk, coastal erosion, natural environment, historic environment and the economy. It also looks at how management should change sustainably for years to come.

A 'Hold the Line' policy is used throughout Denbighshire.

The full SMP and appendices can be found here: http://www.mycoastline.org

5.5 River Basin Management Plan – Western Wales River Basin District and Dee River Basin District



The River Basin Management Plans for the Western Wales River Basin District and the Dee River Basin District are plans to achieve Water Framework Directive requirements to improve the water quality of surface water bodies.

While these plans do not identify flood risk or consider management of flood risk, they must be taken into account when carrying out any flood risk management works. Works must not cause the deterioration of water quality in any surface water body or prevent improvement targets from being met. The plan also encourage sustainable drainage systems (SuDS) to be used in new development to remove contaminants from surface water as well as reducing flood risk.

The Western Wales River Basin Management Plan report can be found at:
www.environment-agency.gov.uk/research/planning/125095.aspx

The Dee River Basin Management Plan report can be found at:
www.environment-agency.gov.uk/research/planning/124748.aspx

5.6 Denbighshire Strategic Flood Consequence Assessment

The Denbighshire Strategic Flood Consequence Assessment (SFCA) was produced as a background paper for the Deposit Local Development Plan (LDP) in 2007 in accordance with TAN15[14]. The aim of the SFRA is to apply the sequential test to candidate developments sites in order to direct future development away from high flood risk areas. The SFCA considers both fluvial and coastal flooding issues within the county. Sites with high flood risk were rejected and those with partial areas of risk were considered within the flood free area.

The full report can be found on the Denbighshire County Council website.

[14] Welsh Assembly Government (2004) Technical Advice Note 15 Development and Flood Risk

5.7 The Tidal Clwyd Flood Risk Management Strategy

The tidal Clwyd strategy covers the north Wales coastline and inland tidal area between Abergele and the Denbighshire-Flintshire border near Prestatyn. It covers the main centres of population around Rhyl, Kinmel Bay and Prestatyn. In addition to the permanent residents living in the strategy area, many thousands of people visit the area each year, including holidaymakers at local caravan parks. The strategy suggests solutions to tackle both tidal flooding issues from the river and coastal flooding from the sea. The strategy will be reviewed regularly during its lifetime to take account of any potential changes that may occur over time.

The report can be found on Natural Resources Wales website or at: www.environment-agency.gov.uk/static/images/Leisure/20111205_Clwyd_factsheet_(online_version).pdf.

5.8 Rhyl – Prestatyn Coastal Defence Strategy Study Report

The report details coastal flood risk for the Denbighshire towns of Rhyl and Prestatyn, within Sub-cell11a. The strategy outlines the means of establishing, justifying and prioritising the overall aims and objectives of flood and coastal defence policy for the areas concerned. It has been produced to ensure that the future flood and erosion risk management is compatible with and where appropriate contributes to the sustainable development of the Denbighshire coastline within the strategic Shoreline Management Plan.

The report is not publicly available at this time.

6 . Managing the Likelihood of Flooding

Following the Pitt Review recommendations the Flood Water Management Act 2010, outlined and clarified flood risk management responsibilities across all flood management organisations. The FWMA subsequently defined certain organisations as 'Risk Management Authorities' in Wales whom have roles and responsibilities around flooding. The Risk Management Authorities in Denbighshire are:

Natural Resources Wales is responsible for managing flood risk from **main rivers** and the **sea**, and also has a strategic overview role over all flood and coastal erosion risk management and for regulating the safety of reservoirs. NRW also has a key role in providing flood warnings to the public.

Denbighshire County Council as a Lead Local Flood Authority and a Highways Authority, is responsible for taking the lead in managing flood risk from all local sources, including **surface water, groundwater,** and **ordinary watercourses** and managing flood risk on roads and **highways** within the area.

Dŵr Cymru Welsh Water (DCWW) and **Dee Valley Water** are the regional water and sewage treatment companies serving the Denbighshire area. Both are responsible for flood risk from **burst pipes.** DCWW are responsible also for flooding from **sewage.**

North and Mid-Wales Trunk Road Agent (NMWTRA) are responsible for the maintenance and improvement of **trunk roads** across Denbighshire on behalf of the Welsh Government as a Highways Authority. NWTRA must ensure that:

- Road projects do not increase flood risk;
- Road discharges do not pollute receiving water bodies.

Contact details for each of these Risk Management Authorities can be found in Appendix A.

All of the risk management authorities identified above have the following new responsibilities under the Act:

- **A duty** to co-operate with other risk management authorities within the function of their flood and coastal erosion risk management role, which includes sharing flood data and information; and

- **Authority to take on** flood and coastal erosion functions from another risk management authority when agreed by both sides.

Co-operation with other risk management authorities includes the following:

- Discussing with other risk management authorities before designating structures;

- Report local flooding incidents to the DCC Flood Investigation Officer on a monthly basis;

- Report flood assets, as defined by agreed criteria, as and when they are made known;
- Assist with Flood Investigation Reports when required;
- Provide local knowledge on SuDS regarding applications in their area;
- Ensure that members of the public are guided to the appropriate authority or organisation; and
- Share expertise, data, information and local knowledge and work jointly to understand and reduce flood risk across Denbighshire.

Each risk management authority also has specific responsibilities under the FWMA; which are described in the next section.

However flood risk management is not something that can be left solely in the hands of certain organisations and forgotten by everyone else. **Households, businesses and landowners** have their part to play too. Even if this strategy was being devised at a time of substantial public sector budget cuts, the organisations would still not be able to prevent all floods or solve all concerns. That is why the powers and responsibilities of Denbighshire's citizens are also recorded in this section.

6.1 Responsibilities of Natural Resources Wales

On 1st April 2013 Natural Resources Wales (NRW) was established to create one single environment body for Wales taking over the functions of the Environment Agency Wales (EAW), the Countryside Council for Wales (CCW) and the Forestry Commission Wales. This new body has taken on all of the responsibilities of the Environment Agency in relation to flood and coastal erosion risk management in Wales. The Environment Agency Wales and its responsibilities up until the establishment of the single body will now be referred to as Natural Resources Wales (NRW) for the purposes of this report.

Natural Resources Wales has always led on the management of the risks of flooding from main rivers and the sea. However, in recognition of the links between coastal flooding and coastal erosion, particularly in terms of consequences, and as an outcome of the FWMA, NRW has new operational responsibilities in relation to coastal erosion as well as operational responsibilities for flooding from rivers and the sea. NRW also has a wider oversight role for all flood and coastal erosion risk management in Wales.

As part of its oversight role the NRW will lead on the provision of technical advice and support to the other Risk Management Authorities. It 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 the Floodline Warning Service.

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

- Reporting to the Minister on flood and coastal erosion risk in Wales including the application of the National Strategy; and
- The establishment of Regional Flood and Coastal Committees.

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

- Collect data on progress regarding flood and coastal erosion risk from Risk Management Authorities;
- Report factual information to Welsh Government; and
- As requested, provide interpretive advice to the Welsh Government.

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

In addition to its statutory duties, Natural Resources Wales has a number of permissive powers. These are powers that allow it to carry out a course of action, but do not compel it 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 NRW'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 NRW as well as providing guidance to Local Authorities on these matters for flooding from other sources.

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

NRW's Local Operational Role includes being a coastal erosion risk management authority, emergency planning, advising on the planning process and managing flooding from main rivers, reservoirs and the sea.

6.1.1 Coastal Erosion Risk Management Authority

Natural Resources Wales is a coastal erosion risk management authority with the power to protect land against coastal erosion and to control third party activities on the coast, such as the construction of private defences or the removal of beach material. Importantly since October 2011 Lead Local Flood Authorities have required NRW approval to undertake coastal protection works.

6.1.2 Emergency Planning

Natural Resources Wales contributes to the development of multi-agency flood plans, which are developed by Local Resilience Forums (LRFs) to help the organisations involved in responding to a flood to work better together. NRW also contributes to the National Flood Emergency Framework for England and Wales which includes guidance on developing and assessing these plans.

It is responsible for providing advice to planning authorities regarding development and flood risk; providing fluvial and coastal flood warnings; monitoring flood and coastal erosion risks and supporting emergency responders when floods occur.

NRW works with the Met Office to provide forecasts and warnings of flooding from rivers and the sea in England and Wales.

NRW and other asset operating authorities also have a role in proactive operational management of their assets and systems to reduce risk during a flood incident.

6.1.3 Main Rivers

Main Rivers are a statutory type of watercourse usually larger streams and rivers, but also include some smaller watercourses. A main river is defined as a watercourse marked as such on a main river map designated by the Welsh Government (Under the Water Resources Act 1991). NRW has powers to carry out flood defence works to main rivers. However the overall responsibility for maintenance of main rivers lies with the riparian owner.

6.1.4 Coastal

Natural Resources Wales is the lead organisation responsible for all flood and erosion risk management around the coastline of Wales, including tidal flood risk. NRW leads in developing a coastal management plan that works at local, regional and national level, with partner organisations, including local authorities, putting agreed plans into practical action.

NRW also has a regulatory role in consenting works carried out by others in, or adjacent to water courses and sea/tidal defences to ensure that they have regard to flood risk and do not cause unnecessary environmental damage or impacts.

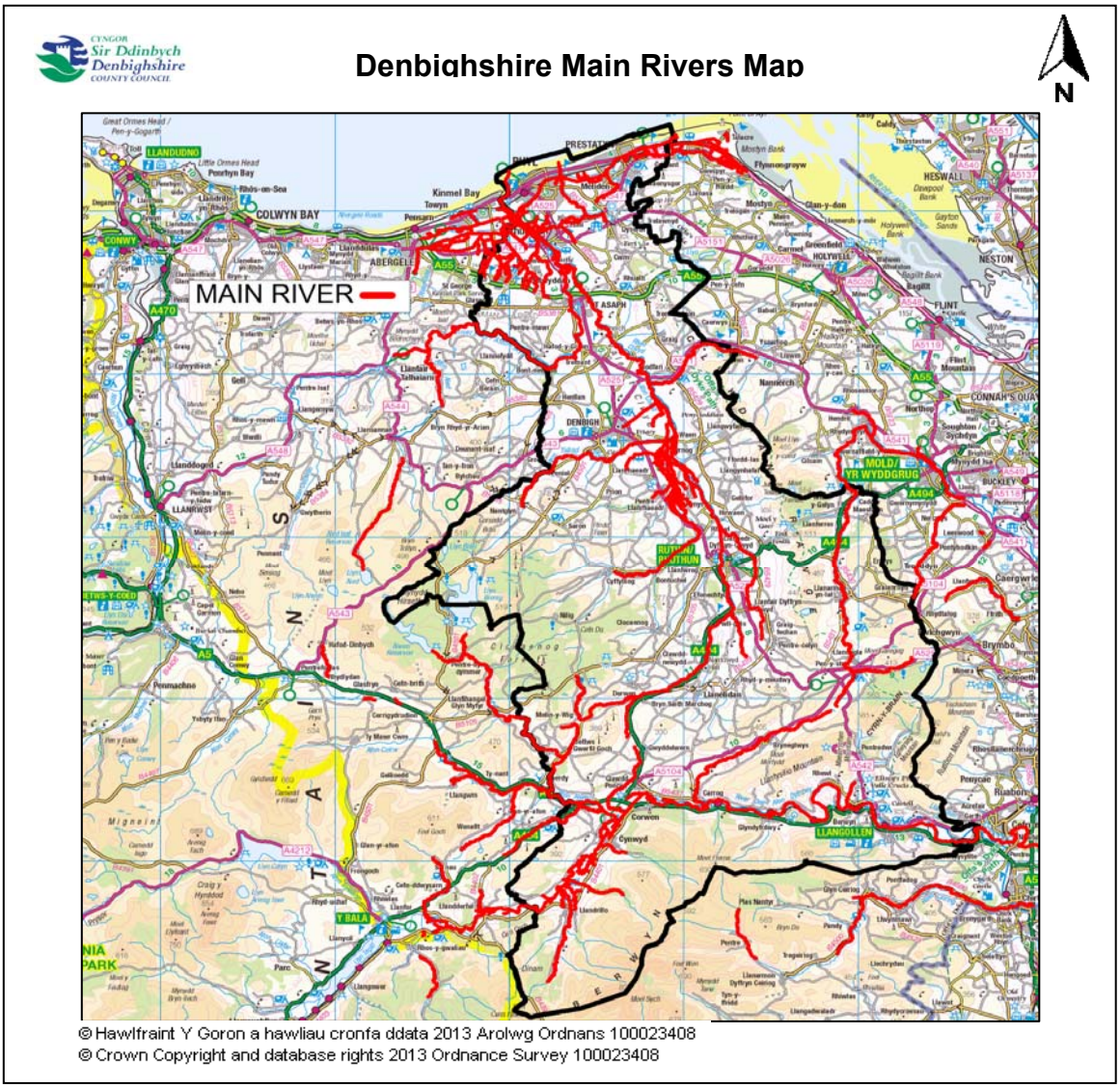


Figure 6.1: Map of main rivers from EA Datashare website

6.1.5 Reservoirs

The NRW enforces the Reservoirs Act 1975, which is the safety legislation for reservoirs in the United Kingdom. NRW is responsible as the Enforcement Authority for reservoirs that have a storage capacity greater than 25,000 m³ (above the natural level of the surrounding land) and, once the relevant parts of the Flood and Water Management Act have been commenced, reservoirs with a capacity of 10,000 m³.

As the Enforcement Authority the NRW are responsible for:

- Maintaining a register of reservoirs, and making this information available to the public;
- Ensuring that reservoirs are designed and constructed using the correct design standards;
- Ensuring that the owner (undertaker) has appointed an engineer to inspect the reservoir periodically;
- Ensuring that the owner commissions regular inspections of the reservoir by an inspecting engineer;

- Ensuring that the owner carries out essential works required in the 'interests of safety' as soon as practicable under the supervision of a qualified civil engineer (from an inspecting engineer panel);
- Influencing, warning, cautioning and ultimately prosecuting non-compliant owners;
- Commissioning construction engineers, supervising engineers, inspecting engineers and essential works required in the 'interests of safety' in the event of non-compliance and recouping costs incurred from the owner;
- Producing a biennial report about our enforcement and operational activities to the Department for Environment, Food and Rural Affairs (Defra) and to the Welsh Government; and
- Acting in an emergency if the owner fails to take appropriate action.

Natural Resources Wales has now produced reservoir flood maps which show the effects on the downstream catchment of a dam breach for approximately 2000 large raised reservoirs which they regulate under the Reservoirs Act 1975**.** These have been sent to reservoir owners and the relevant local authorities.

6.2 Powers and Responsibilities of Denbighshire County Council

The Flood and Water Management Act 2010 identified Denbighshire County Council as the Lead Local Flood Authority for the district. They are responsible for taking the lead in managing flood risk from local sources. This includes surface water, groundwater and ordinary watercourses and also where there is an interaction between these sources and main rivers or the sea. DCC also has other related roles in emergency planning, regulatory services and road drainage which are detailed in the following sections.

Following implementation of the Act, the Cabinet members for DCC chose Highways & Environmental Services department to take the lead in ensuring the Council's compliance with legislation and to ensure that all relevant departments and external agencies assist to fulfil the requirements of this Act. Highways & Environmental Services already carried out similar duties and had formed the necessary relationships with other departments and external bodies to undertake this role. The diagram below illustrates many of the departments within DCC that have a part to play in reducing flood risk and implementing the Act as a Lead Local Flood Authority.

Figure 6.1: Denbighshire County Council as a LLFA

The FWMA 2010 identifies DCC as the LLFA for the administrative County of Denbighshire. This gave the council a number of **statutory duties** in overseeing the management of local flood risk from surface water, groundwater and ordinary watercourses such as streams and ditches (including lakes and ponds). It also gave DCC a number of **permissive powers** which allow them to do something, but do not compel them to and are defined in Table 7.1 below:

Statutory duties	Permissive powers
Strategic leadership[15]; Comply with the National Strategy[16]; Co-operate with other authorities[17]; Investigating flood incidents and publishing the results[18]; Keep a register of assets likely to affect flood risk[19]; and Contribute to sustainable development[20].	Powers to designate structures and features that affect flood or coastal erosion risk; Powers to request information; 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.

Table 6.1: Denbighshire County Council Statutory Duties and Permissive Powers

As Lead Local Flood Authority, the Denbighshire County Council will also take on the role of the SuDS Adopting and Approving Body (SAB) in relation to sustainable drainage systems. In this role the Council will be responsible for both approving the original design of the SuDS and adopting and maintaining the finished system.

6.2.1 Highways & Environmental Services

Highways and Environmental Services have taken the lead in delivering and implementing the requirements of the Act on behalf of DCC. However, this task requires input and a partnership of working with the other relevant departments in the council. Some of the tasks outlined in the following sections have been core activities for the council for a number of years and processes are in place to deliver those tasks. Other tasks, however, relate to the new responsibilities which have recently been assigned and will require new processes to be developed and implemented.

6.2.1.1 Strategic Leadership

DCC is responsible for co-ordinating and overseeing flood risk management on a day to day basis across the County. In practice DCC took the lead in dealing with groundwater, surface water and ordinary watercourse flooding incidents prior to the changes contained within the FWMA; however the responsibility has now been allocated to DCC by law. At the onset, this involves developing this strategy which will set out DCC's approach to dealing with flooding identified under the Act. It also involves ensuring all flood risk authorities are aware of their responsibilities, monitoring progress and activity by all organisations involved and communicating with the public and between organisations.

[15] Section 10(1) of the Flood and Water Management Act 2010
[16] Section 10(5) of the Flood and Water Management Act 2010
[17] Section 13 of the Flood and Water Management Act 2010
[18] Section 19 of the Flood and Water Management Act 2010
[19] Section 21 of the Flood and Water Management Act 2010
[20] Section 27 of the Flood and Water Management Act 2010

6.2.1.2 Recording of Flood Incidents

To assemble an accurate picture of flood risk across Denbighshire requires the collection of precise and useful records from actual flood incidents occurring across the County. DCC have set a standard to record every flood incident that occurs in the county. A detailed investigation will be carried out when certain criteria are met, which is explained in more detail in the next section.

Partnership working and collaboration is an integral part of managing flood risk and is reflected in the duty to co-operate within the Act. The measure for the future is to build stronger links with local community groups, the public, landowners and private organisations that we expect to take a proactive involvement in flood risk management and provide us with information on flood incidents.

DCC's aim is to obtain as much information on flooding incidents that occur across Denbighshire and in order to do this we encourage the public to use the Council's website to provide information that we may not be aware about.

If you become aware of a flood in your area, please provide us with the following information via **highways@denbighshire.gov.uk**

- Your name and contact details
- Date of flood;
- Location of the flood (map references or precise address);
- The duration of flood;
- The depth of flood at its worst;
- Where did the water come from? e.g. overflowing river;
- What was the weather preceding the flood, rainfall if known;
- Did water enter a property? Which ones;
- What damage did the flooding cause? e.g. blocked road for several hours;
- Was any action taken at the time to reduce the flood risk? e.g. flood gates;
- Any other relevant information; and
- Photographs and videos of the flood and damage preceding the flood.

6.2.1.3 Investigation of Flood Incidents

An LLFA has a duty to investigate all sources of significant flooding events. The national definition of *significant* is unavailable; therefore the decision whether or not to investigate a flood is at the discretion of the LLFA and the comprehensiveness of the investigation will be adjusted to reflect the significance of the incident and the resources available. In the event of very widespread, significant flooding affecting large areas of Denbighshire, our ability to investigate every incident in detail is likely to be severely limited.

The aim of flood investigations is to bring all useful information together in one place, providing an understanding of situations, outlining possible causes of flooding and potential long-term solutions to protect people and their homes from flooding. Further recommendations will also be made to highlight potential flood risk management actions. Reports will provide a clear and thorough understanding of flood incidents. Ideally the investigations will provide long term solutions and recommended actions to potentially solve the problem, however through the investigation process there is no guarantee that these will be acted upon by the authorities or persons responsible to carry out these actions, unless permissive powers are used under the Land Drainage Act.

A flood investigation will involve consultation with the relevant risk management authorities, landowners and private organisations involved, all of whom will be expected to cooperate and provide comments. The Council has agreed a methodology for flood investigations with Natural Resources Wales, which is shown in Figure 6.2.

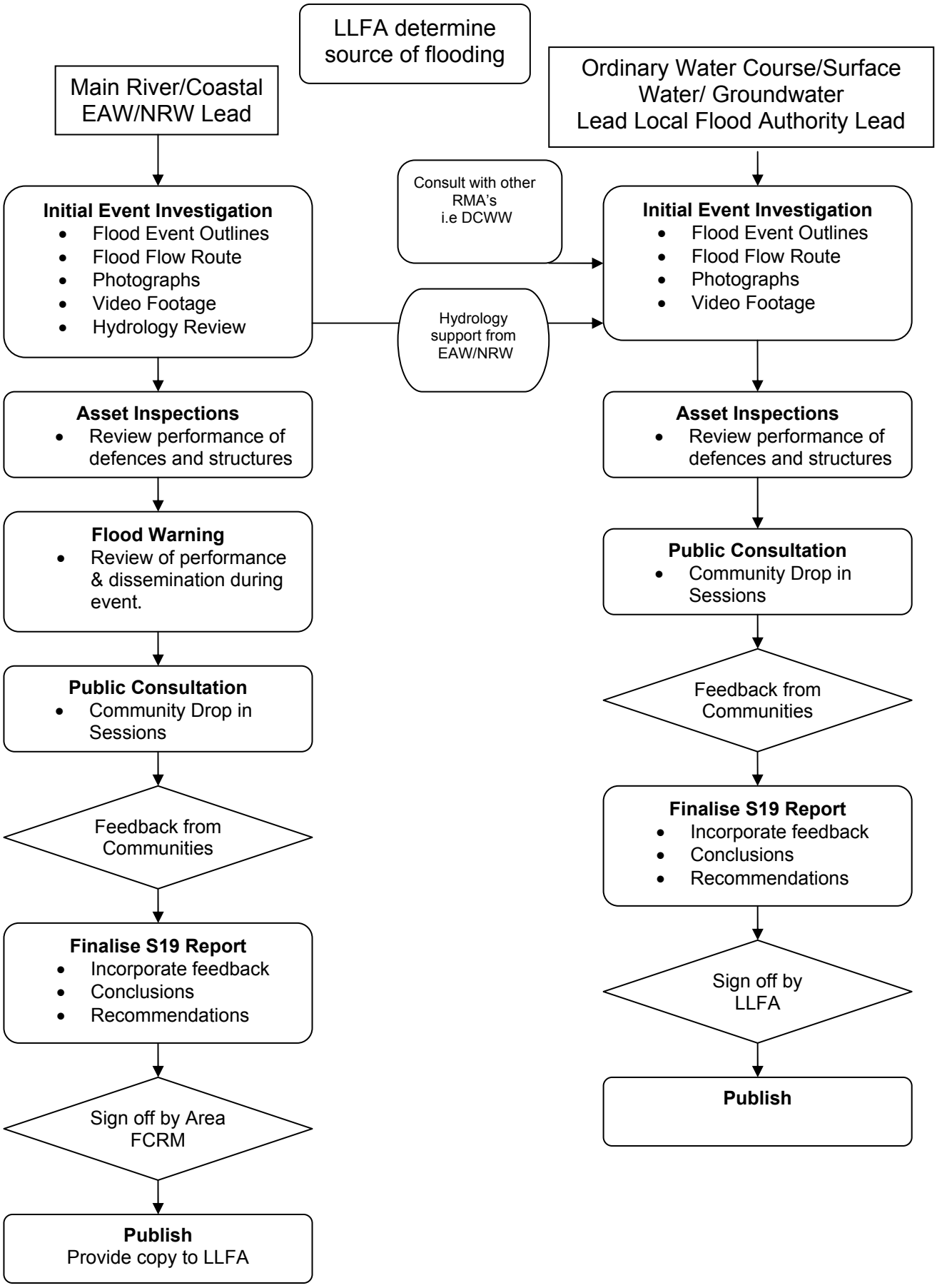


Figure 6.2 Methodology for Flood Investigation in co-ordination with Natural Resources Wales

6.2.1.4 Register of Flood Risk Assets

An asset in the context of flood risk management is an artificial or natural structure that works as a flood defence or as part of a drainage system considered likely to have a significant impact on flood risk. An example could be a trash screen, culvert, pumping station, walls or banks of a river channel.

Denbighshire County Council is required to keep an **asset register** of structures or features which it considers are likely to have a significant effect on local flood risk. Information on ownership and state of repair will be held on the register and it will be made available for inspection by the public at all reasonable times. The register will take the form of a live database, which will be constantly updated in the light of flood incidents, flood investigations and changes to infrastructure. In the first instance the recording of assets will be prioritised by its location; future flood risk mapping and known flood risk areas taken from the Preliminary Flood Risk Assessment will be used to analyse the 'significance' of each flood risk asset. The vulnerability of the asset's surroundings will also be used to determine the consequences of its failure.

The council is also required to keep an **asset record** for use by risk management authorities. The record will provide further information about each asset and contact details for the owner or maintainer. This database will be used to investigate cases where flood risk asset issues have been reported.

6.2.1.5 Sustainable development

DCC has a duty to aim to contribute towards the achievement of sustainable development in the exercise of flood or coastal erosion risk management functions and to have regard to the Welsh Ministerial guidance on this topic. 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 of how to aim to make a contribution towards the achievement of sustainable development while carrying out duties in managing local flood risk under the Act. The ways in which DCC will work towards achieving sustainable development in the FCERM role are described in Section 10.

6.2.1.6 Designating Assets

The relevant clauses of the FWMA have now commenced (August 2012), therefore empowering Denbighshire County Council and the Natural Resources Wales as 'designating authorities'. That is, they have the permissive powers to 'designate' features or structures which they consider affects flood risk and it is not owned by the LLFA or the Natural Resources Wales. If an asset becomes 'designated' its owner cannot alter, remove or replace a designated structure or feature without the consent of 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. Designation of features or structures is not something that will be done regularly but only conducted when it is deemed that there are concerns about the asset.

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

6.2.1.7 Meeting the Flood Risk Regulations

The Flood Risk Regulations 2009[21] (FRR) replicate the allocation of responsibility of local flood risks and have allocated specific responsibilities for conducting assessments. All LLFA are required to produce a

[21] Flood Risk Regulations 2009

Preliminary Flood Risk Assessment (PFRA). The first PFRA was published in June 2011 and can be found on the Denbighshire County Council website:

http://www.denbighshire.gov.uk/en-gb/DNAP-8PCC5B

The information contained within will be reviewed in 2017 and every six years thereafter.

6.2.1.8 Consenting Works on Ordinary Watercourses

DCC are responsible for the regulation of ordinary watercourses. This includes issuing of consents for any changes to ordinary watercourses that might obstruct or alter the flow of an ordinary watercourse and enforcement action to rectify unlawful and potentially damaging work to a watercourse.

This role was previously held by NRW but has been transferred to enable the LLFA to implement their new roles and responsibilities in respect to local flood risk. NRW still retain their responsibility of consenting works on main rivers.

If riparian owners or other bodies wish to culvert an ordinary watercourse or insert any obstruction, consent is required. The purpose of ordinary water course regulation is to control activities that may have an adverse flooding impact. It is essential that anyone who intends on carrying out works either temporary or permanent in, over, under or near a watercourse or flood defences (including sea defences) obtain any necessary consents before commencing works. Consents on forms of obstruction identified by the Land Drainage Act will be charged. Riparian owners are encouraged to contact the Highways and Environment Services Department to discuss any applications. The relevant application form can be downloaded at:

https://www.denbighshire.gov.uk/en/resident/planning-and-building-regulations/planning/ordinary-watercourse-consent.aspx

6.2.1.9 As SuDS Approval Body (SAB)

Sustainable drainage systems (SuDS) are a change of approach from conventional drainage which aimed to convey water as quickly as possible from a development, often causing watercourses downstream to overload and potentially cause flooding. The key principles that influence the planning and design of SuDS are:

- Storing runoff and releasing it slowly (attenuation);
- Allowing water to soak into the ground (infiltration);
- Slowly transporting (conveying) water on the surface;
- Filtering out pollutants; and
- Allowing sediments to settle out by controlling the flow of the water[22].

SuDS are also an opportunity to ensure that amenity and biodiversity are considered with the same importance as managing volumes of water.

[22] http://www.ciria.com/suds/suds_principles.htm

The Flood and Water Management Act 2010 assigns Denbighshire County Council the role of a SuDS Approval Body (SAB) for the county of Denbighshire. When this aspect of the Act is enacted (expected by April 2014) full details of how this will be implemented will be agreed with partners and publicised widely. The SuDS approval process will be integrated with the planning process; with discussions commencing at the earliest possible stage.

It is expected that any development requiring planning permission will require a drainage approval and that when the SAB is established, it will be required to:

- Assess the drainage design for all construction work which has drainage implications;
- Adopt all SuDS schemes which connect more than one property; and
- Ensure that all adopted SuDS schemes are properly maintained.

An important provision in the FWMA includes the removal of the automatic right to connect to surface water sewer systems; instead connection to an existing sewer network is conditional on the SAB approving the drainage system.

Drainage is a complex issue and should be considered at the earliest stage of the development process. DCC will be producing a local SuDS Design Guide in accordance with National Standards on SuDS, to advise on what the expectations are for the design of drainage, which is expected to be out for consultation in 2014 after national guidance has been provided following the enactment of the SAB.

Note: DCC is waiting for additional information and guidance from Welsh Government regarding the adoption of SuDS therefore the information above is subject to change.

6.2.2 Coastal

Denbighshire County Council is a coastal erosion risk management authority with the power to protect land against coastal erosion and to control third party activities on the coast, such as the construction of private defences or the removal of beach material. Importantly since October 2011 Lead Local Flood Authorities have required NRW approval to undertake coastal protection works.

6.2.3 Joint Emergency Planning Unit

The introduction of the civil contingencies Act 2004 required a restructure of joint-agency planning in Wales. This resulted in the creation of Local Resilience Forums (supported by various co-ordinating groups) based on the four police force areas in Wales.

The Joint Emergency Planning Unit (JEPU) for Denbighshire and Flintshire Councils works closely with the North Wales Resilience Forum (NWRF), which was established in March 2005. The membership of the NWRF is made up of the strategic level managers of each of the Category 1 responders (Local Authorities including DCC, Police, Ambulance, Local Health Boards, Fire & Rescue Services and other relevant bodies). Its overall purpose is to ensure that there is an appropriate level of preparedness to enable an effective multi-agency response to emergencies including floods which may have a significant impact on the communities of North Wales.

The Resilience Forum's objectives are[23]:

- To agree on joint strategic and policy approaches relating to North Wales preparedness and response;
- To approve the Community Risk Register (CCR) and ensure it provides a robust basis for planning;
- To ensure that appropriate multi-agency plans, procedures, training and exercises necessary to address identified or foreseeable local and wider area hazards are in place and outstanding gaps identified;
- To direct and oversee the activities of working groups as they are established and allocate measures to them as appropriate;
- To receive reports from the working groups on current threat levels, gaps in planning and progress on actions measured;
- To ensure that appropriate resources are made available to working groups to fulfil statutory and measure-based responsibilities;
- To co-ordinate the individual approaches and responsibilities of each organisation to ensure that they complement each other and dovetail with partners' arrangements; and
- To consider the implications of legislation, national initiatives and decisions of the Regional Resilience Forum for the North Wales Resilience Forum area.

The role of the JEPU in terms of FCERM includes:

- Emergency planning responsibilities;
- Provision of a 24/7 Duty Officer system for Denbighshire and Flintshire County Councils;
- The preparation of flood contingency plans which detail the arrangements for responding to a disaster or major flood incident in Denbighshire;
- Assess Denbighshire's risks in accordance with lead responsibility and coordinate local authority input to community Risk Register;
- Develop Emergency Plans in accordance with lead responsibility;
- Develop local authority Business Continuity Management arrangements;
- Develop arrangements for Civil Preparedness information available for public use with other relevant DCC services;
- Working with communities to ensure that they are informed and prepared for civil emergencies such as flooding, and are able to recover following an emergency i.e. flood partnerships;
- Maintain system for warning, informing and advising public in event of an emergency;
- Share information with other Denbighshire responders;

[23] North Wales Community Risk Register 2012 Produced by North Wales Resilience Forum, Version 10 January 2012 - Final

- Co-operate with other Denbighshire responders to enhance co-operation and efficiency; and
- Provide advice and assistance to businesses and voluntary organisations about business continuity management, during and after an emergency.

The JEPU supports the Authority in the following during a crisis:

- Coordinate emergency support within their own functions;
- Deal with surface water and groundwater flooding, flooding from 'non main rivers';
- Work with the other Category 1 and 2 responders as part of the multi-agency response to floods;
- Coordinate emergency support from the voluntary sector;
- Liaise with central and regional government departments;
- Liaise with essential service providers;
- Open Rest Centres;
- Manage the local transport and traffic networks;
- Mobilise trained emergency social workers;
- Provide emergency assistance;
- Deal with environmental health issues, such as contamination and pollution
- Coordinate the recovery process;
- Manage public health issues
- Provide advice and management of public health;
- Provide support and advice to individuals; and
- Assist with business continuity. An increasingly important part of this role, supported by Natural Resources Wales and voluntary organisations, is to encourage the formation of local emergency groups.

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

- Support the emergency services with evacuation;
- Provide temporary accommodation, including emergency feeding and rest centres;
- Provide social and welfare support to the vulnerable and 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 local 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; and
- Provide any other services that normally fall within the day to day responsibilities of the Council.

6.2.4 As a Planning Authority

Denbighshire County Council acts as the Local Planning Authority within the administrative boundaries of the County. The two principle functions of the Authority are reflected in the departmental structure; Forward/ Strategic Planning (the production and monitoring of a Local Development Plan) and Development Control.

6.2.4.1 Strategic Planning/Planning Policy Function

In June 2013, the Council adopted the Local Development Plan which lays out the framework for the use and development of land within the County up to 2021. It is supported by a number of Supplementary Planning Guidance Notes (SPG's) and site development briefs to provide detailed guidance on individual policies.

Statutory bodies, such Environment Agency Wales and the Countryside Council for Wales (both merged into Natural Resources Wales [NRW]), were regularly consulted on proposed land allocations and site designations during the plan-making process. Comments on flooding, land drainage and nature conservation were defined as important site characteristics in the assessment of suitability for development.

The Local Development Plan team may also contribute towards Flood Risk Management by producing a Strategic Flood Consequences Assessment for the County or specific areas of the County.

6.2.4.2 Development Control Function

The Council's Planning Development and Control Section process and determine planning applications. In doing so they will need to have regards to flood risk and surface water drainage issues to ensure that development proposals comply with documents such as Technical Advice Note 15 – Development and Flood Risk (TAN 15). They will liaise with NRW, Welsh Water and drainage engineers on such proposals and will determine applications having regard to their input.

6.3 Water and Sewage Companies

6.3.1.1 Dwr Cymru – Welsh Water

Dŵr Cymru – Welsh Water (DCWW) is responsible not only for the provision of water supply in Denbighshire, but also for making appropriate arrangements for the drainage of foul water, the treatment of waste, surface water sewers and combined sewers. They have primary responsibility for floods from water supply and sewerage systems, which can include sewer flooding, burst pipes or water mains or floods caused by system failures. Welsh Water is working with its customers to reduce the cost of blockages and risk of system failures through a campaign named Let's Stop the Block. Further information can be found through the link below.

http://www.letsstoptheblock.com/

Figure 7.2: Dŵr Cymru Welsh Water boundaries (North and South)

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
- A duty to co-operate with other relevant authorities in the exercise of their flood and coastal erosion risk management functions;

Water and sewerage companies often hold valuable information which could greatly aid the understanding of flood risks faced by communities across Wales.

6.3.1.2 Dee Valley Water

Dee Valley Water Plc supplies water to approximately 258,000 customers in Chester and North East Wales and North West England including parts of Denbighshire County (see Figure 7.4 below). Dee Valley is responsible for the provision of 23 million tonnes of water per year over an area of 831 square kilometres. As such, they have the primary responsibility for floods from their water systems, which can include burst pipes or water mains or floods caused by system failures.

Dee Valley has a duty to prevent and reduce leakage and promote water efficiency. They also have a duty to prevent wastage and promote the efficient use of water by their customers.

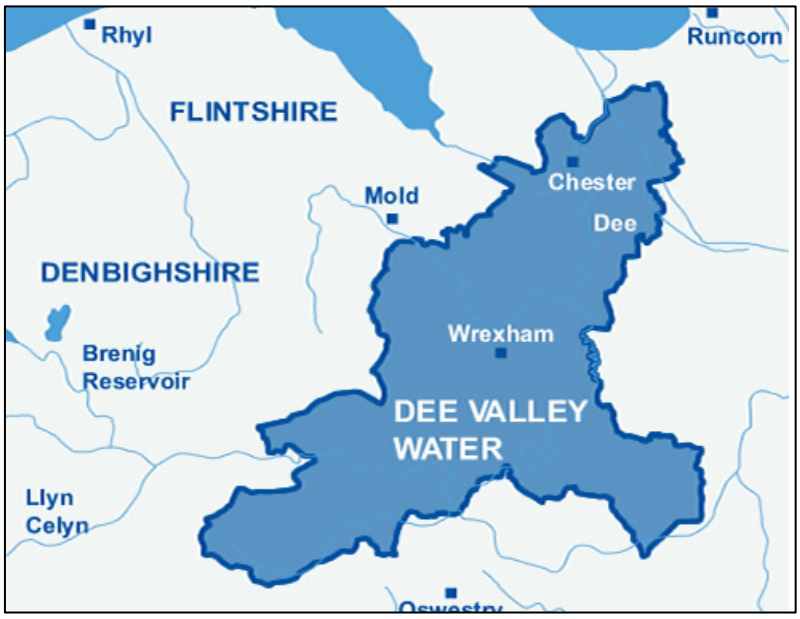


Figure 7.3: Dee Valley Water Operating Area boundary

6.3.2 Flood Risk Management

Water and sewage companies have the following responsibilities around flood risk management:

- Respond to flooding incidents involving their assets;
- Produce reports of the flood incidents;
- Maintenance of a register of properties at risk of flooding due to a hydraulic overload in the sewerage network (Flood Register, previously known as the DG5 Register);
- Undertake capacity improvements to alleviate sewer flooding problems on the register;
- Provide, maintain and operate systems of public sewers and works for the purpose of effectually draining an area;
- May be subject to scrutiny from lead local flood authorities' democratic processes;

- Statutory consultee to the SAB (when enforced) when the drainage system is proposed to communicate with the public sewer.

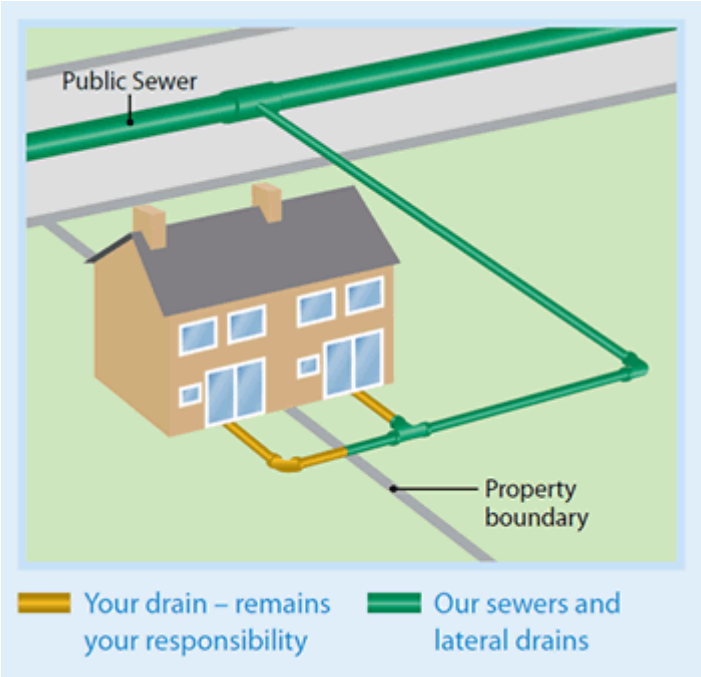


Figure 7.4 Sewerage pipe responsibilities

On 1st October 2012 the responsibility for private sewers and lateral drains transferred overnight to sewerage undertakers in Wales and England, under section 42 of the Flood and Water Management Act. In Denbighshire, this means that sewers which serve more than one property and pipes outside of the boundary of a property (for example in the highway) are now the responsibility of Dŵr Cymru Welsh Water to repair and maintain. Any pipes within the property boundary which only serve that property remain the responsibility of the property owner

6.4 Denbigshire County Council as a Highways Authority

Denbighshire County Council Highways and Environmental Services Department is responsible for the network of non-trunk roads in Denbighshire County. The Welsh Government is responsible for trunk roads in Wales; these are maintained by the North and Mid Wales Trunk Road Agency (NMWTRA) in Denbighshire on behalf of the Welsh Government.

The County Council is responsible for the entire highway network other than the A5, A55 and A494 trunk roads. The total length of roads in the County is 1,475km, made up as follows:

- Trunk roads 72 km
- Principal classified A roads 140 km
- Non principal classified B and C roads 655 km
- Unclassified roads 608 km

The Council has defined a strategic highway network which includes the A5, A55 and A494 trunk roads and the following roads for which the Council is responsible:

- the A525 which runs north-south through the County connecting Rhyl, with the A55, St Asaph, Denbigh, Ruthin and continues outside the County to Wrexham;
- the A548 coast road which runs between Pensarn in neighbouring Conwy County Borough (where it connects with the A55), Rhyl and Prestatyn to the Denbighshire/Flintshire boundary and then to the New Dee Crossing;
- the A547 which runs between Abergele in neighbouring Conwy County Borough (where it connects with the A55), Rhuddlan, Dyserth and Meliden to Prestatyn;
- the A5151 which connects the A525 at Rhuddlan, with Dyserth and the A55 near Holywell in Flintshire.
- the A541 which connects the A525 at Trefnant with Mold in Flintshire;
- the A539 which connects Llangollen with the A483 and Wrexham.

All Highways Authorities are Risk Management Authorities according to the FWMA and must adhere to all the responsibilities imposed on risk management authorities; a duty to co-operate with other risk management authorities and authority to take on Flood & Coastal Erosion Risk Management functions from another risk management authority when agreed by both sides.

In addition to their responsibility as a risk management authority, highways authorities also have further responsibilities which are detailed under the following headings:

6.4.1 Responsibility to maintain the Highways

Under the Highways Act, the Highways Authority has a duty to maintain the highway. This includes ensuring that highway drainage systems are clear and that blockages on the highway are cleared, where reasonably practicable. As part of this duty, roads are regularly inspected and maintained.

6.4.2 Adoption of SuDS

Highways Authorities currently have the power to adopt SuDS that serve the highway through Section 38 of the Highways Act but are under no obligation to do so. Under the Flood and Water Management Act, Highways Authorities will be required to adopt any SuDS approved by the SuDS Approval Body which exist within the highways boundary.

6.4.3 Powers to deliver works

The Highway Authority can deliver works that they consider necessary to protect the highway from flooding. These can be on the highway or on land which has been acquired by the highway authority in the exercise of highway and acquisition powers for that purpose. Highway Authorities may divert parts of a watercourse or carry out any other works on any form of watercourse if it is necessary for the construction, improvement or alteration of the highway or provides a new means of access to any premises from a highway.

6.4.4 Response in an Emergency Flooding Event

In the event of an emergency or major incident Denbighshire's Highways Authority will aim to provide:

- The means to transport people through it's contacts with local bus, coach and taxi operators and the in house fleet to assist with evacuations and helping uninjured survivors at the scene of a major incident to travel home or to a place of safety;

- Assistance in management of the transportation network to restore the flow of traffic in the event of an evacuation or away from the area of an incident. This includes providing equipment such as barriers, cones and signs and setting up and marking route diversions (service provided by Works Contractors in conjunction with the Police) and changing traffic signal controls to improve the flow of traffic; and

- Use of the Denbighshire Traffic Control Centre facilities and established media contacts to keep staff and the public across the County informed on travel related matters plus detection systems to enable management of traffic on the road network. The means to inspect repair or clear the highway network through the provision of staff, materials and equipment sourced through contractors.

6.4.5

North and Mid Wales Trunk Road Agency on behalf of the Welsh Government

Trunk roads in Denbighshire are maintained by the North and Mid Wales Trunk Road Agency (NMWTRA) on behalf of the Welsh Government as a Highway Authority. The Trunk Road network in North and Mid-Wales consists of approximately 1175 km (730 miles) of trunk road covering 8 Welsh Local Authorities – Ceredigion, Conwy, Denbighshire, Flintshire, Gwynedd, Isle of Anglesey, Powys and Wrexham. NMWTRA must ensure that:

- Road projects do not increase flood risk; and
- Road discharges do not pollute receiving water bodies.

Figure 7.9: The map shows the full extent of the NMWTRA

The NMWTRA have responsibility for the highway drainage on the following trunk roads in Denbighshire County:

- A55 from Bodelwyddan to Junction 30
- A5 from Corwen to Cefn Mawr
- A494 from Corwen to Gwernymynydd

6.4.6 Powers and Responsibilities of Denbighshire's Citizens (Businesses, Landowners and Local Households)

Property Owners and Residents

It is the responsibility of householders and businesses to protect their property from flooding.

While in some circumstances 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. There are a number of measures which can be taken to make your property more resistant (stop water entering) and resilient (better prepared to recover) to flooding. These include:

- Check whether your household is at risk from flooding from the river, coast or local flood sources. All households in Flood Zones C1 and C2 (areas at risk from coastal or main river flooding) should have been contacted notifying them of this and, unless they have chosen to opt-out; will receive flood warnings from Natural Resources Wales when the risk of river or coastal flooding is high. Go to Flood Map at www.naturalresourceswales.gov.uk;

- Ensure that preparations have been made for the event of a flood. These include registering for Natural Resources Wales Floodline Warnings Direct service if flooding from rivers may be involved, keeping a 'grab bag' of essential items ready and having a plan to turn off electricity, gas and water supplies;

- Take resistant measures to ensure that your house is protected from flooding, either through permanent measures such as sealants in the wall or temporary measures such as floodsax or flood guards. See the National Flood Forum's independent Blue Pages directory: http://www.bluepages.org.uk/;

- The combined effect of many people paving over their front gardens can increase the amount of surface runoff which adds to the risk of flooding. See the 'Guidance on the permeable surfacing of front gardens' leaflet: http://www.communities.gov.uk/publications/planningandbuilding/pavingfrontgardens;

  Another useful website is also,
  http://www.connectright.org.uk/

- Take measures to make sure the house is resilient to flooding so that if it does occur it does not cause too much damage;

- Where possible, take out flood insurance;

- If your property is served by separate surface water and foul sewers, you have a responsibility to fix any pipes which may be wrongly connected. For example, dirty water from sinks, baths, showers, appliances and the toilet should go to the foul sewer to be treated, otherwise watercourses can be polluted. Gutters and gullies collecting rainwater should connect to the surface water sewer – if these are wrongly connected to the foul sewer then flooding from the foul sewer can result. See the leaflet 'Is your home connected right;

  http://www.environment-agency.gov.uk/homeandleisure/pollution/water/31424.aspx;

- If you own land adjoining a watercourse then you are a riparian owner and you have a responsibility to pass on flow without obstruction or pollution, including maintaining the banks of the channel and any vegetation so they remain clear of debris; and

- Report a flood incident to the Council to help build evidence for action to be taken.

Natural Resources Wales and the Environment Agency provide 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. As detailed in the following link:

https://www.gov.uk/prepare-for-a-flood

The National Flood Forum is a national charity dedicated to supporting and representing communities and individuals at risk of flooding. As detailed in the following link; http://nationalfloodforum.org.uk/

The National Flood Forum has several roles:

- Help people to prepare for flooding in order to prevent it or mitigate its impacts;

- Help people to recover their lives once they have been flooded; and

- Campaign on behalf of flood risk communities and working with government and agencies to ensure that they develop a community perspective.

6.4.7 Riparian Ownership

Landowners, householders and businesses whose property is adjacent to a river or stream or ditch are likely to be riparian owners with responsibilities. The riparian owner is likely to own the land up to the centre of the watercourse which can be confirmed by The Land Registry.

Riparian owners have a right to protect their property from flooding and erosion but in most case will need to discuss the method of doing this with Natural Resources Wales. 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 Environment Agency's document '*Living on the Edge: A guide to your rights and responsibilities of riverside ownership'* found at:

https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities

6.4.8 Utility and Infrastructure Providers

Within Denbighshire most of the defence assets are the responsibility of DCC, Network Rail or private land owners. Utility and infrastructure providers such as Network Rail, energy companies and telecommunication companies have a crucial role to play in flood risk management as their assets can be important consideration in planning for flooding.

Moreover they may have assets such as culverts, information about which needs to be shared with flood risk management authorities. They already maintain plans for the future development and maintenance of the services they provide and it is important that they factor in flood risk management issues into this planning process. This will ensure that their assets and systems are resilient to flood and coastal risks and that the required level of service can be maintained in the event of an incident.

6.4.9 Reservoir Undertaker

Citizens who own or operate a reservoir have ultimate responsibility for the safety and the maintenance as a reservoir undertaker. Under the FWMA; all undertakers with reservoirs over 10,000 m³ must register their reservoirs with the NRW and all undertakers must report any flood incidents. The reservoir owner is responsible for producing on-site emergency plans which detail how reservoir owners will respond to a potential or real reservoir failure. All undertakers must prepare a reservoir flood plan. It is good practice for all reservoirs to have on-site plans and all reservoir owners are recommended to prepare one.

6.5 Other Bodies

There are many other bodies that play an important role in flood risk management. Countryside Council for Wales and the Forestry commission have now joined with the Environment Agency to form Natural Resources Wales and Cadw is the Government's advisor on cultural heritage and the built environment.

The Met Office, the Canal and River Trust (formally British Waterways), transport and utilities providers all have important expertise and/or infrastructure that may impact on flood risk management.

There are also many non-government organisations that contribute to managing flood risks, including:

- Association of British Insurers;
- Royal Society for the Protection of Birds (RSPB);
- Local Wildlife Trust;
- Woodland Trust;
- Association of Drainage Authorities;
- Engineering consultants and contractors;
- National Flood Forum;
- Red Cross;
- Salvation Army;
- Country Land and Business Association;
- National Farmers Union;
- River Restoration Centre; and
- Network Rail.

7 Local Objectives and Measures

The following sets out the primary objectives for Denbighshire County Council for managing flood and coastal erosion risk throughout Denbighshire. Potential measures will be proposed to meet these objectives and research will be done into the possible sources of funding that may be available for the measures to be implemented.

The objectives are designed to be consistent wider government policy and include a realistic timetable for delivery, which could include phasing over multiple flood risk management strategy cycles. It is important that the process, measures and actions to achieve the objectives are pragmatic and supported by all departments and both partners and stakeholders. There should be demonstrable links between objectives and their contribution to tackling local priorities, in areas potentially vulnerable to flooding.

7.1 Denbighshire County Council's Flood Risk Management Objectives

The objectives will set the vision for how the council and its partners intend to manage local flood risk.

The Local Strategy objectives should also take into account Denbighshire's Corporate Plan which sets out the Council's key priorities over the next five years (2012 – 2017). The Corporate Plan has produced objectives and improvement activities, which have been assigned to Highways & Environmental Services to be implemented.

The Welsh Government's guidance on local strategies states that high level strategic objectives should be developed around the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity. By adopting this approach, the objectives will be consistent with those required under the Flood Risk Regulations 2009 and assist in ensuring that this common approach is maintained across Wales.

It also suggests that the more detailed objectives provide opportunities for LLFA to capture and record both long and short term objectives including and therefore not forgetting the work that is already being completed such as routine maintenance.

Natural Resources Wales have suggested that the LLFA should consider objectives under each of the three key headings; social, economic and environmental.

DCC's objectives for managing flood and coastal erosion risk in Denbighshire County are consistent with the national objectives and are listed overleaf:

Denbighshire County Council's Flood Risk Management Objectives:

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

7.2 Outcomes from Denbighshire County Council's Objectives:

1. **To improve the understanding of local flood risk;**
2. **Ensure that local communities understand their responsibilities in relation to local flood risk management;**
3. **Work in partnership with other Risk Management Authorities and stakeholders;**
4. **Actively manage flood risk associated with new development proposals;**
5. **Encourage proactive, responsible maintenance of privately-owned flood defence and drainage assets;**
6. **Investigate opportunities to reduce surface water run-off from the upper catchments and for flood storage in flood plain areas;**
7. **Identify affordable, sustainable flood risk management projects, and**
8. **Ensure local FRM knowledge is aligned with the Councils emergency planning procedures.**

DCC has undertaken an assessment in the form of a compatibility matrix to make certain that these chosen objectives and outcomes fit in line with National Strategy objectives, Local Strategy guidance and NRW key headings. The matrix also states which objectives are long and short term objectives and can be found in Table 8.1 below:

Outcome number	Denbighshire County Council LFRMS Outcome	Four Overarching National Strategy Objectives				NRW Key Headings			Long (L) or Short (S) term
		Reducing consequences	Raising awareness & engaging people	Providing an effective & sustained response	Prioritising investment	Environmental	Social	Economic	
1	Improve understanding	✓	✓			✓	✓	✓	S
2	Ensure local communities understand their responsibilities	✓	✓			✓	✓	✓	S
3	Work in partnership	✓	✓	✓	✓	✓	✓	✓	S
4	Manage flood risk associated with new development proposals	✓	✓	✓	✓	✓	✓	✓	S
5	Encourage maintenance of privately-owned flood defences	✓	✓		✓	✓	✓	✓	S
6	Investigate opportunities to reduce surface water run-off	✓	✓	✓	✓	✓	✓	✓	S
7	Identify affordable, sustainable flood risk management projects	✓			✓	✓	✓	✓	L
8	Ensure local knowledge is aligned with the Councils emergency planning procedures.	✓	✓			✓	✓		S

Table 7.1: Matrix to demonstrate the links between DCC Local Strategy objectives, National Strategy objectives, and NRW Key Headings

Short term outcome – 0 - 20 years
Long term outcome – 20 - 100 years

7.3 Potential Measures

A measure can be defined as an activity, which will be undertaken to manage risk and achieve the agreed objectives. Local Strategy guidance states that a wide range of measures should be considered for the short (0-20 years), medium (20-50 years) and longer term (50-100 years). These should include both structural and non-structural activities; examples of these are included in Table 8.2 below:

Non-structural Measures	Structural Measures
Flood Warnings Systems; Public awareness and preparedness workshops; Community engagement; and Surface Water Management Plans.	Flood walls; Flood embankments; Trash screens; Demountable flood barriers; and Flood storage features.

Table 8.2: Examples of structural and non-structural activities

Measures which will achieve multiple benefits, such as water quality, biodiversity and amenity benefits are encouraged and should be promoted wherever possible.

The Local Strategy guidance also specifies that all LLFA's should consider measures under the following high level themes:

- Development planning and adaptation (encompassing both new and adaptations to existing developments / landscapes);
- Flood forecasting, warning and response;
- Land, cultural and environmental management;
- Asset management and maintenance;
- Studies assessments and plans;
- High level awareness and engagement (to increase individual and community resilience); and
- Monitoring (of the local flood risk issues).

Where practical and when resources are available, DCC would like to deliver the following measures for managing flood and coastal erosion risk in Denbighshire County subject to funding from Welsh Government.

To improve the understanding of local flood risk;

Measure 1.1 Identify drainage and flood assets and develop asset management system	
Denbighshire County Council is required to keep both asset registers (for public use) and asset records (for use by risk management authorities) for structures and features which are considered to have a significant effect on flood risk. DCC will aim to create its own asset database of structures considered important to flood risk. Where these assets are DCC's, asset management plans for inspection and maintenance will be developed (if not already existent). DCC plans to be dedicated in the recording of flood risk assets, using the mechanisms of Ordinary Watercourse Consenting, investigation of flooding incidents, the Planning Application Process, and in the future, its position as SuDs Approval Body to expand its asset record management using a GIS based system.	
Status	Statutory requirement
Finance	Investment required for additional software
Benefits	Improved understanding of surface water flows within own and third party drainage systems resulting from less confusion over ownership of assets. Through this improvement, the Council will be able to make more informed local flood risk plans.
Timescales	Deliverables should be complete by 2015 with proportionate implementation by 2017 (set by Welsh Government National Flood Risk Management Strategy)

Measure 1.2 Designate flood risk management features	
The Flood and Water Management Act made DCC the 'Designating Authority' with the power to designate a structure (artificial or natural feature of the environment in private ownership). If DCC identifies that a structure or feature potentially affects local flood risk. A person may then not carry out any works on the designated structure or feature without firstly gaining permission of DCC.	
Status	Permissive power
Finance	New function – Revenue Implication
Benefits	Overcomes the risk of a person damaging or removing a structure or feature on private land which is relied upon for flood risk management. Ensures that records of significant flood risk structures/features are formally recorded and monitored. Designated structures or features will be registered in the Local Land Charges Register.
Timescales	Short Term 0 -20 years

Measure 1.3 Record and map flooding incidents	
The introduction of the Flood and Water Management Act 2010 designates Denbighshire County Council as a Lead Local Flood Authority (LLFA), with a duty to assess the flood risk within the County. To assemble an accurate picture of flood risk across Denbighshire requires the collection of precise and useful records from flood incidents occurring across the County.	
Status	FWMA Duty
Finance	Possible investment required for mapping software
Benefits	Measure will enable a greater understanding of flood risk within Denbighshire A higher standard of flood event data will be available which can be utilised in subsequent studies and assessments.
Timescales	Short Term 0 -20 years

Measure 1.4 Carry out flood investigations	
DCC will record and investigate significant flooding incidents and subsequently publish the details in accordance with Section 19 of the FWMA. The investigation must identify which risk management authorities have relevant flood risk management functions and whether they have exercised those functions appropriately in response to the incident.	
Status	Statutory requirement
Costs	New function – Revenue Implication
Benefits	Measure will enable a greater understanding of flood risk within Denbighshire A higher standard of flood event data will be available which can be utilised in subsequent studies and assessments.
Timescales	Short Term 0 -20 years

Measure 1.5 Develop Flood Risk Management Plans for areas of high flood risk	
The Flood Risk Regulations (2009) require Lead Local Flood Authorities to prepare and publish Flood Risk Management Plans by December 2015 where the risk of flooding from local flood risk is significant as identified in the Preliminary Flood Risk Assessment (PFRA). Flood Risk Management Plans attempt to assess, map and develop action plans to manage flood risk. The statutory requirement is only to produce a Flood Risk Management Plan for the flood risk area identified as part of the PFRA. However, the PFRA assessment excluded some areas of high risk due to the national constraints. DCC feel that all areas of high flood risk should be included in the Flood Risk Management Plan and therefore propose to carry out the plan for its administrative boundary.	
Status	Best practice (It is a statutory requirement for the LLFA where there are 'Flood Risk Areas' within their County boundary identified under the FRR 2009)
Finance	New function – Revenue Implication
Benefits	Measure will enable a greater understanding of flood risk within Denbighshire. A higher standard of flood event data will be available which can be utilised in subsequent studies and assessments.
Timescales	Short Term 0 -20 years

Measure 1.6 Develop a regional Learning Action Alliance in partnership with neighbouring LLFA's, flood risk management authorities and other private and public sector specialists to share knowledge of flood risk management approaches	
DCC will endeavour to co-operate with other risk management authorities and stakeholders on new functions and potential future projects that are products of the LFRMS to establish and facilitate best practice, consistency in interpretation and collaborative working.	
Status	Best practice
Finance	No implication
Benefits	Measure will enable a greater understanding of flood risk within Denbighshire. Partnership working avoids duplication of effort and investment amongst RMAs. Enables a better understanding of regional risks and the actions required to manage them.
Timescales	Ongoing

Ensure that local communities understand their responsibilities in relation to local flood risk management

Measure 2.1 Publish a clear strategy and communicate it	
Denbighshire County Council (DCC), as a Lead Local Flood Authority (LLFA) is required to prepare a Local Flood Risk Management Strategy. The purpose of the Local Strategy is to address potential flood risk arising from local sources within the boundaries of the Authority area. An important part of the Local Strategy will be to ensure that our communities are aware of what risks exist, aware of what the Council and other Risk Management Authorities' responsibilities are in terms of flood risk and what communities can do to involve themselves.	
Status	Statutory requirement
Finance	New function – Revenue Implication
Benefits	Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. The strategy will enable a greater understanding of flood risk within Denbighshire by implementing the objectives and measures. Greater understanding of Risk Management Authorities' roles and responsibilities.
Timescales	First draft 2013, thereafter ongoing with regular reviews

Measure 2.2 Develop a communication strategy to improve stakeholder knowledge	
Communicating the risk of flooding and raising awareness can be implemented in the short-term. This will mean stakeholders are more aware of the flood risk across Denbighshire, what the council does to reduce this risk and encourage a more proactive and partnership approach with flood risk management.	
Status	Best practice
Finance	New function – Revenue Implication
Benefits	Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years

Measure 2.3 Develop a dedicated flood risk management page on the Council's website	
The Council has a duty under the Civil Contingencies Act (2004) to warn and inform its residents of the risks and implications of those risks before, during and after any incidents. The Councils web site holds this information and links to further sources of information in relation to flooding incidents.	
Status	Duty under Civil Contingencies Act (2004) extended with best practice
Finance	Existing Function – No implication New Function – Revenue Implication
Benefits	Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.4 Publish and distribute information explaining responsibilities, local flood risk, property protection and resilience	
The Council has a duty under the Civil Contingencies Act (2004) to warn and inform its residents of the risks and implications of those risks before, during and after any incidents. This measure will attempt to encourage property owners to install individual property measures to protect their homes from flooding. The measure will also attempt to raise awareness of the techniques that could be utilised when repairing properties subject to repeated flooding in order to reduce future damages. Increasing flood resilience will reduce damages caused by any water that gets into a property.	
Status	Duty under Civil Contingencies Act (2004) extended with best practice
Finance	Existing Function – No implication New Function – Revenue Implication
Benefits	Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood; Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.5 Involve local communities in local initiatives and schemes	
Involving communities is fundamental to shaping effective services and supporting positive outcomes for Denbighshire. It is important not just socially, but economically: through involving communities residents will become active participants by offering input in the decision making process, we can foster a sense of shared responsibility, work together to provide more efficient and cost effective services and achieve greater impact through better use of resources.	
Status	Best practice
Finance	Project Revenue – potential external funding
Benefits	DCC will be benefiting from the skills, capabilities, expertise and resources of individuals and groups within a community. This includes physical resources but particularly people resources. It is important to support and develop communities' understanding, confidence and skills. It will build new and better relationships with communities, encourage communities to make informed decisions, reduced dependency, will enable communities to make decisions themselves where appropriate and otherwise use their involvement to inform planning and ensure that better decisions are made on behalf of communities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.6 Promote and support Community Flood Plans	
Completing a community flood plan will help community members and groups plan how they can work together to respond quickly when flooding happens. The flood plan should contain all of the information that you will need before, during and after a flooding event. Detailed information on how to develop a community flood plan is available from Natural Resources Wales. Natural Resources Wales are the lead agency on the development of community flood planning in Wales, Denbighshire have worked closely with them in the development of plans for designated communities within the County. The communities chosen are based on an assessment of risk from main river flooding, however when planning begins it takes into account all forms of flooding. The aim of the community flood plans is to develop resilient, aware and organised communities, when faced with flooding in their areas.	
Status	Best Practice
Finance	Existing Function – No implication
Benefits	The first people to respond to any flooding incidents are the communities themselves. A prepared structured response will improve the speed and quality and hopefully reduce the risk and impact. Working together as a community or group has multiple benefits on the ground. It can improve communication before, during and after a flood incident, making sure the right people are involved at the right time. Local people know their risks and the vulnerable in their communities better than any responder agency and will be best placed to react and support. They will also be able to provide information to agencies if they attend the incident.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.7 Promote and support property based resilience	
This measure will attempt to encourage and raise awareness of the techniques that could be utilised when repairing properties subject to repeated flooding in order to reduce future damages. Increasing flood resilience will reduce damages caused by any water that gets into a property.	
Status	Best practice
Finance	Existing Function – No implication Project Revenue – potential external funding
Benefits	Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.8 Visit schools in flood risk areas	
The Council has a duty inform its residents of the risks and implications of the risks of flooding. An important part of the Local Strategy will be to ensure that our communities are aware of what the Council and other Risk Management Authorities' responsibilities are in terms of flood risk and what communities can do to involve themselves. Visiting schools will help raise awareness of flood risk in the classroom. Holding workshops where children could learn about the dangers of flooding, and learn practical information about how to prepare a flood kit. Children can also then pass on information to their parents. DCC can also work with the head teacher of the schools to ensure that all staff and pupils are protected by a school flood plan.	
Status	Best practice
Finance	New function – Revenue Implication
Benefits	Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Greater understanding of Risk Management Authorities' roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.9 Annual flood awareness event and/or flood awareness roadshow	
Raising community awareness and communicating effectively with local communities will enable DCC to set realistic expectations and achievable outcomes for local flood risk management. DCC proposes to proactively inform those that are at risk of local flooding and advise them on what steps to take.	
Status	Best practice
Finance	Existing Function/New Function – Potential revenue implication
Benefits	The Government believes a well-informed public is better able to respond to an emergency and to minimise the impact of the emergency on the community. Informing the public as best we can will build their trust. It will also help minimise disruption and improve / ease the response to any flooding incidents. An aware population has the ability to understand and prepare for the impact of a flooding situation and to make remedial measures prior to a situation for example purchasing flood gates. Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.10 Promote and support Dangerpoint	
DangerPoint is a unique indoor education activity centre based in Talacre, North Wales. DangerPoint has been designed to inspire, inform and engage with groups. It is an excellent way to educate children and the community in essential life skills including preparing and dealing with flooding.	
Status	Best practice
Finance	New Function – Revenue Implication
Benefits	An aware population has the ability to understand and prepare for the impact of a flooding situation and to make remedial measures prior to a situation. Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 2.11 Actively engage with the private flood sector to develop innovative techniques to raise awareness	
Raising community awareness and communicating effectively with local communities will enable DCC to set realistic expectations and achievable outcomes for local flood risk management. By working collaboratively with the private sector, DCC can offer new and improved techniques to raise flood risk awareness. The private sector is renowned for their innovation, efficiency and capability and DCC would like to work with them to create innovative ideas for the council and its residents.	
Status	Best practice
Finance	New Function – Revenue Implication
Benefits	DCC will be benefiting from the skills, capabilities, expertise and resources of the private flood sector. Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Work in partnership with other Risk Management Authorities and stakeholders

Measure 3.1 Work closely with the Natural Resources Wales and Dŵr Cymru Welsh Water to develop cost effective solutions to flooding issues	
DCC will endeavour to co-operate with other risk management authorities on new functions and potential future projects that are products of the LFRMS. The North Wales Flood Risk Management Group has been established to facilitate best practice, consistency in interpretation and collaborative working.	
Status	Best practice under FWMA
Finance	Existing Function – No implication
Benefits	DCC will be benefiting from the skills, capabilities, expertise and resources of the other RMA's. Partnership working avoids duplication of effort and investment amongst RMAs. Enables a better understanding of regional risks and the actions required to manage them. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Actively manage flood risk associated with new development proposals

Measure 4.1 Develop and apply a robust local policy for the drainage of new development sites	
The Flood and Water Management Act 2010 requires new developments and redevelopments in England and Wales to have drainage plans for surface runoff approved by the SAB where the construction work would have drainage implications. This measure is to control drainage on new development, to ensure the avoidance of, or minimising, the adverse effects of any environmental risks associated with flooding on future land use.	
Status	Statutory Requirement and a duty to promote and manage Sustainable Drainage
Finance	Existing Function/New Function – Potential revenue implication
Benefits	Developers benefit from clear guidance. Reduction of runoff rates which will reduce downstream flooding. Enhancement of amenity, environmental and aesthetic value of sites.
Timescales	Short Term 0 – 20 years and ongoing

Measure 4.2 Develop a process with the Planning Department to create clear advice and direction to developers on FRM and Drainage. Encourage developers to adopt a 'best practice' approach to site drainage	
The Flood and Water Management Act 2010 requires new developments and redevelopments in England and Wales to have drainage plans for surface runoff approved by the SAB where the construction work would have drainage implications. This measure is to control drainage on new development, to ensure the avoidance of, or minimising, the adverse effects of any environmental risks associated with flooding on future land use.	
Status	Statutory Requirement and a duty to promote and manage Sustainable Drainage
Finance	Existing Function/New Function – Potential revenue implication
Benefits	Developers benefit from clear guidance. Reduction of runoff rates which will reduce downstream flooding. Enhancement of amenity, environmental and aesthetic value of sites.
Timescales	Short Term 0 – 20 years and ongoing

Encourage proactive, responsible maintenance of privately-owned flood defence and drainage assets

Measure 5.1 Identify highest risk private flood defence and drainage assets	
DCC is required to keep both asset registers (for public use) and asset records (for use by risk management authorities) for structures and features which are considered to have a significant effect on flood risk. There is no formal definition of when an asset has a 'significant effect' but will largely be determined on the flood history of the site and the vulnerability of any infrastructure likely to be affected by a failure of the asset. DCC proposes to be pro-active in the recording of flood risk assets, using the mechanisms of Ordinary Watercourse Consenting, investigation of flooding incidents, the Planning Application Process, and in future, its role as SAB to expand its asset record.	
Status	Statutory Requirement
Finance	New Function – Revenue Implication
Benefits	Confusion over ownership of flood risk assets will be lessened. Maintenance regimes will be able to take into account assets important for managing flood risk, particularly in high risk areas; Denbighshire will be able to establish where all assets are, allowing for quicker identification of the responsible authority in flooding incidences. Denbighshire would be able to produce/refine their own asset maintenance schedule in addition to potentially providing guidance to riparian owners as to how they should maintain their assets.
Timescales	Short Term 0 – 20 years and ongoing

Measure 5.2 Develop technical advice for owners to guide them in preparing local maintenance plans	
This measure is to ensure the avoidance of, or minimising, the adverse effects of any environmental risks associated with flooding from private watercourses.	
Status	Best practice
Finance	Existing Function – No implication
Benefits	Landowners benefit from clear guidance and advice. Confusion over ownership of flood risk assets will be lessened. Maintenance plans will be able to take into account assets important for managing flood risk, particularly in high risk areas. Ensure that the appropriate level of inspections and maintenance takes place across the county.
Timescales	Short Term 0 – 20 years and ongoing

Investigate opportunities to reduce surface water run-off from the upper catchments and for flood storage in flood plain areas

Measure 6.1 Develop a register of land ownership for Denbighshire and neighbouring authority areas with shared catchments	
This measure will reduce confusion over ownership of land and flood risk assets; highlight riparian owners and Risk Management Authorities with responsibilities under the Land drainage Act 1991 and Flood and Water Management Act 2010, which in turn will increase maintenance and reduce flood risk.	
Status	Best practice
Finance	Existing Function/New Function – Potential revenue implication
Benefits	Confusion over ownership of flood risk assets will be lessened. Maintenance regimes will be able to take into account assets important for managing flood risk, particularly in high risk areas. Denbighshire will be able to establish where all assets are, allowing for quicker identification of the responsible riparian owner / authority in flooding incidences. Increased awareness of local flood risk. Greater understanding of stakeholder roles and responsibilities.
Timescales	Short Term 0 – 20 years and ongoing

Measure 6.2 Develop proposals to engage with significant landowners to employ land management techniques and initiatives which help to reduce the rate of surface water run-off	
There is the potential for surface water runoff to be reduced via the implementation of certain land management techniques, whether solely for the purpose of flood risk management or as by-products of other land management schemes. DCC propose to undertake further assessment of the viability of implementing such measures as a means of reducing flood risk in Denbighshire and work with landowners to implement them.	
Status	Best Practice
Finance	Project Revenue – Potential External Funding
Benefits	Greater understanding of where land management techniques can be used within Denbighshire. Implementation of land management techniques would offer a ‘sustainable’ flood risk management solution, particularly when compared to structural measures. Potential wider environmental/amenity benefits of using land management techniques. Potential for greater engagement of land use owners and other stakeholders in local flood risk management and the ability to work collaboratively with neighbouring Local Authorities.
Timescales	Short Term 0 – 20 years and ongoing

Identify affordable, sustainable flood risk management projects

Measure 7.1 Review the Council's programme of flood risk management schemes	
This measure is to prioritise schemes based on flood risk to maximise funding and resources. The technical and economic feasibility of such projects will subsequently be assessed via the Project Appraisal process and current Welsh Government Guidance.	
Status	Best practice
Finance	Existing Function – No implication
Benefits	Gain capital funding to implement flood risk schemes
Timescales	Short Term 0 – 20 years and ongoing

Measure 7.2 Use Flood Risk Management Plans to identify further measures to manage and reduce flood risk	
The Flood Risk Regulations (2009) require Lead Local Flood Authorities to prepare and publish Flood Risk Management Plans by December 2015 where the risk of flooding from local flood risk is significant as identified in the Preliminary Flood Risk Assessment (PFRA). Flood Risk Management Plans attempt to assess, map and develop action plans to manage flood risk. In essence the flood risk management plan will set out DCC recommendations for managing flood risk within its administrative area. It should be stressed that the plan will consider a holistic approach to flood risk management and will not be solely reliant on traditional structural flood risk solutions. Indeed, in line with the objectives of this LFRMS, DCC propose to seek out opportunities to use innovative land management techniques, in addition to identifying synergies with plans and strategies that aim to incorporate natural flood risk management processes that promote nature conservation or landscape enhancements.	
Status	Statutory Requirement
Finance	Project Revenue – Potential External Funding
Benefits	The production of a Flood Risk Management Plan will focus and direct the future work on flood risk management within DCC.
Timescales	Short Term 0 – 20 years and ongoing

Measure 7.3 Encourage and promote community and private contribution towards the costs of flood schemes	
Considering the current pressures on public funding, the money available for flood risk management is unlikely ever to be adequate to deal with all existing flood risks and the increasing future risk brought about by further development and a changing climate. As such, flood risk management will need to be supplemented by everyone working together and by those at risk from flooding taking responsibility to protect and help themselves. This measure will increase the amount of schemes DCC can prioritise and implement within the County.	
Status	Duty under Civil Contingencies Act (2004) extended with best practice
Finance	Project Revenue – Potential External Funding
Benefits	It will build new and better relationships with communities, encourage communities to make informed decisions, reduced dependency, will enable communities to make decisions themselves where appropriate. DCC will be benefiting from the resources of community and increase the amount of flood management schemes that can be implemented.
Timescales	Short Term 0 – 20 years and ongoing

Measure 7.4 Continue to promote flood risk management schemes that might be eligible for Welsh Government grant aid	
Considering the current pressures on public funding, the money available for flood risk management is unlikely ever to be adequate to deal with all existing flood risks and the increasing future risk brought about by further development and a changing climate. As such, flood risk management will need to be supplemented by more external funding.	
Status	Best practice
Finance	Project Revenue – Potential External Funding
Benefits	Increased funding for flood risk management schemes.
Timescales	Short Term 0 – 20 years and ongoing

Ensure local FRM knowledge is aligned with the Councils emergency planning procedures

Measure 8.1 Embed the LFRMS into flood response and recovery plans and use developing knowledge on flood risk to "tune" emergency procedures	
Emergency planning should aim where possible to prevent emergencies occurring and when they do occur, good planning should reduce, control or mitigate the effects of the emergency. It is a systematic and ongoing process which should evolve as lessons are learnt and circumstances change.	
Status	Duty under Civil Contingencies Act (2004) extended with best practice
Finance	Existing Function – No implication
Benefits	A well prepared structured response will improve the speed and quality and hopefully reduce the risk and impact of a flood. Knowing what to do and who is to do it advance improves the response.
Timescales	Short Term 0 – 20 years and ongoing

Measure 8.2 Continue to develop Denbighshire County Council's Multi Agency Flood Plan	
Local Authorities and other organisations are responsible under the Civil Contingencies Act (2004) for developing emergency plans to help reduce, control or ease the effects of an emergency. In doing so, DCC will: • Examine the Risk Assessments provided under the Flood Risk Regulations to assess the flood risks to the County from all sources; • Consider flood prevention schemes; • Arrange joint training and exercising as necessary; • Consider the roles and responsibilities of all bodies who have a role in flood management and response; • Review flood incidents, identify lessons and share information; • Review flood response plans; • Promote flood awareness to the public.	
Status	Statutory Requirement
Finance	Existing Function – No implication
Benefits	Measure will enable a greater understanding of flood risk within Denbighshire. Increased awareness of local flood risk means the residents have the ability to understand and prepare for the impact of flooding and to make resilience and resistance measures prior to a flood. Improved response during flood events.
Timescales	Short Term 0 – 20 years and ongoing

7.4 Compatibility Matrix

DCC has undertaken an assessment in the form of a compatibility matrix to make certain that these potential measures fit in line with Local Strategy guidance and high level themes. The matrix also states which measures are structural and non-structural and whether they are long, medium and short term and can be found in Table 8.3 on the following page.

Key

✓ **=** Measure supports the theme
- **=** Measure is not applicable to the theme

Short Term measure – 0 - 20 years
Medium Term measure – 20 - 50 years
Long Term measure – 50 - 100 years

Ongoing – Measures that are already currently carried out by DCC and will continue
Pending – Measures that DCC are required to do under the FWMA
Aspirational – Measures that are not required but are considered to be beneficial to implement

Measure Reference Number	LFRMS Measures	High Level Themes							Long (L), Medium (M),Short (S) term	Structural (S), Non-structural (NS)	Status - Ongoing (O), Pending (P), Aspirational (A)
		Development planning & adaptation	Flood forecasting, warning & response	Land, cultural & environmental management	Asset management & maintenance	Studies, assessment & plans	High level awareness & engagement	Monitoring			
1.1	Identify drainage and flood assets and develop asset management system	-	-	-	✓	✓	-	✓	S	NS	O
1.2	Designate flood risk management features	-	-	-	✓	-	✓	✓	S	NS	P
1.3	Record and map flooding incidents	-	-	-	✓	-	✓	✓	S	NS	O
1.4	Carry out flood investigations	-	✓	✓	✓	✓	✓	-	S	NS / S	O
1.5	Develop Flood Risk Management Plans for areas of high flood risk	✓	-	✓	-	✓	✓	-	S	NS	A
1.6	Develop a regional Learning Action Alliance	-	-	-	-	-	✓	-	L	NS	A
2.1	Publish a clear Strategy and communicate it	-	-	-	-	✓	✓	-	S	NS	O
2.2	Develop a communication strategy to improve stakeholder knowledge	-	-	-	-	✓	✓	-	S	NS	P
2.3	Develop a dedicated flood risk management page on the Council's website	-	-	-	-	-	✓	-	S	NS	O
2.4	Publish and distribute information explaining responsibilities, local flood risk, property protection/resilience etc	-	-	-	-	-	✓	-	S	NS	P
2.5	Involve local communities in local initiatives and schemes	✓	✓	✓	✓	✓	✓	-	S	NS / S	P / O
2.6	Promote and support Community Flood Plans	-	✓	-	-	✓	✓	✓	S	NS / S	O
2.7	Promote and support property based resilience	✓	✓	-	-	-	✓	-	S	NS	P
2.8	Visit schools in flood risk areas	-	-	-	-	-	✓	-	S	NS	P

Measure Reference Number	LFRMS Measures	High Level Themes							Long (L), Medium (M),Short (S) term	Structural (S), Non-structural (NS)	Status - Ongoing (O), Pending (P), Aspirational (A)
		Development planning & adaptation	Flood forecasting, warning & response	Land, cultural & environmental management	Asset management & maintenance	Studies, assessment & plans	High level awareness & engagement	Monitoring			
2.9	Annual flood awareness event and/or flood awareness roadshow	-	-	-	-	-	✓	-	S	NS	P
2.10	Promote and support Dangerpoint	-	-	-	-	-	✓	-	S	NS	A
2.11	Actively engage with the private flood sector	-	-	-	-	-	✓	-	S	NS	O
3.1	Work closely with the Environment Agency Wales and Dŵr Cymru	✓	✓	✓	✓	✓	✓	✓	S	NS	O
4.1	Develop a t local policy for the drainage of new development sites	✓	-	✓	-	✓	-	-	S	NS / S	A
4.2	With the Planning Department; create clear advice and direction to developers on FRM and Drainage	✓	-	✓	✓	✓	✓	-	S	NS / S	A
5.1	Identify highest risk private flood defence and drainage assets	-	-	-	✓	✓	✓	-	S	NS / S	O
5.2	Develop technical advice for owners for local maintenance plans	-	-	-	✓	✓	✓	-	S	NS	A
6.1	Develop a register of land ownership for Denbighshire	✓	-	✓	✓	✓	✓	-	S	NS	O
6.2	Employ land management techniques and initiatives	✓	-	✓	✓	✓	-	-	S	NS	A
7.1	Review the Council's flood risk management schemes programme	-	-	-	-	✓	-	-	S	NS	P
7.2	Identify further measures to manage and reduce flood risk	-	-	-	-	✓	-	-	S	NS	A
7.3	Encourage community contribution towards flood schemes	✓	-	-	-	-	✓	-	S	NS	A
7.4	Promote flood risk management schemes for WG grant aid	-	-	-	-	-	✓	-	S	NS	O
8.1	Embed the LFRMS into flood response and recovery plans	-	✓	-	-	✓	✓	-	S	NS	A

Measure Reference Number	LFRMS Measures	High Level Themes							Long (L), Medium (M),Short (S) term	Structural (S), Non-structural (NS)	Status - Ongoing (O), Pending (P), Aspirational (A)
		Development planning & adaptation	Flood forecasting, warning & response	Land, cultural & environmental management	Asset management & maintenance	Studies, assessment & plans	High level awareness & engagement	Monitoring			
8.2	Continue to develop the Council's Multi Agency Flood Plan	-	✓	-	-	✓	✓	-	S	NS / S	O

Table 7.3: Matrix to demonstrate the links between DCC Local Strategy measures and Local Strategy Guidance, and high level themes

✓ = Measure supports the theme
- = Measure is not applicable to the theme

Short Term measure – 0 - 20 years
Medium Term measure – 20 - 50 years
Long Term measure – 50 - 100 years

Ongoing – Measures that are already currently carried out by DCC and will continue
Pending – Measures that DCC are required to do under the FWMA
Aspirational – Measures that are not required but would be beneficial to implement

7.5 Adopt Natural Flood Risk Management Techniques

The EA has produced the first national report of how natural processes can help manage flood risk in England and Wales; '*Greater working with natural processes in flood and coastal erosion risk management, January 2012*' which is in response to the Pitt Review recommendation 27[24]. The definition of 'working with natural processes' taken from this report is shown below:

'Working with natural processes means taking action to manage flood and coastal erosion risk by protecting, restoring and emulating the natural regulating function of catchments, rivers, floodplains and coasts. This could, for example, involve using farmland to temporarily store flood water, re-instating washlands and wetlands to store flood water away from high risk areas or allowing cliffs to erode to provide sediment down drift.'

In the context of FCERM, working with natural processes often means slowing down the flow of water (e.g. by re-establishing flood plains that hold flood waters) or speeding up the flow of water (e.g. by removing unnatural obstructions), to prevent flood waters from causing harm. Such techniques protect, restore or emulate natural processes which regulate flooding and erosion and, in doing so, may provide other ecosystem benefits such as biodiversity, carbon storage, and improved water quality. Natural processes operate across a continuum from mitigated engineering to full naturalisation (see Figure 8.1 below).

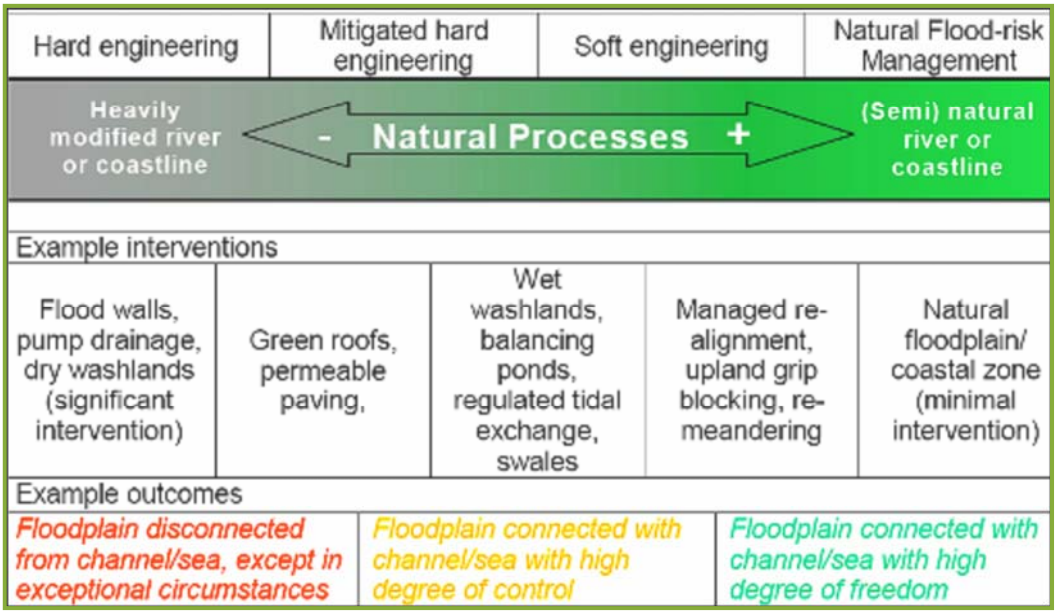


Figure 8.1: Natural Resources Wales' conceptual model of working with natural processes.

Sustainable Drainage Systems (SuDS) reduce flood risk both at a development site and elsewhere in the catchment by replicating natural drainage processes. There are numerous varieties including detention basins (dry), retention ponds (wet), grassed swales, porous pavements, soakaways and 'green' roofs that store water within a building's own footprint. These interventions slow down and absorb surface water runoff and can create valuable habitats for wildlife while reducing flood risk to developments.

[24] "Defra, the Environment Agency and Natural England should work with partners to establish a programme through Catchment Flood Management Plans and Shoreline Management Plans to achieve greater working with natural processes"

Pontbren - a more sustainable system of farming

The Pontbren project was conceived in 1997 by a group of neighbouring families who farmed 1000 hectares in the uplands of mid-Wales, within the catchment of the Pontbren Stream. The group identified a number of changes they could make individually and collectively to improve the viability of their farms by reducing costs, adding value to produce and enhanced marketing. By working with Partners including Coed Cymru, the Forestry Commission and the Welsh Assembly Government they have developed a more sustainable system of farming.

Increasing the proportion of native breeds of hardy sheep enabled the farms to reduce winter housing costs and the amount of bought-in feed. However to lamb successfully on these exposed hills there needed to be good shelter. An important part of the project therefore involved protecting existing native woodlands, planting new woodland as shelterbelts and restoring hedgerows. It soon became apparent that the new plantings also offered a significant reduction in flood run-off. Wildlife too has benefited, from the habitat management and network of habitat corridors, with species such as the green woodpecker and barn owl returning to the area.

Such multi-beneficial projects are hoped to be further developed and encouraged with catchment land owners in Denbighshire and Conwy, in order to help reduce surface run-off levels in the upper catchments of the River Clwyd and Elwy.

Riparian planting alongside small watercourses and across slopes significantly improves surface water drainage in the upper catchment

8 Funding and Delivery

8.5 Funding Requirements

Some of the measures outlined in the previous section have been core activities for the council for a number of years and processes are in place to deliver those measures. Other measures, however, relate to the new responsibilities which have recently been assigned, most of which requiring a new set of skills, experience, processes and software that may take some time to develop or acquire.

It is important that the Local Strategy sets out where the funding will come from to acquire these resources in order to implement the measures within the strategy. Some measures will be delivered with existing council resources but others will require external funding support. Denbighshire County Council must identify what funding sources are currently available to them and what actions will need to be taken to ensure that alternative funding is achievable.

Currently most funding for flooding and coastal erosion comes from Welsh Government in the form of the Revenue Support Grant (RSG). It is essential for the implementation of this Strategy and for all statutory duties mentioned that the funding settlement from Welsh Government to DCC identifies an allocation to Flood Risk Management. The statutory duties outlined previously, will require ongoing funding from the Denbighshire County Council's RSG from 2013 onwards to ensure that there are sufficient resources to implement the strategy and;

- The proposed measures of the Strategy;
- Collect data for the revision of the PFRA in 2016 and every 6 years;
- Maintain and update the asset register;
- Designation of structures and features that affect flood or coastal erosion risk;
- Continue and improve the investigation of floods;
- Continue consenting works in ordinary watercourses;
- When the FWMA is fully implemented; checking, inspecting, approving, adopting and maintaining SuDS schemes as part of the SAB role;
- Implementation, monitoring, reviewing and updating the Local Strategy every 6 years; and
- Community awareness activities associated with duties of the Local Strategy.

8.6 Current Funding Sources

At present Denbighshire County Council receives funding from Welsh Government in two ways:

- A non-hypothecated grant (which can be used by the authorities for any purpose they choose in delivering the services for which they are responsible); An annual and unpredictable amount is provided through the Revenue Support Grant (RSG); and

- A hypothecated grant (which can only be used for the specific purposes for which they are provided); Flood Defence Grant-in-Aid (FDGiA) provided by bidding for Flood Alleviation Grants (FAG), on a scheme by scheme basis, under the Land Drainage Act 1991. Currently the FAG rate (money contributed from WG) for fluvial schemes is 85% and for coastal schemes its 65%. Denbighshire County Council contributes the remainder to the scheme.

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
FCERM Revenue Support Grant (RSG)	For the 2013 / 2014 financial year onwards funding to support each LLFA will be provided through the Revenue Support Grant (RSG) system.	£90+ Thousand	Denbighshire County Council	LLFA duties under the FWMA. Maintenance of ordinary watercourses and related assets. Maintenance of coastal erosion mitigation measures.
Flood Defence Grant-in-Aid (FDGiA)	Welsh government funding for Flood alleviation grants (FAG) on a scheme by scheme basis – recently revised to encourage a partnership approach to maximise match-funding, work towards achieving specified objectives with a requirement to evidence a reduction in flood risk to properties	Unknown	Welsh Government	Medium to large capital FRM projects. FRM and coastal erosion management studies, strategies and projects.
Private Contributions	Voluntary from the private sector and local communities. Funding from beneficiaries of projects could make contributions from national funding viable. Contributions could be financial or “in kind” e.g. land, volunteer labour	Unknown	Denbighshire County Council	All projects
Water Company Investment	Investment heavily regulated by Ofwat but opportunities for contributions to area-wide projects which help to address sewer under-capacity problems	Unknown	DCWW	Projects which help to remove surface water from combined sewers
SAB Income	It is anticipated that Denbighshire will receive application and inspection fees funded by developers in support of the approval and inspection of new development related SuDS. Funding of long-term maintenance of SuDS is currently unclear; although a range of solutions is available including payment of commuted sums by Developers. The long-term funding of maintenance is to form part of the	Unknown	Denbighshire County Council	Development drainage approval and FRM issues

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
	Consultation with Welsh Government.			
Flood and Coastal Resilience Partnership Funding	Some funding allocated for major capital projects require contributions into resilience measures.	Unknown	Denbighshire County Council	Measures which address flood risk to communities and businesses
European Convergence Funding 2007 - 2013	The Convergence programme for West Wales and the Valleys comprise funding from two separate European Structural Funds: the European Regional Development Fund (ERDF) and the European Social Fund (ESF).	£2 million	Denbighshire County Council	Medium to large capital FRM projects
Local Fundraising	An important funding mechanism will come from local fundraising from the local communities and businesses that benefit from the proposed flood defence schemes.	Unknown	Denbighshire County Council	Measures which address flood risk to communities and businesses
Riparian owners	Maintenance and repair of assets is normally the responsibility of riparian owners, awareness raising will assist in ensuring that assets are maintained; however, historic assets with uncertain ownership may require assistance in funding repairs or end of life replacement.	Unknown	Denbighshire County Council	Measures which address flood risk to riparian owners

Table 9.1: DCC's current funding sources for FCERM

8.7 Other Possible Funding Sources for the Future

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
Coastal Communities Fund (delivered on behalf of the	The fund is available to Local Authorities in managing and adapting to flood and coastal erosion risk, and managing pollution risks associated with the coast, where this supports	£1.45 million available for Wales	Big Fund	Projects that help coastal communities to better enable them to use their assets (physical, natural, social, economic and cultural)

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
government by the Big Lottery Fund)	local economic development. The Fund opened for bids in March 2012 but is intended to be a rolling fund with annual bidding rounds. It is expected that there will be at least two future years of funding commencing in 2013 and 2014. The Coastal Communities Fund will open again for applications in early 2013.			to promote sustainable economic growth and jobs
Section 106 contributions (Town & Country Planning Act)	It is anticipated that Denbighshire will receive contributions from developers linked to specific development sites where off-site improvements to drainage infrastructure are required to make the developers proposals acceptable e.g. Green infrastructure with multiple benefits where there will be opportunities for Community groups to manage certain areas.	Unknown	Denbighshire County Council	Larger development sites
Community Infrastructure Levy (CIL)	A local levy applied by the Planning Authority on developers. It allows local authorities to raise funds from new development in the area in order to pay for the impact that the development has on local infrastructure. The levy is based on the concept that almost all development has some impact on infrastructure and services, so it is fair that development should contribute towards the cost of maintaining or upgrading local infrastructure. Denbighshire County Council has not yet implemented a CIL scheme. A bid for CIL would have to be made for flood management/drainage improvements against other competing council priorities.	Unknown	Denbighshire County Council	All measures outlined in the Strategy
Business Rates Supplements	Agreement from local businesses to raise rates for specified purposes.	Unknown	Denbighshire County Council	measures which address flood risk to businesses
Collaborative schemes with other RMA's	There are opportunities for collaborative schemes with other RMAs, although the Water Authority	Unknown	Denbighshire County Council	Key measures in the Strategy

Source of Funding	Description	Indicative budget in 2012/2013	Administered By	To Fund
	has limited scope for allocating funding to schemes outside their capital programme which is usually set several years' in advance; however early discussions and involvement may benefit all parties and the Community.			
Interreg Programmes 2013 - 2020	Interreg Wales Ireland Programme Interreg North West Europe Interreg Atlantic Area To work in partnership with other counties on initiatives involving research, monitoring, awareness raising, developing tools and strategies in flood and coastal erosion.	Unknown	Denbighshire County Council European Section	Revenue based projects
LIFE Programme 2013 – 2020	LIFE Environmental Policy and Governance. To bridge the gap between research and development results and widespread implementation. Information, communication and awareness raising campaigns.	Unknown	Denbighshire County Council European Section	Initiatives that are looking to move from R&D to implementation
Structural Funds Programmes 2013 - 2020	Structural Funds – potentially around climate change adaptation, risk prevention and management.	Unknown	Denbighshire County Council European Section	Potentially medium to large capital projects
Defra	Other funding is being provided by Defra to help some individual homeowners to pay for the cost of installing individual property flood resilience measures in areas that are frequently flooded and do not benefit from community defences. The funding is being administered through the local authorities, reimbursed by the EA. Defra are also funding work to understand and manage the risk from surface water and ground and groundwater flooding.	Unknown	Denbighshire County Council	Installing individual property flood resilience measures

Table 9.2: DCC's possible future funding sources for FCERM

9 Contribution to Wider Environmental Objectives

The main purpose of this report is to set out the strategy for implementing flood risk management measures across Denbighshire. However there is an opportunity to derive significant benefit in the process, in respect to county and country-wide aspirations in the wider context of sustainability, environmental and social improvement. The aim is to provide better environments for residents and businesses as well as improving biodiversity and local habitats for wildlife.

Delivering multiple benefits will require working with partners to identify local priorities and opportunities. Where appropriate, and in line with the principles of the National Strategy, contributions that help to deliver these additional improvements could be sought from those partners that benefit. Higher levels of government funding may also be accessible when wider benefits are delivered as part of the Local Strategy.

The environmental objectives and measures that the Local Strategy will contribute to through the effective management of local flood risk are included below, some of which include Local Strategy objectives and national environmental objectives:

- To reduce the impact and consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;

- To ensure that planning decisions are properly informed by flooding issues and the impact future planning may have on flood risk management and long term developments;

- Improve and/or maintain the capacity of existing drainage systems by targeted maintenance;

- Establish a SuDS Approval Body (SAB);

- The Denbighshire SAB will embrace Welsh Government guidance on the encouragement, adoption and maintenance of SuDS. SuDS are an opportunity to ensure that amenity and biodiversity are considered with the same importance as managing volumes of water;

- Take a sustainable approach to flood risks management balancing economic, environmental and social benefits;

- Water Framework Directive targets (under Article 4.1) which are relevant to this Local Flood Risk Management Strategy include;

  - Ensure no deterioration of surface water and groundwater and the protection of all water bodies (including coastal waters);
  - Achieve ‘good’ ecological status by 2015 for surface water and groundwater;
  - Reduction of pollution and hazardous substances in surface water and groundwater;
  - Reverse any upwards trends of pollutants in groundwater; and
  - Achieve standards and objectives set for protected areas.

- Adopt a holistic approach to drainage solutions;

- Enhance biodiversity and habitat creation within any future capital schemes. These schemes can also be used within urban areas to provide green spaces for amenity;

- Adaptation to climate change through local flood risk management measures, in order to build in community and operational resilience;
- Protect Sites of Special Scientific Interest (SSSIs) within Denbighshire. All flood risk management authorities have a duty (under Section 28G of the Wildlife and Countryside Act 1981) to take reasonable steps to further the conservation and enhancement of SSSIs;
- Ensure no loss or degradation of habitat through flood risk management works to comply with the Biodiversity Action Plan (BAP). As a flood authority, Denbighshire County Council has a duty (under Section 40(1) of the Natural Environment and Rural Communities Act 2006) to conserve biodiversity within Denbighshire;
- Ensure the environmental consequences of implementing the LFRMS are considered against technical, economic and social benefits; and
- The strategy has undergone a thorough assessment against the Strategic Environmental Assessment (SEA) and the Habitats Regulations (HRA).

9.5 The Water Framework Directive

The Water Framework Directive (WFD) is the most substantial piece of EC 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 releases 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 Natural Resources 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 body 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.

9.6 Sustainable Development

9.6.7 One Wales: One Planet

The Welsh Government has a duty to have a 'Scheme for Sustainable Development', setting out how it will promote sustainable development. The current Scheme, One Wales: One Planet[25] was launched in May 2009 and defines sustainable development as:

"Enhancing the economic, social and environmental wellbeing of people and communities, achieving a better quality of life for our own and future generations in ways which:

1. *Promote social justice and equality of opportunity; and*
2. *Enhance the natural and cultural environment and respect its limits - using only our fair share of the earth's resources and sustaining our cultural legacy."*

'One Wales One Planet' says that if every country in the world used as much resources as our own small country, we would need three planets worth of trees, of crops, of oil and so on to survive, and this is increasing. Obviously we can't go on like this and although we are making progress in Denbighshire, there is still more to do.

9.6.8 Guidance to Risk Management Authorities

As required under the Flood and Water Management Act, Welsh Government has published guidance to explain how sustainable development should be applied to flood risk management; *'Sustainable Development: Guidance to Risk Management Authorities Section 27 – Sustainable Development'.*

The guidance states that sustainable development is highly applicable to the Flood and Coastal Erosion Risk Management and requires an approach which delivers four objectives:

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

[25] One Wales : One Planet. The Sustainable Development Scheme of the Welsh Assembly Government, May 2009, http://wales.gov.uk/topics/sustainabledevelopment/publications/onewalesoneplanet/?lang=en

10 Reviewing the Strategy

The Strategy will provide the framework for Denbighshire's delivery of its flood risk management responsibilities and aspirations. Highways & Environmental Services will review the strategy on a regular basis with assistance from other departments to monitor progression on the implementation of the measures. The departments involved will include but not exclusively; Emergency Planning, Planning, Legal, Social Services, Education, and Press.

It is a "living document" which will develop as new information, expertise and resources influence the delivery of the measures outlined in the Strategy. There will also be substantial changes in the next few years, with changes to the planning system and the requirements for sustainable drainage; in the provision of flood insurance; in the funding and design of flood prevention schemes; and with improvements in our knowledge of where the greatest flood risk are within the County. DCC will take account of these changes and consider the implications in respect to the Strategy and make annual on-going adjustments to the Strategy as necessary.

The Strategy has been developed to deliver a short to medium term improvement plan to establish a sound evidence and knowledge base to develop a longer-term investment programme for FRM measures across the region. It is anticipated that the Strategy will become more focussed on the delivery of an affordable and funded capital programme of FRM works in the longer term.

It is proposed that a formal review of the Local Strategy should take place in 2017 following the review of the National Strategy in 2016, and to coincide with the review of the preliminary flood risk assessment as required by the Flood Risk Regulations 2009. The Strategy should then continue to be reviewed every six years in conjunction with the review of the PFRA, unless circumstances dictate a more frequent review.

Stages in Flood Risk Management	Date
Complete first Annual Action Plan to implement the strategy	Winter 2014 & each year thereafter
Publication of Flood Hazard and Risk Maps	December 2013 & each six years thereafter (where appropriate)
Publication of Flood Risk Management Plans and completion of the first cycle of the Flood Risk Regulations	22nd December 2015 & each six years thereafter (where appropriate)
Publication of the second National Flood Risk Management Strategy by the Welsh Government	2016
Review and update of the Denbighshire Flood Risk Assessment (PFRA)	Spring 2017 & each six years thereafter
Complete first formal review of the Denbighshire LFRMS	Spring / summer 2017 & each six years thereafter (or where appropriate)

Table11.1: Timetable for DCC for implementing the LFRMS review

Appendix A

Risk Management Authorities in Denbighshire County

Dee Valley	
Address	Packsaddle Wrexham Road Rhostyllen Wrexham LL14 4EH
Telephone	Leak Line 0800 298 7112 / Emergency 01978 846946
Website	contact@deevalleygroup.com

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

Natural Resources 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@naturalresourceswales.gov.uk
Website	www.naturalresourceswales.gov.uk
Floodline - Phone Number	0845 988 1188 (24 hour service) **Type Talk:** 0845 602 6340

Denbighshire County Council	
Address	Denbighshire County Council County Hall Wynnstay Road Ruthin

	LL15 1YN
Telephone	01824 706101
Fax	01824 706180
Website	www.denbighshire.gov.uk

Welsh Government	
Address	Sustainable Places Welsh Government Cathay's Park Cardiff CF10 3NQ
Telephone	(Welsh) 0300 0604400 or 0845 010 4400 (English) 0300 0603300 or 0845 010 3300 (International Enquiries) (+44) 1443 845500
e-mail	FloodCoastalRisk@wales.gsi.gov.uk
Website	www.wales.gov.uk