



# Executive Summary

## Context

Flood risk is addressed within the context of the Regional Development Strategy and regional planning policy statement 15. It is imperative to consider flood risk when aiming to accommodate future growth across all the council area, as it can act as a major constraint on existing and future development, result in the loss of life and destroy buildings.

Flood risk management in the past has largely been based on flood defence and flood warning. With climate change, and predictions of more intense rainfall and stormier weather in summer months, wetter winters and rising sea levels, we are likely to experience damaging floods more frequently and intensely. Recent years has seen an increase in the need for modern approaches and well co-ordinated, sustainable actions to deal with the threat of increased flood risks to society.

A strategic approach to flood risk should be adopted by considering the council catchment as a whole, ensuring new development is not exposed unnecessarily to flooding, whilst having regard to the cumulative effects of existing development within the city boundary.

### *Land Zoning:*

When determining land for zoning, council should adopt a precautionary approach and thus avoid developing land which has been identified as being at risk of flooding.

### *Multi-faceted approach:*

Flood Management collaboration is being implemented between local councils, statutory departments / organisations (e.g.; DAERA, DfI, Rivers Agency and NI Water) and support services within the public and private sector. It is proposed these partnerships work together on agreed programmes such as Living with Water Programme, to protect against flooding, enhance the natural environment and facilitate economic growth.

The Dept. for Infrastructure is the responsible department for flood management in N Ireland from May 2016.



Evidence Base	Social, Economic & Environmental Factors
<ul style="list-style-type: none"> <li>• Belfast is ranked as 1<sup>st</sup> in areas as potential for flood risk across NI. 9,800 properties are potentially at significant risk of flooding from rivers.</li> <li>• Significant portions of the city lie within flood plains</li> <li>• Fluvial, pluvial and tidal are main methods of flooding in Belfast area.</li> <li>• Watercourses: Contribute to the overall flood risk: River Lagan, Connswater River incl. tributaries (Knock River &amp; Loop River) in the east, in the west, the Blackstaff and Clowney rivers (incl. tributaries).</li> <li>• Trends indicate promotion of natural and man-made drainage as a critical element of design; and support their use for future design.</li> <li>• Complement Flood Risk Management Plans.</li> <li>• EU Flood Risk Directive provides an opportunity to fully implement sustainable flood management. The directive provides a platform to change the way we deal with flooding across the city and promote sustainable flood resilience measures.</li> </ul> <p><i>Key Areas:</i></p> <ul style="list-style-type: none"> <li>• Steer appropriate development to areas of lowest flood risk, without increasing elsewhere;</li> <li>• Promote SUDS in policy and future development.</li> </ul>	<ul style="list-style-type: none"> <li>• Planning policy should promote drainage as a critical element of design, and support the use of SuDs for future development.</li> <li>• Job creation opportunities – green infrastructure.</li> <li>• Improve Flood Resistance and Resilience in high Flood Risk Areas.</li> <li>• Flood risk awareness, and the potential impact of flooding for businesses, appears to be limited.</li> <li>• Flood protection can be implemented into new green space linked to City Centre Regeneration and Investment Strategy, whilst promoting habitat creation helping mitigate flood risk.</li> <li>• Public Health – Severe injury or death from flooding</li> </ul>

Flood Management	Coastal Development
<ul style="list-style-type: none"> <li>• Flood management is important in striking a balance between Belfast’s sensitive environmental location, and its role as the major economic driver for the region.</li> <li>• Prevention of damage caused by floods by avoiding construction of houses and industries in present and future flood-prone areas or by adapting future developments to minimise the risk of flooding.</li> <li>• Protection by taking measures to reduce the likelihood of floods and/or the impact of floods in a specific location such as restoring flood plains, wetlands.</li> <li>• Promote natural flood mitigation schemes</li> </ul>	<ul style="list-style-type: none"> <li>• Belfast Coastal Area – Falls under Marine Special Protection Area needs protection from coastal squeeze, to safeguard against loss of distinctive habitats and climate change.</li> <li>• The Marine and Coastal Access Act 2009 and the Marine Act (NI) 2013 require the DoE, as the NI Marine Plan Authority, to prepare and adopt marine plans that would manage the NI marine area and contribute to its sustainable development.</li> <li>• Recognise that some types of development require coastal locations: ports, marinas, industries and recreational projects. During the zoning of land within the development of the plan appropriate land(s) should be zoned for such uses.</li> <li>• Promote the economic, social and environmental coastal assets whilst preserving and protecting.</li> <li>• Provide supplementary guidance for coastal development, which supports the sustainable growth of marine, aquaculture, tourism, fishing and other economic development opportunities.</li> </ul>

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# 1.0 Introduction

## Purpose of this document

- 1.1 This is one of a series of 17 topic papers which have been put together to inform the Sustainability Appraisal Scoping Report for the Belfast Local Development Plan (LDP).
- 1.2 Each topic paper provides a summary of the evidence base required for the Sustainability Appraisal, Preferred Options Paper and Local Development Plan. They establish a baseline position and identify the key issues that need to be addressed.
- 1.3 By combining the evidence gathering stages for both the Sustainability Appraisal and Local Development Plan, we aim to streamline the documentation produced and avoid duplication. It will also help to ensure that sustainable development is embedded in the planning process and that sustainability appraisal is one of the main drivers informing the preparation of the Local Development Plan.
- 1.4 Each topic paper can be read separately but, inevitably, there are important related matters in other topic papers and background evidence.

## Member Workshops

- 1.6 A series of 17 Topic Papers were drafted in the early part of 2016 to provide elected members with baseline information to inform the preparation of the Local Development Plan. As such the information presented within this topic paper is intended to:
  - Build the capacity of the members to make informed planning decisions, particularly within the plan making context;
  - Provide baseline information which will inform Development Plan Policy making at a local level;
  - Consider the Settlement Hierarchy within the new Belfast Local Government District;
  - Assess the land use needs of a growing population within the Belfast City Council area and to consider the adequacy of the existing growth strategy; and
  - To link with important ongoing work in relation to the development of a Community Plan (the Belfast Agenda) and other strategic work being undertaken by the Council.
- 1.7 These papers were presented to members for discussion at a series of informal workshops with Planning Committee Members throughout the Spring 2016, with key issues and opportunities for the City identified for consideration.
- 1.8 The original Topic paper entitled 'Planning and Flood Risk (Incl. Coastal Development)' was presented at a workshop on 21 April 2016. It has since been updated to ensure the statistics referenced are up to date for publication alongside the Preferred Options Paper.
- 1.9 A general approach to flood risk management in the past has largely been based on flood defence and flood warning. With climate change, and predictions of more intense rainfall and stormier weather in summer months, wetter winters and rising sea levels, we are likely to experience damaging floods more frequently and intensely. In recent years there has

seen an increase in the need for modern approaches and well co-ordinated, sustainable actions to deal with these increased flood risks to society.

- 1.10 The Local Plan should aim to outline and evaluate how flood risk can be addressed within the context of the Regional Development Strategy and regional planning policy. It is imperative to consider flood risk when aiming to accommodate growth across all the council area, as it can act as a major constraint on development or establish the need for a new development.

## Flooding Oversight

- 1.11 Flooding is a natural process that cannot be entirely prevented. Some areas across the city are already susceptible to intermittent flooding from various sources, principally from;
- Rivers / watercourses, (fluvial)
  - Coastal
  - Surface water runoff. (pluvial / ponding)
- 1.12 With regard to flood risk and addressing all phases of flood risk management cycle, there are three main areas to focus upon:
- **Prevention** of damage caused by floods by avoiding construction of houses and industries in present and future flood-prone areas or by adapting future developments to the risk of flooding;
  - **Protection** by taking measures to reduce the likelihood of floods and/or the impact of floods in a specific location such as restoring flood plains, wetlands, and gullies, and;
  - **Preparedness** such as providing instructions to the public on what to do in the event of flooding. ( flood warnings /community flood action plans, flood evacuation protocols )
- 1.13 The Flood Risks Directive provides the platform to fully implement sustainable flood management within Belfast council area. Such an approach can help deliver cost effective and sustainable solutions, protecting vulnerable homes and businesses from flooding, whilst also benefiting environment and biodiversity within the city.
- 1.14 The Flood Risk Management Plans for Northern Ireland have been produced to comply with the requirements of European Union Directive on managing Flood Risk (2007/60/EC) (Floods Directive) as transposed to local legislation through The Water Environment (Floods Directive) Regulations (Northern Ireland) 2009
- 1.15 The Flood Risk Management Plans highlight the flood hazards and risks in the 20 most Significant Flood Risk Areas in Northern Ireland from flooding from rivers, the sea, surface water and reservoirs. The Plans identify the measures that will be undertaken over the next 6 years and they set out how the relevant authorities will work together and with communities to reduce the flood risks.

## 2.0 Policy Context

### European / National Policy

#### European Union Floods Directive

- 2.1 The European Union Directive on the Management of Flood Risks (the 'Flood Risks Directive') was agreed in April 2007.
- 2.2 The new Directive places more emphasis on non-structural measures (soft engineering techniques) such as using natural flood plains and wetlands to store water during floods, and makes flood management a key part of river basin management process under the Water Framework Directive.
- 2.3 The Flood Risks Directive provides an opportunity to fully implement sustainable flood management in Northern Ireland. This European legislation, offers the chance to change the way we deal with flooding in Belfast and surrounding areas and make our approach to flood resilience more sustainable.
- 2.4 The Directive will require Member States to:
  - i) Undertake a preliminary flood risk assessment,
  - ii) Develop flood hazard and flood risk maps and;
  - iii) Produce flood risk management plans for zones at risk of flooding.

### Regional Policy

- 2.5 The **Regional Development Strategy 2035** (RDS) recognises the need to avoid, where possible, the selection of flood prone land for employment and housing growth. It urges the planning system to adopt a precautionary approach to development in areas of flood risk and the use of the latest flood risk information that is available in order to properly manage development.

#### **The RDS Policy RG12: - Promote a more sustainable approach to the provision of water and sewerage services and flood risk management.**

- Changes in population distribution, household formation, urban development, and our lifestyles continue to put increased pressure on our water resources and drainage systems. Climate change will also have an impact on our water environment, with potentially increased flood events from drainage systems, rivers, the sea and surface water run-off. The planning for the provision of water and sewerage infrastructure and treatment facilities is both a practical and environmental necessity for regional development.
- **Integrate water and land-use planning.** Land-use planning should be informed by current water and sewerage infrastructure and future investment programmes. This will involve close cooperation between planning authorities and the water industry in the preparation of local development plans and long-term water strategies.
- **Encourage sustainable surface water management.** Greater use of Sustainable Drainage Systems (SuDS) should be encouraged, particularly as part of significant development proposals. SuDS provide a water quality benefit and if designed appropriately can help control flows into rivers and drains thereby reduce the risk of



flooding. All new urban storm water drainage systems should incorporate measures to manage the flow of waters which exceed design standards (exceedance flows) in order to help protect vulnerable areas.

## **Planning Policy Statement 15 (Revised): Planning and Flood Risk: September 2014**

- 2.6 In Northern Ireland, Planning Policy Statements have statutory basis under Article 3 of the Planning (Northern Ireland) Order 1991, and are intended to formulate and co-ordinate policy for securing the orderly and consistent planning of the development of land. Flood planning policy in Northern Ireland is dictated by the requirements of Planning Policy Statement (PPS15), which aims to:
- Prevent development within the Q100 fluvial (river) floodplain and Q200 (coastal) floodplain;
  - Protect existing flood defences;
  - Protect developments from flooding from overland (surface water) sources;
  - Prevent unnecessary culverting or closing of existing open river channels
- 2.7 Development is not permitted within floodplains unless the development satisfies one of a number of exception criteria – such as being classed as strategic infrastructure.
- 2.8 The primary aim of this PPS is therefore *to, 'prevent future development that may be at risk from flooding or that may increase the risk of flooding elsewhere'*<sup>1</sup>.

## **Addendum to Planning Policy Statement 7: Safeguarding the Character of Established Residential Areas: August 2010**

### *Policy LC 3 Permeable Paving in New Residential Developments*

- 2.9 "Favourable consideration will be given to using permeable paving within new residential developments as a means of reducing the risk of flooding associated with surface water run-off.
- 2.10 Where appropriate private driveways, patios, paths, and shared hard landscaped surfaces should be built using permeable paving materials."<sup>2</sup> (See appendix 3 – GDO Amended 2011)
- 2.11 Permeable pavements are one method of example of a SuDs scheme that can be easily implemented into a site which can help control the flow and speed of surface water run-off whilst blending into the urban fabric of a new residential development.

### The Role of the Development Plan

- 2.12 "The preparation of the development plan will enable council to develop and enhance working relationships and build on synergies with those bodies and groups directly involved at the forefront of both flood management and flood awareness. The development plan itself will aim to identify, develop and promote opportunities to create a more sustainable lead society which balances how land can be future developed without creating negative externalities, which may increase the risk of flooding elsewhere.

<sup>1</sup> PPS 15 (Revised): Planning and Flood Risk; Dept of Environment - September 2014

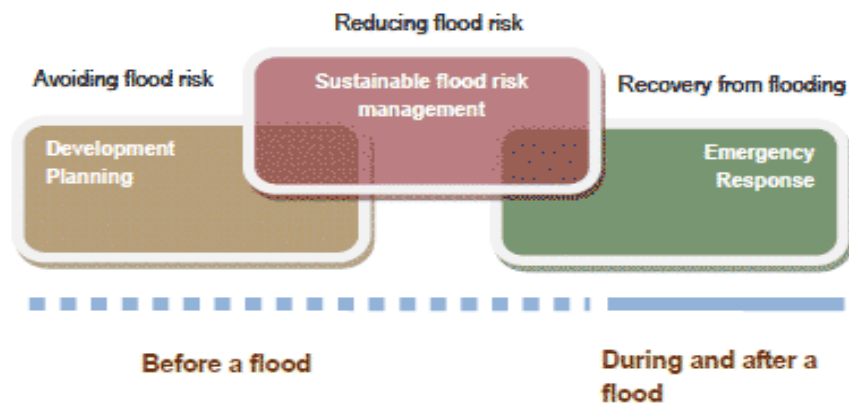
<sup>2</sup> PPS 7 Addendum to Planning Policy: Safeguarding the Character - August 2010

2.13 Within the last number of years there has been greater worldwide emphasis and significance associated when developing local development plans and fully incorporating flood risk management. The European Union Floods Directive provides a new approach to assessment and management of flood risks. “<sup>3</sup>

The floods directive basically prescribes a three-step procedure:

- First step: *Preliminary Flood Risk Assessment*
- Second step: *Risk Assessment*
- Third step: *Flood Risk Management Plans*

**Figure 1: Flood Management Process Flowchart**



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### **Strategic Planning and Policy Statement (SPPS) – DoE September 2015**

2.14 The aim of the **Strategic Planning Policy Statement** in relation to flood risk is to prevent future development that may be at risk from flooding or that may increase the risk of flooding elsewhere. The plan itself will aim to identify, develop and promote opportunities to create a more sustainable lead society which balances how land can be future developed without increasing the risk of flooding elsewhere.

2.15 The Strategic Planning Policy Statement on Flood Risk is a requirement established by the European Union Floods Directive. It confirms that development can increase the consequences of flooding and identifies the important role of the Local Plan in zoning land so as to reduce the risks and impacts of flooding. The Directive highlights the fundamental importance of preventing or restricting new development in flood prone areas. The Directive also recognises the role of the planning system in regulating new development in existing built up areas so as to afford greater protection to people and property, where this is considered appropriate and commensurate with the flood risk.

2.16 The Strategic Planning Policy Statement requires flood risk to be managed by adopting a precautionary approach to the identification of land for development through the LDP process and the determination of development proposals, in those areas susceptible to flooding where there is a lack of precise information on present day flood risk or future uncertainties associated with flood estimation, climate change predictions and scientific evidence;

<sup>3</sup> PPS 15 (Revised): Planning and Flood Risk; Dept of Environment - September 2014

<sup>4</sup> [www.gov.scot/Publications/2011](http://www.gov.scot/Publications/2011)

2.17 The policy also aims to:

- manage development in ways that are appropriate to the four main sources of flood risk in Northern Ireland, i.e. fluvial, coastal, surface water and water impoundment (reservoir) breach or failure;
- seek to protect development that is permitted within flood risk areas by ensuring that adequate and appropriate measures are employed to mitigate and manage the flood risks;
- promote sustainable development through the retention and restoration of natural flood plains and natural watercourses as a form of flood alleviation and an important environmental and social resource;
- promote sustainable development through encouraging the use of sustainable drainage for new development and redevelopment / regeneration schemes;
- promote public awareness of flood risk and the flood risk information that is available and of relevance to undertaking development; and
- promote an integrated and sustainable approach to the management of development and flood risk which contributes to:
  - The safety and well-being of everyone,
  - The prudent and efficient use of economic resources,
  - The conservation and enhancement of biodiversity, and
  - The conservation of archaeology and the built heritage.

2.18 The Local Development Plans has to consider:

- Development in River (Fluvial) and Coastal Flood Plains
- Development in Proximity to Reservoirs
- Protection of Flood Defence and Drainage Infrastructure
- Artificial Modification of Watercourses

2.19 The Plan must use the latest Flood Risk Information produced by the Department for Infrastructure and work in collaboration with relevant Departments, adjacent councils, and agencies. It must take account of the potential risks from flooding over the plan period and beyond as this is likely to influence decisions on such matters as the zoning of land for development or the designation of land for open space use. The Plan should also promote sustainable drainage within the plan area, for example by requiring such solutions, where appropriate to individual zonings, as a key site requirement.

**Figure 2: Photo of Belfast Laganside after a flood event**



## **The Water and Sewerage Services Act (Northern Ireland) 2016**

- 2.20 The Water and Sewerage Services Act (Northern Ireland) 2016 received Royal Assent and came into operation on 23 March 2016.
- 2.21 From the 23rd May 2016 any person proposing to connect a sewer or a lateral drain to a public sewer will require written approval to connect on the basis of a mandatory Sewer Adoption Agreement.
- 2.22 The Agreement will be subject to three conditions.
- Condition One specifies that the agreement should set out the standards to which the sewers, lateral drains and works are to be constructed;
  - Condition Two sets out provisions as to the adoption of the sewers, lateral drains and works, and
  - Condition Three states that the agreement must be accompanied by an adequate bond security provided for the discharge of the obligations imposed under the agreement.
- 2.23 Clause 4 of the Water Act provides a definition of sustainable drainage systems for dealing with surface water from premises, and provides the power to adopt specified SuDS structures.
- 2.24 The 2016 Act places a requirement for SuDS to be considered and constructed where appropriate and for NI Water to refuse surface water connections to a public sewer.

The approval for surface water run-off from development will be under the responsibility of the water course management section of the new Department of Infrastructure. With the exception of tidal estuaries and coastal waters, green field run-off should be considered as a normal starting point for design of development surface water drainage systems.

- 2.25 NI Water will accept the design standards based on the CIRIA SuDs Manual C753 published in November 2015. It covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments.

## **Sustainable Water – A long Term Strategy for Northern Ireland**

- 2.26 While development of the strategy has been led by the Department for Regional Development (now DfI), the document itself was informed by all water stakeholders. The key stakeholders responsible for helping to prepare the Long-Term Water Strategy were NI Water, Rivers Agency, NIEA, DARD and DRD.
- 2.27 The Strategy presents an over arching approach to help facilitate implementation of a range of initiatives aimed at delivering the long term vision to have a sustainable water sector in Northern Ireland.
- 2.28 The document was published on 25<sup>th</sup> March 2016 and has been endorsed by the NI Executive.
- 2.29 One of the key aims and principles of the document is 'Principle 4 – Flood Risk Management', which supports what is said within SPPS, which is that flooding cannot totally be eliminated, but it is important that it is sustainably managed to help protect social, economic and environmental development.

2.30 Part 3 of the document – ‘Flood Risk Management and Drainage’, makes a number of recommendations to be considered when local development plans are to be produced. 5 aims within

- *Deliver Sustainable Flood Resilient Development*
- *Manage the Catchment to Reduce Flood Risk*
- *Provide Sustainable Integrated Drainage in Rural and Urban Areas*
- *Improve Flood Resistance and Resilience in high Flood Risk Areas*
- *Be Prepared for Extreme Weather Events*<sup>5</sup>

## Local Policy Context

### Belfast Metropolitan Area Plan (BMAP) 2015

- 2.31 The BMAP is a development plan prepared under the provisions of Part 3 of the Planning (Northern Ireland) Order 1991 by the Dept of Environment. The plan itself identifies zones for retail, residential and commercial development across the council areas of Belfast, Lisburn and the Borough Council areas of Carrickfergus, Newtownabbey and North Down.<sup>6</sup>
- 2.32 The plan was adopted on 9<sup>th</sup> September 2014. On Friday 11<sup>th</sup> March 2016 a High Court judge ruled that Northern Ireland environment minister Mark H Durkan had no legal power to approve the Belfast Metropolitan Area Plan 2015 (BMAP). A decision on a remedy to the case will be taken at a later date.
- 2.33 Volume 2 of BMAP 2015 sets out the policies of Belfast district ( parts of Volume 3 and Volume 5; Lisburn and Castlereagh would also be applicable under RPA : Review of Public Administration ). The policies within are in general conformity with the Regional Development Strategy (RDS).
- 2.34 BMAP outlines within the Plan Strategy & Framework Volume 1, page 97 that the Rivers Agency should be consulted on land use development proposals which are likely to impact on watercourses and flood plains.
- 2.35 The plan also identifies a number of previously recorded flood areas which affect particular settlements within the plan area:
- River Lagan towards Lisburn.
  - Ravernet River
  - Ballygomartin River
  - River Enler
  - Loop River
  - Forthriver
  - Three Mile Water
  - Six Mile Water<sup>7</sup>

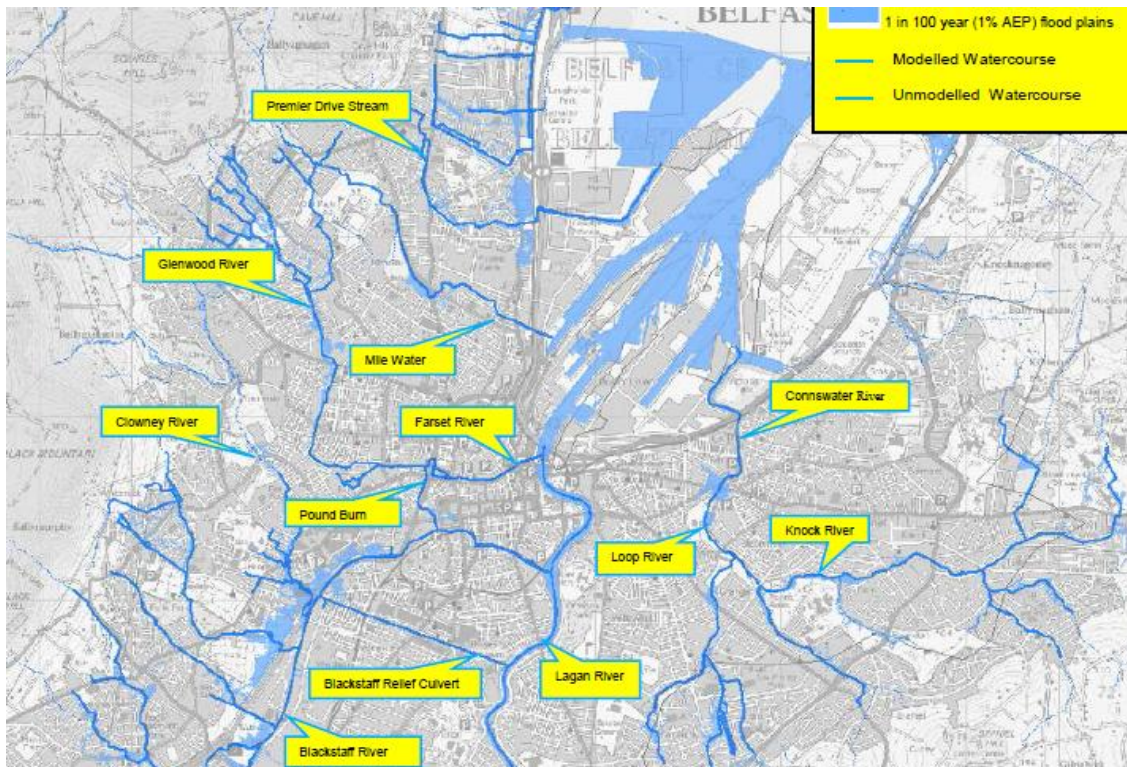
<sup>5</sup> Sustainable Water – A long Term Strategy for Northern Ireland : DRD– p66-90

<sup>6</sup> [www.planningni.gov.uk/index/policy/dev\\_plans/devplans\\_az/bmap\\_2015.htm](http://www.planningni.gov.uk/index/policy/dev_plans/devplans_az/bmap_2015.htm)

<sup>7</sup> BMAP -Technical Supplement 6: Urban Environment



**Figure 3: Watercourses of Belfast: Source DARD – Rivers Agency Dec 2015**



2.36 The policy also points to a Strategic Flood Map (NI), stored on the Rivers Agency website, which indicate portions of Belfast City Centre lie within or adjacent to a coastal flood plain. Planning applications in any of these areas must be accompanied with a FRA ( Flood Risk Assessment ) with a focus on resilience and resistance.

2.37 Developers are advised to consult at an early stage regarding future proposals with NI Water and Rivers Agency to ensure flooding or flood plain issues that may affect specific sites within the plan area do not pose flood risks or would result in increasing flood risk to any other sites.

### **Living with Water Programme – ( DfI and NI Water )**

2.38 This document provides an overview on the programme of work called 'Living with Water Programme', which is being progressed to develop solutions that will make up the Strategic Drainage Infrastructure Plan.

2.39 The aim of the Living with Water Programme will be to deliver a drainage plan for Belfast to protect against flooding, enhance the environment and enable the economy to grow

2.40 The drainage infrastructure of many towns and cities across N Ireland, including Belfast is currently inadequate, this has resulted in :

- Instances of serious flooding across N Ireland occurring with increased frequency
- Belfast Harbour area falling from moderate to bad within the WFD classification
- The main WwTW (Waste water treatment works) serving Belfast is above its theoretical design capacity.

- 2.41 The need for cross-sectoral approaches to develop optimum solutions that can be efficiently delivered. DRD ( Now under DfI ) and NI Water set up a Strategic Drainage Infrastructure board in January 2015 with representatives from key stakeholders.

### 3.0 Flood Risk

- 3.1 Flooding is a natural process that cannot be entirely prevented. Some areas are already susceptible to intermittent flooding from various sources, principally from rivers, the sea or surface water runoff. Climate change is generally expected to increase flood risk, albeit that there remains much uncertainty as to the degree of climate change that will occur and the implications for particular areas of Northern Ireland.
- 3.2 The effects of flooding on human activity are wide ranging. Floods have the potential to cause fatalities and injury, displacement of people, pollution and health risk, damage to buildings, adverse environmental impacts and to severely compromise economic and social activities.
- 3.3 Climate change will have a significant impact with extreme weather resulting in flooding of properties and infrastructure (DEFRA, 2012. UK Climate Change Risk Assessment: Climate Change Risk Assessment for Northern Ireland). The predictions of more intense rainfall and stormier weather in summer months, wetter winters rising sea levels and storm surges, we are likely to experience damaging floods more frequently and intensely. Significant areas of the city lie within flood plains, of the River Lagan Basin with its tributaries.
- 3.4 Belfast is located within the River Lagan Catchment, and on the mouth of Belfast Lough, a coastal estuary. Within the Lagan Catchment there are a number of smaller tributary rivers flowing from the surrounding hills into the city to the River Lagan and Belfast Lough, all of which have the potential to flood during periods of heavy prolonged rainfall. Belfast is also at risk from flash floods caused by storm water unable to drain away quickly into the combined storm and sewerage network. Much of Belfast storm drainage and sewerage network was built in the late 19<sup>th</sup> and early 20<sup>th</sup> century, with the proposed expansion of the City the current capacity of the network will be exceeded, potentially increasing the risk of flooding. Within the last ten years there have been five significant flood events in Belfast which has caused considerable disruption for property owners. The effects of flooding on human activity are wide ranging, with the potential to cause fatalities and injury, displacement of people, pollution and health risk, damage to buildings, adverse environmental impacts and to severely compromise economic and social activities.

The most recent notable floods to occur in Belfast in recent years being:

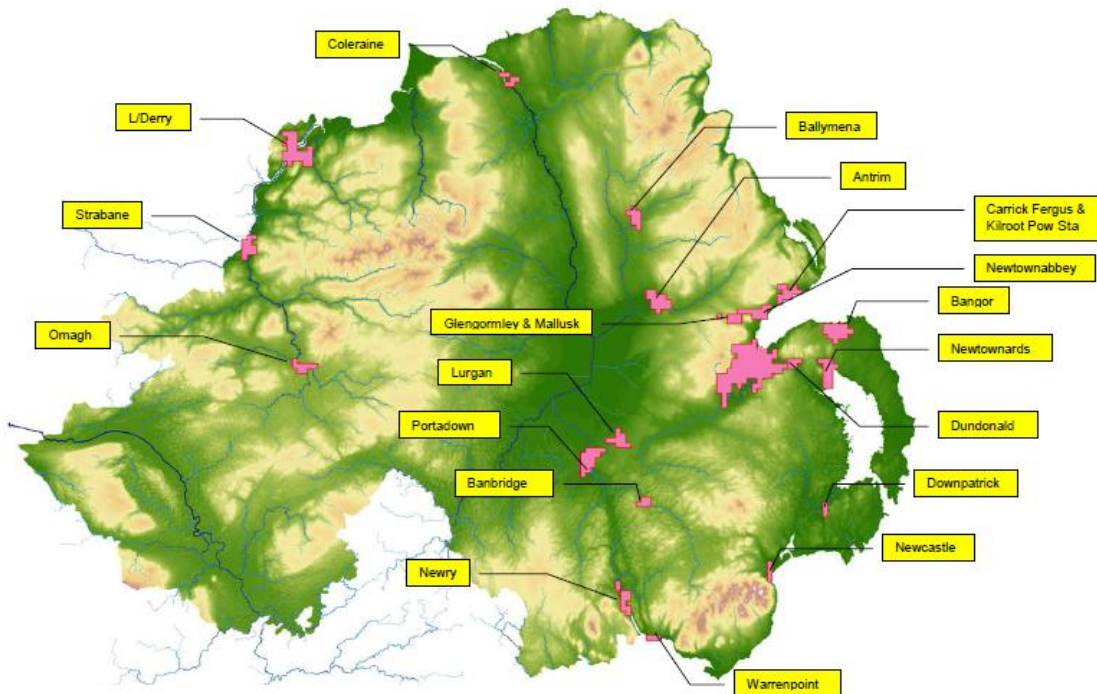
#### 27<sup>th</sup> June 2012:

- 44mm of rain fell in less than 3 hours
- Over 1400 properties flooded
- Areas affected: Finaghy area ( Locksley Park, Sicily Park, Priory Park, Ashton Park, Greystown, Orchardville )

#### 3<sup>rd</sup> January 2014:

- Triggered a major strategic response from government and statutory departments
- The tide peaked at 2.75 OD (a few cm from breaching various sections of walls and embankments, which act as a form of coastal flood defence).
- Would have caused catastrophic affects to Belfast's low lying city centre.

**Figure 4: Belfast is within the top 20 identified flood risk areas across the region**



3.5 In Belfast with regards to flood risk:

- It is estimated that up to '9,800 properties are potentially at significant risk of flooding from rivers in the Belfast area.
- Approximately 6,000 of this number would be at risk of flooding from both rivers and the sea, and almost all of these are located within the floodplain of the tidally influenced lower reaches of the River Lagan.'<sup>8</sup>
- Significant portions of the city lie within flood plains

3.6 The Local Development Plan will take account of the potential risks from all sources of flooding over the plan period and beyond as this is likely to influence decisions on such matters as the zoning of land for various uses including residential or economic development. The Local Development Plan should avoid zoning sites for development in flood risk areas.

## Flood Mapping

3.7 There are a number of Flood Maps that will be used in the preparation of the Plan

- Surface Water Flooding

<sup>8</sup> [www.infrastructure-ni.gov.uk/sites/default/files/publications/dard/north-eastern-frmp.PDF](http://www.infrastructure-ni.gov.uk/sites/default/files/publications/dard/north-eastern-frmp.PDF) p90



- Coastal Flooding
- River Flooding

3.8 DARD published its Flood Risk Management Plans in December 2015. The documents can be viewed on the DARD website.<sup>9</sup> *(Maps attached at the end of the paper)*

3.9 The maps were produced as a requirement under the EU Floods Directive, with the goal to provide a holistic, structured approach to the management of flood risk and to be used as correlation analysis that can help inform decision regarding future flooding matters.

3.10 A common reference in flood risk is the 100 year flood, also known as the 1% flood. This essentially means that in any given year there is a 1% chance a flood risk area will flood.

3.11 There are three different kinds of flooding shown on the Flood Maps (surface water, rivers and the sea). The table below indicates the probability of a flood event from occurring annually.

1%	AEP = 1 in 100 year event	Greater rainfall event
2%	AEP = 1 in 50 year event	
5%	AEP = 1 in 20 year event	
10%	AEP = 1 in 10 year event	
20%	AEP = 1 in 5 year event	
50%	AEP = 1 in 2 year event	
100%	AEP = Happens every year	Lesser rainfall event

## Flood Resilience Measures

3.12 As Belfast intensifies development within the city, there risk is that more water runs rapidly into rivers and less filters through soil. This can lead to localised flooding and water pollution. A new approach is required to deal with the overland flow and slow down the speed in which precipitation occurs thus avoiding flash flooding. Sustainable Urban Drainage Schemes (SUD) provides an alternative approach. Rather than seeing water in the built environment as a threat, we should take the opportunity to develop a green and blue infrastructure network in the City, integrating SUD's that will deliver effective drainage while at the same time avoiding increased flood risk. It will manage rainfall to mimic natural drainage and minimise adverse impacts on water quality. SUD can contribute to the amenity and aesthetic value of the development, as well as enhancing biodiversity. Permeable paving within developments can also help aid in which water filters through the paved structure rather than running off it.

3.13 Innovative designs to mitigate and adapt to flood risk will need to be considered to as part of the City's flood resilient measures. There should be a focus on retro-fitting existing properties which can help mitigate flooding as well as temporarily retain rainfall i.e. rain gardens and bio-swales, to help address flash flooding. Designs of buildings should also fully recognise flood levels across the city and finished floor levels should be set above the worse case design flood levels to mitigate risk.

3.14 Increased flood events from drainage systems, rivers, the sea and surface water run-off. Changes in population distribution, household formation, urban development, and our

<sup>9</sup> [www.dardni.gov.uk/publication/flood-risk-management](http://www.dardni.gov.uk/publication/flood-risk-management)

lifestyles will put increased pressure on the drainage systems. There is a necessity to integrate water and land-use planning to mitigate flood risk. Land-use planning should be informed by the current North East flood risk management plans. The Council will take a strategic approach to minimise flood risk through engagement and sharing information with adjoining local councils; Antrim and Newtownabbey, Lisburn and Castlereagh and North Down and Ards. This joined up approach is crucial as flooding and the risks can cover council boundary lines.

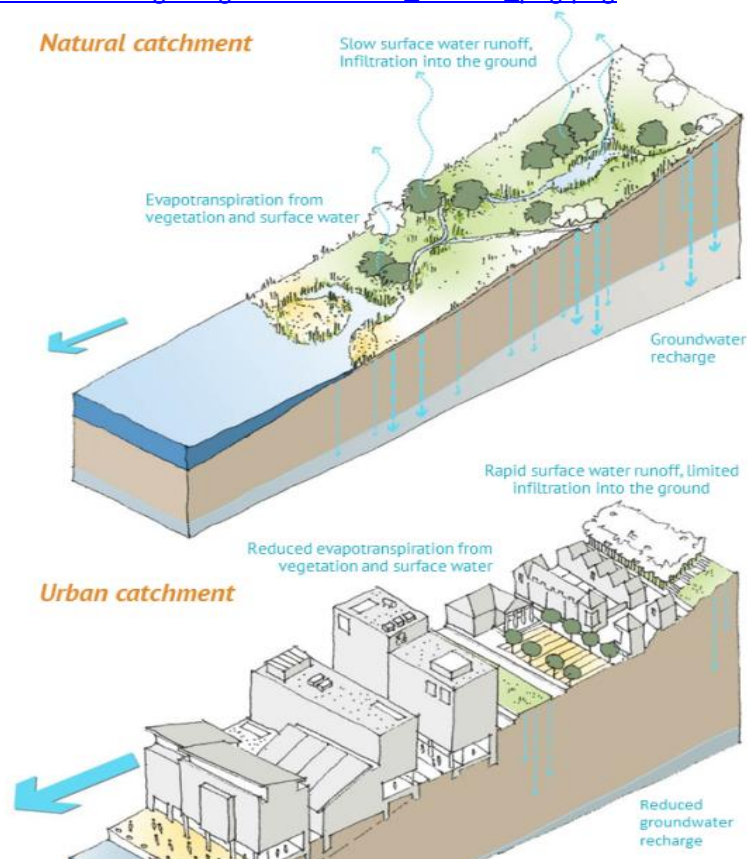
## Flood Resilience Aims

3.15 Through the Local Development Plan:

- When zoning land for large developments, surface water schemes should be designed to help meet the future drainage needs within the council area. A typical example could be a retention pond to manage stormwater runoff for a residential development to prevent flooding downstream.
- Future planning policies should require and promote that SuDs are the preferred option for proposals at design stage to address flood risk. Examples include, green roofs, permeable paving, soakaways, ponds and wetlands. It is worth noting that SuD schemes alone will not be able to address all flood risk concerns, there will be a need for assisted schemes and management practices all acting in a holistic approach.
- Scientific evidence from a wide range of sources supports the view that tree-planting in upland and lowland areas can help minimise flood risk as part of a wider solution in sustainable natural flood management measures. Therefore, planning policy should promote and require this as a natural flood risk mitigation measure.
- Educate all sections of community into the understanding of the applicability and positive externalities SuDS can provide within the urban fabric economically, socially and environmentally.

**Figure 5: Urban Growth adds pressure on surface water run-off outlets**

Source: [http://www.susdrain.org/images/catchments\\_resized\\_png.png](http://www.susdrain.org/images/catchments_resized_png.png)



## Planning Positively for Green and Blue Infrastructure

- 3.16 “Green infrastructure” is describes as a network of multi-functional green space that is capable of delivering a wide range of environmental, biodiversity enhancement and quality of life benefits for local communities.
- 3.17 The Local Development Plan will facilitate the development of an extensive network of natural heritage, open spaces and green areas which combine to form a single green infrastructure resource or ecosystem services capable of serving many functions and benefits. Green Infrastructure is important for many reasons including recreation, amenity, biodiversity, active transport, flood prevention, health and well-being. It is a fundamental component for the creation of sustainable communities to adapt the effects of climate change, protecting biodiversity, to respond to the healthy living agenda and the need to safeguard vital ecosystem services. It also provides business, employment, and educational opportunities; encouraging tourism; and promoting sustainable use of scarce land resources.
- 3.18 Green infrastructure should be designed to be multi-functional. A single piece of land can offer opportunities for play and adventure, store water during heavy rainfall, provide habitat for wildlife, and improve residential amenity by offering high quality landscaping that complements the built environment.
- 3.19 The creation of green continuous networks in the city will contribute to climate adaptation in cooling the city and the collection of storm water. A green continuous network will consist of trees, green roofs and walls, gardens and green courtyards, green planting on roadsides. New green continuous networks would include green wedges i.e. Lagan Valley Regional Park, or corridors between the city’s parks and nature areas i.e. Connswater Greenway, or green continuous city spaces, where cyclists, pedestrians, rainwater and urban nature share the space.
- 3.20 Cities struggle to cope with flash floods of the sort we are likely to see more of with climate change resulting in problematic runoff. Effective planning of the green and blue infrastructure network will help reduce the flood risk to people and property. Green spaces next to rivers and streams create natural flood plains where water flows and can be stored when it floods. Trees and other plants process rainwater (through interception, evaporation and transpiration) to reduce flows., or bioretention. Sustainable drainage can help reduce the risk from surface water flooding particularly in high risk areas; a 10% increase in green infrastructure on a site can see a 5% reduction in surface water runoff. All new urban storm water drainage Sustainable drainage systems (SuDS) can be integrated into green corridors and spaces; these can include rain gardens for “Bioretention” which are relatively small depressed areas designed to retain water for a short time in order to slow down and reduce storm runoff peaks, as well as reduce pollution. Swales, or bioswales, are shallow ditches with a slight gradient, designed to filter and absorb water as it flows slowly downhill. This downhill flow is what distinguishes them from rain gardens systems should incorporate measures to manage the flow of waters which exceed design standards (exceedance flows) in order to help protect vulnerable areas. Green roofs, rain gardens and swales can help in the most basic fashion by holding onto large quantities of water. More engineered solutions can also store water for subsequent reuse in a closed loop system.

## Green Infrastructure Case Study

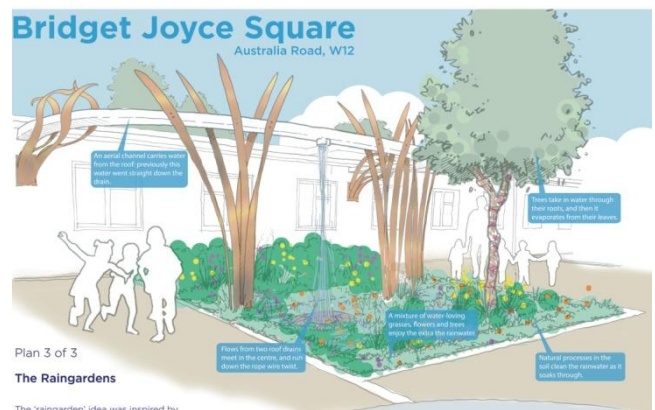
Location:

Bridget Joyce Square (Australia Road), White City, London

### *The Project.*

The project is located between a school and two playgrounds in the heart of White City, London. The previous road and parking formed a hazard for children crossing the road and made school drop-off and pick-up difficult.

**Figure 6: Site pre-construction - <sup>10</sup>**

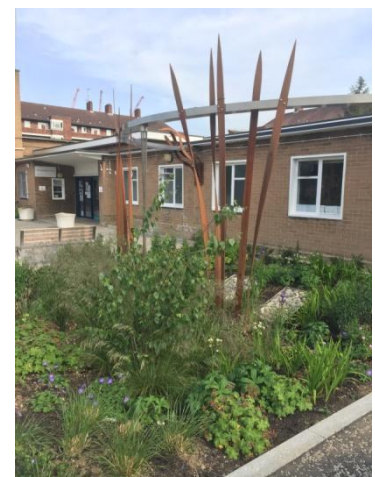
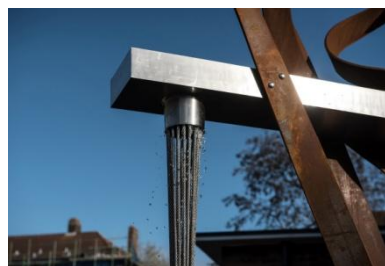


### *The Outcome:*

The scheme created an urban public park through the use of traffic restrictions, new surfacing, new elements of green infrastructure and street furniture that forms a valuable community resource whilst helping to reduce the area's contribution to flooding. The park is designed to provide a dedicated setting for community events, such as festivals, fairs and markets, and to provide an attractive and safe social space for informal, daily community use with improved access to the school and playground. The scheme also provides connectivity and a safer pedestrian passageway.

Annual flow volumes into the combined sewer overflow have been reduced by 50%.

**Figure 7: Photos of the site once complete**





### SuD Examples: (See Appendix D showing various options)

<i>Vegetative Engineering</i>	<i>Soft engineering</i>	<i>Hard engineering</i>
Filter strips	Infiltration trenches	Permeable pavement
Swales	Detention Ponds	Geocellular systems
Bioretention areas	Retention Ponds	Oversized sewers
Constructed wetlands		
Green roofs		
Tree pits		

## Coastal Development

- 6.1 At 650km in length, the coast of Northern Ireland is relatively short - yet it supports an exceptional diversity of marine wildlife and their habitats. The coast, and the seas around it, includes highly productive and biologically diverse ecosystems, with features which serve as critical natural defences against storms, floods and erosion. A number of species and habitats are recognised as internationally important and the majority of the coastline is protected for its special interest. This dynamic area supports tourism, agriculture, recreation, aquaculture, inshore fisheries, industry, commercial harbours and quays, as well as being used for waste disposal and power generation.
- 6.2 The RDS recognises that the Belfast Coastal Area (BCA) needs to be protected from coastal squeeze, to safeguard against loss of distinctive habitats and adapt to climate change. The Strategic Planning Policy Statement (SPPS) aims in regards to the coast reinforce what is stated within the RDS that any development within the coastal area should be highly sensitive the environmental surroundings.
- 6.3 The Marine and Coastal Access Act 2009 and the Marine Act (Northern Ireland) 2013 require the Department of the Environment, as the Northern Ireland Marine Plan Authority, to prepare and adopt marine plans that would manage the Northern Ireland marine area and contribute to its sustainable development.
- 6.4 The composition of the Northern Ireland marine area, as defined by section 2 of the Marine Act (Northern Ireland) 2013 and section 322 of the Marine and Coastal Access Act 2009, means that legislatively there will be two marine plans in Northern Ireland -that is, one for its inshore region (out to 12 nautical miles) and another for its offshore region (an area beyond 12 nautical miles). However, for administrative and practical purposes, the intention



is that these two marine plans will be combined into a single document to establish a “single” marine plan for Northern Ireland.

- 6.5 The interaction between the land and sea planning systems is important. Terrestrial planning extends to the Mean Low Water Mark while marine planning and licensing extend to the Mean High Water Mark. Therefore, the requirement to work effectively together to achieve harmonisation is recognised and the Local Development Plan will have to be cognisant of the emergence of the Marine Plan for Northern Ireland.

### **BMA Coastal Area**

- 6.6 The designated BMA Coastal Area follows the coastline of Belfast Lough and extends to the Low Water Mark, including the narrow strips of coast between the High Water Mark and the Low Water Mark with the exception of the designated urban included in the BMA Coastal Area, it contains many environmentally sensitive areas, and also listed buildings and scheduled monuments with an industrial heritage value. Any development for employment and port related activities within the harbour area will need to take these factors into account.

Policy COU 3 - *BMA Coastal Area* states that within the BMA Coastal Area, planning permission will only be granted to development proposals which meet the following criteria:

- the proposed development is of such national or regional importance as to outweigh any detrimental impact on the coastal environment; or
- it can be demonstrated that any proposal will not harm the qualities of the coastal landscape, while still protecting nature conservation value.

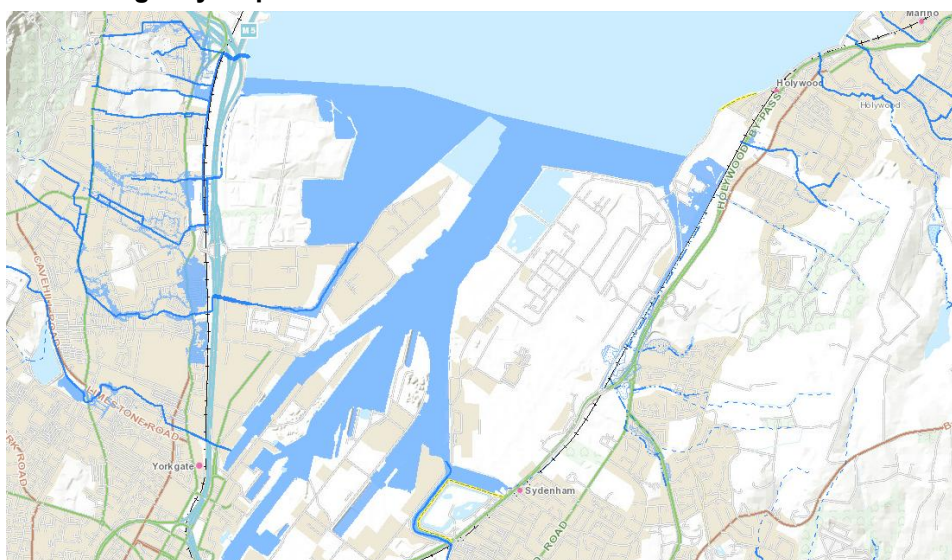
- 6.7 The Coastal Area can be considered into 3 sections:

- Blackhead Cliffs to Carrickfergus;
- Carrickfergus to Belfast; and
- Belfast to Bangor to Orlock

### **Marine Strategy Framework Directive through the Marine Policy Statement (MPS)**

- 6.8 The Marine Strategy Framework Directive was formally adopted by the European Union in July 2008. It provides the legislative framework for an ecosystem approach to the sustainable management of the marine environment. The Marine Policy Statement (MPS) was published in 2011 and was prepared and adopted under the Marine and Coastal Access Act 2009. The MPS provides the policy framework for the marine planning system and aids decision making on plans affecting the marine environment.

**Figure 8: River Agency Map: view of Belfast Council's Coastline**



- 6.9 LDPs recognise that some types of development require coastal locations, such as ports, marinas, port-related industries and recreational projects. Therefore, during the zoning of land within the development of the plan appropriate land(s) should be zoned for such uses.
- 6.11 The plan should also identify areas of the coast that are known to be at risk from flooding, coastal erosion (or land instability) where new development should not be permitted.
- 6.12 Aims and Objectives:
- Promote the economic, social and environmental coastal assets whilst preserving and protecting;
  - Inform new coastal development policy in the Local Development Plan;
  - Provide detailed supplementary guidance for coastal development, which supports the sustainable growth of marine renewable, aquaculture, tourism, fishing and other economic development opportunities

## 4.0 Issues and Approaches

### Summary of Key Issues

- 4.1 The purpose of this paper has been to provide an overview of aspects relating to flood risk and coastal development of the new Council area. The information can be used to help determine land use zoning types within the Local Development Plan.
- 4.2 It is clear that Belfast faces complex challenges and opportunities in addressing flood risk in future years. A strategic approach to flood risk should be adopted by considering the council catchment as a whole, ensuring that new development is not exposed unnecessarily to flooding, whilst having regard to the cumulative effects of existing development within the city boundary.
- 4.3 Floods impact on both individuals and communities, and have social, economic, and environmental consequences. The consequences of floods vary greatly depending on the location, speed and extent of flooding, and the vulnerability and value of the natural and constructed environments they affect.
- 4.4 Flooding of urban areas can result in significant damage to private property, including homes and businesses. Losses occur due to damage to both the structure and contents of buildings. Insurance of the structure and its contents against flooding can reduce the impacts of floods on individuals or companies.
- 4.5 The paper has helped indicate that significant parts of the city are vulnerable to flooding are lie within designated flood plains. For the city to function, it is critical for appropriate development to be steered to areas of lowest flood risk, without increasing elsewhere across the city. Flood management is important in striking a balance between Belfast's sensitive environmental location, and its role as the major economic driver for the region.
- 4.6 It is therefore suggested that the following findings emerging from this topic paper will be critical for the development of the LDP:
  - (i) The new plan should complement Flood Risk Management Plans. <sup>11</sup>
  - (ii) The local plan should steer appropriate development to areas that are of the lowest flood risk, without increasing the risk elsewhere. A sequential risk based approach to policy should be developed to minimise flood risk.
  - (iii) Planning policy should promote drainage as a critical element of design, and support the use of SuDs for future development.
  - (iv) Careful consideration of areas identified at being of highest risk from coastal and fluvial (rivers) flooding, through policy that supports mitigation measures to reduce the overall level of flood risk through appropriate application of SuDs and other types of drainage systems.
  - (v) Careful consideration of zoning for development in areas that have been identified as being at risk of flooding either on the Strategic / Hazard / Climate Change Flood maps.

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<sup>11</sup> [www.dardni.gov.uk/publications/flood-risk-management-plans](http://www.dardni.gov.uk/publications/flood-risk-management-plans)



4.7 As previously discussed, there will be the need to consider where best to steer appropriate development to areas within the city that are of the lowest flood risk, without increasing flood risk elsewhere.

- Flooding has the potential to threaten life and cause substantial damage to property, in order to try and minimise flood risk across the city, good planning and management measures should fully take account of future land allocation within the local development plan.

### **Justification**

4.8 The Local Development Plan must address flood risk and take a precautionary approach to identification of land for development through the plan process and the determination of development proposals. There is a need to work collaboratively within a multi-agency framework in order to respond to flooding and associated risks.

4.9 A strategic approach to flood risk should be adopted by considering the council catchment area as a whole, ensuring that new development is not exposed unnecessarily to flooding, whilst having regard to the cumulative effects of existing development within the city boundary.

4.10 The local plan should also set a framework for more site-specific flood risk assessments, controlling development within flood risk areas, considering opportunities to facilitate the relocation of development, and for the incorporation of measures to address flood risk from all new developments such as sustainable urban drainage systems.

4.11 It is therefore important that planning policies provide a framework to ensure that flood risk to people and property is not increased as a result of development.

4.12 In bringing forward the plan, consideration should be given to the promotion and integration of lands drainage as a critical element of design, and support the use of SuDs (Sustainable Urban Drainage Design Schemes) for future development.

- Future planning policies should require and promote that SuDs are the preferred option for proposals at design stage to address flood risk. Examples include, green roofs, permeable paving, soakaways, ponds and wetlands. It is worth noting that SuD schemes alone will not be able to address all flood risk concerns, there will be a need for assisted schemes and management practices all acting in a holistic approach.

### **Justification**

4.13 The Local Development Plan should promote drainage within all elements of design to ensure a proactive approach towards flood risk and help alleviate risks and concerns.

4.14 Innovative designs to help address flood risk will be encouraged and promoted that will act as part of flood resilient measures. There should also be a focus on retro-fitting existing properties which can help temporarily retain rainfall in helping to address flash flooding. Designs of buildings should also fully recognise flood levels across the city and finished floor levels to be set above the worse case design flood levels.

4.15 There needs to be a focus on seeking to identify and protecting a citywide Green Infrastructure Network. A designated an extensive Green Network of community greenways and green wedges, based around the main linear, semi-natural features that dissect the city

would be of great benefit to Belfast. A connected city with green networks and linkages can help promote the health of a city whilst promoting the reduction in congestion levels. This can help play a small part in reducing greenhouse emissions, thus helping mitigate against flooding. Sites in the Green Infrastructure Network could be protected from development seriously adversely affecting its continuity and value.

- 4.16 New development should be required to incorporate green infrastructure features as part of the design, which includes green roofs and walls, roof gardens, sustainable urban drainage systems (SuDS), tree and hedgerow planting, and creating safe accessible links with neighbouring green space.
- 4.17 In recognition of the vital contribution Green Infrastructure could make to the City, it is proposed to set a standard for the provision of accessible open space, which is that no person should live more than 400 metres or 5 minutes walk from their nearest area of accessible open space

### **Justification**

- 4.18 In carrying forward the BMAP policy of protecting a citywide Green Network of Community Greenways, Open Spaces, Natural Heritage and Green Wedges. It would be a mechanism to be protected from development which adversely affects its continuity and value. This approach could be a positive way to plan for an integrated green infrastructure in the city.
- 4.19 This enables development proposals to incorporate existing and/or new green infrastructure features within their design (such as green roofs, SUDS, trees, etc. It allows green infrastructure improvements to be considered at an early stage of the design process and considered to be a sensible route to securing green infrastructure and green network improvements across the city. Development proposals within, or in close proximity to, a Green Network corridor should enhance the functionality and connectivity of the corridor.
- 4.20 As a city there is a need to recognise the huge contribution that a Green Infrastructure Network should make to the City, and supports the retention and enhancement of important parks, open spaces, playing fields, woodlands, allotments, community gardens, large tracts of countryside, landscape features of hills, and valleys, as well as many other areas that constitute green infrastructure. Areas of 'blue space', such as river corridors, wetlands and waterways are also intrinsic elements of green infrastructure. The provision of additional open space and green areas where appropriate will be required as part of new developments. However improved access to green spaces will not always be appropriate, for example to sensitive areas that could be damaged through disturbance. Limited releases of open space for development could only be considered in exceptional circumstances where the loss would not result in detriment to the overall green infrastructure provision and there is scope for improving the quality of provision elsewhere.
- 4.21 In recognition of the vital contribution open spaces make to the City it is the intention to set a standard for the provision of accessible open space which is provisionally proposed to be that no person should live more than 400 metres or 5 minutes walk from their nearest area of accessible open space.
- 4.22 In proposing the provision of an accessible open space standard, it may help to achieve an appropriate level of accessible open space provision throughout the City.
- 4.23 This information contained within this topic paper has been used to inform the next stage of the LDP process, the Preferred Options Paper.

# Table of Figures

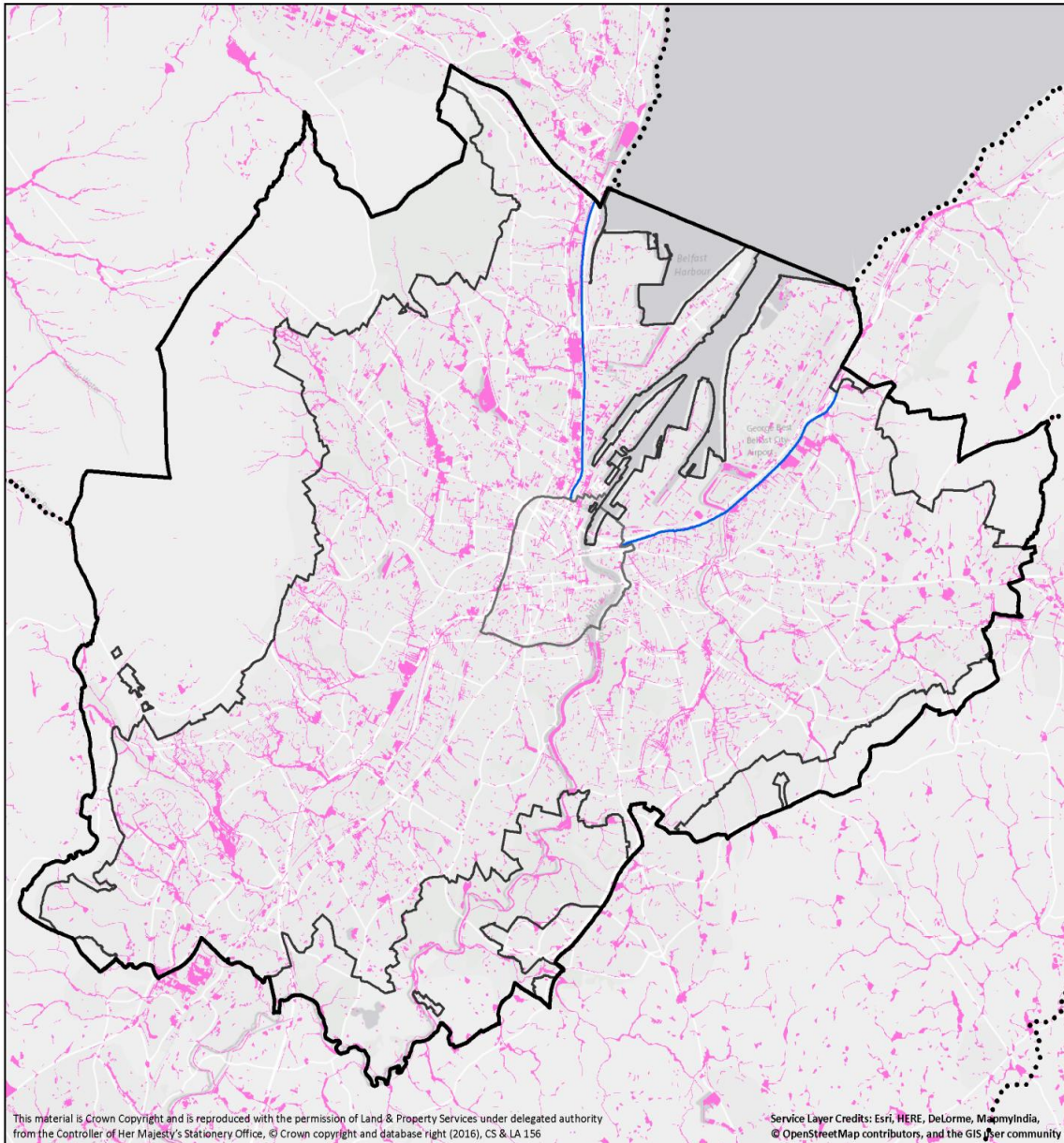
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# Appendix A: Flood Hazard Map – Surface Water



**Belfast**  
City Council

FLOOD RISK AND  
COASTAL DEVELOPMENT



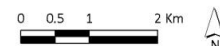
## Flood Hazard Mapping - Surface Water

### Climate Change - Surface Water:

 Surface Water (I200CC)

Source: Mapping and Modelling Unit, Rivers Agency

-  Council Area
-  Metropolitan/Settlement Development Limit
-  Belfast City Centre
-  Belfast Harbour Area

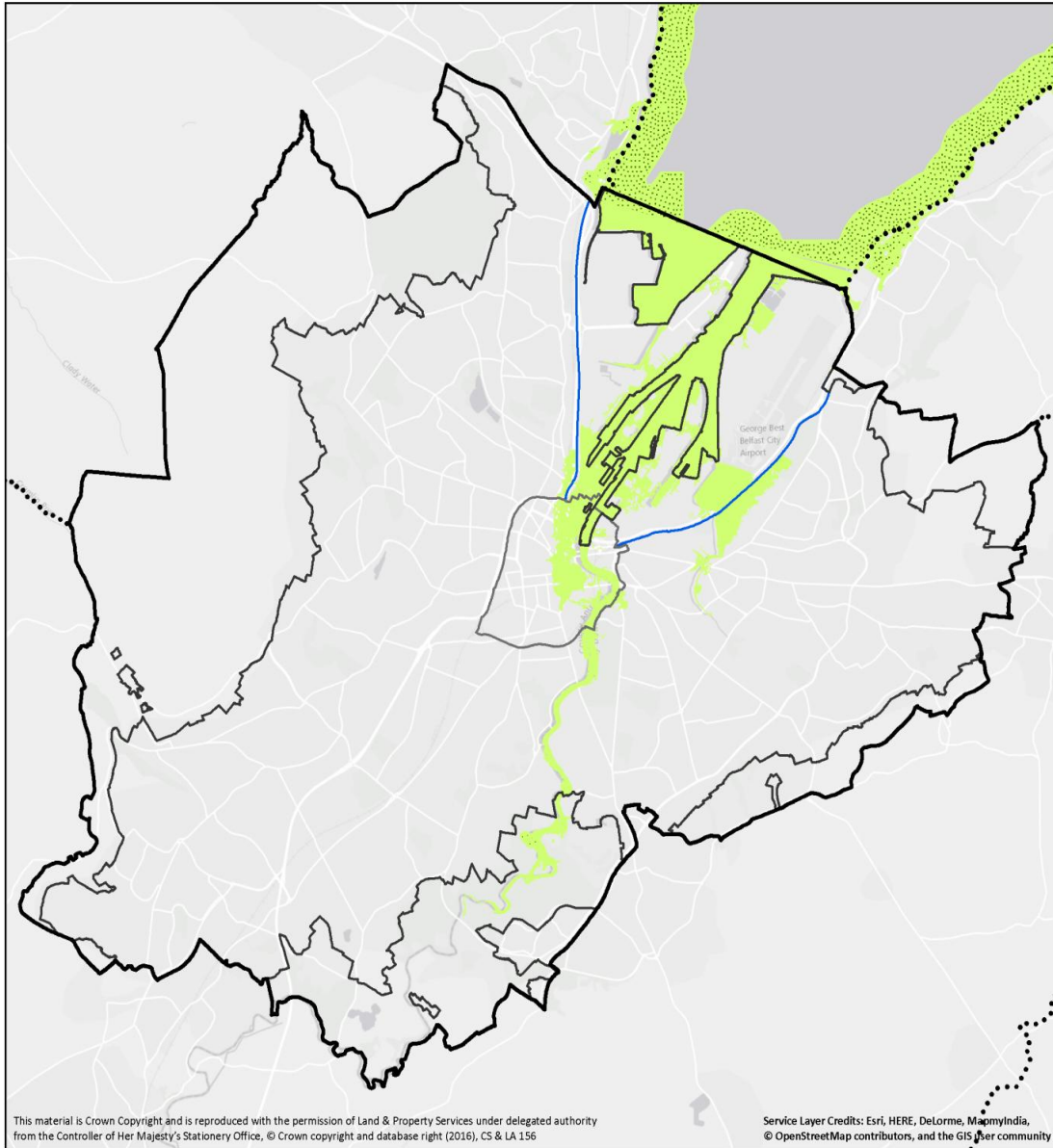


# Appendix B: Flood Hazard Map – Coastal / Tidal



**Belfast**  
City Council

FLOOD RISK AND  
COASTAL DEVELOPMENT



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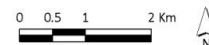
### Flood Hazard Mapping - Sea

#### Climate Change - Floodplain Sea:

- Floodplain Detailed (T200CC)
- Floodplain Strategic (T200CC)

Source: Mapping and Modelling Unit, Rivers Agency

- Council Area
- Metropolitan/Settlement Development Limit
- Belfast City Centre
- Belfast Harbour Area



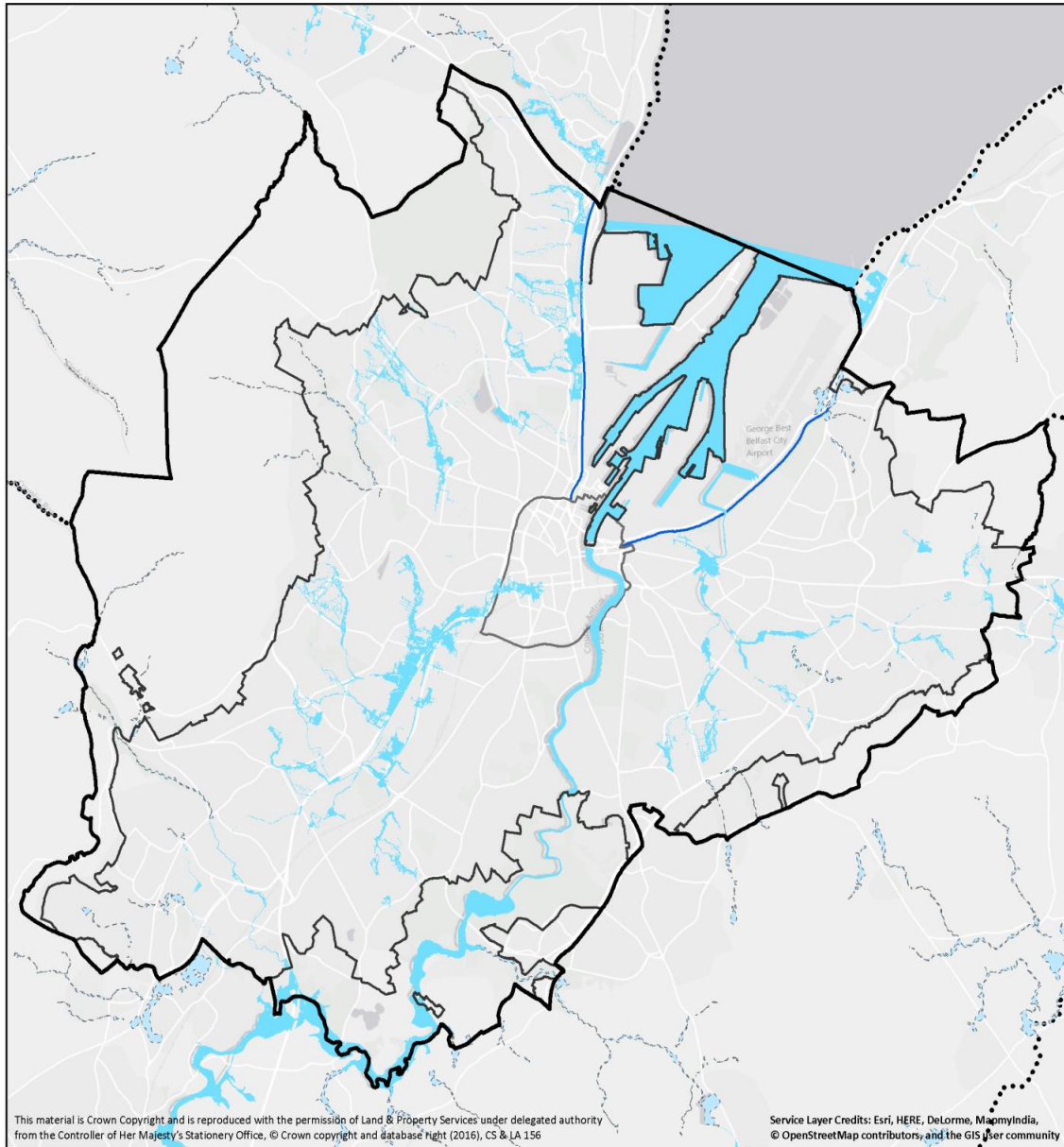


# Appendix C: Flood Hazard Map – Rivers



**Belfast City Council**

FLOOD RISK AND COASTAL DEVELOPMENT



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## Flood Hazard Mapping - Rivers

### Climate Change - Floodplain Rivers:

Floodplain Detailed (Q100)

Floodplain Strategic (Q100)

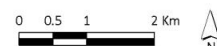
Council Area

Metropolitan/Settlement Development Limit

Belfast City Centre

Belfast Harbour Area

Source: Mapping and Modelling Unit, Rivers Agency



## Appendix D: Illustrations of SuD Scheme Examples



Retrofitted tree garden / tree pit



Rainwater harvest system



Example of a Swale, Olympic Stadium, London



Linear pocket park <sup>12</sup>

<sup>12</sup> [www.susdrain.org/case-studies/](http://www.susdrain.org/case-studies/)



## Appendix E: Flood Risk Vulnerability Classification

Essential Infrastructure	<ul style="list-style-type: none"> <li>• Essential transport infrastructure (including mass evacuation routes), which have to cross the area at risk.</li> <li>• Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations; and water treatment works that need to remain operational in times of flood.</li> <li>• Wind turbines.</li> </ul>
Highly Vulnerable	<ul style="list-style-type: none"> <li>• Police stations, Ambulance stations, Fire stations, Command Centres and telecommunications installations required to be operational during flooding.</li> <li>• Emergency dispersal points.</li> <li>• Basement dwellings.</li> <li>• Caravans, mobile homes and park homes intended for permanent residential use.</li> <li>• Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "Essential Infrastructure")</li> </ul>
More Vulnerable	<ul style="list-style-type: none"> <li>• Hospitals.</li> <li>• Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.</li> <li>• Buildings used for: dwelling houses; student halls of residence; drinking establishments; nightclubs; and hotels.</li> <li>• Non-residential uses for health services, nurseries and educational establishments.</li> <li>• Landfill and sites used for waste management facilities for hazardous waste.</li> <li>• Sites used for holiday or short-let caravans and camping, <b>subject to a specific warning and evacuation plan.</b></li> </ul>
Less Vulnerable	<ul style="list-style-type: none"> <li>• Police, ambulance and fire stations, which are <b>not</b> required to be operational during flooding.</li> <li>• Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in 'more vulnerable'; and assembly and leisure.</li> <li>• Land and buildings used for agriculture and forestry.</li> <li>• Waste treatment (except landfill and hazardous waste facilities).</li> <li>• Minerals working and processing (except for sand and gravel working).</li> <li>• Water treatment plants, which do <b>not</b> need to remain operational during times of flood.</li> <li>• Sewage treatment plants (if adequate measures to control pollution and manage sewage during flooding events are in place).</li> </ul>
Water-compatible Development	<ul style="list-style-type: none"> <li>• Flood control infrastructure.</li> <li>• Water transmission infrastructure and pumping stations.</li> <li>• Sewage transmission infrastructure and pumping stations.</li> <li>• Sand and gravel workings.</li> <li>• Docks, marinas and wharves.</li> <li>• Navigation facilities.</li> <li>• MOD defence installations.</li> <li>• Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.</li> <li>• Water-based recreation (excluding sleeping accommodation).</li> <li>• Lifeguard and coastguard stations.</li> <li>• Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.</li> <li>• Essential ancillary sleeping or residential accommodation for staff required by uses in this category, <b>subject to a specific warning and evacuation plan.</b></li> </ul>

13

This classification is based partly on Defra/Environment Agency research on Flood Risks to People (FD2321/TR2) and also on the need of some uses to keep functioning during flooding.

<sup>13</sup> Technical Guidance to the National Planning Policy Framework ; March 2012 : Department for Communities and Local Government