

2. RIVER SUIR CATCHMENT FLOOD RISK MANAGEMENT PLAN

2.1 Plan Objectives

Flood risk in Ireland has historically been addressed through the use of structural or engineered solutions to existing problems, such as the implementation of flood relief schemes to protect areas already at risk. In line with internationally changing perspectives, the Irish Government adopted a new policy in 2004 that shifted the emphasis in addressing flood risk towards:-

- A catchment based context for managing risk;
- More pro-active risk management, with a view to avoiding or minimising future increases in risk; and
- Increased use of non-structural flood impact mitigation measures.

Catchment Flood Risk Assessment and Management Studies (CFRAMS) and Catchment Flood Risk Management Plans (CFRMPS) are the core of this new national policy for flood risk management and the strategy for its implementation. These studies have been developed to meet the requirements, of the EU Directive on the assessment and management of flood risks which was adopted in October 2007 (the 'Floods Directive'). This directive was transposed into Irish law in March 2010 (S.I. No. 122 of 2010).

The 'Floods Directive', which is aimed at reducing and managing flood-related risks to human health and life, the environment, cultural heritage, economic activity and infrastructure and links closely to the implementation of the Water Framework Directive, will require EU Member States to develop a preliminary Flood Risk Assessment including flood risk maps for all river basins/catchments.

North Tipperary County Council, South Tipperary County Council, Kilkenny County Council, Limerick County Council, Waterford County Council, Waterford City Council and the Office of Public Works (OPW) have identified the Suir Catchment as a pilot project due to existing flood risk. Furthermore the potential for increased future flood risk also exists due to drivers and pressures such as climate change and ongoing development in the area.

As a pilot project of the OPW's CFRAM Programme, the specific objectives of the Suir CFRAMS are to:-

- Assess the flood risk to the catchment as a whole body both now and in the future;
- Identify how future land use and climate change may increase the risk of flooding;
- Carry out a Strategic Environmental Assessment (SEA), to ensure that environmental issues and opportunities for enhancement are considered;
- Consider potential options to manage the flood risk including both structural and non structural measures;
- Develop an economically, socially and environmentally appropriate long-term strategy (Catchment Flood Risk Management Plan, CFRMP) to manage the flood risk and help ensure the safety and sustainability of communities in the Suir Catchment; and

- To comply with the requirements of the European Directive on the Assessment and Management of Flood Risk.

The following objectives of the Suir CFRAMS will help to produce the Catchment Flood Risk Management Plan (CFRMP):-

- Collection and Analysis of data relevant to flooding within the study area;
- Identification and condition assessment of flood defence assets;
- Managing and undertaking surveys required for the assessment;
- Analysis of the hydrology of the River Suir Catchment;
- Hydraulic analysis of the main river channel and significant tributaries;
- Development of flood hazard and flood risk mapping;
- Development and appraisals of possible flood risk management measures and determination of an appropriate flood risk management options;
- Strategic Environmental Assessment to evaluate at the earliest possible stage the environmental constraints, opportunities, impacts and consequences which the plan may have; and
- Preparation of Suir CFRMP.

2.2 Environmental Objectives

The environmental scoping report is part of the SEA process. The purpose of this report is to describe the environmental characteristics of the Suir Catchment and present our initial understanding of the key environmental issues relating to flood risk and its management within the catchment. It proposes a framework of draft environmental objectives to inform the identification and assessment of flood risk management options and subsequent selection of appropriate preferred options.

The main draft environmental objectives of the plan are:-

- Reduce flood risk to people, property and the environment;
- Protect human health, safety and employment by minimising the effects of flooding on key community services, sectors and infrastructure;
- Support the achievement of good ecological status/potential under the EU Water Framework Directive; and
- Promote sustainable land use.

Other environmental objectives are listed below:-

- Maintain and enhance where possible biodiversity, flora and fauna particularly at areas of designated environmental importance;
- Assist in achieving favourable status by 2020 for species and habitats of special conservation interests;
- Maintain and enhance where possible angling facilities;
- Protect and enhance where possible landscape and townscape character and visual amenity;
- Protect and enhance where possible features of archaeological and cultural heritage;
- Enhance public access through walkways and cycle paths;
- Promote the principles of sustainable development;
- Enhance natural functioning of the floodplain to achieve a diverse river profile; and
- Reduce vulnerability to the impacts of climate change and maintain flexibility for future responses.

2.3 Study Location

The River Suir Catchment drains an area in the southeast of the county of approx. 3,520 km², which represents about 4% of the land area of Ireland. At 183km, the Suir is the second longest river in Ireland. It is a wide river ranging from 25-35m in its middle sections. The main channel of the Suir and its tributaries flow mainly through counties Tipperary, Kilkenny and Waterford which form part of the South Eastern River Basin District. Very small pockets of the catchment are within County Limerick and County Cork (See **Figure 2-1** in Appendix A: 'Main Populated Areas and Main Rivers').

The River Suir rises in the Devils Bit mountains near Moneygall (north of Templemore), and flows in a southerly direction until meeting the Knockmealdown mountain range where the river changes its course northwards. At Knocklofty, the River turns east passing north of the Comeragh Mountains and continues on through Waterford City until it enters the sea at Waterford Harbour. The river is tidal to a point upstream of Carrick-on-Suir.

There are a number of tributary sub-catchments of the main channel including those of the, Drish, Upper Clodiagh (Thurles), Multeen, Ara, Aherlow, Tar, Nier, Anner, Lingaun, Portlaw Clodiagh, Blackwater and a number of smaller tributaries including the Mall, Arglo, Fidaghta, Glenary and the Glen.

The dominant land use within the catchment is pasture with significant amounts of coniferous forestry; considerable areas of arable and peat bog are also present in. Forestry cover within the Suir is approximately 10% (Forest Service, 1998). Several of the Suir major sub-catchments (Aherlow and Tar) along with certain sections of the main channel are heavily forested.

2.4 Flooding History

The most recent flood event within the Suir Catchment was in 2009 where in particular Waterford City, Clonmel and Ardfinnan were affected by flooding. Waterford City was also impacted on the 27th of October 2004, where a 40 year flood occurred due to a number of combining factors including; high spring tides, strong south easterly winds and persistent heavy rain. The flood event caused problems in the following areas of the city: The Quay, Tramore Road, Poleberry, Newtown Road, Waterside, Bath St Link Road and Tramore Road/Ivory Lodge.

The town of Clonmel suffered severe flooding during November 2000; peak flood levels came within 70mm of the highest recorded level of the 20th Century (1946) and surpassed the more recent severe floods of 1996 and 1997, by over 25mm.

The initial flooding occurred due to the overflowing of the Auk, the Whitening and Boulic stream (all tributaries) and followed by the Suir itself throughout the following two days. Over two hundred properties were seriously damaged, with a further 60 properties affected. Over 40 households were evacuated. The entire Old Bridge section of Clonmel was closed to traffic, along with the Dungarvan Road, Waterford Road, Rasheen Road, the Quays, all three bridges and various other streets throughout the town. Flood events also occurred in 2004 and 2008. Plate 2-1 and 2-2 below provides an illustration of the extent of flooding in Clonmel during the 2004 and 2008 flood events.

Plate 2-1: Flooding on Convent Road, Clonmel 2004



Plate 2-2: Flooding Quay Street, Clonmel, 2008

The December 1968 flood in Clonmel was the worst in living memory. The flood frequency analysis undertaken on Hydrometric Station 16004, Thurles (the nearest station) indicated that the December 1968 flood has about a 40 year return period.

A flood study was carried out by E.G Pettit & Co for Clonmel Borough Council and the OPW. The report outlined a solution to the current flooding problem in Clonmel that involves work on the existing embankments and quay walls, flood relief measures as part of this scheme are currently in progress. Other flood relief schemes recently completed or underway within the Suir Catchment include:-

- Carrick on Suir-Scheme completed;
- Waterford City-Scheme proposed; and
- Templemore- Scheme proposed.

Table 2-1 below provides an overview of some Flood Events within the Suir Catchment.

Table 2-1: Flood Events in the Suir Catchment

Area	Description of Flood Event	Year
Suir Catchment	<p>In November 2009 Ireland was affected by severe flooding. In the Suir catchment flooding occurred in Clonmel, Ardfinnan and Waterford. The following areas in Clonmel flooded:</p> <ul style="list-style-type: none"> • Irishtown • Davis Road • The Quays <p>In Waterford flooding was reported along the Tramore Road and the Quay</p>	
Waterford City	<p>Waterford City suffered a 40year flood event in October 27th 2004. The flood occurred due to a number of combining factors including; high spring tides, strong south easterly winds and persistent heavy rain. The flood event caused problems in the following areas of the city:-</p> <ul style="list-style-type: none"> • The Quay • Tramore Road • Poleberry • Newtown Road • Waterside • Bath St Link Road • Tramore Road/Ivory Lodge 	Oct 2004
South Tipperary	<p>The towns of Clonmel and Carrick on Shannon suffered severe flooding from 1.00pm on Sunday 5th November, 2000 until the morning of Wednesday 8th November, 2000.</p> <p>Peak flood levels came within 70mm of the highest recorded level of this century i.e. 1946 and surpassed the more recent severe floods of 1996 and 1997, by over 25mm.</p> <p>The flooding extended over a wide geographical area of the County. In South Tipperary the river Suir overflowed its banks from Carrick-on-Suir through Kilsheelan, Clonmel, Newcastle, Ardfinnan to Cahir a distance of some 50km.</p> <p>In addition there was widespread flooding caused by the river Anner and other tributaries of the Suir bursting their banks.</p> <p>The flooding caused severe damage to the road infrastructure of the County including damage to bridges on the Glen of Aherlow and Clonmel Area, damage to the N76 at Nine Mile House where a landslide caused the road to be blocked. Private households and businesses suffered hardship and financial loss. Agricultural losses were high as thousands of hectares of prime farmland. Other impacts included school closures, absence from work and loss of business.</p> <p>A total of 184 properties were flooded; 132 residential and 52 commercial.</p>	November 5 th to November 8 th 2000

Area	Description of Flood Event	Year
Clonmel	The December 1968 flood in Clonmel was the worst in living memory. The flood frequency analysis undertaken on Hydrometric Station 16004, Thurles (the nearest station) indicated that the December 1968 flood has about a 40 year return period.	December 1968

While weather conditions are considered a key factor in causing flooding inappropriate land use also contributes including building on flood plains, roads and other infrastructure, inappropriate waste management, forestry practices and inadequate maintenance of rivers.

2.5 Flood Risk Management Strategies

A number of generic flood risk management options were identified during the early stages of the CFRAMS. At this stage this list is not exhaustive and may be added to at a later stage. The implementation of any of these options could be subject to an Environmental Impact Assessment (EIA) and Habitats Directive (Appropriate) Assessment (HDA).

A flood risk management strategy can be either made up of non-structural ('soft' engineering) or structural ('hard' engineering) measures. A flood risk management option consists of one or a number of or a combination of flood risk management measures. **Table 2-2** summarises the potential, structural and non-structural flood risk management measures. The potential significant impacts, opportunities and constraints of each strategy are further discussed in Section 4.1.

Table 2-2: Possible Flood Risk Management Measures

Strategy	Description
Do Minimum	Current flood maintenance practices are kept but no further provisions are put in place. Maintenance of channel and existing defences.
More Proactive	Responding to potential breaches, management of set back, implementing of planning and development controls, inspections of culverts.
Non-Structural Options	
Land Use Management, Planning & Development Control	<p>Zoning of land for flood development, prevention of incremental development etc in order to attenuate flood water with a view to reduce run-off. Introducing Building Regulations (regulations relating to floor levels, flood proofing, sustainable drainage systems and the prevention of reconstruction or redevelopment in flood risk areas). Protecting/flood proofing individual properties.</p> <ul style="list-style-type: none"> • Installation of flood forecasting and warning system; • Development of emergency flood response plans; • Targeted public awareness and preparedness campaign; • Individual property protection/flood resilience; • Sustainable drainage systems; • Mechanisms to control surface water run-off, i.e. filter strips and swales, permeable and porous pavements; • Right to flood agreements with landowners; and • Land use change; and use of wetlands including conservation of existing wetlands and restoration of degraded wetlands;

Structural Options	
New Storage	Constructing a new attenuation unit(s), adding flood plains, detention basins
Existing Reservoirs	Creating additional storage in existing reservoirs.
Defences	Raising existing or constructing new flood defences.
Channel Widening	Widening the river channel.
Altering Structures	Underpinning or raising the soffits of bridges, modifying/removing weirs. Flow diversion in new channel Relocation of properties Overland flows (allowing flooding of roads in a controlled manner).